

**APPENDIX A
WATERSHED MONITORING DATA**

RAINFALL GAUGE DATA

**RAINFALL GAUGE DATA –
LAKE ELSINORE (STATION 067)**

Riverside County Flood Control

HYDAY V129 Output 08/08/2019

Site 067 Elsinore NWS Automatic
 Variable 11.10 Rainfall in Inches, Auto
 Figures are for period ending 08:00

Year 2018/19
 Table Type Rain

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Day
1						0.01	0.03	0.43			0.02		1
2				0.02				0.03	0.27				2
3								0.83	0.11				3
4				0.03				0.06					4
5				0.01				0.39					5
6						0.37	0.45	0.08	0.18				6
7						1.08	0.02	0.01	0.25				7
8			0.02			0.01			0.04				8
9													9
10								0.09					10
11							0.01	0.16					11
12							0.24	0.01	0.41				12
13				0.99			0.06		0.01				13
14				0.28			0.01	1.96					14
15							0.43	1.24					15
16		0.01					0.61	0.09			0.01		16
17							0.13				0.03		17
18						0.01	0.50	0.25					18
19							0.01				0.04		19
20								0.01			0.24		20
21					0.01			0.14	0.26				21
22					0.02			0.25	0.06				22
23					0.01				0.01		0.24		23
24											0.01		24
25		0.04				0.09							25
26											0.01		26
27						0.01					0.10		27
28													28
29					0.06								29
30					0.52								30
31													31
Mean	0.00	0.00	0.00	0.04	0.02	0.05	0.08	0.22	0.05	0.00	0.02	0.00	
Maximum	0.00	0.04	0.02	0.99	0.52	1.08	0.61	1.96	0.41	0.00	0.24	0.00	
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total	0.00	0.05	0.02	1.33	0.62	1.57	2.50	6.02	1.59	0.00	0.68	0.00	

Summaries

----- Notes -----
 All recorded data is continuous and reliable

Annual Mean 0.04
 Annual Total 14.3
 Maximum Minimum
 Daily 1.96 0.00

**RAINFALL GAUGE DATA-
PERRIS CDF (STATION 152)**

Site 152 Perris CDF
 Variable 11.10 Rainfall in Inches, Auto
 Figures are for period ending 08:00

Year 2018/19
 Table Type Rain

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Day
1						0.01		0.50					1
2								0.06	0.29				2
3								0.82	0.10				3
4				0.02				0.02					4
5				0.01				0.69					5
6						0.35	0.49	0.06	0.17				6
7						0.89	0.02	0.01	0.23		0.45		7
8						0.01			0.02		0.01		8
9									0.01				9
10								0.05			0.07		10
11								0.04			0.01		11
12							0.19		0.28				12
13				0.76			0.08		0.01				13
14							0.01	1.82					14
15				0.01			0.40	0.80					15
16							0.89	0.02					16
17							0.12	0.01			0.02		17
18							0.26	0.09					18
19											0.07		19
20											0.02		20
21								0.18	0.26				21
22					0.06			0.01	0.06				22
23					0.01				0.01		0.24		23
24											0.02		24
25					0.01	0.04							25
26						0.06							26
27											0.14		27
28											0.01		28
29					0.08								29
30					1.00								30
31													31
Mean	0.00	0.00	0.00	0.03	0.04	0.04	0.08	0.18	0.05	0.00	0.03	0.00	
Maximum	0.00	0.00	0.00	0.76	1.00	0.89	0.89	1.82	0.29	0.00	0.45	0.00	
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total	0.00	0.00	0.00	0.79	1.16	1.35	2.45	5.16	1.42	0.00	1.05	0.00	

Summaries

----- Notes -----
 All recorded data is continuous and reliable

Annual Mean	0.04	
Annual Total	13.3	
	Maximum	Minimum
Daily	1.82	0.00

**RAINFALL GAUGE DATA –
PIGEON PASS (STATION 155)**

Riverside County Flood Control

HYDAY V129 Output 08/08/2019

Site 155 Pigeon Pass
 Variable 11.10 Rainfall in Inches, Auto
 Figures are for period ending 08:00

Year 2018/19
 Table Type Rain

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Day
1								0.51			0.01		1
2						0.01		0.18	0.43				2
3								0.82	0.98	0.03			3
4				0.12				0.47					4
5								0.68		0.01			5
6						0.31	0.35	0.08	0.12				6
7						0.90		0.01	0.41		0.01		7
8	0.02						0.01		0.13				8
9													9
10		0.06						0.17			0.05		10
11								0.10			0.12		11
12							0.18		0.10		0.01		12
13				0.71			0.03		0.02				13
14				0.10				2.03					14
15							0.25	1.46					15
16							0.82	0.20			0.06		16
17							0.57				0.09	0.01	17
18	0.05						0.98	0.13					18
19											0.37		19
20								0.01			0.13		20
21								0.30	0.51		0.01	0.01	21
22					0.11			0.02	0.03				22
23					0.01			0.01	0.01		0.43		23
24											0.02		24
25											0.01		25
26						0.05					0.01		26
27											0.39		27
28											0.01		28
29					0.13								29
30					1.02					0.02			30
31													31
Mean	0.00	0.00	0.00	0.03	0.04	0.04	0.10	0.26	0.09	0.00	0.06	0.00	
Maximum	0.05	0.06	0.00	0.71	1.02	0.90	0.98	2.03	0.98	0.03	0.43	0.01	
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total	0.07	0.06	0.00	0.93	1.26	1.27	3.20	7.19	2.74	0.06	1.72	0.02	

Summaries

----- Notes -----
 All recorded data is continuous and reliable

Annual Mean 0.05
 Annual Total 18.5
 Maximum Minimum
 Daily 2.03 0.00

**RAINFALL GAUGE DATA –
SAN JACINTO (STATION 186)**

Riverside County Flood Control

HYDAY V129 Output 08/08/2019

Site 186 San Jacinto NWS Automatic
 Variable 11.10 Rainfall in Inches, Auto
 Figures are for period ending 08:00

Year 2018/19
 Table Type Rain

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Day
1							0.26	0.67			0.04		1
2								0.07	0.23			0.01	2
3								0.83	0.12			0.01	3
4				0.01				0.20	0.01				4
5								0.49					5
6						0.29	0.72	0.09	0.17				6
7						0.94		0.01	0.26		0.13		7
8						0.01			0.02				8
9													9
10								0.06			0.09		10
11								0.17					11
12	0.05						0.16	0.01	0.31				12
13				0.29			0.08						13
14				0.17				2.09	0.01				14
15							0.17	1.35					15
16							0.67	0.12					16
17							0.19	0.01			0.01		17
18							0.24	0.09					18
19								0.01			0.32		19
20							0.01				0.17		20
21								0.30	0.39		0.01		21
22					0.07			0.20	0.12				22
23									0.01		0.49		23
24											0.06		24
25						0.09							25
26						0.24							26
27						0.01					0.28		27
28											0.01		28
29					0.09					0.06			29
30					1.14					0.34			30
31													31
Mean	0.00	0.00	0.00	0.01	0.04	0.05	0.08	0.24	0.05	0.01	0.05	0.00	
Maximum	0.05	0.00	0.00	0.29	1.14	0.94	0.72	2.09	0.39	0.34	0.49	0.01	
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total	0.05	0.00	0.00	0.46	1.30	1.57	2.49	6.75	1.64	0.40	1.61	0.02	

Summaries

----- Notes -----
 All recorded data is continuous and reliable

Annual Mean 0.04
 Annual Total 16.3
 Maximum Minimum
 Daily 2.09 0.00

**RAINFALL GAUGE DATA –
WINCHESTER (STATION 248)**

Riverside County Flood Control

HYDAY V129 Output 08/08/2019

Site 248 Winchester
 Variable 11.10 Rainfall in Inches, Auto
 Figures are for period ending 08:00

Year 2018/19
 Table Type Rain

Day	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Day
1							0.09	0.54					1
2								0.06	0.35				2
3								0.69	0.13				3
4								0.13					4
5				0.01				0.42					5
6						0.29	0.51	0.11	0.11		0.01		6
7						0.85	0.01		0.21		0.18		7
8						0.01			0.01		0.01		8
9									0.01				9
10								0.11					10
11								0.08					11
12							0.18	0.01	0.45				12
13				0.43			0.02						13
14				0.24				1.90					14
15				0.01			0.21	0.83					15
16							0.61	0.09					16
17							0.09				0.02		17
18							0.30	0.20					18
19	0.02							0.01			0.17		19
20							0.01				0.09		20
21								0.09	0.74				21
22					0.04			0.13	0.19				22
23					0.01			0.01			0.20		23
24											0.02		24
25						0.06							25
26						0.01							26
27											0.04		27
28											0.01		28
29					0.09								29
30					0.94								30
31													31
Mean	0.00	0.00	0.00	0.02	0.04	0.04	0.07	0.19	0.07	0.00	0.02	0.00	
Maximum	0.02	0.00	0.00	0.43	0.94	0.85	0.61	1.90	0.74	0.00	0.20	0.00	
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total	0.02	0.00	0.00	0.69	1.07	1.22	2.03	5.38	2.20	0.00	0.76	0.00	

Summaries

----- Notes -----
 All recorded data is continuous and reliable

Annual Mean 0.04
 Annual Total 13.3
 Maximum Minimum
 Daily 1.90 0.00

STREAM GAUGE DATA
(Excel Worksheet)

ANALYTICAL MONITORING REPORTS

STORM 1

November 29, 2018 - December 3, 2018



BABCOCK Laboratories, Inc.
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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 1 of 5
 Project Name: Amec Foster Wheeler-Lake
 Elsinore 7-2018 to 6-2020
 Project Number: Lake Elsinore 7-2018 to 6-2020

Report Date: 20-Dec-2018

Work Order Number: B8K3472

Received on Ice (Y/N): Yes Temp: 2 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B8K3472-01	S-03-112918	Liquid	11/29/18 13:30	Garth Engelhorn/Aus	11/30/18 08:18	Mallory Graves
B8K3472-02	S-03-112918 DUP	Liquid	11/29/18 13:30	Garth Engelhorn/Aus	11/30/18 08:18	Mallory Graves
B8K3472-03	S-03-112918 FB	Liquid	11/29/18 14:00	Garth Engelhorn/Aus	11/30/18 08:18	Mallory Graves



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 2 of 5
 Project Name: Amec Foster Wheeler-Lake
 Elsinore 7-2018 to 6-2020
 Project Number: Lake Elsinore 7-2018 to 6-2020

Report Date: 20-Dec-2018

Work Order Number: B8K3472

Received on Ice (Y/N): Yes Temp: 2 °C

Laboratory Reference Number

B8K3472-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
S-03-112918	Liquid	11/29/18 13:30	11/30/18 8:18

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Aggregate Organic Compounds								
Biochemical Oxygen Demand	ND	10	10	mg/L	SM 5210B	12/01/18 01:02	JGZ	
Chemical Oxygen Demand	64	10	7.4	mg/L	SM 5220D	12/12/18 18:39	JCW	



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 3 of 5
Project Name: Amec Foster Wheeler-Lake
Elsinore 7-2018 to 6-2020
Project Number: Lake Elsinore 7-2018 to 6-2020

Report Date: 20-Dec-2018

Work Order Number: B8K3472

Received on Ice (Y/N): Yes Temp: 2 °C

Laboratory Reference Number

B8K3472-02

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
S-03-112918 DUP	Liquid	11/29/18 13:30	11/30/18 8:18

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Aggregate Organic Compounds								
Biochemical Oxygen Demand	ND	10	10	mg/L	SM 5210B	12/01/18 01:02	JGZ	
Chemical Oxygen Demand	69	10	7.4	mg/L	SM 5220D	12/12/18 18:39	JCW	



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 4 of 5
 Project Name: Amec Foster Wheeler-Lake
 Elsinore 7-2018 to 6-2020
 Project Number: Lake Elsinore 7-2018 to 6-2020

Report Date: 20-Dec-2018

Work Order Number: B8K3472

Received on Ice (Y/N): Yes Temp: 2 °C

Laboratory Reference Number

B8K3472-03

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
S-03-112918 FB	Liquid	11/29/18 14:00	11/30/18 8:18

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Aggregate Organic Compounds								
Biochemical Oxygen Demand	ND	2.5	2.5	mg/L	SM 5210B	12/01/18 01:02	JGZ	
Chemical Oxygen Demand	ND	10	7.4	mg/L	SM 5220D	12/12/18 18:39	JCW	



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 5 of 5
Project Name: Amec Foster Wheeler-Lake
Elsinore 7-2018 to 6-2020
Project Number: Lake Elsinore 7-2018 to 6-2020

Report Date: 20-Dec-2018

Work Order Number: B8K3472

Received on Ice (Y/N): Yes Temp: 2 °C

Notes and Definitions

- ND: Analyte NOT DETECTED at or above the Method Detection Limit (if MDL is reported), otherwise at or above the Reportable Detection Limit (RDL)
- NR: Not Reported
- RDL: Reportable Detection Limit
- MDL: Method Detection Limit
- * / " : NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Short_No Alias.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.

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CA ELAP No. 2698
EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 1
Project Name: Amec Foster Wheeler-Lake
Elsinore 7-2018 to 6-2020
Project Number: Lake Elsinore 7-2018 to 6-2020

Report Date: 20-Dec-2018

Work Order Number: **B8K3472**

Received on Ice (Y/N): Yes Temp: 2 °C

Destination Lab: Babcock Laboratories
6100 Quail Valley Court Riverside, CA 92507
(951)653-3351

Chain of Custody

Client: Amec Foster Wheeler Environment and Infrastructure		Contact: Garth Engelhorn		Fax: No.		Additional Reporting Requests									
Phone No. 760-644-0167		email: garth.engelhorn@altaenviron.com													
Project Name: Lake Elsinore Project		Turn Around Time: Routine													
Project Location: Salt Creek/San Jacinto/Canyon Lake		*Lab TAT Approval		By:											
Sampler Information		# of Containers & Preservatives		Sample Type		Analysis Requested		Matrix	Notes						
Name: <u>Garth E. / Austin K.</u>															
Employer: <u>Alta</u>															
Signature: <u>[Signature]</u>															
Sample ID	Date	Time	Unpreserved	H2SO4	HNO3	Total # of Containers	Routine	Resample	Special	COD SM5220D	BOD SM5210B				
S-03-112918	11/29/18	13:30	1	1		2	X			X	X			Stormwater	
S-03-112918-DUP	11/29/18	13:30	1	1		2	X			X	X			Stormwater	
S-03-112918-FB	11/29/18	14:00	1	1		2	X			X	X			Stormwater	
Relinquished By (sign)		Print Name /Company		Date/Time		Received By (sign)		Print Name /Company							
<u>[Signature]</u>		Garth Engelhorn / Alta		11/30/18 07:20		<u>[Signature]</u>		Mallory Graves / Alta Environmental							
<u>[Signature]</u>		Mallory Graves		11/30/18 08:18		<u>[Signature]</u>		K Marshall							
Samples submitted on ice? Yes No		Custody Seals intact? Yes No N/A		Samples intact? Yes No		Temperature: <u>2</u> °C		Sample meets laboratory acceptance criteria? Yes No		Permission to continue? Yes No		Deviation/Notes: _____		Signature/Date: _____	
Yes		No		Yes		No		Yes		No		Lab No. <u>B8K3472</u>		Logged in By/Date: _____	
												Page <u>1</u> of <u>1</u>			

NOV 30 2018



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 1 of 5
 Project Name: Amec Foster Wheeler-Lake
 Elsinore 7-2018 to 6-2020
 Project Number: Salt Creek/San Jacinto/Canyon
 Lake

Report Date: 20-Dec-2018

Work Order Number: B8K3432

Received on Ice (Y/N): Yes Temp: 8 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B8K3432-01	S-03-113018 ---ROUTINE---	Liquid	11/30/18 10:54	Garth E./Austin K.	11/30/18 13:35	Mallory Graves
B8K3432-02	S-03-113018-DUP ---ROUTINE-- -	Liquid	11/30/18 10:54	Garth E./Austin K.	11/30/18 13:35	Mallory Graves
B8K3432-03	S-03-113018-FB ---ROUTINE---	Liquid	11/30/18 12:15	Garth E./Austin K.	11/30/18 13:35	Mallory Graves



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 2 of 5
 Project Name: Amec Foster Wheeler-Lake
 Elsinore 7-2018 to 6-2020
 Project Number: Salt Creek/San Jacinto/Canyon
 Lake

Report Date: 20-Dec-2018

Work Order Number: B8K3432

Received on Ice (Y/N): Yes Temp: 8 °C

Laboratory Reference Number

B8K3432-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
S-03-113018	Liquid	11/30/18 10:54	11/30/18 13:35

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Cations								
Total Hardness	37	3.0	0.35	mg/L	SM 2340B/EPA 200.7	12/11/18 12:16	KCS	
Calcium	11	1.0	0.31	mg/L	EPA 200.7	12/11/18 12:16	KCS	
Magnesium	2.2	1.0	0.35	mg/L	EPA 200.7	12/11/18 12:16	KCS	
Anions								
Nitrate as N	0.99	0.20	0.055	mg/L	EPA 300.0	12/01/18 01:50	KBS	
Nitrite as N	ND	0.10	0.059	mg/L	EPA 300.0	12/01/18 01:50	KBS	
Solids								
Total Dissolved Solids	92	10	10	mg/L	SM 2540C	12/05/18 23:20	CMR	
Total Suspended Solids	28	2	2	mg/L	SM 2540D	12/06/18 12:03	ATR	
Nutrients								
Ammonia-Nitrogen	0.32	0.10	0.048	mg/L	SM4500NH3H G	12/04/18 12:17	SLL	
Kjeldahl Nitrogen	1.5	0.20	0.13	mg/L	EPA 351.2	12/10/18 15:04	SLL	
Organic Nitrogen	1.2	0.2		mg/L	Calculation			
Total Nitrogen	2.5	0.2	0.13	mg/L	Calculation			
Ortho Phosphate Phosphorus	0.38	0.050	0.016	mg/L	SM 4500P E	12/01/18 12:00	JB	



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 3 of 5
 Project Name: Amec Foster Wheeler-Lake
 Elsinore 7-2018 to 6-2020
 Project Number: Salt Creek/San Jacinto/Canyon
 Lake

Report Date: 20-Dec-2018

Work Order Number: B8K3432

Received on Ice (Y/N): Yes Temp: 8 °C

Laboratory Reference Number

B8K3432-02

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
S-03-113018-DUP	Liquid	11/30/18 10:54	11/30/18 13:35

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Cations								
Total Hardness	38	3.0	0.35	mg/L	SM 2340B/EPA 200.7	12/11/18 12:21	KCS	
Calcium	12	1.0	0.31	mg/L	EPA 200.7	12/11/18 12:21	KCS	
Magnesium	2.2	1.0	0.35	mg/L	EPA 200.7	12/11/18 12:21	KCS	
Anions								
Nitrate as N	0.92	0.20	0.055	mg/L	EPA 300.0	12/01/18 02:02	KBS	
Nitrite as N	ND	0.10	0.059	mg/L	EPA 300.0	12/01/18 02:02	KBS	
Solids								
Total Dissolved Solids	87	10	10	mg/L	SM 2540C	12/05/18 23:20	CMR	
Total Suspended Solids	30	2	2	mg/L	SM 2540D	12/05/18 20:05	KL	
Nutrients								
Ammonia-Nitrogen	0.32	0.10	0.048	mg/L	SM4500NH3H G	12/04/18 12:19	SLL	
Kjeldahl Nitrogen	1.2	0.10	0.063	mg/L	EPA 351.2	12/06/18 15:30	SLL	
Organic Nitrogen	0.9	0.1		mg/L	Calculation			
Total Nitrogen	2.1	0.2	0.06	mg/L	Calculation			
Ortho Phosphate Phosphorus	0.26	0.050	0.016	mg/L	SM 4500P E	12/01/18 12:00	JB	



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 4 of 5
 Project Name: Amec Foster Wheeler-Lake
 Elsinore 7-2018 to 6-2020
 Project Number: Salt Creek/San Jacinto/Canyon
 Lake

Report Date: 20-Dec-2018

Work Order Number: B8K3432

Received on Ice (Y/N): Yes Temp: 8 °C

Laboratory Reference Number

B8K3432-03

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
S-03-113018-FB	Liquid	11/30/18 12:15	11/30/18 13:35

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Cations								
Total Hardness	48	3.0	0.35	mg/L	SM 2340B/EPA 200.7	12/11/18 12:58	KCS	
Calcium	16	1.0	0.31	mg/L	EPA 200.7	12/11/18 12:58	KCS	
Magnesium	1.7	1.0	0.35	mg/L	EPA 200.7	12/11/18 12:58	KCS	
Anions								
Nitrate as N	0.52	0.20	0.055	mg/L	EPA 300.0	12/01/18 02:39	KBS	
Nitrite as N	ND	0.10	0.059	mg/L	EPA 300.0	12/01/18 02:39	KBS	
Solids								
Total Dissolved Solids	140	10	10	mg/L	SM 2540C	12/05/18 23:20	CMR	
Total Suspended Solids	ND	2	2	mg/L	SM 2540D	12/05/18 20:05	KL	
Nutrients								
Ammonia-Nitrogen	ND	0.10	0.048	mg/L	SM4500NH3H G	12/04/18 12:20	SLL	
Kjeldahl Nitrogen	0.50	0.10	0.063	mg/L	EPA 351.2	12/06/18 14:25	SLL	
Organic Nitrogen	0.5	0.1		mg/L	Calculation			
Total Nitrogen	1.0	0.2	0.06	mg/L	Calculation			
Ortho Phosphate Phosphorus	ND	0.050	0.016	mg/L	SM 4500P E	12/01/18 12:00	JB	



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Report Date: 20-Dec-2018

Analytical Report: Page 5 of 5
Project Name: Amec Foster Wheeler-Lake
Elsinore 7-2018 to 6-2020
Project Number: Salt Creek/San Jacinto/Canyon
Lake

Work Order Number: B8K3432

Received on Ice (Y/N): Yes Temp: 8 °C

Notes and Definitions

- J Estimated value
- ND: Analyte NOT DETECTED at or above the Method Detection Limit (if MDL is reported), otherwise at or above the Reportable Detection Limit (RDL)
- NR: Not Reported
- RDL: Reportable Detection Limit
- MDL: Method Detection Limit
- * / " : NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Short_No Alias.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.

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CA ELAP No. 2698
EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 1
Project Name: Amec Foster Wheeler-Lake
Elsinore 7-2018 to 6-2020
Project Number: Salt Creek/San Jacinto/Canyon
Lake

Report Date: 20-Dec-2018

Work Order Number: **B8K3432**

Received on Ice (Y/N): Yes Temp: 8 °C

Destination Lab: Babcock Laboratories
6100 Quail Valley Court Riverside, CA 92507
(951)653-3351

Chain of Custody

Client: Amec Foster Wheeler Environment and Infrastructure		Contact: Garth Engelhorn		Fax: No.		Additional Reporting Requests																							
Phone No. 760-644-0167		email: garth.engelhorn@altaenviron.com				Include QC Data Package																							
Project Name: Lake Elsinore Project		Turn Around Time: Routine																											
Project Location: Salt Creek/San Jacinto/Canyon Lake		*Lab TAT Approval		By:																									
Sampler Information			# of Containers & Preservatives		Sample Type		Analysis Requested					Matrix	Notes																
Name: <u>Garth E. Austin Jr.</u>																													
Employer: <u>Alta</u>																													
Signature: <u>[Signature]</u>																													
Sample ID	Date	Time	Unpreserved	H2SO4	HNO3	Total # of Containers	Routine	Resample	Special	Nitrate EPA 300.0	Nitrite SM4500 - NO2B	Ammonia SM4500-NH3 H	TKN EPA 351.3	Total Phosphorous SM 4500-PE	OrthoPhosphate SM4500-PE	TSS SM2540C	TDS EPA 160.1	Total Hardness SM2340C	Total Organic Nitrogen (calc)	Total Nitrogen (calc)									
S-03-113018	11/30/18	1054	1	1	1	3	X			X	X	X	X	X	X	X	X	X	X	X	X	Stormwater							
S-03-113018-Dup	11/30/18	1054	1	1	1	3	X			X	X	X	X	X	X	X	X	X	X	X	X								
S-03-113018-FB	11/30/18	1215	1	1	1	3	X			X	X	X	X	X	X	X	X	X	X	X	X								
Relinquished By (sign)			Print Name /Company		Date/Time		Received By (sign)					Print Name /Company																	
<u>[Signature]</u>			<u>Garth Engelhorn/Alta</u>		<u>11/30/18 1240</u>		<u>[Signature]</u>					<u>Mallory Graves / Alta</u>																	
<u>Mallory Graves</u>			<u>Mallory Graves/Alta</u>		<u>11/30/18 0135</u>		<u>[Signature]</u>					<u>Alex Graves / ESB</u>																	
Samples submitted on ice? Yes No			Custody Seals Intact? Yes No N/A			Samples intact? Yes No			Temperature: <u>8</u> °C			Sample meets laboratory acceptance criteria? Yes No			Permission to continue? Yes No			Deviation/Notes:			Signature/Date:			Lab No. _____					
																								Logged in By/Date:			Page _____ of _____		

B8K3432
11/30/2018 14:26



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 3
Project Name: Amec Foster Wheeler-Lake
Elsinore 7-2018 to 6-2020
Project Number: 1515101305 FY 2018-2019

Report Date: 02-Jan-2019

Work Order Number: B8L0200

Received on Ice (Y/N): Yes Temp: 3 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B8L0200-01	S-04-120218	Liquid	12/02/18 11:30	Garth Engelhorn/Aus	12/03/18 12:33	Austin Kay



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 2 of 3
 Project Name: Amec Foster Wheeler-Lake
 Elsinore 7-2018 to 6-2020
 Project Number: 1515101305 FY 2018-2019

Report Date: 02-Jan-2019

Work Order Number: B8L0200

Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number

B8L0200-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
S-04-120218	Liquid	12/02/18 11:30	12/03/18 12:33

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Aggregate Organic Compounds								
Biochemical Oxygen Demand	<60.45	10	10	mg/L	SM 5210B	12/03/18 19:28	JCW	N-BOD, N-BOD1, N-BOD2
Chemical Oxygen Demand	44	10	7.4	mg/L	SM 5220D	12/12/18 19:56	JCW	



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 3 of 3
Project Name: Amec Foster Wheeler-Lake
Elsinore 7-2018 to 6-2020
Project Number: 1515101305 FY 2018-2019

Report Date: 02-Jan-2019

Work Order Number: B8L0200

Received on Ice (Y/N): Yes Temp: 3 °C

Notes and Definitions

N-BOD The reported result is an estimated value because the result did not meet method calculation criteria.

N-BOD1 Dilution water blank exceeds 0.20 mg/L. As per method, data is reportable as qualified.

N-BOD2 The LCS is outside method acceptance limits. As per method, data is reportable as qualified.

ND: Analyte NOT DETECTED at or above the Method Detection Limit (if MDL is reported), otherwise at or above the Reportable Detection Limit (RDL)

NR: Not Reported

RDL: Reportable Detection Limit

MDL: Method Detection Limit

* / " : NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Short_No Alias.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.

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CA ELAP No. 2698
EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 1
Project Name: Amec Foster Wheeler-Lake
Elsinore 7-2018 to 6-2020
Project Number: 1515101305 FY 2018-2019

Report Date: 02-Jan-2019

Work Order Number: **B8L0200**

Received on Ice (Y/N): Yes Temp: 3 °C

Destination Lab: Babcock Laboratories
6100 Quail Valley Court Riverside, CA 92507
(951)653-3351

Chain of Custody

Client: Amec Foster Wheeler Environment and Infrastructure Phone No. 760-644-0167		Contact: Garth Engelhorn email: garth.engelhorn@altaenviron.com		Fax: No.		Additional Reporting Requests							
Project Name: Lake Elsinore Project		Turn Around Time: Routine		*Lab TAT Approval		By:							
Project Location: Salt Creek/San Jacinto/Canyon Lake													
Sampler Information		# of Containers & Preservatives		Sample Type		Analysis Requested		Matrix		Notes			
Name: <u>Garth E. Austin K.</u>													
Employer: <u>Alta</u>													
Signature: <u>[Signature]</u>													
Sample ID	Date	Time	Unpreserved	H2SO4	HNO3	Total # of Containers	Routine	Resample	Special	COD SM520D	BOD SM5210B	Matrix	Notes
<u>S-04-120218</u>	<u>12/21/18</u>	<u>11:30</u>	<u>1</u>	<u>1</u>		<u>2</u>	<u>X</u>			<u>X</u>	<u>X</u>	<u>Stormwater</u>	
Relinquished By (sign)		Print Name/Company		Date/Time		Received By (sign)		Print Name/Company					
<u>[Signature]</u>		<u>Austin Kay / Alta</u>		<u>12/31/18 12:33</u>		<u>[Signature]</u>		<u>Myka / EJB</u>					
Samples submitted on ice? Yes No		Custody Seals intact? Yes No N/A		Samples intact? Yes No		Temperature: <u>3</u> °C		Sample meets laboratory acceptance criteria? Yes No		Permission to continue? Yes No		Deviation/Notes:	
Yes No		Yes No N/A		Yes No				Yes No		Yes No		Signature/Date:	
										Lab No. <u>B8L0200 25</u>		Logged in By/Date:	
												Page <u>1</u> of <u>1</u>	

DEC 03 2018



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 3
Project Name: Amec Foster Wheeler-Lake
Elsinore 7-2018 to 6-2020
Project Number: 1515101305 FY 2018-2019

Report Date: 02-Jan-2019

Work Order Number: B8L0201

Received on Ice (Y/N): Yes Temp: 3 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B8L0201-01	S-04-120218 ---ROUTINE---	Liquid	12/02/18 11:30	Garth E./Austin K.	12/03/18 12:33	Mallory Graves



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 2 of 3
 Project Name: Amec Foster Wheeler-Lake
 Elsinore 7-2018 to 6-2020
 Project Number: 1515101305 FY 2018-2019

Report Date: 02-Jan-2019

Work Order Number: B8L0201

Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number

B8L0201-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
S-04-120218	Liquid	12/02/18 11:30	12/03/18 12:33

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Cations								
Total Hardness	72	15	1.8	mg/L	SM 2340B/EPA 200.7	12/12/18 13:47	KCS	
Calcium	20	5.0	1.6	mg/L	EPA 200.7	12/12/18 13:47	KCS	
Magnesium	5.2	5.0	1.8	mg/L	EPA 200.7	12/12/18 13:47	KCS	
Anions								
Nitrate as N	0.73	0.20	0.055	mg/L	EPA 300.0	12/04/18 00:33	RER	
Nitrite as N	0.099	0.10	0.059	mg/L	EPA 300.0	12/04/18 00:33	RER	J
Solids								
Total Dissolved Solids	150	10	10	mg/L	SM 2540C	12/05/18 23:20	CMR	
Total Suspended Solids	32	10	10	mg/L	SM 2540D	12/06/18 14:01	ATR	
Nutrients								
Ammonia-Nitrogen	0.11	0.10	0.048	mg/L	SM4500NH3H G	12/04/18 13:00	SLL	
Kjeldahl Nitrogen	1.0	0.10	0.063	mg/L	EPA 351.2	12/06/18 14:53	SLL	
Organic Nitrogen	0.9	0.1		mg/L	Calculation			
Total Nitrogen	1.8	0.2	0.06	mg/L	Calculation			
Ortho Phosphate Phosphorus	0.28	0.050	0.016	mg/L	SM 4500P E	12/04/18 08:23	ATR	
Total Phosphorus	0.45	0.05	0.02	mg/L	SM 4500P B E	12/10/18 17:45	ATR	



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 3 of 3
Project Name: Amec Foster Wheeler-Lake
Elsinore 7-2018 to 6-2020
Project Number: 1515101305 FY 2018-2019

Report Date: 02-Jan-2019

Work Order Number: B8L0201

Received on Ice (Y/N): Yes Temp: 3 °C

Notes and Definitions

- J Estimated value
- ND: Analyte NOT DETECTED at or above the Method Detection Limit (**if MDL is reported**), otherwise at or above the Reportable Detection Limit (RDL)
- NR: Not Reported
- RDL: Reportable Detection Limit
- MDL: Method Detection Limit
- * / " : NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Short_No Alias.rpt

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CA ELAP No. 2698
EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 1
Project Name: Amec Foster Wheeler-Lake
Elsinore 7-2018 to 6-2020
Project Number: 1515101305 FY 2018-2019

Report Date: 02-Jan-2019

Work Order Number: B8L0201

Received on Ice (Y/N): Yes Temp: 3 °C

Destination Lab: Babcock Laboratories
6100 Quail Valley Court Riverside, CA 92507
(951)653-3351

Chain of Custody

Client: Amec Foster Wheeler Environment and Infrastructure Phone No. 760-644-0167		Contact: Garth Engelhorn email: garth.engelhorn@altaenviron.com		Fax No.		Additional Reporting Requests Include QC Data Package								
Project Name: Lake Elsinore Project		Turn Around Time: Routine		*Lab TAT Approval		By:								
Project Location: Salt Creek/San Jacinto/Canyon Lake														
Sampler Information			# of Containers & Preservatives			Sample Type			Analysis Requested			Matrix	Notes	
Name: <u>Garth E. Engelhorn</u>			Unpreserved			Routine			Nitrate EPA 300.0					
Employer: <u>Alta</u>			H2SO4			Resample			Nitrite SM4500 - NO2B					
Signature: <u>[Signature]</u>			HNO3			Special			Ammonia SM4500-NH3 H					
Sample ID			Date			Time			TKN EPA 351.3					
S-04-120218			12/3/18			11:30			Total Phosphorus SM 4500-PE					
									OrthoPhosphate SM4500-PE					
									TSS SM2540C					
									TDS EPA 160.1					
									Total Hardness SM2340C					
									Total Organic Nitrogen (calc)					
									Total Nitrogen (calc)					
												Stormwater		
Relinquished By (sign)			Print Name /Company			Date/Time			Received By (sign)			Print Name /Company		
<u>[Signature]</u>			Austin Hoy/Alta			12/3/18 12:33			<u>[Signature]</u>			Austin/EP		
Samples submitted on ice? Yes No			Custody Seals intact? Yes No N/A			Samples intact? Yes No			Temperature: 3 °C			Sample meets laboratory acceptance criteria? Yes No		
Yes			Yes			Yes			3			Yes		
												Deviation/Notes:		
												Signature/Date:		
												Lab No. B8L0201		
												Logged in By/Date:		
												Page 1 of 1		

DEC 03 2018



BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 1 of 1
Project Name: Amec Foster Wheeler-Lake
Project Number: Lake Elsinore 7-2018 to 6-2
Work Order Number: B8K3457

Report Date: 20-Dec-2018

Received on Ice (Y/N Yes Temp: 8 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B8K3457-01	S-03-113018	Liquid	11/30/18 10:54	Garth E./Austin K.	11/30/18 13:35	Mallory Graves
B8K3457-02	S-03-113018-DUP	Liquid	11/30/18 10:54	Garth E./Austin K.	11/30/18 13:35	Mallory Graves
B8K3457-03	S-03-113018-FB	Liquid	11/30/18 12:15	Garth E./Austin K.	11/30/18 13:35	Mallory Graves

Note: Requested Low Level Total Phosphorus analysis was subcontracted to Eurofins CalScience.

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Case Narrative+ COC.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.



BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 1 of 1
Project Name: Amec Foster Wheeler-Lake
Project Number: Lake Elsinore 7-2018 to 6-2
Work Order Number: B8K3457

Report Date: 20-Dec-2018

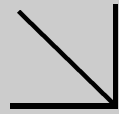
Received on Ice (Y/N) Yes Temp: 8 °C

Destination Lab: Babcock Laboratories
6100 Quail Valley Court Riverside, CA 92507
(951)653-3351

Chain of Custody

Client: Amec Foster Wheeler Environment and Infrastructure Phone No. 760-644-0167		Contact: Garth Engelhorn email: garth.engelhorn@altaenviron.com		Fax: No.		Additional Reporting Requests Include QC Data Package															
Project Name: Lake Elsinore Project Project Location: Salt Creek/San Jacinto/Canyon Lake		Turn Around Time: Routine *Lab TAT Approval		By:																	
Sampler Information		# of Containers & Preservatives		Sample Type		Analysis Requested		Matrix	Notes												
Name: <u>Garth E. Austin Jr.</u>																					
Employer: <u>Alta</u>																					
Signature:																					
Sample ID	Date	Time	Unpreserved	H2504	HNO3	Total # of Containers	Routine	Resample	Special	Nitrate EPA 300.0	Nitrite SM4500 - NO2B	Ammonia SM4500-NH3 H	TKN EPA 351.3	Total Phosphorous SM 4500-PE	OrthoPhosphate SM4500-PE	TSS SM2540C	TDS EPA 160.1	Total Hardness SM2340C	Total Organic Nitrogen (calc)	Total Nitrogen (calc)	
S-03-113018	11/30/18	1054	1	1	1	3	X			X	X	X	X	X	X	X	X	X	X	X	Stormwater
S-03-113018-Dup	11/30/18	1054	1	1	1	3	X			X	X	X	X	X	X	X	X	X	X	X	
S-03-113018-FB	11/30/18	1215	1	1	1	3	X			X	X	X	X	X	X	X	X	X	X	X	
Relinquished By (sign)		Print Name /Company		Date/Time		Received By (sign)		Print Name /Company													
		Mollory Graves / Alta		11/30/18 1240				Alex Engelhorn / Alta													
Samples submitted on ice? Yes No		Custody Seals intact? Yes No N/A		Samples intact? Yes No		Temperature: 8 °C		Sample meets laboratory acceptance criteria? Yes No		Permission to continue? Yes No		Deviation/Notes:		Signature/Date:		Lab No.:		Logged in By/Date:		Page ____ of ____	

B8K3457
11/30/2018 15:09

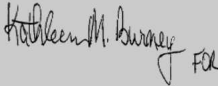

WORK ORDER NUMBER: 18-12-0165
The difference is service


AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For
Client: Babcock Laboratories, Inc.

Client Project Name: B8K3457

Attention: Cindy A. Waddell
 6100 Quail Valley Court
 Riverside, CA 92507-0704



 Approved for release on 12/13/2018 by:
 Carla Hollowell
 Project Manager

ResultLink ▶

Email your PM ▶

Eurofins Calscience (Calscience) certifies that the test results provided in this report meet all NELAC Institute requirements for parameters for which accreditation is required or available. Any exceptions to NELAC Institute requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

Contents

Client Project Name: B8K3457
Work Order Number: 18-12-0165

1	Work Order Narrative.	3
2	Sample Summary.	4
3	Detections Summary.	5
4	Client Sample Data.	6
	4.1 EPA 365.1 Total Phosphorus (Aqueous).	6
5	Quality Control Sample Data.	7
	5.1 LCS/LCSD.	7
6	Glossary of Terms and Qualifiers.	8
7	Chain-of-Custody/Sample Receipt Form.	9

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 12/04/18. They were assigned to Work Order 18-12-0165.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of ≤ 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

DoD Projects:

The test results contained in this report are accredited under the laboratory's ISO/IEC 17025:2005 and DoD-ELAP accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation ADE-1864.

Sample Summary

Client: Babcock Laboratories, Inc.	Work Order:	18-12-0165
6100 Quail Valley Court	Project Name:	B8K3457
Riverside, CA 92507-0704	PO Number:	
	Date/Time Received:	12/04/18 12:15
	Number of Containers:	3

Attn: Cindy A. Waddell

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
B8K3457-01	18-12-0165-1	11/30/18 10:54	1	Aqueous
B8K3457-02	18-12-0165-2	11/30/18 10:54	1	Aqueous
B8K3457-03	18-12-0165-3	11/30/18 10:54	1	Aqueous

Detections Summary

Client: Babcock Laboratories, Inc.	Work Order: 18-12-0165
6100 Quail Valley Court	Project Name: B8K3457
Riverside, CA 92507-0704	Received: 12/04/18

Attn: Cindy A. Waddell

Page 1 of 1

Client SampleID

<u>Analyte</u>	<u>Result</u>	<u>Qualifiers</u>	<u>RL</u>	<u>Units</u>	<u>Method</u>	<u>Extraction</u>
B8K3457-01 (18-12-0165-1)						
Phosphorus, Total	0.31		0.010	mg/L	EPA 365.1	N/A
B8K3457-02 (18-12-0165-2)						
Phosphorus, Total	0.32		0.010	mg/L	EPA 365.1	N/A

Subcontracted analyses, if any, are not included in this summary.

Analytical Report

Babcock Laboratories, Inc.
 6100 Quail Valley Court
 Riverside, CA 92507-0704

Date Received: 12/04/18
 Work Order: 18-12-0165
 Preparation: N/A
 Method: EPA 365.1
 Units: mg/L

Project: B8K3457

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
B8K3457-01	18-12-0165-1-A	11/30/18 10:54	Aqueous	ACA 1	N/A	12/12/18 14:14	181212L01
<u>Parameter</u>		<u>Result</u>	<u>RL</u>		<u>DF</u>		<u>Qualifiers</u>
Phosphorus, Total		0.31	0.010		1.00		
B8K3457-02	18-12-0165-2-A	11/30/18 10:54	Aqueous	ACA 1	N/A	12/12/18 14:14	181212L01
<u>Parameter</u>		<u>Result</u>	<u>RL</u>		<u>DF</u>		<u>Qualifiers</u>
Phosphorus, Total		0.32	0.010		1.00		
B8K3457-03	18-12-0165-3-A	11/30/18 10:54	Aqueous	ACA 1	N/A	12/12/18 14:14	181212L01
<u>Parameter</u>		<u>Result</u>	<u>RL</u>		<u>DF</u>		<u>Qualifiers</u>
Phosphorus, Total		ND	0.010		1.00		
Method Blank	099-16-889-17	N/A	Aqueous	ACA 1	N/A	12/12/18 14:14	181212L01
<u>Parameter</u>		<u>Result</u>	<u>RL</u>		<u>DF</u>		<u>Qualifiers</u>
Phosphorus, Total		ND	0.010		1.00		

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Quality Control - LCS/LCSD

Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, CA 92507-0704

Date Received: 12/04/18
Work Order: 18-12-0165
Preparation: N/A
Method: EPA 365.1

Project: B8K3457

Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number			
099-16-889-17	LCS	Aqueous	ACA 1	N/A	12/12/18 14:14	181212L01			
099-16-889-17	LCSD	Aqueous	ACA 1	N/A	12/12/18 14:14	181212L01			
Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Phosphorus, Total	0.2000	0.1930	96	0.1936	97	90-110	0	0-20	

Glossary of Terms and Qualifiers

Work Order: 18-12-0165

Page 1 of 1

<u>Qualifiers</u>	<u>Definition</u>
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

SUBCONTRACT ORDER

Babcock Laboratories, Inc.

B8K3457

18-12-0165

SENDING LABORATORY:

Babcock Laboratories, Inc.
 6100 Quail Valley Court
 Riverside, CA 92507-0704
 Phone: (951) 653-3351
 Fax: (951) 653-1662
 Project Manager: Cindy A. Waddell

RECEIVING LABORATORY:

Eurofins Calscience, Inc.
 7440 Lincoln Way
 Garden Grove, CA 92841-1427
 Phone : (714) 895-5494
 Fax: (714) 894-7501

System Name: Wood Environmental
 Sampler: Garth E./Austin K.

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: B8K3457-01 Liquid	① 12/27/18 23:59	Sampled: 11/30/18 10:54	S-03-113018	Proj.No.: <u>Lake Elsinore</u> <u>7-2018 to 6-2020</u>
Subout_02 Containers Supplied: 250 mL Poly - H2SO4 (A)	12/27/18 23:59	12/10/18 10:54	Low Level Total Phosphorus	
Sample ID: B8K3457-02 Liquid	② 12/27/18 23:59	Sampled: 11/30/18 10:54	S-03-113018-DUP	Proj.No.: <u>Lake Elsinore</u> <u>7-2018 to 6-2020</u>
Subout_02 Containers Supplied: 250 mL Poly - H2SO4 (A)	12/27/18 23:59	12/10/18 10:54	Low Level Total Phosphorus	
Sample ID: B8K3457-03 Liquid	③ 12/27/18 23:59	Sampled: 11/30/18 10:54	S-03-113018-FB	Proj.No.: <u>Lake Elsinore</u> <u>7-2018 to 6-2020</u>
Subout_02 Containers Supplied: 250 mL Poly - H2SO4 (A)	12/27/18 23:59	12/10/18 10:54	Low Level Total Phosphorus	

Return to Contents

All Containers Intact: Yes No Samples Preserved Properly: Yes No
 Samples Received at oC Sample Labels / COC Agree: Yes No Custody Seals Present: Yes No

Please forward all acknowledgements of sample receipt, final reports and invoices to data@babcocklabs.com

NO HARDCOPIES PLEASE.

Released By: Lacy Duttill Date: 12/3/18
 Received By: _____ Date: _____
 Released By: (Fedex) Date: _____
 Received By: EC Date: 12/4/18 12:15

OIGS

ORIGIN ID:ONTA (951) 653-3351
BABCOCK LABORATORIES
6100 QUAIL VALLEY CT
RIVERSIDE, CA 92507
UNITED STATES US

SHIP DATE: 03DEC18
ACTWGT: 3.40 LB MAN
CAD: 0266194/CAFE3211

BILL SENDER

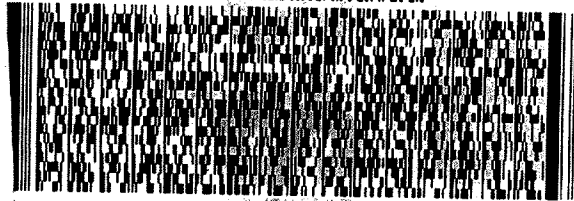
TO **SAMPLE RECEIVING**
EUROFINS CALSCIENCE, INC.
7440 LINCOLN WAY

GARDEN GROVE CA 92841

(714) 896-6484
PHU:
PO:

REF:

DEPT:



FedEx
Express

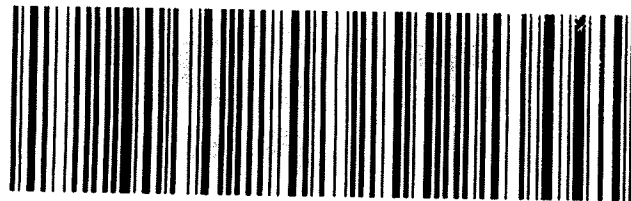


TUE - 04 DEC 10:30A
PRIORITY OVERNIGHT

RK# 4747 0112 7383
0201

92 APVA

92841
CA-US SNA



SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: Babcock Labs; Inc.

DATE: 12/04/2018

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)
 Thermometer ID: SC6 (CF: 0.0°C); Temperature (w/o CF): 3-4 °C (w/ CF): 3-4 °C; Blank Sample
 Sample(s) outside temperature criteria (PM/APM contacted by: _____)
 Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling
 Sample(s) received at ambient temperature; placed on ice for transport by courier
 Ambient Temperature: Air Filter
 Checked by: UJSO

CUSTODY SEAL:

Cooler	<input type="checkbox"/> Present and Intact	<input type="checkbox"/> Present but Not Intact	<input checked="" type="checkbox"/> Not Present	<input type="checkbox"/> N/A	Checked by: <u>UJSO</u>
Sample(s)	<input type="checkbox"/> Present and Intact	<input type="checkbox"/> Present but Not Intact	<input checked="" type="checkbox"/> Not Present	<input type="checkbox"/> N/A	Checked by: <u>UJSO</u>

SAMPLE CONDITION:

	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC document(s) received complete	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Sampling date <input type="checkbox"/> Sampling time <input type="checkbox"/> Matrix <input type="checkbox"/> Number of containers			
<input type="checkbox"/> No analysis requested <input type="checkbox"/> Not relinquished <input type="checkbox"/> No relinquished date <input type="checkbox"/> No relinquished time			
Sampler's name indicated on COC	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample container label(s) consistent with COC	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container(s) intact and in good condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper containers for analyses requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sufficient volume/mass for analyses requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Samples received within holding time	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aqueous samples for certain analyses received within 15-minute holding time			
<input type="checkbox"/> pH <input type="checkbox"/> Residual Chlorine <input type="checkbox"/> Dissolved Sulfide <input type="checkbox"/> Dissolved Oxygen	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Proper preservation chemical(s) noted on COC and/or sample container	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unpreserved aqueous sample(s) received for certain analyses			
<input type="checkbox"/> Volatile Organics <input type="checkbox"/> Total Metals <input type="checkbox"/> Dissolved Metals			
Acid/base preserved samples - pH within acceptable range	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Container(s) for certain analysis free of headspace.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Volatile Organics <input type="checkbox"/> Dissolved Gases (RSK-175) <input type="checkbox"/> Dissolved Oxygen (SM 4500)			
<input type="checkbox"/> Carbon Dioxide (SM 4500) <input type="checkbox"/> Ferrous Iron (SM 3500) <input type="checkbox"/> Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

CONTAINER TYPE: (Trip Blank Lot Number: _____)

Aqueous: VOA VOAh VOAna₂ 100PJ 100PJna₂ 125AGB 125AGBh 125AGBp 125PB 125PBz_{na} (pH__9)
 250AGB 250CGB 250CGBs (pH__2) 250PB 250PBn (pH__2) 500AGB 500AGJ 500AGJs (pH__2) 500PB
 1AGB 1AGBna₂ 1AGBs (pH__2) 1AGBs (O&G) 1PB 1PBna (pH__12) SPORTS _____ _____
Solid: 4ozCGJ 8ozCGJ 16ozCGJ Sleeve (____) EnCores® (____) TerraCores® (____) _____ _____ _____
Air: Tedlar™ Canister Sorbent Tube PUF _____ **Other Matrix** (____): _____ _____ _____

Container: **A** = Amber, **B** = Bottle, **C** = Clear, **E** = Envelope, **G** = Glass, **J** = Jar, **P** = Plastic, and **Z** = Ziploc/Resealable Bag
 Preservative: **b** = buffered, **f** = filtered, **h** = HCl, **n** = HNO₃, **na** = NaOH, **na₂** = Na₂S₂O₃, **p** = H₃PO₄, Labeled/Checked by: UJSO
s = H₂SO₄, **u** = ultra-pure, **x** = Na₂SO₃+NaHSO₄.H₂O, **z_{na}** = Zn (CH₃CO₂)₂ + NaOH Reviewed by: UJCE

STORM 2
December 5-7, 2018



BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 4
Project Name: Amec Foster Wheeler-Lake
Elsinore 7-2018 to 6-2020
Project Number: Lake Elsinore 7-2018 to 6-2020

Report Date: 20-Dec-2018

Work Order Number: B8L0776

Received on Ice (Y/N): Yes Temp: 3 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B8L0776-01	S-03-12052018	Liquid	12/05/18 16:50	Austin Kay	12/06/18 12:24	Mallory Graves
B8L0776-02	S-04-12062018	Liquid	12/06/18 09:08	Austin Kay	12/06/18 12:24	Mallory Graves



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 2 of 4
 Project Name: Amec Foster Wheeler-Lake
 Elsinore 7-2018 to 6-2020
 Project Number: Lake Elsinore 7-2018 to 6-2020

Report Date: 20-Dec-2018

Work Order Number: B8L0776

Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number

B8L0776-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
S-03-12052018	Liquid	12/05/18 16:50	12/06/18 12:24

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Aggregate Organic Compounds								
Biochemical Oxygen Demand	ND	10	10	mg/L	SM 5210B	12/06/18 21:05	JGZ	N-BOD1, N-BOD2
Chemical Oxygen Demand	55	10	7.4	mg/L	SM 5220D	12/18/18 11:48	JCW	



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 3 of 4
 Project Name: Amec Foster Wheeler-Lake
 Elsinore 7-2018 to 6-2020
 Project Number: Lake Elsinore 7-2018 to 6-2020

Report Date: 20-Dec-2018

Work Order Number: B8L0776

Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number

B8L0776-02

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
S-04-12062018	Liquid	12/06/18 09:08	12/06/18 12:24

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Aggregate Organic Compounds								
Biochemical Oxygen Demand	ND	10	10	mg/L	SM 5210B	12/07/18 11:30	JCW	N-BOD2
Chemical Oxygen Demand	41	10	7.4	mg/L	SM 5220D	12/18/18 11:48	JCW	



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 4 of 4
Project Name: Amec Foster Wheeler-Lake
Elsinore 7-2018 to 6-2020
Project Number: Lake Elsinore 7-2018 to 6-2020

Report Date: 20-Dec-2018

Work Order Number: B8L0776

Received on Ice (Y/N): Yes Temp: 3 °C

Notes and Definitions

- N-BOD1 Dilution water blank exceeds 0.20 mg/L. As per method, data is reportable as qualified.
- N-BOD2 The LCS is outside method acceptance limits. As per method, data is reportable as qualified.
- ND: Analyte NOT DETECTED at or above the Method Detection Limit (**if MDL is reported**), otherwise at or above the Reportable Detection Limit (RDL)
- NR: Not Reported
- RDL: Reportable Detection Limit
- MDL: Method Detection Limit
- * / " : NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Short_No Alias.rpt

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CA ELAP No. 2698
EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



BABCOCK Laboratories, Inc.
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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 1
Project Name: Amec Foster Wheeler-Lake
Elsinore 7-2018 to 6-2020
Project Number: Lake Elsinore 7-2018 to 6-2020

Report Date: 20-Dec-2018

Work Order Number: **B8L0776**

Received on Ice (Y/N): Yes Temp: 3 °C

Destination Lab: Babcock Laboratories
6100 Quail Valley Court Riverside, CA 92507

Chain of Custody

(951)653-3351		Client: Amec Foster Wheeler Environment and Infrastructure		Contact: Garth Engelhorn		Fax: No.		Additional Reporting Requests			
Phone No. 760-644-0167		Project Name: Lake Elsinore Project		Turn Around Time: Routine							
Project Location: Salt Creek/San Jacinto/Canyon Lake		*Lab TAT Approval		By:							
Sampler Information			# of Containers & Preservatives		Sample Type		Analysis Requested		Matrix	Notes	
Name:	Austin K.		Unpreserved		Total # of Containers	Routine					
Employer:	Alta		H2SO4			Resample					
Signature:	<i>AK</i>		HNO3			Special					
Sample ID	Date	Time				COD SM520D					
S-03-12052018	12/5/18	16:50	1	1	2	BOD SM5210B				Stormwater	
S-04-12062018	12/6/18	09:28	1	1	2					Stormwater	
Relinquished By (sign)			Print Name /Company		Date/Time		Received By (sign)		Print Name /Company		
<i>Mellory Graves</i>			Austin Kay / Alta		12/6/18 11:30		<i>Mellory Graves</i>		Mellory Graves / Alta		
			Mellory Graves / Alta		12/6/18 12:24		<i>[Signature]</i>		Mellory Graves / Alta		
Samples submitted on ice? Yes No			Custody Seals intact? Yes No (N/A)			Samples intact? Yes No			Temperature: 3 °C		
Sample meets laboratory acceptance criteria? Yes No			Permission to continue? Yes No			Deviation/Notes:			Signature/Date:		
Lab No. _____			Logged in By/Date: _____			Page _____ of _____					

B8L0776
12/06/2018 15:22



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 4
Project Name: Amec Foster Wheeler-Lake
Elsinore 7-2018 to 6-2020
Project Number: 1515101305 FY 2018-2019

Report Date: 02-Jan-2019

Work Order Number: B8L1036

Received on Ice (Y/N): Yes Temp: 1 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B8L1036-01	S-03-12072018	Liquid	12/07/18 10:43	Garth E./Austin K.	12/07/18 17:50	Garth Engelhorn/Alta
B8L1036-02	S-04-12072018	Liquid	12/07/18 11:28	Garth E./Austin K.	12/07/18 17:50	Garth Engelhorn/Alta



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 2 of 4
 Project Name: Amec Foster Wheeler-Lake
 Elsinore 7-2018 to 6-2020
 Project Number: 1515101305 FY 2018-2019

Report Date: 02-Jan-2019

Work Order Number: B8L1036

Received on Ice (Y/N): Yes Temp: 1 °C

Laboratory Reference Number

B8L1036-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
S-03-12072018	Liquid	12/07/18 10:43	12/07/18 17:50

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Cations								
Total Hardness	240	6.0	0.70	mg/L	SM 2340B/EPA 200.7	12/18/18 20:37	KCS	
Calcium	57	2.0	0.62	mg/L	EPA 200.7	12/18/18 20:37	KCS	
Magnesium	22	2.0	0.70	mg/L	EPA 200.7	12/18/18 20:37	KCS	
Anions								
Nitrate as N	0.79	0.20	0.055	mg/L	EPA 300.0	12/08/18 10:23	KBS	
Nitrite as N	ND	0.10	0.059	mg/L	EPA 300.0	12/08/18 10:23	KBS	
Solids								
Total Dissolved Solids	530	20	20	mg/L	SM 2540C	12/13/18 13:25	BBR	
Total Suspended Solids	130	5	5	mg/L	SM 2540D	12/13/18 17:45	KL	
Nutrients								
Ammonia-Nitrogen	0.25	0.10	0.048	mg/L	SM4500NH3H G	12/11/18 13:40	SLL	
Kjeldahl Nitrogen	1.9	0.10	0.063	mg/L	EPA 351.2	12/12/18 14:26	SLL	
Organic Nitrogen	1.7	0.1		mg/L	Calculation			
Total Nitrogen	2.7	0.2	0.06	mg/L	Calculation			
Ortho Phosphate Phosphorus	0.14	0.050	0.016	mg/L	SM 4500P E	12/08/18 11:15	JB	
Total Phosphorus	0.49	0.05	0.02	mg/L	SM 4500P B E	12/17/18 16:28	ATR	



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 3 of 4
 Project Name: Amec Foster Wheeler-Lake
 Elsinore 7-2018 to 6-2020
 Project Number: 1515101305 FY 2018-2019

Report Date: 02-Jan-2019

Work Order Number: B8L1036

Received on Ice (Y/N): Yes Temp: 1 °C

Laboratory Reference Number

B8L1036-02

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
S-04-12072018	Liquid	12/07/18 11:28	12/07/18 17:50

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Cations								
Total Hardness	99	6.0	0.70	mg/L	SM 2340B/EPA 200.7	12/18/18 20:42	KCS	
Calcium	22	2.0	0.62	mg/L	EPA 200.7	12/18/18 20:42	KCS	
Magnesium	11	2.0	0.70	mg/L	EPA 200.7	12/18/18 20:42	KCS	
Anions								
Nitrate as N	0.73	0.20	0.055	mg/L	EPA 300.0	12/08/18 10:35	KBS	
Nitrite as N	0.081	0.10	0.059	mg/L	EPA 300.0	12/08/18 10:35	KBS	J
Solids								
Total Dissolved Solids	150	10	10	mg/L	SM 2540C	12/13/18 13:25	BBR	
Total Suspended Solids	360	10	10	mg/L	SM 2540D	12/13/18 17:45	KL	
Nutrients								
Ammonia-Nitrogen	0.11	0.10	0.048	mg/L	SM4500NH3H G	12/11/18 12:14	SLL	
Kjeldahl Nitrogen	1.2	0.10	0.063	mg/L	EPA 351.2	12/12/18 14:27	SLL	
Organic Nitrogen	1.1	0.1		mg/L	Calculation			
Total Nitrogen	2.0	0.2	0.06	mg/L	Calculation			
Ortho Phosphate Phosphorus	0.26	0.050	0.016	mg/L	SM 4500P E	12/08/18 11:15	JB	
Total Phosphorus	0.80	0.05	0.02	mg/L	SM 4500P B E	12/17/18 16:28	ATR	



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 4 of 4
Project Name: Amec Foster Wheeler-Lake
Elsinore 7-2018 to 6-2020
Project Number: 1515101305 FY 2018-2019

Report Date: 02-Jan-2019

Work Order Number: B8L1036

Received on Ice (Y/N): Yes Temp: 1 °C

Notes and Definitions

- J Estimated value
- PbIkJ The analyte was detected in the Method Blank at a concentration between the MDL and the MRL.
- ND: Analyte NOT DETECTED at or above the Method Detection Limit (**if MDL is reported**), otherwise at or above the Reportable Detection Limit (RDL)
- NR: Not Reported
- RDL: Reportable Detection Limit
- MDL: Method Detection Limit
- * / " : NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Short_No Alias.rpt

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NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 1
Project Name: Amec Foster Wheeler-Lake
Elsinore 7-2018 to 6-2020
Project Number: 1515101305 FY 2018-2019

Report Date: 02-Jan-2019

Work Order Number: **B8L1036**

Received on Ice (Y/N): Yes Temp: 1 °C

Page 1 of 1

Destination Lab: Babcock Laboratories
6100 Quail Valley Court Riverside, CA 92507
(951)653-3351

Chain of Custody
WOOD Environmental

Client: Amec Foster Wheeler Environment and Infrastructure		Contact: Garth Engelhorn		Fax: No.		Additional Reporting Requests							
Phone No. 760-644-0167		email: garth.engelhorn@altaenviron.com				Include QC Data Package							
Project Name: Lake Elsinore Project		Turn Around Time: Routine											
Project Location: Salt Creek/San Jacinto/Canyon Lake		*Lab TAT Approval		By:									
Sampler Information			# of Containers & Preservatives			Sample Type			Analysis Requested			Matrix	Notes
Name: <u>Garth E. Austin K.</u>			Unpreserved			Routine			Nitrate EPA 300.0				
Employer: <u>Alta</u>			H2SO4			Resample			Nitrite SM4500 - NO2B				
Signature: <u>[Signature]</u>			HNO3			Special			Ammonia SM4500-NH3 H				
Sample ID			Date			Time			TKN EPA 351.3				
S-03-12072018			12/7/18			10:43			Total Phosphorous SM 4500-PE				Stormwater
S-04-12072018			12/7/18			11:28			OrthoPhosphate SM4500-PE				Stormwater
									TSS SM2540C				
									TDS EPA-160.1				
									Total Hardness SM2340C				
									Total Organic Nitrogen (calc)				
									Total Nitrogen (calc)				
Relinquished By (sign)		Print Name /Company		Date/Time		Received By (sign)		Print Name /Company					
<u>[Signature]</u>		Garth Engelhorn/Alta		12/7/18 12:55		<u>[Signature]</u>		K. Marshall					
Samples submitted on ice? Yes No			Custody Seals intact? Yes No N/A			Samples intact? Yes No			Temperature: 1 °C				
Sample meets laboratory acceptance criteria? Yes No			Permission to continue? Yes No			Deviation/Notes:			Signature/Date:			Lab No.	Logged in By/Date:
													Page ___ of ___

B8L1036
12/07/2018 17:50

STORM 3
January 16-20, 2019



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 4
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore

Work Order Number: B9A2149

Report Date: 31-Jan-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B9A2149-01	CLS-011619	Liquid	01/16/19 15:10	Austin Kay	01/17/19 11:50	Austin Kay



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 2 of 4
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore

Work Order Number: B9A2149

Report Date: 31-Jan-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Laboratory Reference Number

B9A2149-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CLS-011619	Liquid	01/16/19 15:10	01/17/19 11:50

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Aggregate Organic Compounds								
Biochemical Oxygen Demand	ND	10	10	mg/L	SM 5210B	01/18/19 00:10	JGZ	N-BOD2
Chemical Oxygen Demand	35	10	7.4	mg/L	SM 5220D	01/28/19 15:45	SLL	

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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 3 of 4
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore

Report Date: 31-Jan-2019

Work Order Number: B9A2149

Received on Ice (Y/N): Yes Temp: 1 °C

Aggregate Organic Compounds - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9A17114 - Analyzed as received										
Blank (9A17114-BLK1)					Prepared & Analyzed: 01/18/19					
Biochemical Oxygen Demand	ND	1.0	1.0	mg/L						
LCS (9A17114-BS1)					Prepared & Analyzed: 01/18/19					
Biochemical Oxygen Demand	142	1.0	1.0	mg/L	198	71.6	85-115			Q-BOD2
Duplicate (9A17114-DUP1)					Source: B9A2052-01 Prepared & Analyzed: 01/18/19					
Biochemical Oxygen Demand	ND	5.0	5.0	mg/L	ND				20	
Batch 9A28112 - Acid Digest										
Blank (9A28112-BLK1)					Prepared & Analyzed: 01/28/19					
Chemical Oxygen Demand	ND	10	7.4	mg/L						
LCS (9A28112-BS1)					Prepared & Analyzed: 01/28/19					
Chemical Oxygen Demand	516	10	7.4	mg/L	500	103	95-105			
Matrix Spike (9A28112-MS1)					Source: B9A2495-01 Prepared & Analyzed: 01/28/19					
Chemical Oxygen Demand	383	13	9.9	mg/L	333	39.2	103	80-120		
Matrix Spike Dup (9A28112-MSD1)					Source: B9A2495-01 Prepared & Analyzed: 01/28/19					
Chemical Oxygen Demand	383	13	9.9	mg/L	333	39.2	103	80-120	0.00	20



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 4 of 4
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore

Work Order Number: B9A2149

Report Date: 31-Jan-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Notes and Definitions

N-BOD2 The LCS is outside method acceptance limits. As per method, data is reportable as qualified.

Q-BOD2 This LCS is outside method acceptance limits. As per method, data is reportable as qualified.

ND: Analyte NOT DETECTED at or above the Method Detection Limit (**if MDL is reported**), otherwise at or above the Reportable Detection Limit (RDL)

NR: Not Reported

RDL: Reportable Detection Limit

MDL: Method Detection Limit

* / " : NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-MDL_No Alias.rpt

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CA ELAP No. 2698
EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 1
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore

Work Order Number: B9A2149

Report Date: 31-Jan-2019


Received on Ice (Y/N): Yes Temp: 1 °C

Destination Lab: Babcock Laboratories
6100 Quail Valley Court Riverside, CA 92507
(951)653-3351

Chain of Custody

Client: Amec Foster Wheeler Environment and Infrastructure		Contact: Garth Engelhorn		Fax: No.		Additional Reporting Requests							
Phone No. 760-644-0167		email: garth.engelhorn@altaenviron.com											
Project Name: Lake Elsinore Project		Turn Around Time: Routine											
Project Location: Salt Creek/San Jacinto/Canyon Lake		*Lab TAT Approval		By:									
Sampler Information			# of Containers & Preservatives		Sample Type		Analysis Requested		Matrix	Notes			
Name: <u>Austin Ray</u>										<u>Carrier</u>			
Employer: <u>Alta</u>													
Signature: <u>[Signature]</u>													
Sample ID	Date	Time	Unpreserved	H2SO4	HNO3	Total # of Containers	Routine	Resample	Special	COD SM5220D	BOD SM5210B	Matrix	Notes
<u>CLS-011619</u>	<u>1/16/19</u>	<u>15:10</u>				<u>2</u>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>Stormwater</u>	
Relinquished By (sign)			Print Name /Company		Date/Time		Received By (sign)		Print Name /Company				
<u>[Signature]</u>			<u>Austin Ray /Alta</u>		<u>1/17/19 11:50</u>		<u>[Signature]</u>		<u>Jordan Gonzalez /ESB</u>				
Samples submitted on ice? Yes No			Custody Seals intact? Yes No <u>N/A</u>		Samples intact? Yes No		Temperature: <u>1</u> °C		Sample meets laboratory acceptance criteria? Yes <u>No</u>		Permission to continue? Yes No <u>*</u>		Deviation/Notes:
													Signature/Date:

B9A2149
1/17/2019 12:53
JMG





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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9A2522

Report Date: 21-Feb-2019

Received on Ice (Y/N): No Temp: 2 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B9A2522-01	CLS-012019	Liquid	01/20/19 09:02	Austin Kay	01/21/19 13:42	Austin Kay



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Client Name: Wood Environment&Infrastructure Solutions, Inc
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San Diego, CA 92123

Analytical Report: Page 2 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9A2522

Report Date: 21-Feb-2019

Received on Ice (Y/N): No Temp: 2 °C

Laboratory Reference Number

B9A2522-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CLS-012019	Liquid	01/20/19 09:02	01/21/19 13:42

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Cations								
Total Hardness	240	15	1.8	mg/L	SM 2340B/EPA 200.7	01/30/19 20:02	MEL	
Calcium	64	5.0	1.6	mg/L	EPA 200.7	02/01/19 14:50	KCS	
Magnesium	21	5.0	1.8	mg/L	EPA 200.7	01/30/19 20:02	MEL	
Anions								
Nitrate as N	0.17	0.20	0.055	mg/L	EPA 300.0	01/21/19 19:20	RER	J
Nitrite as N	ND	0.10	0.059	mg/L	EPA 300.0	01/21/19 19:20	RER	
Solids								
Total Dissolved Solids	510	20	20	mg/L	SM 2540C	01/24/19 14:47	BBR	
Total Suspended Solids	14	2	2	mg/L	SM 2540D	01/24/19 18:58	MWM	
Nutrients								
Ammonia-Nitrogen	0.21	0.10	0.048	mg/L	SM4500NH3H G	01/22/19 13:38	SLL	
Kjeldahl Nitrogen	1.3	0.10	0.063	mg/L	EPA 351.2	01/31/19 10:51	SLL	
Organic Nitrogen	1.1	0.1		mg/L	Calculation			
Total Nitrogen	1.5	0.2	0.06	mg/L	Calculation			
Ortho Phosphate Phosphorus	ND	0.050	0.016	mg/L	SM 4500P E	01/22/19 08:19	ATR	
Total Phosphorus	0.11	0.05	0.02	mg/L	SM 4500P B E	01/22/19 18:15	ATR	

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EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, Inc
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 San Diego, CA 92123

Analytical Report: Page 3 of 8
 Project Name: Amec Foster Wheeler-Lake Elsinore
 Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9A2522

Report Date: 21-Feb-2019

Received on Ice (Y/N): No Temp: 2 °C

Cations - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9A29150 - EPA 200.2										
Blank (9A29150-BLK1)				Prepared: 01/29/19 Analyzed: 01/30/19						
Magnesium	ND	1.0	0.35	mg/L						
LCS (9A29150-BS1)				Prepared: 01/29/19 Analyzed: 01/30/19						
Magnesium	14.9	1.0	0.35	mg/L	17.0	87.5	85-115			
LCS Dup (9A29150-BSD1)				Prepared: 01/29/19 Analyzed: 01/30/19						
Magnesium	15.3	1.0	0.35	mg/L	17.0	90.1	85-115	2.95	20	
Matrix Spike (9A29150-MS1)				Source: B9A2522-01 Prepared: 01/29/19 Analyzed: 01/30/19						
Magnesium	35.5	5.0	1.8	mg/L	17.0	21.4	83.2	70-130		
Matrix Spike (9A29150-MS2)				Source: B9A2820-06 Prepared: 01/29/19 Analyzed: 01/30/19						
Magnesium	29.5	2.0	0.70	mg/L	17.0	15.5	82.4	70-130		
Batch 9B01059 - EPA 200.2										
Blank (9B01059-BLK1)				Prepared & Analyzed: 02/01/19						
Calcium	ND	1.0	0.31	mg/L						
LCS (9B01059-BS1)				Prepared & Analyzed: 02/01/19						
Calcium	17.0	1.0	0.31	mg/L	17.0	99.8	85-115			
LCS Dup (9B01059-BSD1)				Prepared & Analyzed: 02/01/19						
Calcium	16.9	1.0	0.31	mg/L	17.0	99.5	85-115	0.281	20	
Matrix Spike (9B01059-MS1)				Source: B9A2522-01RE1 Prepared: 01/29/19 Analyzed: 02/01/19						
Calcium	76.4	5.0	1.6	mg/L	17.0	63.6	75.3	70-130		



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Analytical Report: Page 4 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9A2522

Report Date: 21-Feb-2019

Received on Ice (Y/N): No Temp: 2 °C

Anions - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9A21137 - Analyzed as Received IC										
Blank (9A21137-BLK1)				Prepared & Analyzed: 01/21/19						
Nitrite as N	ND	0.10	0.059	mg/L						
Nitrate as N	ND	0.20	0.055	mg/L						
LCS (9A21137-BS1)				Prepared & Analyzed: 01/21/19						
Nitrite as N	2.39	0.10	0.059	mg/L	2.50	95.8	90-110			
Nitrate as N	5.40	0.20	0.055	mg/L	5.65	95.5	90-110			
Matrix Spike (9A21137-MS1)				Source: B9A2513-01		Prepared & Analyzed: 01/21/19				
Nitrite as N	2.23	0.10	0.059	mg/L	2.50	ND	89.2	80-120		
Nitrate as N	5.67	0.20	0.055	mg/L	5.65	0.248	95.9	75-131		
Matrix Spike Dup (9A21137-MSD1)				Source: B9A2513-01		Prepared & Analyzed: 01/21/19				
Nitrite as N	2.26	0.10	0.059	mg/L	2.50	ND	90.3	80-120	1.22	20
Nitrate as N	5.74	0.20	0.055	mg/L	5.65	0.248	97.3	75-131	1.33	20



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Analytical Report: Page 5 of 8
 Project Name: Amec Foster Wheeler-Lake Elsinore
 Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9A2522

Report Date: 21-Feb-2019

Received on Ice (Y/N): No Temp: 2 °C

Solids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9A24010 - Analyzed as received										
Blank (9A24010-BLK1)				Prepared & Analyzed: 01/24/19						
Total Dissolved Solids	ND	10	10	mg/L						
LCS (9A24010-BS1)				Prepared & Analyzed: 01/24/19						
Total Dissolved Solids	738	10	10	mg/L	746	98.9	90-110			
Duplicate (9A24010-DUP1)				Source: B9A2651-01 Prepared & Analyzed: 01/24/19						
Total Dissolved Solids	219	10	10	mg/L	207			5.63	20	
Duplicate (9A24010-DUP2)				Source: B9A2651-02 Prepared & Analyzed: 01/24/19						
Total Dissolved Solids	208	10	10	mg/L	204			1.94	20	
Batch 9A24045 - Analyzed as received										
Blank (9A24045-BLK1)				Prepared & Analyzed: 01/24/19						
Total Suspended Solids	ND	0.5	0.5	mg/L						
LCS (9A24045-BS1)				Prepared & Analyzed: 01/24/19						
Total Suspended Solids	494	50	50	mg/L	500	98.8	90-110			
Duplicate (9A24045-DUP1)				Source: B9A2468-01 Prepared & Analyzed: 01/24/19						
Total Suspended Solids	127	5	5	mg/L	129			1.56	25	
Duplicate (9A24045-DUP2)				Source: B9A2471-02 Prepared & Analyzed: 01/24/19						
Total Suspended Solids	7.50	2	2	mg/L	6.00			22.2	25	



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Analytical Report: Page 6 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9A2522

Report Date: 21-Feb-2019

Received on Ice (Y/N): No Temp: 2 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9A22081 - Filter if turbid.										
LCS (9A22081-BS1)				Prepared & Analyzed: 01/22/19						
Ortho Phosphate Phosphorus	0.513	0.42	0.016	mg/L	0.500	103	90-110			
Matrix Spike (9A22081-MS1)				Source: B9A2522-01 Prepared & Analyzed: 01/22/19						
Ortho Phosphate Phosphorus	0.483	0.42	0.016	mg/L	0.500	ND	96.6	80-120		
Matrix Spike Dup (9A22081-MSD1)				Source: B9A2522-01 Prepared & Analyzed: 01/22/19						
Ortho Phosphate Phosphorus	0.486	0.42	0.016	mg/L	0.500	ND	97.1	80-120	0.565	20
Batch 9A22106 - Acid Digest										
LCS (9A22106-BS1)				Prepared & Analyzed: 01/22/19						
Total Phosphorus	0.539	0.05	0.02	mg/L	0.500	108	85-115			
Matrix Spike (9A22106-MS1)				Source: B9A2536-01 Prepared & Analyzed: 01/22/19						
Total Phosphorus	0.711	0.05	0.02	mg/L	0.500	0.175	107	80-120		
Matrix Spike Dup (9A22106-MSD1)				Source: B9A2536-01 Prepared & Analyzed: 01/22/19						
Total Phosphorus	0.708	0.05	0.02	mg/L	0.500	0.175	107	80-120	0.404	20
Batch 9A22112 - Analyzed as received										
Blank (9A22112-BLK1)				Prepared & Analyzed: 01/22/19						
Ammonia-Nitrogen	ND	0.10	0.048	mg/L						
LCS (9A22112-BS1)				Prepared & Analyzed: 01/22/19						
Ammonia-Nitrogen	0.790	0.10	0.048	mg/L	0.780	101	90-110			



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Analytical Report: Page 7 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9A2522

Report Date: 21-Feb-2019

Received on Ice (Y/N): No Temp: 2 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9A22112 - Analyzed as received										
Matrix Spike (9A22112-MS1)		Source: B9A2344-02			Prepared & Analyzed: 01/22/19					
Ammonia-Nitrogen	0.801	0.10	0.048	mg/L	0.780	0.0834	92.0	80-120		
Matrix Spike Dup (9A22112-MSD1)		Source: B9A2344-02			Prepared & Analyzed: 01/22/19					
Ammonia-Nitrogen	0.779	0.10	0.048	mg/L	0.780	0.0834	89.2	80-120	2.80	20
Batch 9A30137 - Acid Digest										
Blank (9A30137-BLK1)		Prepared: 01/30/19 Analyzed: 01/31/19								
Kjeldahl Nitrogen	ND	0.10	0.063	mg/L						
LCS (9A30137-BS1)		Prepared: 01/30/19 Analyzed: 01/31/19								
Kjeldahl Nitrogen	1.07	0.10	0.063	mg/L	1.00		107	80-120		
Matrix Spike (9A30137-MS1)		Source: B9A2736-01			Prepared: 01/30/19 Analyzed: 01/31/19					
Kjeldahl Nitrogen	128	8.0	5.0	mg/L	80.0	57.4	88.5	42-154		
Matrix Spike (9A30137-MS2)		Source: B9A2761-01			Prepared: 01/30/19 Analyzed: 01/31/19					
Kjeldahl Nitrogen	0.781	0.10	0.063	mg/L	1.00	ND	78.1	42-154		



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Client Name: Wood Environment&Infrastructure Solutions, Inc
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Analytical Report: Page 8 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9A2522

Report Date: 21-Feb-2019

Received on Ice (Y/N): No Temp: 2 °C

Notes and Definitions

- J Estimated value
- ND: Analyte NOT DETECTED at or above the Method Detection Limit (if MDL is reported), otherwise at or above the Reportable Detection Limit (RDL)
- NR: Not Reported
- RDL: Reportable Detection Limit
- MDL: Method Detection Limit
- * / " : NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-MDL_No Alias.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.

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LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, Inc
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Analytical Report: Page 1 of 1
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9A2522

Report Date: 21-Feb-2019

Received on Ice (Y/N): No Temp: 2 °C

Destination Lab: Babcock Laboratories
6100 Quail Valley Court Riverside, CA 92507
(951)653-3351

Page 1 of 1

Chain of Custody

Client: Amec Foster Wheeler Environment and Infrastructure Phone No. 760-644-0167		Contact: Garth Engelhorn email: garth.engelhorn@altaenviron.com		Fax: No.		Additional Reporting Requests Include QC Data Package				
Project Name: Lake Elsinore Project Project Location: Salt Creek/San Jacinto/Canyon Lake			Turn Around Time: Routine *Lab TAT Approval		By:					
Sampler Information		# of Containers & Preservatives		Sample Type		Analysis Requested		Matrix	Notes	
Name: <u>Austin Kay</u> Employer: <u>Alta</u> Signature: <u>[Signature]</u>		Unpreserved H2SO4 HNO3		Total # of Containers Routine Resample Special		Nitrate EPA 300.0 Nitrite SM4500-NO2B Ammonia SM4500-NH3 H TKN EPA 351.3 Total Phosphorous SM 4500-PE OrthoPhosphate SM4500-PE TSS SM2540C TDS EPA 160.1 Total Hardness SM2340C Total Organic Nitrogen (calc) Total Nitrogen (calc)				
Sample ID	Date	Time								
<u>CLS-012019</u>	<u>1/20/19</u>	<u>09:02</u>	1	1	3	X	X	X	X	Stormwater
Relinquished By (sign)		Print Name /Company		Date/Time		Received By (sign)		Print Name /Company		
<u>[Signature]</u>		<u>Austin Kay / Alta</u>		<u>1/21/19 13:41</u> <u>1/21/19 13:42</u>		<u>[Signature]</u>		<u>DeAnna Tillman ESB</u>		
Samples submitted on ice? Yes No			Custody Seals intact? Yes No <u>N/A</u>			Samples intact? Yes No			Temperature: <u>2</u> °C	
Sample meets laboratory acceptance criteria? Yes No			Permission to continue? Yes No			Deviation/Notes: _____			Signature/Date: _____	

B9A2522
1/21/2019 13:51
AJG

STORM 4
January 31, 2019 - February 6, 2019



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
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Analytical Report: Page 1 of 6
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore Project

Work Order Number: B9B0042

Report Date: 15-Feb-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B9B0042-01	S-03-020119	Liquid	02/01/19 06:46	Bridgette Reddingto	02/01/19 10:41	Bridgette Reddington
B9B0042-02	S-04-020119	Liquid	02/01/19 07:40	Bridgette Reddingto	02/01/19 10:41	Bridgette Reddington
B9B0042-03	CLS-020119	Liquid	02/01/19 09:00	Bridgette Reddingto	02/01/19 10:41	Bridgette Reddington



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
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Analytical Report: Page 2 of 6
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore Project

Work Order Number: B9B0042

Report Date: 15-Feb-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Laboratory Reference Number

B9B0042-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
S-03-020119	Liquid	02/01/19 06:46	02/01/19 10:41

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Aggregate Organic Compounds								
Biochemical Oxygen Demand	ND	10	10	mg/L	SM 5210B	02/01/19 22:24	HRL	N-BOD2
Chemical Oxygen Demand	35	10	7.4	mg/L	SM 5220D	02/08/19 09:50	KAA	

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Analytical Report: Page 3 of 6
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore Project

Work Order Number: B9B0042

Report Date: 15-Feb-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Laboratory Reference Number

B9B0042-02

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
S-04-020119	Liquid	02/01/19 07:40	02/01/19 10:41

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Aggregate Organic Compounds								
Biochemical Oxygen Demand	ND	5.0	5.0	mg/L	SM 5210B	02/01/19 22:24	HRL	N-BOD2
Chemical Oxygen Demand	16	10	7.4	mg/L	SM 5220D	02/08/19 09:50	KAA	

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LACSD No. 10119



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Analytical Report: Page 4 of 6
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore Project

Work Order Number: B9B0042

Report Date: 15-Feb-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Laboratory Reference Number

B9B0042-03

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CLS-020119	Liquid	02/01/19 09:00	02/01/19 10:41

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Aggregate Organic Compounds								
Biochemical Oxygen Demand	ND	5.0	5.0	mg/L	SM 5210B	02/01/19 22:24	HRL	N-BOD2
Chemical Oxygen Demand	ND	10	7.4	mg/L	SM 5220D	02/08/19 09:50	KAA	

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CA ELAP No. 2698
EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 5 of 6
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore Project

Report Date: 15-Feb-2019

Work Order Number: B9B0042

Received on Ice (Y/N): Yes Temp: 1 °C

Aggregate Organic Compounds - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B01073 - Analyzed as received										
Blank (9B01073-BLK1)				Prepared & Analyzed: 02/01/19						
Biochemical Oxygen Demand	ND	1.0	1.0	mg/L						
LCS (9B01073-BS1)				Prepared & Analyzed: 02/01/19						
Biochemical Oxygen Demand	154	1.0	1.0	mg/L	198	78.0	85-115			Q-BOD2
Duplicate (9B01073-DUP1)				Source: B9B0063-01 Prepared & Analyzed: 02/01/19						
Biochemical Oxygen Demand	232	50	50	mg/L	213			8.66	20	
Batch 9B07054 - Acid Digest										
Blank (9B07054-BLK1)				Prepared: 02/07/19 Analyzed: 02/08/19						
Chemical Oxygen Demand	ND	10	7.4	mg/L						
LCS (9B07054-BS1)				Prepared: 02/07/19 Analyzed: 02/08/19						
Chemical Oxygen Demand	488	10	7.4	mg/L	500	97.7	95-105			
Matrix Spike (9B07054-MS1)				Source: B9B0100-01 Prepared: 02/07/19 Analyzed: 02/08/19						
Chemical Oxygen Demand	447	13	9.9	mg/L	333	288	47.8	80-120		QFpas, QMout
Matrix Spike Dup (9B07054-MSD1)				Source: B9B0100-01 Prepared: 02/07/19 Analyzed: 02/08/19						
Chemical Oxygen Demand	450	13	9.9	mg/L	333	288	48.7	80-120	0.683	20 QFpas, QMout

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Analytical Report: Page 6 of 6
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore Project

Work Order Number: B9B0042

Report Date: 15-Feb-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Notes and Definitions

N-BOD2 The LCS is outside method acceptance limits. As per method, data is reportable as qualified.

Q-BOD2 This LCS is outside method acceptance limits. As per method, data is reportable as qualified.

QFpas Follow-up result within laboratory acceptance criteria.

QMout MS and/or MSD recovery did not meet laboratory acceptance criteria.

ND: Analyte NOT DETECTED at or above the Method Detection Limit (if MDL is reported), otherwise at or above the Reportable Detection Limit (RDL)

NR: Not Reported

RDL: Reportable Detection Limit

MDL: Method Detection Limit

* / " : NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-MDL_No Alias.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.

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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
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Analytical Report: Page 1 of 1
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore Project

Work Order Number: B9B0042

Report Date: 15-Feb-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Destination Lab: Babcock Laboratories
6100 Quail Valley Court Riverside, CA 92507

Chain of Custody

(951)653-3351
Client: Amec Foster Wheeler Environment and Infrastructure Contact: Garth Engelhorn Fax: No.
Phone No. 760-644-0167 email: garth.engelhorn@altaenviron.com
Project Name: Lake Elsinore Project Turn Around Time: Routine
Project Location: Salt Creek/San Jacinto/Canyon Lake *Lab TAT Approval By:

Sampler Information		# of Containers & Preservatives		Sample Type			Analysis Requested				Matrix	Notes	
Name:	Employer:	Signature:	Unpreserved	H2SO4	HNO3	Total # of Containers	Routine	Resample	Special	COD SM/5220D	BOD SM/5210B		
Bridgette Reddington	Alta	Bridgette Reddington											
S-03 Sample ID	Date	Time											
S-03-020119	2/1/19	06:46	1	i		2	X			X	X	Stormwater	pH taken at 06:46
S-04-020119	2/1/19	07:40	1	i		2	X			X	X		pH taken at 07:40
CLS-020119	2/1/19	09:00	1	i		2	X			X	X		pH taken at 09:00

Relinquished By (sign) Print Name /Company Date/Time Received By (sign) Print Name /Company
Bridgette Reddington ALTA ENVIRONMENTAL 02/01/19 10:41 JB ESB

Samples submitted on ice? Yes No
Custody Seals intact? Yes No N/A
Samples intact? Yes No
Temperature: 1 °C
Sample meets laboratory acceptance criteria? Yes No
Permission to continue? Yes No
Deviation/Notes:
Signature/Date:

B9B0042
2/01/2019 12:15
AJG



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 10
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9B0437

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 3 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B9B0437-01	S-03-020419	Liquid	02/04/19 09:30	Austin Kay	02/05/19 13:47	Austin Kay
B9B0437-02	S-04-020419	Liquid	02/04/19 10:30	Austin Kay	02/05/19 13:47	Austin Kay



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Analytical Report: Page 2 of 10
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9B0437

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number

B9B0437-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
S-03-020419	Liquid	02/04/19 09:30	02/05/19 13:47

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Cations								
Total Hardness	150	15	1.8	mg/L	SM 2340B/EPA 200.7	02/13/19 16:27	KCS	
Calcium	37	5.0	1.6	mg/L	EPA 200.7	02/13/19 16:27	KCS	
Magnesium	13	5.0	1.8	mg/L	EPA 200.7	02/13/19 16:27	KCS	
Anions								
Nitrate as N	0.35	0.20	0.055	mg/L	EPA 300.0	02/06/19 02:32	KBS	
Nitrite as N	ND	0.10	0.059	mg/L	EPA 300.0	02/06/19 02:32	KBS	
Solids								
Total Dissolved Solids	350	20	20	mg/L	SM 2540C	02/07/19 21:45	JGZ	
Total Suspended Solids	78	5	5	mg/L	SM 2540D	02/08/19 08:30	ATR	
Nutrients								
Ammonia-Nitrogen	ND	1.0	0.48	mg/L	SM4500NH3H G	02/08/19 12:21	SLL	
Kjeldahl Nitrogen	1.5	0.20	0.13	mg/L	EPA 351.2	02/08/19 11:14	SLL	
Organic Nitrogen	1.5	1.0	1.0	mg/L	Calculation			
Total Nitrogen	1.9	1.0	0.13	mg/L	Calculation			
Ortho Phosphate Phosphorus	0.21	0.050	0.016	mg/L	SM 4500P E	02/05/19 16:49	ATR	
Total Phosphorus	0.46	0.05	0.02	mg/L	SM 4500P B E	02/11/19 15:42	ATR	

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Analytical Report: Page 3 of 10
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9B0437

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 3 °C

Laboratory Reference Number

B9B0437-02

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
S-04-020419	Liquid	02/04/19 10:30	02/05/19 13:47

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Cations								
Total Hardness	72	15	1.8	mg/L	SM 2340B/EPA 200.7	02/13/19 16:29	KCS	
Calcium	18	5.0	1.6	mg/L	EPA 200.7	02/13/19 16:29	KCS	
Magnesium	6.8	5.0	1.8	mg/L	EPA 200.7	02/13/19 16:29	KCS	
Anions								
Nitrate as N	0.44	0.20	0.055	mg/L	EPA 300.0	02/06/19 02:44	KBS	
Nitrite as N	ND	0.10	0.059	mg/L	EPA 300.0	02/06/19 02:44	KBS	
Solids								
Total Dissolved Solids	170	10	10	mg/L	SM 2540C	02/07/19 21:45	JGZ	
Total Suspended Solids	150	10	10	mg/L	SM 2540D	02/08/19 08:30	ATR	
Nutrients								
Ammonia-Nitrogen	ND	5.0	2.4	mg/L	SM4500NH3H G	02/07/19 12:33	DNF	
Kjeldahl Nitrogen	0.89	0.20	0.13	mg/L	EPA 351.2	02/08/19 10:12	SLL	
Organic Nitrogen	ND	5.0		mg/L	Calculation			
Total Nitrogen	ND	5.0	0.13	mg/L	Calculation			
Ortho Phosphate Phosphorus	0.21	0.050	0.016	mg/L	SM 4500P E	02/05/19 16:49	ATR	
Total Phosphorus	0.57	0.05	0.02	mg/L	SM 4500P B E	02/11/19 15:42	ATR	



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Client Name: Wood Environment&Infrastructure Solutions, Inc
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Analytical Report: Page 4 of 10
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9B0437

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 3 °C

Cations - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B12117 - EPA 200.2										
Blank (9B12117-BLK1)				Prepared & Analyzed: 02/13/19						
Calcium	ND	1.0	0.31	mg/L						
Magnesium	ND	1.0	0.35	mg/L						
LCS (9B12117-BS1)				Prepared & Analyzed: 02/13/19						
Calcium	16.6	1.0	0.31	mg/L	17.0	97.7	85-115			
Magnesium	16.3	1.0	0.35	mg/L	17.0	95.6	85-115			
LCS Dup (9B12117-BSD1)				Prepared & Analyzed: 02/13/19						
Calcium	17.8	1.0	0.31	mg/L	17.0	105	85-115	7.16	20	
Magnesium	17.5	1.0	0.35	mg/L	17.0	103	85-115	7.54	20	
Matrix Spike (9B12117-MS1)				Source: B9B0142-01RE1 Prepared & Analyzed: 02/13/19						
Calcium	28.7	2.0	0.62	mg/L	17.0	11.7	100	70-130		
Magnesium	18.6	2.0	0.70	mg/L	17.0	1.81	98.9	70-130		
Matrix Spike (9B12117-MS2)				Source: B9B0460-06 Prepared & Analyzed: 02/13/19						
Calcium	64.4	5.0	1.6	mg/L	17.0	48.2	95.6	70-130		
Magnesium	25.3	5.0	1.8	mg/L	17.0	8.47	99.3	70-130		



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Analytical Report: Page 5 of 10
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9B0437

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 3 °C

Anions - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B05115 - Analyzed as Received IC										
Blank (9B05115-BLK1)				Prepared & Analyzed: 02/05/19						
Nitrite as N	ND	0.10	0.059	mg/L						
Nitrate as N	ND	0.20	0.055	mg/L						
LCS (9B05115-BS1)				Prepared & Analyzed: 02/05/19						
Nitrite as N	2.49	0.10	0.059	mg/L	2.50	99.8	90-110			
Nitrate as N	5.31	0.20	0.055	mg/L	5.65	94.0	90-110			
Matrix Spike (9B05115-MS1)				Source: B9B0390-01 Prepared & Analyzed: 02/06/19						
Nitrite as N	2.33	0.10	0.059	mg/L	2.50	ND	93.3	80-120		
Nitrate as N	5.68	0.20	0.055	mg/L	5.65	0.309	95.0	75-131		
Matrix Spike (9B05115-MS2)				Source: B9B0435-01 Prepared & Analyzed: 02/06/19						
Nitrite as N	0.118	0.10	0.059	mg/L	2.50	ND	4.70	80-120		QMint
Nitrate as N	7.00	0.20	0.055	mg/L	5.65	1.51	97.2	75-131		
Matrix Spike Dup (9B05115-MSD1)				Source: B9B0390-01 Prepared & Analyzed: 02/06/19						
Nitrite as N	2.41	0.10	0.059	mg/L	2.50	ND	96.5	80-120	3.36	20
Nitrate as N	5.81	0.20	0.055	mg/L	5.65	0.309	97.3	75-131	2.28	20



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Analytical Report: Page 6 of 10
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9B0437

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 3 °C

Solids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B07065 - Analyzed as received										
Blank (9B07065-BLK1)				Prepared & Analyzed: 02/07/19						
Total Dissolved Solids	ND	10	10	mg/L						
LCS (9B07065-BS1)				Prepared & Analyzed: 02/07/19						
Total Dissolved Solids	728	10	10	mg/L	746	97.6	90-110			
Duplicate (9B07065-DUP1)				Source: B9B0216-01 Prepared & Analyzed: 02/07/19						
Total Dissolved Solids	504	10	10	mg/L	497			1.40	20	
Duplicate (9B07065-DUP2)				Source: B9B0373-01 Prepared & Analyzed: 02/07/19						
Total Dissolved Solids	290	10	10	mg/L	290			0.00	20	
Batch 9B08013 - Analyzed as received										
Blank (9B08013-BLK1)				Prepared & Analyzed: 02/08/19						
Total Suspended Solids	ND	0.5	0.5	mg/L						
LCS (9B08013-BS1)				Prepared & Analyzed: 02/08/19						
Total Suspended Solids	486	50	50	mg/L	500	97.2	90-110			
Duplicate (9B08013-DUP1)				Source: B9B0205-01 Prepared & Analyzed: 02/08/19						
Total Suspended Solids	104	10	10	mg/L	114			9.17	25	
Duplicate (9B08013-DUP2)				Source: B9B0419-02 Prepared & Analyzed: 02/08/19						
Total Suspended Solids	336	10	10	mg/L	362			7.45	25	



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Analytical Report: Page 7 of 10
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9B0437

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 3 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B05153 - Filter if turbid.										
LCS (9B05153-BS1)				Prepared & Analyzed: 02/05/19						
Ortho Phosphate Phosphorus	0.495	0.050	0.016	mg/L	0.500	99.0	90-110			
Matrix Spike (9B05153-MS1)				Source: B9B0437-01 Prepared & Analyzed: 02/05/19						
Ortho Phosphate Phosphorus	0.739	0.050	0.016	mg/L	0.500	0.209	106	80-120		
Matrix Spike Dup (9B05153-MSD1)				Source: B9B0437-01 Prepared & Analyzed: 02/05/19						
Ortho Phosphate Phosphorus	0.752	0.050	0.016	mg/L	0.500	0.209	109	80-120	1.83	20
Batch 9B07017 - Acid Digest										
Blank (9B07017-BLK1)				Prepared: 02/07/19 Analyzed: 02/08/19						
Kjeldahl Nitrogen	ND	0.10	0.063	mg/L						
LCS (9B07017-BS1)				Prepared: 02/07/19 Analyzed: 02/08/19						
Kjeldahl Nitrogen	0.807	0.10	0.063	mg/L	1.00	80.7	80-120			
Matrix Spike (9B07017-MS1)				Source: B9B0626-01 Prepared: 02/07/19 Analyzed: 02/08/19						
Kjeldahl Nitrogen	136	8.0	5.0	mg/L	80.0	49.3	108	42-154		
Matrix Spike (9B07017-MS2)				Source: B9B0626-02 Prepared: 02/07/19 Analyzed: 02/08/19						
Kjeldahl Nitrogen	3.94	0.20	0.13	mg/L	2.00	1.83	106	42-154		
Batch 9B07029 - Analyzed as received										
Blank (9B07029-BLK1)				Prepared & Analyzed: 02/07/19						
Ammonia-Nitrogen	ND	0.10	0.048	mg/L						



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Analytical Report: Page 8 of 10
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9B0437

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 3 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B07029 - Analyzed as received										
LCS (9B07029-BS1)				Prepared & Analyzed: 02/07/19						
Ammonia-Nitrogen	0.747	0.10	0.048	mg/L	0.780	95.8	90-110			
Matrix Spike (9B07029-MS1)				Source: B9B0734-02 Prepared & Analyzed: 02/07/19						
Ammonia-Nitrogen	6.02	0.10	0.048	mg/L	0.780	6.00	1.65	80-120		QFpas, QMout, QOcal
Matrix Spike Dup (9B07029-MSD1)				Source: B9B0734-02 Prepared & Analyzed: 02/07/19						
Ammonia-Nitrogen	5.97	0.10	0.048	mg/L	0.780	6.00	NR	80-120	0.716	20 QFpas, QMout, QOcal
Batch 9B08026 - Analyzed as received										
Blank (9B08026-BLK1)				Prepared & Analyzed: 02/08/19						
Ammonia-Nitrogen	ND	0.10	0.048	mg/L						
LCS (9B08026-BS1)				Prepared & Analyzed: 02/08/19						
Ammonia-Nitrogen	0.746	0.10	0.048	mg/L	0.780	95.6	90-110			
Matrix Spike (9B08026-MS1)				Source: B9B0734-02RE1 Prepared & Analyzed: 02/08/19						
Ammonia-Nitrogen	38.0	2.0	0.95	mg/L	7.80	28.7	119	80-120		
Matrix Spike Dup (9B08026-MSD1)				Source: B9B0734-02RE1 Prepared & Analyzed: 02/08/19						
Ammonia-Nitrogen	36.3	2.0	0.95	mg/L	7.80	28.7	97.4	80-120	4.56	20
Batch 9B11073 - Acid Digest										
LCS (9B11073-BS1)				Prepared & Analyzed: 02/11/19						
Total Phosphorus	0.531	0.05	0.02	mg/L	0.500	106	85-115			



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Client Name: Wood Environment&Infrastructure Solutions, Inc

Contact: John Rudolph

Address: 9210 Sky Park Court #200

San Diego, CA 92123

Analytical Report: Page 9 of 10

Project Name: Amec Foster Wheeler-Lake Elsinore

Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9B0437

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes

Temp: 3 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B11073 - Acid Digest										
Matrix Spike (9B11073-MS1)		Source: B9A3855-05			Prepared & Analyzed: 02/11/19					
Total Phosphorus	0.815	0.05	0.02	mg/L	0.500	0.278	107	80-120		
Matrix Spike Dup (9B11073-MSD1)		Source: B9A3855-05			Prepared & Analyzed: 02/11/19					
Total Phosphorus	0.806	0.05	0.02	mg/L	0.500	0.278	106	80-120	1.06	20



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 10 of 10
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9B0437

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 3 °C

Notes and Definitions

- J Estimated value
- QFpas Follow-up result within laboratory acceptance criteria.
- QMint Due to matrix interference, the MS and/or MSD did not meet laboratory acceptance criteria.
- QMout MS and/or MSD recovery did not meet laboratory acceptance criteria.
- QOcal The concentration indicated for this analyte is an estimated value above the calibration range of the instrument.
- ND: Analyte NOT DETECTED at or above the Method Detection Limit (**if MDL is reported**), otherwise at or above the Reportable Detection Limit (RDL)
- NR: Not Reported
- RDL: Reportable Detection Limit
- MDL: Method Detection Limit
- * / " : NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-MDL_No Alias.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.

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EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, Inc
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 1 of 1
 Project Name: Amec Foster Wheeler-Lake Elsinore
 Project Number: Lake Elsinore Proj. Salt Creek/SJ/C

Work Order Number: B9B0437

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 3 °C

Destination Lab: Babcock Laboratories
 6100 Quail Valley Court Riverside, CA 92507
 (951)653-3351

Chain of Custody

Client: Amec Foster Wheeler Environment and Infrastructure		Contact: Garth Engelhorn		Fax: No.		Additional Reporting Requests			
Phone No. 760-644-0167		email: garth.engelhorn@altaenviron.com				Include QC Data Package			
Project Name: Lake Elsinore Project		Turn Around Time: Routine							
Project Location: Salt Creek/San Jacinto/Canyon Lake		*Lab TAT Approval		By:					
Sampler Information		# of Containers & Preservatives		Sample Type		Analysis Requested		Matrix	Notes
Name: <u>Austin Kay</u>		Unpreserved		Routine		Nitrate EPA 300.0			
Employer: <u>Alta</u>		H2SO4		Resample		Nitrite SM4500 - NO2B			
Signature: <u>[Signature]</u>		HNO3		Special		Ammonia SM4500-NH3 H			
Sample ID		Date		Time		TKN EPA 351.3			
S-03-020419		2/4/19		09:30		Total Phosphorous SM 4500-PE			
S-04-020419		2/4/19		10:30		OrthoPhosphate SM4500-PE			Stormwater
						TSS SM2540C			
						TDS EPA 160.1			
						Total Hardness SM2340C			
						Total Organic Nitrogen (calc)			
						Total Nitrogen (calc)			
Relinquished By (sign)		Print Name /Company		Date/Time		Received By (sign)		Print Name /Company	
<u>[Signature]</u>		Austin Kay /Alta		2/5/19 13:47		<u>[Signature]</u>		Nickaley/ESB	
Samples submitted on ice? Yes No		Custody Seals intact? Yes No N/A		Samples intact? Yes No		Temperature: <u>03</u> °C		Sample meets laboratory acceptance criteria? Yes No	
								Permission to continue? Yes No	
								Deviation/Notes: _____	
								Signature/Date: _____	
								Lab No. _____	
								Logged in By/Date: _____	
								Page _____ of _____	

B9B0437
 2/05/2019 13:47
 JUG





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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
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Analytical Report: Page 1 of 8
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore

Work Order Number: B9B0653

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B9B0653-01	CLS - 020619	Liquid	02/06/19 11:34	Austin Kay	02/06/19 13:40	Austin Kay



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 2 of 8
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore

Work Order Number: B9B0653

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Laboratory Reference Number

B9B0653-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CLS - 020619	Liquid	02/06/19 11:34	02/06/19 13:40

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Cations								
Total Hardness	230	15	1.8	mg/L	SM 2340B/EPA 200.7	02/14/19 17:20	KCS	
Calcium	59	5.0	1.6	mg/L	EPA 200.7	02/14/19 17:20	KCS	
Magnesium	20	5.0	1.8	mg/L	EPA 200.7	02/14/19 17:20	KCS	
Anions								
Nitrate as N	0.21	0.20	0.055	mg/L	EPA 300.0	02/07/19 04:14	KBS	
Nitrite as N	ND	0.10	0.059	mg/L	EPA 300.0	02/07/19 04:14	KBS	
Solids								
Total Dissolved Solids	470	10	10	mg/L	SM 2540C	02/13/19 11:50	DNF	
Total Suspended Solids	16	2	2	mg/L	SM 2540D	02/12/19 14:28	MWM	
Nutrients								
Ammonia-Nitrogen	0.070	0.10	0.048	mg/L	SM4500NH3H G	02/08/19 12:26	SLL	J
Kjeldahl Nitrogen	0.86	0.10	0.063	mg/L	EPA 351.2	02/08/19 11:15	SLL	
Organic Nitrogen	0.8	0.1		mg/L	Calculation			
Total Nitrogen	1.1	0.2	0.06	mg/L	Calculation			
Ortho Phosphate Phosphorus	ND	0.050	0.016	mg/L	SM 4500P E	02/06/19 17:07	ATR	
Total Phosphorus	0.14	0.05	0.02	mg/L	SM 4500P B E	02/19/19 15:05	ATR	

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NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
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Analytical Report: Page 3 of 8
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore

Work Order Number: B9B0653

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Cations - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B14018 - EPA 200.2										
Blank (9B14018-BLK1)					Prepared & Analyzed: 02/14/19					
Calcium	ND	1.0	0.31	mg/L						
Magnesium	ND	1.0	0.35	mg/L						
LCS (9B14018-BS1)					Prepared & Analyzed: 02/14/19					
Calcium	17.0	1.0	0.31	mg/L	17.0	99.8	85-115			
Magnesium	16.5	1.0	0.35	mg/L	17.0	97.3	85-115			
LCS Dup (9B14018-BSD1)					Prepared & Analyzed: 02/14/19					
Calcium	16.5	1.0	0.31	mg/L	17.0	96.9	85-115	3.00	20	
Magnesium	16.0	1.0	0.35	mg/L	17.0	94.2	85-115	3.21	20	
Matrix Spike (9B14018-MS1)					Source: B9B0357-01 Prepared & Analyzed: 02/14/19					
Calcium	18.4	2.0	0.62	mg/L	17.0	1.94	97.1	70-130		
Magnesium	16.4	2.0	0.70	mg/L	17.0	ND	96.4	70-130		
Matrix Spike (9B14018-MS2)					Source: B9B0357-02 Prepared & Analyzed: 02/14/19					
Calcium	30.9	2.0	0.62	mg/L	17.0	13.7	102	70-130		
Magnesium	19.9	2.0	0.70	mg/L	17.0	3.25	98.0	70-130		



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
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Analytical Report: Page 4 of 8
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore

Work Order Number: B9B0653

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Anions - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B06142 - Analyzed as Received IC										
Blank (9B06142-BLK1)				Prepared & Analyzed: 02/07/19						
Nitrite as N	ND	0.10	0.059	mg/L						
Nitrate as N	ND	0.20	0.055	mg/L						
LCS (9B06142-BS1)				Prepared & Analyzed: 02/07/19						
Nitrite as N	2.51	0.10	0.059	mg/L	2.50	100	90-110			
Nitrate as N	5.25	0.20	0.055	mg/L	5.65	93.0	90-110			
Matrix Spike (9B06142-MS1)				Source: B9B0625-01 Prepared & Analyzed: 02/07/19						
Nitrite as N	2.38	0.10	0.059	mg/L	2.50	ND	95.3	80-120		
Nitrate as N	5.36	0.20	0.055	mg/L	5.65	0.153	92.2	75-131		
Matrix Spike (9B06142-MS2)				Source: B9B0749-01 Prepared & Analyzed: 02/07/19						
Nitrite as N	3.51	0.10	0.059	mg/L	2.50	0.953	102	80-120		
Nitrate as N	18.3	0.20	0.055	mg/L	5.65	12.7	99.8	75-131		
Matrix Spike Dup (9B06142-MSD1)				Source: B9B0625-01 Prepared & Analyzed: 02/07/19						
Nitrite as N	2.43	0.10	0.059	mg/L	2.50	ND	97.4	80-120	2.18	20
Nitrate as N	5.51	0.20	0.055	mg/L	5.65	0.153	94.8	75-131	2.73	20



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
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Analytical Report: Page 5 of 8
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore

Work Order Number: B9B0653

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Solids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B12123 - Analyzed as received										
Blank (9B12123-BLK1)					Prepared & Analyzed: 02/12/19					
Total Suspended Solids	ND	0.5	0.5	mg/L						
LCS (9B12123-BS1)					Prepared & Analyzed: 02/12/19					
Total Suspended Solids	494	50	50	mg/L	500	98.8	90-110			
Duplicate (9B12123-DUP1)					Source: B9B0636-02 Prepared & Analyzed: 02/12/19					
Total Suspended Solids	1120	50	50	mg/L	1020			9.35	25	
Duplicate (9B12123-DUP2)					Source: B9B0640-01 Prepared & Analyzed: 02/12/19					
Total Suspended Solids	70.0	10	10	mg/L	64.0			8.96	25	
Batch 9B13075 - Analyzed as received										
Blank (9B13075-BLK1)					Prepared & Analyzed: 02/13/19					
Total Dissolved Solids	ND	10	10	mg/L						
LCS (9B13075-BS1)					Prepared & Analyzed: 02/13/19					
Total Dissolved Solids	722	10	10	mg/L	746	96.8	90-110			
Duplicate (9B13075-DUP1)					Source: B9B0641-01 Prepared & Analyzed: 02/13/19					
Total Dissolved Solids	389	10	10	mg/L	383			1.55	20	
Duplicate (9B13075-DUP2)					Source: B9B0645-01 Prepared & Analyzed: 02/13/19					
Total Dissolved Solids	503	10	10	mg/L	488			3.03	20	



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
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San Diego, CA 92123

Analytical Report: Page 6 of 8
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore

Work Order Number: B9B0653

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B05153 - Filter if turbid.										
LCS (9B05153-BS1)				Prepared & Analyzed: 02/05/19						
Ortho Phosphate Phosphorus	0.495	0.050	0.016	mg/L	0.500	99.0	90-110			
Matrix Spike (9B05153-MS1)				Source: B9B0437-01 Prepared & Analyzed: 02/05/19						
Ortho Phosphate Phosphorus	0.739	0.050	0.016	mg/L	0.500	0.209	106	80-120		
Matrix Spike Dup (9B05153-MSD1)				Source: B9B0437-01 Prepared & Analyzed: 02/05/19						
Ortho Phosphate Phosphorus	0.752	0.050	0.016	mg/L	0.500	0.209	109	80-120	1.83	20
Batch 9B07017 - Acid Digest										
Blank (9B07017-BLK1)				Prepared: 02/07/19 Analyzed: 02/08/19						
Kjeldahl Nitrogen	ND	0.10	0.063	mg/L						
LCS (9B07017-BS1)				Prepared: 02/07/19 Analyzed: 02/08/19						
Kjeldahl Nitrogen	0.807	0.10	0.063	mg/L	1.00	80.7	80-120			
Matrix Spike (9B07017-MS1)				Source: B9B0626-01 Prepared: 02/07/19 Analyzed: 02/08/19						
Kjeldahl Nitrogen	136	8.0	5.0	mg/L	80.0	49.3	108	42-154		
Matrix Spike (9B07017-MS2)				Source: B9B0626-02 Prepared: 02/07/19 Analyzed: 02/08/19						
Kjeldahl Nitrogen	3.94	0.20	0.13	mg/L	2.00	1.83	106	42-154		
Batch 9B08026 - Analyzed as received										
Blank (9B08026-BLK1)				Prepared & Analyzed: 02/08/19						
Ammonia-Nitrogen	ND	0.10	0.048	mg/L						



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 7 of 8
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore

Work Order Number: B9B0653

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B08026 - Analyzed as received										
LCS (9B08026-BS1)				Prepared & Analyzed: 02/08/19						
Ammonia-Nitrogen	0.746	0.10	0.048	mg/L	0.780	95.6	90-110			
Matrix Spike (9B08026-MS1)				Source: B9B0734-02RE1 Prepared & Analyzed: 02/08/19						
Ammonia-Nitrogen	38.0	2.0	0.95	mg/L	7.80	28.7	119	80-120		
Matrix Spike Dup (9B08026-MSD1)				Source: B9B0734-02RE1 Prepared & Analyzed: 02/08/19						
Ammonia-Nitrogen	36.3	2.0	0.95	mg/L	7.80	28.7	97.4	80-120	4.56	20
Batch 9B19072 - Acid Digest										
LCS (9B19072-BS1)				Prepared & Analyzed: 02/19/19						
Total Phosphorus	0.493	0.05	0.02	mg/L	0.500	98.7	85-115			
Matrix Spike (9B19072-MS1)				Source: B9B1441-09 Prepared & Analyzed: 02/19/19						
Total Phosphorus	0.625	0.05	0.02	mg/L	0.500	0.129	99.2	80-120		
Matrix Spike Dup (9B19072-MSD1)				Source: B9B1441-09 Prepared & Analyzed: 02/19/19						
Total Phosphorus	0.651	0.05	0.02	mg/L	0.500	0.129	104	80-120	4.04	20



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 8 of 8
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore

Work Order Number: B9B0653

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Notes and Definitions

- J Estimated value
- ND: Analyte NOT DETECTED at or above the Method Detection Limit (if MDL is reported), otherwise at or above the Reportable Detection Limit (RDL)
- NR: Not Reported
- RDL: Reportable Detection Limit
- MDL: Method Detection Limit
- * / " : NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-MDL_No Alias.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.

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CA ELAP No. 2698
EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 1
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore

Work Order Number: B9B0653

Report Date: 21-Feb-2019

Received on Ice (Y/N): Yes Temp: 1 °C

Destination Lab: Babcock Laboratories
6100 Quail Valley Court Riverside, CA 92507
(951)653-3351

Chain of Custody

Client: Amec Foster Wheeler Environment and Infrastructure Phone No. 760-644-0167		Contact: Garth Engelhorn email: garth.engelhorn@altaenviron.com		Fax: No.		Additional Reporting Requests Include QC Data Package	
Project Name: Lake Elsinore Project Project Location: Salt Creek/San Jacinto/Canyon Lake			Turn Around Time: Routine		*Lab TAT Approval By:		

Sampler Information			# of Containers & Preservatives			Sample Type		Analysis Requested										Matrix	Notes			
Name:	Employer:	Signature:	Unpreserved	H2SO4	HNO3	Total # of Containers	Routine	Resample	Special	Nitrate EPA 300.0	Nitrite SM4500 - ND2B	Ammonia SM4500-NH3 H	TKN EPA 351.3	Total Phosphorous SM 4500-PE	OrthoPhosphate SM4500-PE	TSS SM2540C	TDS EPA 160.1	Total Hardness SM2340C	Total Organic Nitrogen (calc)	Total Nitrogen (calc)		
CL5-020619	Alta	[Signature]	1	1		3	X			X	X	X	X	X	X	X	X	X	X	X	X	Stormwater

Relinquished By (sign)	Print Name /Company	Date/Time	Received By (sign)	Print Name /Company
[Signature]	Austin Kay /Alta	2/16/19 13:40	Alex [Signature]	Alex Griffin /ESB

Samples submitted on ice? Yes No
 Custody Seals intact? Yes No N/A
 Samples intact? Yes No
 Temperature: 1 °C

Sample meets laboratory acceptance criteria? Yes No
 Permission to continue? Yes No
 Deviation/Notes: _____
 Signature/Date: _____

B9B0653
2/06/2019 13:40
JUG AJG

STORM 5
February 14-18, 2019



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 4
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore Project

Work Order Number: B9B1764

Report Date: 01-Mar-2019

Received on Ice (Y/N): Yes Temp: 5 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B9B1764-01	CLS-021419	Liquid	02/14/19 10:45	Austin Kay	02/14/19 12:52	Austin Kay



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 2 of 4
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore Project

Work Order Number: B9B1764

Report Date: 01-Mar-2019

Received on Ice (Y/N): Yes Temp: 5 °C

Laboratory Reference Number

B9B1764-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CLS-021419	Liquid	02/14/19 10:45	02/14/19 12:52

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Aggregate Organic Compounds								
Biochemical Oxygen Demand	ND	10	10	mg/L	SM 5210B	02/15/19 12:55	ATR	N-BOD1, N-BOD2
Chemical Oxygen Demand	41	10	7.4	mg/L	SM 5220D	02/19/19 15:25	CAA	

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Riverside, CA 92502-0432

location
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CA ELAP No. 2698
EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 3 of 4
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore Project

Report Date: 01-Mar-2019

Work Order Number: B9B1764

Received on Ice (Y/N): Yes Temp: 5 °C

Aggregate Organic Compounds - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B15011 - Analyzed as received										
Blank (9B15011-BLK1)					Prepared & Analyzed: 02/15/19					
Biochemical Oxygen Demand	ND	1.0	1.0	mg/L						
LCS (9B15011-BS1)					Prepared & Analyzed: 02/15/19					
Biochemical Oxygen Demand	127	1.0	1.0	mg/L	198	64.0	85-115			Q-BOD2
Duplicate (9B15011-DUP1)					Source: B9B1723-01 Prepared & Analyzed: 02/15/19					
Biochemical Oxygen Demand	289	50	50	mg/L	262			9.81	20	
Batch 9B19086 - Acid Digest										
Blank (9B19086-BLK1)					Prepared & Analyzed: 02/19/19					
Chemical Oxygen Demand	ND	10	7.4	mg/L						
LCS (9B19086-BS1)					Prepared & Analyzed: 02/19/19					
Chemical Oxygen Demand	511	10	7.4	mg/L	500	102	95-105			
Matrix Spike (9B19086-MS1)					Source: B9B1932-01 Prepared & Analyzed: 02/19/19					
Chemical Oxygen Demand	368	13	9.9	mg/L	333	29.9	101	80-120		
Matrix Spike Dup (9B19086-MSD1)					Source: B9B1932-01 Prepared & Analyzed: 02/19/19					
Chemical Oxygen Demand	377	13	9.9	mg/L	333	29.9	104	80-120	2.47	20

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Analytical Report: Page 4 of 4
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore Project

Work Order Number: B9B1764

Report Date: 01-Mar-2019

Received on Ice (Y/N): Yes Temp: 5 °C

Notes and Definitions

- N-BOD1 Dilution water blank exceeds 0.20 mg/L. As per method, data is reportable as qualified.
- N-BOD2 The LCS is outside method acceptance limits. As per method, data is reportable as qualified.
- Q-BOD2 This LCS is outside method acceptance limits. As per method, data is reportable as qualified.
- ND: Analyte NOT DETECTED at or above the Method Detection Limit (**if MDL is reported**), otherwise at or above the Reportable Detection Limit (RDL)
- NR: Not Reported
- RDL: Reportable Detection Limit
- MDL: Method Detection Limit
- * / "" : NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-MDL_No Alias.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.

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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 1
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore Project

Work Order Number: B9B1764

Report Date: 01-Mar-2019

Received on Ice (Y/N): Yes Temp: 5 °C

Destination Lab: Babcock Laboratories
6100 Quail Valley Court Riverside, CA 92507
(951)653-3351

Chain of Custody

Client: Amec Foster Wheeler Environment and Infrastructure Phone No. 760-644-0167		Contact: Garth Engelhorn email: garth.engelhorn@altaenviron.com		Fax: No.		Additional Reporting Requests							
Project Name: Lake Elsinore Project			Turn Around Time: Routine										
Project Location: Salt Creek/San Jacinto/Canyon Lake			*Lab TAT Approval		By:								
Sampler Information		# of Containers & Preservatives		Sample Type		Analysis Requested		Matrix	Notes				
Name: <u>Austin Kay</u>													
Employer: <u>Alta</u>													
Signature: <u>[Signature]</u>													
Sample ID	Date	Time	Unpreserved	H2SO4	HNO3	Total # of Containers	Routine	Resample	Special	COD SM5220D	BOD SM5210B	Matrix	Notes
<u>CLS-021419</u>	<u>2/14/19</u>	<u>14:05</u>				<u>2</u>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Stormwater	
Relinquished By (sign)		Print Name /Company		Date/Time		Received By (sign)		Print Name /Company					
<u>[Signature]</u>		<u>Austin Kay / Alta</u>		<u>2/14/19 12:52</u>		<u>[Signature]</u>		<u>Jenny G. ESB</u>					
Samples submitted on ice? Yes No		Custody Seals intact? Yes No		Samples intact? Yes No		Temperature: <u>5</u> °C		Sample meets laboratory acceptance criteria? Yes No		Permission to continue? Yes No		Deviation/Notes:	
<input checked="" type="checkbox"/> No		<input checked="" type="checkbox"/> No <u>(N/A)</u>		<input checked="" type="checkbox"/> No				<input checked="" type="checkbox"/> No		<input type="checkbox"/> No			
Signature/Date:													

B9B1764
2/14/2019 14:06
AJG



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
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Analytical Report: Page 1 of 9
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore - Salt Creek/San J

Report Date: 05-Mar-2019

Work Order Number: B9B2112
Received on Ice (Y/N): Yes Temp: 1 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B9B2112-01	CLS - 021819	Liquid	02/18/19 6:28	Austin Kay	02/19/19 09:58	Bridgette Reddington



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Analytical Report: Page 2 of 9
 Project Name: AMEC-Lake Elsinore
 Project Number: Lake Elsinore - Salt Creek/San J

Report Date: 05-Mar-2019

Work Order Number: B9B2112
 Received on Ice (Y/N): Yes Temp: 1 °C

Laboratory Reference Number

B9B2112-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CLS - 021819	Liquid	02/18/19 06:28	02/19/19 9:58

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Cations								
Total Hardness	220	3.0	0.35	mg/L	SM 2340B/EPA 200.7	02/26/19 21:34	KCS	
Calcium	55	1.0	0.31	mg/L	EPA 200.7	02/26/19 21:34	KCS	
Magnesium	19	1.0	0.35	mg/L	EPA 200.7	02/26/19 21:34	KCS	
Anions								
Nitrate as N	0.48	0.20	0.055	mg/L	EPA 300.0	02/19/19 18:02	KBS	
Nitrite as N	0.069	0.10	0.059	mg/L	EPA 300.0	02/19/19 18:02	KBS PblkJ, J	
Solids								
Total Dissolved Solids	430	10	10	mg/L	SM 2540C	02/21/19 15:39	BBR	
Total Suspended Solids	150	5	5	mg/L	SM 2540D	02/21/19 18:14	MWM	
Nutrients								
Ammonia-Nitrogen	0.11	0.10	0.048	mg/L	SM4500NH3H G	02/20/19 12:23	SLL	
Kjeldahl Nitrogen	1.1	0.10	0.063	mg/L	EPA 351.2	02/20/19 16:24	SLL	
Organic Nitrogen	1.0	0.1		mg/L	Calculation			
Total Nitrogen	1.6	0.2	0.06	mg/L	Calculation			
Ortho Phosphate Phosphorus	0.094	0.050	0.016	mg/L	SM 4500P E	02/19/19 15:51	ATR	
Total Phosphorus	0.32	0.05	0.02	mg/L	SM 4500P B E	02/25/19 10:35	ATR	



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Analytical Report: Page 3 of 9
 Project Name: AMEC-Lake Elsinore
 Project Number: Lake Elsinore - Salt Creek/San J

Report Date: 05-Mar-2019

Work Order Number: B9B2112
 Received on Ice (Y/N): Yes Temp: 1 °C

Cations - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B25125 - EPA 200.2										
Blank (9B25125-BLK1) Prepared: 02/25/19 Analyzed: 02/26/19										
Calcium	ND	1.0	0.31	mg/L						
Magnesium	ND	1.0	0.35	mg/L						
LCS (9B25125-BS1) Prepared: 02/25/19 Analyzed: 02/26/19										
Calcium	16.6	1.0	0.31	mg/L	17.0	97.7	85-115			
Magnesium	16.3	1.0	0.35	mg/L	17.0	95.8	85-115			
LCS Dup (9B25125-BSD1) Prepared: 02/25/19 Analyzed: 02/26/19										
Calcium	16.8	1.0	0.31	mg/L	17.0	98.7	85-115	1.07	20	
Magnesium	16.6	1.0	0.35	mg/L	17.0	97.7	85-115	2.05	20	
Matrix Spike (9B25125-MS1) Source: B9B1783-01 Prepared: 02/25/19 Analyzed: 02/26/19										
Calcium	17.3	2.0	0.62	mg/L	17.0	1.00	95.9	70-130		
Magnesium	16.4	2.0	0.70	mg/L	17.0	ND	96.4	70-130		
Matrix Spike (9B25125-MS2) Source: B9B1956-01RE1 Prepared: 02/25/19 Analyzed: 02/26/19										
Calcium	45.7	5.0	1.6	mg/L	17.0	29.3	96.8	70-130		
Magnesium	33.7	5.0	1.8	mg/L	17.0	16.9	98.9	70-130		



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Client Name: Wood Environment&Infrastructure Solutions, In
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 Address: 9210 Sky Park Court #200
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Analytical Report: Page 4 of 9
 Project Name: AMEC-Lake Elsinore
 Project Number: Lake Elsinore - Salt Creek/San J

Report Date: 05-Mar-2019

Work Order Number: B9B2112
 Received on Ice (Y/N): Yes Temp: 1 °C

Anions - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B19143 - Analyzed as Received IC										
Blank (9B19143-BLK1)				Prepared & Analyzed: 02/19/19						
Nitrite as N	0.0640	0.10	0.059	mg/L						J
Nitrate as N	0.176	0.20	0.055	mg/L						J
LCS (9B19143-BS1)				Prepared & Analyzed: 02/19/19						
Nitrite as N	2.40	0.10	0.059	mg/L	2.50	95.8	90-110			
Nitrate as N	5.64	0.20	0.055	mg/L	5.65	99.9	90-110			
Matrix Spike (9B19143-MS1)				Source: B9B2094-01		Prepared & Analyzed: 02/19/19				
Nitrite as N	2.67	0.10	0.059	mg/L	2.50	0.305	94.6	80-120		
Nitrate as N	6.50	0.20	0.055	mg/L	5.65	0.871	99.6	75-131		
Matrix Spike (9B19143-MS2)				Source: B9B2111-01		Prepared & Analyzed: 02/19/19				
Nitrite as N	2.34	0.10	0.059	mg/L	2.50	0.0780	90.4	80-120		
Nitrate as N	5.52	0.20	0.055	mg/L	5.65	0.223	93.7	75-131		
Matrix Spike Dup (9B19143-MSD1)				Source: B9B2094-01		Prepared & Analyzed: 02/19/19				
Nitrite as N	2.62	0.10	0.059	mg/L	2.50	0.305	92.5	80-120	1.95	20
Nitrate as N	6.48	0.20	0.055	mg/L	5.65	0.871	99.2	75-131	0.358	20



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Analytical Report: Page 5 of 9
 Project Name: AMEC-Lake Elsinore
 Project Number: Lake Elsinore - Salt Creek/San J

Report Date: 05-Mar-2019

Work Order Number: B9B2112
 Received on Ice (Y/N): Yes Temp: 1 °C

Solids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B21013 - Analyzed as received										
Blank (9B21013-BLK1) Prepared & Analyzed: 02/21/19										
Total Dissolved Solids	ND	10	10	mg/L						
LCS (9B21013-BS1) Prepared & Analyzed: 02/21/19										
Total Dissolved Solids	746	10	10	mg/L	746	100	90-110			
Duplicate (9B21013-DUP1) Source: B9B2270-01 Prepared & Analyzed: 02/21/19										
Total Dissolved Solids	248	10	10	mg/L	252			1.60	20	
Duplicate (9B21013-DUP2) Source: B9B2270-02 Prepared & Analyzed: 02/21/19										
Total Dissolved Solids	248	10	10	mg/L	242			2.45	20	
Batch 9B21054 - Analyzed as received										
Blank (9B21054-BLK1) Prepared & Analyzed: 02/21/19										
Total Suspended Solids	ND	0.5	0.5	mg/L						
LCS (9B21054-BS1) Prepared & Analyzed: 02/21/19										
Total Suspended Solids	490	50	50	mg/L	500	98.0	90-110			
Duplicate (9B21054-DUP1) Source: B9B2033-01 Prepared & Analyzed: 02/21/19										
Total Suspended Solids	ND	2	2	mg/L	ND				25	
Duplicate (9B21054-DUP2) Source: B9B2033-02 Prepared & Analyzed: 02/21/19										
Total Suspended Solids	ND	2	2	mg/L	ND				25	



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Analytical Report: Page 6 of 9
 Project Name: AMEC-Lake Elsinore
 Project Number: Lake Elsinore - Salt Creek/San J

Report Date: 05-Mar-2019

Work Order Number: B9B2112
 Received on Ice (Y/N): Yes Temp: 1 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B19149 - Filter if turbid.										
LCS (9B19149-BS1) Prepared & Analyzed: 02/19/19										
Ortho Phosphate Phosphorus	0.510	0.050	0.016	mg/L	0.500	102	90-110			
Matrix Spike (9B19149-MS1) Source: B9B2112-01 Prepared & Analyzed: 02/19/19										
Ortho Phosphate Phosphorus	0.628	0.050	0.016	mg/L	0.500	0.0944	107	80-120		
Matrix Spike Dup (9B19149-MSD1) Source: B9B2112-01 Prepared & Analyzed: 02/19/19										
Ortho Phosphate Phosphorus	0.633	0.050	0.016	mg/L	0.500	0.0944	108	80-120	0.868	20
Batch 9B19151 - Analyzed as received										
Blank (9B19151-BLK1) Prepared & Analyzed: 02/20/19										
Ammonia-Nitrogen	ND	0.10	0.048	mg/L						
LCS (9B19151-BS1) Prepared & Analyzed: 02/20/19										
Ammonia-Nitrogen	0.746	0.10	0.048	mg/L	0.780	95.6	90-110			
Matrix Spike (9B19151-MS1) Source: B9B1886-02 Prepared & Analyzed: 02/20/19										
Ammonia-Nitrogen	58.5	5.0	2.4	mg/L	39.0	22.2	92.9	80-120		
Matrix Spike Dup (9B19151-MSD1) Source: B9B1886-02 Prepared & Analyzed: 02/20/19										
Ammonia-Nitrogen	59.9	5.0	2.4	mg/L	39.0	22.2	96.6	80-120	2.43	20
Batch 9B20081 - Acid Digest										
Blank (9B20081-BLK1) Prepared & Analyzed: 02/20/19										
Kjeldahl Nitrogen	ND	0.10	0.063	mg/L						



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Analytical Report: Page 7 of 9
 Project Name: AMEC-Lake Elsinore
 Project Number: Lake Elsinore - Salt Creek/San J

Report Date: 05-Mar-2019

Work Order Number: B9B2112
 Received on Ice (Y/N): Yes Temp: 1 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9B20081 - Acid Digest										
LCS (9B20081-BS1)				Prepared & Analyzed: 02/20/19						
Kjeldahl Nitrogen	0.960	0.10	0.063	mg/L	1.00	96.0	80-120			
Matrix Spike (9B20081-MS1)				Source: B9B2050-01 Prepared & Analyzed: 02/20/19						
Kjeldahl Nitrogen	135	8.0	5.0	mg/L	80.0	52.7	103	42-154		
Matrix Spike (9B20081-MS2)				Source: B9B2050-02 Prepared & Analyzed: 02/20/19						
Kjeldahl Nitrogen	133	8.0	5.0	mg/L	80.0	50.4	103	42-154		
Batch 9B22052 - Acid Digest										
LCS (9B22052-BS1)				Prepared: 02/22/19 Analyzed: 02/25/19						
Total Phosphorus	0.536	0.05	0.02	mg/L	0.500	107	85-115			
Matrix Spike (9B22052-MS1)				Source: B9B2294-01 Prepared: 02/22/19 Analyzed: 02/25/19						
Total Phosphorus	2.29	0.05	0.02	mg/L	0.500	2.33	NR	80-120		QFpas, QMout
Matrix Spike Dup (9B22052-MSD1)				Source: B9B2294-01 Prepared: 02/22/19 Analyzed: 02/25/19						
Total Phosphorus	2.30	0.05	0.02	mg/L	0.500	2.33	NR	80-120	0.375	20 QFpas, QMout



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Analytical Report: Page 8 of 9
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore - Salt Creek/San J

Report Date: 05-Mar-2019

Work Order Number: B9B2112
Received on Ice (Y/N): Yes Temp: 1 °C

Notes and Definitions

- J Estimated value
- PblkJ The analyte was detected in the Method Blank at a concentration between the MDL and the MRL.
- QFpas Follow-up result within laboratory acceptance criteria.
- QMout MS and/or MSD recovery did not meet laboratory acceptance criteria.
- ND: Analyte NOT DETECTED at or above the Method Detection Limit (**if MDL is reported**), otherwise at or above the Reportable Detection Limit (RDL)
- NR: Not Reported
- RDL: Reportable Detection Limit
- MDL: Method Detection Limit

* / (Non-NELAP): NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Cindy A. Waddell

cc:

e-Standard_No Alias.rpt

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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 9 of 9
 Project Name: AMEC-Lake Elsinore
 Project Number: Lake Elsinore - Salt Creek/San J

Report Date: 05-Mar-2019

Work Order Number: B9B2112
 Received on Ice (Y/N): Yes Temp: 1 °C

Destination Lab: Babcock Laboratories
 6100 Quail Valley Court Riverside, CA 92507

Chain of Custody

Client: Amec Foster Wheeler Environment and Infrastructure Phone No. 760-644-0167		Contact: Garth Engelhorn email: garth.engelhorn@altaenviron.com		Fax: No.		Additional Reporting Requests Include QC Data Package								
Project Name: Lake Elsinore Project			Turn Around Time: Routine			By:								
Project Location: Salt Creek/San Jacinto/Canyon Lake			*Lab TAT Approval											
Sampler Information			# of Containers & Preservatives			Sample Type			Analysis Requested			Matrix	Notes	
Name: <u>Austin Kay</u>			Unpreserved			Routine			Nitrate EPA 300.0					
Employer: <u>Alta</u>			H2SO4			Resample			Nitrite SM4500 - ND2B					
Signature: <u>[Signature]</u>			HNO3			Special			Ammonia SM4500-NH3 H					
Sample ID			Date			Time			TKN EPA 351.3					
<u>CLS-021819</u>			<u>2/19/2019</u>			<u>13:28</u>			Total Phosphorous SM 4500-PE					
									OrthoPhosphate SM4500-PE					
									TSS SM2540C					
									Total Hardness SM2340C					
									Total Organic Nitrogen (calc)					
									Total Nitrogen (calc)					
												Stormwater		
Relinquished By (sign)			Print Name /Company			Date/Time			Received By (sign)			Print Name /Company		
<u>[Signature]</u>			<u>Austin Kay / Alta</u>			<u>2/19/19 13:15</u>			<u>[Signature]</u>			<u>BRIDGETTE REDDINGTON / ALTA</u>		
<u>[Signature]</u>			<u>BRIDGETTE REDDINGTON / ALTA</u>			<u>2/19/19 9:58</u>			<u>[Signature]</u>			<u>Jenny G ESB</u>		
Samples submitted on ice? Yes No			Custody Seals intact? Yes No (N/A)			Samples intact? Yes No			Temperature: <u>1</u> °C			Sample meets laboratory acceptance criteria? Yes No		
												Permission to continue? Yes No		
												Deviation/Notes: _____		
												Signature/Date: _____		
												Lab No. _____		
												Logged in By/Date: _____		
												Page _____ of _____		

B9B2112
 2/19/2019 13:21
 JUG



FIELD WATER QUALITY DATA

**San Jacinto Watershed Nutrient TMDL Monitoring
Stormwater Sample Field Water Quality Parameters**

Analyte	Units	S-03	S-03	S-04	S-03	S-03	S-04	S-04	CLS	CLS	CLS	CLS	S-03	S-04	CLS	CLS	CLS	CLS	CLS
		11/29/2018	11/30/2018	11/30/2018	12/5/2018	12/6/2018	12/6/2018	12/6/2018	12/6/2018	1/16/2019	1/17/2019	1/17/2019	1/18/2019	2/1/2019	2/1/2019	2/1/2019	2/5/2019	2/6/2019	2/14/2019
Temperature	Celsius	14.5	13.4	13.2	9.9	12.1	9.8	11.8	13.5	12.2	13.6	12.4	8.9	9.6	11.8	12.0	11.3	12.4	11.5
pH	pH units	8.10	7.82	7.76	7.30	7.68	6.98	7.37	7.52	7.99	7.72	7.96	8.04	8.06	8.12	7.87	7.87	7.69	7.79
Conductivity	uS/cm	125	197	186	197	127	326	160	1,466	983	958	862	1,042	196	854	887	884	802	691
Turbidity	NTU	37.20	26.40	85.00	35.50	38.50	14.50	86.40	8.71	1.38	8.92	3.07	4.70	53.80	9.10	11.10	11.60	22.90	25.20
Dissolved Oxygen	mg/L	8.44	7.53	8.73	8.94	8.88	8.86	8.72	9.60	9.98	9.78	10.15	9.50	7.83	10.10	10.02	10.29	10.23	10.52

**CHEMISTRY SUMMARY
DATA TABLES**

**San Jacinto Watershed Nutrient TMDL Monitoring
Stormwater Sample Chemical Analysis Summary - 2018-2019**

Analyte	Sample Type	Method	Units	S-03-112918	S-03-113018	S-03-12052018	S-03-12072018	S-03-020119	S-03-020419	S-04-120218	S-04-12062018	S-04-020119	S-04-12072018	S-04-020419	CLS-011619	CLS-012019	CLS-020119	CLS-020619	CLS-021419	CLS-021819
				11/29/2018	11/30/2018	12/5/2018	12/7/2018	2/1/2019	2/4/2019	12/2/2018	12/6/2018	2/1/2019	12/7/2018	2/4/2019	1/16/2019	1/20/2019	2/1/2019	2/6/2019	2/14/2019	2/18/2019
Ammonia-Nitrogen	Composite	SM4500NH3H	mg/L	NS	0.32	NS	0.25	NS	ND(<0.48)	0.11	NS	NS	0.11	0.38	NS	0.21	NS	(0.070)J	NS	0.11
Biochemical Oxygen Demand ¹	Grab	SM 5210B	mg/L	ND(<10)	NS	ND(<10)	NS	ND(<10)	NS	<60.45	ND(<10)	ND(<5.0)	NS	NS	ND(<10)	NS	ND(<5.0)	NS	ND(<10)	NS
Chemical Oxygen Demand ¹	Grab	SM 5220D	mg/L	64	NS	55	NS	35	NS	44	41	16	NS	NS	35	NS	ND(<7.4)	NS	41	NS
Kjeldahl Nitrogen	Composite	EPA 351.2	mg/L	NS	1.5	NS	1.9	NS	1.5	1.0	NS	NS	1.2	0.89	NS	1.3	NS	0.86	NS	1.1
Nitrate as N	Composite	EPA 300.0	mg/L	NS	0.99	NS	0.79	NS	0.35	0.73	NS	NS	0.73	0.44	NS	(0.17)J	NS	0.21	NS	0.48
Nitrite as N	Composite	EPA 300.0	mg/L	NS	ND(<0.059)	NS	ND(<0.059)	NS	ND(<0.059)	(0.099)J	NS	NS	(0.081)J	ND(<0.059)	NS	ND(<0.059)	NS	ND(<0.059)	NS	0.069
Organic Nitrogen	Composite	Calculation	mg/L	NS	1.2	NS	1.7	NS	1.5	0.9	NS	NS	1.1	0.51	NS	1.1	NS	0.8	NS	0.96
Total Nitrogen	Composite	Calculation	mg/L	NS	2.5	NS	2.7	NS	1.9	1.8	NS	NS	2.0	1.33	NS	1.5	NS	1.1	NS	1.6
Total Phosphorus	Composite	SM 4500P B E	mg/L	NS	0.31	NS	0.49	NS	0.46	0.45	NS	NS	0.8	0.57	NS	0.11	NS	0.14	NS	0.32
Ortho Phosphate Phosphorus	Composite	SM 4500P E	mg/L	NS	0.38	NS	0.14	NS	0.21	0.28	NS	NS	0.26	0.21	NS	ND(<0.016)	NS	ND(<0.016)	NS	0.094
Total Dissolved Solids	Composite	SM 2540C	mg/L	NS	92	NS	530	NS	350	150	NS	NS	150	170	NS	510	NS	470	NS	430
Total Hardness	Composite	SM 2340B/EPA 200.7	mg/L	NS	37	NS	240	NS	150	72	NS	NS	99	72	NS	240	NS	230	NS	220
Total Suspended Solids	Composite	SM 2540D	mg/L	NS	28	NS	130	NS	78	32	NS	NS	360	150	NS	14	NS	16	NS	150

Notes:

1. Biochemical Oxygen Demand and Chemical Oxygen Demand were analyzed for the first discrete grab sample only.

mg/L = milligrams per liter

ug/L = micrograms per liter

mg/kg = milligrams per kilogram

NS = Not Sampled

ND = Parameter not detected at the indicated detection limit.

J = Qualified with a "J" flag, results were evaluated to the Method Detection Limit (MDL). The reported concentration is > MDL and < Reporting Limit (RL) and is estimated.

SM = standard method

EPA = U.S. Environmental Protection Agency

**San Jacinto Watershed Nutrient TMDL Monitoring
Stormwater QA/QC Sample Analysis Summary - 2018-2019**

Analyte	Sample Type	Method	Units	S-03-112918 DUP	S-03-113018-DUP	S-03-112918 FB	S-03-113018-FB
				11/29/2018	11/30/2018	11/29/2018	11/30/2018
				13:30	10:54	14:00	12:15
Ammonia-Nitrogen	Composite	SM4500NH3H	mg/L	NS	0.32	NS	ND(<0.048)
Biochemical Oxygen Demand ¹	Grab	SM 5210B	mg/L	ND(<10)	NS	ND(<2.5)	NS
Chemical Oxygen Demand ¹	Grab	SM 5220D	mg/L	69	NS	ND(<7.4)	NS
Kjeldahl Nitrogen	Composite	EPA 351.2	mg/L	NS	1.2	NS	0.5
Nitrate as N	Composite	EPA 300.0	mg/L	NS	0.92	NS	0.52
Nitrite as N	Composite	EPA 300.0	mg/L	NS	ND(<0.059)	NS	ND(<0.059)
Organic Nitrogen	Composite	Calculation	mg/L	NS	0.9	NS	0.5
Total Nitrogen	Composite	Calculation	mg/L	NS	2.1	NS	1.0
Total Phosphorus	Composite	SM 4500P B E	mg/L	NS	0.32	NS	ND(<0.0028)
Ortho Phosphate Phosphorus	Composite	SM 4500P E	mg/L	NS	0.26	NS	ND(<0.016)
Total Dissolved Solids	Composite	SM 2540C	mg/L	NS	87	NS	140
Total Hardness	Composite	SM 2340B/EPA 200.7	mg/L	NS	38	NS	48
Total Suspended Solids	Composite	SM 2540D	mg/L	NS	30	NS	ND(<2)

Notes:

1. Biochemical Oxygen Demand and Chemical Oxygen Demand were analyzed for the first discrete grab sample only.

mg/L = milligrams per liter

ug/L = micrograms per liter

mg/kg = milligrams per kilogram

NS = Not Sampled

ND = Parameter not detected at the indicated detection limit.

J = Qualified with a "J" flag, results were evaluated to the Method Detection Limit (MDL). The reported concentration is > MDL and < Reporting Limit (RL) and is estimated.

SM = standard method

EPA = U.S. Environmental Protection Agency

APPENDIX B - QUARTERLY LAKE MONITORING REPORTS

QUARTER 1 – JULY TO SEPTEMBER 2019

Lake Elsinore and Canyon Lake Nutrient TMDL Monitoring 2019-2020 Quarter 1 Report



Prepared for:

Lake Elsinore & San Jacinto Watersheds Project Authority
11615 Sterling Avenue
Riverside, California 92503

Prepared by:

Wood Environment and Infrastructure Solutions, Inc.
9210 Sky Park Court, Suite 200
San Diego, CA 92123

February 24, 2020

wood.

Lake Elsinore

Monitoring Dates

July 26, 2019, August 27, 2019 and September 26, 2019. Sampling is required monthly in Lake Elsinore during summer months (June – September) and bi-monthly during the remainder of the year (October – May).

Monitoring Locations

Water quality monitoring took place at five locations in Lake Elsinore: Sites LE01, LE02, LE03 and the two in-lake data sondes maintained by Elsinore Valley Municipal Water District (EVMWD): the Lakeshore Sonde and the Grand Avenue Sonde. These sites are depicted in Figure 1.

Weather

July 26, 2019 – Clear and hot, high of 102°F, WNW winds up to 12 mph in the afternoon.

August 27, 2019– Sunny and clear. Hot. High of 100°F, WSW winds up to 12 mph in the afternoon.

September 26, 2019 – Little to no wind in the morning, up to 8 mph in the late afternoon. Overcast skies and mild with a high of 77°F.

Water Quality Monitoring Activities

Water quality monitoring was successfully performed in accordance with the project specific Work Plan and there were no equipment failures or delay. Field monitoring included the following activities at each location or where noted:

- Vertical water column profile measurements of temperature, conductivity, pH, and dissolved oxygen; (All stations)
- Depth-integrated water chemistry sample for Total Dissolved Solids, Sulfide, Nitrate as N, Nitrite as N, Kjeldahl Nitrogen, Total Nitrogen, Ammonia-Nitrogen, Ortho Phosphate Phosphorus, Total Phosphorus; (Site LE02 only)
- Chlorophyll-a surface (0-2 m) and full depth-integrated samples; (Site LE02 only)
- Secchi disk measurements; (All stations)
- Full water column vertical plankton tows with samples preserved and archived for potential assessment in the future as needed; (Site LE02 only)
- Visual observations and photos of lake conditions.

A summary of water quality profile data are presented in Tables 1 through 3 and results of the water chemistry analyses are presented in Tables 4 through 6.

Satellite imagery of chlorophyll-a estimated concentrations, turbidity, and harmful algal bloom (HAB) probability based on remote sensing data are presented in Figures 2 through 10. Data gaps in the satellite images may be due to cyanobacterial slicks on the surface of the lake.

Copies of field datasheets are provided in Appendix A.

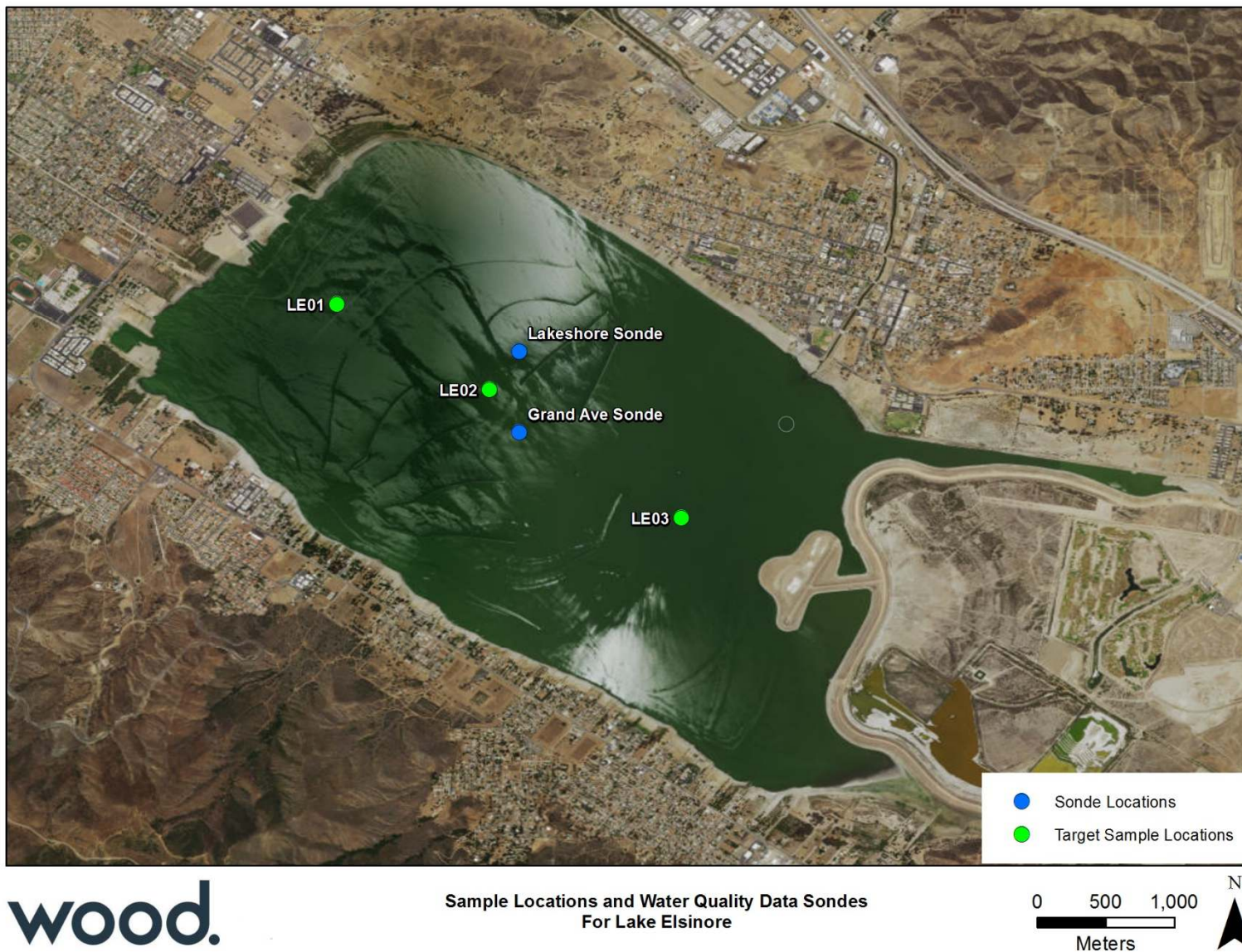


Figure 1. Lake Elsinore Sampling Locations

Table 1. Lake Elsinore *In-situ* Water Column Profile – July 26, 2019

Site	Time	Measure	Surface	1 m	2 m	3 m	4 m	5 m	6 m	7 m	8 m	Water Column Mean
LE01 ^a	10:50	Temp (°C)	29.0	27.6	27.2	27.1	27.0	26.8	26.8	--	--	27.4
		Sp. Cond (µS/cm)	3655	3647	3646	3645	3645	3645	3647	--	--	3647
		pH	9.12	9.05	9.00	8.98	8.96	8.94	8.94	--	--	9.00
		DO (mg/L)	8.3	4.5	3.4	2.4	1.8	2.3	1.1	--	--	3.4
LE02 ^b	08:35	Temp (°C)	27.6	27.5	27.4	27.3	27.2	27.2	27.2	27.1	--	27.3
		Sp. Cond (µS/cm)	3646	3646	3647	3647	3646	3646	3646	3646	--	3646
		pH	9.11	9.07	9.04	9.03	9.02	9.02	9.01	9.00	--	9.04
		DO (mg/L)	6.3	4.0	3.3	2.9	2.8	2.5	2.2	1.9	--	3.2
LE03	08:05	Temp (°C)	27.7	27.6	27.6	27.5	27.5	27.4	--	--	--	27.6
		Sp. Cond (µS/cm)	3645	3644	3643	3643	3643	3644	--	--	--	3644
		pH	9.11	9.10	9.07	9.06	9.06	9.04	--	--	--	9.07
		DO (mg/L)	5.6	5.6	4.3	3.9	3.7	2.6	--	--	--	4.3
Lakeshore Sonde ^c	10:35	Temp (°C)	28.5	28.3	27.6	27.3	27.2	27.2	27.1	26.9	--	27.5
		Sp. Cond (µS/cm)	3650	3648	3647	3647	3646	3646	3646	3646	--	3647
		pH	9.15	9.13	9.02	8.98	8.94	8.93	8.93	8.89	--	9.00
		DO (mg/L)	9.7	7.8	3.6	2.6	1.5	1.3	0.3	0.3	--	3.4
Grand Ave Sonde	10:15	Temp (°C)	28.6	27.8	27.6	27.3	27.2	27.1	26.8	--	--	27.5
		Sp. Cond (µS/cm)	3650	3645	3646	3647	3647	3646	3646	--	--	3647
		pH	9.12	9.06	9.00	8.97	8.96	8.94	8.87	--	--	8.99
		DO (mg/L)	9.2	5.9	3.6	2.8	2.2	1.8	0.3	--	--	3.7

a- Bottom depth measurement taken at 5.5 m

b- Bottom depth measurement taken at 6.5 m

c- Bottom depth measurement taken at 6.5 m

Afternoon measurements not taken during this monitoring event.

Table 2. Lake Elsinore *In-situ* Water Column Profile – August 27, 2019

Site	Time	Measure	Surface	1 m	2 m	3 m	4 m	5 m	6 m	7 m	8 m	Water Column Mean
LE01	10:45	Temp (°C)	28.4	27.4	26.9	26.8	26.6	26.4	--	--	--	27.1
		Sp. Cond (µS/cm)	3770	3767	3759	3758	3759	3759	--	--	--	3762
		pH	9.23	9.18	9.09	9.06	8.99	8.94	--	--	--	9.08
		DO (mg/L)	12.8	9.5	6.6	5.2	2.9	1.6	--	--	--	6.4
	14:40	Temp (°C)	30.5	28.2	26.9	26.5	26.5	26.4	--	--	--	27.5
		Sp. Cond (µS/cm)	3774	3781	3759	3759	3759	3760	--	--	--	3765
		pH	9.25	9.17	9.04	8.91	8.90	8.89	--	--	--	9.03
		DO (mg/L)	15.5	13.1	7.6	3.4	2.9	2.4	--	--	--	7.5
LE02 ^a	08:00	Temp (°C)	26.8	26.8	26.7	26.7	26.5	26.5	26.5	26.4	--	26.6
		Sp. Cond (µS/cm)	3757	3757	3758	3760	3760	3759	3760	3760	--	3759
		pH	9.09	9.06	9.04	9.04	8.98	8.97	8.96	8.95	--	9.01
		DO (mg/L)	7.1	6.1	5.5	4.3	3.5	3.0	2.8	2.3	--	4.3
	15:05	Temp (°C)	31.9	27.7	27.1	26.9	26.8	26.6	26.6	26.5	--	27.5
		Sp. Cond (µS/cm)	3787	3758	3760	3758	3885	3759	3759	3760	--	3778
		pH	9.24	9.24	9.09	9.02	8.97	8.93	8.93	8.91	--	9.04
		DO (mg/L)	13.2	14.5	10.1	6.1	4.4	2.9	3.1	2.1	--	7.1
LE03 ^b	10:30	Temp (°C)	27.3	27.0	26.9	26.8	26.8	26.7	--	--	--	26.9
		Sp. Cond (µS/cm)	3753	3755	3753	3756	3757	3759	--	--	--	3756
		pH	9.19	9.1	9.07	9.04	9.02	8.98	--	--	--	9.07
		DO (mg/L)	10.3	6.6	5.9	4.5	4.0	3.0	--	--	--	5.7
	15:20	Temp (°C)	28.9	27.7	27.2	26.8	26.8	26.7	--	--	--	27.4
		Sp. Cond (µS/cm)	3749	3755	3759	3756	3758	3760	--	--	--	3756
		pH	9.39	9.28	9.05	8.98	8.96	8.93	--	--	--	9.10
		DO (mg/L)	17.9	15.8	4.9	4.2	3.3	2.0	--	--	--	8.02
Lakeshore Sonde	16:00	Temp (°C)	29.5	27.2	26.9	26.8	26.7	26.6	26.5	26.4	--	27.1
		Sp. Cond (µS/cm)	3766	3757	3757	3758	3760	3760	3760	3762	--	3760
		pH	9.30	9.15	9.05	9.01	8.98	8.95	8.94	8.89	--	9.03
		DO (mg/L)	15.4	14.0	7.0	4.7	3.8	3.4	1.8	0.5	--	6.3
Grand Ave Sonde ^c	15:35	Temp (°C)	29.5	27.3	26.9	26.8	26.7	26.6	26.6	--	--	27.2
		Sp. Cond (µS/cm)	3766	3759	3757	3757	3758	3758	3759	--	--	3759
		pH	9.29	9.16	9.04	8.99	8.97	8.96	8.95	--	--	9.05
		DO (mg/L)	14.4	10.3	5.7	4.3	3.6	3.3	3.2	--	--	6.4

a- Bottom depth measurement taken at 6.5 m

b- Bottom depth measurement taken at 4.5 m

c- Bottom depth measurement taken at 5.5 m

Table 3. Lake Elsinore *In-situ* Water Column Profile – September 26, 2019

Site	Time	Measure	Surface	1 m	2 m	3 m	4 m	5 m	6 m	7 m	8 m	Water Column Mean	
LE01	7:43	Temp (°C)	24.2	24.3	24.2	24.2	24.2	24.1	--	--	--	24.2	
		Sp. Cond (µS/cm)	3850	3850	3850	3851	3850	3851	--	--	--	3850	
		pH	9.29	9.27	9.26	9.23	9.18	9.14	--	--	--	9.23	
		DO (mg/L)	6.8	6.7	6.5	5.8	3.4	2.7	--	--	--	5.3	
	14:00	Temp (°C)	24.5	24.6	24.5	24.1	24.1	24.1	--	--	--	24.3	
		Sp. Cond (µS/cm)	3851	3851	3852	3851	3851	3852	--	--	--	3851	
		pH	9.30	9.30	9.29	9.20	9.17	9.15	--	--	--	9.24	
LE02 ^a	8:11	Temp (°C)	24.0	24.0	24.0	24.1	24.0	24.0	24.0	24.0	--	24.0	
		Sp. Cond (µS/cm)	3850	3852	3852	3852	3851	3852	3852	3852	--	3852	
		pH	9.17	9.18	9.17	9.18	9.17	9.17	9.17	9.17	9.17	--	9.17
		DO (mg/L)	4.4	3.9	3.7	3.8	3.7	3.8	3.8	3.8	3.8	--	3.9
	13:51	Temp (°C)	24.1	24.1	24.1	24.1	24.1	24.0	24.0	--	--	24.1	
		Sp. Cond (µS/cm)	3850	3851	3851	3851	3852	3852	3852	--	--	3851	
		pH	9.29	9.27	9.26	9.25	9.23	9.18	9.18	--	--	9.24	
LE03 ^b	7:58	Temp (°C)	23.8	23.9	23.9	23.9	23.9	23.9	--	--	--	23.9	
		Sp. Cond (µS/cm)	3840	3843	3843	3845	3845	3845	--	--	--	3844	
		pH	9.20	9.21	9.21	9.21	9.21	9.20	--	--	--	9.21	
		DO (mg/L)	6.1	5.9	5.6	5.6	5.5	5.5	--	--	--	5.7	
	13:40	Temp (°C)	24.6	24.5	24.5	24.0	23.9	23.9	--	--	--	24.2	
		Sp. Cond (µS/cm)	3843	3844	3848	3846	3848	3847	--	--	--	3846	
		pH	9.35	9.32	9.22	9.18	9.17	9.17	--	--	--	9.24	
Lakeshore Sonde ^c	10:20	DO (mg/L)	11.6	10.1	5.3	5.0	4.7	4.2	--	--	--	6.8	
		Temp (°C)	24.7	24.1	24.0	24.0	24.0	24.0	24.0	24.0	24.0	--	24.1
		Sp. Cond (µS/cm)	3855	3855	3853	3852	3852	3852	3852	3852	3852	--	3853
		pH	9.25	9.24	9.18	9.17	9.17	9.16	9.16	9.16	9.16	--	9.19
Grand Ave Sonde ^d	10:45	DO (mg/L)	6.8	5.9	3.9	3.8	3.6	3.6	3.6	3.4	--	4.3	
		Temp (°C)	24.4	24.0	24.0	23.9	23.9	23.9	23.9	--	--	24.0	
		Sp. Cond (µS/cm)	3865	3852	3852	3850	3850	3850	3850	--	--	3853	
		pH	9.24	9.20	9.21	9.22	9.22	9.22	9.20	--	--	9.22	
		DO (mg/L)	6.7	4.8	5.1	5.2	5.7	5.5	4.9	--	--	5.4	

- a- Bottom depth measurement taken at 6.4m during morning profile readings
- b- Bottom depth measurement taken at 4.5m and 4.6m for morning and afternoon readings, respectively.
- c- Bottom depth measurement taken at 6.4m
- d- Bottom depth measurement taken at 5.7m

Table 4. Water Chemistry for Lake Elsinore – July 26, 2019

Method	Compound	Units	RL	Basin Plan or TMDL Target	Depth Integrated or Surface Sample	LE02
SM 2540C	Total Dissolved Solids	mg/L	40	2000 ³	Depth Integrated	<u>2100</u>
SM 4500S2 D	Sulfide	mg/L	0.1	NA	Depth Integrated	ND
EPA 300.0	Nitrate as N	mg/L	0.2	NA	Depth Integrated	ND
EPA 300.0	Nitrite as N	mg/L	0.1	NA	Depth Integrated	ND
EPA 351.2	Kjeldahl Nitrogen	mg/L	0.4	NA	Depth Integrated	4.3
Calculation	Total Nitrogen ^a	mg/L	--	0.75 ^{b1}	Depth Integrated	4.3
SM4500NH3H	Ammonia-Nitrogen	mg/L	0.1	CMC: 1.2 ^{c1} CCC: 0.2 ^{c1}	Depth Integrated	0.11
SM 4500P E	Ortho Phosphate Phosphorus	mg/L	0.05	NA	Depth Integrated	0.019 J
EPA 365.1	Total Phosphorus	mg/L	0.01	0.1 ^{b1}	Depth Integrated	0.116
EPA 10200 H	Chlorophyll-a	µg/L	1.0	25 ^{d1} , 40 ^{d2}	Surface (0-2m)	63.5
EPA 10200 H	Chlorophyll-a	µg/L	1.0	25 ^{d1} , 40 ^{d2}	Depth Integrated	61.4

Notes:

^a - Total Nitrogen = TKN+NO₂+NO₃

^b - Annual average

^c - Values are site specific dependent upon pH and temperature recorded at each location. Target based on equations in 2004 TMDL permit Table 5-9n.

^d - Summer average

¹ – 2020 TMDL Target, based on Table 5-9n of 2004 TMDL

² – 2015 TMDL Target, based on Table 5-9n of 2004 TMDL

³ – Santa Ana Region Basin Plan Objective

RL - Reporting Limit

TMDL - Total Maximum Daily Load

NA – Not applicable/ available

ND – Not detected

J – concentration between MDL and RL (estimated)

Bold Underline - Indicates exceedance of Basin Plan

Table 5. Water Chemistry for Lake Elsinore – August 27, 2019

Method	Compound	Units	RL	Basin Plan or TMDL Target	Depth Integrated or Surface Sample	LE02
SM 2540C	Total Dissolved Solids	mg/L	20	2000 ³	Depth Integrated	<u>2200</u>
SM 4500S2 D	Sulfide	mg/L	0.1	NA	Depth Integrated	ND
EPA 300.0	Nitrate as N	mg/L	0.2	NA	Depth Integrated	ND
EPA 300.0	Nitrite as N	mg/L	0.1	NA	Depth Integrated	ND
EPA 351.2	Kjeldahl Nitrogen	mg/L	0.4	NA	Depth Integrated	4.2
Calculation	Total Nitrogen ^a	mg/L	--	0.75 ^{b1}	Depth Integrated	4.2
SM4500NH3H	Ammonia-Nitrogen	mg/L	0.1	CMC: 1.3 ^{c1} CCC: 0.22 ^{c1}	Depth Integrated	0.12
SM 4500P E	Ortho Phosphate Phosphorus	mg/L	0.05	NA	Depth Integrated	ND
EPA 365.1	Total Phosphorus	mg/L	0.01	0.1 ^{b1}	Depth Integrated	0.104
EPA 10200 H	Chlorophyll-a	µg/L	1.0	25 ^{d1} , 40 ^{d2}	Surface (0-2m)	81.9
EPA 10200 H	Chlorophyll-a	µg/L	1.0	25 ^{d1} , 40 ^{d2}	Depth Integrated	99.1

Notes:

^a - Total Nitrogen = TKN+NO₂+NO₃

^b - Annual average

^c - Values are site specific dependent upon pH and temperature recorded at each location. Target based on equations in 2004 TMDL permit Table 5-9n.

^d - Summer average

¹ - 2020 TMDL Target, based on Table 5-9n of 2004 TMDL

² - 2015 TMDL Target, based on Table 5-9n of 2004 TMDL

³ - Santa Ana Region Basin Plan Objective

RL-Reporting Limit

TMDL- Total Maximum Daily Load

NA – Not applicable/ available

ND – Not detected

Bold Underline - Indicates exceedance of Basin Plan

Table 6. Water Chemistry for Lake Elsinore – September 26, 2019

Method	Compound	Units	RL	Basin Plan or TMDL Target	Depth Integrated or Surface Sample	LE02
SM 2540C	Total Dissolved Solids	mg/L	40	2000 ³	Depth Integrated	<u>2200</u>
SM 4500S2 D	Sulfide	mg/L	0.1	NA	Depth Integrated	ND
EPA 300.0	Nitrate as N	mg/L	0.2	NA	Depth Integrated	ND
EPA 300.0	Nitrite as N	mg/L	0.1	NA	Depth Integrated	ND
EPA 351.2	Kjeldahl Nitrogen	mg/L	0.2	NA	Depth Integrated	5.1
Calculation	Total Nitrogen ^a	mg/L	--	0.75 ^{b1}	Depth Integrated	5.1
SM4500NH3H	Ammonia-Nitrogen	mg/L	0.1	CMC: 1.03 ^{c1} CCC: 0.21 ^{c1}	Depth Integrated	ND
SM 4500P E	Ortho Phosphate Phosphorus	mg/L	0.05	NA	Depth Integrated	ND
EPA 365.1	Total Phosphorus	mg/L	0.01	0.1 ^{b1}	Depth Integrated	0.108
EPA 10200 H	Chlorophyll-a	µg/L	1.0	25 ^{d1} , 40 ^{d2}	Surface (0-2m)	165
EPA 10200 H	Chlorophyll-a	µg/L	1.0	25 ^{d1} , 40 ^{d2}	Depth Integrated	128

Notes:

^a - Total Nitrogen = TKN+NO₂+NO₃

^b - Annual average

^c - Values are site specific dependent upon pH and temperature recorded at each location. Target based on equations in 2004 TMDL permit Table 5-9n.

^d - Summer average

¹ - 2020 TMDL Target, based on Table 5-9n of 2004 TMDL

² - 2015 TMDL Target, based on Table 5-9n of 2004 TMDL

³ - Santa Ana Region Basin Plan Objective

RL-Reporting Limit

TMDL- Total Maximum Daily Load

NA – Not applicable/ available

ND – Not detected

Bold Underline - Indicates exceedance of Basin Plan

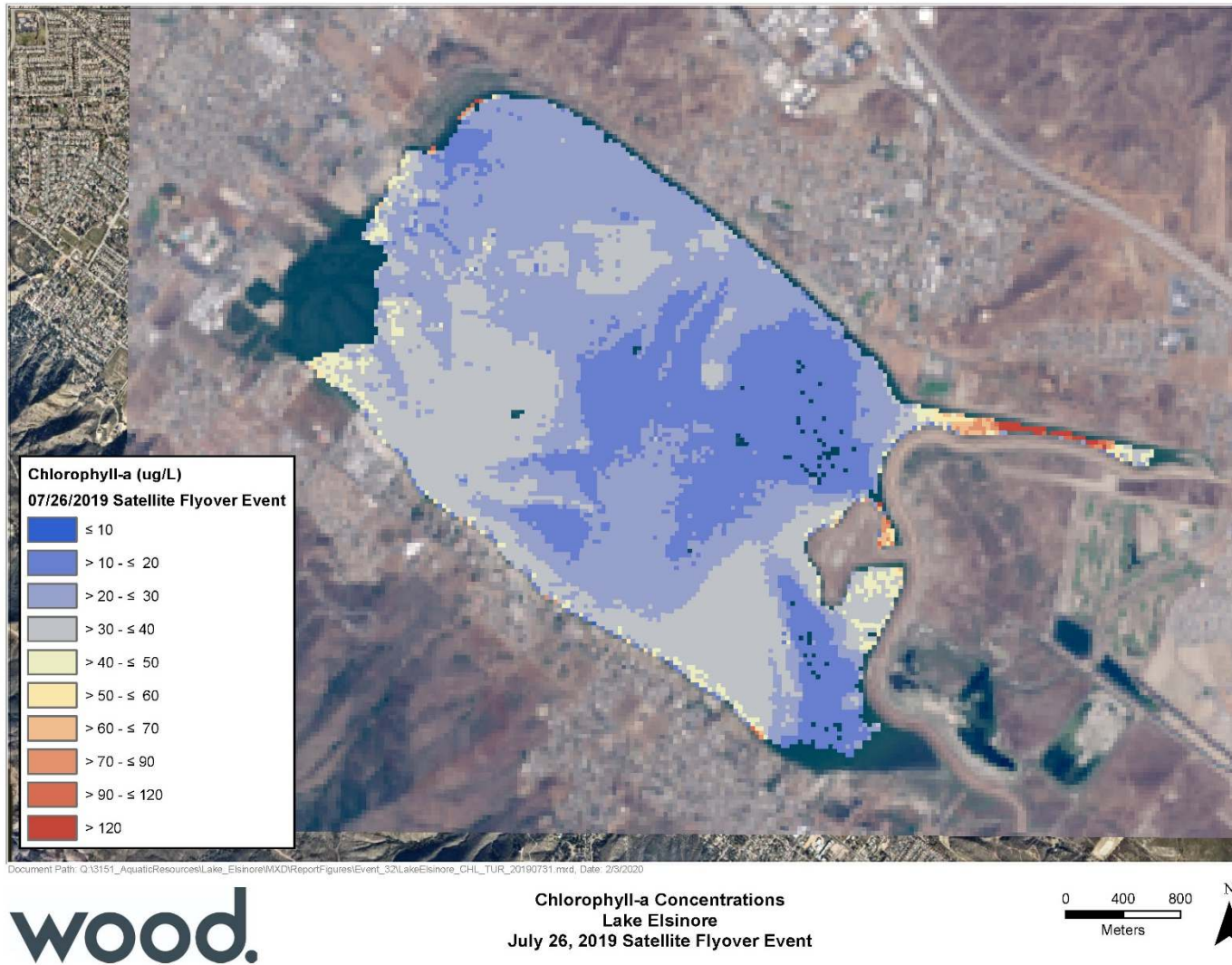
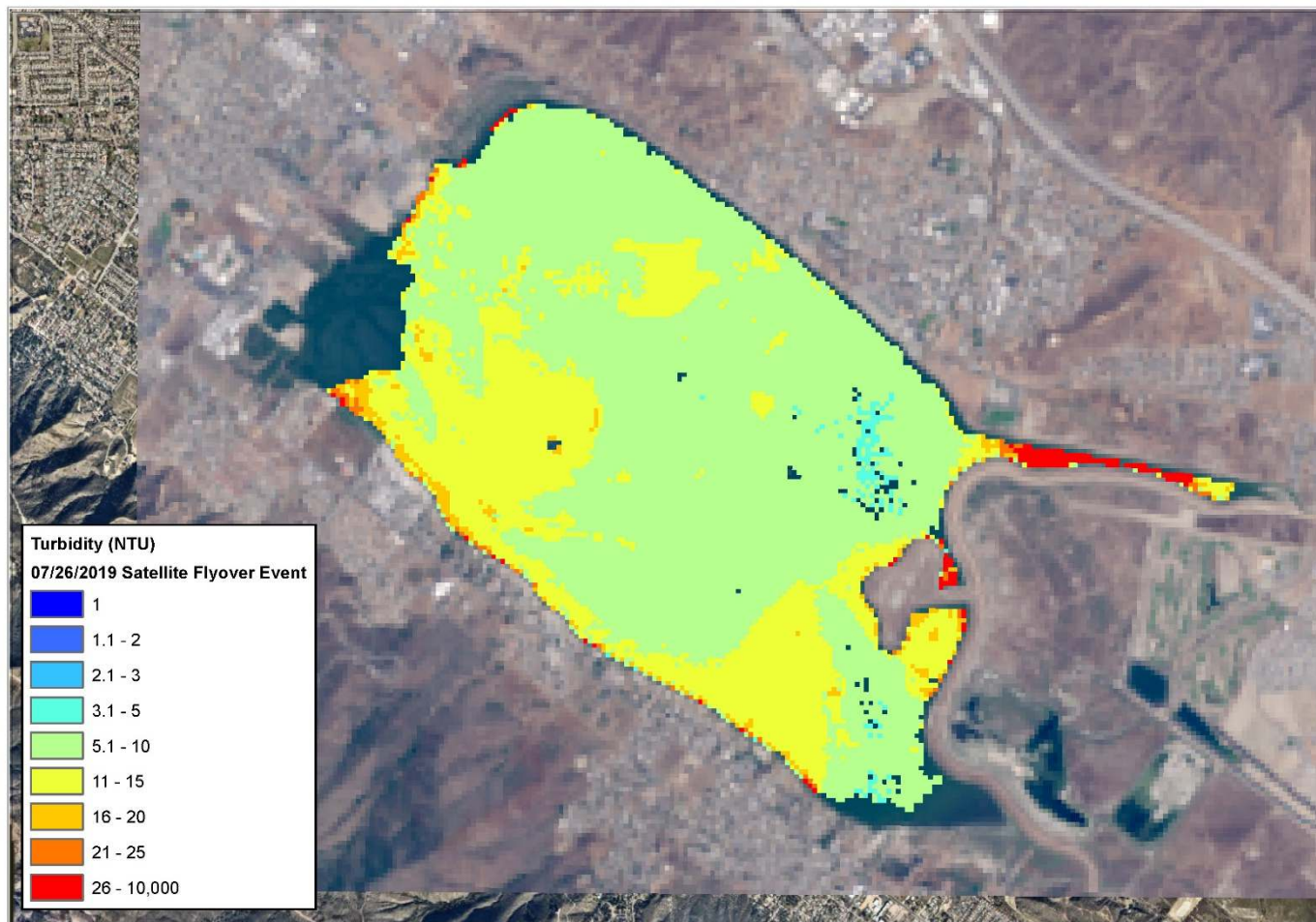


Figure 2. Satellite Imagery of Lake Elsinore Chlorophyll-a Concentrations July 26, 2019
Data gaps in northwest corner of lake are due to reflected sunglint



Document Path: Q:\3151_AquaticResources\Lake_Elsinore\WXDI\ReportFigures\Event_32\LakeElsinore_CHL_TUR_20190731.mxd, Date: 2/3/2020

wood.

Turbidity
Lake Elsinore
July 26, 2019 Satellite Flyover Event

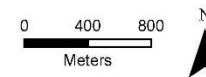


Figure 3. Satellite Imagery of Lake Elsinore Turbidity Measurements July 24, 2019
Data gaps in northwest corner of lake are due to reflected sunlight

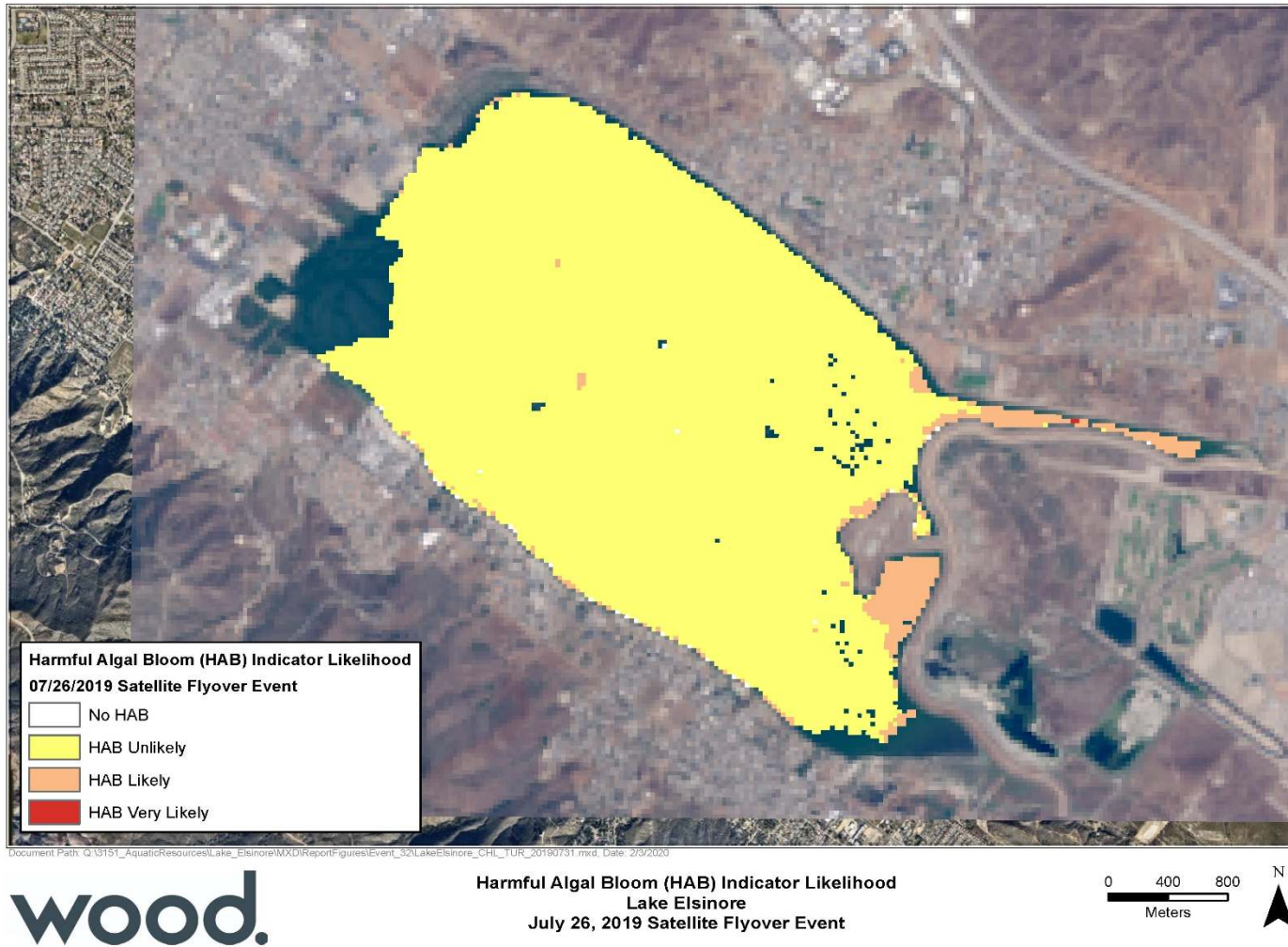


Figure 4. Satellite Imagery of Lake Elsinore HAB Indicator Likelihood July 26, 2019
Data gaps in northwest corner of lake are due to reflected sunglint

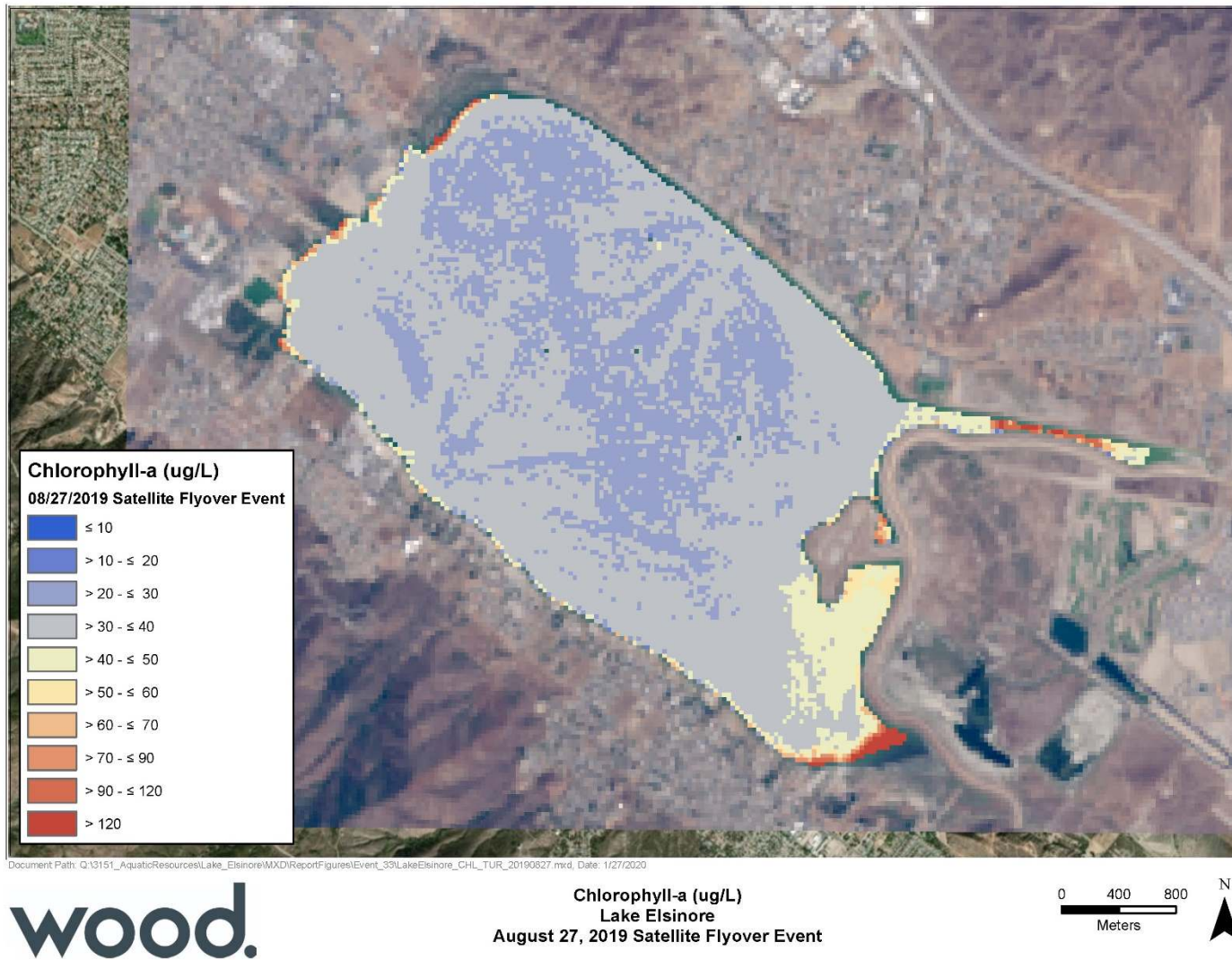


Figure 5. Satellite Imagery of Lake Elsinore Chlorophyll-a Concentrations August 27, 2019

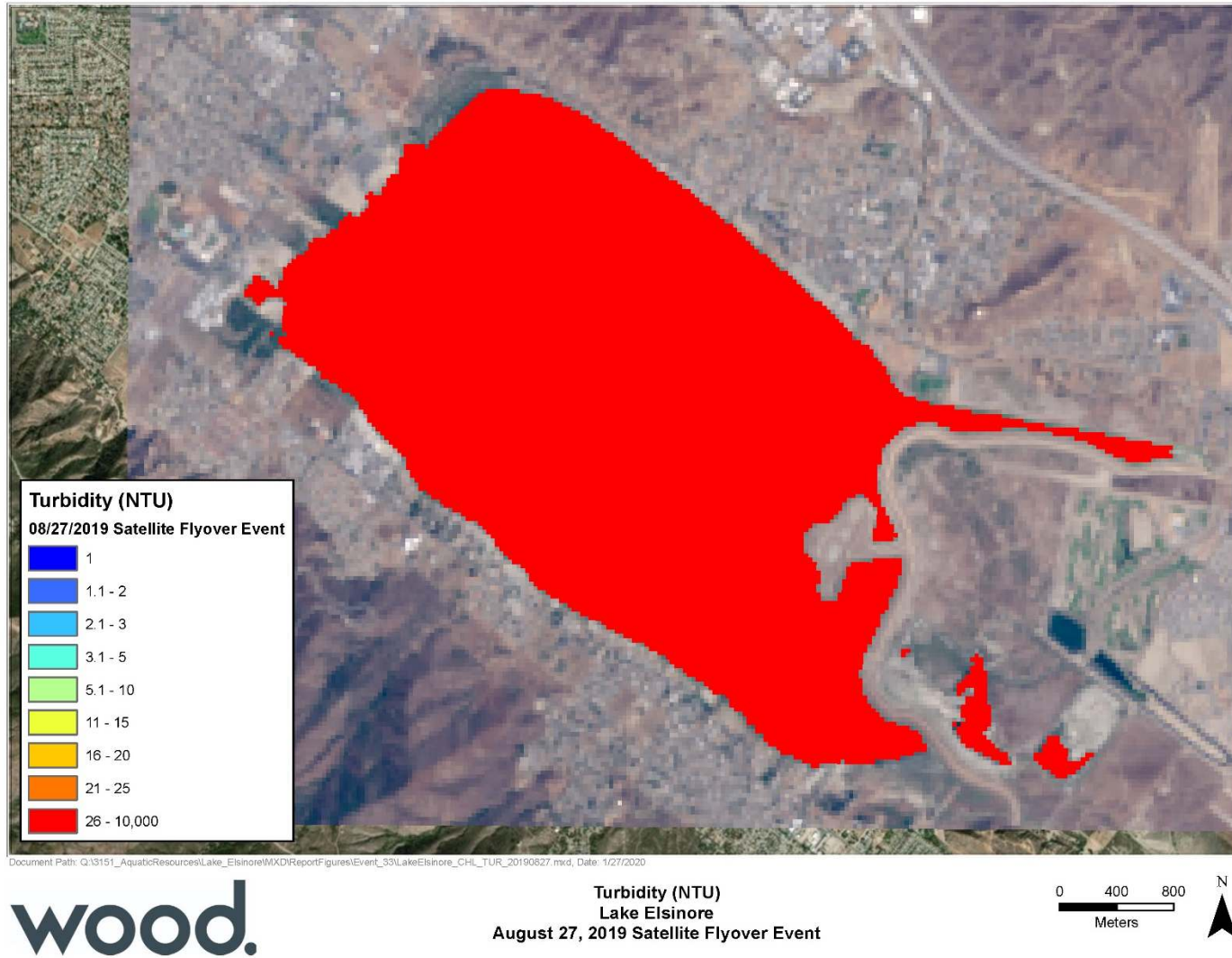


Figure 6. Satellite Imagery of Lake Elsinore Turbidity Measurements August 27, 2019

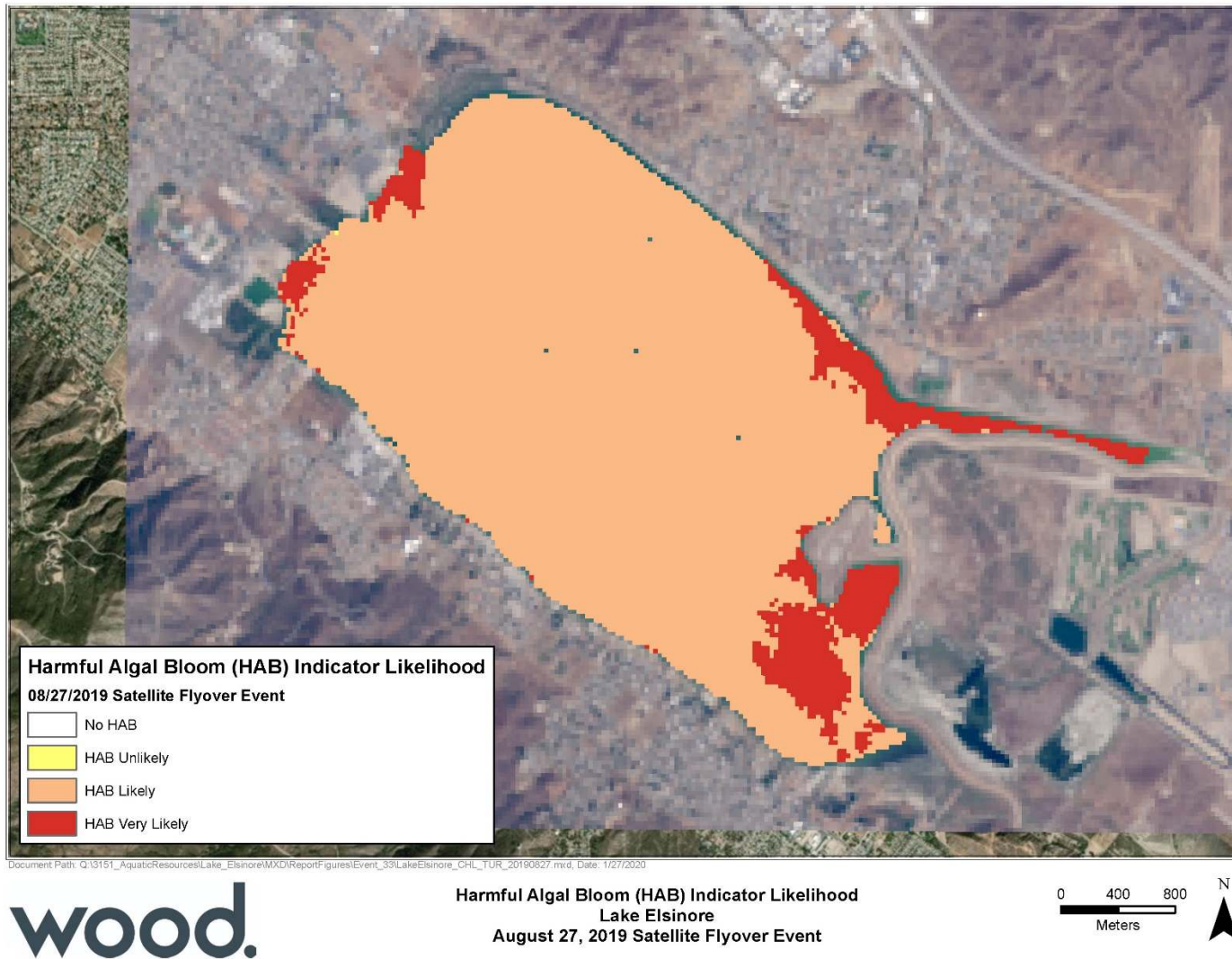
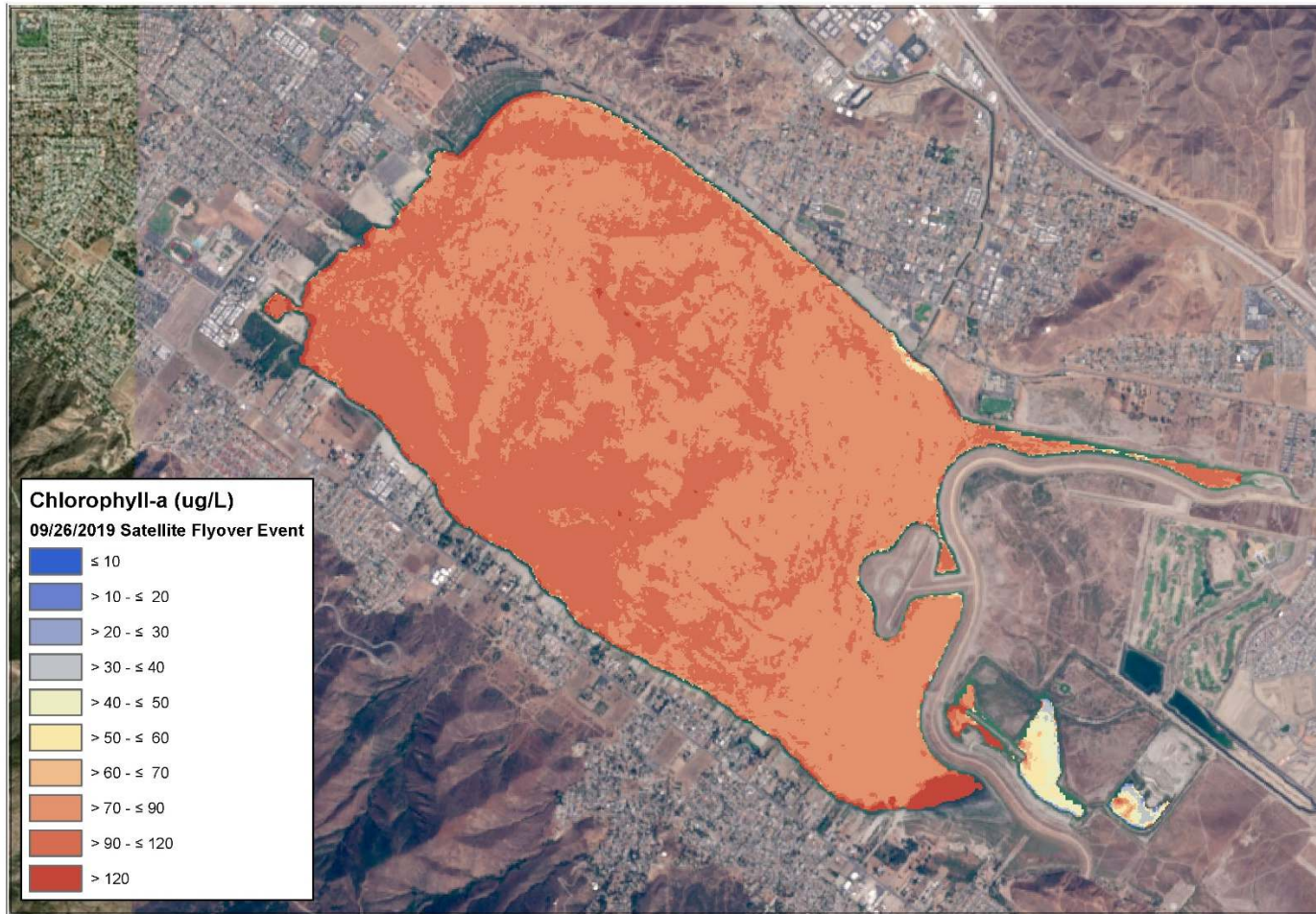


Figure 7. Satellite Imagery of Lake Elsinore HAB Indicator Likelihood August 27, 2019



Document Path: Q:\3151_AquaticResources\Lake_Elsinore\MXD\ReportFigures\Event_34\LakeElsinore_CHL_TUR_20190926.mxd, Date: 1/27/2020



Chlorophyll-a (ug/L)
Lake Elsinore
September 26, 2019 Satellite Flyover Event

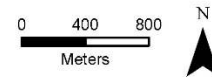


Figure 8. Satellite Imagery of Lake Elsinore Chlorophyll-a Concentrations September 26, 2019

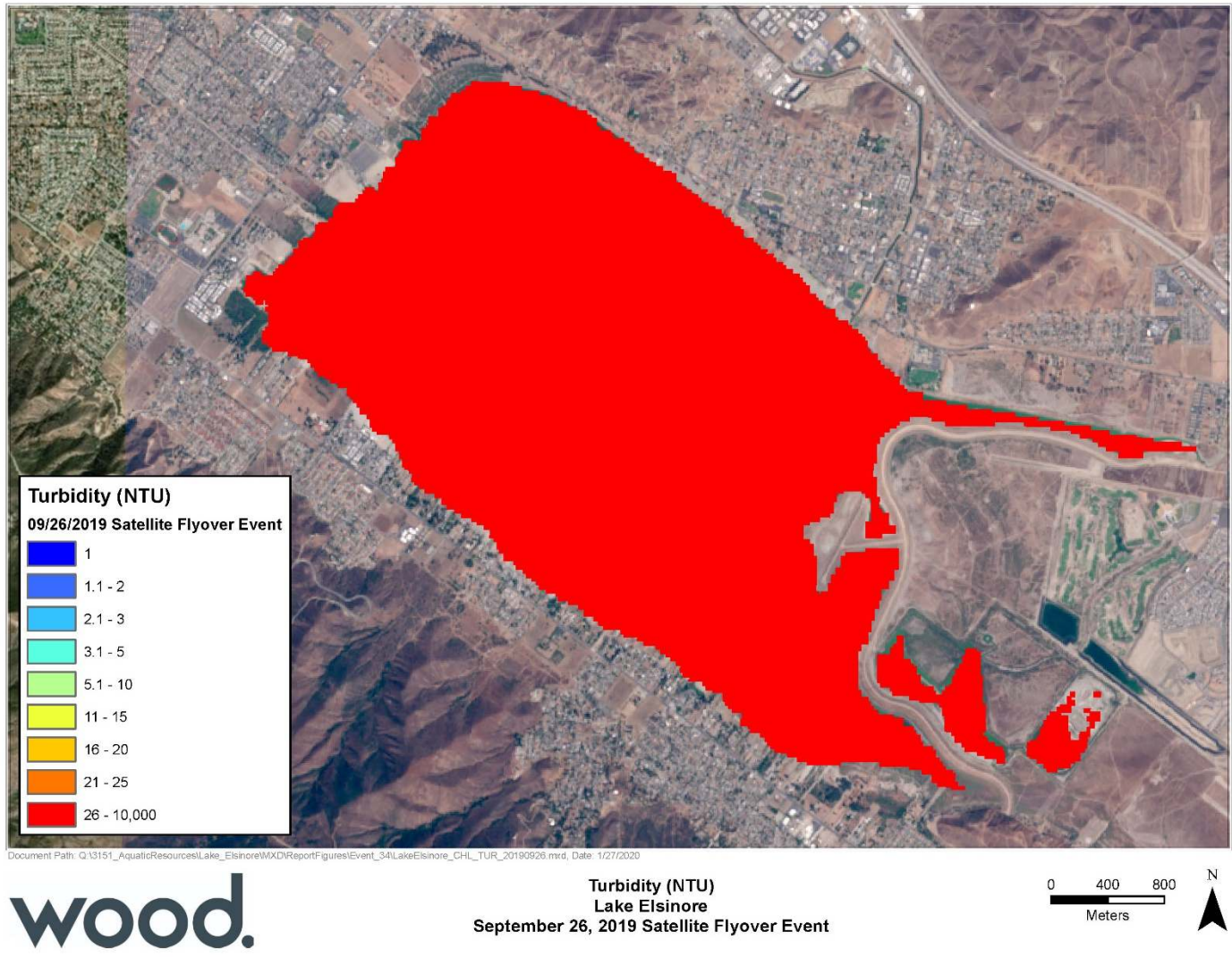
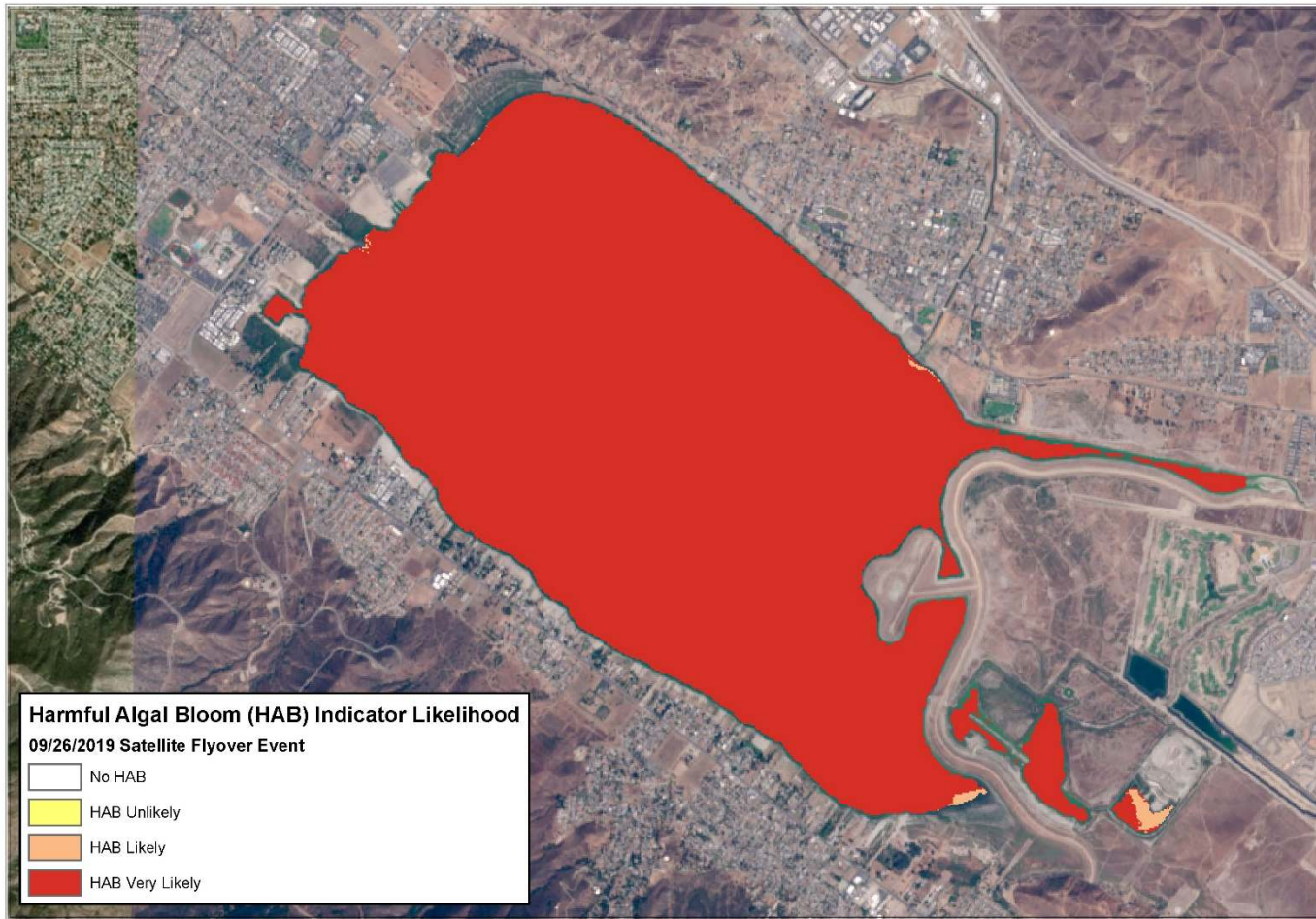


Figure 9. Satellite Imagery of Lake Elsinore Turbidity Measurements September 26, 2019



Document Path: Q:\15151_AquaticResources\Lake_Elsinore\MXD\ReportFigures\Event_34\LakeElsinore_CHL_TUR_20190926.mxd, Date: 1/27/2020



Harmful Algal Bloom (HAB) Indicator Likelihood
Lake Elsinore
September 26, 2019 Satellite Flyover Event

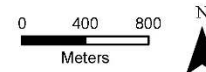


Figure 10. Satellite Imagery of Lake Elsinore HAB Indicator Likelihood September 26, 2019

Canyon Lake

Monitoring Dates

August 27, 2019. Pre-alum application water quality monitoring was also performed during this monitoring event. Year-round bi-monthly monitoring is required for Canyon Lake.

Locations

Four locations were sampled in Canyon Lake: Sites CL07, CL08, CL09 and CL10. These sites are depicted in Figure 11.

Weather

August 27, 2019– Sunny and clear. Hot. High of 101°F, WSW winds up to 12 mph in the afternoon.

Water Quality Monitoring Activities

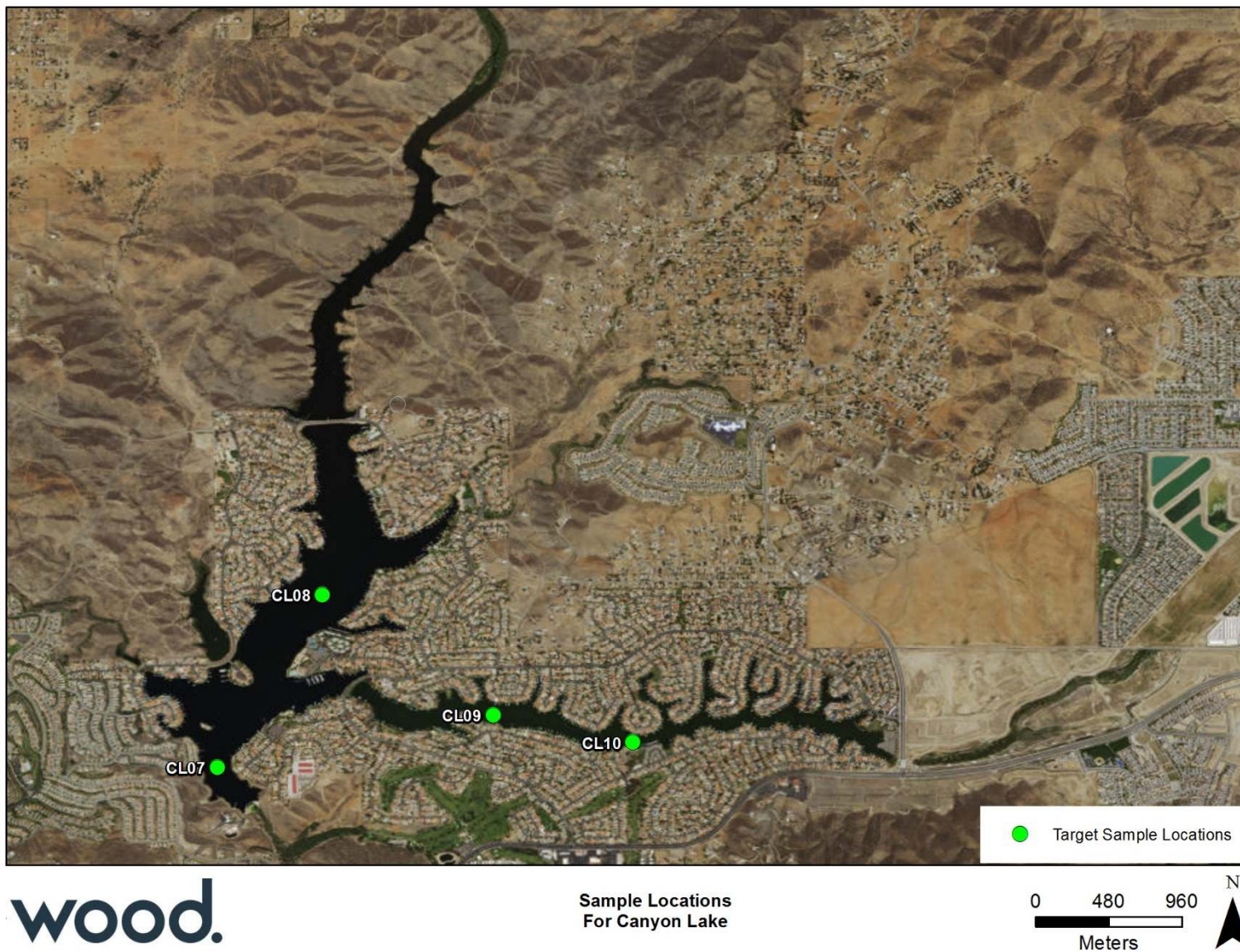
Water quality monitoring was successfully performed in accordance with the TMDL Work Plan for the August 27th event and there were no equipment failures or delays. Field monitoring included the following activities at each location or where noted:

- Vertical water column profile measurements of temperature, conductivity, pH, and dissolved oxygen;
- Depth-integrated (surface-to-bottom) water chemistry samples for Total Dissolved Solids, Sulfide, Nitrate as N, Nitrite as N, Kjeldahl Nitrogen, Total Nitrogen, Ammonia-Nitrogen, Ortho Phosphate Phosphorus, Total Phosphorus, Total and Dissolved Aluminum;
- Chlorophyll-a surface (0-2 m) and full depth-integrated samples;
- Secchi disk measurements;
- Full water column vertical plankton tows with samples preserved and archived for potential assessment in the future as needed;
- Visual observations and photos of lake conditions.

A summary of water quality profile data are presented in Table 7. Results of the water chemistry analyses are presented in Table 8.

Satellite imagery of chlorophyll-a, turbidity, and HAB probability based on remote sensing data are presented in Figures 12 through 14. Satellite chlorophyll-a estimated concentrations in portions of the eastern arm of Canyon Lake, and portions of the main lake body are impacted by, an “edge-effect” of the nearby land mass, the consequence of which can be artificially elevated chlorophyll-a concentrations. These data have been flagged and removed from the maps.

Copies of field datasheets are provided in Appendix A.



wood.

Sample Locations
For Canyon Lake

Figure 11. Canyon Lake Sampling Locations

Table 7. Canyon Lake *In situ* Water Column Profile – August 27, 2019

Site	Time	Measure	Surface	1 m	2 m	3 m	4 m	5 m	6 m	7 m	8 m	9 m	10 m	11 m	12 m	13 m	14 m	15 m	16 m	17 m	Water Column Mean - All	Water Column Mean - Epilimnion	Water Column Mean - Hypolimnion	
CL07 ^a	10:15	Temp (°C)	28.1	28.0	27.8	27.8	27.7	26.6	21.9	18.3	15.5	14.8	14.1	13.8	13.7	13.5	13.4	--	--	--	20.3	27.9	13.9	
		Sp. Cond (µS/cm)	725	725	724	724	724	724	724	678	644	627	624	616	623	624	618	624	--	--	--	668	724	621.5
		pH	8.50	8.52	8.53	8.51	8.51	7.71	7.18	7.00	7.06	7.09	7.10	7.08	7.15	7.17	7.08	--	--	--	7.61	8.51	7.11	
		DO (mg/L)	7.3	7.3	7.2	7.1	7.1	2.0	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	--	--	--	2.7	7.2	0.2	
CL07 ^b	15:30	Temp (°C)	29.6	29.1	28.4	28.0	27.8	25.8	20.5	17.4	15.5	14.6	14.1	13.8	13.7	13.5	13.5	--	--	--	20.4	28.6	13.9	
		Sp. Cond (µS/cm)	712	728	723	723	724	726	667	644	625	621	619	626	625	624	628	--	--	--	668	722	624	
		pH	8.52	8.57	8.56	8.52	8.49	7.69	7.12	7.13	7.20	7.26	7.32	7.35	7.41	7.44	7.39	--	--	--	7.73	8.53	7.36	
		DO (mg/L)	7.8	7.9	7.7	7.5	7.2	1.0	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	--	--	--	2.7	7.6	0.2	
CL08 ^b	09:30	Temp (°C)	28.4	28.0	28.0	27.9	27.8	26.3	21.6	17.7	16.2	--	--	--	--	--	--	--	--	--	24.7	28.0	16.2	
		Sp. Cond (µS/cm)	718	717	718	718	721	710	676	640	635	--	--	--	--	--	--	--	--	--	695	718	635	
		pH	8.52	8.50	8.50	8.49	8.42	7.53	7.13	6.99	6.98	--	--	--	--	--	--	--	--	--	7.90	8.49	6.98	
		DO (mg/L)	7.5	7.4	7.3	7.2	6.5	0.4	0.3	0.3	0.2	--	--	--	--	--	--	--	--	--	4.1	7.2	0.3	
CL08 ^b	15:10	Temp (°C)	28.9	29.0	28.3	28.1	27.8	26.9	22.0	16.9	16.0	--	--	--	--	--	--	--	--	--	24.9	28.4	16.0	
		Sp. Cond (µS/cm)	710	720	717	718	719	712	663	637	634	--	--	--	--	--	--	--	--	--	692	717	634	
		pH	8.61	8.61	8.60	8.61	8.47	7.75	7.36	7.13	7.21	--	--	--	--	--	--	--	--	--	8.04	8.58	7.21	
		DO (mg/L)	8.3	8.3	8.0	7.9	7.0	1.0	0.3	0.3	0.2	--	--	--	--	--	--	--	--	--	4.6	7.9	0.2	
CL09	08:45	Temp (°C)	27.7	27.7	27.7	27.5	26.3	20.7	17.3	--	--	--	--	--	--	--	--	--	--	--	25.0	27.7	17.3	
		Sp. Cond (µS/cm)	867	868	868	874	917	910	903	--	--	--	--	--	--	--	--	--	--	--	887	869	903	
		pH	8.79	8.78	8.76	8.55	7.55	6.89	6.90	--	--	--	--	--	--	--	--	--	--	--	8.03	8.72	6.90	
		DO (mg/L)	8.1	8.1	8.0	6.3	0.4	0.3	0.2	--	--	--	--	--	--	--	--	--	--	--	4.5	7.6	0.2	
CL09	14:55	Temp (°C)	29.6	28.3	27.8	27.5	26.6	21.3	17.2	--	--	--	--	--	--	--	--	--	--	--	25.5	28.3	17.2	
		Sp. Cond (µS/cm)	851	866	883	898	913	923	903	--	--	--	--	--	--	--	--	--	--	--	891	875	903	
		pH	8.77	8.73	8.72	8.40	7.64	6.80	6.84	--	--	--	--	--	--	--	--	--	--	--	7.99	8.66	6.84	
		DO (mg/L)	9.1	9.4	9.0	6.4	0.7	0.3	0.3	--	--	--	--	--	--	--	--	--	--	--	5.0	8.5	0.3	
CL10 ^c	07:30	Temp (°C)	27.4	27.3	27.4	27.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	27.4	--	--	
		Sp. Cond (µS/cm)	922	922	922	921	--	--	--	--	--	--	--	--	--	--	--	--	--	--	922	--	--	
		pH	8.70	8.69	8.68	8.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.69	--	--	
		DO (mg/L)	6.9	6.8	6.9	6.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.9	--	--	
CL10 ^c	14:45	Temp (°C)	31.0	29.5	27.9	27.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	29.0	--	--	
		Sp. Cond (µS/cm)	898	917	944	924	--	--	--	--	--	--	--	--	--	--	--	--	--	--	921	--	--	
		pH	8.69	8.72	8.58	8.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.57	--	--	
		DO (mg/L)	9.2	10.0	8.6	6.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.5	--	--	

Hypolimnion
 Epilimnion
 Thermocline
 No Shading - Indicates that there is no stratification

a- Bottom measurement in the afternoon taken at 13.5m
 b- Bottom measurement in the afternoon taken at 7.5m
 c- Bottom measurement in the afternoon taken at 2.5m

Table 8. Canyon Lake Water Chemistry – August 27, 2019

Method	Compound	Units	RL	Basin Plan or TMDL Target	Depth Integrated or Surface Sample	CL07	CL08	CL09	CL10
SM 2540C	Total Dissolved Solids	mg/L	10	700 ³	Depth Integrated	370	420	560	600
SM 4500S2 D	Sulfide	mg/L	0.1	NA	Depth Integrated	3.4	1.3	10	ND
EPA 300.0	Nitrate as N	mg/L	0.2	10	Depth Integrated	ND	ND	ND	ND
EPA 300.0	Nitrite as N	mg/L	0.1	NA	Depth Integrated	ND	ND	ND	ND
EPA 351.2	Kjeldahl Nitrogen	mg/L	0.1-0.2	NA	Depth Integrated	2.1	0.97	2.9	1.2
Calculation	Total Nitrogen ^a	mg/L	--	0.75 ^{b1}	Depth Integrated	2.1	0.97	2.9	1.2
SM4500NH3H	Ammonia-Nitrogen	mg/L	0.1	CMC: 2.25-16.76 ^{c1} CCC: 0.35-2.71 ^{c1}	Depth Integrated	1.3	0.18	1.9	ND
SM 4500P E	Ortho Phosphate Phosphorus	mg/L	0.05	NA	Depth Integrated	0.23	0.016J	0.025J	ND
EPA 365.1	Total Phosphorus	mg/L	0.01	0.1 ^{b1}	Depth Integrated	0.239	0.044	0.085	0.039 F
EPA 200.7	Total Aluminum	µg/L	100	NA	Depth Integrated	ND	34 J	75 J	230
EPA 200.7	Dissolved Aluminum	µg/L	100	NA	Depth Integrated	ND	ND	ND	47 J
EPA 10200 H	Chlorophyll-a	µg/L	1.0	25 ^{b1} , 40 ^{b2}	Surface (0-2m)	6.66	6.66	13.8	19.9
EPA 10200 H	Chlorophyll-a	µg/L	1.0	25 ^{b1} , 40 ^{b2}	Depth Integrated	33.3	36.3	64.5	19.5

Notes:

^a - Total Nitrogen = TKN+NO₂+NO₃

^b - Annual average

^c - Values are site specific dependent upon pH and temperature. Target based on equations in 2004 TMDL permit Table 5-9n.

¹ - 2020 TMDL Target, based on Table 5-9n of 2004 TMDL

² - 2015 TMDL Target, based on Table 5-9n of 2004 TMDL

³ - Santa Ana Region Basin Plan Objective

RL-Reporting Limit

TMDL- Total Maximum Daily Load

NA – Not applicable/available

NS – Not sampled; ND – Not detected

J – concentration between MDL and RL (estimated)

F- Matrix Spike (MS) and/or Matrix Spike Duplicate (MSD) was outside acceptance limits

Underline - Indicates exceedance of Basin Plan

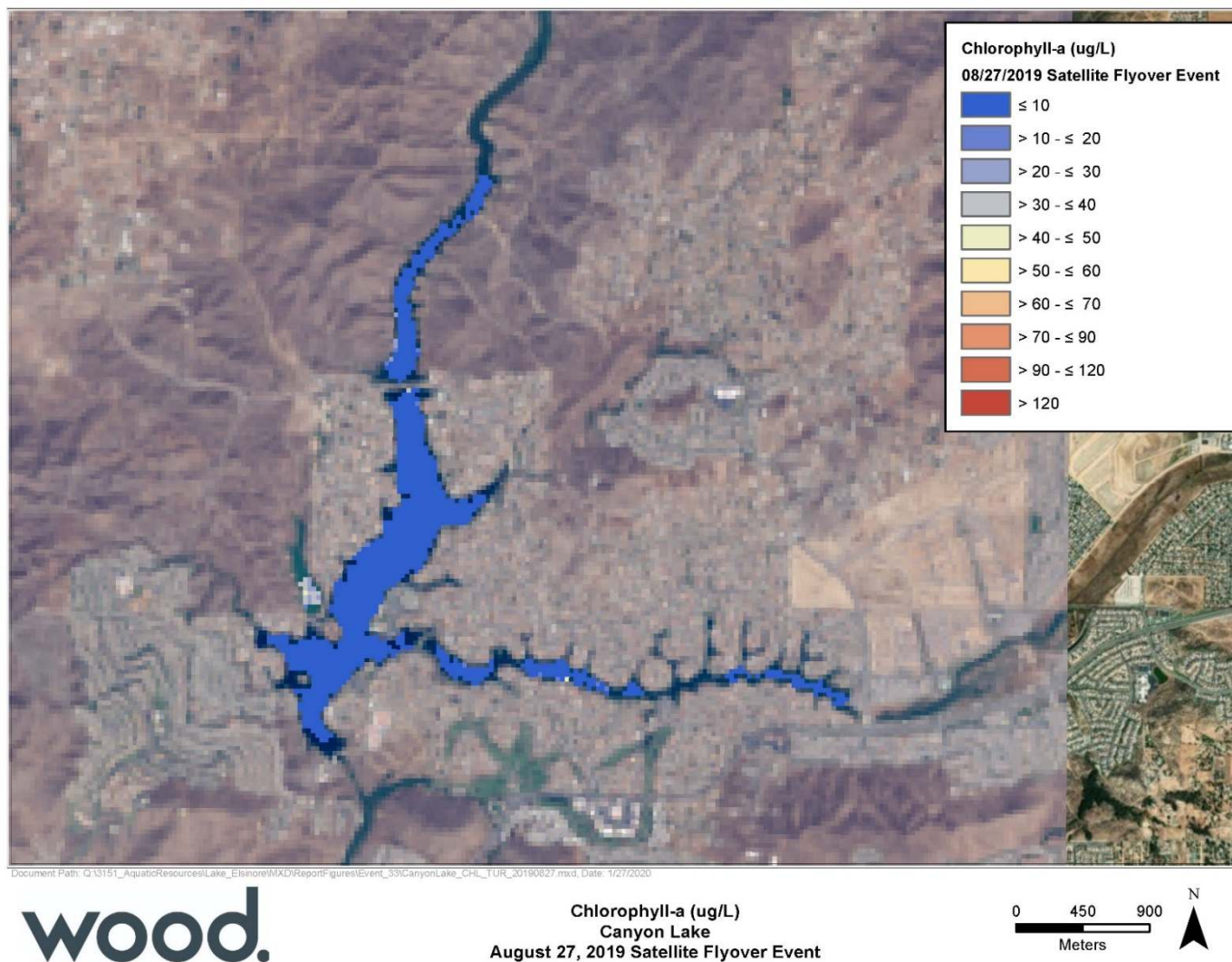


Figure 12. Satellite Imagery of Canyon Lake Chlorophyll-a Concentrations August 27, 2019 *Data near the edges of the main lake body and narrow portions of the eastern arm have been flagged due to mixing of water and land data pixels, and have been removed from the dataset (i.e. blacked out).*

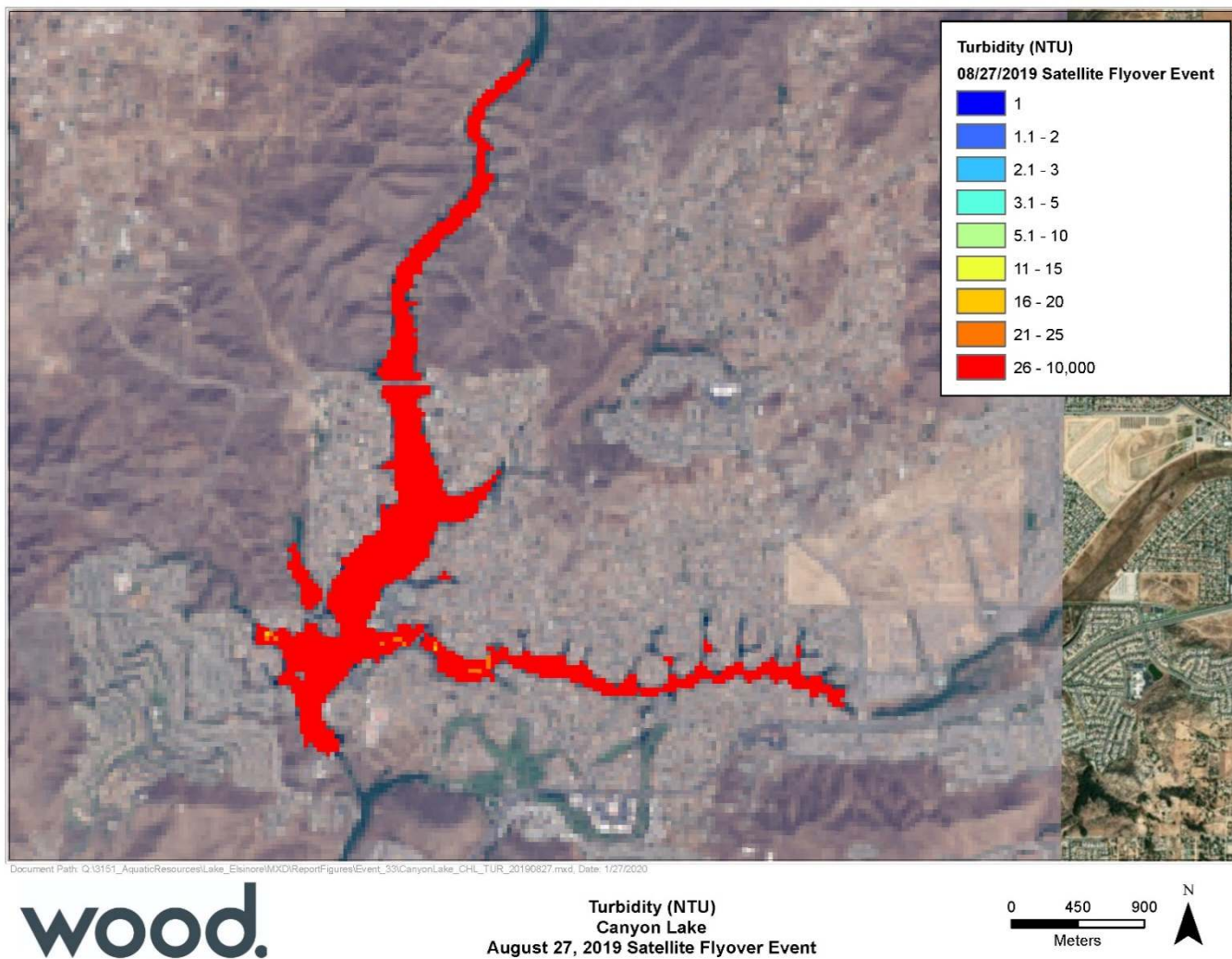


Figure 13. Satellite Imagery of Canyon Lake Turbidity Measurements August 27, 2019

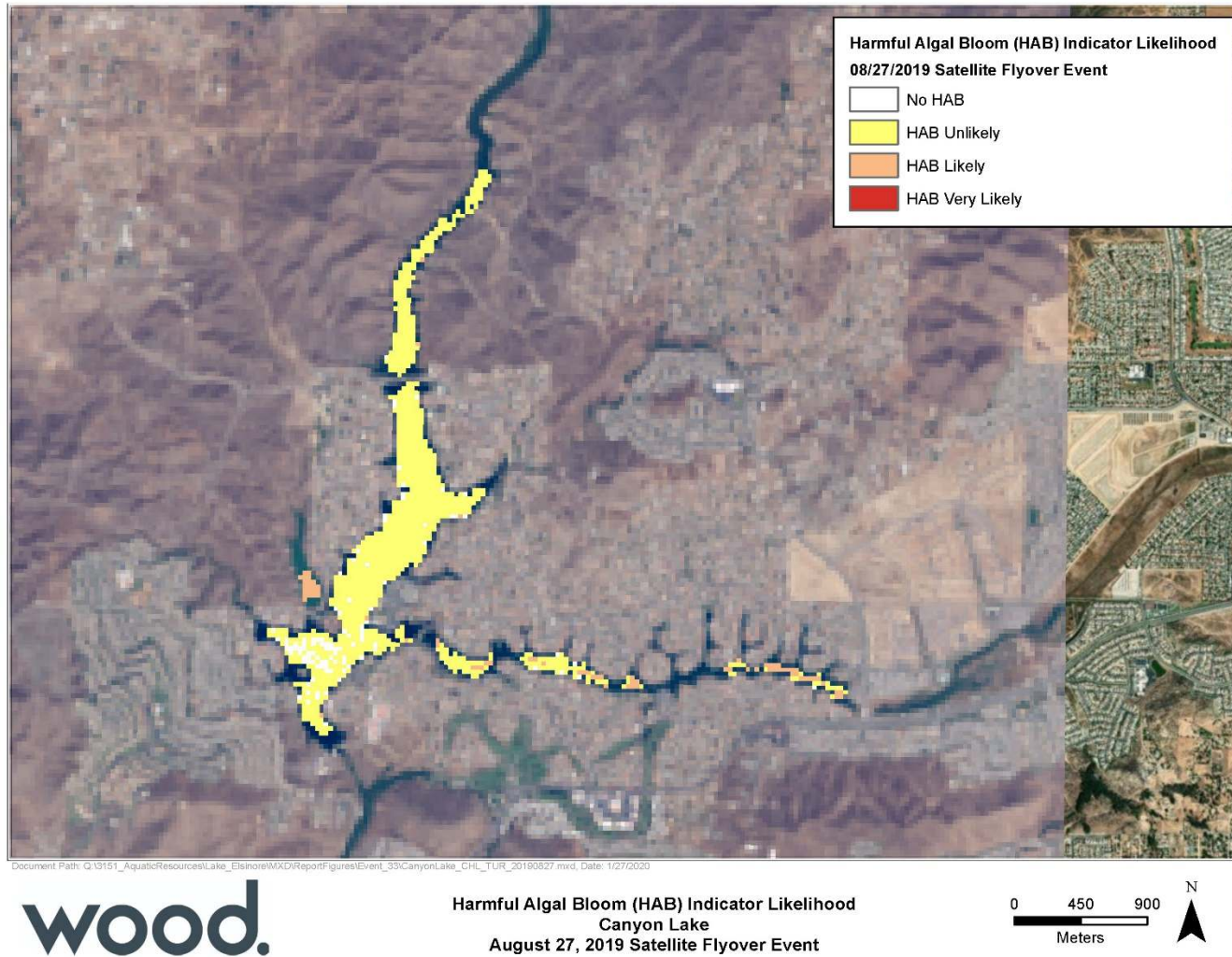


Figure 14. Satellite Imagery of Lake Elsinore HAB Indicator Likelihood August 27, 2019
Data near the edges of the main lake body and narrow portions of the eastern arm have been flagged due to mixing of water and land data pixels, and have been removed from the dataset (i.e. blacked out).

Appendix A
Field Datasheets

July 26, 2019
Field Datasheets

FIELD DATASHEET

Date: 07/26/2019 Location (Circle) Lake Elsinore/Canyon Lake Station: LE01

Time on Station: 1050 Time off Station: 1110

Weather Conditions: sunny Wind (mph & direction): 0

Lat: on target Long: on target

Water Depth (m): 5.8 Secchi Depth (m): 0.4

Water Chemistry Sample?: Y N
Chl-a Sample?: Y N Plankton Sample?: Y / N
Surface volume filtered (ml): _____ *fisheries management*

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll
(~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)
0	29.0	3655	9.12	8.3	15				
1	27.6	3647	9.05	4.5	16				
2	27.2	3646	9.00	3.4	17				
3	27.1	3645	8.98	2.4	18				
4	27.0	3645	8.96	1.8	19				
5	26.8	3645	8.94	2.3	20				
65.5	26.8	3647	8.94	1.1	21				
7					22				
8					23				
9					24				
10					25				
11					26				
12					27				
13					28				
14					29				

FIELD DATASHEET

Date: 07/26/2019 Location (Circle): Lake Elsinore/Canyon Lake Station: Lakeshore
Sonde

Time on Station: 1035 Time off Station: 1045

Weather Conditions: Sunny Wind (mph & direction): 0

Lat: on target Long: on target

Water Depth (m): 7.1 Secchi Depth (m): 0.4

Water Chemistry Sample?: Y Chl-a Sample?: Y Plankton Sample?: Y

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll
(~500 mL fill volume preferred)

Comments:

Surface Sonde lost

chl a (RFU)

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)
0	28.5	3650	9.15	9.7	15	27.7	6.9		
1	28.3	3648	9.13	7.8	16	34.64	8.61		
2	27.6	3647	9.02	3.6	17	35.45	8.91		
3	27.3	3647	8.98	2.6	18	33.36	8.37		
4	27.2	3646	8.94	1.5	19	31.78	7.95		
5	27.2	3646	8.93	1.3	20	31.53	7.89		
6	27.1	3646	8.93	0.3	21	31.75	7.96		
7.5	26.9	3646	8.89	0.3	22	33.89	8.47		
8					23				
9					24				
10					25				
11					26				
12					27				
13					28				
14					29				

FIELD DATASHEET

Date: 07/26/2019 Location (Circle): Lake Elsinore Canyon Lake Station: Grand Ave SndL

Time on Station: 1015 Time off Station: 1030

Weather Conditions: Sunny Wind (mph & direction): 0

Lat: on target Long: on target

Water Depth (m): 6.4 Secchi Depth (m): 0.4

Water Chemistry Sample?: Y/N Chl-a Sample?: Y/N Algae Sample?: Y/N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll
(~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)
0	28.6	3650	9.12	9.2
0.5	27.8	3646	9.07	8.0
1	27.8	3645	9.06	5.9
2	27.6	3646	9.00	3.6
3	27.3	3647	8.97	2.8
4	27.2	3647	8.96	2.2
5	27.1	3646	8.94	1.8
6	26.8	3646	8.87	0.3
7				
8				
9				
10				
11				
12				
13				

chl_a (µg/L) | chl_a (RFU)

31.38 | 7.83

31.69 | 7.88

35.60 | 8.41

36.78 | 8.95

35.03 | 8.45

34.11 | 8.40

32.00 | 7.63

33.2 | 8.17

* replace DO caps next month

FIELD DATASHEET

Date: 0726 Location (Circle): Lake Elsinore/Canyon Lake Station: LE02

Time on Station: 0835 Time off Station: _____

Weather Conditions: sunny Wind (mph & direction): 0

Lat: on target Long: on target

Water Depth (m): 6.9 Secchi Depth (m): 0.5

Water Chemistry Sample?: Y / N Chl-a Sample?: Y / N Algae Sample?: Y / N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

****Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll
(~500 mL fill volume preferred)**

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)
0	27.5	3646	9.11	6.3	79.8	8.02
0.5	27.6	3646	9.09	4.9	79.9	8.05
1	27.5	3646	9.07	4.0	80.7	8.00
2	27.4	3647	9.04	3.3	81.0	8.62
3	27.3	3647	9.03	2.9	81.3	9.36
4	27.2	3646	9.02	2.8	81.4	9.23
5	27.2	3646	9.02	2.5	81.5	8.78
6	27.2	3646	9.01	2.2	81.6	8.60
76.5	27.1	3646	9.00	1.9	81.4	8.61
8						
9						
10						
11						
12						
13						

chl a
21.9 µg/L
5.41 RFU
31.2 µg/L
7.70 RFU

FIELD DATASHEET

Date: 07/26/2019 Location (Circle) Lake Elsinore Canyon Lake Station: LE 03

Time on Station: 0805 Time off Station: 0830

Weather Conditions: Sunny Wind (mph & direction): 0830

Lat: on target Long: on target

Water Depth (m): 5.3 Secchi Depth (m): 0.4

Water Chemistry Sample?: Y/N Chl-a Sample?: Y/N Plankton Sample?: Y/N
 Surface volume filtered (ml): _____ fisheries management
 Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll
(~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)
0	27.7	3645	9.11	5.6	15				
1	27.6	3644	9.10	5.6	16				
2	27.6	3643	9.07	4.3	17				
3	27.5	3643	9.06	3.9	18				
4	27.5	3643	9.06	3.7	19				
5	27.4	3644	9.04	2.6	20				
6					21				
7					22				
8					23				
9					24				
10					25				
11					26				
12					27				
13					28				
14					29				

August 27, 2019
Field Datasheets

FIELD DATASHEET

Date: 8.27.19 Location (Circle): Lake Elsinore/Canyon Lake Station: CL07

Time on Station: 1015 Time off Station: 1100

Weather Conditions: Sunny, clear Wind (mph & direction): ~3-5mph

Lat: On target Long: _____

Water Depth (m): 14 Secchi Depth (m): 2m

Water Chemistry Sample?: Y / N Chl-a Sample?: Y / N Plankton Sample?: Y / N
Surface volume filtered (ml): _____
Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	28.1	725	8.50	7.26	12	13.7	623.6	7.15	0.20
1	28.0	725	8.52	7.30	13	13.5	617.8	7.17	0.20
2	27.8	724	8.53	7.24	14	13.4	623.7	7.08	0.20
3	27.8	724	8.51	7.11	15				
4	27.7	724	8.51	7.07	16				
5	26.6	724	7.71	1.97	17				
6	21.9	678	7.18	0.35	18				
7	18.3	644	7.00	0.28	19				
8	15.5	627	7.06	0.23	20				
9	14.8	623.8	7.09	0.23	21				
10	14.1	616.2	7.10	0.22	22				
11	13.8	623.2	7.08	0.21	23				

FIELD DATASHEET

Date: 8/27/19 Location (Circle): Lake Elsinore/Canyon Lake Station: CLO7

Time on Station: 1530 Time off Station: 1545

Weather Conditions: Clear + Sunny Wind (mph & direction): _____

Lat: On Target Long: _____

Water Depth (m): 14 Secchi Depth (m): 2.0m

Water Chemistry Sample?: ~~Y~~ N Chl-a Sample?: Y / N Plankton Sample?: Y N
Surface volume filtered (ml): _____
Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	29.10	712	8.52	7.77	12	13.7	625	7.41	0.22
1	29.1	728	8.57	7.86	13	13.5	624	7.44	0.22
2	28.4	723	8.56	7.74	14 13.5	13.5	628	7.39	0.20
3	28.0	723	8.52	7.53	15				
4	27.8	724	8.49	7.17	16				
5	25.8	726	7.69	1.04	17				
6	20.5	667	7.12	0.29	18				
7	17.4	644	7.13	0.25	19				
8	15.5	625	7.20	0.24	20				
9	14.6	621	7.26	0.23	21				
10	14.1	619	7.32	0.23	22				
11	13.8	626	7.35	0.22	23				

FIELD DATASHEET

Date: 8/27/19 Location (Circle): Lake Elsinore/Canyon Lake Station: CLCP

Time on Station: 0930 Time off Station: 0950

Weather Conditions: Calm + Sunny Wind (mph & direction): 1-2 SW

Lat: On Trawl Long: _____

Water Depth (m): 7.95 Secchi Depth (m): 1.8

Water Chemistry Sample?: N / N Chl-a Sample?: Y / N Plankton Sample?: Y / N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred)

Comments:

Morning

Afternoon @ 1510

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	28.4	718	8.52	7.53	120	28.9	710	8.61	8.34
1	28.0	717	8.50	7.44	131	29.0	720	8.11	8.30
2	28.0	718	8.50	7.33	142	28.3	717	8.60	8.03
3	27.9	718	8.49	7.21	153	28.1	718	8.61	7.85
4	27.8	721	8.42	6.53	164	27.8	719	8.47	6.97
5	26.8	710	7.53	0.40	175	26.9	712	7.75	0.95
6	21.6	676	7.13	0.31	186	22.0	663	7.36	0.31
7	17.7	640	6.99	0.26	197	16.9	637	7.13	0.26
8	11.2	635	6.98	0.25	207.5	16.0	634	7.21	0.24
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 8-27-19 Location (Circle): Lake Elsinore/Canyon Lake Station: CL09

Time on Station: 0845 Time off Station: 0915

Weather Conditions: Sunny, clear Wind (mph & direction): ~3-5 mph

Lat: on target Long: _____

Water Depth (m): 6.7 Secchi Depth (m): 0.9

Water Chemistry Sample?: / N Chl-a Sample?: / N Plankton Sample?: / N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred)

Comments:

Morley *AD Johnson @ 1455*

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	27.7	867	8.79	8.13	120	29.6	851	8.77	9.14
1	27.7	868	8.78	8.12	131	28.3	866	8.73	9.43
2	27.7	868	8.76	7.96	142	27.8	883	8.72	9.00
3	27.5	874	8.55	6.34	153	27.5	898	8.40	6.36
4	26.3	917	7.55	0.39	164	26.6	913	7.64	0.74
5	20.7	910	6.89	0.28	175	21.3	923	6.80	0.32
6	17.3	903	6.90	0.24	186	17.2	903	6.84	0.28
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 8/27/19 Location (Circle): Lake Elsinore/Canyon Lake Station: CL10

Time on Station: 0730 Time off Station: 0830

Weather Conditions: Clear, Sunny Wind (mph & direction): ~3-5 mph

Lat: On Target Long: _____

Water Depth (m): 2.95 Secchi Depth (m): 0.6

Water Chemistry Sample?: / N Chl-a Sample?: / N Plankton Sample?: / N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred)

Comments:

Morning

Afternoon @ 1445

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	27.4	922	8.70	6.93	120	31.0	898	8.69	9.17
1	27.3	922	8.69	6.84	131	29.5	917	8.72	9.96
2	27.4	922	8.68	6.86	142	27.9	944	8.58	8.56
2.5	27.4	921	8.68	6.84	152.5	27.0	924	8.29	6.09
4					16				
5					17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 8-27-19 Location (Circle): Lake Elsinore/Canyon Lake Station: NORTH SKI area

Time on Station: 1400 Time off Station: 1415

Weather Conditions: Sunny, hot Wind (mph & direction): ~3 mph

Lat: on target Long: _____

Water Depth (m): 6.5 m Secchi Depth (m): _____

Water Chemistry Sample?: Y/ N Chl-a Sample?: Y/ N Plankton Sample?: Y/ N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	28.5	623	8.47	8.78	12				
1	28.1	627	8.40	8.35	13				
2	27.8	628	8.28	7.52	14				
3	27.6	629	8.06	6.27	15				
4	27.4	631	7.92	5.34	16				
5	27.0	633	7.52	1.67	17				
6	26.7	635	6.78	0.30	18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 8/27/2019 Location (Circle): Lake Elsinore Canyon Lake Station: LE01

Time on Station: 10:45 Time off Station: 10:30

Weather Conditions: Sunny, Hbt, Calm Wind (mph & direction): None

Lat: 33.66898 Long: -117.36419

Water Depth (m): ~~3.4~~ 5.4 Secchi Depth (m): 0.3m

Water Chemistry Sample?: Y N Chl-a Sample?: Y N Plankton Sample?: Y N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	28.4	37.70	9.23	12.77	12				
1	27.4	37.67	9.18	9.53	13				
2	26.9	37.59	9.09	6.60	14				
3	26.8	37.38	9.06	5.21	15				
4	26.6	37.59	8.99	2.89	16				
5	26.4	37.59	8.94	1.58	17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 8/27/2019 Location (Circle): Lake Elsinore / Canyon Lake Station: LEO1

Time on Station: 14:40 Time off Station: 19:00

Weather Conditions: Sunny, Hot Wind (mph & direction): 8-6 E MPH
clear

Lat: 33.66898 Long: -117.36419

Water Depth (m): 5.4m Secchi Depth (m): 0.3m

Water Chemistry Sample?: Y / N
Chl-a Sample?: Y / N Plankton Sample?: Y / N
Surface volume filtered (ml): _____
Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll
(~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	30.5	3774	9.25	15.5	12				
1	28.2	3781	9.17	13.1	13				
2	26.9	3759	9.04	7.61	14				
3	26.5	3759	8.91	3.37	15				
4	26.5	3759	8.90	2.90	16				
5	26.4	3760	8.89	2.43	17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 8/27/2019 Location (Circle): Lake Elsinore/Canyon Lake Station: LE02

Time on Station: 08:00 Time off Station: 10:15

Weather Conditions: Sunny, Hot, calm Wind (mph & direction): None

Lat: 33.66334 Long: -117.35421

Water Depth (m): 6.7m Secchi Depth (m): .3

Water Chemistry Sample?: Y / N Chl-a Sample?: Y / N Plankton Sample?: Y / N

Surface volume filtered (ml): 250

LE-02 - Surf the 0840 Depth-Integrated volume filtered (ml): 250

Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred)

Comments:

LE-02
Depth Integrated the
Sample: 0830

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	26.8	3757	9.09	7.12	12				
1	26.8	3757	9.06	6.13	13				
2	26.7	3758	9.04	5.5	14				
3	26.7	3760	9.04	4.3	15				
4	26.5	3760	8.98	3.45	16				
5	26.5	3759	8.97	3.04	17				
6	26.5	3760	8.96	2.76	18				
6.5	26.4	3760	8.95	2.25	19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 8/27/2019 Location (Circle) Lake Elsinore / Canyon Lake Station: LEOZ

Time on Station: 15:05 Time off Station: 15:15

Weather Conditions: Sunny, Hot, Calm Wind (mph & direction): 3-6-10 MPH

Lat: 33.6634 Long: -117.35421

Water Depth (m): 6.7 Secchi Depth (m): 0.3M

Water Chemistry Sample?: Y N Chl-a Sample?: Y N Plankton Sample?: Y N
Surface volume filtered (ml): _____
Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred)

Comments:

2100ml in Cobi

6.5

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	31.9	3787	9.24	13.19	12				
1	27.7	3758	9.24	14.47	13				
2	27.1	3760	9.09	10.11	14				
3	26.9	3758	9.02	6.06	15				
4	26.8	3885	8.97	4.38	16				
5	26.6	3759	8.93	2.85	17				
6	26.6	3759	8.93	3.12	18				
7	26.5	3760	8.91	2.14	19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 8/27/2019 Location (Circle): Lake Elsinore / Canyon Lake Station: LE03

Time on Station: 10:30 Time off Station: 10:35

Weather Conditions: Sunny, Hot, Calm Wind (mph & direction): None

Lat: 33.65494 Long: -117.34163

Water Depth (m): 4.8m Secchi Depth (m): .3m

Water Chemistry Sample?: Y / N Chl-a Sample?: Y / N Plankton Sample?: Y / N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll
(~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)
0	27.3	3753	9.19	10.25	15				
1	27.0	3755	9.10	6.64	16				
2	26.9	3753	9.07	5.91	17				
3	26.8	3756	9.04	4.5	18				
4	26.8	3757	9.02	3.98	19				
4.5	26.7	3759	8.98	2.97	20				
6					21				
7					22				
8					23				
9					24				
10					25				
11					26				
12					27				
13					28				
14					29				

FIELD DATASHEET

Date: 8/27/2019 Location (Circle): Lake Elsinore/Canyon Lake Station: LE03

Time on Station: 15:20 Time off Station: 16:30

Weather Conditions: Sunny, Hot, Calm Wind (mph & direction): 3-6-10 MPH

Lat: 33.65499 Long: -117.24181

Water Depth (m): 4.8 m Secchi Depth (m): 0.3 m

Water Chemistry Sample?: Y N
Chl-a Sample?: Y N Plankton Sample?: Y N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	28.9	3749	9.39	17.9	12				
1	27.7	3755	9.28	16.8	13				
2	27.2	3759	9.05	4.94	14				
3	26.8	3756	8.98	4.24	15				
4	26.8	3758	8.96	3.26	16				
4.5	26.7	3760	8.93	1.95	17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 8/27/2019 Location (Circle): Lake Elsinore/Canyon Lake Station: Lakeshore

Time on Station: 16:00 Time off Station: 16:15

Weather Conditions: Ht, Sunny, calm, clear Wind (mph & direction): S-6-10 MPH

Lat: 33.66571 Long: -117.35281

Water Depth (m): 7.6 Secchi Depth (m): .3m

Water Chemistry Sample?: Y/ N Chl-a Sample?: Y/ N Plankton Sample?: Y/ N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	29.5	3766	9.30	15.35	12				
1	27.2	3757	9.15	14.00	13				
2	26.9	3757	9.05	7.01	14				
3	26.8	3758	9.01	4.71	15				
4	26.7	3760	8.98	3.84	16				
5	26.6	3760	8.95	3.37	17				
6	26.5	3760	8.94	1.82	18				
7	26.4	3762	8.89	0.48	19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 8/27/2019 Location (Circle): Lake Elsinore/Canyon Lake Station: Grandview

Time on Station: 15:35 Time off Station: 15:50

Weather Conditions: Hot, Sunny, Clear, calm Wind (mph & direction): S-6-10 MPH

Lat: 33.66050 Long: -117.35236

Water Depth (m): 6.0 Secchi Depth (m): 0.3m

Water Chemistry Sample?: Y/N Chl-a Sample?: Y/N Plankton Sample?: Y/N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	29.5	3766	9.29	14.41	12				
1	27.3	3759	9.16	10.33	13				
2	26.9	3757	9.04	5.74	14				
3	26.8	3757	8.99	4.30	15				
4	26.7	3758	8.97	3.60	16				
5	26.6	3758	8.96	3.33	17				
5.5	26.6	3759	8.95	3.19	18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 8-27-19 Location (Circle): Lake Elsinore/Canyon Lake Station: NORTH SKI area

Time on Station: 1400 Time off Station: 1415

Weather Conditions: Sunny, hot Wind (mph & direction): ~3 mph

Lat: on target Long: _____

Water Depth (m): 6.5 m Secchi Depth (m): _____

Water Chemistry Sample?: Y/ N Chl-a Sample?: Y/ N Plankton Sample?: Y/ N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll
(~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	28.5	623	8.47	8.78	12				
1	28.1	627	8.40	8.35	13				
2	27.8	628	8.28	7.52	14				
3	27.6	629	8.06	6.27	15				
4	27.4	631	7.92	5.34	16				
5	27.0	633	7.52	1.07	17				
6	26.7	635	6.78	0.30	18				
7					19				
8					20				
9					21				
10					22				
11					23				

September 26, 2019
Field Datasheets

FIELD DATASHEET

Date: 09/26/2019 Location (Circle): Lake Elsinore Canyon Lake Station: LE01

Time on Station: 07:43 Time off Station: 07:52

Weather Conditions: Colm, overcast Wind (mph & direction): None

Lat: 33.66898 Long: -117.36418

Water Depth (m): 5.6 Secchi Depth (m): .25

Water Chemistry Sample?: Y N Chl-a Sample?: Y N Plankton Sample?: Y N

Surface volume filtered (ml): N/A

Depth-Integrated volume filtered (ml): N/A

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	24.2	3850	9.29	6.77	12				
1	24.3	3850	9.27	6.65	13				
2	24.2	3850	9.26	6.51	14				
3	24.2	3851	9.23	5.76	15				
4	24.2	3850	9.18	3.42	16				
5	24.1	3851	9.14	2.74	17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 09/26/2019 Location (Circle): Lake Elsinore Canyon Lake Station: LEOZ

Time on Station: 08:11 Time off Station: 10:10

Weather Conditions: Sunny, Calm Wind (mph & direction): None

Lat: 33.66335 Long: -117.35421

Water Depth (m): 6.5 Secchi Depth (m): 0.25

Water Chemistry Sample? Y / N Chl-a Sample? Y / N Plankton Sample? Y / N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): 500

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred)

Comments:

Bottle Time: 8:30 - Integrated
8:40 - Surf

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	24.0	3860	9.17	4.38	12				
1	24.0	3862	9.18	3.91	13				
2	24.0	3852	9.17	3.72	14				
3	24.1	3852	9.18	3.76	15				
4	24.0	3851	9.17	3.73	16				
5	24.0	3852	9.17	3.76	17				
6	24.0	3852	9.17	3.79	18				
6.4	24.0	3852	9.17	3.78	19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 09/26/2019 Location (Circle): Lake Elsinore/Canyon Lake Station: LE03

Time on Station: 07:58 Time off Station: 08:05

Weather Conditions: CalM, Overcast Wind (mph & direction): None

Lat: 33.65494 Long: -117.34164

Water Depth (m): 4.8 Secchi Depth (m): 2.5

Water Chemistry Sample?: Y N Chl-a Sample?: Y N Plankton Sample?: Y N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	23.8	3840	9.2	6.07	12				
1	23.9	3843	9.21	5.92	13				
2	23.9	3843	9.21	5.62	14				
3	23.9	3845	9.21	5.55	15				
4	23.9	3845	9.21	5.47	16				
4.5	23.9	3845	9.2	5.47	17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 9/26/2019 Location (Circle): Lake Elsinore/Canyon Lake Station: LE01

Time on Station: 14:00 Time off Station: _____

Weather Conditions: overcast, slight wind Wind (mph & direction): 0-5, West

Lat: 33.66898 Long: -117.36418

Water Depth (m): 5.5 Secchi Depth (m): 0.25

Water Chemistry Sample?: Y / N Chl-a Sample?: Y / N Plankton Sample?: Y / N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll
(~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)
0	24.5	3851	9.30	9.07	15				
1	24.6	3851	9.30	8.69	16				
2	24.5	3852	9.29	8.76	17				
3	24.1	3851	9.20	4.26	18				
4	24.1	3851	9.17	3.69	19				
5	24.1	3852	9.15	3.24	20				
6					21				
7					22				
8					23				
9					24				
10					25				
11					26				
12					27				
13					28				
14					29				

FIELD DATASHEET

Date: 9/26/2019 Location (Circle) Lake Elsinore Canyon Lake Station: LEOZ

Time on Station: 13:51 Time off Station: 13:57

Weather Conditions: overcast, slight Wind Wind (mph & direction): 0-3, West

Lat: 33.66335 Long: -117.35421

Water Depth (m): 6.6 Secchi Depth (m): .25

Water Chemistry Sample?: Y N Chl-a Sample?: Y N Plankton Sample?: Y N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll

(~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)
0	24.1	3860	9.29	8.48	15				
1	24.1	3861	9.27	7.64	16				
2	24.1	3861	9.26	7.23	17				
3	24.1	3861	9.25	6.68	18				
4	24.1	3852	9.23	6.48	19				
5	24.0	3852	9.18	4.24	20				
6	24.0	3852	9.18	4.70	21				
7					22				
8					23				
9					24				
10					25				
11					26				
12					27				
13					28				
14					29				

FIELD DATASHEET

Date: 9/26/2019 Location (Circle): Lake Elsinore/Canyon Lake Station: LE03

Time on Station: 13:40 Time off Station: 13:47

Weather Conditions: Overcast, Slight Wind Wind (mph & direction): 0-3, West

Lat: 33.65494 Long: -117.34165

Water Depth (m): 4.9 Secchi Depth (m): .25

Water Chemistry Sample?: Y / N Chl-a Sample?: Y / N Plankton Sample?: Y / N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	24.6	3843	9.35	11.6	12				
1	24.5	3844	9.32	10.1	13				
2	24.5	3848	9.22	5.3	14				
3	24.0	3846	9.18	4.95	15				
4	23.9	3848	9.17	4.66	16				
4.6	X 23.9	3847	9.17	4.20	17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 9/26/2019 Location (Circle): Lake Elsinore/Canyon Lake Station: Lake Elsinore

Time on Station: 10:20 Time off Station: 10:40

Weather Conditions: Sunny, calm Wind (mph & direction): None

Lat: 33.66571 Long: -117.35291

Water Depth (m): 6.6 Secchi Depth (m): 25

Water Chemistry Sample?: Y N Chl-a Sample?: Y N Plankton Sample?: Y N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll
(~500 mL fill volume preferred)

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)
0	24.7	3855	9.25	6.82	15				
1	24.1	3855	9.24	5.87	16				
2	24.0	3853	9.18	3.89	17				
3	24.0	3852	9.17	3.75	18				
4	24.0	3852	9.17	3.64	19				
5	24.0	3852	9.16	3.64	20				
6	24.0	3852	9.16	3.58	21				
7	24.0	3852	9.16	3.40	22				
8					23				
9					24				
10					25				
11					26				
12					27				
13					28				
14					29				

6.6d

FIELD DATASHEET

Date: 9/26/2019 Location (Circle) Lake Elsinore/Canyon Lake Station: Grand Ave

Time on Station: 10:45 Time off Station: 11:15

Weather Conditions: Sunny, Calm Wind (mph & direction): None

Lat: 33.66055 Long: -117.35233

Water Depth (m): 5.9 Secchi Depth (m): .25

Water Chemistry Sample?: Y/ N Chl-a Sample?: Y/ N Plankton Sample?: Y/ N

Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll
(~500 mL fill volume preferred)

Comments:

Changed DO Probe

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH	DO (mg/L)
0	24.4	3865	9.24	6.74	15				
1	24.0	3852	9.2	4.8	16				
2	24.0	3852	9.21	5.06	17				
3	23.9	3850	9.22	5.18	18				
4	23.9	3850	9.22	5.68	19				
5	23.9	3850	9.22	5.51	20				
5.7	23.9	3850	9.20	4.92	21				
7					22				
8					23				
9					24				
10					25				
11					26				
12					27				
13					28				
14					29				

QUARTER 2 – OCTOBER AND DECEMBER 2019

Lake Elsinore and Canyon Lake Nutrient TMDL In-lake Monitoring 2019-2020 Quarter 2 Report



Prepared for:

Lake Elsinore & San Jacinto Watershed Project Authority
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February 25, 2020

wood.

Lake Elsinore

Monitoring Dates

October 17, 2019 and December 20, 2019. The lake levels during the sampling events were 1238.54 feet and 1239.02 feet, respectively. Sampling is conducted monthly in Lake Elsinore during summer (June – September) and bi-monthly during the remainder of the year (October – May).

Monitoring Locations

Five locations were monitored in Lake Elsinore: Sites LE01, LE02, LE03 and the two in-lake data sondes maintained by Elsinore Valley Municipal Water District (EVMWD): Lakeshore Sonde and Grand Avenue Sonde. These sites are depicted in Figure 1.

Weather

October 17, 2019 – Sunny and calm in the morning with 0-2 mph winds. Gusty winds in the afternoon prevented staff from collection afternoon water quality readings, including EVMWD sonde sites. Temperatures reflected a low of 61°F and high of 82°F.

December 20, 2019– Sunny and clear in the morning, with partly cloudy skies in the afternoon. Very calm with winds 0-2 mph. Temperatures reflected a low of 40°F and high of 73°F.

Water Quality Monitoring Activities

Water quality monitoring was successfully performed in accordance with the project specific Work Plan, with the exception of the afternoon water quality profiles not being performed on October 17 due to high winds and unsafe conditions. Additionally, the pH probe used for the December 20 monitoring event reported erroneous measurements inconsistent with typical results. The pH readings taken during this event are considered inaccurate and the meter probe has since been serviced and replaced. Field monitoring included the following activities at each location or where noted:

- Vertical water column profile measurements of temperature, conductivity, pH, and dissolved oxygen (all sites);
- Depth-integrated water chemistry sample for Total Dissolved Solids, Sulfide, Nitrate as N, Nitrite as N, Kjeldahl Nitrogen, Total Nitrogen, Ammonia-Nitrogen, Ortho Phosphate Phosphorus, Total Phosphorus, Total and Dissolved Aluminum (Site LE02 only);
- Chlorophyll-a surface (0-2 m) and full depth-integrated samples (Site LE02 only);
- Secchi disk measurements (all sites);
- Full water column vertical plankton tows with samples preserved and archived for potential assessment in the future as needed (Site LE02 only);
- Visual observations and photos of lake conditions.

A summary of water quality profile data is presented in Tables 1 and 2. Results of the water chemistry analyses are presented in Tables 3 and 4.

Satellite imagery of chlorophyll-a estimated concentrations, turbidity, and harmful algal bloom (HAB) probability based on remote sensing data are presented in Figures 2 through 7. Due to field staff scheduling conflicts, satellite data from October 14 is used for comparison to the October 17 monitoring data.

Copies of field datasheets are provided in Appendix A.



Figure 1. Lake Elsinore Sampling Locations

Table 1. Lake Elsinore *In-situ* Water Column Profile – October 17, 2019

Site	Time	Measure	Surface	1 m	2 m	3 m	4 m	5 m	6 m	Water Column Mean
LE01	7:55	Temp (°C)	20.1	20.1	20.1	20.1	19.9	19.8	--	20.0
		Sp. Cond (µS/cm)	3897	3895	3894	3894	3897	3896	--	3896
		pH	9.31	9.30	9.30	9.30	9.28	9.27	--	9.29
		DO (mg/L)	5.5	5.3	5.3	5.3	4.5	4.4	--	5.0
LE02	09:15	Temp (°C)	19.8	19.8	19.7	19.7	19.6	19.6	19.6	19.7
		Sp. Cond (µS/cm)	3897	3897	3896	3896	3896	3895	3896	3896
		pH	9.32	9.27	9.26	9.24	9.22	9.21	9.19	9.24
		DO (mg/L)	6.2	4.5	4.2	3.9	3.4	3.1	2.4	3.9
LE03 ^a	8:45	Temp (°C)	20.2	20.2	20.2	20.1	19.8	19.8	--	20.1
		Sp. Cond (µS/cm)	3893	3893	3893	3895	3897	3897	--	3895
		pH	9.32	9.31	9.30	9.25	9.19	9.18	--	9.26
		DO (mg/L)	6.3	5.8	5.7	4.2	2.1	1.9	--	4.3

Note: Afternoon and data sonde measurements were not performed due to high winds and unsafe conditions.

a- Bottom depth measurement taken at 4.5m

Table 2. Lake Elsinore *In-situ* Water Column Profile –December 20, 2019

Site	Time	Measure	Surface	1 m	2 m	3 m	4 m	5 m	6 m	7 m	Water Column Mean	
LE01	07:40	Temp (°C)	11.6	11.6	11.6	11.6	11.6	11.6	--	--	11.6	
		Sp. Cond (µS/cm)	3844	3844	3844	3844	3844	3844	3844	--	--	3844
		pH	ME	ME	ME	ME	ME	ME	ME	--	--	ME
		DO (mg/L)	2.4	2.1	2.1	2.0	2.0	2.0	2.0	--	--	2.1
	15:30	Temp (°C)	13.4	12.2	11.8	11.7	11.5	11.3	11.3	--	--	12.0
		Sp. Cond (µS/cm)	3849	3853	3838	3842	3845	3844	3844	--	--	3845
		pH	ME	ME	ME	ME	ME	ME	ME	--	--	ME
LE02	08:20	DO (mg/L)	4.9	4.3	2.1	1.9	1.4	1.3	1.3	--	--	2.6
		Temp (°C)	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	--	11.9
		Sp. Cond (µS/cm)	3840	3840	3840	3840	3840	3840	3841	3840	--	3840
		pH	ME	ME	ME	ME	ME	ME	ME	ME	--	ME
	14:35	DO (mg/L)	1.9	1.7	1.6	1.6	1.6	1.5	1.5	1.5	--	1.6
		Temp (°C)	14.5	12.1	11.9	11.9	11.9	11.9	11.9	11.9	--	12.3
		Sp. Cond (µS/cm)	3847	3847	3839	3839	3839	3839	3840	3840	--	3842
		pH	ME	ME	ME	ME	ME	ME	ME	ME	--	ME
LE03 ^a	07:55	DO (mg/L)	3.9	3.3	1.6	1.4	1.3	1.3	1.3	--	2.0	
		Temp (°C)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	--	--	12.0
		Sp. Cond (µS/cm)	3827	3826	3826	3827	3829	3843	3843	--	--	3830
		pH	ME	ME	ME	ME	ME	ME	ME	--	--	ME
	14:15	DO (mg/L)	4.0	3.9	3.9	3.8	3.6	3.4	3.4	--	--	3.8
		Temp (°C)	14.6	12.3	12.1	12.0	11.9	11.8	11.8	--	--	12.5
		Sp. Cond (µS/cm)	3827	3824	3821	3821	3827	3814	3814	--	--	3822
		pH	ME	ME	ME	ME	ME	ME	ME	--	--	ME
Lakeshore Sonde ^b	14:50	DO (mg/L)	6.2	5.6	4.2	4.1	3.7	3.6	3.6	--	--	4.6
		Temp (°C)	14.4	12.1	11.9	11.8	11.8	11.8	11.8	11.7	11.7	12.2
		Sp. Cond (µS/cm)	3842	3887	3840	3840	3839	3839	3839	3834	3834	3844
		pH	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME
		DO (mg/L)	3.7	1.4	1.3	1.2	1.2	1.2	1.2	1.8	1.8	1.7
Grand Ave Sonde ^c	10:40	Temp (°C)	12.2	12.1	12.0	11.9	11.9	11.9	11.9	--	--	12.0
		Sp. Cond (µS/cm)	3841	3837	3840	3839	3839	3839	3839	3839	--	3839
		pH	ME	ME	ME	ME	ME	ME	ME	ME	--	ME
		DO (mg/L)	3.5	3.6	2.3	2.1	2.1	2.0	2.0	2.0	--	2.5

ME- Meter Error. pH probe malfunction caused erroneous readings for this event (not reported).

a- Bottom depth measurement taken at 4.5m

b- Bottom depth measurement taken at 6.5m

c- Bottom depth measurement taken at 5.5m

Table 3. Water Chemistry for Lake Elsinore – October 17, 2019

Method	Compound	Units	RL	Basin Plan or TMDL Target	Depth Integrated or Surface Sample	LE02
SM 2540C	Total Dissolved Solids	mg/L	40	2000 ³	Depth Integrated	1800
SM 4500S2 D	Sulfide	mg/L	0.1	NA	Depth Integrated	ND
EPA 300.0	Nitrate as N	mg/L	0.2	NA	Depth Integrated	ND
EPA 300.0	Nitrite as N	mg/L	0.1	NA	Depth Integrated	ND
EPA 351.2	Total Kjeldahl Nitrogen	mg/L	0.5	NA	Depth Integrated	5.5
Calculation	Total Nitrogen ^a	mg/L	--	0.75 ^{b1}	Depth Integrated	5.5
SM4500NH3H	Ammonia-Nitrogen	mg/L	0.1	CMC: 0.9 ^{c1} CCC: 0.2 ^{c1}	Depth Integrated	0.05 J
SM 4500P E	Ortho Phosphate Phosphorus	mg/L	0.05	NA	Depth Integrated	0.05 J
EPA 365.1	Total Phosphorus	mg/L	0.01	0.1 ^{b1}	Depth Integrated	0.22
EPA 10200 H	Chlorophyll-a	µg/L	1.0	25 ^{d1} , 40 ^{d2}	Surface (0-2m)	139
					Depth Integrated	153

Notes:

^a - Total Nitrogen = TKN+NO₂+NO₃

^b - Annual average

^c - Values are site specific dependent upon pH and temperature recorded at each location

^d - Summer average

NA – Not applicable/ available

¹ – 2020 TMDL Target, based on Table 5-9n of 2004 TMDL

² – 2015 TMDL Target, based on Table 5-9n of 2004 TMDL

³ – Santa Ana Region Basin Plan Objective

J – concentration between MDL and RL (estimated)

Table 4. Water Chemistry for Lake Elsinore – December 20, 2019

Method	Compound	Units	RL	Basin Plan or TMDL Target	Depth Integrated or Surface Sample	LE02
SM 2540C	Total Dissolved Solids	mg/L	20	2000 ³	Depth Integrated	2200
SM 4500S2 D	Sulfide	mg/L	0.1	NA	Depth Integrated	ND
EPA 300.0	Nitrate as N	mg/L	0.2	NA	Depth Integrated	ND
EPA 300.0	Nitrite as N	mg/L	0.1	NA	Depth Integrated	ND
EPA 351.2	Total Kjeldahl Nitrogen	mg/L	0.4	NA	Depth Integrated	6.7
Calculation	Total Nitrogen ^a	mg/L	--	0.75 ^{b1}	Depth Integrated	6.7
SM4500NH3H	Ammonia-Nitrogen	mg/L	0.1	CMC: 1.14 ^{c1} CCC: 0.42 ^{c1}	Depth Integrated	1.3
SM 4500P E	Ortho Phosphate Phosphorus	mg/L	0.05	NA	Depth Integrated	0.13
EPA 365.1	Total Phosphorus	mg/L	0.01	0.1 ^{b1}	Depth Integrated	0.28 F
EPA 10200 H	Chlorophyll-a	µg/L	1.0	25 ^{d1} , 40 ^{d2}	Surface (0-2m)	37.2
					Depth Integrated	NM ^e

Notes:

^a - Total Nitrogen = TKN+NO₂+NO₃

^b - Annual average

^c - Values are site specific dependent upon pH and temperature recorded at each location. As a result of the pH probe malfunction, a default pH value of 9.1 was used to approximate previous December monitoring events.

^d - Summer average

^e - Sample dropped during laboratory preparation. Not recovered.

NA – Not applicable/ available

ND – Not detected

NM – Not measured

¹ – 2020 TMDL Target, based on Table 5-9n of 2004 TMDL

² – 2015 TMDL Target, based on Table 5-9n of 2004 TMDL

³ – Santa Ana Region Basin Plan Objective

F- Matrix Spike (MS) and/or Matrix Spike Duplicate (MSD) was outside acceptance limits

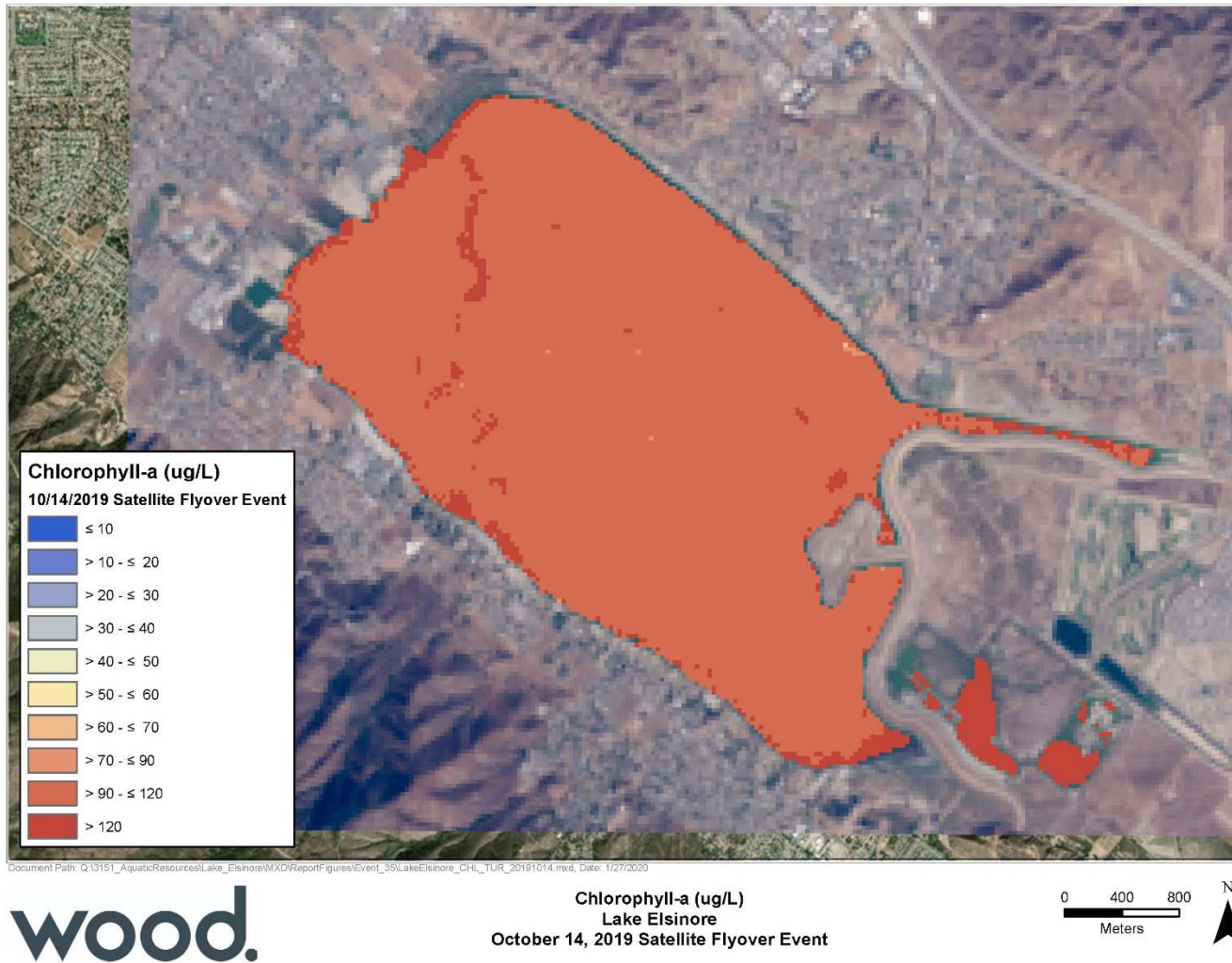


Figure 2. Satellite Imagery of Lake Elsinore Chlorophyll-a Concentrations October 14, 2019



Document Path: Q:\3151_AquaticResources\Lake_Elsinore\WXD\Report\Figures\Event_35\LakeElsinore_CHL_TUR_20191014.mxd, Date: 1/27/2020

wood.

Turbidity (NTU)
Lake Elsinore
October 14, 2019 Satellite Flyover Event

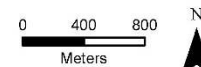


Figure 3. Satellite Imagery of Lake Elsinore Turbidity Measurements October 14, 2019

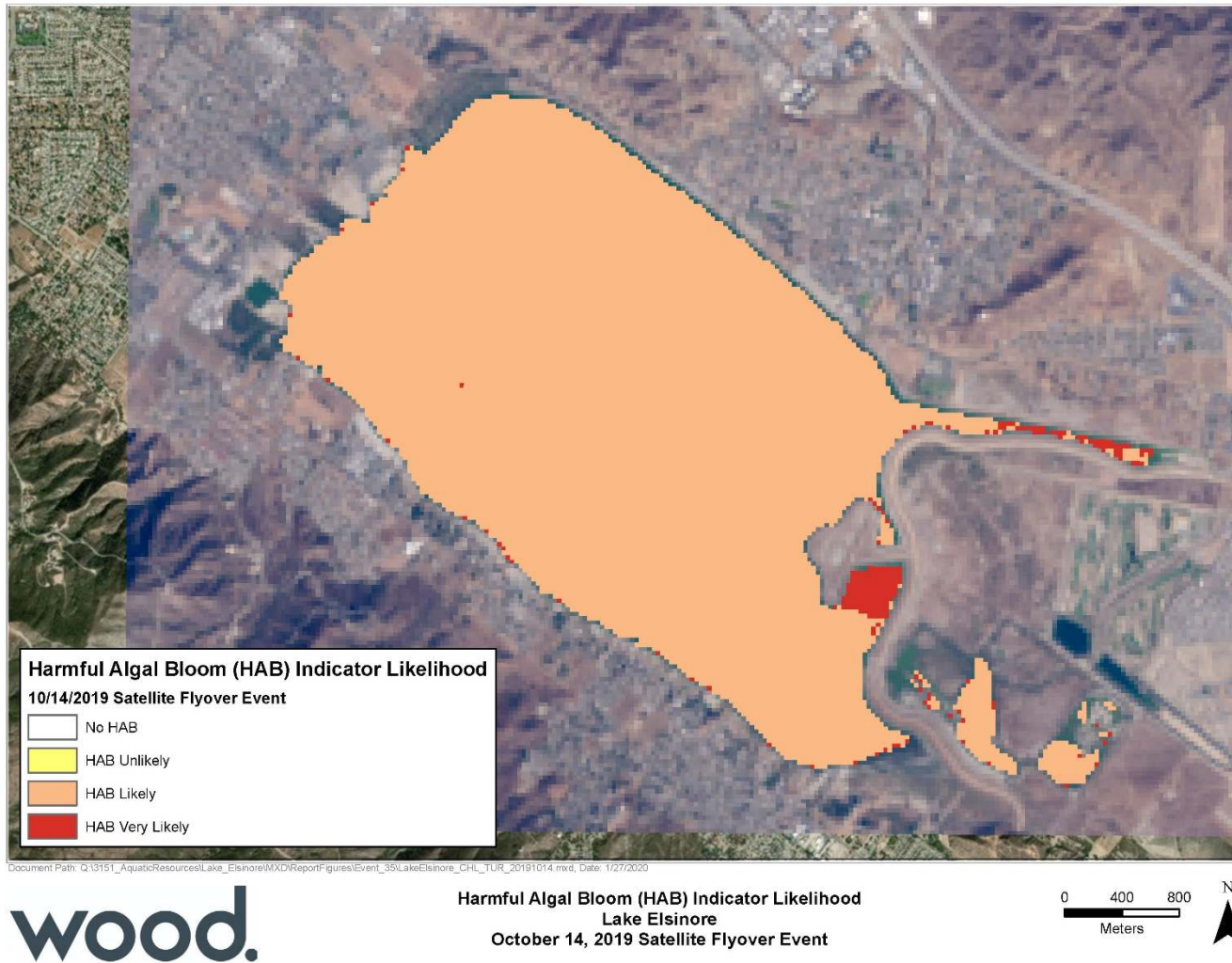


Figure 4. Satellite Imagery of Lake Elsinore HAB Indicator Likelihood October 14, 2019

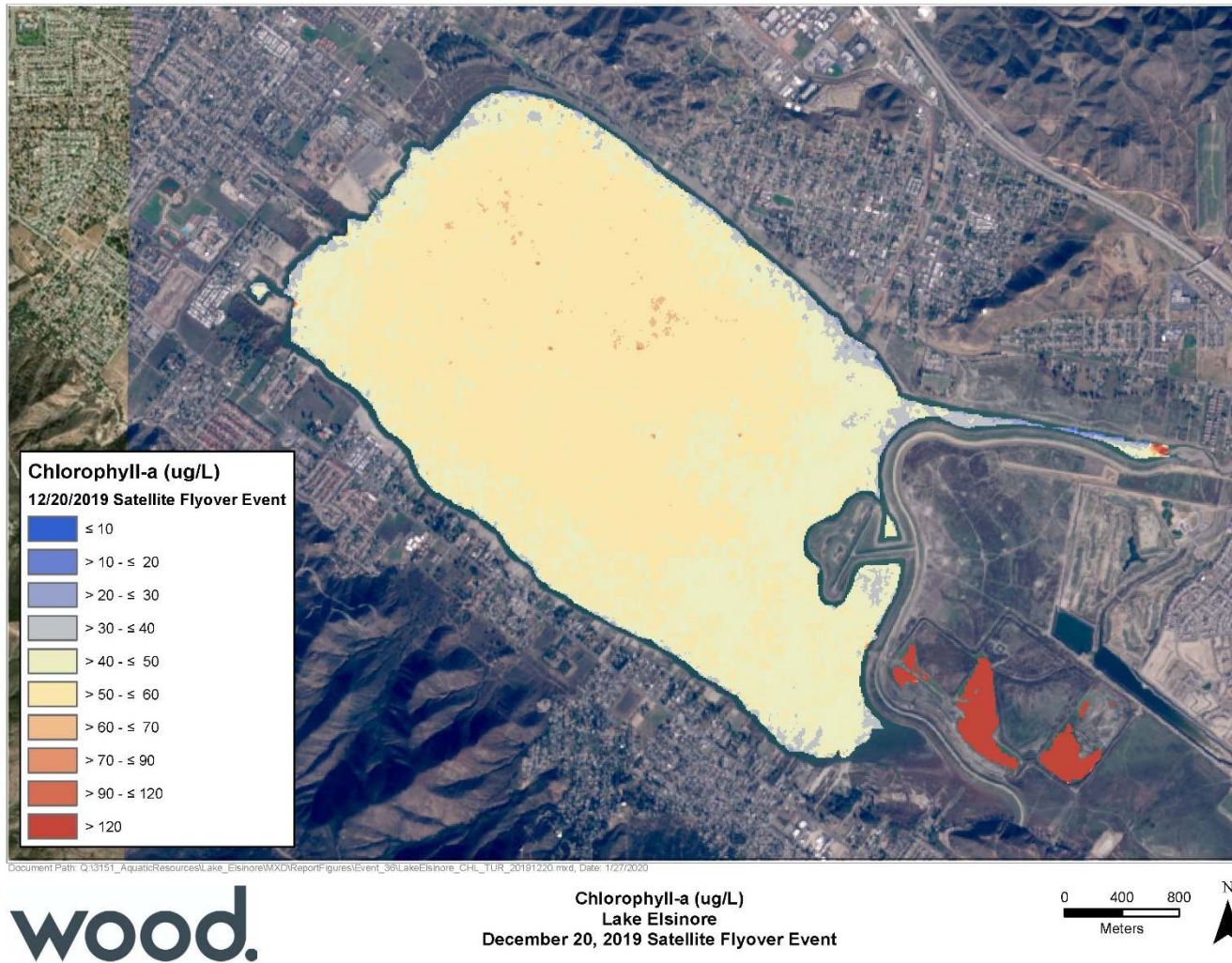


Figure 5. Satellite Imagery of Lake Elsinore Chlorophyll-a Concentrations December 20, 2019

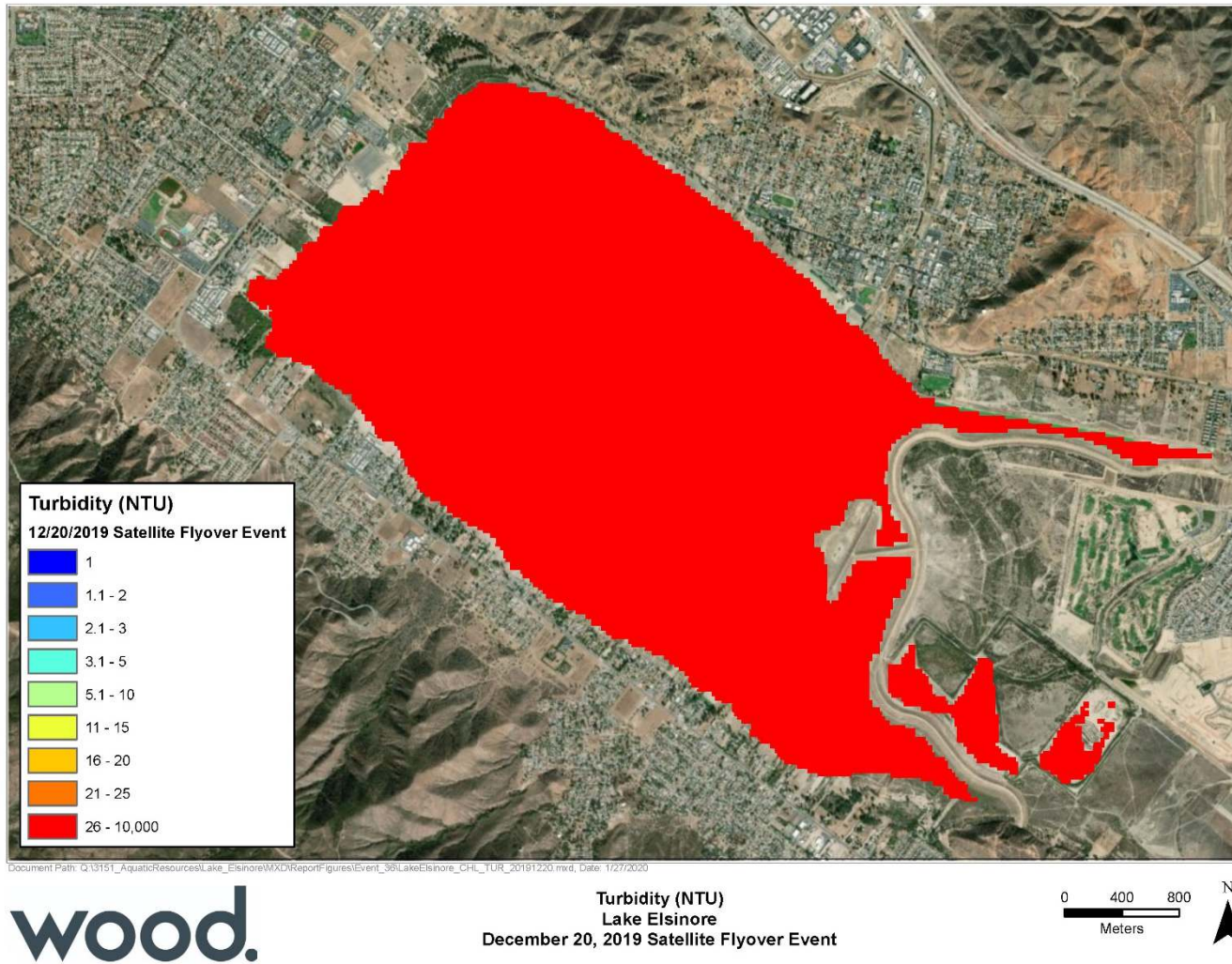


Figure 6. Satellite Imagery of Lake Elsinore Turbidity Measurements December 20, 2019

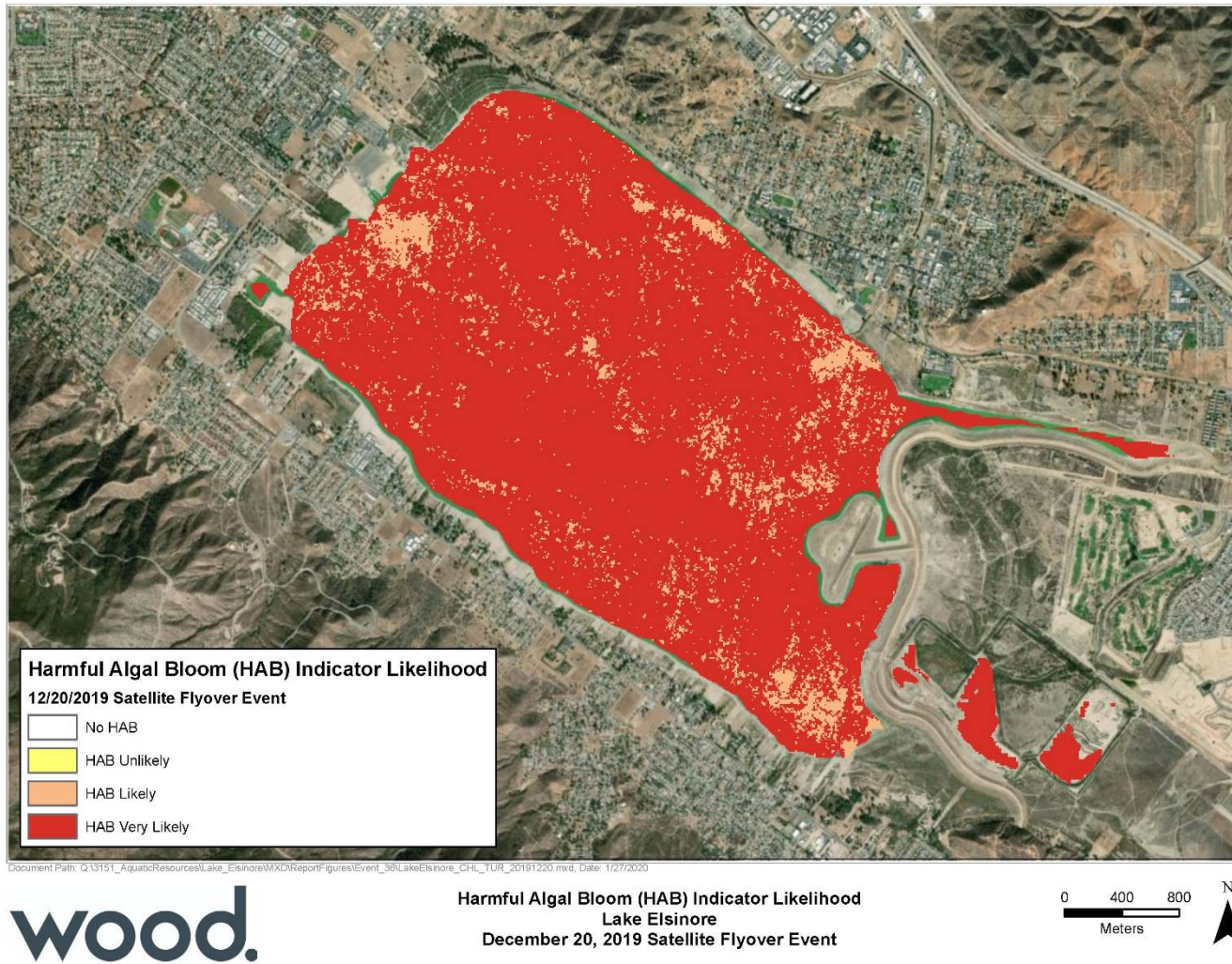


Figure 7. Satellite Imagery of Lake Elsinore HAB Indicator Likelihood December 20, 2019

Canyon Lake

Monitoring Dates

October 17, 2019 and December 20, 2019. Year-round bi-monthly monitoring is required for Canyon Lake. The lake level on the days of sampling were 1375.75 feet and 1380.65 feet, respectively.

Locations

Four locations were sampled in Canyon Lake: Sites CL07, CL08, CL09, and CL10. These sites are depicted in Figure 8.

Weather

October – Sunny and clear in the morning with 0-2 mph NW winds. Sunny and breezy in the afternoon with 5-8 mph E winds. Low of 61°F and a high of 82°F.

December – Sunny and clear with winds 0-5 mph NE. Lows around 40°F, warming to 73°F.

Water Quality Monitoring Activities

Water quality monitoring was successfully performed in accordance with the TMDL Work Plan and there were no equipment failures or delays. Field monitoring included the following activities at each site:

- Vertical water column profile measurements of temperature, conductivity, pH, and dissolved oxygen;
- Depth-integrated water chemistry sample for Total Dissolved Solids, Sulfide, Nitrate as N, Nitrite as N, Kjeldahl Nitrogen, Total Nitrogen, Ammonia-Nitrogen, Ortho Phosphate Phosphorus, Total Phosphorus, Total and Dissolved Aluminum;
- Chlorophyll-a surface (0-2 m) and full depth-integrated samples;
- Secchi disk measurements;
- Full water column vertical plankton tows with samples preserved and archived for potential assessment in the future as needed;
- Visual observations and photos of lake conditions.

A summary of water quality profile data are presented in Tables 5 and 6. Results of the water chemistry analyses are presented in Tables 7 and 8.

Satellite imagery of chlorophyll-a, turbidity, and cyanobacterial risk based on remote sensing data are presented in Figures 9 through 14. Due to scheduling conflicts, satellite data from October 14 is used for comparison to the October 17 monitoring data. Satellite chlorophyll-a concentrations in portions of the northern and eastern arms of Canyon Lake are likely impacted by the narrowness of the water body, resulting in an “edge-effect” of the nearby land mass, the consequence of which can be artificially elevated chlorophyll-a concentrations. These data have been flagged and removed from the maps. Copies of field datasheets are provided in Appendix A.

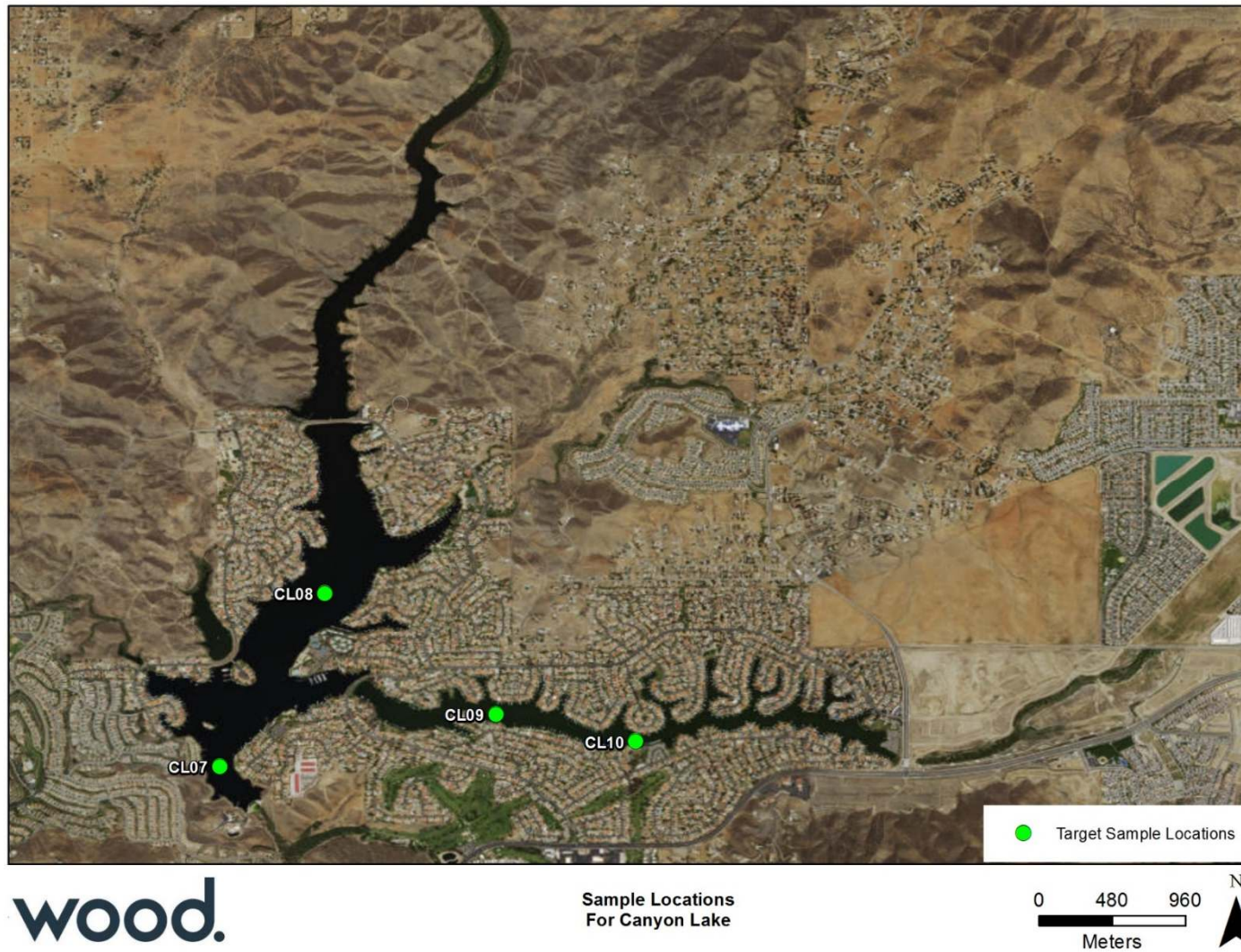


Figure 8. Canyon Lake Sampling Locations

Table 5. Canyon Lake *In-situ* Water Column Profile –October 17, 2019

Site	Time	Measure	Surface	1 m	2 m	3 m	4 m	5 m	6 m	7 m	8 m	9 m	10 m	11 m	12 m	13 m	Water Column Mean - All	Water Column Mean - Epilimnion	Water Column Mean - Hypolimnion
CL07	10:26	Temp (°C)	21.2	21.0	20.8	20.7	20.6	20.5	20.3	20.1	15.7	15.0	14.4	14.1	14.1	13.9	18.0	20.7	14.1
		Sp. Cond (µS/cm)	736	783	784	784	784	788	789	789	655	648	653	657	666	660	727	778	659
		pH	8.00	8.00	7.95	7.92	7.73	7.60	7.27	7.19	6.87	6.87	6.85	6.83	6.82	6.84	7.3	7.8	6.8
		DO (mg/L)	7.8	7.8	7.4	7.2	6.1	2.7	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	2.9	5.6	0.2
CL07	14:54	Temp (°C)	21.2	21.2	21.1	20.7	20.4	20.3	20.3	19.0	16.3	14.8	14.5	14.0	13.9	13.8	18.0	20.7	14.1
		Sp. Cond (µS/cm)	786	786	785	786	790	787	786	757	668	656	652	665	667	669	731	787	663
		pH	8.13	8.13	8.11	7.84	7.72	7.62	7.50	7.00	6.83	6.82	6.82	6.77	6.75	6.72	7.3	7.9	6.8
		DO (mg/L)	8.7	8.6	8.2	4.5	5.9	3.2	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	3.0	5.6	0.2
CL08	10:00	Temp (°C)	21.1	21.1	20.9	20.6	20.4	20.4	20.2	18.2	--	--	--	--	--	--	20.4	--	--
		Sp. Cond (µS/cm)	615	783	784	786	787	784	781	763	--	--	--	--	--	--	760	--	--
		pH	8.24	8.24	8.23	7.96	7.44	7.38	7.31	6.95	--	--	--	--	--	--	7.7	--	--
		DO (mg/L)	8.8	8.8	8.6	3.3	2.1	1.5	1.1	0.3	--	--	--	--	--	--	4.3	--	--
CL08	14:39	Temp (°C)	21.6	21.5	21.3	20.4	20.3	20.3	20.2	19.9	--	--	--	--	--	--	20.7	--	--
		Sp. Cond (µS/cm)	781	784	784	785	784	784	783	781	--	--	--	--	--	--	783	--	--
		pH	8.30	8.29	8.18	7.58	7.39	7.35	7.27	7.18	--	--	--	--	--	--	7.7	--	--
		DO (mg/L)	9.7	9.5	9.1	3.9	2.7	2.4	0.8	0.3	--	--	--	--	--	--	4.8	--	--
CL09 ^a	09:17	Temp (°C)	20.4	20.4	20.3	20.1	20.0	19.9	19.6	--	--	--	--	--	--	--	20.1	--	--
		Sp. Cond (µS/cm)	996	996	994	991	996	1010	1020	--	--	--	--	--	--	--	1000	--	--
		pH	8.23	8.39	8.39	7.79	7.47	7.28	7.02	--	--	--	--	--	--	--	7.8	--	--
		DO (mg/L)	9.4	9.4	9.1	4.2	1.6	0.3	0.3	--	--	--	--	--	--	--	4.9	--	--
CL09 ^a	14:15	Temp (°C)	21.5	21.3	20.4	20.1	20.0	19.9	19.9	--	--	--	--	--	--	--	20.4	--	--
		Sp. Cond (µS/cm)	977	983	985	988	996	1013	1016	--	--	--	--	--	--	--	994	--	--
		pH	8.50	8.49	8.34	7.84	7.48	7.37	7.30	--	--	--	--	--	--	--	7.9	--	--
		DO (mg/L)	11.3	11.4	9.1	3.7	1.3	0.4	0.3	--	--	--	--	--	--	--	5.4	--	--
CL10	8:28	Temp (°C)	20.5	20.6	20.5	--	--	--	--	--	--	--	--	--	--	--	20.5	--	--
		Sp. Cond (µS/cm)	1055	1060	1072	--	--	--	--	--	--	--	--	--	--	--	1062	--	--
		pH	8.25	8.28	7.93	--	--	--	--	--	--	--	--	--	--	--	8.2	--	--
		DO (mg/L)	8.4	8.4	8.4	--	--	--	--	--	--	--	--	--	--	--	8.4	--	--
CL10	14:00	Temp (°C)	22.0	21.6	20.8	--	--	--	--	--	--	--	--	--	--	--	21.5	--	--
		Sp. Cond (µS/cm)	1008	1045	1053	--	--	--	--	--	--	--	--	--	--	--	1035	--	--
		pH	8.05	8.39	8.35	--	--	--	--	--	--	--	--	--	--	--	8.3	--	--
		DO (mg/L)	12.0	11.5	7.9	--	--	--	--	--	--	--	--	--	--	--	10.5	--	--

Hypolimnion
 Epilimnion
 Thermocline
 No Shading - Indicates that there is no stratification

a- Bottom measurement taken at 5.5m

Table 6. Canyon Lake *In-situ* Water Column Profile –December 20, 2019

Site	Time	Measure	Surface	1 m	2 m	3 m	4 m	5 m	6 m	7 m	8 m	9 m	10 m	11 m	12 m	13 m	14 m	15 m	Water Column Mean - All
CL07 ^a	10:10	Temp (°C)	12.7	12.6	12.5	12.5	12.5	12.5	12.5	12.5	12.6	12.5	12.4	12.4	12.4	12.4	12.5	12.4	12.5
		Sp. Cond (µS/cm)	748	755	757	758	758	758	761	762	762	760	758	753	756	756	757	757	757
		pH	6.65	6.81	6.95	7.06	7.13	7.20	7.26	7.30	7.35	7.38	7.39	7.43	7.44	7.45	7.45	7.44	7.44
		DO (mg/L)	4.6	4.5	4.4	4.4	4.5	4.4	4.3	4.3	4.3	4.4	4.4	4.4	4.3	4.3	4.3	4.3	4.3
CL07 ^a	14:15	Temp (°C)	14.1	13.1	12.7	12.5	12.5	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4
		Sp. Cond (µS/cm)	762	770	762	762	762	762	761	760	757	755	754	755	756	756	757	758	759
		pH	7.78	7.75	7.67	7.63	7.61	7.59	7.59	7.58	7.58	7.56	7.57	7.56	7.54	7.55	7.55	7.54	7.54
		DO (mg/L)	5.9	5.2	4.7	4.6	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.2	4.2	4.1	4.1	4.0
CL08 ^b	09:30	Temp (°C)	12.4	12.4	12.3	12.3	12.3	12.3	12.3	12.3	12.3	--	--	--	--	--	--	--	12.3
		Sp. Cond (µS/cm)	746	748	748	747	748	748	748	747	748	--	--	--	--	--	--	--	748
		pH	6.73	6.91	7.02	7.19	7.25	7.30	7.34	7.37	7.38	--	--	--	--	--	--	--	7.17
		DO (mg/L)	5.4	5.3	5.2	5.2	5.2	5.1	5.1	5.0	5.0	--	--	--	--	--	--	--	5.2
CL08 ^b	14:02	Temp (°C)	13.5	13.0	12.5	12.4	12.3	12.3	12.3	12.2	12.2	--	--	--	--	--	--	--	12.5
		Sp. Cond (µS/cm)	732	747	747	751	749	749	748	747	748	--	--	--	--	--	--	--	746
		pH	7.61	7.69	7.68	7.65	7.64	7.61	7.61	7.59	7.59	--	--	--	--	--	--	--	7.63
		DO (mg/L)	6.4	6.3	5.3	5.1	5.1	5.1	4.8	4.7	4.6	--	--	--	--	--	--	--	5.3
CL09 ^c	08:45	Temp (°C)	11.6	11.6	11.6	11.6	11.6	11.7	11.5	11.5	--	--	--	--	--	--	--	--	11.6
		Sp. Cond (µS/cm)	923	929	928	928	929	976	1164	1181	--	--	--	--	--	--	--	--	995
		pH	6.47	7.16	7.42	7.56	7.70	7.58	7.16	7.04	--	--	--	--	--	--	--	--	7.26
		DO (mg/L)	6.9	6.8	6.8	6.7	6.6	0.7	0.3	0.3	--	--	--	--	--	--	--	--	4.4
CL09	13:43	Temp (°C)	12.9	12.4	11.8	11.6	11.6	11.6	11.5	--	--	--	--	--	--	--	--	--	11.9
		Sp. Cond (µS/cm)	900	925	933	932	935	944	1171	--	--	--	--	--	--	--	--	--	963
		pH	8.19	8.23	8.23	8.14	8.12	8.10	7.61	--	--	--	--	--	--	--	--	--	8.09
		DO (mg/L)	7.2	7.4	6.9	6.4	6.3	6.1	0.1	--	--	--	--	--	--	--	--	--	5.8
CL10 ^d	07:52	Temp (°C)	11.6	11.6	11.6	11.6	11.7	--	--	--	--	--	--	--	--	--	--	--	11.6
		Sp. Cond (µS/cm)	947	942	941	941	946	--	--	--	--	--	--	--	--	--	--	--	943
		pH	7.32	8.04	8.17	8.23	8.25	--	--	--	--	--	--	--	--	--	--	--	8.00
		DO (mg/L)	8.0	8.0	8.0	8.0	7.8	--	--	--	--	--	--	--	--	--	--	--	8.0
CL10 ^d	13:30	Temp (°C)	13.6	12.6	11.8	11.7	11.7	--	--	--	--	--	--	--	--	--	--	--	12.3
		Sp. Cond (µS/cm)	947	939	943	946	950	--	--	--	--	--	--	--	--	--	--	--	945
		pH	8.60	8.63	8.49	8.44	8.41	--	--	--	--	--	--	--	--	--	--	--	8.51
		DO (mg/L)	9.1	9.3	8.1	7.7	7.6	--	--	--	--	--	--	--	--	--	--	--	8.3

Note: No stratification observed during this event, therefore epilimnion and hypolimnion mean values are not reported.

- a- Bottom measurement taken at 14.5m
- b- Bottom measurement taken at 7.5m
- c- Bottom measurement taken at 6.5m
- d- Bottom measurement taken at 3.5m

Table 7. Canyon Lake Water Chemistry – October 17, 2019

Method	Compound	Units	RL	Basin Plan or TMDL Target	Depth Integrated or Surface	CL07	CL08	CL09	CL10
SM 2540C	Total Dissolved Solids	mg/L	10	700	Depth Integrated	380	420	560	590
SM 2540D	Total Suspended Solids	mg/L	2	NA	Depth Integrated	4	ND	10	12
SM 4500S2 D	Sulfide	mg/L	0.1	NA	Depth Integrated	6.7	ND	ND	ND
EPA 300.0	Nitrate as N	mg/L	0.2	10	Depth Integrated	ND	ND	ND	ND
EPA 300.0	Nitrite as N	mg/L	0.1	NA	Depth Integrated	ND	ND	ND	ND
EPA 351.2	Total Kjeldahl Nitrogen	mg/L	0.1	NA	Depth Integrated	2.7	0.71	1.2	1.1
Calculation	Total Nitrogen ^a	mg/L	--	0.75 ^{b1}	Depth Integrated	2.7	0.71	1.2	1.1
SM4500NH3H	Ammonia-Nitrogen	mg/L	0.1	CMC: 5.7-26.2 ^{c1} CCC: 1.2-4.1 ^{c1}	Depth Integrated	1.7	0.57	ND	ND
SM 4500P E	Ortho Phosphate Phosphorus	mg/L	0.05	NA	Depth Integrated	0.23	ND	ND	0.027 J
EPA 365.1	Total Phosphorus	mg/L	0.01	0.1 ^{b1}	Depth Integrated	0.24	0.024	0.043	0.062
EPA 200.7	Total Aluminum	µg/L	100	NA	Depth Integrated	ND	36 J	120	280
EPA 200.7	Dissolved Aluminum	µg/L	100	NA	Depth Integrated	ND	ND	ND	ND
EPA 10200 H	Chlorophyll-a	µg/L	1.0	25 ^{b1} , 40 ^{b2}	Surface (0-2m)	14.5	13.5	31.8	40.3
					Depth Integrated	33.7	14.7	17.9	27.9

Notes:

^a - Total Nitrogen = TKN+NO₂+NO₃

^b - Annual average

^c - Values are site specific; dependent upon pH and temperature

¹ – 2020 TMDL Target, based on Table 5-9n of 2004 TMDL

² – 2015 TMDL Target, based on Table 5-9n of 2004 TMDL

NA – Not applicable/available

ND – Not detected

NS- Not Sampled

J – concentration between MDL and RL

Table 8. Canyon Lake Water Chemistry –December 20, 2019

Method	Compound	Units	RL	Basin Plan or TMDL Target	Depth Integrated or Surface	CL07	CL08	CL09	CL10
SM 2540C	Total Dissolved Solids	mg/L	10	700	Depth Integrated	440	420	540	540
SM 2540D	Total Suspended Solids	mg/L	2	NA	Depth Integrated	4	6	8	12
SM 4500S2 D	Sulfide	mg/L	0.1	NA	Depth Integrated	ND	ND	0.2	ND
EPA 300.0	Nitrate as N	mg/L	0.2	10	Depth Integrated	ND	ND	ND	ND
EPA 300.0	Nitrite as N	mg/L	0.1	NA	Depth Integrated	ND	ND	ND	ND
EPA 351.2	Total Kjeldahl Nitrogen	mg/L	0.1	NA	Depth Integrated	1.2	1.2	1.5	1.7
Calculation	Total Nitrogen ^a	mg/L	--	0.75 ^{b1}	Depth Integrated	1.2	1.2	1.5	1.7
SM4500NH3H	Ammonia-Nitrogen	mg/L	0.1	CMC: 8.4-29.5 ^{c1} CCC: 2.4-5.4 ^{c1}	Depth Integrated	0.34	0.31	0.24	0.085 J
SM 4500P E	Ortho Phosphate Phosphorus	mg/L	0.05	NA	Depth Integrated	0.018 J	0.019 J	0.052	0.021 J
EPA 365.1	Total Phosphorus	mg/L	0.01	0.1 ^{b1}	Depth Integrated	0.047	0.054	0.095	0.086
EPA 200.7	Total Aluminum	µg/L	100	NA	Depth Integrated	81 J	87 J	120	180
EPA 200.7	Dissolved Aluminum	µg/L	100	NA	Depth Integrated	ND	ND	ND	ND
EPA 10200 H	Chlorophyll-a	µg/L	1.0	25 ^{b1} , 40 ^{b2}	Surface (0-2m)	16.4	29.7	23.7	46.7
					Depth Integrated	20.7	21.9	19.0	55.4

Notes:

^a - Total Nitrogen = TKN+NO₂+NO₃

^b - Annual average

^c - Values are site specific dependent upon pH and temperature

NA – Not applicable/available

ND – Not detected

NS- Not sampled

¹ – 2020 TMDL Target, based on Table 5-9n of 2004 TMDL

² – 2015 TMDL Target, based on Table 5-9n of 2004 TMDL

J – concentration between MDL and RL

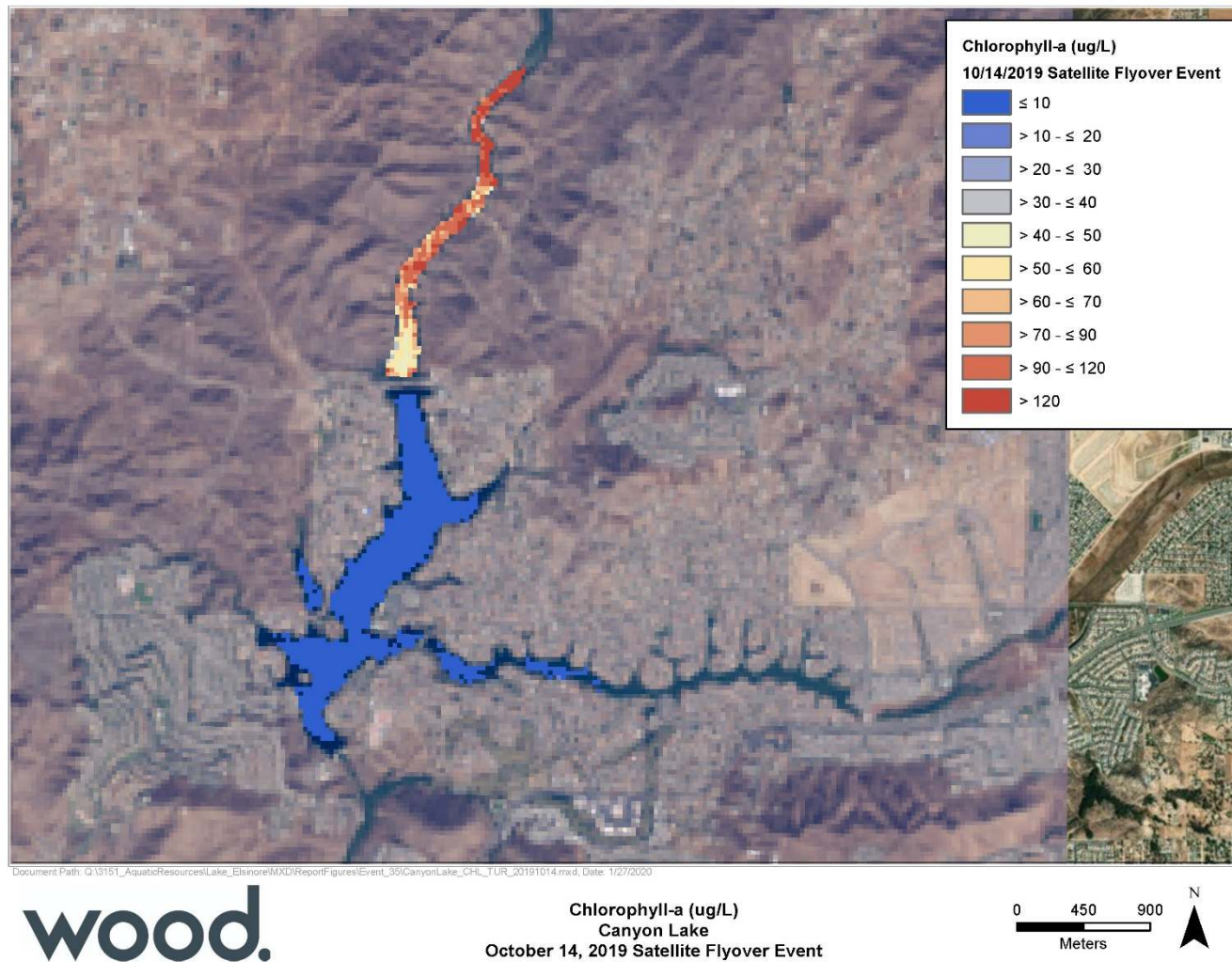
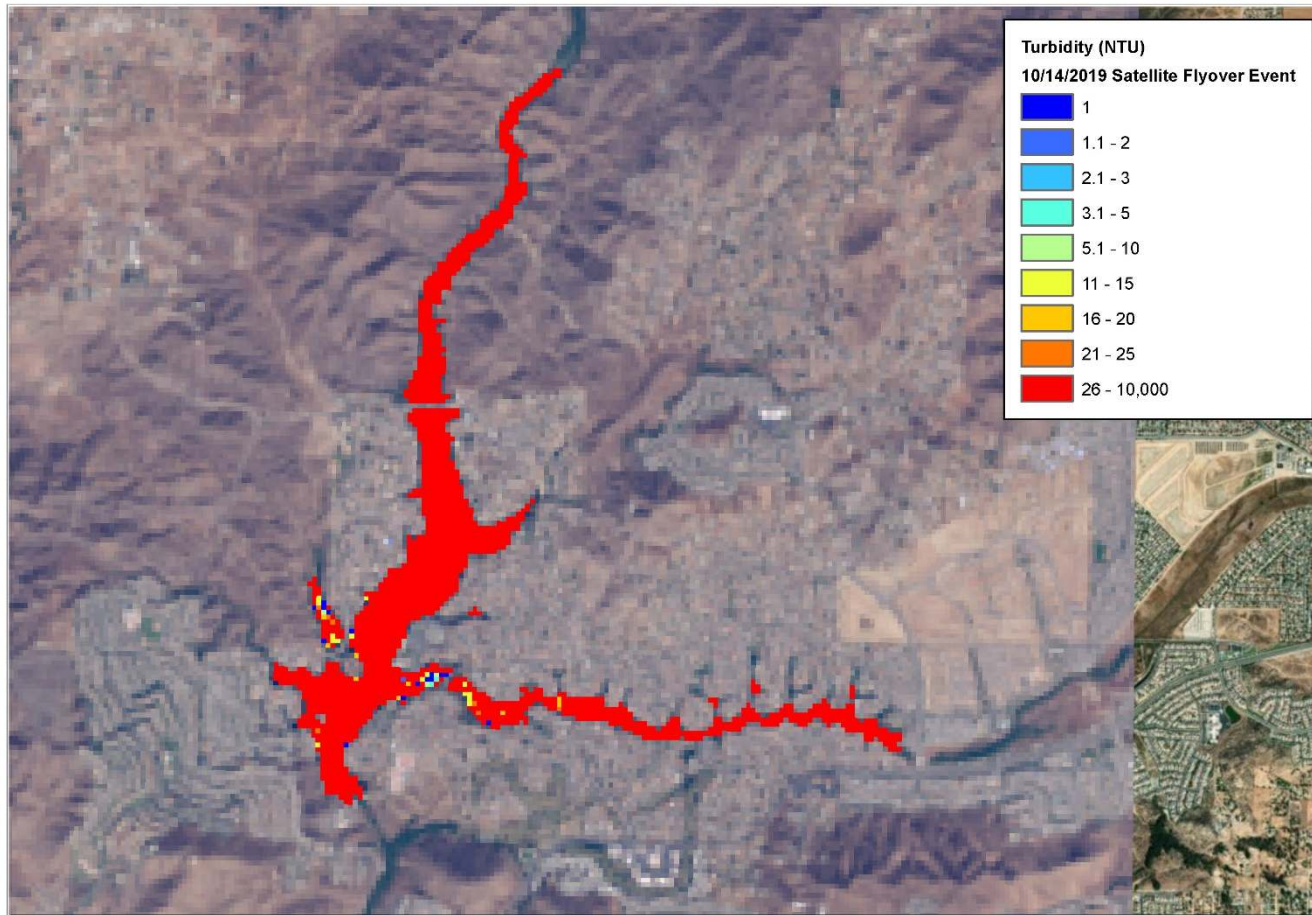


Figure 9. Satellite Imagery of Canyon Lake Chlorophyll-a Concentrations October 14, 2019
Data near the edges of the main lake body and narrow portions of the eastern arm have been flagged due to mixing of water and land pixel data, and have been removed from the dataset (i.e. blacked out).



wood.

Turbidity (NTU)
Canyon Lake
October 14, 2019 Satellite Flyover Event

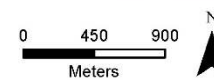


Figure 10. Satellite Imagery of Canyon Lake Turbidity Measurements October 14, 2019

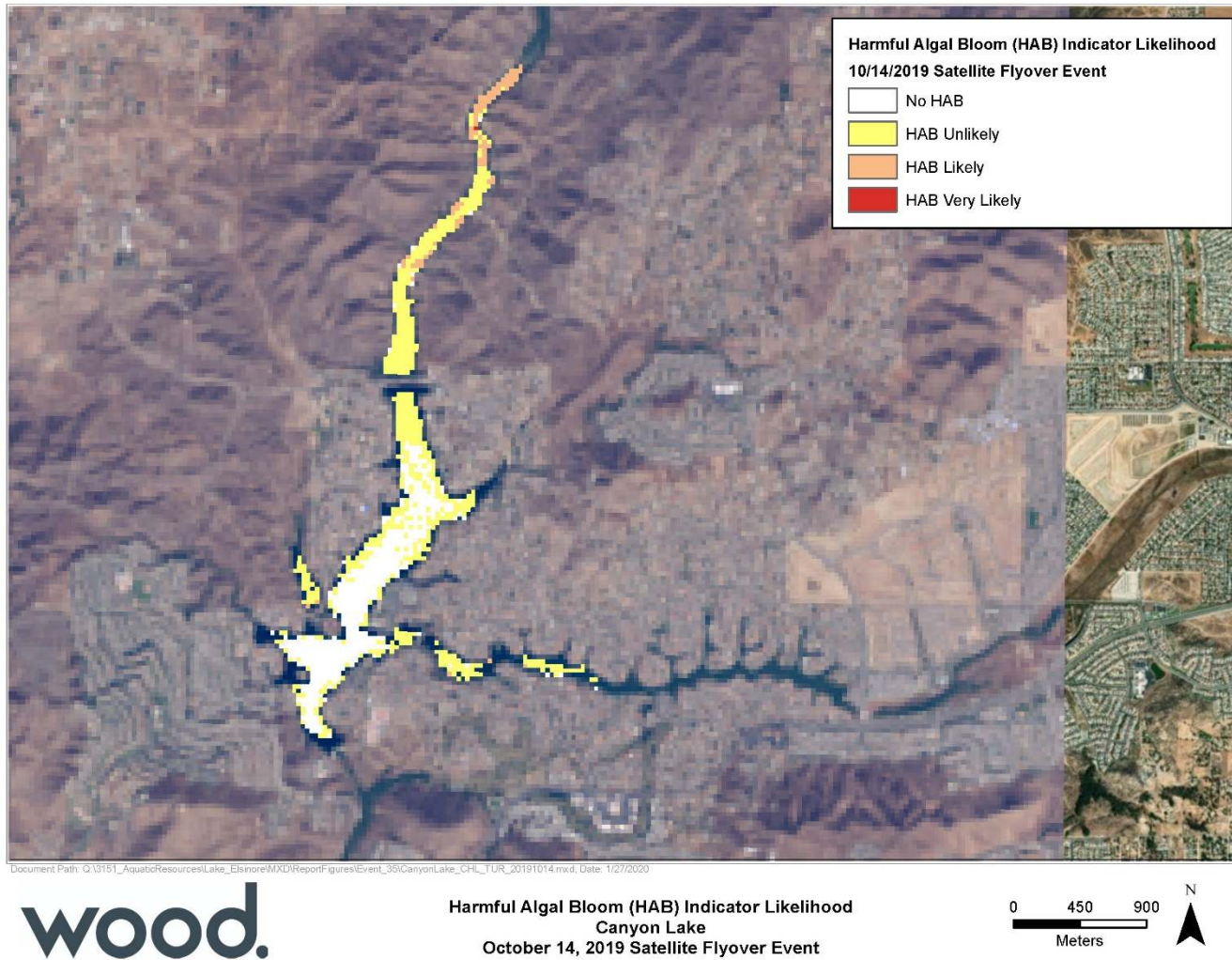


Figure 11. Satellite Imagery of Lake Elsinore HAB Indicator Likelihood October 14, 2019
Data near the edges of the main lake body and narrow portions of the eastern arm have been flagged due to mixing of water and land pixel data, and have been removed from the dataset (i.e. blacked out).

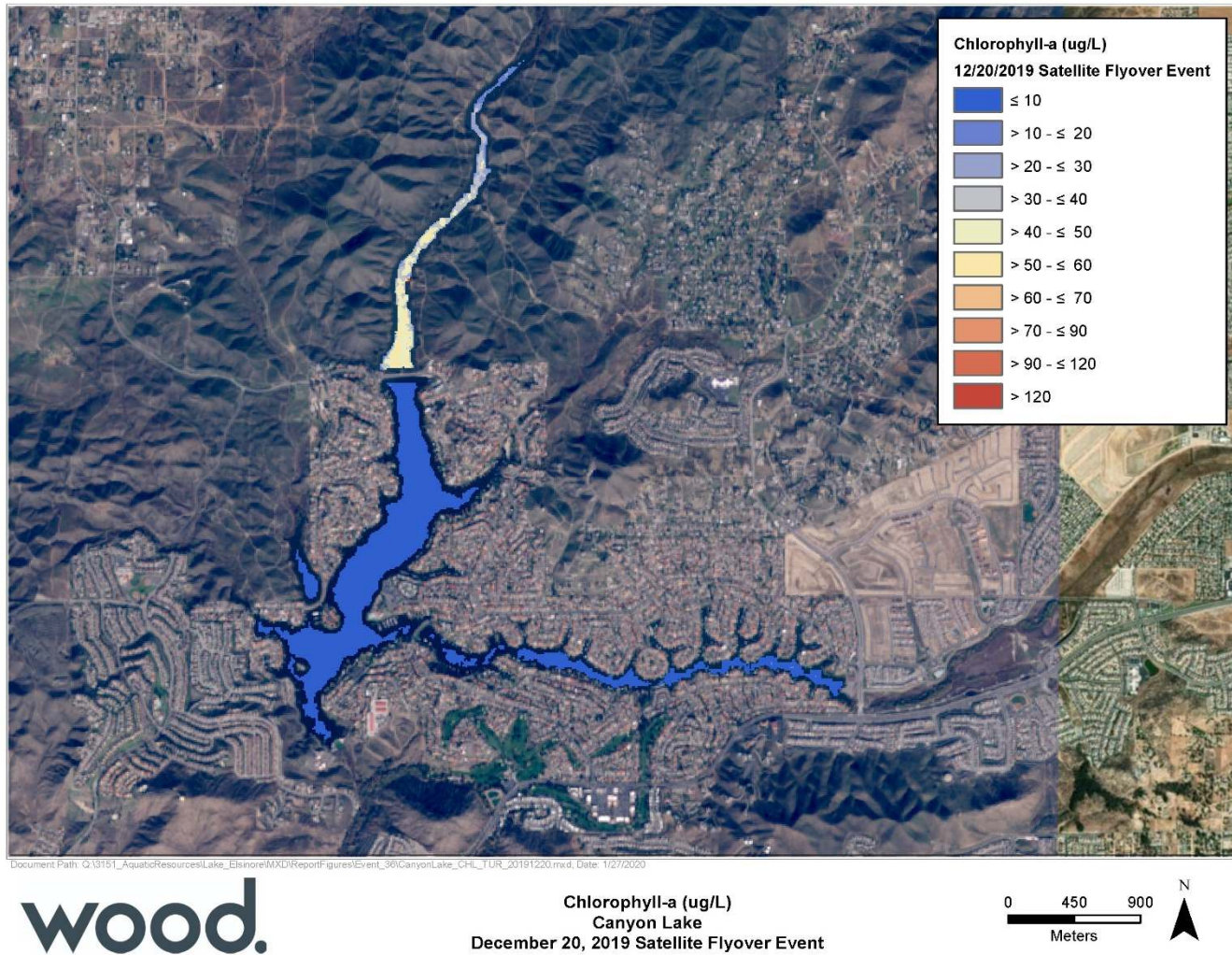


Figure 12. Satellite Imagery of Canyon Lake Chlorophyll-a Concentrations December 20, 2019

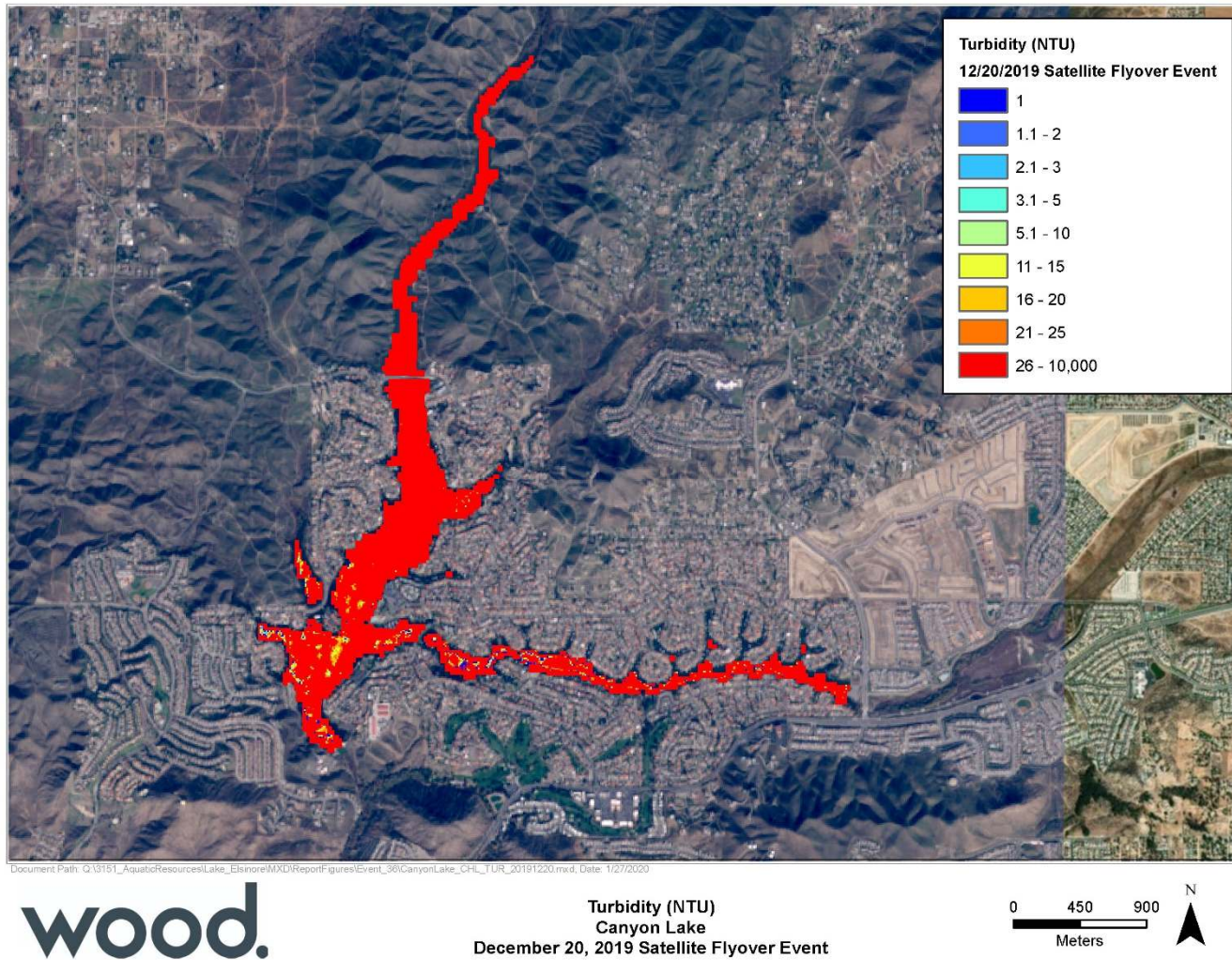


Figure 13. Satellite Imagery of Canyon Lake Turbidity Measurements December 20, 2019

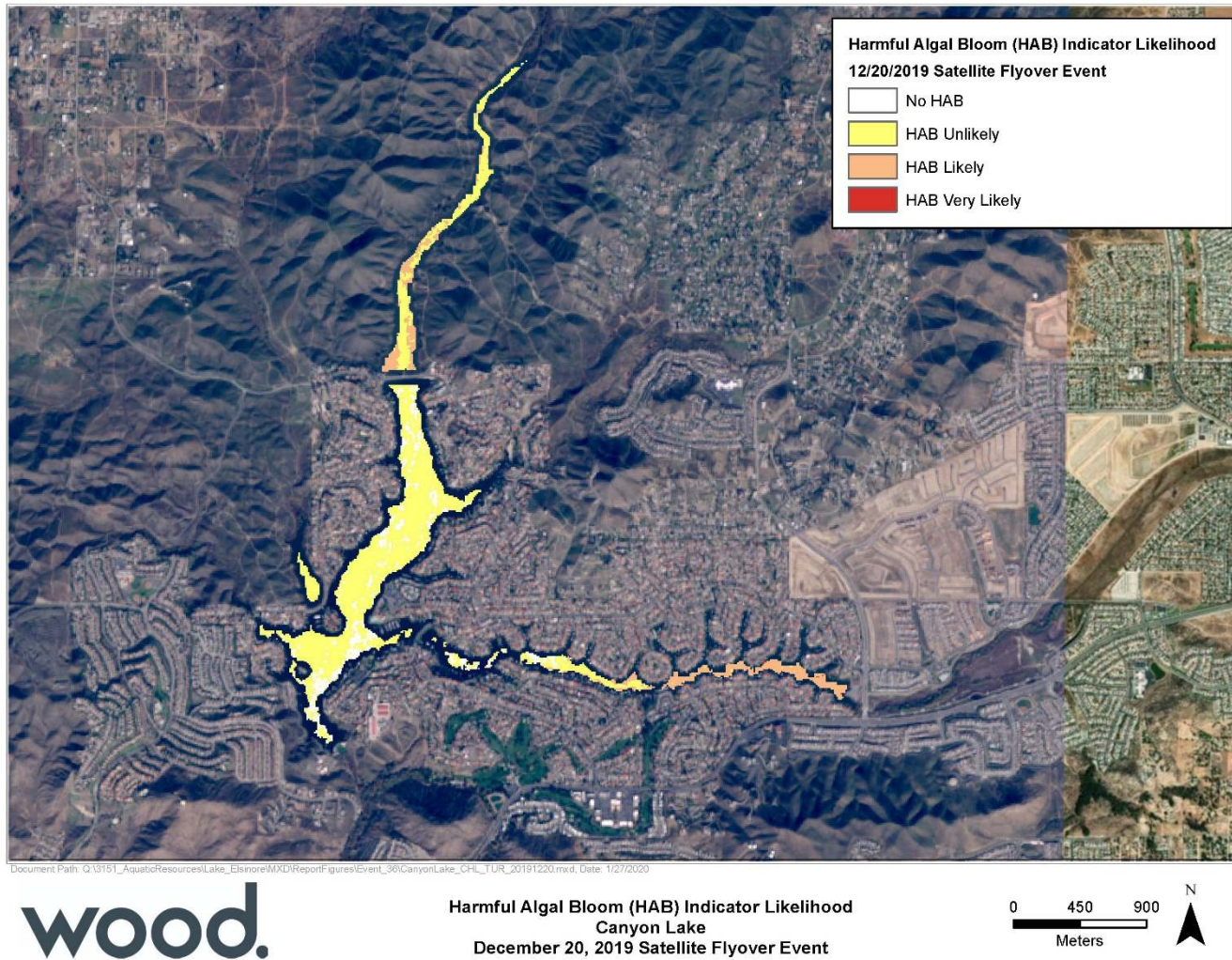


Figure 14. Satellite Imagery of Lake Elsinore HAB Indicator Likelihood December 20, 2018

Appendix A
Field Datasheets

**October 17, 2019
Field Datasheets**

FIELD DATASHEET

Date: 10/17/2019 Location (Circle): Lake Elsinore / Canyon Lake Station: LE01

Time on Station: 07:55 Time off Station: 08:40

Weather Conditions: Sunny Calm Wind (mph & direction): None

Lat: 33.66898 Long: -117.36419

Water Depth (m): 5.4 Secchi Depth (m): 2

Water Chemistry Sample?: Y/N Chl-a Sample?: Y/N Plankton Sample?: Y/N
 SAMPLE TIME: _____ Surface volume filtered (ml): _____ Sample Time: 08:40
 Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	20.1	3897	9.31	5.48	12				
1	20.1	3895	9.30	5.32	13				
2	20.1	3894	9.30	5.34	14				
3	20.1	3894	9.30	5.32	15				
4	19.9	3897	9.28	4.46	16				
5	19.8	3896	9.27	4.37	17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

FisLenses Zoo plankton : pull # 1: 100 4: 85 7: 100
 2: 75 5: 90
 3: 90 6: 100
 total: 500 + ml
 total

Phytoplankton
 SFT Budget + Dis. to m/s
 in ILKDPB each → 500 mL 500 mL

FIELD DATASHEET

Date: 10/17/2019 Location (Circle): Lake Elsinore/Canyon Lake Station: LE02
 Time on Station: 9:15 Time off Station: _____
 Weather Conditions: Sunny Calm Wind (mph & direction): None
 Lat: 33.66334 Long: -117.35421
 Water Depth (m): 6.5 Secchi Depth (m): 0.2 m

Water Chemistry Sample? Y / N Chl-a Sample? Y / N Plankton Sample? Y / N

SAMPLE TIME: 1000

Surface volume filtered (ml): 385

Depth-Integrated volume filtered (ml): 400 (same as TNTP D-1)

Depth Integrated Chl-a TMDL

Chl-a:
0-2: 0.980
SURF: _____
TMDL

0-2 m TMDL

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	19.8	3897	9.32	6.17	12				
1	19.8	3896	9.27	4.48	13				
2	19.7	3896	9.26	4.47	14				
3	19.7	3896	9.24	3.87	15				
4	19.6	3896	9.22	3.41	16				
5	19.6	3895	9.21	3.09	17				
6	19.6	3896	9.19	2.42	18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 10/17/2019 Location (Circle): Lake Elsinore/Canyon Lake Station: LE03

Time on Station: 8:45 Time off Station: 9:10

Weather Conditions: Sunny Calm Wind (mph & direction): None

Lat: 33.65494 Long: -117.34165

Water Depth (m): 4.6 Secchi Depth (m): 2

Water Chemistry Sample?: Y/N Y N
SAMPLE TIME: _____

Chl-a Sample?: Y/N Y N
Surface volume filtered (ml): _____ Sample Time: 8:55
Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	20.2	3893	9.32	6.29	12				
1	20.2	3893	9.31	5.83	13				
2	20.2	3893	9.30	5.73	14				
3	20.1	3895	9.25	4.16	15				
4	19.8	3897	9.19	2.06	16				
4.5	19.8	3897	9.18	1.91	17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

Zoo plankton tow:
#1: 110ml 4-110
2 80ml 5-80
3 80ml 6-100

FIELD DATASHEET

Date: 10/17/2019 Location (Circle): Lake Elsinore/Canyon Lake Station: CLO7

Time on Station: 1026 Time off Station: 1048

Weather Conditions: Sunny, clear Wind (mph & direction): 0-2 mph ENE

Lat: on target Long: on target

Water Depth (m): 13.35 Secchi Depth (m): 1.4

Water Chemistry Sample?: Y / N Chl-a Sample?: Y / N Plankton Sample?: Y / N

SAMPLE TIME: 1040 Surface volume filtered (ml): 500

Depth-Integrated volume filtered (ml): 500

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	21.2	726	8.00	7.8	12	14.1	666	6.82	0.2
1	21.0	783	8.00	7.8	13	13.9	660	6.84	0.2
2	20.8	784	7.95	7.4	14				
3	20.7	784	7.92	7.2	15				
4	20.6	784	7.73	6.1	16				
5	20.5	788	7.60	2.7	17				
6	20.3	789	7.27	0.3	18				
7	20.1	789	7.19	0.3	19				
8	15.7	655	6.87	0.2	20				
9	15.0	648	6.87	0.2	21				
10	14.4	653	6.85	0.2	22				
11	14.1	657	6.83	0.2	23				

FIELD DATASHEET

Date: 10/17/19 Location (Circle): Lake Elsinore/Canyon Lake Station: CLO7

Time on Station: 1454 Time off Station: 1500

Weather Conditions: SUNNY, windy Wind (mph & direction): 10-12 mph E

Lat: see below Long: _____

Water Depth (m): 13.35 Secchi Depth (m): 1.4

Water Chemistry Sample?: Y Chl-a Sample?: Y Plankton Sample?: Y
SAMPLE TIME: _____ Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Slightly North of target to prevent drifting into dam area (windy conditions).

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	21.2	786	8.13	8.7	12	13.9	667	6.75	0.2
1	21.2	786	8.13	8.6	13	13.8	669	6.72	0.2
2	21.1	785	8.11	8.2	14				
3	20.7	786	7.84	4.5	15				
4	20.4	790	7.72	5.9	16				
5	20.3	787	7.62	3.2	17				
6	20.3	786	7.50	0.4	18				
7	19.0	757	7.00	0.3	19				
8	16.3	668	6.83	0.3	20				
9	14.8	656	6.82	0.3	21				
10	14.5	652	6.82	0.3	22				
11	14.0	665	6.77	0.2	23				

FIELD DATASHEET

Date: 10/17/19 Location (Circle): Lake Elsinore/Canyon Lake Station: C108

Time on Station: 1000 Time off Station: 1020

Weather Conditions: Sunny, clear Wind (mph & direction): 0 mph

Lat: ONTARGET Long: ONTARGET

Water Depth (m): 7.4 Secchi Depth (m): 1.3

Water Chemistry Sample? Y / N Chl-a Sample?: Y / N Plankton Sample? Y / N
SAMPLE TIME: 1005 Surface volume filtered (ml): 500

Depth-Integrated volume filtered (ml): 500

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	21.1	615	8.24	8.8	12				
1	21.1	783	8.24	8.8	13				
2	20.9	784	8.23	8.6	14				
3	20.6	786	7.96	3.3	15				
4	20.4	787	7.44	2.1	16				
5	20.4	784	7.38	1.5	17				
6	20.2	781	7.31	1.1	18				
7	18.2	763	6.95	0.3	19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 10/17/19 Location (Circle): Lake Elsinore/Canyon Lake Station: 408

Time on Station: 1439 Time off Station: 1446

Weather Conditions: Sunny, windy Wind (mph & direction): _____

Lat: on target Long: on target

Water Depth (m): 7.4 Secchi Depth (m): 1.3

Water Chemistry Sample?: Y/ N Chl-a Sample?: Y/ N Plankton Sample?: Y/ N

SAMPLE TIME: _____ Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	21.6	781	8.30	9.65	12				
1	21.5	784	8.29	9.50	13				
2	21.3	784	8.18	8.11	14				
3	20.4	785	7.58	3.87	15				
4	20.3	784	7.39	2.70	16				
5	20.3	784	7.35	2.38	17				
6	20.2	783	7.27	0.78	18				
7	19.9	781	7.18	0.20	19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 10/17/2019 Location (Circle): Lake Elsinore (Canyon Lake) Station: CLO9

Time on Station: 0917 Time off Station: 0930

Weather Conditions: Sunny, clear. Wind (mph & direction): 0-2 mph E

Lat: on target Long: on target

Water Depth (m): 5.95 Secchi Depth (m): 0.7

Water Chemistry Sample?: Y / N Chl-a Sample?: Y / N Plankton Sample?: Y / N
 SAMPLE TIME: 0925 Surface volume filtered (ml): 360
 Depth-Integrated volume filtered (ml): 500ml

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	20.4	996	8.23	9.4	12				
1	20.4	996	8.39	9.4	13				
2	20.3	994	8.39	9.1	14				
3	20.1	991	7.79	4.2	15				
4	20.0	996	7.47	1.6	16				
5	19.9	1010	7.28	0.3	17				
6.5	19.6	1020	7.02	0.3	18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 10/17/19 Location (Circle): Lake Elsinore Canyon Lake Station: C109

Time on Station: 1415 Time off Station: 1421

Weather Conditions: SUNNY, breezy Wind (mph & direction): 5-8 mph E

Lat: ON target Long: ON target

Water Depth (m): 5.95 Secchi Depth (m): 0.7

Water Chemistry Sample?: Y Chl-a Sample?: Y Plankton Sample?: Y

SAMPLE TIME: Surface volume filtered (ml):

Depth-Integrated volume filtered (ml):

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

↑ Missed a sample

Comments:

plankton sample collection

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	21.5	977	8.50	11.29	12				
1	21.3	983	8.49	11.40	13				
2	20.4	985	8.34	9.06	14				
3	20.1	988	7.84	3.68	15				
4	20.0	996	7.48	1.30	16				
5	19.9	1013	7.37	0.42	17				
5.5	19.9	1016	7.30	0.36	18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 10/17/2019 Location (Circle): Lake Elsinore/Canyon Lake Station: C10

Time on Station: 0828 Time off Station: 0905

Weather Conditions: Sunny, clear Wind (mph & direction): 0-2 mph E

Lat: ON TARGET Long: ON TARGET

Water Depth (m): 2.25 Secchi Depth (m): 0.62

Water Chemistry Sample? Y / N Chl-a Sample? Y / N Plankton Sample? Y / N
SAMPLE TIME: 0850 Surface volume filtered (ml): 300ml

Depth-Integrated volume filtered (ml): 350ml

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	20.5	1055	8.25	8.4	12				
1	20.6	1060	8.28	8.4	13				
2	20.5	1072	7.93	8.4	14				
3					15				
4					16				
5					17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 10/17/19 Location (Circle): Lake Elsinore/Canyon Lake Station: CL10

Time on Station: 1400 Time off Station: 1405

Weather Conditions: SUNNY, breezy Wind (mph & direction): 5-8 mph E

Lat: on target Long: on target

Water Depth (m): 2.25m Secchi Depth (m): 0.62

Water Chemistry Sample?: Y N
Chl-a Sample?: Y N Plankton Sample?: Y N

SAMPLE TIME: n/a
Surface volume filtered (ml): /
Depth-Integrated volume filtered (ml): /

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	22.0	1008	8.05	12.0	12				
1	21.6	1045	8.39	11.5	13				
2	20.8	1053	8.35	7.06	14				
3					15				
4					16				
5					17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 10/17/19 Location (Circle): Lake Elsinore/Canyon Lake Station: N. Ski Area

Time on Station: 1545 Time off Station: 1550

Weather Conditions: Sunny, calm Wind (mph & direction): 5-8 mph E

Lat: on target Long: on target

17.2ft Water Depth (m): 5.2 m Secchi Depth (m): 0.8

Water Chemistry Sample?: Y N Chl-a Sample?: Y N Plankton Sample?: Y N

SAMPLE TIME: _____ Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	20.4	715	7.82	7.51	12				
1	19.9	704	7.87	7.56	13				
2	19.7	706	7.82	6.91	14				
3	19.6	714	7.77	6.55	15				
4	19.6	717	7.73	6.18	16				
5	19.4	719	7.66	5.48	17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

December 20, 2019
Field Datasheets

12/20/19

FIELD DATASHEET

Date: LE02 Location (Circle): Lake Elsinore Station: LE02

Time on Station: 08:20 Time off Station: 10:10

Weather Conditions: sunny, calm Wind (mph & direction): 0-2 mph

Lat: on target Long: on target

Water Depth (m): 6.5 Secchi Depth (m): 0.45m

Water Chemistry Sample Times: Chl-a Samples?: Y N Algae Taxonomy Sample?: Y N (0930)

Surface: 0845
Surface DUP: 0935
Depth Int: 0830
Depth Int. DUP: 0900
Bottom: 0905
Bottom DUP: 0950

Surface volume filtered (ml): 500 mL
Surface DUP volume filtered (ml): 350 mL
Depth Int. volume filtered (ml): 500 mL
Depth Int. DUP volume filtered (ml): 500 mL (TMDL)

**Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250mL filter volume).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH*	DO (mg/L)	ORP (mV)	Turbidity (NTU)
0	11.9	3840	7.17	1.89	112.6	11.08
0.5	11.9	3840	7.18	1.71	112.6	11.00
1	11.9	3840	7.17	1.67	112.6	110.9
2	11.9	3840	7.16	1.58	112.5	11.08
3	11.9	3840	7.15	1.59	112.5	11.00
4	11.9	3840	7.15	1.55	112.4	11.00
5	11.9	3841	7.14	1.54	112.3	11.10
6	11.9	3840	7.13	1.54	112.3	11.10
7						
8						
9						
10						
11						

*pH readings are erroneous, do not use

FIELD DATASHEET

#POST-SAMPLING

Date: 12/20/19 Location (Circle): Lake Elsinore Station: LE02

Time on Station: 0820 Time off Station: 1030

Weather Conditions: Sunny, calm Wind (mph & direction): 0-2

Lat: on target Long: on target

Water Depth (m): 4.5 Secchi Depth (m): 0.45

Water Chemistry Sample Times: **Chl-a Samples?:** Y/N **Algae Taxonomy Sample?:** Y/N

Surface: _____
Surface DUP: _____
Depth Int: _____
Depth Int. DUP: _____
Bottom: _____
Bottom DUP: _____

SEE PRE-SAMPLING DATA SHEET

Surface volume filtered (ml): _____
Surface DUP volume filtered (ml): _____
Depth Int. volume filtered (ml): _____
Depth Int. DUP volume filtered (ml): _____

****Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250mL filter volume).**

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH*	DO (mg/L)	ORP (mV)	Turbidity (NTU)
0	12.6	3844	7.47	2.42	92.9	10.5
0.5	12.3	3848	7.45	2.21	93.5	11.1
1	12.0	3842	7.39	1.93	94.1	11.1
2	11.9	3840	7.22	1.61	95.4	11.00
3	11.9	3840	7.16	1.50	96.0	10.9
4	11.9	3840	7.13	1.48	96.5	10.75
5	11.9	3840	7.11	1.43	97.0	10.85
6	11.9	3840	7.10	1.42	97.2	10.75
7						
8						
9						
10						
11						

**pH readings are erroneous, do not use.*

FIELD DATASHEET

Date: 12/20/19 Location (Circle): Lake Elsinore/Canyon Lake Station: LE01

Time on Station: 07:40 Time off Station: 07:50

Weather Conditions: SUNNY, CALM Wind (mph & direction): 0-2mph

Lat: on target Long: on target

Water Depth (m): 5.5 Secchi Depth (m): 0.45

Water Chemistry Sample?: Y / N Chl-a Sample?: Y / N Plankton Sample?: Y / N

SAMPLE TIME: n/a Surface volume filtered (ml): n/a

Depth-Integrated volume filtered (ml): n/a

*Do not exceed **7 PSI** or **14 in. Hg** when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH* (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	11.6	3844	7.65	2.38	12				
1	11.6	3844	7.4	2.13	13				
2	11.6	3844	7.37	2.07	14				
3	11.6	3844	7.34	2.01	15				
4	11.6	3844	7.33	1.97	16				
5	11.6	3844	7.33	1.95	17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

*pH readings are erroneous, do not use.

FIELD DATASHEET

Date: 12/20/19 Location (Circle): Lake Elsinore/Canyon Lake Station: LEOZ

Time on Station: 08:20 Time off Station: 10:10

Weather Conditions: Sunny Calm Wind (mph & direction): 0-2 mph

Lat: on Target+ Long: on Target+

Water Depth (m): 6.5 Secchi Depth (m): 0.45

Water Chemistry Sample?: Y / N
SAMPLE TIME: 0900

Chl-a Sample?: Y / N Plankton Sample?: Y / N
Surface volume filtered (ml): 500ml
Depth-Integrated volume filtered (ml): 500 ml

*Do not exceed **7 PSI** or **14 in. Hg** when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH*	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	11.9	3840	7.17	1.89	12				
1	11.9	3840	7.17	1.67	13				
2	11.9	3840	7.16	1.58	14				
3	11.9	3840	7.15	1.59	15				
4	11.9	3840	7.15	1.55	16				
5	11.9	384	7.14	1.54	17				
6	11.9	3840	7.13	1.54	18				
7					19				
8					20				
9					21				
10					22				
11					23				

*pH readings are erroneous, do not use.

FIELD DATASHEET

Date: 12/20/19 Location (Circle): Lake Elsinore/Canyon Lake Station: LE03

Time on Station: 0755 Time off Station: 0810

Weather Conditions: sunny, calm Wind (mph & direction): 0-2mph

Lat: on target Long: on target

Water Depth (m): 4.7 Secchi Depth (m): 0.45

Water Chemistry Sample?: Y/N Chl-a Sample?: Y/N Plankton Sample?: Y/N

SAMPLE TIME: n/a Surface volume filtered (ml): n/a

Depth-Integrated volume filtered (ml): n/a

*Do not exceed **7 PSI** or **14 in. Hg** when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH*	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	12.0	3827	7.33	4.00	12				
1	12.0	3826	7.25	3.91	13				
2	12.0	3826	7.28	3.86	14				
3	12.0	3827	7.30	3.77	15				
4	12.0	3829	7.30	3.59	16				
4.5	12.0	3843	7.35	3.41	17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

*pH readings are erroneous, do not use

FIELD DATASHEET

Date: 12/20/19 Location (Circle): Lake Elsinore/Canyon Lake Station: LE01

Time on Station: 1530 Time off Station: 1540

Weather Conditions: partly cloudy Wind (mph & direction): 0-2mph

Lat: on target Long: on target

Water Depth (m): 5.5 Secchi Depth (m): 0.45m

Water Chemistry Sample?: Y/N Chl-a Sample?: Y/N Plankton Sample?: Y/N

SAMPLE TIME: n/a Surface volume filtered (ml): n/a

Depth-Integrated volume filtered (ml): n/a

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH *	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	13.4	3849	7.53	4.86	12				
1	12.2	3853	7.72	4.28	13				
2	11.8	3838	7.40	2.14	14				
3	11.7	3842	7.30	1.88	15				
4	11.5	3845	7.24	1.36	16				
5	11.3	3844	7.19	1.27	17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

*pH readings are erroneous, do not use.

FIELD DATASHEET

Date: 12/20/19 Location (Circle): Lake Elsinore/Canyon Lake Station: LE02
 Time on Station: 1435 Time off Station: 1445
 Weather Conditions: partly cloudy, calm Wind (mph & direction): 0-2 mph SW
 Lat: on target Long: on target
 Water Depth (m): 6.5 Secchi Depth (m): 0.45
 Water Chemistry Sample?: Y/ N Chl-a Sample?: Y/ N Plankton Sample?: Y/ N
 SAMPLE TIME: n/a Surface volume filtered (ml): n/a
 Depth-Integrated volume filtered (ml): n/a

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments: Aeration lines running earlier in am

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH*	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	14.5	3847	7.63	3.90	12				
1	12.1	3847	7.48	3.26	13				
2	11.9	3839	7.57	1.56	14				
3	11.9	3839	7.52	1.35	15				
4	11.9	3839	7.46	1.29	16				
5	11.9	3840	7.42	1.30	17				
6	11.9	3840	7.40	1.30	18				
7					19				
8					20				
9					21				
10					22				
11					23				

*pH readings are erroneous, do not use.

FIELD DATASHEET

Date: 12/20/19 Location (Circle): Lake Elsinore/Canyon Lake Station: LE03

Time on Station: 1415 Time off Station: 1430

Weather Conditions: partly cloudy, calm Wind (mph & direction): 2-4 mph SSW

Lat: on target Long: on target

Water Depth (m): 4.7 Secchi Depth (m): 0.45m

Water Chemistry Sample?: Y/N Chl-a Sample?: Y/N Plankton Sample?: Y/N

SAMPLE TIME: n/a Surface volume filtered (ml): n/a

Depth-Integrated volume filtered (ml): n/a

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

pH meter - very slow, inconsistent, values not steady

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH*	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	14.6	3827	8.46	6.19	12				
1	12.3	3824	7.92	5.63	13				
2	12.1	3821	7.83	4.20	14				
3	12.0	3821	7.79	4.05	15				
4	11.9	3827	7.76	3.66	16				
4.5	11.8	3814	7.72	3.57	17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

*pH readings are erroneous, do not use.

FIELD DATASHEET

Date: 12/20/19 Location (Circle): Lake Elsinore/Canyon Lake Station: LAKESHORE

Time on Station: 14:50 Time off Station: 15:25

Weather Conditions: partly cloudy, calm Wind (mph & direction): 0-2 mph

Lat: on target Long: on target

Water Depth (m): 6.9 Secchi Depth (m): 0.45

Water Chemistry Sample?: Y/ N Chl-a Sample?: Y/ N Plankton Sample?: Y/ N

SAMPLE TIME: n/a Surface volume filtered (ml): n/a

Depth-Integrated volume filtered (ml): n/a

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments: installed new surface DO logger

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH*	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	14.4	3842	7.28	3.69	12				
1	12.1	3887	7.70	1.43	13				
2	11.9	3840	7.45	1.28	14				
3	11.8	3840	7.33	1.24	15				
4	11.8	3839	7.28	1.23	16				
5	11.8	3839	7.23	1.24	17				
6	11.7	3834	7.19	1.81	18				
6.5	11.7	3834	7.17	1.82	19				
8					20				
9					21				
10					22				
11					23				

*pH readings are erroneous, do not use

FIELD DATASHEET

Date: 12/20/19 Location (Circle): Lake Elsinore/Canyon Lake Station: Grand Ave.

Time on Station: 10:40 Time off Station: 11:00

Weather Conditions: Sunny Calm Wind (mph & direction): 0-2 mph

Lat: on target Long: on target

Water Depth (m): 6 Secchi Depth (m): 0.45

Water Chemistry Sample?: Y / N Chl-a Sample?: Y / N Plankton Sample?: Y / N

SAMPLE TIME: _____ Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	12.2	3841	7.13	3.53	12				
1	12.1	3837	7.16	3.64	13				
2	12.0	3840	7.13	2.27	14				
3	11.9	3839	7.08	2.08	15				
4	11.9	3839	7.06	2.06	16				
5	11.9	3839	7.05	2.03	17				
6	11.9	3839	7.04	2.00	18				
7					19				
8					20				
9					21				
10					22				
11					23				

S.S

*pH readings are erroneous, do not use.

FIELD DATASHEET

Date: 12.20.19 Location (Circle): Lake Elsinore/Canyon Lake Station: CLO7

Time on Station: 1010 Time off Station: _____

Weather Conditions: Sunny Wind (mph & direction): _____

Lat: on target Long: on target

Water Depth (m): 15 m Secchi Depth (m): 1.0

Water Chemistry Sample? Y / N Chl-a Sample? Y / N Plankton Sample? Y / N

SAMPLE TIME: 1030 Surface volume filtered (ml): 500

Depth-Integrated volume filtered (ml): 500

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	12.7	748	6.65	4.59	12	12.4	756	7.44	4.34
1	12.6	755	6.81	4.53	13	12.4	750	7.45	4.32
2	12.5	757	6.95	4.41	14	12.5	757	7.45	4.27
3	12.5	758	7.06	4.43	15 14.5	12.4	757	7.44	4.25
4	12.5	758	7.13	4.48	16				
5	12.5	758	7.20	4.43	17				
6	12.5	761	7.26	4.33	18				
7	12.5	762	7.30	4.33	19				
8	12.6	762	7.35	4.33	20				
9	12.5	760	7.38	4.36	21				
10	12.4	758	7.39	4.36	22				
11	12.4	753	7.43	4.37	23				

FIELD DATASHEET

Date: 12/20/19 Location (Circle): Lake Elsinore/Canyon Lake Station: CLO8

Time on Station: 0930 Time off Station: _____

Weather Conditions: Clear Wind (mph & direction): 0

Lat: on target Long: on target

Water Depth (m): 7.8 Secchi Depth (m): 0.9

Water Chemistry Sample? Y / N Plankton Sample? Y / N

SAMPLE TIME: 0945 Surface volume filtered (ml): 500 mL

Depth-Integrated volume filtered (ml): 500 mL

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	12.4	746	6.73	5.35	12				
1	12.4	748	6.91	5.34	13				
2	12.3	748	6.02	5.23	14				
3	12.3	747	7.19	5.23	15				
4	12.3	748	7.25	5.18	16				
5	12.3	748	7.30	5.10	17				
6	12.3	748	7.34	5.06	18				
7	12.3	747	7.37	5.00	19				
7.5	12.3	748	7.38	4.98	20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 12/20/19 Location (Circle): Lake Elsinore/Canyon Lake Station: CLO9

Time on Station: 0845 Time off Station: _____

Weather Conditions: Clear Wind (mph & direction): 0

Lat: on target Long: on target

Water Depth (m): 6.7 Secchi Depth (m): 0.9

Water Chemistry Sample?: (Y)N Chl-a Sample?: (Y)N Plankton Sample?: (Y)N

SAMPLE TIME: 0900 Surface volume filtered (ml): 440 ml
Depth-Integrated volume filtered (ml): 500 ml

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	11.6	923	6.47	6.89	12				
1	11.6	929	7.14	6.82	13				
2	11.6	928	7.42	6.77	14				
3	11.6	928	7.56	6.08	15				
4	11.6	929	7.70	6.03	16				
5	11.7	976	7.58	0.65	17				
6	11.5	1164	7.11	0.29	18				
X65	11.5	1181	7.04	0.25	19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 12/20/19 Location (Circle): Lake Elsinore/Canyon Lake Station: CL10

Time on Station: 0752 Time off Station: _____

Weather Conditions: Clear Wind (mph & direction): 0

Lat: on target Long: on target

Water Depth (m): 3.9 Secchi Depth (m): 0.7

Water Chemistry Sample? N Chl-a Sample? N Plankton Sample? N
SAMPLE TIME: 0810 Surface volume filtered (ml): 440ml

Depth-Integrated volume filtered (ml): 410ml

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	11.6	947	7.32	8.02	12				
1	11.6	942	8.07	8.04	13				
2	11.6	941	8.17	7.98	14				
3	11.6	941	8.23	7.99	15				
3.5	11.7	946	8.25	7.81	16				
5					17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 12.20.19 Location (Circle): Lake Elsinore/Canyon Lake Station: CLO7

Time on Station: 1415 Time off Station: _____

Weather Conditions: Clear Wind (mph & direction): ~~0~~

Lat: on target Long: on target

Water Depth (m): 15.0 Secchi Depth (m): 1.0

Water Chemistry Sample?: Y N
 Chl-a Sample?: Y N Plankton Sample?: Y N
 SAMPLE TIME: _____ Surface volume filtered (ml): _____
 Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments: _____

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	14.1	762	7.78	5.88	12	12.4	756	7.54	4.17
1	13.1	770	7.75	5.20	13	12.4	756	7.55	4.07
2	12.7	762	7.77	4.66	14	12.4	757	7.55	4.10
3	12.5	762	7.63	4.56	14.5	12.4	758	7.54	4.02
4	12.5	762	7.61	4.33	16				
5	12.5	762	7.59	4.32	17				
6	12.5	761	7.59	4.33	18				
7	12.4	760	7.58	4.31	19				
8	12.4	757	7.58	4.33	20				
9	12.4	755	7.56	4.32	21				
10	12.4	754	7.57	4.28	22				
11	12.4	755	7.56	4.22	23				

FIELD DATASHEET

Date: 12.20.19 Location (Circle): Lake Elsinore/Canyon Lake Station: CLO8

Time on Station: 1402 Time off Station: _____

Weather Conditions: Clear Wind (mph & direction): 5 NE

Lat: on target Long: on target

Water Depth (m): 7.8 Secchi Depth (m): 0.9

Water Chemistry Sample?: Y N
 Chl-a Sample?: Y N Plankton Sample?: Y N
 SAMPLE TIME: _____ Surface volume filtered (ml): _____
 Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	13.5	732	7.61	6.41	12				
1	13.0	747	7.69	6.25	13				
2	12.5	747	7.68	5.28	14				
3	12.4	751	7.65	5.10	15				
4	12.3	749	7.64	5.05	16				
5	12.3	749	7.61	5.10	17				
6	12.3	748	7.61	4.80	18				
7	12.2	747	7.59	4.68	19				
8.75	12.2	748	7.59	4.63	20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 12.20.19 Location (Circle): Lake Elsinore/Canyon Lake Station: CLO9

Time on Station: 1343 Time off Station: _____

Weather Conditions: Sunny Wind (mph & direction): 0

Lat: on target Long: on target

Water Depth (m): 6.7 Secchi Depth (m): 0.9

Water Chemistry Sample?: Y N Chl-a Sample?: Y N Plankton Sample?: Y N

SAMPLE TIME: _____ Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments: _____

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	12.9	900	8.19	7.18	12				
1	12.4	925	8.23	7.36	13				
2	11.8	933	8.23	6.88	14				
3	11.6	932	8.14	6.41	15				
4	11.6	935	8.12	6.32	16				
5	11.6	944	8.10	6.05	17				
6	11.5	1171	7.61	0.07	18				
7/0.5					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 12.20.19 Location (Circle): Lake Elsinore/Canyon Lake Station: CL10

Time on Station: 1330 Time off Station: _____

Weather Conditions: Sunny Wind (mph & direction): 0

Lat: on target Long: on target

Water Depth (m): _____ Secchi Depth (m): 0.7

Water Chemistry Sample?: Y/N Chl-a Sample?: Y/N Plankton Sample?: Y/N

SAMPLE TIME: _____ Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	13.6	947	8.60	9.07	12				
1	12.6	939	8.63	9.31	13				
2	11.8	943	8.49	8.06	14				
3	11.7	946	8.44	7.66	15				
4.35	11.7	950	8.41	7.56	16				
5					17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

QUARTER 3 – FEBRUARY AND APRIL 2020

Lake Elsinore and Canyon Lake Nutrient TMDL Monitoring 2019-2020 Quarter 3 Report FINAL



Prepared for:

Lake Elsinore & San Jacinto Watershed Project Authority
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May 29, 2020

Lake Elsinore

Monitoring Dates

February 18, 2020 and April 13, 2020. The lake levels during the sampling events were 1240.28 feet and 1244.73 feet, respectively. Sampling is conducted monthly in Lake Elsinore during summer (June – September) and bi-monthly during the remainder of the year (October – May).

Monitoring Locations

Five locations were monitored in Lake Elsinore: Sites LE01, LE02, LE03 and the two in-lake data sondes maintained by Elsinore Valley Municipal Water District (EVMWD): Lakeshore Sonde and Grand Avenue Sonde. These sites are depicted in Figure 1.

Weather

February – Partly cloudy and calm, 0-5 mph W wind, with a morning low of 54°F and a high of 61°F

April – Overcast with a slight breeze, 0-5 mph WSW wind in the morning. Winds accelerated in the afternoon and prevented the field staff from collecting afternoon water quality readings on the lake. Lows around 43°F, warming to 79°F.

Water Quality Monitoring Activities

Water quality monitoring was successfully performed in accordance with the project specific Work Plan, with no equipment failures or delays. Field monitoring included the following activities at each location or where noted:

- Vertical water column profile measurements of temperature, conductivity, pH, and dissolved oxygen (all sites);
- Depth-integrated water chemistry sample for Total Dissolved Solids, Sulfide, Nitrate as N, Nitrite as N, Kjeldahl Nitrogen, Total Nitrogen, Ammonia-Nitrogen, Ortho Phosphate Phosphorus, Total Phosphorus (LE02 only);
- Chlorophyll-a surface (0-2 m) and full depth-integrated samples (LE02 only);
- Secchi disk measurements (LE01, LE02, and LE03);
- Full water column vertical plankton tows with samples preserved and archived for potential assessment in the future as needed (LE02 only);
- Visual observations and photos of lake conditions.

A summary of water quality profile data is presented in Tables 1 and 2. Results of the water chemistry analyses are presented in Tables 3 and 4.

Aerial imagery of chlorophyll-a, turbidity, and cyanobacterial bloom risk based on remote sensing satellite data are presented in Figures 2 through 11.

Copies of field datasheets are provided in Appendix A.



Figure 1. Lake Elsinore Sampling Locations

Table 1. Lake Elsinore *In-situ* Water Column Profile –February 18, 2020

Site	Time	Measure	Surface	1 m	2 m	3 m	4 m	5 m	6 m	7 m	8 m	Water Column Mean
LE01 ^a	11:25	Temp (°C)	14.6	13.5	12.6	12.1	11.9	11.7	--	--	--	12.7
		Sp. Cond (µS/cm)	3574	3577	3576	3575	3578	3577	--	--	--	3576
		pH*	9.16	9.17	8.99	8.94	8.91	8.86	--	--	--	9.01
		DO (mg/L)	16.2	15.9	11.4	10.0	9.6	7.0	--	--	--	11.7
	16:15	Temp (°C)	14.9	14.8	14.0	13.0	12.4	12.1	12.1	--	--	13.3
		Sp. Cond (µS/cm)	3569	3569	3580	3580	3575	3574	3574	--	--	3574
		pH*	9.28	9.28	9.18	9.05	9.02	8.95	8.92	--	--	9.10
		DO (mg/L)	20.2	19.9	17.0	12.9	11.9	10.1	9.39	--	--	14.5
LE02 ^b	08:30	Temp (°C)	13.4	13.3	13.3	12.2	11.6	11.5	11.4	11.4	--	12.3
		Sp. Cond (µS/cm)	3569	3569	3570	3581	3588	3581	3583	3582	--	3578
		pH*	9.14	9.12	9.11	8.93	8.85	8.81	8.81	8.81	--	8.95
		DO (mg/L)	16.0	14.9	14.6	9.8	7.7	6.9	6.7	6.6	--	10.4
	15:40	Temp (°C)	14.9	14.2	12.6	11.9	11.7	11.6	11.4	11.4	--	12.5
		Sp. Cond (µS/cm)	3560	3553	3588	3579	3579	3579	3581	3581	--	3575
		pH*	9.24	9.20	8.98	8.91	8.85	8.83	8.78	8.78	--	8.95
		DO (mg/L)	18.1	16.7	11.2	9.3	7.6	7.1	5.8	5.78	--	10.2
LE03 ^c	07:55	Temp (°C)	13.6	13.6	12.8	12.2	11.9	11.7	--	--	--	12.6
		Sp. Cond (µS/cm)	3564	3562	3574	3580	3584	3583	--	--	--	3575
		pH*	9.15	9.15	8.98	8.92	8.89	8.81	--	--	--	8.98
		DO (mg/L)	15.3	15.5	10.4	9.7	8.9	6.8	--	--	--	11.1
	14:50	Temp (°C)	14.8	13.9	13.3	12.2	11.7	11.7	--	--	--	13.3
		Sp. Cond (µS/cm)	3568	3568	3574	3580	3581	3577	--	--	--	3575
		pH*	9.27	9.20	8.95	8.82	8.78	8.78	--	--	--	8.97
		DO (mg/L)	21.9	16.9	12.0	7.3	6.7	6.6	--	--	--	11.9
Lakeshore Sonde ^d	15:55	Temp (°C)	14.7	14.5	13.3	12.4	11.8	11.5	11.4	11.3	11.3	12.5
		Sp. Cond (µS/cm)	3561	3569	3569	3576	3579	3581	3581	3580	3580	3575
		pH*	9.26	9.23	9.13	8.95	8.85	8.80	8.79	8.79	8.78	8.95
		DO (mg/L)	18.6	18.0	12.8	10.2	7.8	6.1	6.0	5.8	5.8	10.1
Grand Ave Sonde	15:15	Temp (°C)	15.5	13.7	12.5	12.0	11.6	11.6	11.5	--	--	12.6
		Sp. Cond (µS/cm)	3559	3566	3574	3577	3580	3579	3579	--	--	3573
		pH*	9.24	9.12	8.98	8.92	8.83	8.79	8.81	--	--	8.96
		DO (mg/L)	118.2	15.8	11.8	9.8	7.3	6.4	6.6	--	--	25.1

Note: No stratification observed during this event, therefore epilimnion and hypolimnion mean values are not reported.
 *pH measurements may not have accurately reflected true values. Meter/probe were investigated after sampling event.
 a- Afternoon bottom depth measurement taken at 5.5m c- Bottom depth measurement taken at 4.5m
 b- Bottom depth measurement taken at 6.5m d- Bottom depth measurement taken at 7.5m

Table 2. Lake Elsinore *In-situ* Water Column Profile –April 13, 2020

Site	Time	Measure	Surface	1 m	2 m	3 m	4 m	5 m	6 m	7 m	8 m	Water Column Mean	
LE01 ^a	10:20	Temp (°C)	16.3	15.6	15.3	15.3	15.3	15.2	15.2	15.2	--	15.5	
		Sp. Cond (µS/cm)	2816	2904	2934	2931	2946	2953	3016	3023	3023	--	2914
		pH	9.30	9.26	9.25	9.22	9.16	9.14	9.09	9.09	9.09	--	9.22
		DO (mg/L)	11.1	9.9	8.9	7.6	6.8	6.4	4.6	4.6	4.6	--	7.5
			Temp (°C)	--	--	--	--	--	--	--	--	--	--
			Sp. Cond (µS/cm)	--	--	--	--	--	--	--	--	--	--
			pH	--	--	--	--	--	--	--	--	--	--
			DO (mg/L)	--	--	--	--	--	--	--	--	--	--
LE02	08:20	Temp (°C)	15.7	15.7	15.7	15.6	15.5	15.4	15.4	15.4	15.2	15.6	
		Sp. Cond (µS/cm)	2794	2793	2796	2841	2921	2932	2975	3035	3021	3021	2886
		pH	9.26	9.26	9.25	9.21	9.20	9.20	9.20	9.19	9.17	9.17	9.22
		DO (mg/L)	9.5	9.5	9.3	8.4	7.8	7.7	7.6	7.3	6.82	6.82	8.4
			Temp (°C)	--	--	--	--	--	--	--	--	--	--
			Sp. Cond (µS/cm)	--	--	--	--	--	--	--	--	--	--
			pH	--	--	--	--	--	--	--	--	--	--
			DO (mg/L)	--	--	--	--	--	--	--	--	--	--
LE03	08:00	Temp (°C)	15.7	15.7	15.7	15.7	15.6	15.5	15.4	--	--	15.7	
		Sp. Cond (µS/cm)	2738	2740	2777	2854	2961	2970	2971	--	--	2840	
		pH	9.25	9.25	9.23	9.21	9.19	9.17	9.17	--	--	9.22	
		DO (mg/L)	9.7	9.7	9.2	8.3	7.7	7.3	7.3	--	--	8.6	
			Temp (°C)	--	--	--	--	--	--	--	--	--	--
			Sp. Cond (µS/cm)	--	--	--	--	--	--	--	--	--	--
			pH	--	--	--	--	--	--	--	--	--	--
			DO (mg/L)	--	--	--	--	--	--	--	--	--	--
Lakeshore Sonde		Temp (°C)	--	--	--	--	--	--	--	--	--	--	
		Sp. Cond (µS/cm)	--	--	--	--	--	--	--	--	--	--	
		pH	--	--	--	--	--	--	--	--	--	--	
		DO (mg/L)	--	--	--	--	--	--	--	--	--	--	
Grand Ave Sonde		Temp (°C)	--	--	--	--	--	--	--	--	--	--	
		Sp. Cond (µS/cm)	--	--	--	--	--	--	--	--	--	--	
		pH	--	--	--	--	--	--	--	--	--	--	
		DO (mg/L)	--	--	--	--	--	--	--	--	--	--	

No measurements taken in the afternoon or from the Sondes due to elevated afternoon winds

a- Bottom depth measurement taken at 6.5m

Table 3. Water Chemistry for Lake Elsinore – February 18, 2020

Method	Compound	Units	RL	Basin Plan or TMDL Target	Depth Integrated or Surface Sample	LE02
SM 2540C	Total Dissolved Solids	mg/L	40	2000 ³	Depth Integrated	2100
SM 4500S2 D	Sulfide	mg/L	0.1	NA	Depth Integrated	ND
EPA 300.0	Nitrate as N	mg/L	0.2	NA	Depth Integrated	0.23
EPA 300.0	Nitrite as N	mg/L	0.1	NA	Depth Integrated	ND
EPA 351.2	Total Kjeldahl Nitrogen	mg/L	0.1	NA	Depth Integrated	0.97
Calculation	Total Nitrogen ^a	mg/L	--	0.75 ^{b1}	Depth Integrated	1.2
SM4500NH3H	Ammonia-Nitrogen	mg/L	0.1	CMC: 1.43 ^{c1} CCC: 0.52 ^{c1}	Depth Integrated	0.073 J
EPA 300.0	Ortho Phosphate Phosphorus	mg/L	0.05	NA	Depth Integrated	ND
EPA 365.1	Total Phosphorus	mg/L	0.01	0.1 ^{b1}	Depth Integrated	0.182
EPA 10200 H	Chlorophyll-a	µg/L	1.0	25 ^{d1} , 40 ^{d2}	Surface (0-2m)	77.6
					Depth Integrated	56.8

Notes:

^a - Total Nitrogen = TKN+NO₂+NO₃

^b - Annual average

^c - Values are site specific dependent upon pH and temperature recorded at each location

^d - Summer average

NA – Not applicable/ available

ND – Not detected

J – value between MDL and RL

¹ – 2020 TMDL Target, based on Table 5-9n of 2004 TMDL

² – 2015 TMDL Target, based on Table 5-9n of 2004 TMDL

³ – Santa Ana Region Basin Plan Objective

Table 4. Water Chemistry for Lake Elsinore – April 13, 2020

Method	Compound	Units	RL	Basin Plan or TMDL Target	Depth Integrated or Surface Sample	LE02
SM 2540C	Total Dissolved Solids	mg/L	40	2000 ³	Depth Integrated	1700
SM 4500S2 D	Sulfide	mg/L	0.1	NA	Depth Integrated	ND
EPA 300.0	Nitrate as N	mg/L	0.2	NA	Depth Integrated	ND
EPA 300.0	Nitrite as N	mg/L	0.1	NA	Depth Integrated	ND
EPA 351.2	Total Kjeldahl Nitrogen	mg/L	0.05	NA	Depth Integrated	3.9
Calculation	Total Nitrogen ^a	mg/L	--	0.75 ^{b1}	Depth Integrated	3.9
SM4500NH3H	Ammonia-Nitrogen	mg/L	0.1	CMC: 0.965 ^{c1} CCC: 0.338 ^{c1}	Depth Integrated	ND
EPA 300.0	Ortho Phosphate Phosphorus	mg/L	0.05	NA	Depth Integrated	ND
EPA 365.1	Total Phosphorus	mg/L	0.01	0.1 ^{b1}	Depth Integrated	0.174
EPA 10200 H	Chlorophyll-a	µg/L	1.0	25 ^{d1} , 40 ^{d2}	Surface (0-2m)	105
					Depth Integrated	99.5

Notes:

^a - Total Nitrogen = TKN+NO₂+NO₃

^b - Annual average

^c - Values are site specific dependent upon pH and temperature recorded at each location

^d - Summer average

NA – Not applicable/ available

ND – Not detected

J – value between MDL and RL

¹ – 2020 TMDL Target, based on Table 5-9n of 2004 TMDL

² – 2015 TMDL Target, based on Table 5-9n of 2004 TMDL

³ – Santa Ana Region Basin Plan Objective

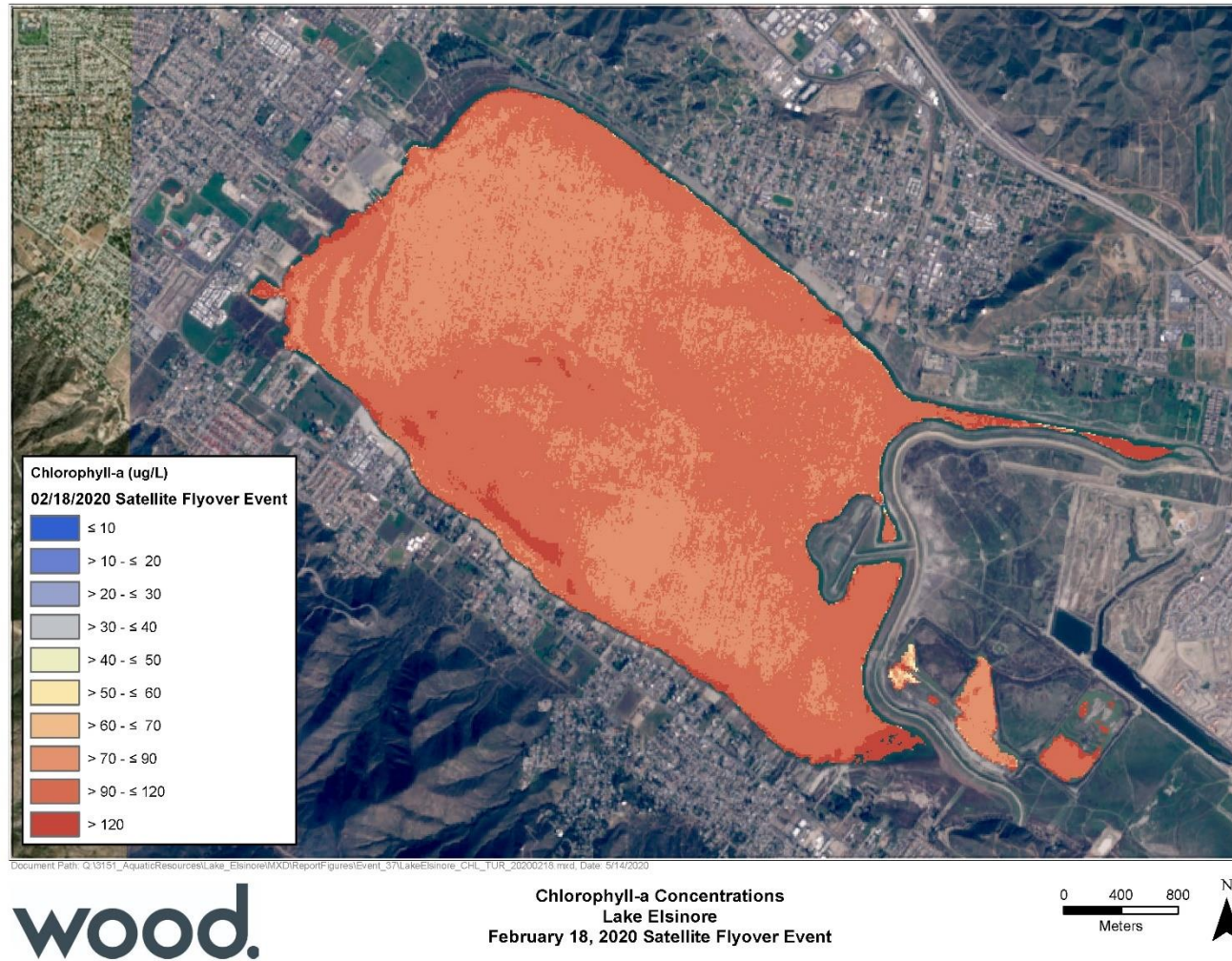


Figure 2. Satellite Imagery of Lake Elsinore Chlorophyll-a Concentrations February 18, 2020

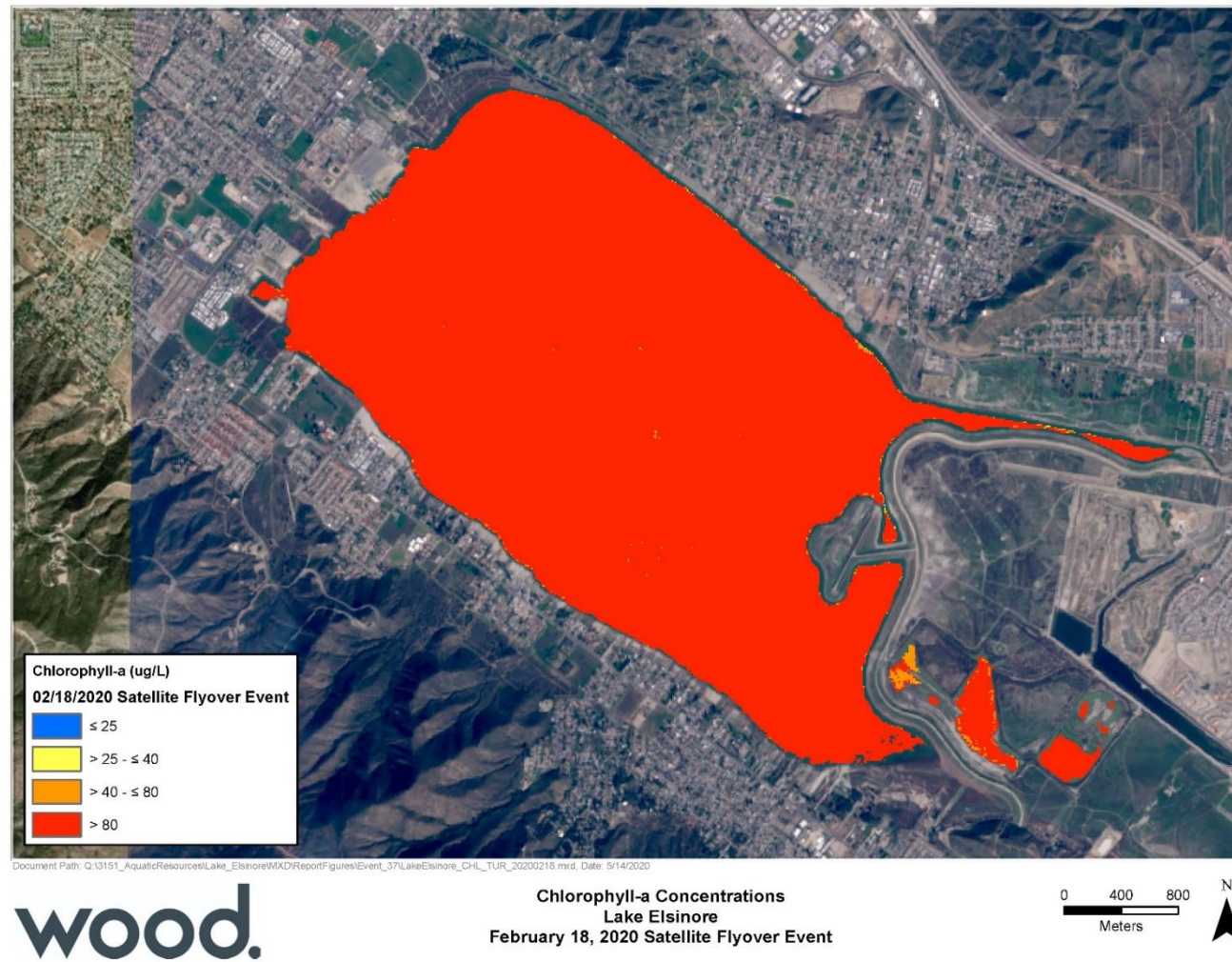


Figure 3. Satellite Imagery of Lake Elsinore Chlorophyll-a Concentrations based on TMDL Targets February 18, 2020

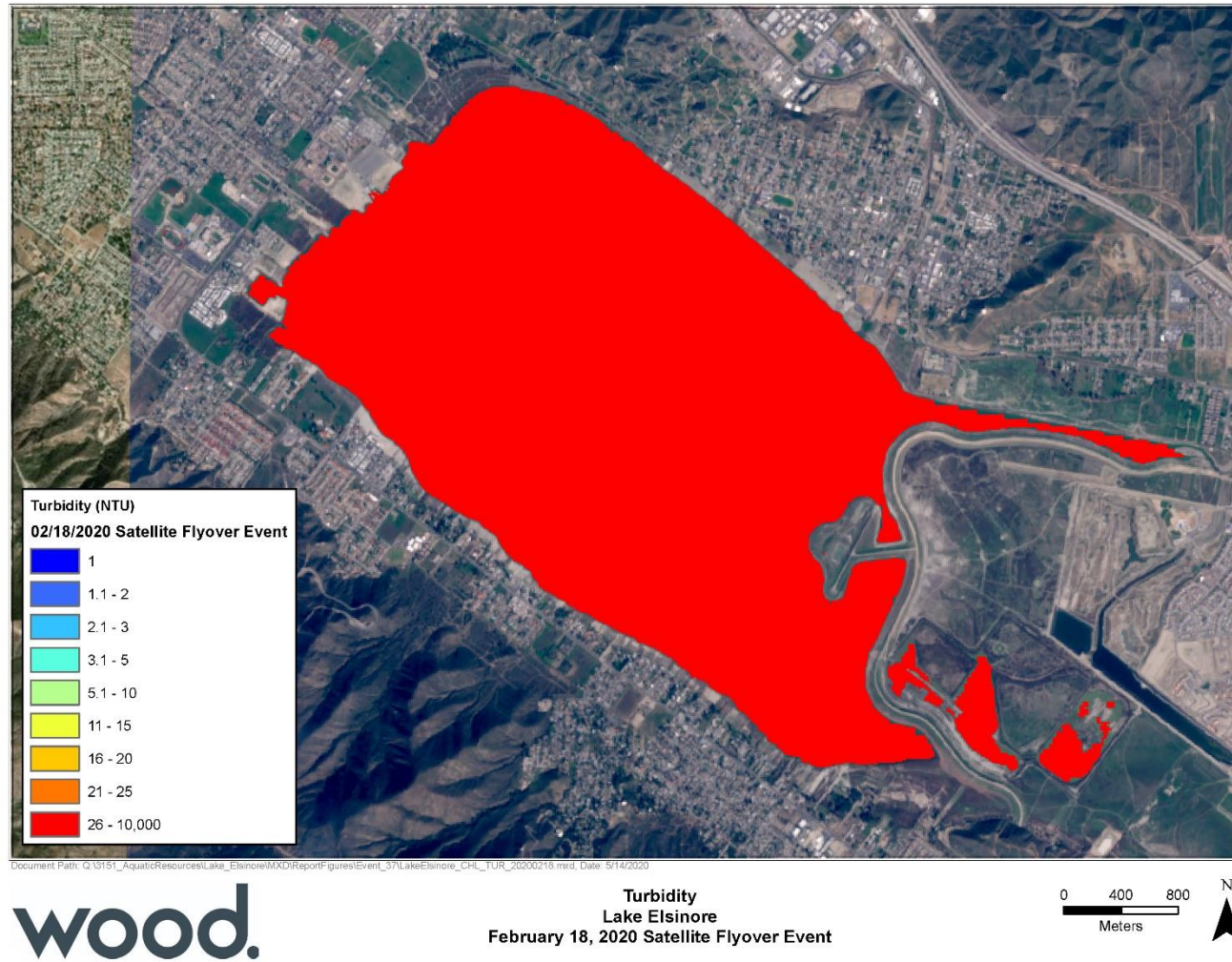


Figure 4. Satellite Imagery of Lake Elsinore Turbidity Measurements February 18, 2020

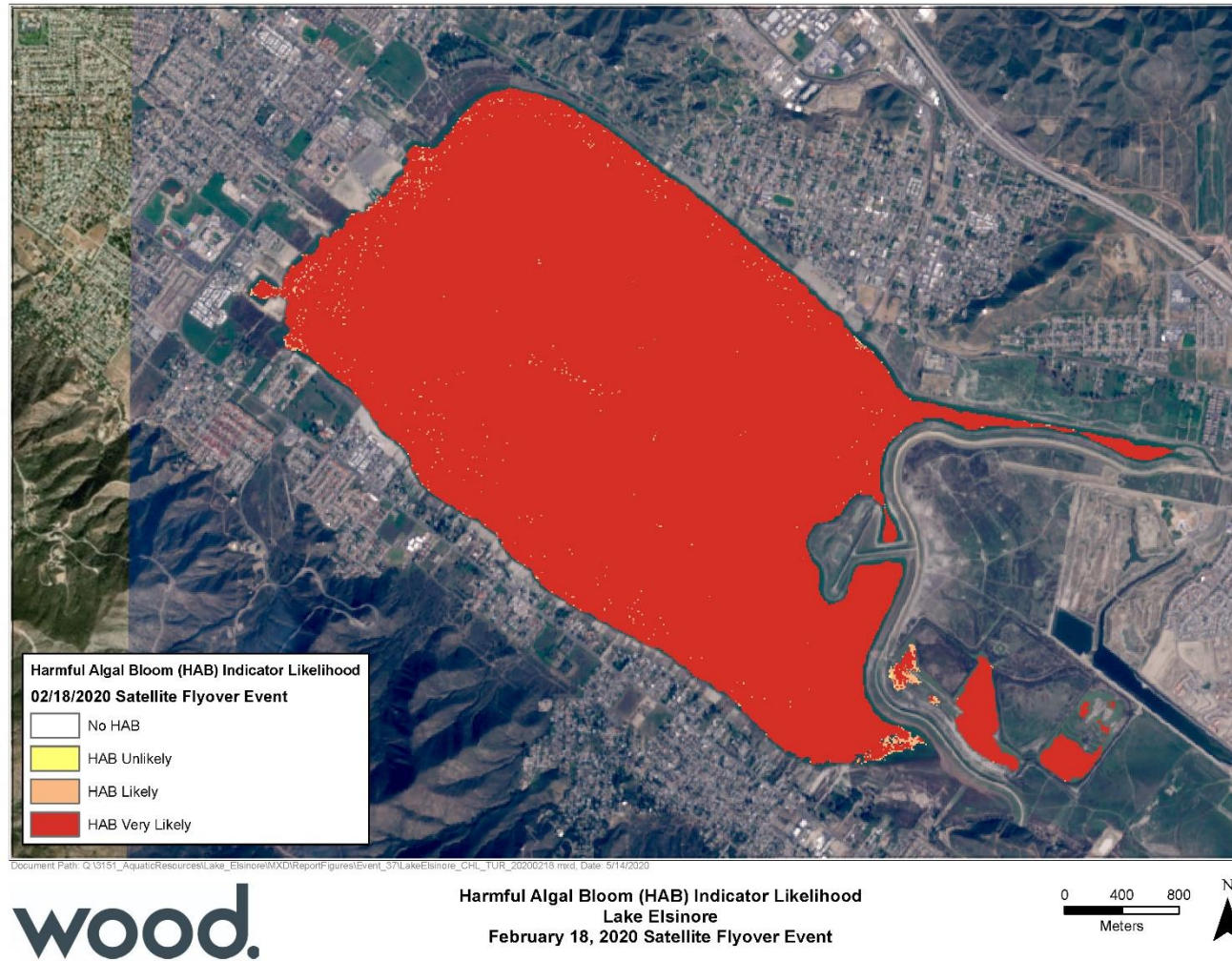


Figure 5. Satellite Imagery of Lake Elsinore HAB Indicator Likelihood February 18, 2020
Data gaps mid-lake are due to large surface cyanobacterial slicks



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wood.

Satellite Imagery
Lake Elsinore
February 18, 2020 Satellite Flyover Event

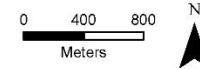


Figure 6. Lake Elsinore Unprocessed Raw Satellite Image from February 18, 2020

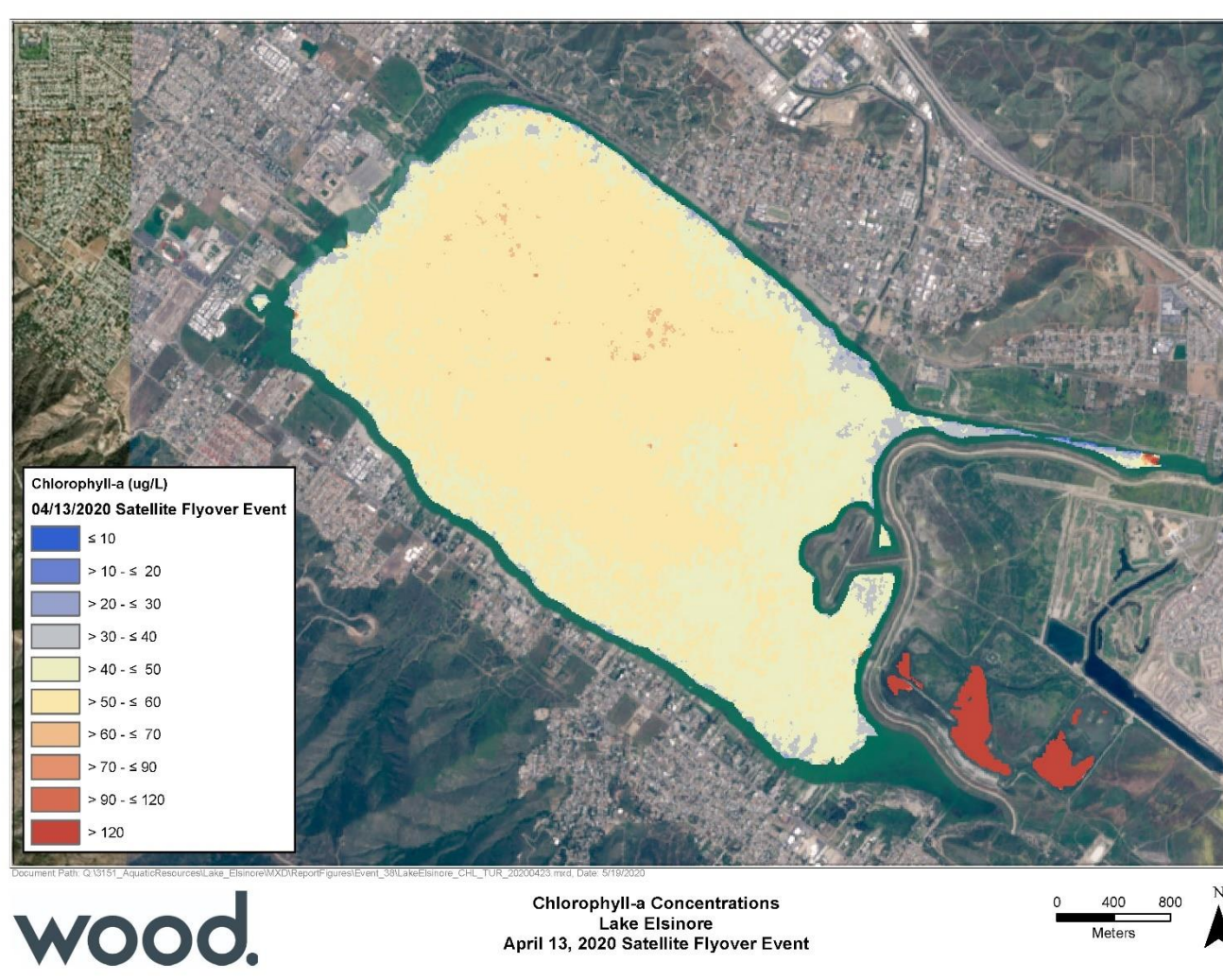


Figure 7. Satellite Imagery of Lake Elsinore Chlorophyll-a Concentrations April 13, 2020

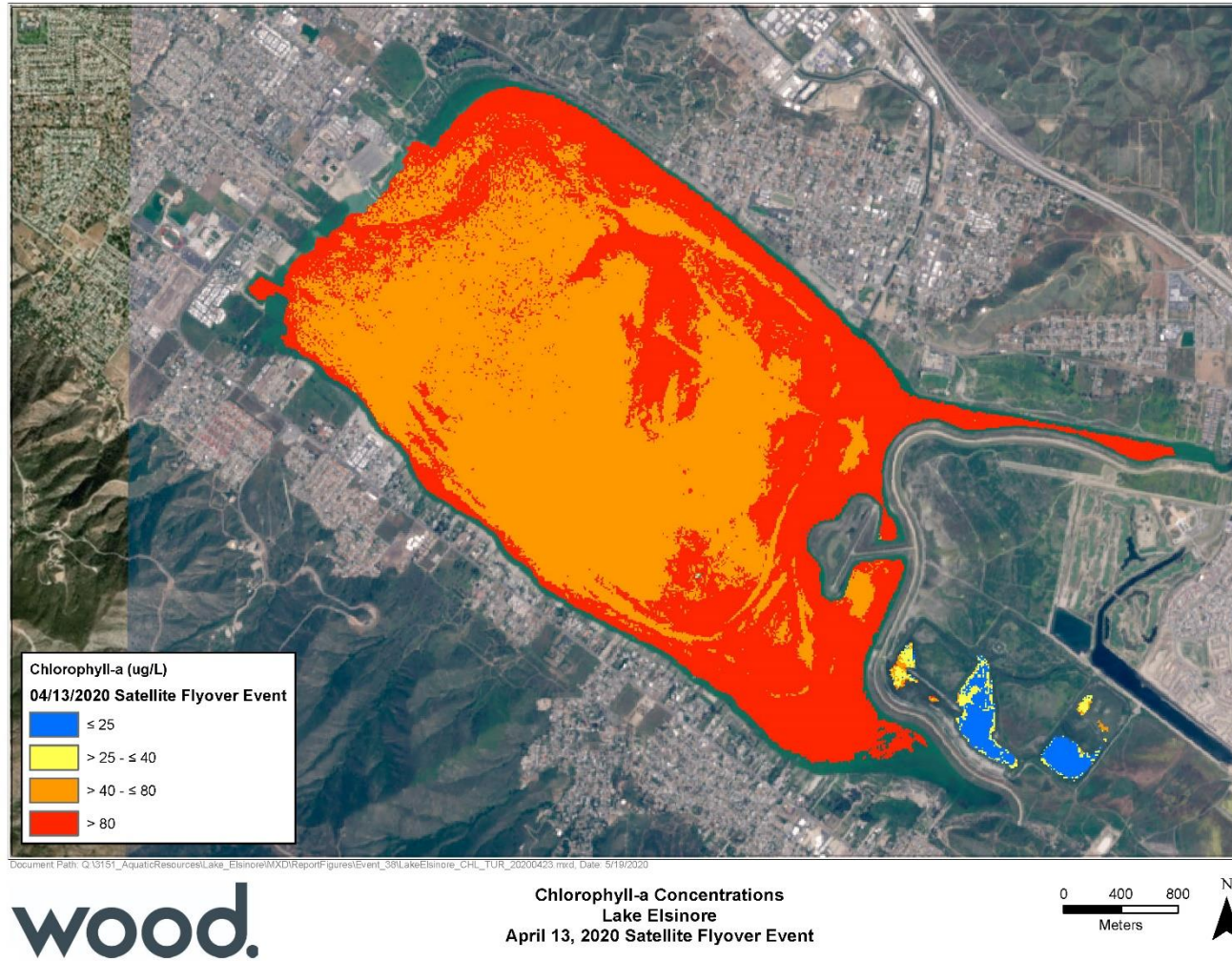


Figure 8. Satellite Imagery of Lake Elsinore Chlorophyll-a Concentrations based on TMDL Targets April 13, 2020

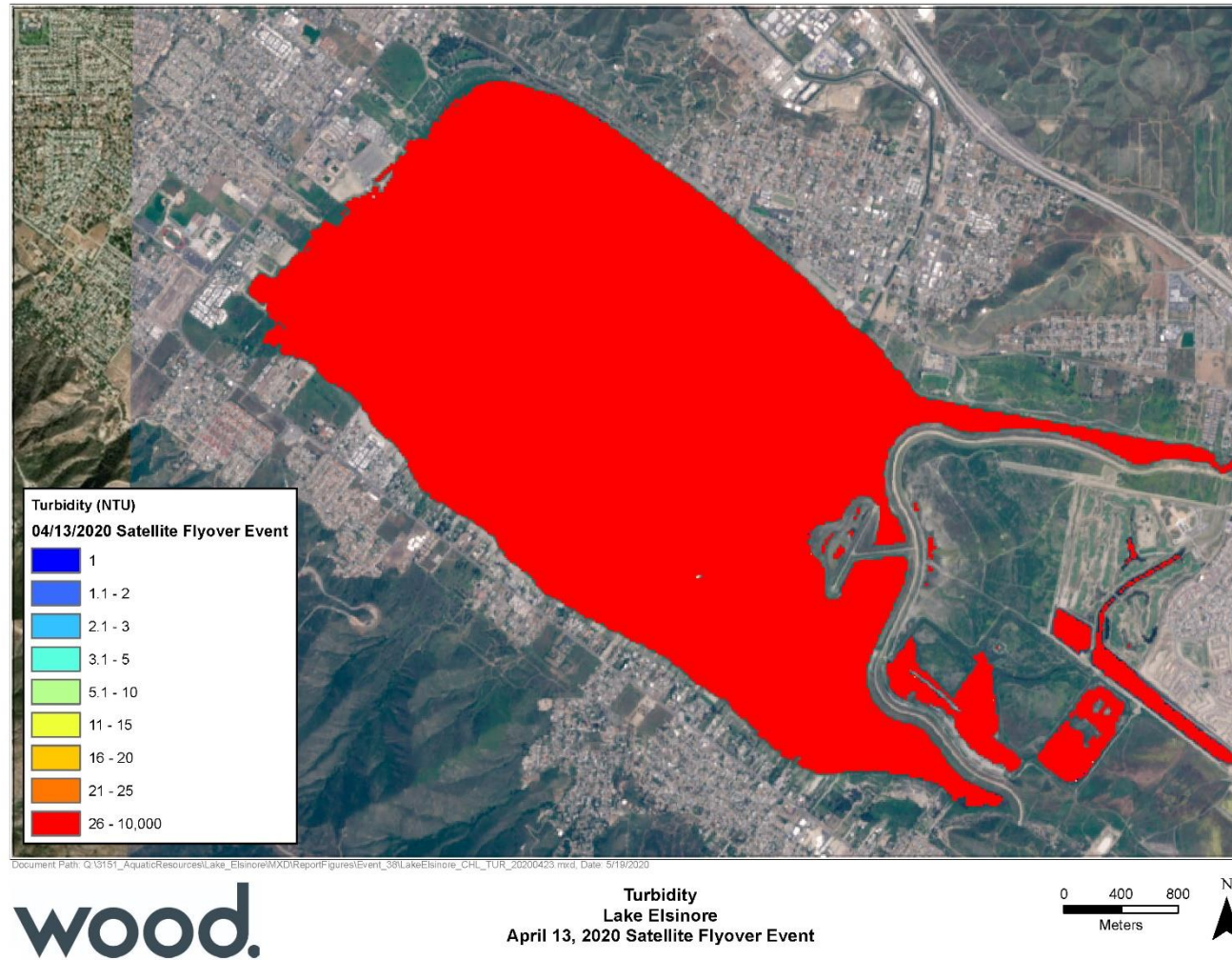
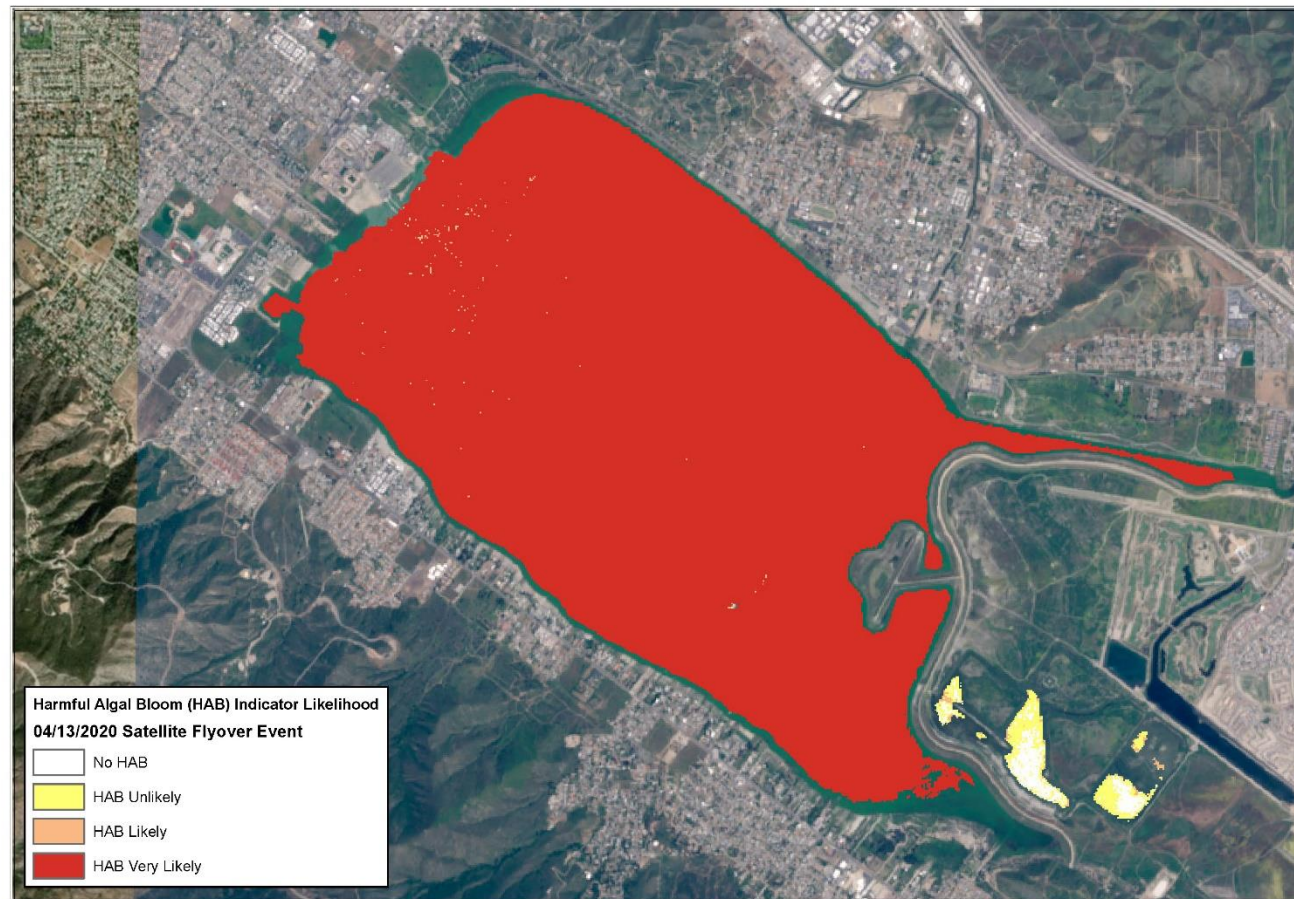


Figure 9. Satellite Imagery of Lake Elsinore Turbidity Measurements April 13, 2020



Harmful Algal Bloom (HAB) Indicator Likelihood
Lake Elsinore
April 13, 2020 Satellite Flyover Event

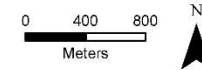


Figure 10. Satellite Imagery of Lake Elsinore HAB Indicator Likelihood April 13, 2020



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wood.

Satellite Imagery
Lake Elsinore
April 13, 2020 Satellite Flyover Event

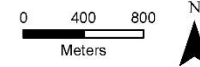


Figure 11. Lake Elsinore Unprocessed Raw Satellite Image from April 13, 2020

Canyon Lake

Monitoring Dates

February 18, 2020 and April 13, 2020. Year-round bi-monthly monitoring is required for Canyon Lake. The lake level on the days of sampling were 1381.66 feet and 1382.08 feet, respectively.

Locations

Four locations were sampled in Canyon Lake: Sites CL07, CL08, CL09, and CL10. These sites are depicted in Figure 12.

Weather

February – Partly cloudy and calm, 0-5 mph W wind, with a morning low of 54°F and a high of 61°F

April – Overcast with a slight breeze in the morning (0-5 mph WSW wind), which accelerated to 5-10mph W wind in the afternoon. Lows around 43°F, warming to 79°F.

Water Quality Monitoring Activities

Water quality monitoring was successfully performed in accordance with the TMDL Work Plan and there were no equipment failures or delays. Field monitoring included the following activities at each location:

- Vertical water column profile measurements of temperature, conductivity, pH, and dissolved oxygen;
- Depth-integrated water chemistry sample for Total Dissolved Solids, Total Suspended Solids, Sulfide, Nitrate as N, Nitrite as N, Kjeldahl Nitrogen, Total Nitrogen, Ammonia-Nitrogen, Ortho Phosphate Phosphorus, Total Phosphorus, Total and Dissolved Aluminum;
- Chlorophyll-a surface (0-2 m) and full depth-integrated samples;
- Secchi disk measurements;
- Full water column vertical plankton tows with samples preserved and archived for potential assessment in the future as needed;
- Visual observations and photos of lake conditions.

A summary of water quality profile data are presented in Tables 5 and 6. Results of the water chemistry analyses are presented in Tables 7 and 8.

Satellite imagery of chlorophyll-a, turbidity, and cyanobacterial bloom risk based on remote sensing data are presented in Figures 13 through 22. Satellite chlorophyll-a concentrations in portions of the eastern arm of Canyon Lake are likely impacted by the narrowness of the water body, resulting in an “edge-effect” of the nearby land mass, the consequence of which can be artificially elevated chlorophyll-a concentrations.

Copies of field datasheets are provided in Appendix A.



Figure 12. Canyon Lake Sampling Locations

Table 5. Canyon Lake *In-situ* Water Column Profile – February 18, 2020

Site	Time	Measure	Surface	1 m	2 m	3 m	4 m	5 m	6 m	7 m	8 m	9 m	10 m	11 m	12 m	13 m	14 m	15 m	Water Column Mean - All		
CL07	10:07	Temp (°C)	13.9	13.6	12.6	12.5	11.9	11.6	11.6	11.5	11.5	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.9	
		Sp. Cond (µS/cm)	700	703	544	714	720	722	721	721	720	721	722	722	724	722	722	722	722	722	708
		pH	9.44	9.37	8.84	8.80	8.09	8.02	7.91	7.85	7.75	7.70	7.69	7.68	7.68	7.68	7.68	7.67	7.67	7.67	8.12
		DO (mg/L)	17.6	16.7	12.0	12.2	7.2	6.3	5.8	4.8	4.1	4.1	4.0	4.0	3.9	3.9	3.9	3.9	3.9	3.9	7.2
CL07	14:58	Temp (°C)	17.2	14.6	13.6	12.4	11.9	11.8	11.6	11.6	11.6	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	12.3	
		Sp. Cond (µS/cm)	703	700	705	717	722	723	722	723	722	723	723	723	723	723	723	724	723	719	
		pH	9.51	9.50	9.30	8.48	8.07	7.95	7.88	7.80	7.75	7.69	7.68	7.67	7.67	7.67	7.67	7.67	7.67	7.67	8.12
		DO (mg/L)	19.2	18.8	15.6	8.6	6.6	6.0	5.5	4.9	4.3	4.0	3.9	3.9	3.9	3.9	3.9	3.8	3.8	3.8	7.3
CL08	09:30	Temp (°C)	14.2	13.8	13.4	12.6	11.8	11.8	11.7	11.7	11.6	11.6	--	--	--	--	--	--	--	12.4	
		Sp. Cond (µS/cm)	697	699	706	723	720	719	719	720	720	725	--	--	--	--	--	--	--	715	
		pH	9.44	9.40	9.21	8.52	8.02	7.84	7.80	7.79	7.76	7.7	--	--	--	--	--	--	--	8.35	
		DO (mg/L)	17.9	17.4	17.0	10.0	6.0	5.2	5.4	5.3	4.8	3.4	--	--	--	--	--	--	--	9.2	
CL08	14:45	Temp (°C)	15.1	14.1	12.8	12.4	12.0	11.8	11.7	11.7	11.6	11.6	--	--	--	--	--	--	--	12.5	
		Sp. Cond (µS/cm)	698	694	716	721	721	720	721	722	722	725	--	--	--	--	--	--	--	716	
		pH	9.55	9.58	8.83	8.39	7.83	7.78	7.77	7.81	7.74	7.69	--	--	--	--	--	--	--	8.30	
		DO (mg/L)	20.2	20.7	11.4	8.9	5.6	5.1	5.1	5.5	4.5	3.6	--	--	--	--	--	--	--	9.1	
CL09 ^a	08:41	Temp (°C)	14.1	14.0	13.4	12.5	12.4	12.1	11.7	11.3	11.2	--	--	--	--	--	--	--	--	12.5	
		Sp. Cond (µS/cm)	803	805	835	877	912	907	938	1019	1040	--	--	--	--	--	--	--	--	904	
		pH	9.19	9.19	8.96	8.32	8.15	7.83	7.42	7.24	7.2	--	--	--	--	--	--	--	--	8.17	
		DO (mg/L)	14.7	14.6	13.4	7.8	5.9	2.9	0.1	0.0	0.0	--	--	--	--	--	--	--	--	6.6	
CL09 ^a	14:20	Temp (°C)	15.8	14.6	13.6	12.7	12.4	12.1	11.7	11.5	11.3	--	--	--	--	--	--	--	--	12.9	
		Sp. Cond (µS/cm)	805	806	833	859	912	913	906	1017	1039	--	--	--	--	--	--	--	--	899	
		pH	9.25	9.25	9.08	8.46	8.09	7.82	7.50	7.23	7.21	--	--	--	--	--	--	--	--	8.21	
		DO (mg/L)	15.8	15.6	13.8	9.0	5.5	3.4	0.0	0.0	0.0	--	--	--	--	--	--	--	--	7.0	
CL10 ^b	07:55	Temp (°C)	13.9	13.9	13.9	13.0	12.9	--	--	--	--	--	--	--	--	--	--	--	--	13.5	
		Sp. Cond (µS/cm)	841	842	858	980	982	--	--	--	--	--	--	--	--	--	--	--	--	901	
		pH	9.22	9.22	9.14	8.26	8.14	--	--	--	--	--	--	--	--	--	--	--	--	8.80	
		DO (mg/L)	14.3	14.4	13.8	7.0	5.5	--	--	--	--	--	--	--	--	--	--	--	--	11.0	
CL10 ^b	14:00	Temp (°C)	16.3	14.9	13.7	13.1	12.9	--	--	--	--	--	--	--	--	--	--	--	--	14.2	
		Sp. Cond (µS/cm)	839	849	863	922	961	--	--	--	--	--	--	--	--	--	--	--	--	887	
		pH	9.19	9.23	9.10	8.71	8.20	--	--	--	--	--	--	--	--	--	--	--	--	8.89	
		DO (mg/L)	15.3	15.6	13.3	10.2	5.2	--	--	--	--	--	--	--	--	--	--	--	--	11.9	

Note: No stratification observed during this event, therefore epilimnion and hypolimnion mean values are not reported.

a- Bottom measurement taken at 7.5m

b- Bottom measurement taken at 3.5m

Table 6. Canyon Lake In-situ Water Column Profile –April 9, 2019

Site	Time	Measure	Surface	1 m	2 m	3 m	4 m	5 m	6 m	7 m	8 m	9 m	10 m	11 m	12 m	13 m	14 m	15 m	Water Column Mean - All
CL07	08:35	Temp (°C)	15.0	14.9	14.9	14.9	14.9	14.9	14.8	14.8	14.9	14.8	14.8	14.6	14.5	14.3	13.9	13.9	14.7
		Sp. Cond (µS/cm)	452	369	473	475	485	483	503	513	575	588	597	602	608	612	632	635	538
		pH	7.90	7.88	7.87	7.86	7.84	7.81	7.80	7.81	7.80	7.78	7.75	7.69	7.63	7.58	7.56	7.50	7.75
		DO (mg/L)	4.8	4.6	4.5	4.5	4.3	4.0	4.0	4.0	3.4	3.1	2.4	1.4	0.5	0.0	0.0	0.0	2.8
CL07	13:35	Temp (°C)	16.4	15.5	15.1	15.0	14.9	14.9	14.8	14.8	14.9	14.9	14.9	14.7	14.7	14.6	14.5	14.5	14.9
		Sp. Cond (µS/cm)	463	463	469	464	477	476	500	518	553	580	597	587	615	624	702	735	551
		pH	7.90	7.80	7.77	7.75	7.77	7.77	7.76	7.76	7.75	7.73	7.71	7.61	7.65	7.61	7.60	7.42	7.71
		DO (mg/L)	5.4	5.1	4.7	4.7	4.6	4.5	4.3	4.1	3.9	3.9	2.8	2.1	2.3	0.0	0.0	0.0	3.3
CL08	09:10	Temp (°C)	15.5	15.3	15.3	15.1	15.0	14.7	14.6	14.7	14.7	14.7	14.6	14.5	--	--	--	--	14.9
		Sp. Cond (µS/cm)	444	445	447	445	452	430	488	551	595	609	610.2	618.5	--	--	--	--	511
		pH	7.66	7.58	7.39	7.49	7.77	7.72	7.71	7.76	7.74	7.71	7.68	7.65	--	--	--	--	7.66
		DO (mg/L)	5.2	5.1	5.0	4.7	4.5	3.8	3.4	3.6	3.1	2.8	2.6	2.2	--	--	--	--	3.8
CL08	14:02	Temp (°C)	16.2	15.9	15.5	15.2	15.0	14.8	14.7	14.7	14.8	14.7	14.6	14.7	--	--	--	--	15.1
		Sp. Cond (µS/cm)	435	440	445	444	435	423	523	566	606	613	613	604	--	--	--	--	512
		pH	6.94	7.11	7.46	7.68	7.68	7.68	7.66	7.67	7.66	7.50	7.42	7.48	--	--	--	--	7.50
		DO (mg/L)	6.7	6.5	6.1	5.4	5.2	5.0	4.3	4.1	3.1	0.4	0.1	0.0	--	--	--	--	3.9
CL09	09:55	Temp (°C)	15.6	15.2	14.9	14.1	13.8	13.1	12.9	12.7	12.7	--	--	--	--	--	--	--	13.9
		Sp. Cond (µS/cm)	625	640	631	640	629	565	559.3	566	903	--	--	--	--	--	--	--	640
		pH	8.48	8.29	8.14	7.79	7.73	7.68	7.62	7.59	7.38	--	--	--	--	--	--	--	7.86
		DO (mg/L)	8.1	7.3	6.4	4.3	4.2	4.0	3.7	3.5	0.0	--	--	--	--	--	--	--	4.6
CL09 ^a	14:25	Temp (°C)	16.5	16.3	15.3	14.1	13.9	13.0	12.7	12.9	12.8	--	--	--	--	--	--	--	14.2
		Sp. Cond (µS/cm)	620	709	675	671	620	558	568	897	835	--	--	--	--	--	--	--	684
		pH	8.93	8.87	8.42	7.90	7.76	7.64	7.56	7.80	7.43	--	--	--	--	--	--	--	8.03
		DO (mg/L)	12.2	11.6	8.3	5.4	4.9	4.7	4.2	0.5	0.1	--	--	--	--	--	--	--	5.8
CL10	10:35	Temp (°C)	15.8	15.3	14.8	13.4	--	--	--	--	--	--	--	--	--	--	--	--	14.8
		Sp. Cond (µS/cm)	611	605	604	582.1	--	--	--	--	--	--	--	--	--	--	--	--	601
		pH	8.18	7.92	7.88	7.75	--	--	--	--	--	--	--	--	--	--	--	--	7.93
		DO (mg/L)	6.6	6.1	5.6	4.4	--	--	--	--	--	--	--	--	--	--	--	--	5.7
CL10	14:42	Temp (°C)	16.2	16.1	15.5	14.5	13.5	--	--	--	--	--	--	--	--	--	--	--	15.2
		Sp. Cond (µS/cm)	609	608	605	661	637	--	--	--	--	--	--	--	--	--	--	--	624
		pH	8.28	8.14	7.90	7.79	7.69	--	--	--	--	--	--	--	--	--	--	--	7.96
		DO (mg/L)	9.4	9.0	7.1	5.8	2.5	--	--	--	--	--	--	--	--	--	--	--	6.8

Note: No stratification observed during this event, therefore epilimnion and hypolimnion mean values are not reported.
 a- Bottom measurement taken at 7.5

Table 7. Canyon Lake Water Chemistry – February 18, 2020

Method	Compound	Units	RL	Basin Plan or TMDL Target	Depth Integrated or Surface	CL07	CL08	CL09	CL10
SM 2540C	Total Dissolved Solids	mg/L	10	700	Depth Integrated	390	390	510	510
SM 2540D	Total Suspended Solids	mg/L	2	NA	Depth Integrated	6	8	5	10
SM 4500S2 D	Sulfide	mg/L	0.1	NA	Depth Integrated	ND	ND	1.3	ND
EPA 300.0	Nitrate as N	mg/L	0.2	10	Depth Integrated	ND	ND	ND	ND
EPA 300.0	Nitrite as N	mg/L	0.1	NA	Depth Integrated	ND	ND	ND	ND
EPA 351.2	Total Kjeldahl Nitrogen	mg/L	0.1	NA	Depth Integrated	0.93	1.1	0.86	1.4
Calculation	Total Nitrogen ^a	mg/L	--	0.75 ^{b1}	Depth Integrated	0.93	1.1	0.86	1.4
SM4500NH3H	Ammonia-Nitrogen	mg/L	0.1	CMC: 1.85-6.89 ^{c1} CCC: 0.661-2.03 ^{c1}	Depth Integrated	0.25	0.14	0.86	0.067 J
SM 4500P E	Ortho Phosphate Phosphorus	mg/L	0.05	NA	Depth Integrated	ND	ND	0.19	ND
EPA 365.1	Total Phosphorus	mg/L	0.01	0.1 ^{b1}	Depth Integrated	0.064	0.056	0.203	0.076
EPA 200.7	Total Aluminum	µg/L	100	NA	Depth Integrated	68 J	71 J	ND	71 J
EPA 200.7	Dissolved Aluminum	µg/L	200	NA	Depth Integrated	ND	ND	ND	ND
EPA 10200 H	Chlorophyll-a	µg/L	1.0	25 ^{b1} , 40 ^{b2}	Surface (0-2m)	40.6	30.7	9.58	16.7
					Depth Integrated	17.5	25.3	13.2	17.1

Notes:

^a - Total Nitrogen = TKN+NO₂+NO₃

^b - Annual average

^c - Values are site specific; dependent upon pH and temperature

¹ – 2020 TMDL Target, based on Table 5-9n of 2004 TMDL

² – 2015 TMDL Target, based on Table 5-9n of 2004 TMDL

NA – Not applicable/available

ND – Not detected

J – value between MDL and RL

Table 8. Canyon Lake Water Chemistry –April 13, 2020

Method	Compound	Units	RL	Basin Plan or TMDL Target	Depth Integrated or Surface Sample	CL07	CL08	CL09	CL10
SM 2540C	Total Dissolved Solids	mg/L	10	700	Depth Integrated	330	310	380	360
SM 2540D	Total Suspended Solids	mg/L	2	NA	Depth Integrated	4	6	16	13
SM 4500S2 D	Sulfide	mg/L	0.1	NA	Depth Integrated	ND	ND	0.50	ND
EPA 300.0	Nitrate as N	mg/L	0.2	10	Depth Integrated	ND	ND	0.19	0.27
EPA 300.0	Nitrite as N	mg/L	0.1	NA	Depth Integrated	ND	ND	ND	ND
EPA 351.2	Total Kjeldahl Nitrogen	mg/L	0.1	NA	Depth Integrated	1.1	0.93	1.6	1.3
Calculation	Total Nitrogen ^a	mg/L	--	0.75 ^{b1}	Depth Integrated	1.1	0.93	1.79	1.57
SM4500NH3H	Ammonia-Nitrogen	mg/L	0.1	CMC: 9.59-15.4 ^{c1} CCC: 2.64-3.65 ^{c1}	Depth Integrated	0.35	0.24	0.40	0.073
SM 4500P E	Ortho Phosphate Phosphorus	mg/L	0.05	NA	Depth Integrated	0.21	0.17	0.43	0.44
EPA 365.1	Total Phosphorus	mg/L	0.01	0.1 ^{b1}	Depth Integrated	0.211	0.223	0.448	0.432
EPA 200.7	Total Aluminum	µg/L	200	NA	Depth Integrated	210	720	960	1000
EPA 200.7	Dissolved Aluminum	µg/L	100	NA	Depth Integrated	ND	ND	ND	ND
EPA 10200 H	Chlorophyll-a	µg/L	1.0	25 ^{b1} , 40 ^{b2}	Surface (0-2m)	6.65	5.53	28.5	17.6
					Depth Integrated	4.64	4.33	9.00	8.85

Notes:

^a - Total Nitrogen = TKN+NO₂+NO₃

^b - Annual average

^c - Values are site specific dependent upon pH and temperature

NA – Not applicable/available

ND – Not detected

¹ – 2020 TMDL Target, based on Table 5-9n of 2004 TMDL

² – 2015 TMDL Target, based on Table 5-9n of 2004 TMDL

J – concentration between MDL and RL

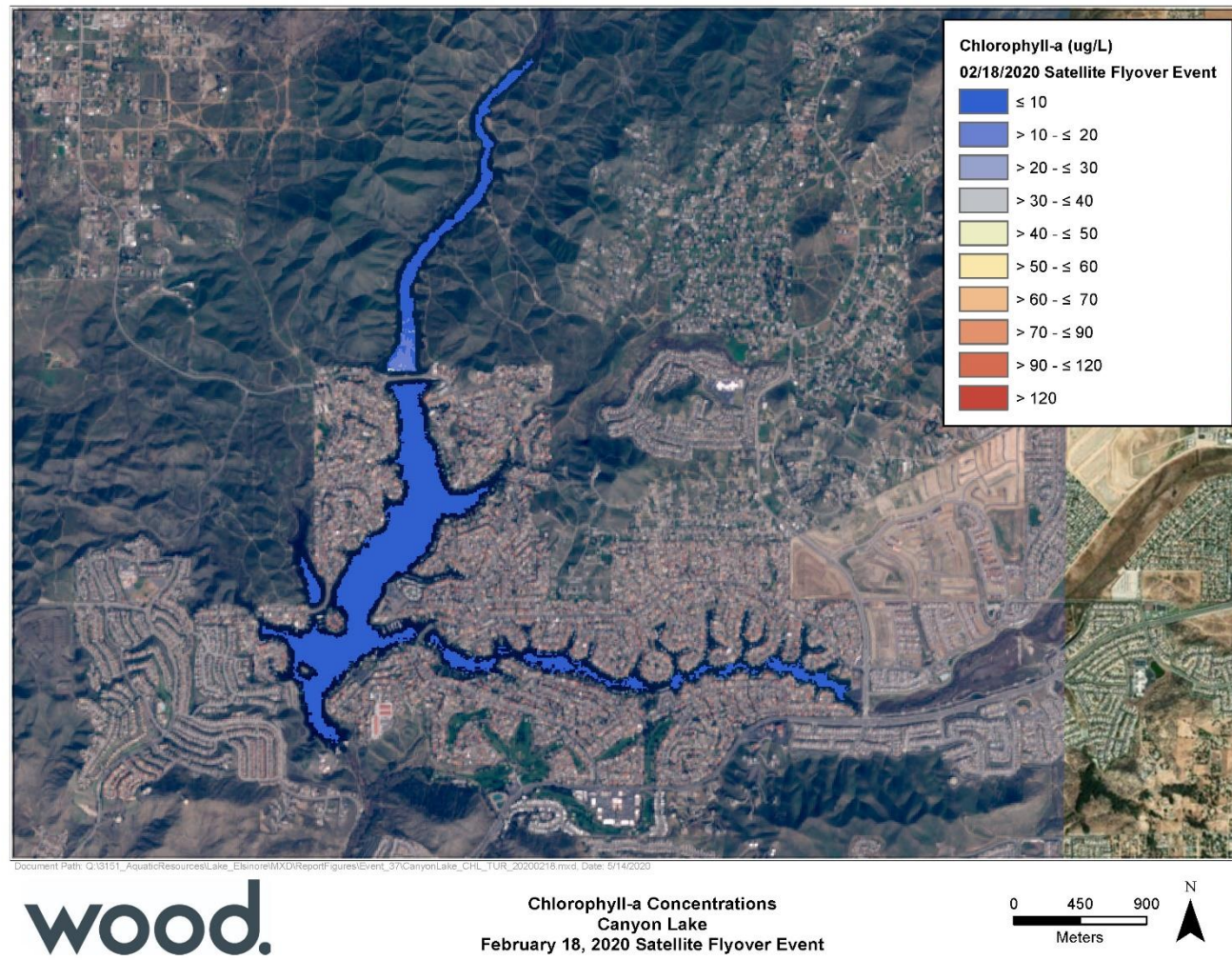
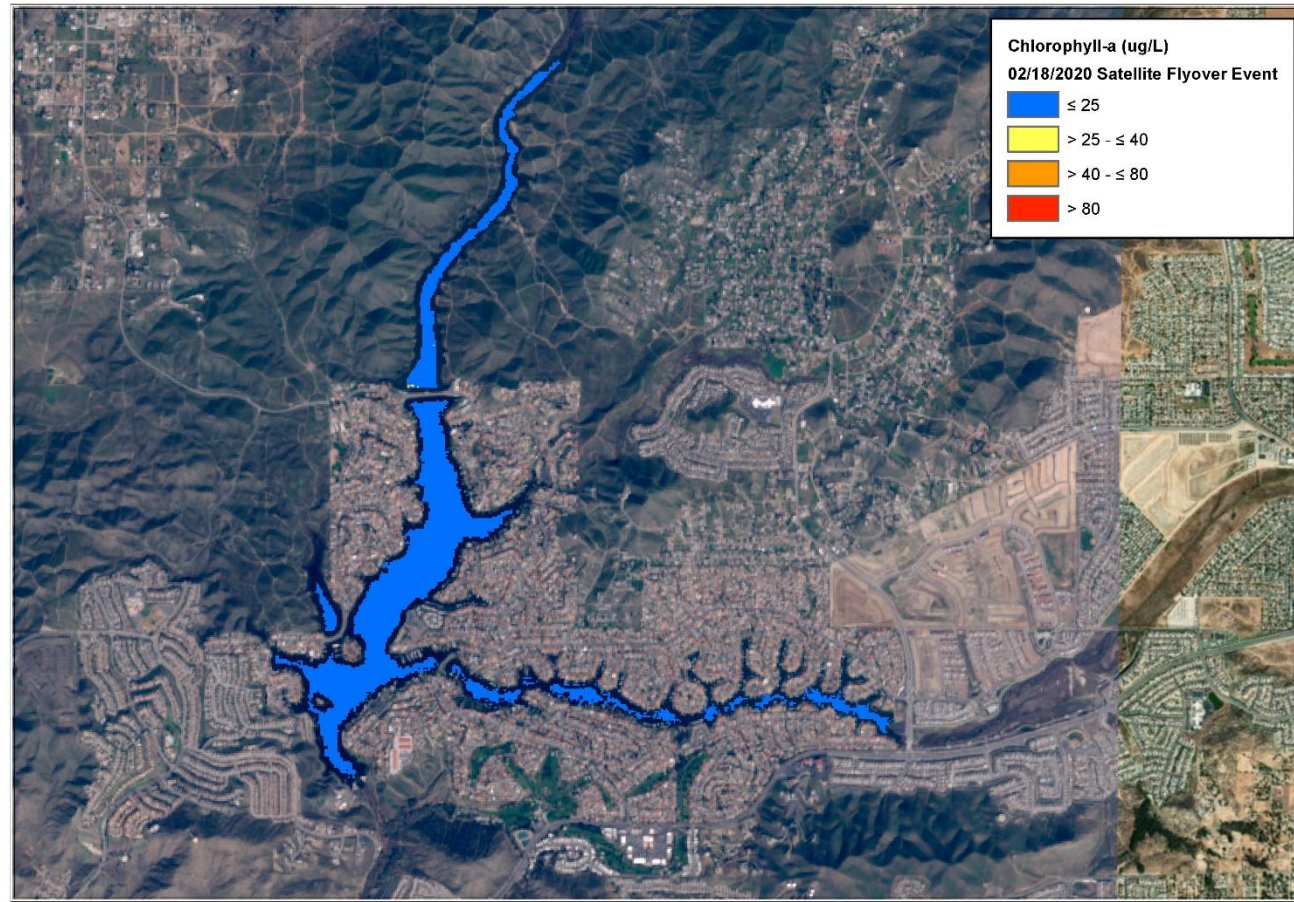


Figure 13. Satellite Imagery of Canyon Lake Chlorophyll-a Concentrations February 18, 2020



Document Path: Q:\3101_AquaticResources\Lake_Elsinore\MXDR\Report\Figures\Event_37\CanyonLake_CHL_TUR_20200218.mxd, Date: 5/14/2020



Chlorophyll-a Concentrations
Canyon Lake
February 18, 2020 Satellite Flyover Event

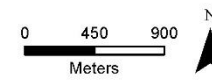
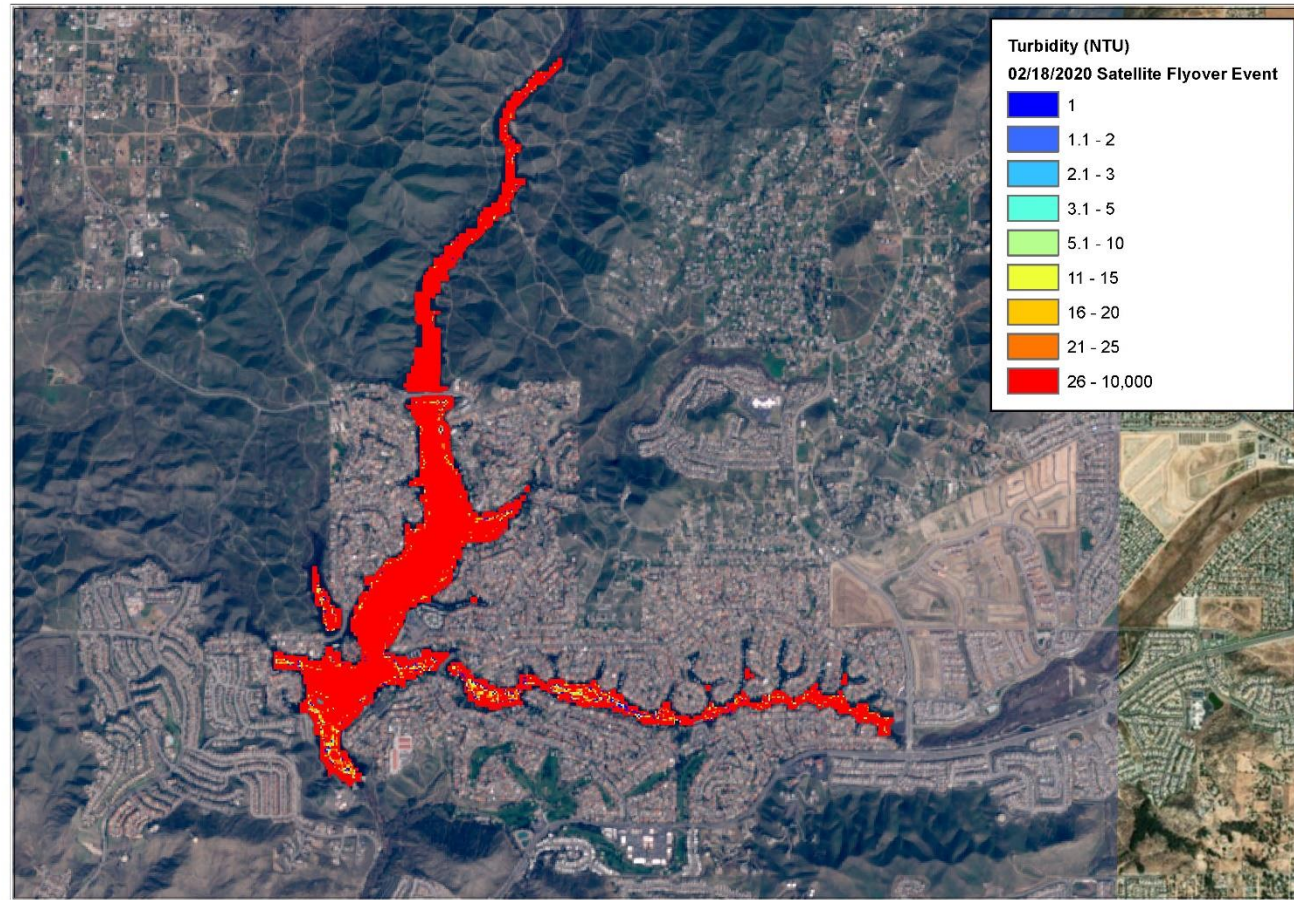


Figure 14. Satellite Imagery of Canyon Lake Chlorophyll-a Concentrations based on TMDL Targets February 18, 2020



Document Path: Q:\3101_AquaticResources\Lake_Elsinore\MXD\Report\Figures\Event_37\CanyonLake_CHL_TUR_20200218.mxd, Date: 5/14/2020

wood.

Turbidity
Canyon Lake
February 18, 2020 Satellite Flyover Event

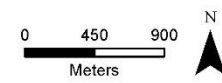
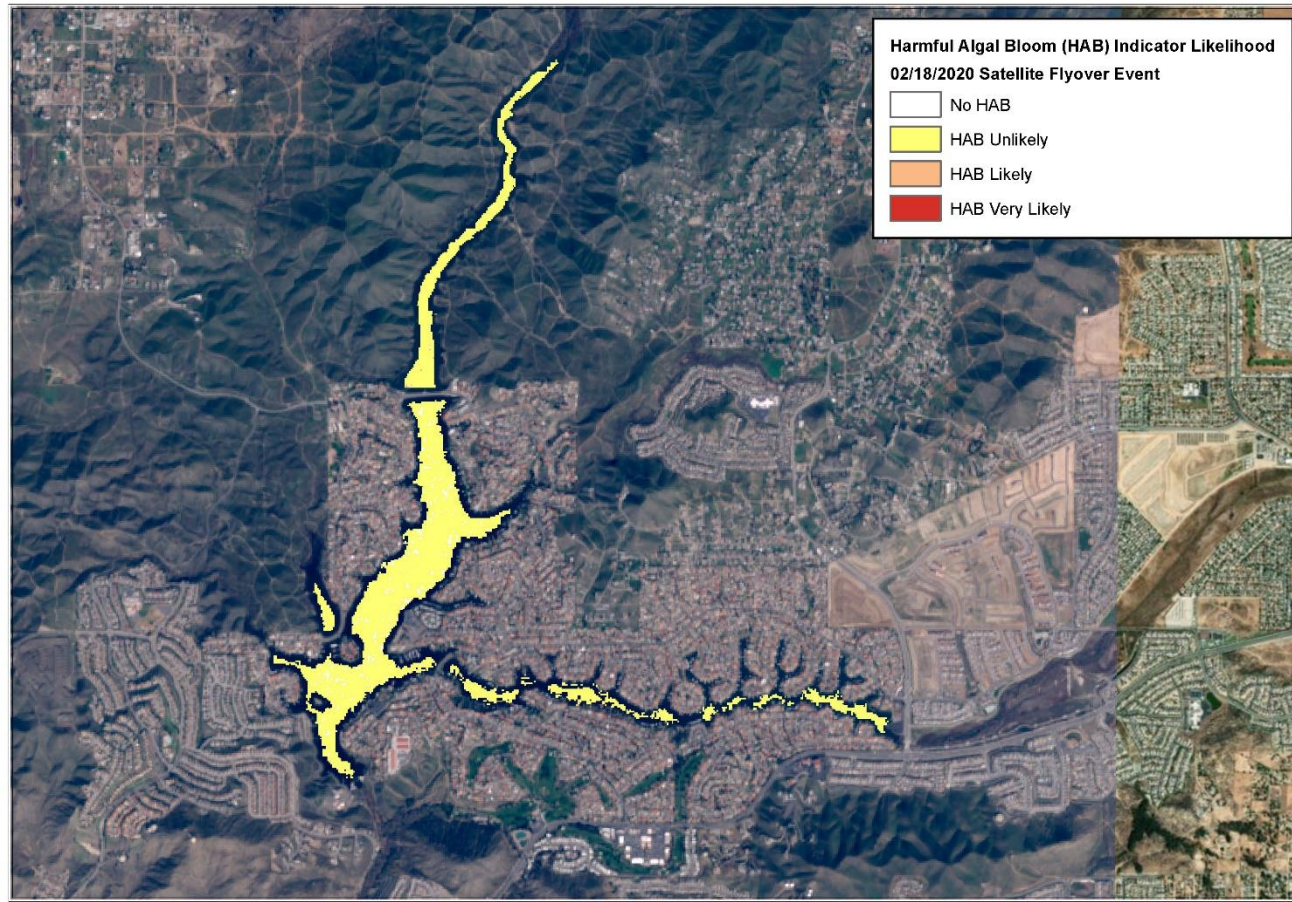


Figure 15. Satellite Imagery of Canyon Lake Turbidity Measurements February 18, 2020



Harmful Algal Bloom (HAB) Indicator Likelihood
Canyon Lake
February 18, 2020 Satellite Flyover Event

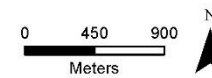


Figure 16. Satellite Imagery of Canyon Lake HAB Indicator Likelihood February 18, 2020



Document Path: Q:\3101_AquaticResources\Lake_Elsinore\MXD\Report\Figures\Event_37\CanyonLake_CHL_TUR_20200218.mxd, Date: 5/14/2020

wood.

Satellite Imagery
Canyon Lake
February 18, 2020 Satellite Flyover Event

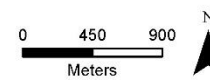


Figure 17. Canyon Lake Unprocessed Raw Satellite Image from February 18, 2020

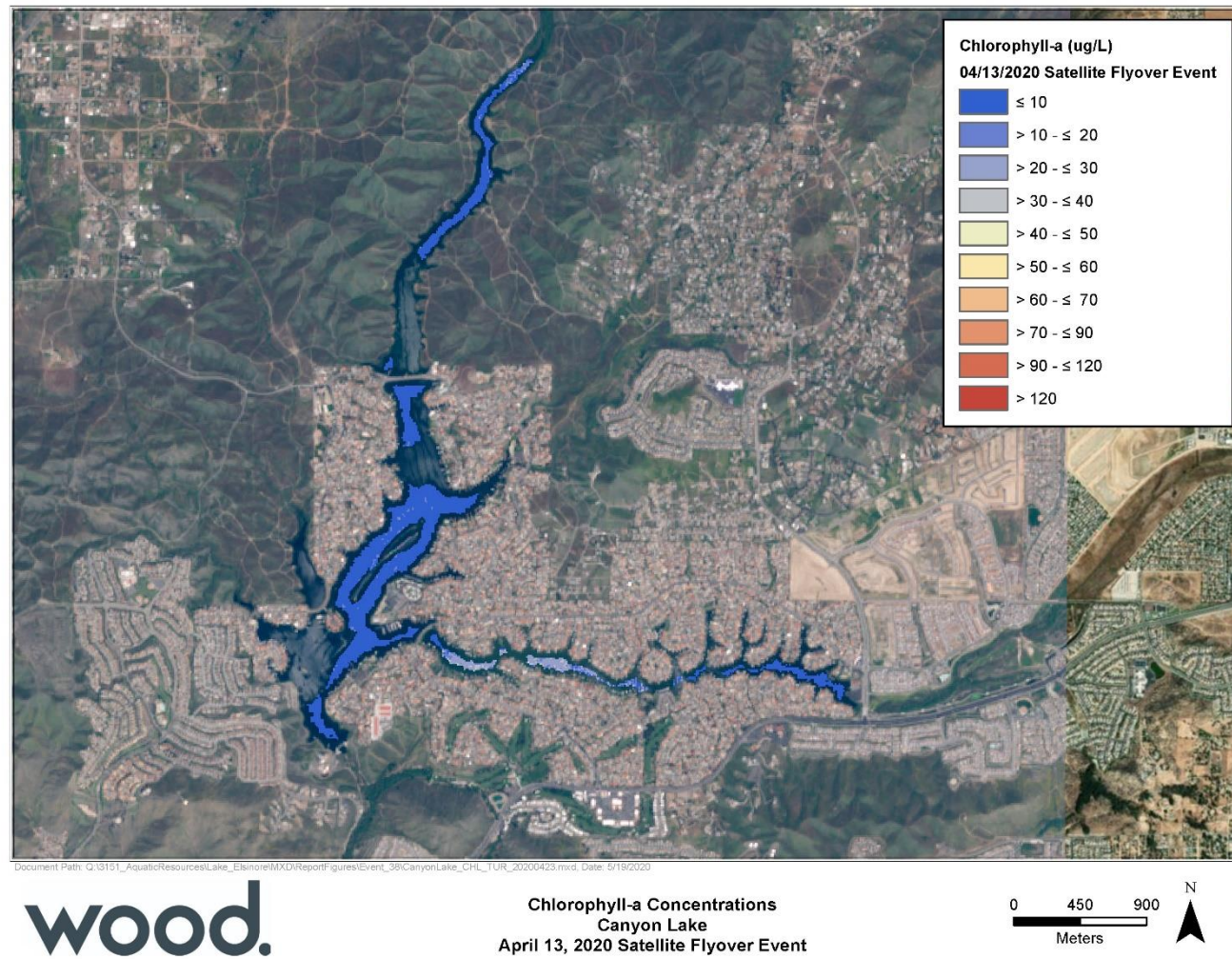


Figure 18. Satellite Imagery of Canyon Lake Chlorophyll-a Concentrations April 13, 2020

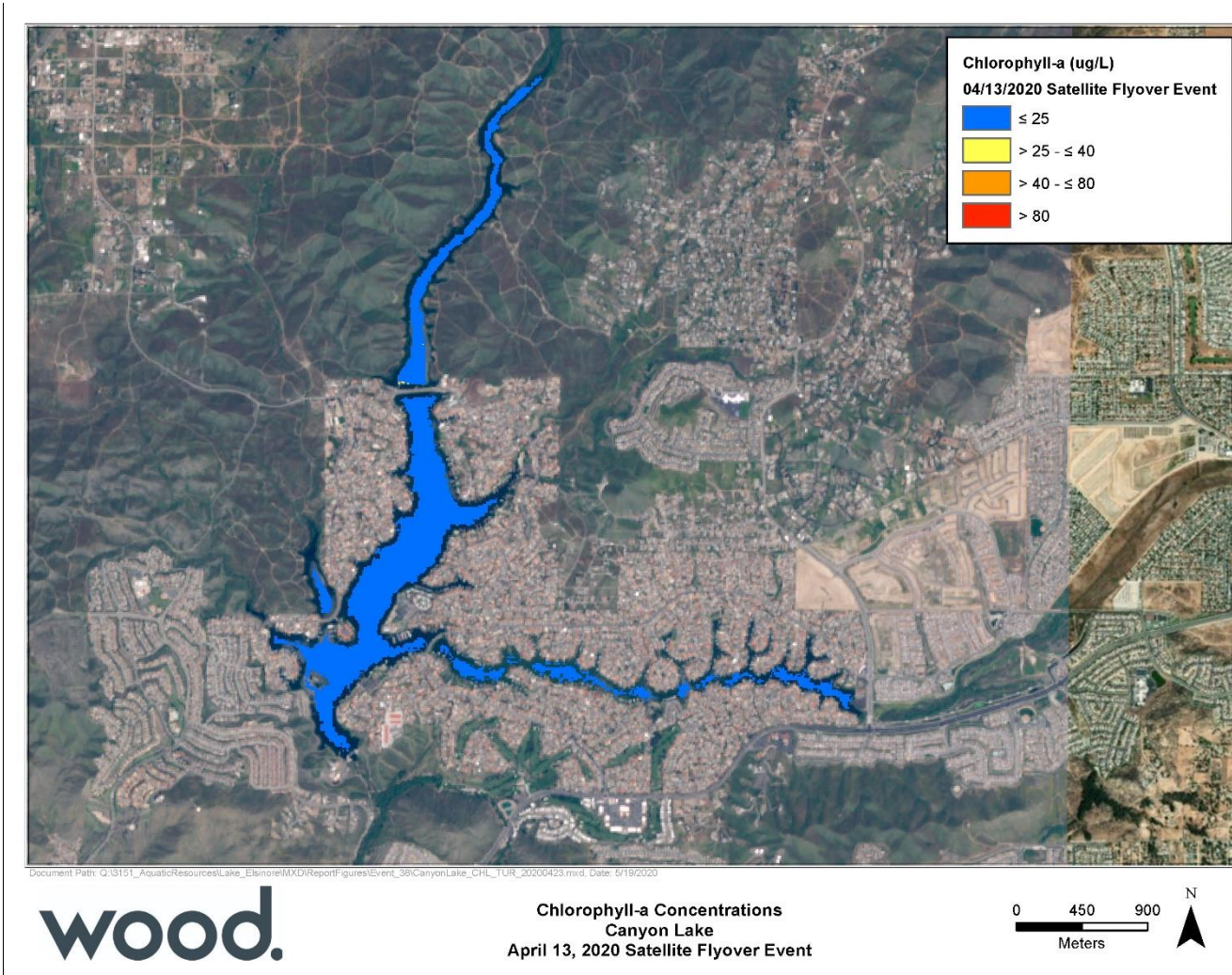
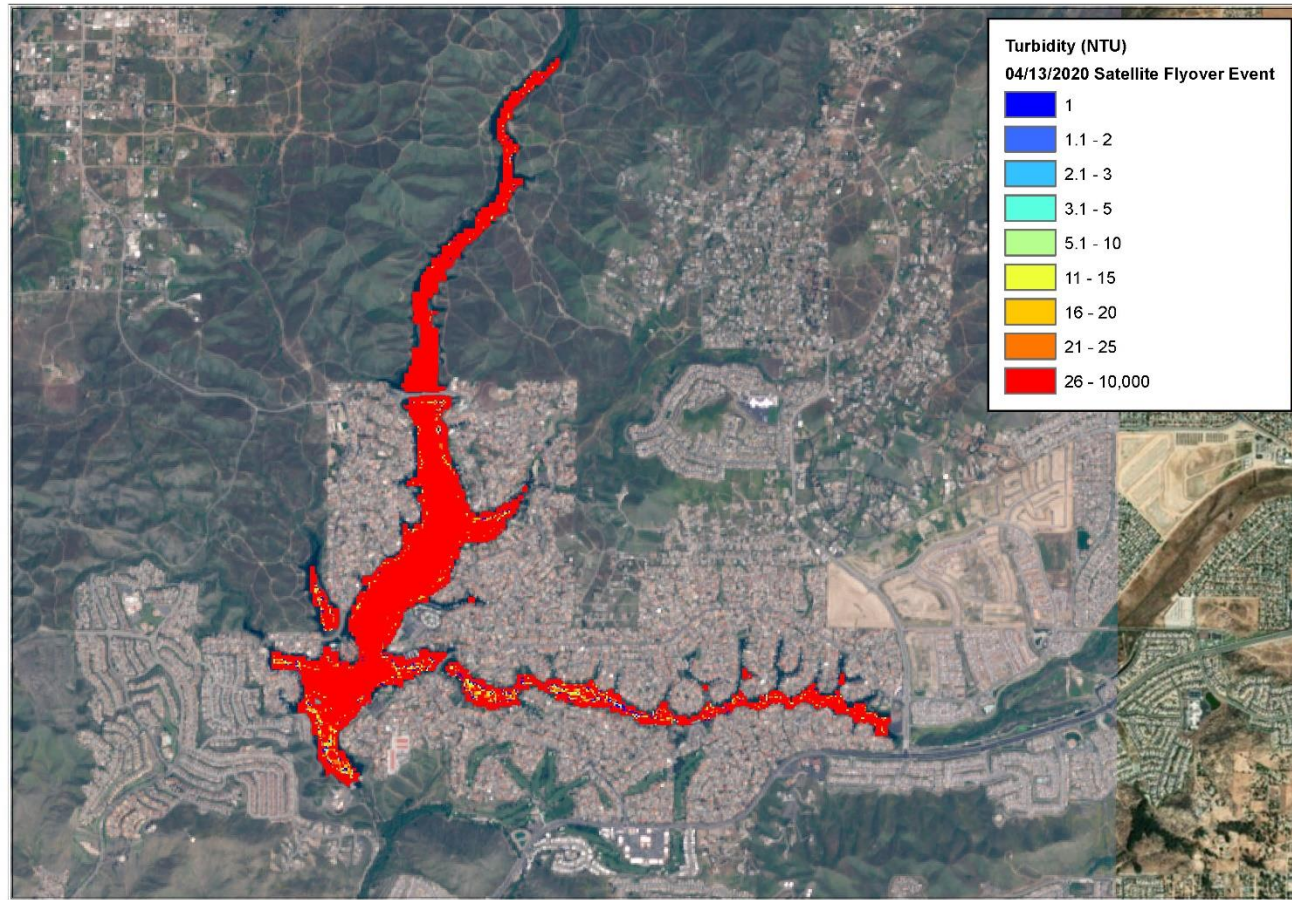


Figure 19. Satellite Imagery of Canyon Lake Chlorophyll-a Concentrations based on TMDL Targets April 13, 2020



Document Path: Q:\3151_AquaticResources\Lake_Elsinore\MXDR\Report\Figures\Event_36\CanyonLake_CHL_TUR_20200423.mxd, Date: 5/19/2020



Turbidity
Canyon Lake
April 13, 2020 Satellite Flyover Event

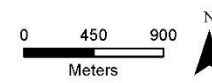
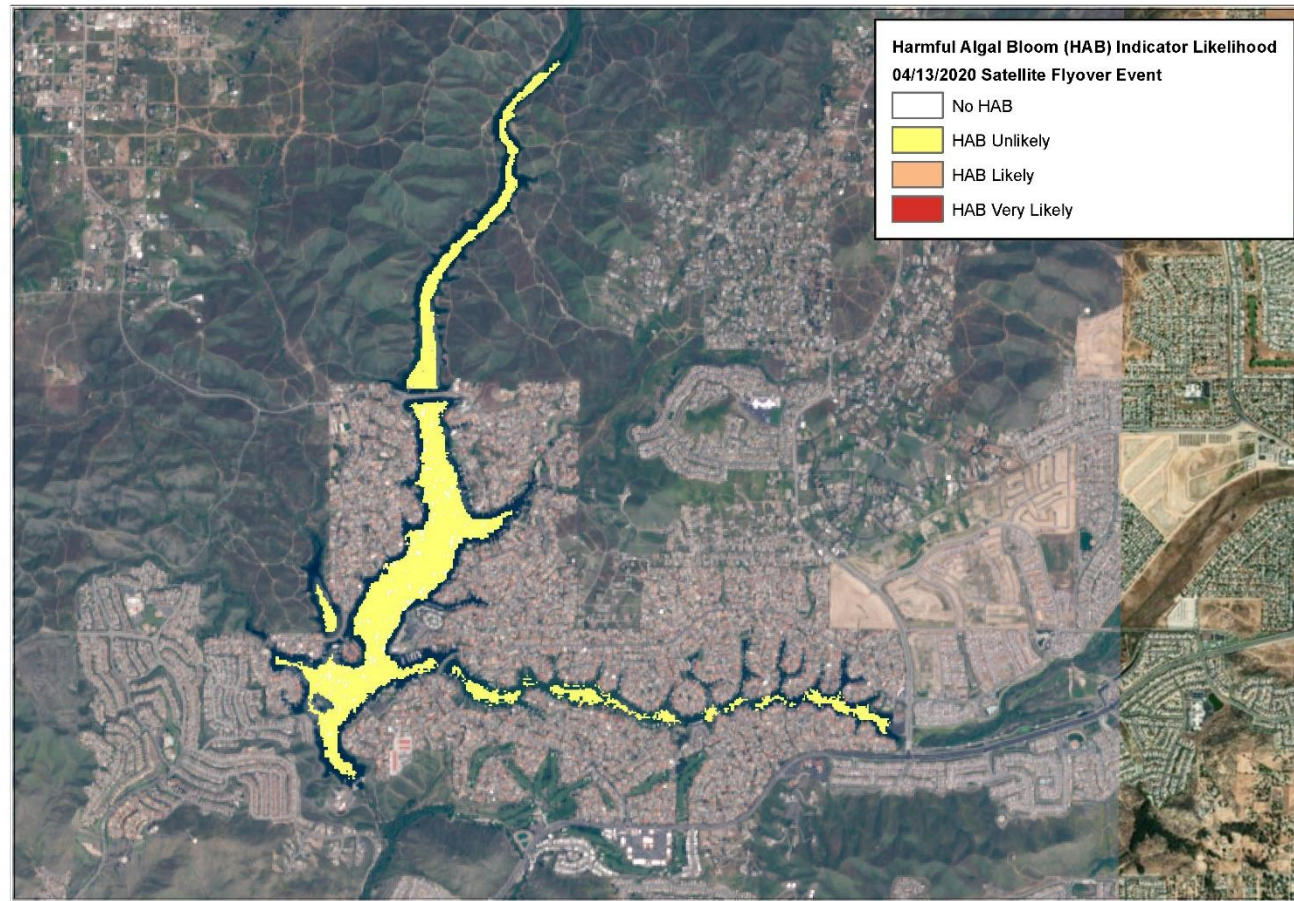


Figure 20. Satellite Imagery of Canyon Lake Turbidity Measurements April 13, 2020



Harmful Algal Bloom (HAB) Indicator Likelihood
Canyon Lake
April 13, 2020 Satellite Flyover Event

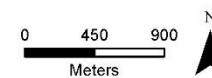


Figure 21. Satellite Imagery of Canyon Lake HAB Indicator Likelihood April 13, 2020



Document Path: G:\3151_AquaticResources\Lake_Elsinore\IXD\Report\figures\event_38\CanyonLake_CHL_TUR_20200423.mxd, Date: 5/19/2020



Satellite Imagery
Canyon Lake
April 13, 2020 Satellite Flyover Event

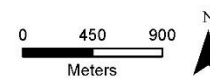


Figure 22. Canyon Lake Unprocessed Raw Satellite Image from April 13, 2020

Appendix A
Field Datasheets

February 18, 2020
Field Datasheets

FIELD DATASHEET

Date: 02/18/20 Location (Circle): Lake Elsinore Canyon Lake Station: LE01

Time on Station: 11:25 Time off Station: _____

Weather Conditions: Partly Cloudy + calm Wind (mph & direction): None

Lat: On Target Long: On Target

Water Depth (m): 5.6 Secchi Depth (m): .25

Water Chemistry Sample?: Y N
 Chl-a Sample?: Y N Plankton Sample?: Y N
 SAMPLE TIME: _____ Surface volume filtered (ml): _____
 Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Phytoplankton Sample Collected @
Zoo Plankton Sample Collected @

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	14.6	3574	9.16	16.24	12				
1	13.5	3577	9.17	15.09	13				
2	12.6	3576	8.99	11.43	14				
3	12.1	3575	8.94	9.99	15				
4	11.9	3578	8.91	9.57	16				
5	11.87	3577	8.86	7.01	17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 02/18/20 Location (Circle): Lake Elsinore/Canyon Lake Station: LE02

Time on Station: 08:30 Time off Station: 11:00

Weather Conditions: Partly Cloudy/calm Wind (mph & direction): None

Lat: on Target Long: on Target

Water Depth (m): 6.9 Secchi Depth (m): .25

Water Chemistry Sample?: Y / N Plankton Sample?: Y / N

SAMPLE TIME: 08:45 Surface volume filtered (ml): 250ml

Depth-Integrated volume filtered (ml): 300ml

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	13.4	3569	9.14	15.95	12				
1	13.3	3569	9.12	14.90	13				
2	13.3	3570	9.11	14.61	14				
3	12.2	3581	8.93	9.78	15				
4	11.6	3588	8.85	7.72	16				
5	11.5	3581	8.81	6.85	17				
6	11.4	3583	8.81	6.71	18				
6.6 →	11.4	3582	8.81	6.62	19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 2/18/2020 Location (Circle) Lake Elsinore Canyon Lake Station: 1503

Time on Station: 07:55 Time off Station: 08:25

Weather Conditions: Sunny, Calm Wind (mph & direction): None

Lat: On Target Long: On Target

Water Depth (m): 4.9m Secchi Depth (m): 0.25

Water Chemistry Sample?: Y/ N Chl-a Sample?: Y/ N Plankton Sample?: Y/ N

SAMPLE TIME: / Surface volume filtered (ml): /

Depth-Integrated volume filtered (ml): /

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Phytoplankton collected @ ~~11:10~~ 11:10 - Returned to site to Resample
Zooplankton collected @ 08:20

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	13.6	3564	9.15	15.27	12				
1	13.6	3567	9.15	15.93	13				
2	12.8	3574	8.98	16.44	14				
3	12.2	3580	8.92	9.72	15				
4	11.9	3584	8.89	8.91	16				
4.5	11.7	3583	8.81	6.75	17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

Because 1st sample was full Depth Integrated

FIELD DATASHEET

Date: 02/18/20 Location (Circle) Lake Elsinore / Canyon Lake Station: LE01

Time on Station: 16:15 Time off Station: 16:30

Weather Conditions: Sunny, Light Wind Wind (mph & direction): 5 MPH, West

Lat: On Target Long: On Target

Water Depth (m): 5.7m Secchi Depth (m): .25

Water Chemistry Sample?: Y / N Chl-a Sample?: Y / N Plankton Sample?: Y / N
SAMPLE TIME: _____ Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	14.9	3569	9.28	20.18	12				
1	14.8	3569	9.28	19.88	13				
2	14.0	3580	9.18	17.02	14				
3	13.0	3580	9.05	12.92	15				
4	12.4	3575	9.02	11.86	16				
5	12.1	3574	8.95	10.10	17				
5.5	12.1	3574	8.92	9.39	18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 02/18/20 Location (Circle): Lake Elsinore/Canyon Lake Station: LEOZ

Time on Station: 15:40 Time off Station: 15:50

Weather Conditions: Sunny, Light Wind Wind (mph & direction): 5MPH, West

Lat: On Target Long: On Target

Water Depth (m): 6.8 Secchi Depth (m): .25

Water Chemistry Sample?: Y N
Chl-a Sample?: Y N
Plankton Sample?: Y N

SAMPLE TIME: _____ Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	14.9	3560	9.24	18.05	12				
1	14.2	3553	9.20	16.66	13				
2	13.6	3588	8.98	11.22	14				
3	11.9	3579	8.91	9.29	15				
4	11.7	3579	8.85	7.56	16				
5	11.6	3579	8.83	7.10	17				
6	11.4	3581	8.78	5.78	18				
6.5	11.4	3581	8.78	5.78	19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 2/18/20 Location (Circle): Lake Elsinore / Canyon Lake Station: LE03

Time on Station: 0.14:50 Time off Station: 13:10

Weather Conditions: Sunny, Light wind Wind (mph & direction): 5 mph W

Lat: On Target Long: On Target

Water Depth (m): 4.9 Secchi Depth (m): 25

Water Chemistry Sample?: Y / N Chl-a Sample?: Y / N Plankton Sample?: Y / N

SAMPLE TIME: Surface volume filtered (ml):

Depth-Integrated volume filtered (ml):

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

$O_m = 16.8$ 3568 9.27 21.93

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	14.8	3548	9.21	20.42	12				
1	13.9	3568	9.20	16.94	13				
2	13.3	3574	8.95	12.02	14				
3	12.2	3580	8.82	7.33	15				
4	11.7	3581	8.78	6.69	16				
4.5	11.7	3577	8.78	6.58	17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 02/18/20 Location (Circle) Lake Elsinore Canyon Lake Station: Grand Ave

Time on Station: 15:15 Time off Station: 15:35

Weather Conditions: Sunny, light wind Wind (mph & direction): SWPH, West

Lat: On Target Long: On Target

Water Depth (m): 6.4 Secchi Depth (m): .25

Water Chemistry Sample?: Y/N Chl-a Sample?: Y/N Plankton Sample?: Y/N
 SAMPLE TIME: _____ Surface volume filtered (ml): _____
 Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Sonde serial # : 20190780
 DO cap changed: 12/20/19 DO cap exp: 4/26/20, initialized, 09/26/19

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	15.9	3559	9.24	18.22	12				
1	13.7	3566	9.12	15.78	13				
2	12.5	3574	8.98	11.82	14				
3	12.0	3577	8.92	9.84	15				
4	11.6	3580	8.83	7.26	16				
5	11.6	3579	8.79	6.35	17				
6	11.6	3579	8.81	6.63	18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 02/18/20 Location (Circle): Lake Elsinore/Canyon Lake

Station: Lake Shore
~~Lakeview~~

Time on Station: 15:55 Time off Station: 16:10

Weather Conditions: Sunny, Light Wind Wind (mph & direction): 5 MPH, West

Lat: On Target Long: On Target

Water Depth (m): 7.7 Secchi Depth (m): 0.25

Water Chemistry Sample?: Y/ N Chl-a Sample?: Y/ N Plankton Sample?: Y/ N

SAMPLE TIME: _____
Surface volume filtered (ml): _____
Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Serial#: 20190778 Date Initialized: 12/19/19 Date Exp: 07/19/19
DO Manufacturer: 10/25/19 | Sonde Set to 1 min, say

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	14.87	3561	9.26	18.50	12				
1	14.5	3569	9.23	18.00	13				
2	13.93	3569	9.13	12.81	14				
3	12.4	3576	8.95	10.20	15				
4	11.8	3579	8.85	7.80	16				
5	11.5	3581	8.80	6.08	17				
6	11.4	3581	8.79	6.02	18				
7	11.3	3580	8.79	5.81	19				
7.5	11.3	3580	8.78	5.76	20				
9					21				
10					22				
11					23				

its full, changed to every hour

FIELD DATASHEET

Date: 2/18/20 Location (Circle): Lake Elsinore/Canyon Lake Station: C107

Time on Station: 1007 Time off Station: 1045

Weather Conditions: Sunny & partly cloudy. Wind (mph & direction): 0 mph.

Lat: on target Long: on target

Water Depth (m): 17.2 ^{15.2} Secchi Depth (m): 0.6

Water Chemistry Sample?: Y N
SAMPLE TIME: 1025

Chl-a Sample?: Y N Plankton Sample?: Y N
Surface volume filtered (ml): 450 mL
Depth-Integrated volume filtered (ml): 500 mL

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	13.9	700	9.44	17.6	12	11.4	722	7.68	3.9
1	13.6	703	9.37	16.7	13	11.4	722	7.68	3.9
2	12.6	544	8.84	12.0	14	11.4	722	7.67	3.9
3	12.5	714	8.80	12.2	15	11.4	722	7.67	3.9
4	11.9	720	8.09	7.2	16				
5	11.6	722	8.02	6.3	17				
6	11.6	721	7.91	7.5.8	18				
7	11.5	721	7.85	4.8	19				
8	11.5	720	7.75	4.1	20				
9	11.4	721	7.70	4.1	21				
10	11.4	722	7.69	4.0	22				
11	11.4	724	7.68	4.0	23				

FIELD DATASHEET

Date: 2/18/2020 Location (Circle): Lake Elsinore/Canyon Lake Station: CLO8

Time on Station: 0930 Time off Station: 1000

Weather Conditions: partly cloudy Wind (mph & direction): 0 mph

Lat: ON target Long: ON target

Water Depth (m): 9.3 Secchi Depth (m): 0.6

Water Chemistry Sample? Y N Chl-a Sample? Y N Plankton Sample? Y N
SAMPLE TIME: 0945 Surface volume filtered (ml): 500ml

Depth-Integrated volume filtered (ml): 385ml

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	14.2	697	9.44	17.9	12				
1	13.8	699	9.40	17.4	13				
2	13.4	706	9.21	17.0	14				
3	12.6	723	8.52	10.0	15				
4	11.8	720	8.02	6.0	16				
5	11.8	719	7.84	5.2	17				
6	11.7	719	7.80	5.4	18				
7	11.7	720	7.79	5.3	19				
8	11.6	720	7.76	4.8	20				
9	11.6	725	7.69	3.4	21				
10					22				
11					23				

FIELD DATASHEET

Date: 2/18/2020 Location (Circle): Lake Elsinore/Canyon Lake Station: C109

Time on Station: 0841 Time off Station: 0910

Weather Conditions: Sunny & partly cloudy Wind (mph & direction): 0 mph

Lat: on target Long: on target

Water Depth (m): 7.9 Secchi Depth (m): 0.7

Water Chemistry Sample?: Y / N Chl-a Sample?: Y / N Plankton Sample?: Y / N
SAMPLE TIME: 0855 Surface volume filtered (ml): 500 mL

Depth-Integrated volume filtered (ml): 500 mL

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	14.1	803	9.19	14.7	12				
1	14.0	805	9.19	14.6	13				
2	13.4	835	8.96	13.4	14				
3	12.5	877	8.32	7.8	15				
4	12.4	912	8.15	5.9	16				
5	12.1	907	7.83	2.9	17				
6	11.7	938	7.42	0.1	18				
7	11.3	1019	7.24	0.0	19				
8.5	11.2	1040	7.22	0.0	20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 2/18/2020 Location (Circle): Lake Elsinore/Canyon Lake Station: CL10

Time on Station: 0755 Time off Station: 0830

Weather Conditions: Sunny & partly cloudy. Wind (mph & direction): 0-2 mph W

Lat: on target Long: on target

Water Depth (m): 4.0 Secchi Depth (m): 0.7

Water Chemistry Sample? Y / N Chl-a Sample? Y / N Plankton Sample? Y / N
SAMPLE TIME: 0810 Surface volume filtered (ml): 435ml

Depth-Integrated volume filtered (ml): 385ml

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	13.9	841	9.22	14.3	12				
1	13.9	842	9.22	14.4	13				
2	13.9	858	9.14	13.8	14				
3	13.0	⁹⁸⁰ 755 cm	^{8.26} 8.44 cm	7.0	15				
4 3.5	12.9	982	8.14	5.5	16				
5					17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 2/19/20 Location (Circle): Lake Elsinore/Canyon Lake Station: CLO7

Time on Station: 1458 Time off Station: 1510

Weather Conditions: Sunny, Pt. Cloudy Wind (mph & direction): 25mph WSW

Lat: on target Long: on target

Water Depth (m): 15.2 Secchi Depth (m): 0.6

Water Chemistry Sample?: Y/ Chl-a Sample?: Y/ Plankton Sample?: Y/

SAMPLE TIME: N/A Surface volume filtered (ml): N/A

Depth-Integrated volume filtered (ml): N/A

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	17.2	703	9.51	19.2	12	11.5	723	7.67	3.9
1	14.6	700	9.50	18.8	13	11.5	723	7.67	3.9
2	13.6	705	9.30	15.6	14	11.5	724	7.67	3.8
3	12.4	717	8.48	8.6	15	11.5	723	7.67	3.8
4	11.9	722	8.07	6.6	16				
5	11.8	723	7.95	6.0	17				
6	11.6	722	7.88	5.5	18				
7	11.6	723	7.80	4.9	19				
8	11.6	722	7.75	4.3	20				
9	11.5	723	7.69	4.0	21				
10	11.5	723	7.68	3.9	22				
11	11.5	723	7.67	3.9	23				

FIELD DATASHEET

Date: 2/18/20 Location (Circle): Lake Elsinore/Canyon Lake Station: C108
 Time on Station: 1445 Time off Station: 1455
 Weather Conditions: ptly cloudy, warm Wind (mph & direction): 2.5 mph WSW
 Lat: on target Long: on target
 Water Depth (m): 9.3 Secchi Depth (m): 0.6
 Water Chemistry Sample?: Y/ N Chl-a Sample?: Y/ N Plankton Sample?: Y/ N
 SAMPLE TIME: N/A Surface volume filtered (ml): N/A
 Depth-Integrated volume filtered (ml): N/A

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	15.1	698	9.58	20.2	12				
1	14.1	694	9.58	20.7	13				
2	12.8	716	8.83	11.4	14				
3	12.4	721	8.39	8.9	15				
4	12.0	721	7.83	5.6	16				
5	11.8	720	7.78	5.13	17				
6	11.7	721	7.77	5.05	18				
7	11.7	722	7.81	5.46	19				
8	11.6	722	7.74	4.5	20				
9	11.6	725	7.69	3.6	21				
10					22				
11					23				

FIELD DATASHEET

Date: 2/18/20 Location (Circle): Lake Elsinore/Canyon Lake Station: CLO9

Time on Station: 1420 Time off Station: 1428

Weather Conditions: partly cloudy, warm Wind (mph & direction): 0-2mph WSW

Lat: on target Long: on target

Water Depth (m): 7.9 Secchi Depth (m): 0.7

Water Chemistry Sample?: Y/ N Chl-a Sample?: Y/ N Plankton Sample?: Y/ N

SAMPLE TIME: N/A Surface volume filtered (ml): N/A

Depth-Integrated volume filtered (ml): N/A

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	15.8	805	9.25	15.8	12				
1	14.6	806	9.25	15.6	13				
2	13.6	833	9.08	13.8	14				
3	12.7	859	8.46	9.00	15				
4	12.4	912	8.09	5.5	16				
5	12.1	913	7.82	3.4	17				
6	11.7	906	7.50	0.03	18				
7	11.5	1017	7.23	0.0	19				
7.5	11.3	1039	7.21	0.0	20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 2/18/20 Location (Circle): Lake Elsinore/Canyon Lake Station: CL10

Time on Station: 1400 Time off Station: 1410

Weather Conditions: ptly cloudy, warm Wind (mph & direction): 0-2 mph WSW

Lat: on target Long: on target

Water Depth (m): 4.0 Secchi Depth (m): 0.7

Water Chemistry Sample?: Y/N Chl-a Sample?: Y/N Plankton Sample?: Y/N

SAMPLE TIME: N/A Surface volume filtered (ml): N/A

Depth-Integrated volume filtered (ml): N/A

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	16.3	839	9.19	15.26	12				
1	14.9	849	9.23	15.55	13				
2	13.7	863	9.10	13.3	14				
3	13.1	922	8.71	10.15	15				
3.5	12.9	961	8.20	5.21	16				
5					17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 2/18/20 Location (Circle): Lake Elsinore/Canyon Lake Station: N. Ski Area

Time on Station: 1546 Time off Station: 1555

Weather Conditions: partly cloudy, warm Wind (mph & direction): 5-8 mph WSW

Lat: [dock] Long: [dock]

Water Depth (m): 23.4 ft. Secchi Depth (m): 0.65

Water Chemistry Sample?: Y/ N Chl-a Sample?: Y/ N Plankton Sample?: Y/ N

SAMPLE TIME: N/A Surface volume filtered (ml): N/A
Depth-Integrated volume filtered (ml): N/A

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments: breezy

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	15.1	365	9.52	17.1	12				
1	13.8	374	9.40	15.8	13				
2	12.8	392	9.19	13.3	14				
3	11.9	432	8.45	9.5	15				
4	11.5	423	7.83	7.5	16				
5	11.2	430	7.74	6.4	17				
6	11.2	436	7.67	5.6	18				
7	11.2	440	7.21	4.0	19				
8					20				
9					21				
10					22				
11					23				

April 13, 2020
Field Datasheets

FIELD DATASHEET

Date: 04/13/2020 Location (Circle): Lake Elsinore/Canyon Lake Station: LE01

Time on Station: 1020 Time off Station: 1030

Weather Conditions: mostly sunny Wind (mph & direction): 0-var

Lat: on station Long: on station

Water Depth (m): 7.0 Secchi Depth (m): 0.35

Water Chemistry Sample?: Y/ N Chl-a Sample?: Y/ N Plankton Sample?: Y/ N

SAMPLE TIME: _____ Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	16.3	2816	9.30	11.10	12				
1	15.6	2904	9.26	9.89	13				
2	15.3	2934	9.25	8.94	14				
3	15.3	2931	9.22	7.58	15				
4	15.3	2946	9.16	6.76	16				
5	15.2	2953	9.14	6.38	17				
6	15.2	3016	9.09	4.57	18				
76.5	15.2	3023	9.09	4.55	19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 4/13/2020 Location (Circle): Lake Elsinore/Canyon Lake Station: 1502

Time on Station: 0820 Time off Station: 1010

Weather Conditions: overcast, slight breeze Wind (mph & direction): 0-5 mph

Lat: on station Long: on station

Water Depth (m): 8.3 Secchi Depth (m): 0.4

Water Chemistry Sample?: /N
SAMPLE TIME: 0915

Chl-a Sample?: /N Plankton Sample?: Y/
Surface volume filtered (ml): 325
Depth-Integrated volume filtered (ml): 240

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments: MISSING plankton bottle, not able to collect

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	15.7	2794	9.26	9.50	12				
1	15.7	2793	9.26	9.53	13				
2	15.7	2796	9.25	9.31	14				
3	15.6	2841	9.21	8.37	15				
4	15.5	2921	9.20	7.78	16				
5	15.4	2932	9.20	7.74	17				
6	15.4	2975	9.20	7.57	18				
7	15.4	3035	9.19	7.34	19				
8	15.2	3021	9.17	6.82	20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 04/13/2020 Location (Circle): Lake Elsinore/Canyon Lake Station: LE03

Time on Station: 0800 Time off Station: 0815

Weather Conditions: overcast, light breeze Wind (mph & direction): _____

Lat: on station Long: on station

Water Depth (m): 6.4 Secchi Depth (m): 0.4

Water Chemistry Sample?: Y / N Chl-a Sample?: Y / N Plankton Sample?: Y / N

SAMPLE TIME: _____ Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	15.7	2738	9.25	9.66	12				
1	15.7	2740	9.25	9.65	13				
2	15.7	2777	9.23	9.22	14				
3	15.7	2854	9.21	8.30	15				
4	15.6	2961	9.19	7.66	16				
5	15.5	2970	9.17	7.29	17				
6	15.4	2971	9.17	7.30	18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 04/13/20 Location (Circle): Lake Elsinnore/Canyon Lake Station: C107

Time on Station: 08:35 Time off Station: 09:00

Weather Conditions: overcast calm Wind (mph & direction): None

Lat: on Target Long: on Target

Water Depth (m): 15.3 Secchi Depth (m): 0.95

Water Chemistry Sample?: Y/N Chl-a Sample?: Y Plankton Sample?: Y
 SAMPLE TIME: 8:40 Surface volume filtered (ml): 500
8:45 500 Depth-Integrated volume filtered (ml): 375

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments: Do reading in
due negatives - meter may
need to be calibrated

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	15	451.9	7.9	5.79	12	14.5	608.4	7.63	0.45
1	14.9	368.5	7.88	4.76	13	14.3	611.6	7.58	0 (-.03)
2	14.9	473.0	7.87	4.58	14	13.9	631.6	7.56	0 (-.08)
3	14.9	474.6	7.86	4.51	15	13.9	635.4	7.50	0 (-.09)
4	14.9	484.9	7.84	4.28	16				
5	14.9	483	7.81	4.01	17				
6	14.8	502.9	7.80	3.97	18				
7	14.8	512.7	7.81	3.95	19				
8	14.9	575.4	7.80	3.42	20				
9	14.8	587.5	7.78	3.13	21				
10	14.8	597.4	7.75	2.44	22				
11	14.6	601.7	7.69	1.42	23				

FIELD DATASHEET

Date: 04/13/20 Location (Circle): Lake Elsinore/Canyon Lake Station: C208

Time on Station: 9:10 Time off Station: 09:35

Weather Conditions: Sunny, Calm Wind (mph & direction): None

Lat: On Target Long: On Target

Water Depth (m): 11.2 Secchi Depth (m): 0.8

Water Chemistry Sample?: Y/N Chl-a Sample?: (Y)N Plankton Sample?: (Y)N

SAMPLE TIME: 9:20 *Draw* Surface volume filtered (ml): 325

Integrate top
9:25 *surf* Depth-Integrated volume filtered (ml): 500

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

SP Cond = 444.7

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	15.5	443.7	7.66	5.20	12				
1	15.3	444.7	7.68	5.12	13				
2	15.3	447.2	7.39	4.99	14				
3	15.1	444.9	7.49	4.67	15				
4	15.0	452.3	7.78	4.50	16				
5	4.7	430.3	7.72	3.84	17				
6	4.6	488.2	7.71	3.37	18				
7	4.7	531.0	7.76	3.57	19				
8	4.7	595.0	7.74	3.14	20				
9	4.7	608.8	7.71	2.79	21				
10	4.6	610.2	7.68	2.60	22				
11	4.5	618.5	7.65	2.20	23				

FIELD DATASHEET

Date: 02/13/20 Location (Circle): Lake Elsinore/Canyon Lake Station: CLO9

Time on Station: 09:55 Time off Station: 10:25

Weather Conditions: Partly Sunny, Calm Wind (mph & direction): None

Lat: On Target Long: On Target

Water Depth (m): 8.10 Secchi Depth (m): 0.3

Water Chemistry Sample?: Y / N Chl-a Sample?: Y / N Plankton Sample?: Y / N

SAMPLE TIME: 10:05 surf Surface volume filtered (ml): 350
10:10 surf Depth-Integrated volume filtered (ml): 300

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

~~Negative DO reading - calibrate meter?~~

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	15.6	625	8.48	8.09	12				
1	15.2	640	8.29	7.31	13				
2	14.9	631	8.14	6.39	14				
3	14.1	640	7.79	4.28	15				
4	13.8	629	7.73	4.18	16				
5	13.1	565	7.68	3.98	17				
6	12.9	559.3	7.62	3.74	18				
7	12.7	566.2	7.59	3.47	19				
8	12.7	903	7.38	.03	20				
9	12.7	1054	7.29	0.00	21				
10					22				
11					23				

FIELD DATASHEET

Date: 4/13/20 Location (Circle): Lake Elsinore/Canyon Lake Station: CL10

Time on Station: 10:35 Time off Station: 10:55

Weather Conditions: overcast, calm Wind (mph & direction): None

Lat: On Target Long: On Target

Water Depth (m): 4.4 Secchi Depth (m): 0.4

Water Chemistry Sample?: Y / N Chl-a Sample?: Y / N Plankton Sample?: Y / N

SAMPLE TIME: 10:45 Int Surface volume filtered (ml): 325

10:50 Surf Depth-Integrated volume filtered (ml): 325

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	15.8	611	8.18	6.57	12				
1	15.3	605.2	7.92	6.06	13				
2	14.8	603.9	7.88	5.61	14				
3	13.4	582.1	7.75	4.40	15				
4					16				
5					17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 4/13/20 Location (Circle): Lake Elsinore/Canyon Lake Station: CLO7

Time on Station: 1335 Time off Station: 1355

Weather Conditions: _____ Wind (mph & direction): _____

Lat: _____ Long: _____

Water Depth (m): 15.3 Secchi Depth (m): 0.95

Water Chemistry Sample?: Y N Chl-a Sample?: Y N Plankton Sample?: Y N

SAMPLE TIME: _____ Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments: _____

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	16.4	463	7.9	5.38	12	14.7	615.3	7.65	2.31
1	15.5	463	7.8	5.10	13	14.6	623.5	7.61	0 (-0.03)
2	15.1	469	7.77	4.74	14	14.5	702	7.60	0 (-0.04)
3	15.0	464	7.75	4.67	15	14.5	735	7.42	0 (-0.05)
4	14.9	476.9	7.77	4.58	16				
5	14.9	476	7.77	4.49	17				
6	14.9	500	7.76	4.34	18				
7	14.8	517.5	7.76	4.05	19				
8	14.8	532.5	7.75	3.92	20				
9	14.9	580	7.73	3.87	21				
10	14.9	597	7.71	2.84	22				
11	14.7	587	7.61	2.10	23				

FIELD DATASHEET

Date: 4/13/20 Location (Circle): Lake Elsinore/Canyon Lake Station: CL08

Time on Station: 1402 Time off Station: 1407

Weather Conditions: Cloudy Wind (mph & direction): 5-10 mph W

Lat: _____ Long: _____

Water Depth (m): 11.2 Secchi Depth (m): 0.8

Water Chemistry Sample?: Y N
SAMPLE TIME: _____ Chl-a Sample?: Y N Plankton Sample?: Y N
Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	16.2	435.2	6.94	6.7	12				
1	15.9	439.9	7.11	6.5	13				
2	15.5	444.7	7.46	6.1	14				
3	15.2	441.1	7.68	5.4	15				
4	15.0	435.0	7.68	5.2	16				
5	14.8	423.2	7.68	5.0	17				
6	14.7	523.1	7.46	4.3	18				
7	14.7	566.1	7.67	4.1	19				
8	14.8	606.2	7.66	3.1	20				
9	14.7	613.1	7.50	0.4	21				
10	14.6	613.2	7.42	0.1	22				
11	14.7	603.8	7.48	0.0	23				

FIELD DATASHEET

Date: 4/13/20 Location (Circle): Lake Elsinore/Canyon Lake Station: CLO9

Time on Station: 1425 Time off Station: _____

Weather Conditions: cloudy Wind (mph & direction): 0 2-5 mph NW

Lat: _____ Long: _____

Water Depth (m): 8.1 Secchi Depth (m): 0.3

Water Chemistry Sample?: Y/ N Chl-a Sample?: Y/ N Plankton Sample?: Y/ N

SAMPLE TIME: _____ Surface volume filtered (ml): _____
Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments: _____

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	16.5	620	8.93	12.2	12				
1	16.5 16.763	709	8.87	11.6	13				
2	15.3	675	8.42	8.3	14				
3	14.1	671	7.90	5.4	15				
4	13.9	620	7.76	4.9	16				
5	13.0	558	7.64	4.7	17				
6	12.7	568	7.56	4.2	18				
7	12.9	625 897	7.00	0.5	19				
8 7.5	12.8	835	7.43	0.1	20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 4/13/20 Location (Circle): Lake Elsinore Canyon Lake Station: CL10
 Time on Station: 1442 Time off Station: 1445
 Weather Conditions: cloudy Wind (mph & direction): 25 mph NW

Lat: _____ Long: _____

Water Depth (m): 4.4 Secchi Depth (m): 0.4

Water Chemistry Sample?: Y / N Chl-a Sample?: Y / N Plankton Sample?: Y / N
 SAMPLE TIME: _____ Surface volume filtered (ml): _____
 Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments:

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	16.2	609	8.28	9.4	12				
1	16.1	608	8.14	9.0	13				
2	15.5	605	7.90	7.1	14				
3	14.5	661	7.79	5.8	15				
4	13.5	637	7.69	2.5	16				
5					17				
6					18				
7					19				
8					20				
9					21				
10					22				
11					23				

FIELD DATASHEET

Date: 4/13/20 Location (Circle): Lake Elsinore/Canyon Lake Station: North Ski

Time on Station: 1540 Time off Station: _____

Weather Conditions: Cloudy Wind (mph & direction): 0-5 mph W

Lat: _____ Long: _____

Water Depth (m): 7.1 Secchi Depth (m): 3

Water Chemistry Sample?: Y N Chl-a Sample?: Y N Plankton Sample?: Y N

SAMPLE TIME: _____ Surface volume filtered (ml): _____

Depth-Integrated volume filtered (ml): _____

*Do not exceed 7 PSI or 14 in. Hg when filtering chlorophyll (~500 mL fill volume preferred). Discard lower chamber when full (after first 250 mL are filtered).

Comments: _____

Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)	Depth (m)	Temp (°C)	Sp. Cond (µS/cm)	pH (units)	DO (mg/L)
0	16.2	243	8.23	8.6	12				
1	16.1	242	8.23	8.1	13				
2	14.1	227	8.13	6.6	14				
3	13.3	225	8.12	6.2	15				
4	13.2	226	8.08	5.9	16				
5	12.5	229.7	8.04	5.8	17				
6	12.5	230.4	7.98	5.4	18				
6.5	12.5	231.6	7.94	5.3	19				
8					20				
9					21				
10					22				
11					23				

APPENDIX C - LAKE MONITORING ANALYTICAL REPORTS



BABCOCK Laboratories, Inc.

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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore TMDL Monitoring

Work Order Number: B9G3771

Report Date: 21-Aug-2019

Received on Ice (Y/N): Yes Temp: 10 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B9G3771-01	LE02	Liquid	07/26/19 09:00	John R.	07/26/19 13:51	Courier (Hector N.) -DE



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 2 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore TMDL Monitoring

Work Order Number: B9G3771

Report Date: 21-Aug-2019

Received on Ice (Y/N): Yes Temp: 10 °C

Laboratory Reference Number

B9G3771-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
LE02	Liquid	07/26/19 09:00	07/26/19 13:51

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	07/27/19 06:25	KBS	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	07/27/19 06:25	KBS	
Solids								
Total Dissolved Solids	2100	40	40	mg/L	SM 2540C	08/01/19 19:25	CAA	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	08/02/19 20:20	CAA	
Nutrients								
Ammonia-Nitrogen	0.11	0.10	0.044	mg/L	SM4500NH3H G	08/02/19 11:06	ATR	
Kjeldahl Nitrogen	4.3	0.40	0.37	mg/L	EPA 351.2	07/31/19 14:54	SLL	
Ortho Phosphate Phosphorus	0.019	0.050	0.016	mg/L	SM 4500P E	07/26/19 22:40	MWM	J
Total Phosphorus	0.22	0.05	0.02	mg/L	SM 4500P B E	08/06/19 12:47	ATR	

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EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



BABCOCK Laboratories, Inc.

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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 3 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore TMDL Monitoring

Work Order Number: B9G3771

Report Date: 21-Aug-2019

Received on Ice (Y/N): Yes Temp: 10 °C

Anions - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9G26066 - Analyzed as Received IC										
Blank (9G26066-BLK1)				Prepared & Analyzed: 07/27/19						
Nitrite as N	ND	0.10	0.091	mg/L						
Nitrate as N	ND	0.20	0.16	mg/L						
LCS (9G26066-BS1)				Prepared & Analyzed: 07/27/19						
Nitrite as N	2.56	0.10	0.091	mg/L	2.50	102	90-110			
Nitrate as N	5.87	0.20	0.16	mg/L	5.65	104	90-110			
Matrix Spike (9G26066-MS1)				Source: B9G3709-01		Prepared & Analyzed: 07/27/19				
Nitrite as N	2.40	0.10	0.091	mg/L	2.50	ND	95.8	80-120		
Nitrate as N	5.87	0.20	0.16	mg/L	5.65	ND	104	75-131		
Matrix Spike (9G26066-MS2)				Source: B9G3773-04		Prepared & Analyzed: 07/27/19				
Nitrite as N	2.19	0.10	0.091	mg/L	2.50	ND	87.8	80-120		
Nitrate as N	6.05	0.20	0.16	mg/L	5.65	ND	107	75-131		
Matrix Spike Dup (9G26066-MSD1)				Source: B9G3709-01		Prepared & Analyzed: 07/27/19				
Nitrite as N	2.44	0.10	0.091	mg/L	2.50	ND	97.5	80-120	1.74	20
Nitrate as N	6.03	0.20	0.16	mg/L	5.65	ND	107	75-131	2.67	20



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Client Name: Wood Environment&Infrastructure Solutions, Inc

Contact: John Rudolph

Address: 9210 Sky Park Court #200

San Diego, CA 92123

Analytical Report: Page 4 of 8

Project Name: Amec Foster Wheeler-Lake Elsinore

Project Number: Lake Elsinore TMDL Monitoring

Work Order Number: B9G3771

Report Date: 21-Aug-2019

Received on Ice (Y/N): Yes

Temp: 10 °C

Solids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9H01039 - Analyzed as received										
Blank (9H01039-BLK1)				Prepared & Analyzed: 08/01/19						
Total Dissolved Solids	ND	10	10	mg/L						
LCS (9H01039-BS1)				Prepared & Analyzed: 08/01/19						
Total Dissolved Solids	730	10	10	mg/L	746	97.9	90-110			
Duplicate (9H01039-DUP1)				Source: B9G3948-01 Prepared & Analyzed: 08/01/19						
Total Dissolved Solids	554	20	20	mg/L	564			1.79	20	
Duplicate (9H01039-DUP2)				Source: B9G3948-05 Prepared & Analyzed: 08/01/19						
Total Dissolved Solids	330	10	10	mg/L	339			2.69	20	

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EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 5 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore TMDL Monitoring

Work Order Number: B9G3771

Report Date: 21-Aug-2019

Received on Ice (Y/N): Yes Temp: 10 °C

General Inorganics - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9H02083 - Analyzed as received										
Blank (9H02083-BLK1)				Prepared & Analyzed: 08/02/19						
Sulfide	ND	0.10	0.10	mg/L						
LCS (9H02083-BS1)				Prepared & Analyzed: 08/02/19						
Sulfide	0.400	0.10	0.10	mg/L	0.400	100	50-150			
Matrix Spike (9H02083-MS1)				Source: B9G3771-01 Prepared & Analyzed: 08/02/19						
Sulfide	0.400	0.10	0.10	mg/L	0.400	ND	100	50-150		
Matrix Spike Dup (9H02083-MSD1)				Source: B9G3771-01 Prepared & Analyzed: 08/02/19						
Sulfide	0.400	0.10	0.10	mg/L	0.400	ND	100	50-150	0.00	30



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 6 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore TMDL Monitoring

Work Order Number: B9G3771

Report Date: 21-Aug-2019

Received on Ice (Y/N): Yes Temp: 10 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9G26078 - Filter if turbid.										
LCS (9G26078-BS1)				Prepared & Analyzed: 07/26/19						
Ortho Phosphate Phosphorus	0.544	0.050	0.016	mg/L	0.500	109	90-110			
Matrix Spike (9G26078-MS1)				Source: B9G3764-01 Prepared & Analyzed: 07/26/19						
Ortho Phosphate Phosphorus	0.551	0.050	0.016	mg/L	0.500	ND	110	80-120		
Matrix Spike Dup (9G26078-MSD1)				Source: B9G3764-01 Prepared & Analyzed: 07/26/19						
Ortho Phosphate Phosphorus	0.539	0.050	0.016	mg/L	0.500	ND	108	80-120	2.26	20
Batch 9G31070 - Acid Digest										
Blank (9G31070-BLK1)				Prepared & Analyzed: 07/31/19						
Kjeldahl Nitrogen	ND	0.10	0.093	mg/L						
LCS (9G31070-BS1)				Prepared & Analyzed: 07/31/19						
Kjeldahl Nitrogen	1.11	0.10	0.093	mg/L	1.00	111	80-120			
Matrix Spike (9G31070-MS1)				Source: B9G3709-01 Prepared & Analyzed: 07/31/19						
Kjeldahl Nitrogen	165	8.0	7.4	mg/L	80.0	83.8	101	42-154		
Matrix Spike (9G31070-MS2)				Source: B9G3941-01 Prepared & Analyzed: 07/31/19						
Kjeldahl Nitrogen	1.98	0.10	0.093	mg/L	1.00	0.971	101	42-154		
Batch 9H02011 - Analyzed as received										
Blank (9H02011-BLK1)				Prepared & Analyzed: 08/02/19						
Ammonia-Nitrogen	ND	0.10	0.044	mg/L						



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Client Name: Wood Environment&Infrastructure Solutions, Inc
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 San Diego, CA 92123

Analytical Report: Page 7 of 8
 Project Name: Amec Foster Wheeler-Lake Elsinore
 Project Number: Lake Elsinore TMDL Monitoring

Work Order Number: B9G3771

Report Date: 21-Aug-2019

Received on Ice (Y/N): Yes Temp: 10 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9H02011 - Analyzed as received										
LCS (9H02011-BS1)					Prepared & Analyzed: 08/02/19					
Ammonia-Nitrogen	0.944	0.10	0.044	mg/L	1.00	94.4	90-110			
Matrix Spike (9H02011-MS1)					Source: B9G3771-01 Prepared & Analyzed: 08/02/19					
Ammonia-Nitrogen	1.07	0.10	0.044	mg/L	1.00	0.111	96.1	80-120		
Matrix Spike Dup (9H02011-MSD1)					Source: B9G3771-01 Prepared & Analyzed: 08/02/19					
Ammonia-Nitrogen	1.16	0.10	0.044	mg/L	1.00	0.111	105	80-120	7.88	20
Batch 9H06060 - Acid Digest										
LCS (9H06060-BS1)					Prepared & Analyzed: 08/06/19					
Total Phosphorus	0.554	0.05	0.02	mg/L	0.500	111	85-115			
Matrix Spike (9H06060-MS1)					Source: B9G3632-05 Prepared & Analyzed: 08/06/19					
Total Phosphorus	0.617	0.05	0.02	mg/L	0.500	0.0833	107	80-120		
Matrix Spike Dup (9H06060-MSD1)					Source: B9G3632-05 Prepared & Analyzed: 08/06/19					
Total Phosphorus	0.617	0.05	0.02	mg/L	0.500	0.0833	107	80-120	0.00	20



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 8 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore TMDL Monitoring

Work Order Number: B9G3771

Report Date: 21-Aug-2019

Received on Ice (Y/N): Yes Temp: 10 °C

Notes and Definitions

- J Estimated value
- ND: Analyte NOT DETECTED at or above the Method Detection Limit (**if MDL is reported**), otherwise at or above the Reportable Detection Limit (RDL)
- NR: Not Reported
- RDL: Reportable Detection Limit
- MDL: Method Detection Limit
- * / " : NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-MDL_No Alias.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.

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LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 1 of 1
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore TMDL Monit
Work Order Number: B9G3798

Report Date: 22-Aug-2019

Received on Ice (Y/N Yes Temp:10 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B9G3798-01	LE02 - Int	Solid	7/26/19 9:00	John Rudolph	7/26/19 13:51	Courier (Hector N.)-DE
B9G3798-02	LE02 - Surf	Solid	7/26/19 9:00	John Rudolph	7/26/19 13:51	Courier (Hector N.)-DE

Note: Analysis for Chlorophyll a was subcontracted to Truesdail Laboratories, Inc.

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Case Narrative+ COC.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.



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Client Name: Wood Environment&Infrastructure S
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 1 of 1
Project Name: AMEC-Lake Elsinore
Project Number: Lake Elsinore TMDL Monito
Work Order Number: B9G3798

Report Date: 22-Aug-2019

Received on Ice (Y/N) Yes Temp: 10 °C

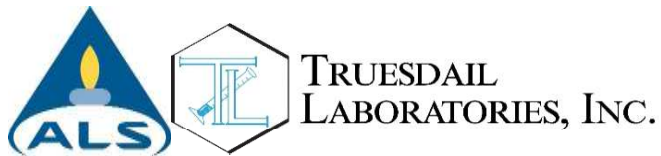
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Chain of Custody & Sample Information Record

Client: Wood Environment and Infrastructure Solutions, Inc.		Contact: John Rudolph		Phone No. 858-243-8158	
FAX No.		Email: john.rudolph@woodplc.com		Additional Reporting Requests	
Project Name: <u>Lake Elsinore TMDL Monitoring</u>		Turn Around Time: <u>Routine</u>		<input type="checkbox"/> Include QC Data Package: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> FAX Results: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Email Results: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> State EDT: <input type="checkbox"/> Yes <input type="checkbox"/> No (Include Source Number in Notes)	
Project Location: <u>Lake Elsinore</u>		*Lab TAT Approval: By:		*Additional Charges May Apply	
Name: <u>John Rudolph</u> Employer: <u>Wood E&I Solutions, Inc.</u> Signature: _____		# of Containers & Preservatives Unpreserved H2SO4 HCl HNO3 Na2S2O3 NaOH NaOH/ZnAcetate NH4Cl MCAA Frozen		Total # of Containers Routine Resample Special Total Sulfide Nitrate - Nitrite TDS TKN Ammonia Total Phosphorus SRP/Ortho-P Chlorophyll-a	
Sample ID		Date	Time	Analysis Requested	
LE02 - Int		07/26/19	0900	Matrix: DW = Drinking Water, WW = Wastewater, GW = Groundwater, S = Soil, SG = Sludge, L = Liquid, M = Miscellaneous Notes: Chl-a samples on 0.7 um GFF, Frozen	
LE02 - Surf		07/26/19	0900	Filter Volume: 200mL Filter Volume: 200mL Filter Volume: Filter Volume: Filter Volume: Filter Volume: Filter Volume: Filter Volume: Filter Volume:	
Relinquished By (sign)	Print Name / Company	Date / Time	Received By (Sign)	Print Name / Company	
	John Rudolph / Wood	7/26/19 1238		Harry DS	
	Harry DS	7/26/19 1351		Harry DS	

(For Lab Use Only) Sample Integrity Upon Receipt		Lab Notes	
Sample(s) Submitted on Ice?	Yes <input checked="" type="radio"/> No <input type="radio"/>	Temperature	T: 62
Custody Seal(s) Intact?	Yes <input type="radio"/> No <input checked="" type="radio"/> N/A	10 °C	
Sample(s) Intact?	Yes <input checked="" type="radio"/> No <input type="radio"/>	<input type="checkbox"/> Cooler Blank	

B9G3798
Rcd: 07/26/2019 13:51
1sg Temp Gun Id: 62



ALS - Truesdail Laboratories
3337 Michelson Drive, Suite CN750
Irvine, CA 92612
I +1 714 730 6239

Report

Client: Babcock Laboratories, Inc.
6100 Quail Valley Ct
Riverside, CA 92507

Work Order No.: 19G0478

Printed: 08/08/2019

Attention: Cindy A. Waddell

Project Name: Chlorophyll

Project Number: B9G3798

CASE NARRATIVE

SAMPLE RECEIPT SUMMARY

Table with 6 columns: Sample ID, Laboratory ID, Matrix, Type, Date Sampled, Date Received. Contains two rows of sample data.

DEFINITIONS

Table with 2 columns: Symbol, Definition. Lists abbreviations like DF, MDL, ND, RL and their meanings.

Respectfully yours,

Handwritten signature of Tiana Vo

Tiana Vo
Project Manager



TRUESDAIL
LABORATORIES, INC.

Client: Babcock Laboratories, Inc.

Project Name: Chlorophyll

Project Number: B9G3798

Printed: 08/08/2019

B9G3798-01

19G0478-01 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	61.4	1.00	1.00	mg/m ³	1	1907724	08/07/2019 18:18	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

B9G3798-02

19G0478-02 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	63.5	1.00	1.00	mg/m ³	1	1907724	08/07/2019 18:18	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

This report applies to the sample(s), or product(s), investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed. This report shall not be reproduced without the written consent of ALS-Truesdail Laboratories, Inc., and must be reproduced in its entirety.

1960478

SUBCONTRACT ORDER

Printed: 7/29/2019 10:56

Babcock Laboratories, Inc.

B9G3798

SENDING LABORATORY:

Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, CA 92507-0704
Phone: (951) 653-3351
Fax: (951) 653-1662
Project Manager: Cindy A. Waddell

RECEIVING LABORATORY:

Truesdail Laboratories - Subcontract
3337 Michelson Drive Suite CN750
Irvine, CA 92614
Phone : (714) 730-6239
Fax: (714) 730-6462

Please include J-flags and EXCEL EDD.

Employed by: Wood Environ. & Infrastructure Solutions Inc
Sampled by: John Rudolph

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: B9G3798-01 Solid		Sampled: 07/26/19 09:00	LE02 - Int	<u>Proj.No.:Lake Elsinore TMDL Monitoring</u>
Subout Containers Supplied: Whirl-Pak (A)	08/21/19 23:59	08/05/19 09:00		Report Chlorophyll a / Filter Volume = 200ml
Sample ID: B9G3798-02 Solid		Sampled: 07/26/19 09:00	LE02 - Surf	<u>Proj.No.:Lake Elsinore TMDL Monitoring</u>
Subout Containers Supplied: Whirl-Pak (A)	08/21/19 23:59	08/05/19 09:00		Report Chlorophyll a / Filter Volume = 200ml

All Containers Intact: Yes No Samples Preserved Properly: Yes No

Samples Received at A1 oC Sample Labels / COC Agree: Yes No Custody Seals Present: Yes No

Please forward all acknowledgements of sample receipt, final reports and invoices to data@babcocklabs.com
NO HARDCOPIES PLEASE.

Released By [Signature] Date 7/29/19 Received By [Signature] Date 07/30/19 10:10 Am

Released By _____ Date _____ Received By _____ Date _____

ANALYTICAL REPORT

Eurofins Calscience LLC
7440 Lincoln Way
Garden Grove, CA 92841
Tel: (714)895-5494

Laboratory Job ID: 570-3187-1
Client Project/Site: B9G3799
Revision: 1

For:
Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, California 92507

Attn: Cindy A Waddell



Authorized for release by:
2/19/2020 2:04:54 PM

Carla Hollowell, Project Manager I
(714)895-5494
carlahollowell@eurofinsus.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Definitions/Glossary

Client: Babcock Laboratories, Inc.
Project/Site: B9G3799

Job ID: 570-3187-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Babcock Laboratories, Inc.
Project/Site: B9G3799

Job ID: 570-3187-1

Job ID: 570-3187-1

Laboratory: Eurofins Calscience LLC

Narrative

**Job Narrative
570-3187-1**

Comments

No additional comments.

Receipt

The sample was received on 7/30/2019 9:50 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.8° C.

General Chemistry

Method(s) 365.1: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 570-9429 and analytical batch 570-9491 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Client Sample Results

Client: Babcock Laboratories, Inc.
Project/Site: B9G3799

Job ID: 570-3187-1

General Chemistry

Client Sample ID: B9G3799-01
Date Collected: 07/26/19 09:00
Date Received: 07/30/19 09:50

Lab Sample ID: 570-3187-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.116		0.0100	0.00281	mg/L		08/01/19 14:22	08/01/19 16:12	1

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QC Sample Results

Client: Babcock Laboratories, Inc.
Project/Site: B9G3799

Job ID: 570-3187-1

Method: 365.1 - Phosphorus, Total

Lab Sample ID: MB 570-9429/1-A
Matrix: Water
Analysis Batch: 9491

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 9429

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	ND		0.0100	0.00281	mg/L		08/01/19 14:22	08/01/19 15:33	1

Lab Sample ID: LCS 570-9429/2-A
Matrix: Water
Analysis Batch: 9491

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 9429

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.200	0.2115		mg/L		106	90 - 110

Lab Sample ID: LCSD 570-9429/3-A
Matrix: Water
Analysis Batch: 9491

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 9429

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphorus, Total	0.200	0.2092		mg/L		105	90 - 110	1	20

Lab Sample ID: 570-3187-1 MS
Matrix: Water
Analysis Batch: 9491

Client Sample ID: B9G3799-01
Prep Type: Total/NA
Prep Batch: 9429

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.116		0.200	0.2859	F1	mg/L		85	90 - 110

Lab Sample ID: 570-3187-1 MSD
Matrix: Water
Analysis Batch: 9491

Client Sample ID: B9G3799-01
Prep Type: Total/NA
Prep Batch: 9429

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphorus, Total	0.116		0.200	0.2722	F1	mg/L		78	90 - 110	5	25

Lab Chronicle

Client: Babcock Laboratories, Inc.
Project/Site: B9G3799

Job ID: 570-3187-1

Client Sample ID: B9G3799-01

Lab Sample ID: 570-3187-1

Date Collected: 07/26/19 09:00

Matrix: Water

Date Received: 07/30/19 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	9429	08/01/19 14:22	UXCH	ECL 1
Total/NA	Analysis	365.1		1			9491	08/01/19 16:12	ED6R	ECL 1

Instrument ID: ACA1

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494



Accreditation/Certification Summary

Client: Babcock Laboratories, Inc.
Project/Site: B9G3799

Job ID: 570-3187-1

Laboratory: Eurofins Calscience LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arizona	State	AZ0781	03-13-20
California	Los Angeles County Sanitation Districts	10109	09-29-20
California	State	2944	09-29-20
Guam	State	20-003R	10-31-19
Hawaii	State	<cert No.>	07-02-20
Nevada	State	CA00111	07-31-20

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Method Summary

Client: Babcock Laboratories, Inc.
Project/Site: B9G3799

Job ID: 570-3187-1

Method	Method Description	Protocol	Laboratory
365.1	Phosphorus, Total	EPA	ECL 1
365.2/365.3/365	Phosphorus, Total	MCAWW	ECL 1

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494



Sample Summary

Client: Babcock Laboratories, Inc.
Project/Site: B9G3799

Job ID: 570-3187-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
570-3187-1	B9G3799-01	Water	07/26/19 09:00	07/30/19 09:50	

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SUBCONTRACT ORDER

Printed: 7/29/2019 10:55

Babcock Laboratories, Inc.

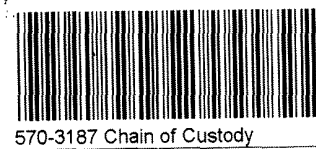
B9G3799

SENDING LABORATORY:

Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, CA 92507-0704
Phone: (951) 653-3351
Fax: (951) 653-1662
Project Manager: Cindy A. Waddell

RECEIVING LABORATORY:

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove, CA 92841-1427
Phone : (714) 895-5494
Fax: (714) 894-7501



System Name: Wood Environment&Infrastructure Solutions, Inc

Sampler: John Rudolph

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: B9G3799-01 Liquid		Sampled: 07/26/19 09:00	LE02	Proj.No.: Lake Elsinore TMDL Monitoring
Subout_02	08/21/19 23:59	08/05/19 09:00		Low Level Total Phosphorus
Containers Supplied: 500 mL Poly H2SO4 (A)				

please include JFlags/MDLs
d EXCEL file
AKL 7/29/19

All Containers Intact: ___ Yes ___ No Samples Preserved Properly: ___ Yes ___ No

Samples Received at ___ oC Sample Labels / COC Agree: ___ Yes ___ No Custody Seals Present: ___ Yes ___ No

Please forward all acknowledgements of sample receipt, final reports and invoices to data@babcocklabs.com

NO HARDCOPIES PLEASE.

Released By:  Date: 7/29/19 Received By:  Date: 7/30/19 0950

Released By: (Fedex) Date: Received By: Date:

ORIGIN ID: ONTA (951) 653-3351
BARCOCK LABORATORIES
8100 QUAIL VALLEY CT
RIVERSIDE, CA 92507
UNITED STATES US

SHIP DATE: 29JUL19
ACTWTG: 14.40 LB MAN
CAD: 0266194/CAFE3309
DIMS: 14x14x12 IN
BILL SENDER

TO **SAMPLE RECEIVING**
CALSCIENCE ENVIRONMENTAL LABS, INC.
7440 LINCOLN WAY

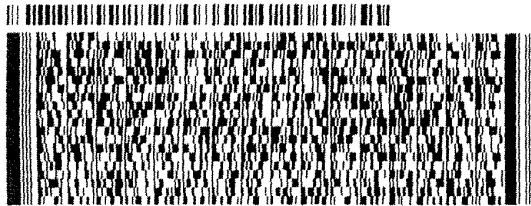
58662/FE51/40R3

GARDEN GROVE CA 928411427

(714) 896-5494
REF:
INU:
PG:

REF:

DEPT:



FedEx
Express



58662/FE51/40R3

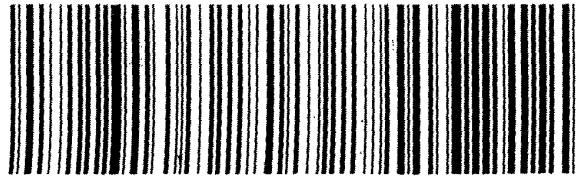
TRK# 1143 4694 5319
0201

TUE - 30 JUL 10:30A
PRIORITY OVERNIGHT

92 APVA

92841
CA-US **SNA**

0201 158-18-424 RTR EXP-CA-92



Login Sample Receipt Checklist

Client: Babcock Laboratories, Inc.

Job Number: 570-3187-1

Login Number: 3187

List Source: Eurofins Calscience

List Number: 1

Creator: Soriano, Precy

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



BABCOCK Laboratories, Inc.

The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 14
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: LECL TMDL Monitoring

Work Order Number: B9H3684

Report Date: 11-Sep-2019

Received on Ice (Y/N): Yes Temp: 6 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B9H3684-01	CL07	Liquid	08/27/19 10:15	Kevin Stolzenba	08/27/19 14:12	Courier (Jason J.) - DE
B9H3684-02	CL08	Liquid	08/27/19 09:30	Kevin Stolzenba	08/27/19 14:12	Courier (Jason J.) - DE
B9H3684-03	CL09	Liquid	08/27/19 08:45	Kevin Stolzenba	08/27/19 14:12	Courier (Jason J.) - DE
B9H3684-04	CL10	Liquid	08/27/19 07:45	Kevin Stolzenba	08/27/19 14:12	Courier (Jason J.) - DE
B9H3684-05	LE02	Liquid	08/27/19 08:30	Kevin Stolzenba	08/27/19 14:12	Courier (Jason J.) - DE



BABCOCK Laboratories, Inc.

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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 2 of 14
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: LECL TMDL Monitoring

Work Order Number: B9H3684

Report Date: 11-Sep-2019

Received on Ice (Y/N): Yes Temp: 6 °C

Laboratory Reference Number

B9H3684-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL07	Liquid	08/27/19 10:15	08/27/19 14:12

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	08/28/19 03:15	KBS	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	08/28/19 03:15	KBS	
Solids								
Total Dissolved Solids	370	10	10	mg/L	SM 2540C	09/03/19 17:30	JGZ	
Total Suspended Solids	2	2	2	mg/L	SM 2540D	09/03/19 10:29	BBR	
General Inorganics								
Sulfide	3.4	0.10	0.10	mg/L	SM 4500S2 D	08/27/19 22:35	CMR	
Nutrients								
Ammonia-Nitrogen	1.3	0.10	0.044	mg/L	SM4500NH3H G	08/29/19 10:03	ATR	
Kjeldahl Nitrogen	2.1	0.10	0.093	mg/L	EPA 351.2	08/28/19 14:29	SLL	
Organic Nitrogen	0.8	0.1	0.02	mg/L	Calculation			
Total Nitrogen	2.1	0.2	0.16	mg/L	Calculation			
Ortho Phosphate Phosphorus	0.23	0.050	0.016	mg/L	SM 4500P E	08/28/19 21:45	MWM	
Metals and Metalloids								
Aluminum-Dissolved	ND	100	33	ug/L	EPA 200.7	08/30/19 00:48	KRV	N_pFilt
Aluminum	ND	100	33	ug/L	EPA 200.7	08/30/19 20:11	KRV	

mailing
P.O Box 432
Riverside, CA 92502-0432

location
6100 Quail Valley Court
Riverside, CA 92507-0704

P 951 653 3351
F 951 653 1662
www.babcocklabs.com

CA ELAP No. 2698
EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



BABCOCK Laboratories, Inc.

The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 3 of 14
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: LECL TMDL Monitoring

Work Order Number: B9H3684

Report Date: 11-Sep-2019

Received on Ice (Y/N): Yes Temp: 6 °C

Laboratory Reference Number

B9H3684-02

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL08	Liquid	08/27/19 09:30	08/27/19 14:12

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	08/28/19 03:28	KBS	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	08/28/19 03:28	KBS	
Solids								
Total Dissolved Solids	420	10	10	mg/L	SM 2540C	09/03/19 17:30	JGZ	
Total Suspended Solids	4	2	2	mg/L	SM 2540D	09/03/19 10:29	BBR	
General Inorganics								
Sulfide	1.3	0.10	0.10	mg/L	SM 4500S2 D	08/27/19 22:35	CMR	
Nutrients								
Ammonia-Nitrogen	0.18	0.10	0.044	mg/L	SM4500NH3H G	08/29/19 10:09	ATR	
Kjeldahl Nitrogen	0.97	0.10	0.093	mg/L	EPA 351.2	08/28/19 14:30	SLL	
Organic Nitrogen	0.8	0.1	0.02	mg/L	Calculation			
Total Nitrogen	1.0	0.2	0.16	mg/L	Calculation			
Ortho Phosphate Phosphorus	0.016	0.050	0.016	mg/L	SM 4500P E	08/28/19 21:45	MWM	J
Metals and Metalloids								
Aluminum-Dissolved	ND	100	33	ug/L	EPA 200.7	08/30/19 00:50	KRV	N_pFilt
Aluminum	34	100	33	ug/L	EPA 200.7	08/30/19 20:13	KRV	J



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 4 of 14
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: LECL TMDL Monitoring

Work Order Number: B9H3684

Report Date: 11-Sep-2019

Received on Ice (Y/N): Yes Temp: 6 °C

Laboratory Reference Number

B9H3684-03

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL09	Liquid	08/27/19 08:45	08/27/19 14:12

Analyte(s)	Result	RDL	MDL	Units	Method	Analysis Date	Analyst	Flag
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	08/28/19 03:42	KBS	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	08/28/19 03:42	KBS	
Solids								
Total Dissolved Solids	560	10	10	mg/L	SM 2540C	09/03/19 17:30	JGZ	
Total Suspended Solids	8	2	2	mg/L	SM 2540D	09/03/19 10:29	BBR	
General Inorganics								
Sulfide	10	0.10	0.10	mg/L	SM 4500S2 D	08/27/19 22:35	CMR	
Nutrients								
Ammonia-Nitrogen	1.9	0.10	0.044	mg/L	SM4500NH3H G	08/29/19 10:11	ATR	
Kjeldahl Nitrogen	2.9	0.10	0.093	mg/L	EPA 351.2	08/28/19 14:32	SLL	
Organic Nitrogen	1.0	0.1	0.02	mg/L	Calculation			
Total Nitrogen	2.9	0.2	0.16	mg/L	Calculation			
Ortho Phosphate Phosphorus	0.025	0.050	0.016	mg/L	SM 4500P E	08/28/19 21:45	MWM	J
Metals and Metalloids								
Aluminum-Dissolved	ND	100	33	ug/L	EPA 200.7	08/30/19 00:53	KRV	N_pFilt
Aluminum	75	100	33	ug/L	EPA 200.7	08/30/19 20:15	KRV	J



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Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: LECL TMDL Monitoring

Work Order Number: B9H3684

Report Date: 11-Sep-2019

Received on Ice (Y/N): Yes Temp: 6 °C

Laboratory Reference Number

B9H3684-04

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL10	Liquid	08/27/19 07:45	08/27/19 14:12

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	08/28/19 03:55	KBS	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	08/28/19 03:55	KBS	
Solids								
Total Dissolved Solids	600	10	10	mg/L	SM 2540C	09/03/19 17:30	JGZ	
Total Suspended Solids	9	2	2	mg/L	SM 2540D	09/03/19 10:29	BBR	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	08/27/19 22:35	CMR	
Nutrients								
Ammonia-Nitrogen	ND	0.10	0.044	mg/L	SM4500NH3H G	08/29/19 10:12	ATR	
Kjeldahl Nitrogen	1.2	0.20	0.19	mg/L	EPA 351.2	08/30/19 14:12	SLL	
Organic Nitrogen	1.2	0.2	0.02	mg/L	Calculation			
Total Nitrogen	1.2	0.2	0.19	mg/L	Calculation			
Ortho Phosphate Phosphorus	ND	0.050	0.016	mg/L	SM 4500P E	08/28/19 21:45	MWM	
Metals and Metalloids								
Aluminum-Dissolved	47	100	33	ug/L	EPA 200.7	08/30/19 00:55	KRV	N_pFilt, J
Aluminum	230	100	33	ug/L	EPA 200.7	08/30/19 20:24	KRV	



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Project Number: LECL TMDL Monitoring

Work Order Number: B9H3684

Report Date: 11-Sep-2019

Received on Ice (Y/N): Yes Temp: 6 °C

Laboratory Reference Number

B9H3684-05

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
LE02	Liquid	08/27/19 08:30	08/27/19 14:12

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	08/28/19 04:08	KBS	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	08/28/19 04:08	KBS	
Solids								
Total Dissolved Solids	2200	20	20	mg/L	SM 2540C	09/03/19 17:30	JGZ	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	08/27/19 22:35	CMR	
Nutrients								
Ammonia-Nitrogen	0.12	0.10	0.044	mg/L	SM4500NH3H G	08/29/19 10:14	ATR	
Kjeldahl Nitrogen	4.2	0.40	0.37	mg/L	EPA 351.2	08/30/19 14:13	SLL	
Organic Nitrogen	4.1	0.4	0.02	mg/L	Calculation			
Total Nitrogen	4.2	0.4	0.37	mg/L	Calculation			
Ortho Phosphate Phosphorus	ND	0.050	0.016	mg/L	SM 4500P E	08/28/19 21:45	MWM	



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Analytical Report: Page 7 of 14
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: LECL TMDL Monitoring

Report Date: 11-Sep-2019

Work Order Number: B9H3684
Received on Ice (Y/N): Yes Temp: 6 °C

Anions - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9H27171 - Analyzed as Received IC										
Blank (9H27171-BLK1)				Prepared & Analyzed: 08/28/19						
Nitrite as N	ND	0.10	0.091	mg/L						
Nitrate as N	ND	0.20	0.16	mg/L						
LCS (9H27171-BS1)				Prepared & Analyzed: 08/28/19						
Nitrite as N	2.46	0.10	0.091	mg/L	2.50	98.3	90-110			
Nitrate as N	5.60	0.20	0.16	mg/L	5.65	99.1	90-110			
Matrix Spike (9H27171-MS1)				Source: B9H3683-04 Prepared & Analyzed: 08/28/19						
Nitrite as N	1.70	0.10	0.091	mg/L	2.50	ND	67.8	80-120		QFini, QMint
Nitrate as N	5.35	0.20	0.16	mg/L	5.65	ND	94.7	75-131		
Matrix Spike (9H27171-MS2)				Source: B9H3702-01 Prepared & Analyzed: 08/28/19						
Nitrite as N	2.43	0.10	0.091	mg/L	2.50	ND	97.2	80-120		
Nitrate as N	5.46	0.20	0.16	mg/L	5.65	ND	96.7	75-131		
Matrix Spike Dup (9H27171-MSD1)				Source: B9H3683-04 Prepared & Analyzed: 08/28/19						
Nitrite as N	1.76	0.10	0.091	mg/L	2.50	ND	70.3	80-120	3.59	20 QFini, QMint
Nitrate as N	5.46	0.20	0.16	mg/L	5.65	ND	96.6	75-131	2.03	20



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Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: LECL TMDL Monitoring

Work Order Number: B9H3684

Report Date: 11-Sep-2019

Received on Ice (Y/N): Yes Temp: 6 °C

Solids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9I03070 - Analyzed as received										
Blank (9I03070-BLK1)					Prepared & Analyzed: 09/03/19					
Total Suspended Solids	ND	0.5	0.5	mg/L						
LCS (9I03070-BS1)					Prepared & Analyzed: 09/03/19					
Total Suspended Solids	518	50	50	mg/L	500	104	90-110			
Duplicate (9I03070-DUP1)					Source: B9H3684-03 Prepared & Analyzed: 09/03/19					
Total Suspended Solids	6.50	2	2	mg/L	8.00			20.7	25	
Duplicate (9I03070-DUP2)					Source: B9H3872-01 Prepared & Analyzed: 09/03/19					
Total Suspended Solids	244	20	20	mg/L	248			1.63	25	
Batch 9I03118 - Analyzed as received										
Blank (9I03118-BLK1)					Prepared & Analyzed: 09/03/19					
Total Dissolved Solids	ND	10	10	mg/L						
LCS (9I03118-BS1)					Prepared & Analyzed: 09/03/19					
Total Dissolved Solids	743	10	10	mg/L	746	99.6	90-110			
Duplicate (9I03118-DUP1)					Source: B9H3647-02 Prepared & Analyzed: 09/03/19					
Total Dissolved Solids	385	10	10	mg/L	332			14.8	20	
Duplicate (9I03118-DUP2)					Source: B9H3647-03 Prepared & Analyzed: 09/03/19					
Total Dissolved Solids	393	10	10	mg/L	375			4.69	20	



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Project Name: Amec Foster Wheeler-Lake Elsinore
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Work Order Number: B9H3684

Report Date: 11-Sep-2019

Received on Ice (Y/N): Yes Temp: 6 °C

General Inorganics - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9H27166 - Analyzed as received										
Blank (9H27166-BLK1)				Prepared & Analyzed: 08/27/19						
Sulfide	ND	0.10	0.10	mg/L						
LCS (9H27166-BS1)				Prepared & Analyzed: 08/27/19						
Sulfide	0.400	0.10	0.10	mg/L	0.400	100	50-150			
Matrix Spike (9H27166-MS1)				Source: B9H3684-01 Prepared & Analyzed: 08/27/19						
Sulfide	3.70	0.10	0.10	mg/L	0.400	3.40	75.0	50-150		
Matrix Spike Dup (9H27166-MSD1)				Source: B9H3684-01 Prepared & Analyzed: 08/27/19						
Sulfide	2.50	0.10	0.10	mg/L	0.400	3.40	NR	50-150	38.7	30 QM-4X



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Report Date: 11-Sep-2019

Received on Ice (Y/N): Yes Temp: 6 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9H28061 - Acid Digest										
Blank (9H28061-BLK1)				Prepared & Analyzed: 08/28/19						
Kjeldahl Nitrogen	ND	0.10	0.093	mg/L						
LCS (9H28061-BS1)				Prepared & Analyzed: 08/28/19						
Kjeldahl Nitrogen	0.993	0.10	0.093	mg/L	1.00	99.3	80-120			
Matrix Spike (9H28061-MS1)				Source: B9H3472-01 Prepared & Analyzed: 08/28/19						
Kjeldahl Nitrogen	2.14	0.10	0.093	mg/L	1.00	1.89	25.7	42-154		QMS(D)
Matrix Spike Dup (9H28061-MSD1)				Source: B9H3472-01 Prepared & Analyzed: 08/28/19						
Kjeldahl Nitrogen	2.57	0.10	0.093	mg/L	1.00	1.89	68.3	42-154	18.1	25
Batch 9H28129 - Filter if turbid.										
LCS (9H28129-BS1)				Prepared & Analyzed: 08/28/19						
Ortho Phosphate Phosphorus	0.538	0.050	0.016	mg/L	0.500	108	90-110			
Matrix Spike (9H28129-MS1)				Source: B9H3683-01 Prepared & Analyzed: 08/28/19						
Ortho Phosphate Phosphorus	0.587	0.050	0.016	mg/L	0.500	ND	117	80-120		
Matrix Spike Dup (9H28129-MSD1)				Source: B9H3683-01 Prepared & Analyzed: 08/28/19						
Ortho Phosphate Phosphorus	0.581	0.050	0.016	mg/L	0.500	ND	116	80-120	0.937	20
Batch 9H29009 - Analyzed as received										
Blank (9H29009-BLK1)				Prepared & Analyzed: 08/29/19						
Ammonia-Nitrogen	ND	0.10	0.044	mg/L						



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Project Number: LECL TMDL Monitoring

Work Order Number: B9H3684

Report Date: 11-Sep-2019

Received on Ice (Y/N): Yes Temp: 6 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9H29009 - Analyzed as received										
LCS (9H29009-BS1)				Prepared & Analyzed: 08/29/19						
Ammonia-Nitrogen	1.01	0.10	0.044	mg/L	1.00	101	90-110			
Matrix Spike (9H29009-MS1)				Source: B9H3683-03 Prepared & Analyzed: 08/29/19						
Ammonia-Nitrogen	1.01	0.10	0.044	mg/L	1.00	0.0711	93.6	80-120		
Matrix Spike Dup (9H29009-MSD1)				Source: B9H3683-03 Prepared & Analyzed: 08/29/19						
Ammonia-Nitrogen	1.04	0.10	0.044	mg/L	1.00	0.0711	97.3	80-120	3.55	20
Batch 9H30012 - Acid Digest										
Blank (9H30012-BLK1)				Prepared & Analyzed: 08/30/19						
Kjeldahl Nitrogen	ND	0.10	0.093	mg/L						
LCS (9H30012-BS1)				Prepared & Analyzed: 08/30/19						
Kjeldahl Nitrogen	1.06	0.10	0.093	mg/L	1.00	106	80-120			
Matrix Spike (9H30012-MS1)				Source: B9H3851-01 Prepared & Analyzed: 08/30/19						
Kjeldahl Nitrogen	128	8.0	7.4	mg/L	80.0	58.0	88.0	42-154		
Matrix Spike (9H30012-MS2)				Source: B9H3851-01 Prepared & Analyzed: 08/30/19						
Kjeldahl Nitrogen	136	8.0	7.4	mg/L	80.0	58.0	97.4	42-154		



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Project Number: LECL TMDL Monitoring

Work Order Number: B9H3684

Report Date: 11-Sep-2019

Received on Ice (Y/N): Yes Temp: 6 °C

Metals and Metalloids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9H29037 - 200.7/ No Digest										
Blank (9H29037-BLK1)				Prepared & Analyzed: 08/29/19						
Aluminum-Dissolved	17.4	100	16	ug/L						QBfil, J
Blank (9H29037-BLK2)				Prepared & Analyzed: 08/29/19						
Aluminum-Dissolved	ND	100	16	ug/L						QBfil
Blank (9H29037-BLK3)				Prepared & Analyzed: 08/29/19						
Aluminum-Dissolved	ND	100	16	ug/L						QBfil
Blank (9H29037-BLK4)				Prepared & Analyzed: 08/29/19						
Aluminum-Dissolved	ND	100	16	ug/L						
Blank (9H29037-BLK5)				Prepared & Analyzed: 08/29/19						
Aluminum-Dissolved	ND	100	16	ug/L						QBfil
LCS (9H29037-BS1)				Prepared & Analyzed: 08/29/19						
Aluminum-Dissolved	317	100	16	ug/L	334	94.9	85-115			
LCS Dup (9H29037-BSD1)				Prepared & Analyzed: 08/29/19						
Aluminum-Dissolved	314	100	16	ug/L	334	94.1	85-115	0.862	20	
Matrix Spike (9H29037-MS1)				Source: B9H3559-01 Prepared & Analyzed: 08/29/19						
Aluminum-Dissolved	15600	5100	840	ug/L	16700	ND	NR	70-130		
Matrix Spike (9H29037-MS2)				Source: B9H3684-04 Prepared & Analyzed: 08/29/19						
Aluminum-Dissolved	676	200	34	ug/L	668	47.0	94.2	70-130		
Batch 9H30043 - EPA 200.2										
Blank (9H30043-BLK1)				Prepared & Analyzed: 08/30/19						
Aluminum	ND	100	16	ug/L						



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Received on Ice (Y/N): Yes Temp: 6 °C

Metals and Metalloids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9H30043 - EPA 200.2										
LCS (9H30043-BS1)				Prepared & Analyzed: 08/30/19						
Aluminum	1010	100	16	ug/L	1170	86.3	85-115			
LCS Dup (9H30043-BSD1)				Prepared & Analyzed: 08/30/19						
Aluminum	1020	100	16	ug/L	1170	87.8	85-115	1.69	20	
Matrix Spike (9H30043-MS1)		Source: B9H3683-01			Prepared & Analyzed: 08/30/19					
Aluminum	1000	200	33	ug/L	1170	ND	86.1	70-130		
Matrix Spike (9H30043-MS2)		Source: B9H3838-02			Prepared & Analyzed: 08/30/19					
Aluminum	1000	100	16	ug/L	1170	ND	85.9	70-130		



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Received on Ice (Y/N): Yes Temp: 6 °C

Notes and Definitions

- J Estimated value
- N_pFilt Sample filtered and preserved upon receipt to the laboratory.
- QBfil Method blank was filtered prior to processing.
- QFini Follow-up result also did not meet laboratory acceptance criteria.
- QM-4X Due to analyte concentration greater than or equal to 4 times the spike concentration, recoveries for the MS and/or MSD did not meet laboratory acceptance criteria.
- QMint Due to matrix interference, the MS and/or MSD did not meet laboratory acceptance criteria.
- QMS(D) Matrix spike recovery was out of acceptance criteria. Precision and accuracy demonstrated by remaining matrix spike results.
- Qrnd The precision and/or accuracy criteria has been met when rounded to the nearest whole percentage value.
- ND: Analyte NOT DETECTED at or above the Method Detection Limit (if MDL is reported), otherwise at or above the Reportable Detection Limit (RDL)
- NR: Not Reported
- RDL: Reportable Detection Limit
- MDL: Method Detection Limit
- * / " : NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-MDL_No Alias.rpt

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Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: LECL TMDL Monitoring

Work Order Number: B9H3684

Report Date: 11-Sep-2019

Received on Ice (Y/N): Yes Temp: 6 °C

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Client: Wood E&I Solutions, Inc.		Contact: John Rudolph		Phone No. 858-243-8158	
FAX No.		Email: john.rudolph@woodplc.com		Additional Reporting Requests Include QC Data Package: <input type="checkbox"/> Yes <input type="checkbox"/> No FAX Results: <input type="checkbox"/> Yes <input type="checkbox"/> No Email Results: <input type="checkbox"/> Yes <input type="checkbox"/> No State EDT: <input type="checkbox"/> Yes <input type="checkbox"/> No (Include Source Number in Notes)	
Project Name: LECL TMDL Monitoring		Turn Around Time: <u>Routine</u>		*3-5 Day	*48 Hour
Project Number: 1915100402		Lab TAT Approval: By:		Rush	Rush
Sampler Information Name: <u>Kevin Stolzeband</u> Employer: Wood E&I Solutions, Inc. Signature: <u>[Signature]</u>		# of Containers & Preservatives Unpreserved H2SO4 HCl HNO3 Na2S2O3 NaOH NaOH/ZnAcetate NH4Cl MCAA Frozen		Analysis Requested TSS Nitrate - Nitrite TDS TKN Ammonia Total Phosphorus SRP/Ortho-P Total Sulfide Total and Dissolved Al	
Matrix DW = Drinking Water WW = Wastewater GW = Groundwater S = Soil SG = Sludge L = Liquid M = Miscellaneous		Notes Ortho-P has NOT been field filtered. Total Phosphorus - Sub to Eurofins Calcine and RUSH 5-day TAT (8/27/19 sample only) Dissolved Metals are NOT field filtered. ** 8/27/19 Total Phosphorus - RUSH (5 day) TAT			
Sample ID	Date	Time	Total # of Containers	Sample Type	Notes
CL07	8/27/19	1015		X X X X X X X X X X	
CL08		0930		X X X X X X X X X X	Carrier
CL09		0845		X X X X X X X X X X	
CL10		0745		X X X X X X X X X X	
LE02	L	0830		X X X X X X X X X X	
Relinquished By (sign)		Print Name / Company		Date / Time	
<u>[Signature]</u>		Kevin Stolzeband Wood		8/27/19	
<u>[Signature]</u>		JASON JUDWINS / DE		8/27/19 2:12pm	
Received By (Sign)		Print Name / Company		Date / Time	
<u>[Signature]</u>		JASON JUDWINS / DE		8/27/19	
<u>[Signature]</u>		ESTEPH / ESB		8/27/19	

(For Lab Use Only)		Sample Integrity Upon Receipt		Lab Notes	
Sample(s) Submitted on Ice?	Yes <input checked="" type="radio"/> No <input type="radio"/>	Temperature	T#62		
Custody Seal(s) Intact?	Yes <input type="radio"/> No <input checked="" type="radio"/> N/A	6 °C			
Sample(s) Intact?	Yes <input checked="" type="radio"/> No <input type="radio"/>	<input type="checkbox"/> Cooler Blank			

B9H3684
Rc'd: 08/27/2019 14:12
AJG Temp Gun Id : T#62



BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Sc
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA, 92123

Analytical Report: Page 1 of 2
 Project Name: AMEC-Lake Elsinore
 Project Number: LECL TMDL Monitoring
Work Order Number: B9H3689

Report Date: 25-Sep-2019

Received on Ice (Y/N) Yes Temp: 6 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B9H3689-01	CL07-Int	Solid	8/27/19 10:15	Kevin Stolzenbach	8/27/19 14:12	Courier (Jason J.) - DE
B9H3689-02	CL07-Surf	Solid	8/27/19 10:15	Kevin Stolzenbach	8/27/19 14:12	Courier (Jason J.) - DE
B9H3689-03	CL08-Int	Solid	8/27/19 9:30	Kevin Stolzenbach	8/27/19 14:12	Courier (Jason J.) - DE
B9H3689-04	CL08-Surf	Solid	8/27/19 9:30	Kevin Stolzenbach	8/27/19 14:12	Courier (Jason J.) - DE
B9H3689-05	CL09-Int	Solid	8/27/19 8:45	Kevin Stolzenbach	8/27/19 14:12	Courier (Jason J.) - DE
B9H3689-06	CL09-Surf	Solid	8/27/19 8:45	Kevin Stolzenbach	8/27/19 14:12	Courier (Jason J.) - DE
B9H3689-07	CL10-Int	Solid	8/27/19 7:45	Kevin Stolzenbach	8/27/19 14:12	Courier (Jason J.) - DE
B9H3689-08	CL10-Surf	Solid	8/27/19 7:45	Kevin Stolzenbach	8/27/19 14:12	Courier (Jason J.) - DE
B9H3689-09	LE02-Int	Solid	8/27/19 8:30	Kevin Stolzenbach	8/27/19 14:12	Courier (Jason J.) - DE
B9H3689-10	LE02-Surf	Solid	8/27/19 8:40	Kevin Stolzenbach	8/27/19 14:12	Courier (Jason J.) - DE

Note: Analysis for Chlorophyll a was subcontracted to Truesdail Laboratories, Inc.



BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 2 of 2
Project Name: AMEC-Lake Elsinore
Project Number: LECL TMDL Monitoring
Work Order Number: B9H3689

Report Date: 25-Sep-2019

Received on Ice (Y/N) Yes Temp: 6 °C

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Case Narrative+ COC.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.



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Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 1 of 1
Project Name: AMEC-Lake Elsinore
Project Number: LECL TMDL Monitoring
Work Order Number: B9H3689

Report Date: 25-Sep-2019

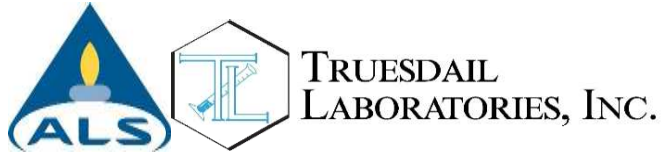
Received on Ice (Y/N) Yes Temp: 6 °C

E.S. Babcock & Sons, Inc. Environmental Laboratories Chain of Custody & Sample Information Record
(951) 653-3351 FAX (951) 653-1662
www.babcocklabs.com

Client: Wood E&I Solutions, Inc.		Contact: John Rudolph		Phone No. 858-243-8158	
FAX No.		Email: john.rudolph@woodplc.com		Additional Reporting Requests	
Project Name: LECL TMDL Monitoring		Turn Around Time: Routine		*3-5 Day *48 Hour *24 Hour Rush Rush Rush	
Project Number: 1915100402		*Lab TAT Approval: By:		*Additional Charges May Apply	
Sampler Information Name: <u>Kevin Stolcanda</u> Employer: Wood E&I Solutions, Inc. Signature: <u>[Signature]</u>		# of Containers & Preservatives Unpreserved H2SO4 HCl HNO3 Na2S2O3 NaOH NaOH/Zn Acetate NH4Cl MCAA Frozen		Analysis Requested Total # of Containers Routine Resample Special Total Sulfide Nitrate - Nitrite TDS TKN Ammonia Total Phosphorus SRP/Ortho-P Chlorophyll-a	
Matrix DW = Drinking Water WW = Wastewater GW = Groundwater S = Soil SG = Sludge L = Liquid M = Miscellaneous		Notes		Chl-a samples on 0.7 um GFF Subout	
Sample ID	Date	Time			Filter Volume
CL07 - Int	8/27/19	1015			250 mL
CL07 - Surf		1015			250 mL
CL08 - Int		0930			250 mL
CL08 - Surf		0930			250 mL
CL09 - Int		0815			250 mL
CL09 - Surf		0815			250 mL
CL10 - Int		0745			250 mL
CL10 - Surf		0745			250 mL
LE02 - Int		0830			250 mL
LE02 - Surf		0840			250 mL
Relinquished By (sign)	Print Name / Company	Date / Time	Received By (Sign)	Print Name / Company	
<u>[Signature]</u>	Kevin Stolcanda / Wood	8/27/19 1200	<u>[Signature]</u>	JASON JOUWNS / DE	
<u>[Signature]</u>	JASON JOUWNS / DE	8/27/19 2:12pm	<u>[Signature]</u>	ESTEPH / ESB	

(For Lab Use Only) Sample Integrity Upon Receipt		Lab Notes	
Sample(s) Submitted on Ice?	Yes No	Temperature	T#62
Custody Seal(s) Intact?	Yes No (N/A)	6°C	
Sample(s) Intact?	Yes No	<input type="checkbox"/> Cooler Blank	

B9H3689
Rc'd: 08/27/2019 14:12
1sg ATG Temp Gun Id: T#62



Report

Client: Babcock Laboratories, Inc.
6100 Quail Valley Ct
Riverside, CA 92507

Work Order No.: 19H0498
Printed: 09/10/2019

Attention: Amanda C. Porter
Project Name: Chlorophyll

CASE NARRATIVE

SAMPLE RECEIPT SUMMARY

Table with 6 columns: Sample ID, Laboratory ID, Matrix, Type, Date Sampled, Date Received. Contains 10 rows of sample data.

DEFINITIONS

Table with 2 columns: Symbol, Definition. Lists DF, MDL, ND, RL and their meanings.

Respectfully yours,

Handwritten signature of Shelly Brady

Shelly Brady
Customer Service Manager



B9H3689-01

19H0498-01 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	33.3	1.00	1.00	mg/m ³	1	1908671	09/09/2019 17:49	EGV	EPA 10200 H	
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B9H3689-02

19H0498-02 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	6.66	1.00	1.00	mg/m ³	1	1908671	09/09/2019 17:49	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

B9H3689-03

19H0498-03 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	36.3	1.00	1.00	mg/m ³	1	1908671	09/09/2019 17:49	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

B9H3689-04

19H0498-04 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	6.66	1.00	1.00	mg/m ³	1	1908671	09/09/2019 17:49	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

B9H3689-05

19H0498-05 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

This report applies to the sample(s), or product(s), investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed. This report shall not be reproduced without the written consent of ALS-Truesdail Laboratories, Inc., and must be reproduced in its entirety.



B9H3689-05 (Continued)

19H0498-05 (Filter) (Continued)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	64.5	1.00	1.00	mg/m ³	1	1908671	09/09/2019 17:49	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

B9H3689-06

19H0498-06 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
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ALS Truesdail

Microbiology

Chlorophyll a	13.8	1.00	1.00	mg/m ³	1	1908671	09/09/2019 17:49	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

B9H3689-07

19H0498-07 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
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ALS Truesdail

Microbiology

Chlorophyll a	19.5	1.00	1.00	mg/m ³	1	1908671	09/09/2019 17:49	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

B9H3689-08

19H0498-08 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
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ALS Truesdail

Microbiology

Chlorophyll a	19.9	1.00	1.00	mg/m ³	1	1908671	09/09/2019 17:49	EGV	EPA 10200 H	
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B9H3689-09

19H0498-09 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
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ALS Truesdail

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TRUESDAIL
LABORATORIES, INC.

Client: Babcock Laboratories, Inc.

Project Name: Chlorophyll

Printed: 09/10/2019

B9H3689-09 (Continued)

19H0498-09 (Filter) (Continued)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
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ALS Truesdail

Microbiology

Chlorophyll a	99.1	1.00	1.00	mg/m ³	1	1908671	09/09/2019 17:49	EGV	EPA 10200 H	
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B9H3689-10

19H0498-10 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	81.9	1.00	1.00	mg/m ³	1	1908671	09/09/2019 17:49	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

This report applies to the sample(s), or product(s), investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed. This report shall not be reproduced without the written consent of ALS-Truesdail Laboratories, Inc., and must be reproduced in its entirety.

19H0498

Printed: 8/28/2019 10:18

SUBCONTRACT ORDER

Babcock Laboratories, Inc.

B9H3689

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: B9H3689-06 Solid		Sampled: 08/27/19 08:45	CL09-Surf	Proj.No.:LECL TMDL Monitoring
Subout	09/23/19 23:59	09/06/19 08:45	Report Chlorophyll a / Filter Volume = 250mL	
Containers Supplied: Whirl-Pak (A)				
Sample ID: B9H3689-07 Solid		Sampled: 08/27/19 07:45	CL10-Int	Proj.No.:LECL TMDL Monitoring
Subout	09/23/19 23:59	09/06/19 07:45	Report Chlorophyll a / Filter Volume = 250mL	
Containers Supplied: Whirl-Pak (A)				
Sample ID: B9H3689-08 Solid		Sampled: 08/27/19 07:45	CL10-Surf	Proj.No.:LECL TMDL Monitoring
Subout	09/23/19 23:59	09/06/19 07:45	Report Chlorophyll a / Filter Volume = 250mL	
Containers Supplied: Whirl-Pak (A)				
Sample ID: B9H3689-09 Solid		Sampled: 08/27/19 08:30	LE02-Int	Proj.No.:LECL TMDL Monitoring
Subout	09/23/19 23:59	09/06/19 08:30	Report Chlorophyll a / Filter Volume = 250mL	
Containers Supplied: Whirl-Pak (A)				
Sample ID: B9H3689-10 Solid		Sampled: 08/27/19 08:40	LE02-Surf	Proj.No.:LECL TMDL Monitoring
Subout	09/23/19 23:59	09/06/19 08:40	Report Chlorophyll a / Filter Volume = 250mL	
Containers Supplied: Whirl-Pak (A)				

Ref: Date: 28Aug19
 Dep: Wgt: 10.00 LBS
 DV: 0.00
 SHIPING: 20.38
 SPECIAL: 1.43
 HANDLING: 0.00
 TOTAL: 21.81
 Sys: PRIORITY OVERNIGHT
 TRACK: 1192 4906 2705

All Containers Intact: ___ Yes ___ No Samples Preserved Properly: ___ Yes ___ No

Samples Received at 3.4 oC Sample Labels / COC Agree: ___ Yes ___ No Custody Seals Present: ___ Yes ___ No

Please forward all acknowledgements of sample receipt, final reports and invoices to data@babcocklabs.com
NO HARDCOPIES PLEASE

Released By: [Signature] Date: 8/28/19 Received By: [Signature] Date: 8/29/19 10:30

Released By: _____ Date: _____ Received By: _____ Date: _____

19H0498

SUBCONTRACT ORDER

Printed: 8/28/2019 10:18

Babcock Laboratories, Inc.

B9H3689

SENDING LABORATORY:

Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, CA 92507-0704
Phone: (951) 653-3351
Fax: (951) 653-1662
Project Manager: Cindy A. Waddell

RECEIVING LABORATORY:

Truesdail Laboratories - Subcontract
3337 Michelson Drive Suite CN750
Irvine, CA 92614
Phone : (714) 730-6239
Fax: (714) 730-6462

System Name: Wood Environmental&Infrastructure Solutions, Inc
Sampler: Kevin Stolzenbach

*Please include MDL's
& Excel file*

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: B9H3689-01 Solid		Sampled: 08/27/19 10:15	CL07-Int	Proj.No.:LECL TMDL Monitoring
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	09/23/19 23:59	09/06/19 10:15		Report Chlorophyll a / Filter Volume = 250mL
Sample ID: B9H3689-02 Solid		Sampled: 08/27/19 10:15	CL07-Surf	Proj.No.:LECL TMDL Monitoring
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	09/23/19 23:59	09/06/19 10:15		Report Chlorophyll a / Filter Volume = 250mL
Sample ID: B9H3689-03 Solid		Sampled: 08/27/19 09:30	CL08-Int	Proj.No.:LECL TMDL Monitoring
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	09/23/19 23:59	09/06/19 09:30		Report Chlorophyll a / Filter Volume = 250mL
Sample ID: B9H3689-04 Solid		Sampled: 08/27/19 09:30	CL08-Surf	Proj.No.:LECL TMDL Monitoring
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	09/23/19 23:59	09/06/19 09:30		Report Chlorophyll a / Filter Volume = 250mL
Sample ID: B9H3689-05 Solid		Sampled: 08/27/19 08:45	CL09-Int	Proj.No.:LECL TMDL Monitoring
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	09/23/19 23:59	09/06/19 08:45		Report Chlorophyll a / Filter Volume = 250mL

ANALYTICAL REPORT

Eurofins Calscience LLC
7440 Lincoln Way
Garden Grove, CA 92841
Tel: (714)895-5494

Laboratory Job ID: 570-5938-1
Client Project/Site: B9H3584
Revision: 1

For:
Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, California 92507

Attn: Cindy A Waddell



Authorized for release by:
2/19/2020 2:06:17 PM

Carla Hollowell, Project Manager I
(714)895-5494
carlahollowell@eurofinsus.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Table of Contents	2
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Client Sample Results	5
QC Sample Results	6
Lab Chronicle	7
Certification Summary	8
Method Summary	9
Sample Summary	10
Chain of Custody	11
Receipt Checklists	13

Definitions/Glossary

Client: Babcock Laboratories, Inc.
Project/Site: B9H3584

Job ID: 570-5938-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Babcock Laboratories, Inc.
Project/Site: B9H3584

Job ID: 570-5938-1

Job ID: 570-5938-1

Laboratory: Eurofins Calscience LLC

Narrative

Job Narrative
570-5938-1

Comments

No additional comments.

Receipt

The samples were received on 8/28/2019 10:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.2° C.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Client Sample Results

Client: Babcock Laboratories, Inc.
Project/Site: B9H3584

Job ID: 570-5938-1

General Chemistry

Client Sample ID: B9H3584-01
Date Collected: 08/27/19 10:15
Date Received: 08/28/19 10:15

Lab Sample ID: 570-5938-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.239		0.0100	0.00281	mg/L		09/03/19 11:45	09/04/19 11:49	1

Client Sample ID: B9H3584-02
Date Collected: 08/27/19 09:30
Date Received: 08/28/19 10:15

Lab Sample ID: 570-5938-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.0444		0.0100	0.00281	mg/L		09/03/19 11:45	09/04/19 11:50	1

Client Sample ID: B9H3584-03
Date Collected: 08/27/19 08:45
Date Received: 08/28/19 10:15

Lab Sample ID: 570-5938-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.0853		0.0100	0.00281	mg/L		09/03/19 11:45	09/04/19 11:52	1

Client Sample ID: B9H3584-04
Date Collected: 08/27/19 07:45
Date Received: 08/28/19 10:15

Lab Sample ID: 570-5938-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.0392	F1	0.0100	0.00281	mg/L		09/03/19 11:45	09/04/19 11:53	1

Client Sample ID: B9H3584-05
Date Collected: 08/27/19 08:30
Date Received: 08/28/19 10:15

Lab Sample ID: 570-5938-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.104		0.0100	0.00281	mg/L		09/03/19 11:45	09/04/19 11:55	1

QC Sample Results

Client: Babcock Laboratories, Inc.
Project/Site: B9H3584

Job ID: 570-5938-1

Method: 365.1 - Phosphorus, Total

Lab Sample ID: 570-5938-4 MS
Matrix: Water
Analysis Batch: 16938

Client Sample ID: B9H3584-04
Prep Type: Total/NA
Prep Batch: 16667

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.0392	F1	0.200	0.2502		mg/L		106	90 - 110

Lab Sample ID: 570-5938-4 MSD
Matrix: Water
Analysis Batch: 16938

Client Sample ID: B9H3584-04
Prep Type: Total/NA
Prep Batch: 16667

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphorus, Total	0.0392	F1	0.200	0.2909	F1	mg/L		126	90 - 110	15	25

Lab Sample ID: MB 570-16938/38
Matrix: Water
Analysis Batch: 16938

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	ND		0.100	0.00281	mg/L			09/04/19 11:29	1

Lab Sample ID: LCS 570-16938/42
Matrix: Water
Analysis Batch: 16938

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.200	0.2011		mg/L		101	90 - 110

Lab Sample ID: LCSD 570-16938/43
Matrix: Water
Analysis Batch: 16938

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphorus, Total	0.200	0.2003		mg/L		100	90 - 110	0	20

Lab Chronicle

Client: Babcock Laboratories, Inc.
Project/Site: B9H3584

Job ID: 570-5938-1

Client Sample ID: B9H3584-01

Lab Sample ID: 570-5938-1

Date Collected: 08/27/19 10:15

Matrix: Water

Date Received: 08/28/19 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	16667	09/03/19 11:45	ED6R	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	16938	09/04/19 11:49	ED6R	ECL 1
Instrument ID: ACA1										

Client Sample ID: B9H3584-02

Lab Sample ID: 570-5938-2

Date Collected: 08/27/19 09:30

Matrix: Water

Date Received: 08/28/19 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	16667	09/03/19 11:45	ED6R	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	16938	09/04/19 11:50	ED6R	ECL 1
Instrument ID: ACA1										

Client Sample ID: B9H3584-03

Lab Sample ID: 570-5938-3

Date Collected: 08/27/19 08:45

Matrix: Water

Date Received: 08/28/19 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	16667	09/03/19 11:45	ED6R	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	16938	09/04/19 11:52	ED6R	ECL 1
Instrument ID: ACA1										

Client Sample ID: B9H3584-04

Lab Sample ID: 570-5938-4

Date Collected: 08/27/19 07:45

Matrix: Water

Date Received: 08/28/19 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	16667	09/03/19 11:45	ED6R	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	16938	09/04/19 11:53	ED6R	ECL 1
Instrument ID: ACA1										

Client Sample ID: B9H3584-05

Lab Sample ID: 570-5938-5

Date Collected: 08/27/19 08:30

Matrix: Water

Date Received: 08/28/19 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	16667	09/03/19 11:45	ED6R	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	16938	09/04/19 11:55	ED6R	ECL 1
Instrument ID: ACA1										

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

Accreditation/Certification Summary

Client: Babcock Laboratories, Inc.
Project/Site: B9H3584

Job ID: 570-5938-1

Laboratory: Eurofins Calscience LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arizona	State	AZ0781	03-13-20
California	Los Angeles County Sanitation Districts	10109	09-29-20
California	State	2944	09-29-20
Guam	State	20-003R	10-31-19
Hawaii	State	<cert No.>	07-02-20
Nevada	State	CA00111	07-31-20

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Method Summary

Client: Babcock Laboratories, Inc.
Project/Site: B9H3584

Job ID: 570-5938-1

Method	Method Description	Protocol	Laboratory
365.1	Phosphorus, Total	EPA	ECL 1
365.2/365.3/365	Phosphorus, Total	MCAWW	ECL 1

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494



Sample Summary

Client: Babcock Laboratories, Inc.
Project/Site: B9H3584

Job ID: 570-5938-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
570-5938-1	B9H3584-01	Water	08/27/19 10:15	08/28/19 10:15	
570-5938-2	B9H3584-02	Water	08/27/19 09:30	08/28/19 10:15	
570-5938-3	B9H3584-03	Water	08/27/19 08:45	08/28/19 10:15	
570-5938-4	B9H3584-04	Water	08/27/19 07:45	08/28/19 10:15	
570-5938-5	B9H3584-05	Water	08/27/19 08:30	08/28/19 10:15	

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5938



570-5938 Chain of Custody

SUBCONTRACT ORDER
Babcock Laboratories, Inc.
B9H3584

Printed: 8/27/2019 14:59

SENDING LABORATORY:

Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, CA 92507-0704
Phone: (951) 653-3351
Fax: (951) 653-1662
Project Manager: Cindy A. Waddell

RECEIVING LABORATORY:

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove, CA 92841-1427
Phone : (714) 895-5494
Fax: (714) 894-7501

System Name: Wood Environment & Infrastructure Solutions, Inc
Sampler: Kevin Stolzabach

*please include Excel file
& MDL's*

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: B9H3584-01 Liquid		Sampled: 08/27/19 10:15	CL07	Proj.No.:Lake Elsinore/Canyon Lake
Subout_02 Containers Supplied: 500 mL Poly H2SO4 (A)	09/03/19 23:59	09/06/19 10:15	Low Level Total Phosphorus	
Sample ID: B9H3584-02 Liquid		Sampled: 08/27/19 09:30	CL08	Proj.No.:Lake Elsinore/Canyon Lake
Subout_02 Containers Supplied: 500 mL Poly H2SO4 (A)	09/03/19 23:59	09/06/19 09:30	Low Level Total Phosphorus	
Sample ID: B9H3584-03 Liquid		Sampled: 08/27/19 08:45	CL09	Proj.No.:Lake Elsinore/Canyon Lake
Subout_02 Containers Supplied: 500 mL Poly H2SO4 (A)	09/03/19 23:59	09/06/19 08:45	Low Level Total Phosphorus	
Sample ID: B9H3584-04 Liquid		Sampled: 08/27/19 07:45	CL10	Proj.No.:Lake Elsinore/Canyon Lake
Subout_02 Containers Supplied: 500 mL Poly H2SO4 (A)	09/03/19 23:59	09/06/19 07:45	Low Level Total Phosphorus	
Sample ID: B9H3584-05 Liquid		Sampled: 08/27/19 08:30	LE02	Proj.No.:Lake Elsinore/Canyon Lake
Subout_02 Containers Supplied: 500 mL Poly H2SO4 (A)	09/03/19 23:59	09/06/19 08:30	Low Level Total Phosphorus	

Ref:
Dep:

Date: 27Aug19
Wgt: 15.20 LBS
DV:

SHIPPING:	20.38
SPECIAL:	1.43
HANDLING:	0.00
TOTAL:	21.81

Svcs: PRIORITY OVERNIGHT
TRACK: 1192 4906 2337

5938

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SUBCONTRACT ORDER

Printed: 8/27/2019 14:59

Babcock Laboratories, Inc.

B9H3584

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- 9
- 10
- 11
- 12

All Containers Intact: Yes No Samples Preserved Properly: Yes No
 Samples Received at _____ oC Sample Labels / COC Agree: Yes No Custody Seals Present: Yes No

Please forward all acknowledgements of sample receipt, final reports and invoices to data@babcocklabs.com
NO HARDCOPIES PLEASE.

Released By:  Date: 08/27/19 Received By:  Date: 8/28/19 10:15

Released By: _____ Date: _____ Received By: _____ Date: _____

3.0/3.2 SC6

Login Sample Receipt Checklist

Client: Babcock Laboratories, Inc.

Job Number: 570-5938-1

Login Number: 5938

List Source: Eurofins Calscience

List Number: 1

Creator: Patel, Jayesh

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



BABCOCK Laboratories, Inc.

The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore TMDL Monitoring

Work Order Number: B913666

Report Date: 10-Oct-2019

Received on Ice (Y/N): Yes Temp: 12 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B913666-01	LE02	Liquid	09/26/19 08:30	Tyler Huff/Lark	09/26/19 14:20	Courier (Jason J.) -DE

mailing
P.O Box 432
Riverside, CA 92502-0432

location
6100 Quail Valley Court
Riverside, CA 92507-0704

P 951 653 3351
F 951 653 1662
www.babcocklabs.com

CA ELAP No. 2698
EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 2 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore TMDL Monitoring

Work Order Number: B913666

Report Date: 10-Oct-2019

Received on Ice (Y/N): Yes Temp: 12 °C

Laboratory Reference Number

B913666-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
LE02	Liquid	09/26/19 08:30	09/26/19 14:20

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	09/27/19 00:52	MCM	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	09/27/19 00:52	MCM	
Solids								
Total Dissolved Solids	2200	40	40	mg/L	SM 2540C	10/02/19 21:50	CMR	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	10/03/19 12:00	CAA	
Nutrients								
Ammonia-Nitrogen	ND	0.10	0.044	mg/L	SM4500NH3H G	10/04/19 09:39	SLL	
Kjeldahl Nitrogen	5.1	0.20	0.19	mg/L	EPA 351.2	10/07/19 15:12	SLL	
Ortho Phosphate Phosphorus	ND	0.050	0.016	mg/L	SM 4500P E	09/26/19 22:27	MWM	

mailing
P.O Box 432
Riverside, CA 92502-0432

location
6100 Quail Valley Court
Riverside, CA 92507-0704

P 951 653 3351
F 951 653 1662
www.babcocklabs.com

CA ELAP No. 2698
EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



BABCOCK Laboratories, Inc.

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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 3 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore TMDL Monitoring

Work Order Number: B913666

Report Date: 10-Oct-2019

Received on Ice (Y/N): Yes Temp: 12 °C

Anions - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9I26055 - Analyzed as Received IC										
Blank (9I26055-BLK1)				Prepared & Analyzed: 09/26/19						
Nitrite as N	ND	0.10	0.091	mg/L						
Nitrate as N	ND	0.20	0.16	mg/L						
LCS (9I26055-BS1)				Prepared & Analyzed: 09/26/19						
Nitrite as N	2.60	0.10	0.091	mg/L	2.50	104	90-110			
Nitrate as N	5.45	0.20	0.16	mg/L	5.65	96.4	90-110			
Matrix Spike (9I26055-MS1)				Source: B913538-01		Prepared & Analyzed: 09/26/19				
Nitrite as N	2.66	0.10	0.091	mg/L	2.50	ND	106	80-120		
Nitrate as N	6.00	0.20	0.16	mg/L	5.65	0.290	101	75-131		
Matrix Spike (9I26055-MS2)				Source: B913669-05		Prepared & Analyzed: 09/27/19				
Nitrite as N	1.25	0.10	0.091	mg/L	2.50	ND	50.1	80-120		QFpas, QMout
Nitrate as N	5.94	0.20	0.16	mg/L	5.65	ND	105	75-131		
Matrix Spike Dup (9I26055-MSD1)				Source: B913538-01		Prepared & Analyzed: 09/26/19				
Nitrite as N	2.61	0.10	0.091	mg/L	2.50	ND	105	80-120	1.67	20
Nitrate as N	5.97	0.20	0.16	mg/L	5.65	0.290	101	75-131	0.526	20



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Client Name: Wood Environment&Infrastructure Solutions, Inc

Contact: John Rudolph

Address: 9210 Sky Park Court #200

San Diego, CA 92123

Analytical Report: Page 4 of 8

Project Name: Amec Foster Wheeler-Lake Elsinore

Project Number: Lake Elsinore TMDL Monitoring

Work Order Number: B913666

Report Date: 10-Oct-2019

Received on Ice (Y/N): Yes

Temp: 12 °C

Solids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9J02107 - Analyzed as received										
Blank (9J02107-BLK1)				Prepared & Analyzed: 10/02/19						
Total Dissolved Solids	ND	10	10	mg/L						
LCS (9J02107-BS1)				Prepared & Analyzed: 10/02/19						
Total Dissolved Solids	750	10	10	mg/L	746	101	90-110			
Duplicate (9J02107-DUP1)				Source: B913617-01		Prepared & Analyzed: 10/02/19				
Total Dissolved Solids	401	10	10	mg/L	402			0.249	20	
Duplicate (9J02107-DUP2)				Source: B913659-02		Prepared & Analyzed: 10/02/19				
Total Dissolved Solids	228	10	10	mg/L	218			4.48	20	



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 5 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore TMDL Monitoring

Work Order Number: B9I3666

Report Date: 10-Oct-2019

Received on Ice (Y/N): Yes Temp: 12 °C

General Inorganics - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9J03029 - Analyzed as received										
Blank (9J03029-BLK1)				Prepared & Analyzed: 10/03/19						
Sulfide	ND	0.10	0.10	mg/L						
LCS (9J03029-BS1)				Prepared & Analyzed: 10/03/19						
Sulfide	0.300	0.10	0.10	mg/L	0.400	75.0	50-150			
Matrix Spike (9J03029-MS1)				Source: B9J0407-01 Prepared & Analyzed: 10/03/19						
Sulfide	0.300	0.10	0.10	mg/L	0.400	ND	75.0	50-150		
Matrix Spike Dup (9J03029-MSD1)				Source: B9J0407-01 Prepared & Analyzed: 10/03/19						
Sulfide	0.300	0.10	0.10	mg/L	0.400	ND	75.0	50-150	0.00	30



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 6 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore TMDL Monitoring

Work Order Number: B913666

Report Date: 10-Oct-2019

Received on Ice (Y/N): Yes Temp: 12 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9I26052 - Filter if turbid.										
LCS (9I26052-BS1)				Prepared & Analyzed: 09/26/19						
Ortho Phosphate Phosphorus	0.525	0.050	0.016	mg/L	0.500	105	90-110			
Matrix Spike (9I26052-MS1)				Source: B913499-03 Prepared & Analyzed: 09/26/19						
Ortho Phosphate Phosphorus	0.607	0.050	0.016	mg/L	0.500	0.0616	109	80-120		
Matrix Spike Dup (9I26052-MSD1)				Source: B913499-03 Prepared & Analyzed: 09/26/19						
Ortho Phosphate Phosphorus	0.621	0.050	0.016	mg/L	0.500	0.0616	112	80-120	2.23	20
Batch 9J04016 - Analyzed as received										
Blank (9J04016-BLK1)				Prepared & Analyzed: 10/04/19						
Ammonia-Nitrogen	ND	0.10	0.044	mg/L						
LCS (9J04016-BS1)				Prepared & Analyzed: 10/04/19						
Ammonia-Nitrogen	1.01	0.10	0.044	mg/L	1.00	101	90-110			
Matrix Spike (9J04016-MS1)				Source: B9J0428-02 Prepared & Analyzed: 10/04/19						
Ammonia-Nitrogen	1.11	0.10	0.044	mg/L	1.00	0.154	95.6	80-120		
Matrix Spike Dup (9J04016-MSD1)				Source: B9J0428-02 Prepared & Analyzed: 10/04/19						
Ammonia-Nitrogen	1.04	0.10	0.044	mg/L	1.00	0.154	88.4	80-120	6.66	20
Batch 9J07085 - Acid Digest										
Blank (9J07085-BLK1)				Prepared & Analyzed: 10/07/19						
Kjeldahl Nitrogen	ND	0.10	0.093	mg/L						



BABCOCK Laboratories, Inc.

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Client Name: Wood Environment&Infrastructure Solutions, Inc

Contact: John Rudolph

Address: 9210 Sky Park Court #200

San Diego, CA 92123

Analytical Report: Page 7 of 8

Project Name: Amec Foster Wheeler-Lake Elsinore

Project Number: Lake Elsinore TMDL Monitoring

Work Order Number: B9I3666

Report Date: 10-Oct-2019

Received on Ice (Y/N): Yes

Temp: 12 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9J07085 - Acid Digest										
LCS (9J07085-BS1)				Prepared & Analyzed: 10/07/19						
Kjeldahl Nitrogen	1.15	0.10	0.093	mg/L	1.00	115	80-120			
Matrix Spike (9J07085-MS1)				Source: B9J0411-01 Prepared & Analyzed: 10/07/19						
Kjeldahl Nitrogen	136	8.0	7.4	mg/L	80.0	61.8	92.3	42-154		
Matrix Spike Dup (9J07085-MSD1)				Source: B9J0411-01 Prepared & Analyzed: 10/07/19						
Kjeldahl Nitrogen	139	8.0	7.4	mg/L	80.0	61.8	97.0	42-154	2.73	25



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Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 8 of 8
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore TMDL Monitoring

Work Order Number: B913666

Report Date: 10-Oct-2019

Received on Ice (Y/N): Yes Temp: 12 °C

Notes and Definitions

- J Estimated value
- QFpas Follow-up result within laboratory acceptance criteria.
- QMout MS and/or MSD recovery did not meet laboratory acceptance criteria.
- ND: Analyte NOT DETECTED at or above the Method Detection Limit (**if MDL is reported**), otherwise at or above the Reportable Detection Limit (RDL)
- NR: Not Reported
- RDL: Reportable Detection Limit
- MDL: Method Detection Limit
- * / "" : NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-MDL_No Alias.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.

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P.O Box 432
Riverside, CA 92502-0432

location
6100 Quail Valley Court
Riverside, CA 92507-0704

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CA ELAP No. 2698
EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutions, Inc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 1
Project Name: Amec Foster Wheeler-Lake Elsinore
Project Number: Lake Elsinore TMDL Monitoring

Work Order Number: B913666

Report Date: 10-Oct-2019

Received on Ice (Y/N): Yes Temp: 12 °C

E.S. Babcock & Sons, Inc. Environmental Laboratories
(951) 653-3351 FAX (951) 653-1662
www.babcocklabs.com

Chain of Custody & Sample Information Record

Client: Wood E&I Solutions, Inc.		Contact: John Rudolph		Phone No. 858-243-8158	
FAX No.		Email: john.rudolph@woodplc.com		Additional Reporting Requests Include QC Data Package: <input type="checkbox"/> Yes <input type="checkbox"/> No FAX Results: <input type="checkbox"/> Yes <input type="checkbox"/> No Email Results: <input type="checkbox"/> Yes <input type="checkbox"/> No State EDT: <input type="checkbox"/> Yes <input type="checkbox"/> No (Include Source Number in Notes)	
Project Name: LE TMDL Monitoring		Turn Around Time: <u>Routine</u>		*3-5 Day	*48 Hour
Project Number: 1915100402		Lab TAT Approval: By:		Rush	Rush
				*Additional Charges May Apply	
Sampler Information		# of Containers & Preservatives		Analysis Requested	
Name: <u>Tyler Huss + Lark Straney</u>		Unpreserved		Routine	
Employer: Wood E&I Solutions, Inc.		H2SO4		Resample	
Signature: _____		HCl		Special	
		HNO3		TS	
		Na2S2O3		Nitrate - Nitrite	
		NaOH		TDS	
		NaOH/ZnAcetate		TKN	
		NH4Cl		Ammonia	
		MCAA		Total Phosphorus	
		Frozen		SRP/Ortho-P	
				Total Sulfide	
				Total AL	
				Dissolved AL	
				Matrix	
				DW = Drinking Water	
				WW = Wastewater	
				GW = Groundwater	
				S = Soil	
				SG = Sludge	
				L = Liquid	
				M = Miscellaneous	
				Notes	
				Ortho-P has NOT been field filtered.	
				Total Phosphorus - Sub to Eurofins Calscience	
				Dissolved Metals are NOT field filtered	
Sample ID	Date	Time	Total # of Containers		
LE02	9/26	0830			
	2019	EVS			
Relinquished By (sign)		Print Name / Company		Date / Time	
		Tyler Huss / Wood		9/26/19 12:45	
		GDDIS / DE		9/26/19 1:35	
		JAMES JOHNSON / DE		9/26/19 2:20pm	
Received By (Sign)		Print Name / Company			
		H. FORTLAUREL RE			
		JAMES JOHNSON / DE			
		ESTEPH			
(For Lab Use Only) Sample Integrity Upon Receipt			Lab Notes		
Sample(s) Submitted on Ice?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Temperature	T#62		
Custody Seal(s) Intact?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	12 °C			
Sample(s) Intact?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	<input type="checkbox"/> Cooler Blank			
			B913666 Rcd: 09/26/2019 14:20 JLH Temp Gun Id :62		



BABCOCK Laboratories, Inc.
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Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 1 of 1
Project Name: Amec Foster Wheeler-Lake
Project Number: LE TMDL Monitoring
Work Order Number: B9I3847

Report Date: 24-Oct-2019

Received on Ice (Y/N Yes Temp:12 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B9I3847-01	LE02 - Int	Solid	9/26/19 8:30	Tyler Huff/Lark Starkey	9/26/19 14:20	Courier (Jason J.) - DE
B9I3847-02	LE02 - Surf	Solid	9/26/19 8:40	Tyler Huff/Lark Starkey	9/26/19 14:20	Courier (Jason J.) - DE

Note: Analysis for Chlorophyll a was subcontracted to Truesdail Laboratories, Inc.

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Case Narrative+ COC.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.



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Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 1 of 1
Project Name: Amec Foster Wheeler-Lake
Project Number: LE TMDL Monitoring
Work Order Number: B913847

Report Date: 24-Oct-2019

Received on Ice (Y/N) Yes Temp: 12 °C

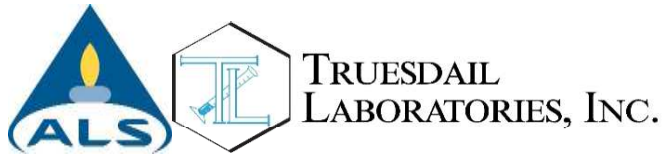
E.S. Babcock & Sons, Inc. Environmental Laboratories
(951) 653-3351 FAX (951) 653-1662
www.babcocklabs.com

Chain of Custody & Sample Information Record

Client: Wood E&I Solutions, Inc.		Contact: John Rudolph		Phone No. 858-243-8158	
FAX No.		Email: john.rudolph@woodplc.com		Additional Reporting Requests	
Project Name: LE TMDL Monitoring		Turn Around Time: Routine		*3-5 Day *48 Hour *24 Hour Rush Rush Rush	
Project Number: 1915100402		*Lab TAT Approval: By:		*Additional Charges May Apply	
Sampler Information		# of Containers & Preservatives		Analysis Requested	
Name: <u>Tyles Holt + Lisa Staskey</u>		Unpreserved		Total # of Containers	
Employer: Wood E&I Solutions, Inc.		H2SO4		Routine	
Signature: _____		HCl		Resample	
		HNO3		Special	
		Na2S2O3		Total Sulfide	
		NaOH		Nitrate - Nitrite	
		NaOH/ZnAcetate		TDS	
		NH4Cl		TKN	
		MCAA		Ammonia	
		Frozen		Total Phosphorus	
				SRP/Ortho-P	
				Chlorophyll-a	
				Matrix	
				Notes	
Sample ID		Date		Time	
LE02 - Int		9/26		0830	
LE02 - Surf		9/26		0840	
DW = Drinking Water		Filter Volume: 500		SUBOUT	
WW = Wastewater		Filter Volume: 500		Chl-a samples on 0.7 um GFF	
GW = Groundwater					
S = Soil					
SG = Sludge					
L = Liquid					
M = Miscellaneous					
Relinquished By (sign)		Print Name / Company		Date / Time	
		2019 E.V.S		9/26/19 2:45	
		WOODS / DO		9/26/19 1:35	
		JASON JORDAN / DO		9/26/19 2:29pm	
Received By (Sign)		Print Name / Company			
		H. Peracchi			
		Jason Jordan / DO			
		ESTERH / ESB			

(For Lab Use Only) Sample Integrity Upon Receipt		Lab Notes	
Sample(s) Submitted on Ice?	Yes No	Temperature	T#62
Custody Seal(s) Intact?	Yes No N/A	12 °C	
Sample(s) Intact?	Yes No	<input type="checkbox"/> Cooler Blank	

B913847
Rc'd: 09/26/2019 14:20
AJG Temp Gun Id : T#62



Report

Client: Babcock Laboratories, Inc.
6100 Quail Valley Ct
Riverside, CA 92507

Work Order No.: 19J0052
Printed: 10/11/2019

Attention: Amanda C. Porter
Project Name: Chlorophyll

CASE NARRATIVE

SAMPLE RECEIPT SUMMARY

Table with 6 columns: Sample ID, Laboratory ID, Matrix, Type, Date Sampled, Date Received. Contains two rows of sample data.

DEFINITIONS

Table with 2 columns: Symbol, Definition. Lists abbreviations like DF, MDL, ND, RL and their meanings.

Respectfully yours,

Joseph Bryan Harding For Shelly Brady
Customer Service Manager



TRUESDAIL
LABORATORIES, INC.

Client: Babcock Laboratories, Inc.

Project Name: Chlorophyll

Printed: 10/11/2019

B9I3847-01

19J0052-01 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	128	1.00	1.00	mg/m ³	1	1910034	10/11/2019 15:53	EGV	EPA 10200 H	
---------------	-----	------	------	-------------------	---	---------	------------------	-----	-------------	--

B9I3847-02

19J0052-02 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	165	1.00	1.00	mg/m ³	1	1910034	10/11/2019 15:53	EGV	EPA 10200 H	
---------------	-----	------	------	-------------------	---	---------	------------------	-----	-------------	--

This report applies to the sample(s), or product(s), investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed. This report shall not be reproduced without the written consent of ALS-Truesdail Laboratories, Inc., and must be reproduced in its entirety.

19J0052

SUBCONTRACT ORDER

Printed: 9/30/2019 9:28

Babcock Laboratories, Inc.
B9I3847

SENDING LABORATORY:

Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, CA 92507-0704
Phone: (951) 653-3351
Fax: (951) 653-1662
Project Manager: Cindy A. Waddell

RECEIVING LABORATORY:

Truesdail Laboratories - Subcontract
3337 Michelson Drive Suite CN750
Irvine, CA 92614
Phone : (714) 730-6239
Fax: (714) 730-6462

System Name: Wood Environment&Infrastructure Solutions, Inc
Sampler: Tyler Huff and Lark Starkey
Please include MDLs and an EXCEL EDD

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: B9I3847-01 Solid		Sampled: 09/26/19 08:30	LE02 - Int	Proj.No.: <u>LE TMDL Monitoring</u>
Subout Containers Supplied: Whirl-Pak (A)	10/22/19 23:59	10/06/19 08:30	Filter Volume 500 / Chlorophyll	
Sample ID: B9I3847-02 Solid		Sampled: 09/26/19 08:40	LE02 - Surf	Proj.No.: <u>LE TMDL Monitoring</u>
Subout Containers Supplied: Whirl-Pak (A)	10/22/19 23:59	10/06/19 08:40	Filter Volume 500 / Chlorophyll	

All Containers Intact: ___ Yes ___ No Samples Preserved Properly: ___ Yes ___ No

Samples Received at 13.4 oC Sample Labels / COC Agree: ___ Yes ___ No Custody Seals Present: ___ Yes ___ No

Please forward all acknowledgements of sample receipt, final reports and invoices to data@babcocklabs.com
NO HARDCOPIES PLEASE.

Released By: [Signature] Date: 9/30/19 Received By: [Signature] Date: 10/1/19 16:45

Released By: _____ Date: _____ Received By: _____ Date: _____

ANALYTICAL REPORT

Eurofins Calscience LLC
7440 Lincoln Way
Garden Grove, CA 92841
Tel: (714)895-5494

Laboratory Job ID: 570-8855-1
Client Project/Site: B9I3850
Revision: 1

For:
Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, California 92507

Attn: Cindy A Waddell



Authorized for release by:
2/19/2020 2:00:00 PM

Carla Hollowell, Project Manager I
(714)895-5494
carlahollowell@eurofinsus.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Definitions/Glossary

Client: Babcock Laboratories, Inc.
Project/Site: B9I3850

Job ID: 570-8855-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Babcock Laboratories, Inc.
Project/Site: B9I3850

Job ID: 570-8855-1

Job ID: 570-8855-1

Laboratory: Eurofins Calscience LLC

Narrative

Job Narrative
570-8855-1

Comments

No additional comments.

Receipt

The sample was received on 10/1/2019 9:45 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.1° C.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Client Sample Results

Client: Babcock Laboratories, Inc.
Project/Site: B9I3850

Job ID: 570-8855-1

General Chemistry

Client Sample ID: B9I3850-01
Date Collected: 09/26/19 08:30
Date Received: 10/01/19 09:45

Lab Sample ID: 570-8855-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.108		0.0100	0.00281	mg/L		10/03/19 12:51	10/03/19 17:10	1

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QC Sample Results

Client: Babcock Laboratories, Inc.
Project/Site: B9I3850

Job ID: 570-8855-1

Method: 365.1 - Phosphorus, Total

Lab Sample ID: MB 570-23499/13-A
Matrix: Water
Analysis Batch: 23758

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 23499

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	ND		0.0100	0.00281	mg/L		10/03/19 12:51	10/03/19 16:46	1

Lab Sample ID: LCS 570-23499/14-A
Matrix: Water
Analysis Batch: 23758

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 23499

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.200	0.2003		mg/L		100	90 - 110

Lab Sample ID: LCSD 570-23499/15-A
Matrix: Water
Analysis Batch: 23758

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 23499

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphorus, Total	0.200	0.2024		mg/L		101	90 - 110	1	20

Lab Sample ID: 570-8174-E-1-D MS
Matrix: Water
Analysis Batch: 23758

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 23499

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.235		0.200	0.4360		mg/L		101	90 - 110

Lab Sample ID: 570-8174-E-1-E MSD
Matrix: Water
Analysis Batch: 23758

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 23499

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphorus, Total	0.235		0.200	0.4396		mg/L		102	90 - 110	1	25

Lab Chronicle

Client: Babcock Laboratories, Inc.
Project/Site: B9I3850

Job ID: 570-8855-1

Client Sample ID: B9I3850-01

Lab Sample ID: 570-8855-1

Date Collected: 09/26/19 08:30

Matrix: Water

Date Received: 10/01/19 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	23499	10/03/19 12:51	UXCH	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	23758	10/03/19 17:10	UXCH	ECL 1

Instrument ID: ACA1

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

Accreditation/Certification Summary

Client: Babcock Laboratories, Inc.
Project/Site: B9I3850

Job ID: 570-8855-1

Laboratory: Eurofins Calscience LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arizona	State	AZ0781	03-13-20
California	Los Angeles County Sanitation Districts	10109	09-29-20
California	SCAQMD LAP	17LA0919	11-29-19
California	State	2944	09-29-20
Guam	State	20-003R	10-31-19
Hawaii	State	<cert No.>	07-02-20
Nevada	State	CA00111	07-31-20



Method Summary

Client: Babcock Laboratories, Inc.
Project/Site: B9I3850

Job ID: 570-8855-1

Method	Method Description	Protocol	Laboratory
365.1	Phosphorus, Total	EPA	ECL 1
365.2/365.3/365	Phosphorus, Total	MCAWW	ECL 1

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494



Sample Summary

Client: Babcock Laboratories, Inc.
Project/Site: B9I3850

Job ID: 570-8855-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
570-8855-1	B9I3850-01	Water	09/26/19 08:30	10/01/19 09:45	

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SUBCONTRACT ORDER

Printed: 9/30/2019 9:29

Babcock Laboratories, Inc.

B9I3850

SENDING LABORATORY:

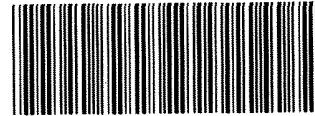
Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, CA 92507-0704
Phone: (951) 653-3351
Fax: (951) 653-1662
Project Manager: Cindy A. Waddell

RECEIVING LABORATORY:

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove, CA 92841-1427
Phone : (714) 895-5494
Fax: (714) 894-7501

System Name: Wood Environment&Infrastructure Solutions, Inc
Sampler: Tyler Huff and Lark Starkey
Please include MDLs and an EXCEL EDD

Analysis	Due	Expires Regulatory Days		Laboratory ID	Comments
		Past	Date Sampled		
Sample ID: B9I3850-01 Liquid	(1)	Sampled: 09/26/19 08:30		LE02	Proj.No.: <u>LE TMDL Monitoring</u>
Subout_02	10/22/19 23:59	10/06/19 08:30		Low Level Total Phosphorus	
Containers Supplied: 500 mL Poly H2SO4 (A)					



570-8855 Chain of Custody

Ref:	Date: 30Sep19	SHIPPING:	20.38
Dep:	Wgt: 13.00 LBS	SPECIAL:	1.58
	DV:	HANDLING:	0.00
		TOTAL:	21.96

Svcs: PRIORITY OVERNIGHT
TRACK: 1246 6435 6384

All Containers Intact: Yes No Samples Preserved Properly: Yes No

Samples Received at oC Sample Labels / COC Agree: Yes No Custody Seals Present: Yes No

Please forward all acknowledgements of sample receipt, final reports and invoices to data@babcocklabs.com
NO HARDCOPIES PLEASE.

Released By: Date: 9/30/19 Received By: Date: 10/01/19 0445

Released By: (Fedex) Date: Received By: Date: Page 1 of 1

8885

- 1
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- 10
- 11
- 12

ORIGIN ID:ONTA (951) 653-3351
 BABCOCK LABORATORIES
 6100 QUAIL VALLEY CT
 RIVERSIDE, CA 92507
 UNITED STATES US

SHIP DATE: 30SEP19
 ACTWGT: 13.00 LB MAN
 CAD: 0266194/CAFE3310
 DIMS: 14x14x12 IN
 BILL SENDER

TO **SAMPLE RECEIVING**
EUROFINS CALSCIENCE, INC.
7440 LINCOLN WAY

GARDEN GROVE CA 92841

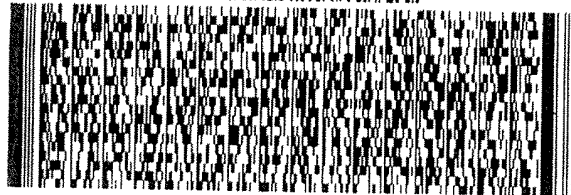
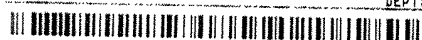
(714) 896-5484

REF:

THU:

PO:

DEPT:



FedEx
Express

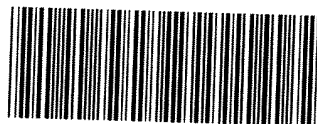
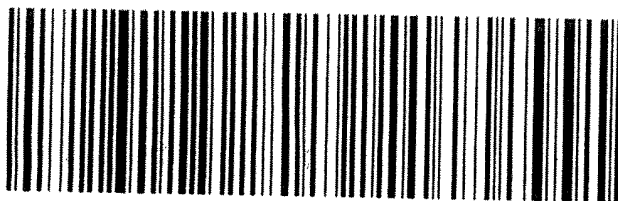


TRK# 1246 6435 6384
 0201

TUE - 01 OCT 10:30A
PRIORITY OVERNIGHT

92 APVA

92841
 CA-US **SNA**



570-8855 Waybill

Login Sample Receipt Checklist

Client: Babcock Laboratories, Inc.

Job Number: 570-8855-1

Login Number: 8855

List Number: 1

Creator: Castro, Joy

List Source: Eurofins Calscience

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	





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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 1 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 31-Oct-2019

Work Order Number: B9J2719
 Received on Ice (Y/N): Yes Temp: 6 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B9J2719-01	CL07	Liquid	10/17/19 10:40	Client	10/17/19 14:30	Courier (Jason J.) - DE
B9J2719-02	CL08	Liquid	10/17/19 10:05	Client	10/17/19 14:30	Courier (Jason J.) - DE
B9J2719-03	CL09	Liquid	10/17/19 9:25	Client	10/17/19 14:30	Courier (Jason J.) - DE
B9J2719-04	CL10	Liquid	10/17/19 9:05	Client	10/17/19 14:30	Courier (Jason J.) - DE
B9J2719-05	LE02	Liquid	10/17/19 10:00	Client	10/17/19 14:30	Courier (Jason J.) - DE



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Analytical Report: Page 2 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 31-Oct-2019

Work Order Number: B9J2719
 Received on Ice (Y/N): Yes Temp: 6 °C

Laboratory Reference Number

B9J2719-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL07	Liquid	10/17/19 10:40	10/17/19 14:30

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	10/18/19 08:29	MCM	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	10/18/19 08:29	MCM	
Solids								
Total Dissolved Solids	380	10	10	mg/L	SM 2540C	10/24/19 13:57	EGV	
Total Suspended Solids	4	2	2	mg/L	SM 2540D	10/23/19 23:19	MWM	
General Inorganics								
Sulfide	6.7	0.10	0.10	mg/L	SM 4500S2 D	10/24/19 22:00	CAA	
Nutrients								
Ammonia-Nitrogen	1.7	0.10	0.044	mg/L	SM4500NH3H G	10/24/19 12:35	SLL	
Kjeldahl Nitrogen	2.7	0.10	0.093	mg/L	EPA 351.2	10/24/19 11:15	SLL	
Organic Nitrogen	1.0	0.1	0.02	mg/L	Calculation			
Total Nitrogen	2.7	0.2	0.16	mg/L	Calculation			
Ortho Phosphate Phosphorus	0.23	0.050	0.016	mg/L	SM 4500P E	10/17/19 22:20	MWM	
Metals and Metalloids								
Aluminum-Dissolved	ND	100	33	ug/L	EPA 200.7	10/25/19 02:06	KRV	N_pFilt
Aluminum	ND	100	33	ug/L	EPA 200.7	10/28/19 17:16	KRV	



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 San Diego, CA 92123

Analytical Report: Page 3 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 31-Oct-2019

Work Order Number: B9J2719
 Received on Ice (Y/N): Yes Temp: 6 °C

Laboratory Reference Number

B9J2719-02

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL08	Liquid	10/17/19 10:05	10/17/19 14:30

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	10/18/19 07:01	MCM	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	10/18/19 07:01	MCM	
Solids								
Total Dissolved Solids	420	10	10	mg/L	SM 2540C	10/24/19 13:57	EGV	
Total Suspended Solids	ND	2	2	mg/L	SM 2540D	10/23/19 23:19	MWM	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	10/24/19 22:00	CAA	
Nutrients								
Ammonia-Nitrogen	0.57	0.10	0.044	mg/L	SM4500NH3H G	10/24/19 12:37	SLL	
Kjeldahl Nitrogen	0.71	0.10	0.093	mg/L	EPA 351.2	10/24/19 11:16	SLL	
Organic Nitrogen	0.1	0.1	0.02	mg/L	Calculation			
Total Nitrogen	0.7	0.2	0.16	mg/L	Calculation			
Ortho Phosphate Phosphorus	ND	0.050	0.016	mg/L	SM 4500P E	10/17/19 22:20	MWM	
Metals and Metalloids								
Aluminum-Dissolved	ND	100	33	ug/L	EPA 200.7	10/25/19 02:08	KRV	N_pFilt
Aluminum	36	100	33	ug/L	EPA 200.7	10/28/19 17:18	KRV	J



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Analytical Report: Page 4 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 31-Oct-2019

Work Order Number: B9J2719
 Received on Ice (Y/N): Yes Temp: 6 °C

Laboratory Reference Number

B9J2719-03

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL09	Liquid	10/17/19 09:25	10/17/19 14:30

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	10/18/19 03:38	MCM	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	10/18/19 03:38	MCM	
Solids								
Total Dissolved Solids	560	10	10	mg/L	SM 2540C	10/24/19 13:57	EGV	
Total Suspended Solids	10	2	2	mg/L	SM 2540D	10/23/19 23:19	MWM	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	10/24/19 22:00	CAA	
Nutrients								
Ammonia-Nitrogen	ND	0.10	0.044	mg/L	SM4500NH3H G	10/24/19 12:39	SLL	
Kjeldahl Nitrogen	1.2	0.10	0.093	mg/L	EPA 351.2	10/24/19 11:18	SLL	
Organic Nitrogen	1.2	0.1	0.02	mg/L	Calculation			
Total Nitrogen	1.2	0.2	0.16	mg/L	Calculation			
Ortho Phosphate Phosphorus	ND	0.050	0.016	mg/L	SM 4500P E	10/17/19 22:20	MWM	
Metals and Metalloids								
Aluminum-Dissolved	ND	100	33	ug/L	EPA 200.7	10/25/19 02:10	KRV	N_pFilt
Aluminum	120	100	33	ug/L	EPA 200.7	10/28/19 17:20	KRV	



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Analytical Report: Page 5 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 31-Oct-2019

Work Order Number: B9J2719
 Received on Ice (Y/N): Yes Temp: 6 °C

Laboratory Reference Number

B9J2719-04

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL10	Liquid	10/17/19 09:05	10/17/19 14:30

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	10/18/19 04:16	MCM	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	10/18/19 04:16	MCM	
Solids								
Total Dissolved Solids	590	10	10	mg/L	SM 2540C	10/24/19 13:57	EGV	
Total Suspended Solids	12	2	2	mg/L	SM 2540D	10/23/19 23:19	MWM	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	10/24/19 22:00	CAA	
Nutrients								
Ammonia-Nitrogen	ND	0.10	0.044	mg/L	SM4500NH3H G	10/24/19 12:41	SLL	
Kjeldahl Nitrogen	1.1	0.10	0.093	mg/L	EPA 351.2	10/24/19 11:19	SLL	
Organic Nitrogen	1.1	0.1	0.02	mg/L	Calculation			
Total Nitrogen	1.1	0.2	0.16	mg/L	Calculation			
Ortho Phosphate Phosphorus	0.027	0.050	0.016	mg/L	SM 4500P E	10/17/19 22:20	MWM	J
Metals and Metalloids								
Aluminum-Dissolved	ND	100	33	ug/L	EPA 200.7	10/25/19 02:12	KRV	N_pFilt
Aluminum	280	100	33	ug/L	EPA 200.7	10/28/19 17:22	KRV	



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Project Name: Amec Foster Wheeler-Lake Elsir
Project Number: LECL TMDL Monitoring

Report Date: 31-Oct-2019

Work Order Number: B9J2719
Received on Ice (Y/N): Yes Temp: 6 °C

Laboratory Reference Number

B9J2719-05

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
LE02	Liquid	10/17/19 10:00	10/17/19 14:30

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	10/18/19 07:13	MCM	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	10/18/19 07:13	MCM	
Solids								
Total Dissolved Solids	1800	40	40	mg/L	SM 2540C	10/24/19 13:57	EGV	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	10/24/19 22:00	KA	
Nutrients								
Ammonia-Nitrogen	0.045	0.10	0.044	mg/L	SM4500NH3H G	10/24/19 12:43	SLL	J
Kjeldahl Nitrogen	5.5	0.50	0.46	mg/L	EPA 351.2	10/24/19 11:48	SLL	
Organic Nitrogen	5.5	0.5	0.02	mg/L	Calculation			
Total Nitrogen	5.5	0.5	0.46	mg/L	Calculation			
Ortho Phosphate Phosphorus	0.048	0.050	0.016	mg/L	SM 4500P E	10/17/19 22:20	MWM	J



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 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 31-Oct-2019

Work Order Number: B9J2719
 Received on Ice (Y/N): Yes Temp: 6 °C

Anions - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9J17089 - Analyzed as Received IC										
Blank (9J17089-BLK1) Prepared & Analyzed: 10/18/19										
Nitrite as N	ND	0.10	0.091	mg/L						
Nitrate as N	ND	0.20	0.16	mg/L						
LCS (9J17089-BS1) Prepared & Analyzed: 10/18/19										
Nitrite as N	2.33	0.10	0.091	mg/L	2.50	93.0	90-110			
Nitrate as N	5.36	0.20	0.16	mg/L	5.65	94.9	90-110			
Matrix Spike (9J17089-MS1) Source: B9J2681-02 Prepared & Analyzed: 10/18/19										
Nitrite as N	2.39	0.10	0.091	mg/L	2.50	ND	95.6	80-120		
Nitrate as N	12.4	0.20	0.16	mg/L	5.65	6.52	103	75-131		
Matrix Spike (9J17089-MS2) Source: B9J2719-04 Prepared & Analyzed: 10/18/19										
Nitrite as N	2.38	0.10	0.091	mg/L	2.50	ND	95.3	80-120		
Nitrate as N	5.55	0.20	0.16	mg/L	5.65	ND	98.2	75-131		
Matrix Spike Dup (9J17089-MSD1) Source: B9J2681-02 Prepared & Analyzed: 10/18/19										
Nitrite as N	2.44	0.10	0.091	mg/L	2.50	ND	97.5	80-120	1.96	20
Nitrate as N	12.5	0.20	0.16	mg/L	5.65	6.52	105	75-131	0.916	20
Batch 9J17090 - Analyzed as Received IC										
Blank (9J17090-BLK1) Prepared & Analyzed: 10/18/19										
Nitrite as N	ND	0.10	0.091	mg/L						
Nitrate as N	ND	0.20	0.16	mg/L						
LCS (9J17090-BS1) Prepared & Analyzed: 10/18/19										
Nitrite as N	2.34	0.10	0.091	mg/L	2.50	93.5	90-110			
Nitrate as N	5.38	0.20	0.16	mg/L	5.65	95.2	90-110			



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Analytical Report: Page 8 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 31-Oct-2019

Work Order Number: B9J2719
 Received on Ice (Y/N): Yes Temp: 6 °C

Anions - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9J17090 - Analyzed as Received IC										
Matrix Spike (9J17090-MS1)		Source: B9J2716-01			Prepared & Analyzed: 10/18/19					
Nitrite as N	2.38	0.10	0.091	mg/L	2.50	ND	95.1	80-120		
Nitrate as N	10.8	0.20	0.16	mg/L	5.65	4.96	103	75-131		
Matrix Spike (9J17090-MS2)		Source: B9J2724-06			Prepared & Analyzed: 10/18/19					
Nitrite as N	2.33	0.10	0.091	mg/L	2.50	ND	93.2	80-120		
Nitrate as N	6.91	0.20	0.16	mg/L	5.65	1.24	100	75-131		
Matrix Spike Dup (9J17090-MSD1)		Source: B9J2716-01			Prepared & Analyzed: 10/18/19					
Nitrite as N	2.43	0.10	0.091	mg/L	2.50	ND	97.0	80-120	1.97	20
Nitrate as N	10.8	0.20	0.16	mg/L	5.65	4.96	104	75-131	0.651	20



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 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 31-Oct-2019

Work Order Number: B9J2719
 Received on Ice (Y/N): Yes Temp: 6 °C

Solids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9J23155 - Analyzed as received										
Blank (9J23155-BLK1)					Prepared & Analyzed: 10/23/19					
Total Suspended Solids	ND	0.5	0.5	mg/L						
Duplicate (9J23155-DUP1)					Source: B9J2361-02 Prepared & Analyzed: 10/23/19					
Total Suspended Solids	ND	2	2	mg/L	ND				25	
Duplicate (9J23155-DUP2)					Source: B9J2695-04 Prepared & Analyzed: 10/23/19					
Total Suspended Solids	ND	2	2	mg/L	ND				25	
Batch 9J24033 - Analyzed as received										
Blank (9J24033-BLK1)					Prepared & Analyzed: 10/24/19					
Total Dissolved Solids	ND	10	10	mg/L						
Duplicate (9J24033-DUP1)					Source: B9J2724-06 Prepared & Analyzed: 10/24/19					
Total Dissolved Solids	574	10	10	mg/L	557			3.01	20	
Duplicate (9J24033-DUP2)					Source: B9J2724-07 Prepared & Analyzed: 10/24/19					
Total Dissolved Solids	561	10	10	mg/L	562			0.178	20	



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 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 31-Oct-2019

Work Order Number: B9J2719
 Received on Ice (Y/N): Yes Temp: 6 °C

General Inorganics - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9J24096 - Analyzed as received										
Blank (9J24096-BLK1)				Prepared & Analyzed: 10/24/19						
Sulfide	ND	0.10	0.10	mg/L						
LCS (9J24096-BS1)				Prepared & Analyzed: 10/24/19						
Sulfide	0.300	0.10	0.10	mg/L	0.400	75.0	50-150			
Matrix Spike (9J24096-MS1)				Source: B9J2719-01 Prepared & Analyzed: 10/24/19						
Sulfide	6.80	0.10	0.10	mg/L	0.400	6.70	25.0	50-150		QM-4X
Matrix Spike Dup (9J24096-MSD1)				Source: B9J2719-01 Prepared & Analyzed: 10/24/19						
Sulfide	6.60	0.10	0.10	mg/L	0.400	6.70	NR	50-150	2.99	30 QM-4X



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 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 31-Oct-2019

Work Order Number: B9J2719
 Received on Ice (Y/N): Yes Temp: 6 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9J17058 - Filter if turbid.										
LCS (9J17058-BS1) Prepared & Analyzed: 10/17/19										
Ortho Phosphate Phosphorus	0.536	0.050	0.016	mg/L	0.500	107	90-110			
Matrix Spike (9J17058-MS1) Source: B9J2538-03 Prepared & Analyzed: 10/17/19										
Ortho Phosphate Phosphorus	0.625	0.050	0.016	mg/L	0.500	0.0849	108	80-120		
Matrix Spike Dup (9J17058-MSD1) Source: B9J2538-03 Prepared & Analyzed: 10/17/19										
Ortho Phosphate Phosphorus	0.639	0.050	0.016	mg/L	0.500	0.0849	111	80-120	2.16	20
Batch 9J22156 - Acid Digest										
Blank (9J22156-BLK1) Prepared: 10/23/19 Analyzed: 10/24/19										
Kjeldahl Nitrogen	ND	0.10	0.093	mg/L						
LCS (9J22156-BS1) Prepared: 10/23/19 Analyzed: 10/24/19										
Kjeldahl Nitrogen	1.05	0.10	0.093	mg/L	1.00	105	80-120			
Matrix Spike (9J22156-MS1) Source: B9J2565-01 Prepared: 10/23/19 Analyzed: 10/24/19										
Kjeldahl Nitrogen	131	8.0	7.4	mg/L	80.0	55.0	95.2	42-154		
Matrix Spike Dup (9J22156-MSD1) Source: B9J2565-01 Prepared: 10/23/19 Analyzed: 10/24/19										
Kjeldahl Nitrogen	138	8.0	7.4	mg/L	80.0	55.0	104	42-154	5.11	25
Batch 9J24046 - Analyzed as received										
Blank (9J24046-BLK1) Prepared & Analyzed: 10/24/19										
Ammonia-Nitrogen	ND	0.10	0.044	mg/L						



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 12 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 31-Oct-2019

Work Order Number: B9J2719
 Received on Ice (Y/N): Yes Temp: 6 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9J24046 - Analyzed as received										
LCS (9J24046-BS1)				Prepared & Analyzed: 10/24/19						
Ammonia-Nitrogen	1.02	0.10	0.044	mg/L	1.00	102	90-110			
Matrix Spike (9J24046-MS1)				Source: B9J2543-01 Prepared & Analyzed: 10/24/19						
Ammonia-Nitrogen	1.37	0.10	0.044	mg/L	1.00	0.331	104	80-120		
Matrix Spike Dup (9J24046-MSD1)				Source: B9J2543-01 Prepared & Analyzed: 10/24/19						
Ammonia-Nitrogen	1.34	0.10	0.044	mg/L	1.00	0.331	101	80-120	2.44	20



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 13 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 31-Oct-2019

Work Order Number: B9J2719
 Received on Ice (Y/N): Yes Temp: 6 °C

Metals and Metalloids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9J24101 - 200.7/ No Digest										
Blank (9J24101-BLK1) Prepared: 10/24/19 Analyzed: 10/25/19										
Aluminum-Dissolved	ND	100	16	ug/L						QBfil
LCS (9J24101-BS1) Prepared: 10/24/19 Analyzed: 10/25/19										
Aluminum-Dissolved	325	100	16	ug/L	334	97.2	85-115			
Matrix Spike (9J24101-MS1) Source: B9J2719-01 Prepared: 10/24/19 Analyzed: 10/25/19										
Aluminum-Dissolved	629	200	34	ug/L	668	ND	94.2	70-130		
Matrix Spike Dup (9J24101-MSD1) Source: B9J2719-01 Prepared: 10/24/19 Analyzed: 10/25/19										
Aluminum-Dissolved	635	200	34	ug/L	668	ND	95.1	70-130	0.911	20
Batch 9J28081 - EPA 200.2										
Blank (9J28081-BLK1) Prepared & Analyzed: 10/28/19										
Aluminum	ND	100	16	ug/L						
LCS (9J28081-BS1) Prepared & Analyzed: 10/28/19										
Aluminum	1070	100	16	ug/L	1170	91.8	85-115			
Matrix Spike (9J28081-MS1) Source: B9J2823-02 Prepared & Analyzed: 10/28/19										
Aluminum	1050	200	33	ug/L	1170	ND	89.9	70-130		
Matrix Spike Dup (9J28081-MSD1) Source: B9J2823-02 Prepared & Analyzed: 10/28/19										
Aluminum	1090	200	33	ug/L	1170	ND	93.5	70-130	3.87	20



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 14 of 15
Project Name: Amec Foster Wheeler-Lake Elsir
Project Number: LECL TMDL Monitoring

Report Date: 31-Oct-2019

Work Order Number: B9J2719
Received on Ice (Y/N): Yes Temp: 6 °C

Notes and Definitions

- J Estimated value
- N_pFilt Sample filtered and preserved upon receipt to the laboratory.
- QBfil Method blank was filtered prior to processing.
- QM-4X Due to analyte concentration greater than or equal to 4 times the spike concentration, recoveries for the MS and/or MSD did not meet laboratory acceptance criteria.
- ND: Analyte NOT DETECTED at or above the Method Detection Limit (**if MDL is reported**), otherwise at or above the Reportable Detection Limit (RDL)
- NR: Not Reported
- RDL: Reportable Detection Limit
- MDL: Method Detection Limit

* / (Non-NELAP): NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Standard_No Alias.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.

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P.O Box 432
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location
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Riverside, CA 92507-0704

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CA ELAP No. 2698
EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 15 of 15
Project Name: Amec Foster Wheeler-Lake Elsi
Project Number: LECL TMDL Monitoring

Report Date: 31-Oct-2019

Work Order Number: B9J2719
Received on Ice (Y/N): Yes Temp: 6 °C

E.S. Babcock & Sons, Inc. Environmental Laboratories
(951) 653-3351 FAX (951) 653-1662
www.babcocklabs.com

Chain of Custody & Sample Information Record

Client: Wood E&I Solutions, Inc.		Contact: John Rudolph		Phone No. 858-243-8158	
FAX No.		Email: john.rudolph@woodpic.com		Additional Reporting Requests	
Project Name: LECL TMDL Monitoring		Turn Around Time: <u>Routine</u> *3-5 Day *48 Hour *24 Hour		Include QC Data Package: <input type="checkbox"/> Yes <input type="checkbox"/> No	
Project Number: 1915100402		Lab TAT Approval: By: _____		FAX Results: <input type="checkbox"/> Yes <input type="checkbox"/> No	
				Email Results: <input type="checkbox"/> Yes <input type="checkbox"/> No	
				State EDT: <input type="checkbox"/> Yes <input type="checkbox"/> No	
				(Include Source Number in Notes)	
Sampler Information		# of Containers & Preservatives		Analysis Requested	
Name: _____		Unpreserved		Matrix	
Employer: Wood E&I Solutions, Inc		H2SO4		Notes	
Signature: _____		HCl		Ortho-P has <u>NOT</u> been field filtered.	
		HNO3		Total Phosphorus - Sub to Eurofins	
		Na2S2O3		Calscience	
		NaOH		Dissolved Metals are <u>NOT</u> field filtered	
		NaOH/ZnAcetate			
		NH4Cl			
		MCAA			
		Frozen			
Sample ID		Date		Time	
CL07		10/17/19		1040	
CL08		1005			
CL09		0925			
CL10		0905			
LE02		1000			
Relinquished By (sign)		Print Name / Company		Date / Time	
[Signature]		Lark Stashak		10/17/2019	
[Signature]		Wood Environment & Infrastructure Solutions		13:30	
[Signature]		Jason Jarama/DE		10/17/19 2:30pm	
[Signature]		Jason Jarama/ESL			
(For Lab Use Only)		Sample Integrity Upon Receipt		Lab Notes	
Sample(s) Submitted on Ice? <input checked="" type="radio"/> Yes <input type="radio"/> No		Temperature		6 °C	
Custody Seal(s) Intact? <input checked="" type="radio"/> Yes <input type="radio"/> No		N/A		REC'd 1430	
Sample(s) Intact? <input checked="" type="radio"/> Yes <input type="radio"/> No		Cooler Blank			

B9J2719
Rc'd: 10/17/2019 14:30
JMG Temp Gun Id : T#62

T00



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Client Name: Wood Environment&Infrastructure Sc
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA, 92123

Analytical Report: Page 1 of 2
 Project Name: Amec Foster Wheeler-Lake
 Project Number: LECL TMDL Monitoring
Work Order Number: B9J2890

Report Date: 18-Dec-2019

Received on Ice (Y/N Yes Temp: 7 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B9J2890-01	CL07-Int	Solid	10/17/19 10:40	Client	10/17/19 14:30	Courier (Jason J.) - DE
B9J2890-02	CL07-Surf	Solid	10/17/19 10:40	Client	10/17/19 14:30	Courier (Jason J.) - DE
B9J2890-03	CL08-Int	Solid	10/17/19 10:05	Client	10/17/19 14:30	Courier (Jason J.) - DE
B9J2890-04	CL08-Surf	Solid	10/17/19 10:05	Client	10/17/19 14:30	Courier (Jason J.) - DE
B9J2890-05	CL09-Int	Solid	10/17/19 9:25	Client	10/17/19 14:30	Courier (Jason J.) - DE
B9J2890-06	CL09-Surf	Solid	10/17/19 9:25	Client	10/17/19 14:30	Courier (Jason J.) - DE
B9J2890-07	CL10-Int	Solid	10/17/19 9:05	Client	10/17/19 14:30	Courier (Jason J.) - DE
B9J2890-08	CL10-Surf	Solid	10/17/19 9:05	Client	10/17/19 14:30	Courier (Jason J.) - DE
B9J2890-09	LE02-Int	Solid	10/17/19 10:00	Client	10/17/19 14:30	Courier (Jason J.) - DE
B9J2890-10	LE02-Surf	Solid	10/17/19 9:20	Client	10/17/19 14:30	Courier (Jason J.) - DE

Note: Analysis for Chlorophyll a was subcontracted to Truesdail Laboratories, Inc.



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Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 2 of 2
Project Name: Amec Foster Wheeler-Lake
Project Number: LECL TMDL Monitoring
Work Order Number: B9J2890

Report Date: 18-Dec-2019

Received on Ice (Y/N) Yes Temp: 7 °C

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Case Narrative+ COC.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.



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Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 1 of 1
Project Name: Amec Foster Wheeler-Lake
Project Number: LECL TMDL Monitoring
Work Order Number: **B9J2890**

Report Date: 18-Dec-2019

Received on Ice (Y/N) Yes Temp: 7 °C

E.S. Babcock & Sons, Inc. Environmental Laboratories Chain of Custody & Sample Information Record
(951) 653-3351 FAX (951) 653-1662
www.babcocklabs.com

Client: Wood E&I Solutions, Inc.		Contact: John Rudolph		Phone No. 858-243-8158	
FAX No.		Email: john.rudolph@woodplc.com		Additional Reporting Requests	
Project Name: LECL TMDL Monitoring		Turn Around Time: <u>Routine</u>		<input type="checkbox"/> 3-5 Day Rush <input type="checkbox"/> *48 Hour Rush <input type="checkbox"/> *24 Hour Rush	
Project Number: 1915100402		*Lab TAT Approval: By:		*Additional Charges May Apply	
Name: _____ Employer: Wood E&I Solutions, Inc. Signature: _____		# of Containers & Preservatives Unpreserved H2SO4 HCl HNO3 Na2S2O3 NaOH NaOH/ZnAcetate NH4Cl MCAA Frozen		Analysis Requested Routine Resample Special Total Sulfide Nitrate - Nitrite TDS TKN Ammonia Total Phosphorus SRP/Ortho-P Chlorophyll-a	
Sample ID CL07 - Int CL07 - Surf CL08 - Int CL08 - Surf CL09 - Int CL09 - Surf CL10 - Int CL10 - Surf LE02 - Int LE02 - Surf		Date 10/17/19 10/17/19 10/05 10/05 09/25 09/25 09/05 09/05 10/00 10/17/19		Time 1040 1040 1005 1005 0925 0925 0905 0905 0900 2:30 PM	
Relinquished By (sign) 		Print Name / Company Lane Starkey Wood Env. Infrastructure Solutions		Date / Time 10/17/2019 13:30 10/17/19	
Received By (Sign) 		Print Name / Company Jason Jenkins / DE		Date / Time 10/17/19 2:30 PM	
(For Lab Use Only) Sample Integrity Upon Receipt		Lab Notes TLO		Sample(s) Submitted on Ice? <input checked="" type="radio"/> Yes <input type="radio"/> No Custody Seal(s) Intact? <input checked="" type="radio"/> Yes <input type="radio"/> No N/A Sample(s) Intact? <input checked="" type="radio"/> Yes <input type="radio"/> No	
Temperature 7 °C <input type="checkbox"/> Cooler Blank		B9J2890 Rcd: 10/17/2019 14:30 EVS Temp Gun Id :60			

Report

Client: Babcock Laboratories, Inc.
 6100 Quail Valley Ct
 Riverside, CA 92507

Work Order No.: 19J0397
 Printed: 11/05/2019

Attention: Amanda C. Porter
 Project Name: Chlorophyll

CASE NARRATIVE

SAMPLE RECEIPT SUMMARY

Sample ID	Laboratory ID	Matrix	Type	Date Sampled	Date Received
B9J2890-01	19J0397-01	Filter		10/17/2019 10:40	10/21/2019 12:05
B9J2890-02	19J0397-02	Filter		10/17/2019 10:40	10/21/2019 12:05
B9J2890-03	19J0397-03	Filter		10/17/2019 10:05	10/21/2019 12:05
B9J2890-04	19J0397-04	Filter		10/17/2019 10:05	10/21/2019 12:05
B9J2890-05	19J0397-05	Filter		10/17/2019 09:25	10/21/2019 12:05
B9J2890-06	19J0397-06	Filter		10/17/2019 09:25	10/21/2019 12:05
B9J2890-07	19J0397-07	Filter		10/17/2019 09:05	10/21/2019 12:05
B9J2890-08	19J0397-08	Filter		10/17/2019 09:05	10/21/2019 12:05
B9J2890-09	19J0397-09	Filter		10/17/2019 10:00	10/21/2019 12:05
B9J2890-10	19J0397-10	Filter		10/17/2019 09:20	10/21/2019 12:05

DEFINITIONS

Symbol	Definition
DF	Dilution Factor
MDL	Method Detection Limit
ND	Not Detected
RL	Reporting Limit

Respectfully yours,



Joseph Bryan Harding For Shelly Brady
 Customer Service Manager



B9J2890-01

19J0397-01 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	33.7	1.00	1.00	mg/m ³	1	1910468	11/04/2019 17:50	EGV	EPA 10200 H	
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B9J2890-02

19J0397-02 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	14.5	1.00	1.00	mg/m ³	1	1910468	11/04/2019 17:50	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

B9J2890-03

19J0397-03 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	14.7	1.00	1.00	mg/m ³	1	1910468	11/04/2019 17:50	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

B9J2890-04

19J0397-04 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	13.5	1.00	1.00	mg/m ³	1	1910468	11/04/2019 17:50	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

B9J2890-05

19J0397-05 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

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B9J2890-05 (Continued)

19J0397-05 (Filter) (Continued)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
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ALS Truesdail

Microbiology

Chlorophyll a	17.9	1.00	1.00	mg/m ³	1	1910468	11/04/2019 17:50	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

B9J2890-06

19J0397-06 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	31.8	1.00	1.00	mg/m ³	1	1910468	11/04/2019 17:50	EGV	EPA 10200 H	
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B9J2890-07

19J0397-07 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
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ALS Truesdail

Microbiology

Chlorophyll a	27.9	1.00	1.00	mg/m ³	1	1910468	11/04/2019 17:50	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

B9J2890-08

19J0397-08 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
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ALS Truesdail

Microbiology

Chlorophyll a	40.3	1.00	1.00	mg/m ³	1	1910468	11/04/2019 17:50	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

B9J2890-09

19J0397-09 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

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TRUESDAIL
LABORATORIES, INC.

Client: Babcock Laboratories, Inc.

Project Name: Chlorophyll

Printed: 11/05/2019

B9J2890-09 (Continued)

19J0397-09 (Filter) (Continued)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	153	1.00	1.00	mg/m ³	1	1910468	11/04/2019 17:50	EGV	EPA 10200 H	
---------------	-----	------	------	-------------------	---	---------	------------------	-----	-------------	--

B9J2890-10

19J0397-10 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	139	1.00	1.00	mg/m ³	1	1910468	11/04/2019 17:50	EGV	EPA 10200 H	
---------------	-----	------	------	-------------------	---	---------	------------------	-----	-------------	--

This report applies to the sample(s), or product(s), investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed. This report shall not be reproduced without the written consent of ALS-Truesdail Laboratories, Inc., and must be reproduced in its entirety.

19J0397

SUBCONTRACT ORDER

Printed: 10/21/2019 9:11

Babcock Laboratories, Inc.

B9J2890

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: B9J2890-06 Solid		Sampled: 10/17/19 09:25	CL09-Surf	Proj.No.: <u>LECL TMDL</u> <u>Monitoring</u>
Subout	10/29/19 23:59	10/27/19 09:25	Report Chlorophyll a / Filter Volume = 360mL	
Containers Supplied: Whirl-Pak (A)				
Sample ID: B9J2890-07 Solid		Sampled: 10/17/19 09:05	CL10-Int	Proj.No.: <u>LECL TMDL</u> <u>Monitoring</u>
Subout	10/29/19 23:59	10/27/19 09:05	Report Chlorophyll a / Filter Volume = 350mL	
Containers Supplied: Whirl-Pak (A)				
Sample ID: B9J2890-08 Solid		Sampled: 10/17/19 09:05	CL10-Surf	Proj.No.: <u>LECL TMDL</u> <u>Monitoring</u>
Subout	10/29/19 23:59	10/27/19 09:05	Report Chlorophyll a / Filter Volume = 300mL	
Containers Supplied: Whirl-Pak (A)				
Sample ID: B9J2890-09 Solid		Sampled: 10/17/19 10:00	LE02-Int	Proj.No.: <u>LECL TMDL</u> <u>Monitoring</u>
Subout	10/29/19 23:59	10/27/19 10:00	Report Chlorophyll a / Filter Volume = 350mL	
Containers Supplied: Whirl-Pak (A)				
Sample ID: B9J2890-10 Solid		Sampled: 10/17/19 09:20	LE02-Surf	Proj.No.: <u>LECL TMDL</u> <u>Monitoring</u>
Subout	10/29/19 23:59	10/27/19 09:20	Report Chlorophyll a / Filter Volume = 385mL	
Containers Supplied: Whirl-Pak (A)				

All Containers Intact: Yes No Samples Preserved Properly: Yes No

Samples Received at 3.1 oC Sample Labels / COC Agree: Yes No Custody Seals Present: Yes No

Please forward all acknowledgements of sample receipt, final reports and invoices to data@babcocklabs.com

NO HARDCOPIES PLEASE.

Released By

Date

[Signature]
10/21/19

Received By

Date

[Signature]
10-21-19 12:05

Released By

Date

Received By

Date

19J0397

SUBCONTRACT ORDER

Printed: 10/21/2019 9:11

Babcock Laboratories, Inc.

B9J2890

SENDING LABORATORY:

Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, CA 92507-0704
Phone: (951) 653-3351
Fax: (951) 653-1662
Project Manager: Cindy A. Waddell

RECEIVING LABORATORY:

Truesdail Laboratories - Subcontract
3337 Michelson Drive Suite CN750
Irvine, CA 92614
Phone : (714) 730-6239
Fax: (714) 730-6462

System Name: Wood Environmental&Infrastructure Solutions, Inc
Sampler: Client

Please include MDLs and EXCEL EDD

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: B9J2890-01 Solid		Sampled: 10/17/19 10:40	CL07-Int	<u>Proj.No.:LECL TMDL Monitoring</u>
Subout	10/29/19 23:59	10/27/19 10:40	Report Chlorophyll a / Filter Volume = 500mL	
<i>Containers Supplied:</i> Whirl-Pak (A)				
Sample ID: B9J2890-02 Solid		Sampled: 10/17/19 10:40	CL07-Surf	<u>Proj.No.:LECL TMDL Monitoring</u>
Subout	10/29/19 23:59	10/27/19 10:40	Report Chlorophyll a / Filter Volume = 500mL	
<i>Containers Supplied:</i> Whirl-Pak (A)				
Sample ID: B9J2890-03 Solid		Sampled: 10/17/19 10:05	CL08-Int	<u>Proj.No.:LECL TMDL Monitoring</u>
Subout	10/29/19 23:59	10/27/19 10:05	Report Chlorophyll a / Filter Volume = 500mL	
<i>Containers Supplied:</i> Whirl-Pak (A)				
Sample ID: B9J2890-04 Solid		Sampled: 10/17/19 10:05	CL08-Surf	<u>Proj.No.:LECL TMDL Monitoring</u>
Subout	10/29/19 23:59	10/27/19 10:05	Report Chlorophyll a / Filter Volume = 500mL	
<i>Containers Supplied:</i> Whirl-Pak (A)				
Sample ID: B9J2890-05 Solid		Sampled: 10/17/19 09:25	CL09-Int	<u>Proj.No.:LECL TMDL Monitoring</u>
Subout	10/29/19 23:59	10/27/19 09:25	Report Chlorophyll a / Filter Volume = 500mL	
<i>Containers Supplied:</i> Whirl-Pak (A)				

ANALYTICAL REPORT

Eurofins Calscience LLC
7440 Lincoln Way
Garden Grove, CA 92841
Tel: (714)895-5494

Laboratory Job ID: 570-10779-1
Client Project/Site: B9J2877
Revision: 1

For:
Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, California 92507

Attn: Cindy A Waddell



Authorized for release by:
2/18/2020 3:54:50 PM

Carla Hollowell, Project Manager I
(714)895-5494
carlahollowell@eurofinsus.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Table of Contents	2
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Definitions/Glossary

Client: Babcock Laboratories, Inc.
Project/Site: B9J2877

Job ID: 570-10779-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Babcock Laboratories, Inc.
Project/Site: B9J2877

Job ID: 570-10779-1

Job ID: 570-10779-1

Laboratory: Eurofins Calscience LLC

Narrative

**Job Narrative
570-10779-1**

Comments

No additional comments.

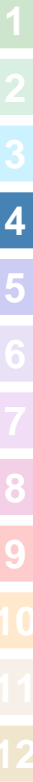
Receipt

The samples were received on 10/22/2019 10:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.1° C.

General Chemistry

Method 365.1: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 570-29264 and analytical batch 570-29299 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Client Sample Results

Client: Babcock Laboratories, Inc.
Project/Site: B9J2877

Job ID: 570-10779-1

General Chemistry

Client Sample ID: B9J2877-01
Date Collected: 10/17/19 10:40
Date Received: 10/22/19 10:00

Lab Sample ID: 570-10779-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.243		0.0100	0.00281	mg/L		10/28/19 10:54	10/29/19 11:29	1

Client Sample ID: B9J2877-02
Date Collected: 10/17/19 10:05
Date Received: 10/22/19 10:00

Lab Sample ID: 570-10779-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.0237		0.0100	0.00281	mg/L		10/28/19 10:54	10/29/19 11:30	1

Client Sample ID: B9J2877-03
Date Collected: 10/17/19 09:25
Date Received: 10/22/19 10:00

Lab Sample ID: 570-10779-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.0434		0.0100	0.00281	mg/L		10/28/19 10:54	10/29/19 11:32	1

Client Sample ID: B9J2877-04
Date Collected: 10/17/19 09:05
Date Received: 10/22/19 10:00

Lab Sample ID: 570-10779-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.0622		0.0100	0.00281	mg/L		10/28/19 10:54	10/29/19 11:33	1

Client Sample ID: B9J2877-05
Date Collected: 10/17/19 10:00
Date Received: 10/22/19 10:00

Lab Sample ID: 570-10779-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.218		0.0100	0.00281	mg/L		10/28/19 10:54	10/29/19 11:35	1

QC Sample Results

Client: Babcock Laboratories, Inc.
Project/Site: B9J2877

Job ID: 570-10779-1

Method: 365.1 - Phosphorus, Total

Lab Sample ID: MB 570-29264/1-A
Matrix: Water
Analysis Batch: 29299

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 29264

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	ND		0.0100	0.00281	mg/L		10/28/19 10:54	10/29/19 10:52	1

Lab Sample ID: LCS 570-29264/2-A
Matrix: Water
Analysis Batch: 29299

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 29264

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.200	0.1928		mg/L		96	90 - 110

Lab Sample ID: LCSD 570-29264/3-A
Matrix: Water
Analysis Batch: 29299

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 29264

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphorus, Total	0.200	0.1959		mg/L		98	90 - 110	2	20

Lab Sample ID: 570-10930-A-1-B MS
Matrix: Water
Analysis Batch: 29299

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 29264

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.673	F1	0.200	0.8272	F1	mg/L		77	90 - 110

Lab Sample ID: 570-10930-A-1-C MSD
Matrix: Water
Analysis Batch: 29299

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 29264

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphorus, Total	0.673	F1	0.200	0.8376	F1	mg/L		82	90 - 110	1	25

Lab Chronicle

Client: Babcock Laboratories, Inc.
Project/Site: B9J2877

Job ID: 570-10779-1

Client Sample ID: B9J2877-01

Lab Sample ID: 570-10779-1

Date Collected: 10/17/19 10:40

Matrix: Water

Date Received: 10/22/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	29264	10/28/19 10:54	PB5X	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	29299	10/29/19 11:29	UXCH	ECL 1
Instrument ID: ACA1										

Client Sample ID: B9J2877-02

Lab Sample ID: 570-10779-2

Date Collected: 10/17/19 10:05

Matrix: Water

Date Received: 10/22/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	29264	10/28/19 10:54	PB5X	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	29299	10/29/19 11:30	UXCH	ECL 1
Instrument ID: ACA1										

Client Sample ID: B9J2877-03

Lab Sample ID: 570-10779-3

Date Collected: 10/17/19 09:25

Matrix: Water

Date Received: 10/22/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	29264	10/28/19 10:54	PB5X	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	29299	10/29/19 11:32	UXCH	ECL 1
Instrument ID: ACA1										

Client Sample ID: B9J2877-04

Lab Sample ID: 570-10779-4

Date Collected: 10/17/19 09:05

Matrix: Water

Date Received: 10/22/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	29264	10/28/19 10:54	PB5X	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	29299	10/29/19 11:33	UXCH	ECL 1
Instrument ID: ACA1										

Client Sample ID: B9J2877-05

Lab Sample ID: 570-10779-5

Date Collected: 10/17/19 10:00

Matrix: Water

Date Received: 10/22/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	29264	10/28/19 10:54	PB5X	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	29299	10/29/19 11:35	UXCH	ECL 1
Instrument ID: ACA1										

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

Accreditation/Certification Summary

Client: Babcock Laboratories, Inc.
Project/Site: B9J2877

Job ID: 570-10779-1

Laboratory: Eurofins Calscience LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arizona	State	AZ0781	03-13-20
California	Los Angeles County Sanitation Districts	10109	09-29-20
California	SCAQMD LAP	17LA0919	11-29-19
California	State	2944	09-29-20
Guam	State	20-003R	10-31-19
Hawaii	State	<cert No.>	07-02-20
Nevada	State	CA00111	07-31-20
Washington	State	C916-18	10-11-20

Method Summary

Client: Babcock Laboratories, Inc.
Project/Site: B9J2877

Job ID: 570-10779-1

Method	Method Description	Protocol	Laboratory
365.1	Phosphorus, Total	EPA	ECL 1
365.2/365.3/365	Phosphorus, Total	MCAWW	ECL 1

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494



Sample Summary

Client: Babcock Laboratories, Inc.
Project/Site: B9J2877

Job ID: 570-10779-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
570-10779-1	B9J2877-01	Water	10/17/19 10:40	10/22/19 10:00	
570-10779-2	B9J2877-02	Water	10/17/19 10:05	10/22/19 10:00	
570-10779-3	B9J2877-03	Water	10/17/19 09:25	10/22/19 10:00	
570-10779-4	B9J2877-04	Water	10/17/19 09:05	10/22/19 10:00	
570-10779-5	B9J2877-05	Water	10/17/19 10:00	10/22/19 10:00	

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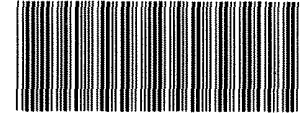
SUBCONTRACT ORDER
Babcock Laboratories, Inc.
B9J2877

SENDING LABORATORY:

Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, CA 92507-0704
Phone: (951) 653-3351
Fax: (951) 653-1662
Project Manager: Cindy A. Waddell

RECEIVING LABORATORY:

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove, CA 92841-1427
Phone : (714) 895-5494
Fax: (714) 894-7501



570-10779 Chain of Custody

System Name: Wood Environment & Infrastructure Solutions, Inc
Sampler: Client

Please include MDLs and EXCEL EDD

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: B9J2877-01 Liquid		Sampled: 10/17/19 10:40	CL07	<u>Proj.No.:Lake</u> <u>Elsinore/Canyon Lake</u>
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	11/12/19 23:59	10/27/19 10:40	Low Level Total Phosphorus	
Sample ID: B9J2877-02 Liquid		Sampled: 10/17/19 10:05	CL08	<u>Proj.No.:Lake</u> <u>Elsinore/Canyon Lake</u>
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	11/12/19 23:59	10/27/19 10:05	Low Level Total Phosphorus	
Sample ID: B9J2877-03 Liquid		Sampled: 10/17/19 09:25	CL09	<u>Proj.No.:Lake</u> <u>Elsinore/Canyon Lake</u>
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	11/12/19 23:59	10/27/19 09:25	Low Level Total Phosphorus	
Sample ID: B9J2877-04 Liquid		Sampled: 10/17/19 09:05	CL10	<u>Proj.No.:Lake</u> <u>Elsinore/Canyon Lake</u>
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	11/12/19 23:59	10/27/19 09:05	Low Level Total Phosphorus	
Sample ID: B9J2877-05 Liquid		Sampled: 10/17/19 10:00	LE02	<u>Proj.No.:Lake</u> <u>Elsinore/Canyon Lake</u>
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	11/12/19 23:59	10/27/19 10:00	Low Level Total Phosphorus	

3.6 / 4.1 SC6

- 10779
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12

SUBCONTRACT ORDER
Babcock Laboratories, Inc.
B9J2877

Printed: 10/21/2019 9:11

All Containers Intact: Yes No Samples Preserved Properly: Yes No

Samples Received at oC Sample Labels / COC Agree: Yes No Custody Seals Present: Yes No

Please forward all acknowledgements of sample receipt, final reports and invoices to data@babcocklabs.com
NO HARDCOPIES PLEASE.

Released By	Date	Received By	Date
	10/21/19	cc	10/22/19 10:00
Released By	Date	Received By	Date

(See ref)

Login Sample Receipt Checklist

Client: Babcock Laboratories, Inc.

Job Number: 570-10779-1

Login Number: 10779

List Number: 1

Creator: Castro, Joy

List Source: Eurofins Calscience

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	





BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 1 of 17
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 07-Jan-2020

Work Order Number: B9L2979
 Received on Ice (Y/N): Yes Temp: 6 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B9L2979-01	CL07	Liquid	12/20/19 10:30	Kate Buckley	12/20/19 14:10	Courier (Jason J.) - DE
B9L2979-02	CL08	Liquid	12/20/19 9:45	Kate Buckley	12/20/19 14:10	Courier (Jason J.) - DE
B9L2979-03	CL09	Liquid	12/20/19 9:00	Kate Buckley	12/20/19 14:10	Courier (Jason J.) - DE
B9L2979-04	CL10	Liquid	12/20/19 8:10	Kate Buckley	12/20/19 14:10	Courier (Jason J.) - DE
B9L2979-05	LE02	Liquid	12/20/19 9:00	Kate Buckley	12/20/19 14:10	Courier (Jason J.) - DE



BABCOCK Laboratories, Inc.
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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 2 of 17
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 07-Jan-2020

Work Order Number: B9L2979
 Received on Ice (Y/N): Yes Temp: 6 °C

Laboratory Reference Number

B9L2979-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL07	Liquid	12/20/19 10:30	12/20/19 14:10

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	12/21/19 07:50	ATR	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	12/21/19 07:50	ATR	
Solids								
Total Dissolved Solids	440	10	10	mg/L	SM 2540C	12/24/19 19:30	JGZ	
Total Suspended Solids	4	2	2	mg/L	SM 2540D	12/26/19 13:32	DSS	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	12/23/19 17:50	DSS	
Nutrients								
Ammonia-Nitrogen	0.34	0.10	0.044	mg/L	SM4500NH3H G	12/30/19 11:12	AJH	
Kjeldahl Nitrogen	1.2	0.10	0.093	mg/L	EPA 351.2	12/24/19 13:20	SLL	
Ortho Phosphate Phosphorus	0.018	0.050	0.016	mg/L	SM 4500P E	12/20/19 19:05	MWM J	
Metals and Metalloids								
Aluminum-Dissolved	ND	100	33	ug/L	EPA 200.7	12/31/19 12:09	MEL	N_pFilt
Aluminum	81	100	33	ug/L	EPA 200.7	12/27/19 15:03	MEL	J



BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 3 of 17
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 07-Jan-2020

Work Order Number: B9L2979
 Received on Ice (Y/N): Yes Temp: 6 °C

Laboratory Reference Number

B9L2979-02

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL08	Liquid	12/20/19 09:45	12/20/19 14:10

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	12/20/19 22:33	ATR	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	12/20/19 22:33	ATR	
Solids								
Total Dissolved Solids	420	10	10	mg/L	SM 2540C	12/24/19 19:30	JGZ	
Total Suspended Solids	6	2	2	mg/L	SM 2540D	12/26/19 13:32	DSS	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	12/23/19 17:50	DSS	
Nutrients								
Ammonia-Nitrogen	0.31	0.10	0.044	mg/L	SM4500NH3H G	12/30/19 11:14	AJH	
Kjeldahl Nitrogen	1.2	0.10	0.093	mg/L	EPA 351.2	12/24/19 13:22	SLL	
Ortho Phosphate Phosphorus	0.019	0.050	0.016	mg/L	SM 4500P E	12/20/19 19:05	MWM J	
Metals and Metalloids								
Aluminum-Dissolved	ND	100	33	ug/L	EPA 200.7	12/31/19 12:15	MEL	N_pFilt
Aluminum	87	100	33	ug/L	EPA 200.7	12/27/19 15:15	MEL	J



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 Address: 9210 Sky Park Court #200
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 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 07-Jan-2020

Work Order Number: B9L2979
 Received on Ice (Y/N): Yes Temp: 6 °C

Laboratory Reference Number

B9L2979-03

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL09	Liquid	12/20/19 09:00	12/20/19 14:10

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	12/20/19 22:45	ATR	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	12/20/19 22:45	ATR	
Solids								
Total Dissolved Solids	540	10	10	mg/L	SM 2540C	12/24/19 19:30	JGZ	
Total Suspended Solids	8	2	2	mg/L	SM 2540D	12/26/19 11:50	DSS	
General Inorganics								
Sulfide	0.20	0.10	0.10	mg/L	SM 4500S2 D	12/23/19 17:50	DSS	
Nutrients								
Ammonia-Nitrogen	0.24	0.10	0.044	mg/L	SM4500NH3H G	12/30/19 11:16	AJH	
Kjeldahl Nitrogen	1.5	0.10	0.093	mg/L	EPA 351.2	12/24/19 13:23	SLL	
Ortho Phosphate Phosphorus	0.052	0.050	0.016	mg/L	SM 4500P E	12/20/19 19:05	MWM	
Metals and Metalloids								
Aluminum-Dissolved	ND	100	33	ug/L	EPA 200.7	12/31/19 12:17	MEL	N_pFilt
Aluminum	120	100	33	ug/L	EPA 200.7	12/27/19 15:17	MEL	



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 Received on Ice (Y/N): Yes Temp: 6 °C

Laboratory Reference Number

B9L2979-04

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL10	Liquid	12/20/19 08:10	12/20/19 14:10

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	12/20/19 22:58	ATR	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	12/20/19 22:58	ATR	
Solids								
Total Dissolved Solids	540	10	10	mg/L	SM 2540C	12/24/19 19:30	JGZ	
Total Suspended Solids	12	2	2	mg/L	SM 2540D	12/26/19 11:50	DSS	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	12/23/19 17:50	DSS	
Nutrients								
Ammonia-Nitrogen	0.085	0.10	0.044	mg/L	SM4500NH3H G	12/30/19 11:21	AJH J	
Kjeldahl Nitrogen	1.7	0.10	0.093	mg/L	EPA 351.2	12/24/19 11:25	SLL	
Ortho Phosphate Phosphorus	0.021	0.050	0.016	mg/L	SM 4500P E	12/20/19 19:05	MWM J	
Metals and Metalloids								
Aluminum-Dissolved	ND	100	33	ug/L	EPA 200.7	12/31/19 12:19	MEL	N_pFilt
Aluminum	180	100	33	ug/L	EPA 200.7	12/27/19 15:19	MEL	



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Laboratory Reference Number

B9L2979-05

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
LE02	Liquid	12/20/19 09:00	12/20/19 14:10

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	12/20/19 23:11	ATR	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	12/20/19 23:11	ATR	
Solids								
Total Dissolved Solids	2200	20	20	mg/L	SM 2540C	12/24/19 19:30	JGZ	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	12/23/19 17:50	DSS	
Nutrients								
Ammonia-Nitrogen	1.3	0.10	0.044	mg/L	SM4500NH3H G	12/30/19 11:23	AJH	Nconf
Kjeldahl Nitrogen	6.7	0.40	0.37	mg/L	EPA 351.2	12/24/19 11:26	SLL	
Ortho Phosphate Phosphorus	0.13	0.050	0.016	mg/L	SM 4500P E	12/20/19 19:05	MWM	



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Work Order Number: B9L2979
 Received on Ice (Y/N): Yes Temp: 6 °C

Anions - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9L20077 - Analyzed as Received IC										
Blank (9L20077-BLK1)				Prepared & Analyzed: 12/20/19						
Nitrite as N	ND	0.10	0.091	mg/L						
Nitrate as N	ND	0.20	0.16	mg/L						
LCS (9L20077-BS1)				Prepared & Analyzed: 12/20/19						
Nitrite as N	2.29	0.10	0.091	mg/L	2.50	91.7	90-110			
Nitrate as N	5.34	0.20	0.16	mg/L	5.65	94.6	90-110			
Matrix Spike (9L20077-MS1)				Source: B9L2979-01 Prepared & Analyzed: 12/20/19						
Nitrite as N	2.22	0.10	0.091	mg/L	2.50	ND	88.7	80-120		
Nitrate as N	5.38	0.20	0.16	mg/L	5.65	ND	95.2	75-131		
Matrix Spike (9L20077-MS2)				Source: B9L2982-01 Prepared & Analyzed: 12/21/19						
Nitrite as N	1.95	0.10	0.091	mg/L	2.50	ND	77.9	80-120		QFpas, QMout
Nitrate as N	7.06	0.20	0.16	mg/L	5.65	1.20	104	75-131		
Matrix Spike Dup (9L20077-MSD1)				Source: B9L2979-01 Prepared & Analyzed: 12/20/19						
Nitrite as N	2.31	0.10	0.091	mg/L	2.50	ND	92.4	80-120	4.17	20
Nitrate as N	5.57	0.20	0.16	mg/L	5.65	ND	98.5	75-131	3.42	20



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Work Order Number: B9L2979
 Received on Ice (Y/N): Yes Temp: 6 °C

Solids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9L24044 - Analyzed as received										
Blank (9L24044-BLK1) Prepared & Analyzed: 12/24/19										
Total Dissolved Solids	ND	10	10	mg/L						
Duplicate (9L24044-DUP1) Source: B9L3061-02 Prepared & Analyzed: 12/24/19										
Total Dissolved Solids	513	10	10	mg/L	502			2.17	20	
Duplicate (9L24044-DUP2) Source: B9L3062-02 Prepared & Analyzed: 12/24/19										
Total Dissolved Solids	466	10	10	mg/L	436			6.65	20	
Batch 9L26023 - Analyzed as received										
Blank (9L26023-BLK1) Prepared & Analyzed: 12/26/19										
Total Suspended Solids	ND	0.5	0.5	mg/L						
Duplicate (9L26023-DUP1) Source: B9L2778-01 Prepared & Analyzed: 12/26/19										
Total Suspended Solids	420	25	25	mg/L	460			9.09	25	
Duplicate (9L26023-DUP2) Source: B9L2878-03RE1 Prepared & Analyzed: 12/26/19										
Total Suspended Solids	1430	50	50	mg/L	1580			9.97	25	
Batch 9L26024 - Analyzed as received										
Blank (9L26024-BLK1) Prepared & Analyzed: 12/26/19										
Total Suspended Solids	ND	0.5	0.5	mg/L						
Duplicate (9L26024-DUP1) Source: B9L2926-01 Prepared & Analyzed: 12/26/19										
Total Suspended Solids	280	10	10	mg/L	300			6.90	25	



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Received on Ice (Y/N): Yes Temp: 6 °C

Solids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9L26024 - Analyzed as received										
Duplicate (9L26024-DUP2)		Source: B9L2927-01			Prepared & Analyzed: 12/26/19					
Total Suspended Solids	266	10	10	mg/L	266			0.00	25	



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General Inorganics - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9L23148 - Analyzed as received										
Blank (9L23148-BLK1)				Prepared & Analyzed: 12/23/19						
Sulfide	ND	0.10	0.10	mg/L						
LCS (9L23148-BS1)				Prepared & Analyzed: 12/23/19						
Sulfide	0.400	0.10	0.10	mg/L	0.400	100	50-150			
Matrix Spike (9L23148-MS1)				Source: B9L2975-02 Prepared & Analyzed: 12/23/19						
Sulfide	0.400	0.10	0.10	mg/L	0.400	ND	100	50-150		
Matrix Spike Dup (9L23148-MSD1)				Source: B9L2975-02 Prepared & Analyzed: 12/23/19						
Sulfide	0.300	0.10	0.10	mg/L	0.400	ND	75.0	50-150	28.6	30



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 Received on Ice (Y/N): Yes Temp: 6 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9L20074 - Filter if turbid.										
LCS (9L20074-BS1)										
Prepared & Analyzed: 12/20/19										
Ortho Phosphate Phosphorus	0.532	0.050	0.016	mg/L	0.500	106	90-110			
Matrix Spike (9L20074-MS1)										
Source: B9L2979-01 Prepared & Analyzed: 12/20/19										
Ortho Phosphate Phosphorus	0.539	0.050	0.016	mg/L	0.500	0.0178	104	80-120		
Matrix Spike Dup (9L20074-MSD1)										
Source: B9L2979-01 Prepared & Analyzed: 12/20/19										
Ortho Phosphate Phosphorus	0.543	0.050	0.016	mg/L	0.500	0.0178	105	80-120	0.758	20
Batch 9L23104 - Acid Digest										
Blank (9L23104-BLK1)										
Prepared & Analyzed: 12/24/19										
Kjeldahl Nitrogen	ND	0.10	0.093	mg/L						
LCS (9L23104-BS1)										
Prepared & Analyzed: 12/24/19										
Kjeldahl Nitrogen	0.985	0.10	0.093	mg/L	1.00	98.5	80-120			
Matrix Spike (9L23104-MS1)										
Source: B9L2565-01 Prepared & Analyzed: 12/24/19										
Kjeldahl Nitrogen	140	8.0	7.4	mg/L	80.0	60.6	98.8	42-154		
Matrix Spike Dup (9L23104-MSD1)										
Source: B9L2565-01 Prepared & Analyzed: 12/24/19										
Kjeldahl Nitrogen	138	8.0	7.4	mg/L	80.0	60.6	96.8	42-154	1.15	25
Batch 9L30078 - Analyzed as received										
Blank (9L30078-BLK1)										
Prepared & Analyzed: 12/30/19										
Ammonia-Nitrogen	ND	0.10	0.044	mg/L						



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Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9L30078 - Analyzed as received										
LCS (9L30078-BS1)				Prepared & Analyzed: 12/30/19						
Ammonia-Nitrogen	1.02	0.10	0.044	mg/L	1.00	102	90-110			
Matrix Spike (9L30078-MS1)				Source: B9L2998-02 Prepared & Analyzed: 12/30/19						
Ammonia-Nitrogen	1.07	0.10	0.044	mg/L	1.00	0.0741	99.6	80-120		
Matrix Spike Dup (9L30078-MSD1)				Source: B9L2998-02 Prepared & Analyzed: 12/30/19						
Ammonia-Nitrogen	1.10	0.10	0.044	mg/L	1.00	0.0741	103	80-120	2.95	20



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Metals and Metalloids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9L23132 - EPA 200.2										
Blank (9L23132-BLK1) Prepared: 12/24/19 Analyzed: 12/27/19										
Aluminum	ND	100	16	ug/L						
LCS (9L23132-BS1) Prepared: 12/24/19 Analyzed: 12/27/19										
Aluminum	1140	100	16	ug/L	1170	98.2	85-115			
Matrix Spike (9L23132-MS1) Source: B9L2979-02 Prepared: 12/24/19 Analyzed: 12/27/19										
Aluminum	1320	100	16	ug/L	1170	87.1	105	70-130		
Matrix Spike Dup (9L23132-MSD1) Source: B9L2979-02 Prepared: 12/24/19 Analyzed: 12/27/19										
Aluminum	1290	100	16	ug/L	1170	87.1	103	70-130	1.85	20
Batch 9L31080 - 200.7/ No Digest										
Blank (9L31080-BLK1) Prepared & Analyzed: 12/31/19										
Aluminum-Dissolved	ND	100	16	ug/L						
Blank (9L31080-BLK2) Prepared & Analyzed: 12/31/19										
Aluminum-Dissolved	339	100	16	ug/L						QBfil, QBLKf
Blank (9L31080-BLK4) Prepared & Analyzed: 12/31/19										
Aluminum-Dissolved	ND	100	16	ug/L						QBfil
Blank (9L31080-BLK5) Prepared & Analyzed: 12/31/19										
Aluminum-Dissolved	ND	100	16	ug/L						
Blank (9L31080-BLK6) Prepared & Analyzed: 12/31/19										
Aluminum-Dissolved	ND	100	16	ug/L						



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Metals and Metalloids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 9L31080 - 200.7/ No Digest										
LCS (9L31080-BS1)				Prepared & Analyzed: 12/31/19						
Aluminum-Dissolved	342	100	16	ug/L	334	103	85-115			
Matrix Spike (9L31080-MS1)				Source: B9L3442-01 Prepared & Analyzed: 12/31/19						
Aluminum-Dissolved	2040	510	84	ug/L	1670	381	99.1	70-130		
Matrix Spike Dup (9L31080-MSD1)				Source: B9L3442-01 Prepared & Analyzed: 12/31/19						
Aluminum-Dissolved	2040	510	84	ug/L	1670	381	99.2	70-130	0.0749	20



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Work Order Number: B9L2979
Received on Ice (Y/N): Yes Temp: 6 °C

Notes and Definitions

- J Estimated value
 - N_pFilt Sample filtered and preserved upon receipt to the laboratory.
 - Nconf Result(s) confirmed by re-analysis.
 - QBfil Method blank was filtered prior to processing.
 - QBLKf The filtered method blank did not meet laboratory acceptance criteria.
 - QFpas Follow-up result within laboratory acceptance criteria.
 - QMout MS and/or MSD recovery did not meet laboratory acceptance criteria.
 - ND: Analyte NOT DETECTED at or above the Method Detection Limit (**if MDL is reported**), otherwise at or above the Reportable Detection Limit (RDL)
 - NR: Not Reported
 - RDL: Reportable Detection Limit
 - MDL: Method Detection Limit
- * / (Non-NELAP): NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Standard_No Alias.rpt

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Report Date: 07-Jan-2020

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Received on Ice (Y/N): Yes Temp: 6 °C

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Chain of Custody & Sample Information Record

Form containing client information, project details, sampler information, analysis requested, and a table of sample IDs (CL07-CL10, LE02) with dates and times. Includes a signature of Kate Buckley and a QR code for B9L2979.

Sample Integrity Upon Receipt table with fields for Sample(s) Submitted on Ice?, Custody Seal(s) Intact?, Sample(s) Intact?, Temperature, and Cooler Blank.

Lab No. 53
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P 951 653 3351
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www.babcocklabs.com

CA ELAP No. 2698
EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 17 of 17
Project Name: Amec Foster Wheeler-Lake Elsir
Project Number: LECL TMDL Monitoring

Report Date: 07-Jan-2020

Work Order Number: B9L2979
Received on Ice (Y/N): Yes Temp: 6 °C

Client Name: Wood E+I solutions

TAG #: 53
Sample #

Received	Container Type	-01	-02	-03	-04	-05	-06	-07	-08	-09	-10
	100mL Sterile Bacti Bottle										
	PLASTIC										
	Half Gallon Unp.										
X	Quart Unp.	1	1	1	1	1					
X	HNO3 Pint	1	1	1	1	1					
X	H2SO4 Pint	2	2	2	2	2					
	NaOH Pint										
	Unpreserved Pint										
	Perchlorate Pint										
	125mL Cr-6										
	KITS										
	GP Kit(240mL glass/50mL)										
	Low Level Perchlorate										
	GLASS										
	500mL Amber H2SO4										
	1L Amber Unp.										
	1L Amber HCL										
	1L Amber H2SO4										
	1L Amber Na2S2O3										
	VIALS:										
	HCL Vial										
	H2SO4 Vial										
	Na2S2O3 Vial										
	Unpreserved Vial										
	NH4Cl Vial										
X	Other Container 250 mL Boly	1	1	1	1	1					
X	Other: 500 mL (Zinc acetate / sodium Hydroxide)	1	1	1	1	1					

Total Number of Containers: 29

Key: 1B=travel blank, 1MHS= too much head space, Brkn=broken, Mlss=missing, NS=need split, HCL=hydrochloric Acid, H 2SO4=Sulfuric Acid

Temp Gun #: <u>62</u>	Custody Seals? YES <u>NO</u>
<u>6</u> °C	Acceptable Criteria <u>YES</u> NO
One Ice: <u>YES</u> NO	Permission to Continue? YES NO
Samples Arrived Intact: <u>YES</u> NO	
Travel Blank Received?	Vials Have Head Space? YES NO
Notes:	
PEV Notified of issues? YES / NO	Initials: <u>LL</u> PAGE OF

B9L2979
 Rcd: 12/20/2019 14:10
 JLH Temp Gun Id: 162



BABCOCK Laboratories, Inc.
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Client Name: Wood Environment&Infrastructure Sc
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA, 92123

Analytical Report: Page 1 of 2
 Project Name: Amec Foster Wheeler-Lake
 Project Number: LECL TMDL Monitoring
Work Order Number: B9L3018

Report Date: 22-Jan-2020

Received on Ice (Y/N) Yes Temp: 6 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
B9L3018-01	CL07-Int	Solid	12/20/19 10:30	Client	12/20/19 14:10	Courier (Jason J.) - DE
B9L3018-02	CL07-Surf	Solid	12/20/19 10:40	Client	12/20/19 14:10	Courier (Jason J.) - DE
B9L3018-03	CL08-Int	Solid	12/20/19 9:45	Client	12/20/19 14:10	Courier (Jason J.) - DE
B9L3018-04	CL08-Surf	Solid	12/20/19 9:55	Client	12/20/19 14:10	Courier (Jason J.) - DE
B9L3018-05	CL09-Int	Solid	12/20/19 9:00	Client	12/20/19 14:10	Courier (Jason J.) - DE
B9L3018-06	CL09-Surf	Solid	12/20/19 9:10	Client	12/20/19 14:10	Courier (Jason J.) - DE
B9L3018-07	CL10-Int	Solid	12/20/19 8:10	Client	12/20/19 14:10	Courier (Jason J.) - DE
B9L3018-08	CL10-Surf	Solid	12/20/19 8:20	Client	12/20/19 14:10	Courier (Jason J.) - DE
B9L3018-09	LE02-Int	Solid	12/20/19 9:00	Client	12/20/19 14:10	Courier (Jason J.) - DE
B9L3018-10	LE02-Surf	Solid	12/20/19 9:35	Client	12/20/19 14:10	Courier (Jason J.) - DE

Note: Analysis for Chlorophyll a was subcontracted to Truesdail Laboratories, Inc.

Note from Truesdail: Sample '09 LE02- INT' was lost during the extraction process – The bottle shattered while the analyst was using the glass tissue grinder. The rest of the samples were analyzed successfully.



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Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 2 of 2
Project Name: Amec Foster Wheeler-Lake
Project Number: LECL TMDL Monitoring
Work Order Number: B9L3018

Report Date: 22-Jan-2020

Received on Ice (Y/N) Yes Temp: 6 °C

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Case Narrative+ COC.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.



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Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 1 of 2
Project Name: Amec Foster Wheeler-Lake
Project Number: LECL TMDL Monitoring
Work Order Number: B9L3018

Report Date: 22-Jan-2020

Received on Ice (Y/N) Yes Temp: 6 °C

E.S. Babcock & Sons, Inc. Environmental Laboratories Chain of Custody & Sample Information Record
(951) 653-3351 FAX (951) 653-1662
www.babcocklabs.com

Client: Wood E&I Solutions, Inc.		Contact: John Rudolph		Phone No. 858-243-8158	
FAX No.		Email: john.rudolph@woodplc.com		Additional Reporting Requests	
Project Name: LECL TMDL Monitoring		Turn Around Time: Routine		*3-5 Day *48 Hour *24 Hour Rush Rush Rush	
Project Number: 1915100402		*Lab TAT Approval: By:		*Additional Charges May Apply	
Sampler Information		# of Containers & Preservatives		Analysis Requested	
Name: <u>Kate Buckley</u>		Unpreserved		Total # of Containers	
Employer: Wood E&I Solutions, Inc.		H2SO4		Routine	
Signature: <u>Kate Buckley</u>		HCl		Resample	
		HNO3		Special	
		Na2S2O3		Total Sulfide	
		NaOH		Nitrate - Nitrite	
		NaOH/ZnAcetate		TDS	
		NH4Cl		TKN	
		MGAA		Ammonia	
		Frozen		Total Phosphorus	
				SRP/Ortho-P	
				Chlorophyll-a	
				Matrix	
				Notes	
				DW = Drinking Water	
				WW = Wastewater	
				GW = Groundwater	
				S = Soil	
				SG = Sludge	
				L = Liquid	
				M = Miscellaneous	
Sample ID		Date		Time	
CL07 - Int		12/20/19		1030	
CL07 - Surf				1040	
CL08 - Int				0945	
CL08 - Surf				0955	
CL09 - Int				0900	
CL09 - Surf				0910	
CL10 - Int				0810	
CL10 - Surf				0820	
LE02 - Int		12/20/19		0900	
LE02 - Surf		12/20/19		0935	
Filter Volume:		500 mL			
Filter Volume:		500 mL			
Filter Volume:		500 mL			
Filter Volume:		500 mL			
Filter Volume:		500 mL			
Filter Volume:		440 mL			
Filter Volume:		440 mL			
Filter Volume:		440 mL			
Filter Volume:		440 mL			
Filter Volume:		500 mL			
Filter Volume:		500 mL			
Relinquished By (sign)		Print Name / Company		Date / Time	
<u>Kate Buckley</u>		Wood - Kate Buckley		12/20/19 13:20	
<u>John Judkins</u>		John Judkins / DS		12/20/19 14:00	
Received By (Sign)		Print Name / Company			
<u>John Judkins</u>		John Judkins / DS			

(For Lab Use Only)		Sample Integrity Upon Receipt		Lab Notes	
Sample(s) Submitted on Ice?	Yes No	Temperature			
Custody Seal(s) Intact?	Yes No N/A	6 °C			
Sample(s) Intact?	Yes No	<input type="checkbox"/> Cooler Blank			

B9L3018
Rc'd: 12/20/2019 14:10
EVS Temp Gun Id :60



BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 2 of 2
Project Name: Amec Foster Wheeler-Lake
Project Number: LECL TMDL Monitoring
Work Order Number: B9L3018

Report Date: 22-Jan-2020

Received on Ice (Y/N) Yes Temp: 6 °C

Client Name: WOOD E&I SOLUTIONS TAG #: 47

Received	Container Type	-01	-02	-03	-04	-05	-06	-07	-08	-09	-10
	100mL Sterile Bacti Bottle										
	PLASTIC										
	Half Gallon Unp.										
	Quart Unp.										
	HNO3 Pint										
	H2SO4 Pint										
	NaOH Pint										
	Unpreserved Pint										
	Perchlorate Pint										
	125mL Cr-6										
	KITS										
	GP Kit(240mLglass/50mL)										
	Low Level Perchlorate										
	GLASS										
	500mL Amber H2SO4										
	1L Amber Unp.										
	1L Amber HCL										
	1L Amber H2SO4										
	1L Amber Na2S2O3										
	VIALS:										
	HCL Vial										
	H2SO4 Vial										
	Na2S2O3 Vial										
	Unpreserved Vial										
	NH4Cl Vial										
X	Other Container										
	DISKS										

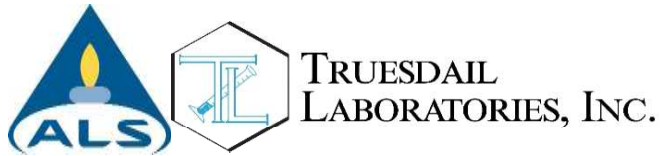
Total Number of Containers: _____
Key: TB=travel blank, TMHS= too much head space, Brkn=broken, Miss=missing, NS=need split, HCL=hydrochloric Acid, H2SO4=Sulfuric Acid

Temp Gun #: <u>60</u> °C	One Ice: <u>YES</u> NO	Custody Seals? YES <u>NO</u>
Samples Arrived Intact: <u>YES</u> NO	Acceptable Criteria <u>YES</u> NO	Permission to Continue? YES NO
Travel Blank Received?	Vials Have Head Space?	YES NO

PM Notified of issues? YES / NO Initials :

B9L3018
Rc'd: 12/20/2019 14:10
EVS Temp Gun Id :60





ALS - Truesdail Laboratories
3337 Michelson Drive, Suite CN750
Irvine, CA 92612
T +1 714 730 6239

Report

Client: Babcock Laboratories, Inc.
6100 Quail Valley Ct
Riverside, CA 92507

Work Order No.: 19L0497
Printed: 01/22/2020

Attention: Amanda C. Porter
Project Name: Chlorophyll

CASE NARRATIVE

SAMPLE RECEIPT SUMMARY

Table with 6 columns: Sample ID, Laboratory ID, Matrix, Type, Date Sampled, Date Received. Contains 10 rows of sample data.

DEFINITIONS

Table with 2 columns: Symbol, Definition. Lists abbreviations: DF (Dilution Factor), MDL (Method Detection Limit), ND (Not Detected), RL (Reporting Limit).

Respectfully yours,

Aldo B. Minano For Joseph Bryan Harding
Project Manager

This report applies to the sample(s), or product(s), investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed. This report shall not be reproduced without the written consent of ALS-Truesdail Laboratories, Inc., and must be reproduced in its entirety.



CL07-Int
19L0497-01 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	20.7	1.00	1.00	mg/m ³	1	1912672	01/07/2020 15:33	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

CL07-Surf
19L0497-02 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	16.4	1.00	1.00	mg/m ³	1	1912672	01/07/2020 15:33	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

CL08-Int
19L0497-03 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	21.9	1.00	1.00	mg/m ³	1	1912672	01/07/2020 15:33	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

CL08-Surf
19L0497-04 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	29.7	1.00	1.00	mg/m ³	1	1912672	01/07/2020 15:33	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

CL09 - Int
19L0497-05 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail



CL09 - Int (Continued)
19L0497-05 (Filter) (Continued)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	19.0	1.00	1.00	mg/m ³	1	1912672	01/07/2020 15:33	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

CL09 - Surf
19L0497-06 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	23.7	1.00	1.00	mg/m ³	1	1912672	01/07/2020 15:33	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

CL10-Int
19L0497-07 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	55.4	1.00	1.00	mg/m ³	1	1912672	01/07/2020 15:33	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

CL10-Surf
19L0497-08 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	46.7	1.00	1.00	mg/m ³	1	1912672	01/07/2020 15:33	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

LE02 - Surf
19L0497-10 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

This report applies to the sample(s), or product(s), investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed. This report shall not be reproduced without the written consent of ALS-Truesdail Laboratories, Inc., and must be reproduced in its entirety.



TRUESDAIL
LABORATORIES, INC.

Client: Babcock Laboratories, Inc.

Project Name: Chlorophyll

Printed: 01/22/2020

LE02 - Surf (Continued)

19L0497-10 (Filter) (Continued)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	37.2	1.00	1.00	mg/m ³	1	1912672	01/07/2020 15:33	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

This report applies to the sample(s), or product(s), investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed. This report shall not be reproduced without the written consent of ALS-Truesdail Laboratories, Inc., and must be reproduced in its entirety.

19L0497

SUBCONTRACT ORDER

Printed: 12/26/2019 11:26

Babcock Laboratories, Inc.

B9L3018

SENDING LABORATORY:

Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, CA 92507-0704
Phone: (951) 653-3351
Fax: (951) 653-1662
Project Manager: Cindy A. Waddell

RECEIVING LABORATORY:

Truesdail Laboratories - Subcontract
3337 Michelson Drive Suite CN750
Irvine, CA 92614
Phone : (714) 730-6239
Fax: (714) 730-6462

Copy/Relog from B9J2890. System Name: Wood Environmental&Infrastructure Solutions, Inc
Sampler: Kate Buckley

Please include MDLs and EXCEL EDD

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: B9L3018-01 Solid		Sampled: 12/20/19 10:30	CL07-Int	<u>Proj.No.:LECL TMDL Monitoring</u>
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	01/03/20 23:59	12/30/19 10:30	Report Chlorophyll a / Filter Volume = 500mL	
Sample ID: B9L3018-02 Solid		Sampled: 12/20/19 10:40	CL07-Surf	<u>Proj.No.:LECL TMDL Monitoring</u>
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	01/03/20 23:59	12/30/19 10:40	Report Chlorophyll a / Filter Volume = 500mL	
Sample ID: B9L3018-03 Solid		Sampled: 12/20/19 09:45	CL08-Int	<u>Proj.No.:LECL TMDL Monitoring</u>
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	01/03/20 23:59	12/30/19 09:45	Report Chlorophyll a / Filter Volume = 500mL	
Sample ID: B9L3018-04 Solid		Sampled: 12/20/19 09:55	CL08-Surf	<u>Proj.No.:LECL TMDL Monitoring</u>
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	01/03/20 23:59	12/30/19 09:55	Report Chlorophyll a / Filter Volume = 500mL	
Sample ID: B9L3018-05 Solid		Sampled: 12/20/19 09:00	CL09-Int	<u>Proj.No.:LECL TMDL Monitoring</u>
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	01/03/20 23:59	12/30/19 09:00	Report Chlorophyll a / Filter Volume = 500mL	

SUBCONTRACT ORDER
Babcock Laboratories, Inc.
B9L3018

Printed: 12/26/2019 11:26

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: B9L3018-06 Solid		Sampled: 12/20/19 09:10	CL09-Surf	<u>Proj.No.:LECL TMDL Monitoring</u>
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	01/03/20 23:59	12/30/19 09:10	Report Chlorophyll a / Filter Volume = 440mL	
Sample ID: B9L3018-07 Solid		Sampled: 12/20/19 08:10	CL10-Int	<u>Proj.No.:LECL TMDL Monitoring</u>
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	01/03/20 23:59	12/30/19 08:10	Report Chlorophyll a / Filter Volume = 410mL	
Sample ID: B9L3018-08 Solid		Sampled: 12/20/19 08:20	CL10-Surf	<u>Proj.No.:LECL TMDL Monitoring</u>
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	01/03/20 23:59	12/30/19 08:20	Report Chlorophyll a / Filter Volume = 440mL	
Sample ID: B9L3018-09 Solid		Sampled: 12/20/19 09:00	LE02-Int	<u>Proj.No.:LECL TMDL Monitoring</u>
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	01/03/20 23:59	12/30/19 09:00	Report Chlorophyll a / Filter Volume = 500mL	
Sample ID: B9L3018-10 Solid		Sampled: 12/20/19 09:35	LE02-Surf	<u>Proj.No.:LECL TMDL Monitoring</u>
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	01/03/20 23:59	12/30/19 09:35	Report Chlorophyll a / Filter Volume = 500mL	

Ref:	Date: 26Dec19	SHIPPING:	15.43
Dep:	Wgt: 6.20 LBS	SPECIAL:	1.12
		HANDLING:	0.00
	DV: 0.00	TOTAL:	16.55

Svcs: PRIORITY OVERNIGHT
TRK: 400 244 ECR

All Containers Intact: Yes No Samples Preserved Properly: Yes No

Samples Received at 136 oC Sample Labels / COC Agree: Yes No Custody Seals Present: Yes No

Please forward all acknowledgements of sample receipt, final reports and invoices to data@babcocklabs.com
NO HARDCOPIES PLEASE.

Released By _____ Date 12/26/19 Received By [Signature] Date 12-27-19 10:18

Released By _____ Date _____ Received By _____ Date _____

ANALYTICAL REPORT

Eurofins Calscience LLC
7440 Lincoln Way
Garden Grove, CA 92841
Tel: (714)895-5494

Laboratory Job ID: 570-16743-1
Client Project/Site: B9L3020
Revision: 1

For:
Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, California 92507

Attn: Cindy A Waddell



Authorized for release by:
2/18/2020 3:59:05 PM

Carla Hollowell, Project Manager I
(714)895-5494
carlahollowell@eurofinsus.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Method Summary	9
Sample Summary	10
Chain of Custody	11
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Definitions/Glossary

Client: Babcock Laboratories, Inc.
Project/Site: B9L3020

Job ID: 570-16743-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Babcock Laboratories, Inc.
Project/Site: B9L3020

Job ID: 570-16743-1

Job ID: 570-16743-1

Laboratory: Eurofins Calscience LLC

Narrative

**Job Narrative
570-16743-1**

Comments

No additional comments.

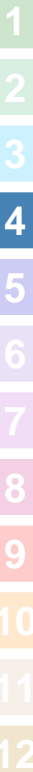
Receipt

The samples were received on 12/27/2019 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.0° C.

General Chemistry

Method 365.1: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 570-41896 and analytical batch 570-42382 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Client Sample Results

Client: Babcock Laboratories, Inc.
Project/Site: B9L3020

Job ID: 570-16743-1

General Chemistry

Client Sample ID: B9L3020-01
Date Collected: 12/20/19 10:30
Date Received: 12/27/19 09:30

Lab Sample ID: 570-16743-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.0467		0.0100	0.00281	mg/L		01/02/20 08:00	01/02/20 12:02	1

Client Sample ID: B9L3020-02
Date Collected: 12/20/19 09:45
Date Received: 12/27/19 09:30

Lab Sample ID: 570-16743-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.0535		0.0100	0.00281	mg/L		01/02/20 08:00	01/02/20 12:03	1

Client Sample ID: B9L3020-03
Date Collected: 12/20/19 09:00
Date Received: 12/27/19 09:30

Lab Sample ID: 570-16743-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.0954		0.0100	0.00281	mg/L		01/02/20 08:00	01/02/20 12:05	1

Client Sample ID: B9L3020-04
Date Collected: 12/20/19 08:10
Date Received: 12/27/19 09:30

Lab Sample ID: 570-16743-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.0855		0.0100	0.00281	mg/L		01/02/20 08:00	01/02/20 12:06	1

Client Sample ID: B9L3020-05
Date Collected: 12/20/19 09:00
Date Received: 12/27/19 09:30

Lab Sample ID: 570-16743-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.278	F1	0.0100	0.00281	mg/L		01/02/20 08:00	01/02/20 12:08	1

QC Sample Results

Client: Babcock Laboratories, Inc.
Project/Site: B9L3020

Job ID: 570-16743-1

Method: 365.1 - Phosphorus, Total

Lab Sample ID: MB 570-41896/5-A
Matrix: Water
Analysis Batch: 42382

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 41896

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	ND		0.0100	0.00281	mg/L		01/02/20 08:00	01/02/20 11:44	1

Lab Sample ID: LCS 570-41896/6-A
Matrix: Water
Analysis Batch: 42382

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 41896

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.200	0.1934		mg/L		97	90 - 110

Lab Sample ID: LCSD 570-41896/7-A
Matrix: Water
Analysis Batch: 42382

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 41896

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Phosphorus, Total	0.200	0.2010		mg/L		101	90 - 110	4	20

Lab Sample ID: 570-16743-5 MS
Matrix: Water
Analysis Batch: 42382

Client Sample ID: B9L3020-05
Prep Type: Total/NA
Prep Batch: 41896

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.278	F1	0.200	0.4426	F1	mg/L		82	90 - 110

Lab Sample ID: 570-16743-5 MSD
Matrix: Water
Analysis Batch: 42382

Client Sample ID: B9L3020-05
Prep Type: Total/NA
Prep Batch: 41896

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Phosphorus, Total	0.278	F1	0.200	0.4457	F1	mg/L		84	90 - 110	1	25

Lab Chronicle

Client: Babcock Laboratories, Inc.
Project/Site: B9L3020

Job ID: 570-16743-1

Client Sample ID: B9L3020-01

Lab Sample ID: 570-16743-1

Date Collected: 12/20/19 10:30

Matrix: Water

Date Received: 12/27/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	41896	01/02/20 08:00	YR9U	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	42382	01/02/20 12:02	YR9U	ECL 1
Instrument ID: ACA1										

Client Sample ID: B9L3020-02

Lab Sample ID: 570-16743-2

Date Collected: 12/20/19 09:45

Matrix: Water

Date Received: 12/27/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	41896	01/02/20 08:00	YR9U	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	42382	01/02/20 12:03	YR9U	ECL 1
Instrument ID: ACA1										

Client Sample ID: B9L3020-03

Lab Sample ID: 570-16743-3

Date Collected: 12/20/19 09:00

Matrix: Water

Date Received: 12/27/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	41896	01/02/20 08:00	YR9U	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	42382	01/02/20 12:05	YR9U	ECL 1
Instrument ID: ACA1										

Client Sample ID: B9L3020-04

Lab Sample ID: 570-16743-4

Date Collected: 12/20/19 08:10

Matrix: Water

Date Received: 12/27/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	41896	01/02/20 08:00	YR9U	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	42382	01/02/20 12:06	YR9U	ECL 1
Instrument ID: ACA1										

Client Sample ID: B9L3020-05

Lab Sample ID: 570-16743-5

Date Collected: 12/20/19 09:00

Matrix: Water

Date Received: 12/27/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	41896	01/02/20 08:00	YR9U	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	42382	01/02/20 12:08	YR9U	ECL 1
Instrument ID: ACA1										

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

Accreditation/Certification Summary

Client: Babcock Laboratories, Inc.
Project/Site: B9L3020

Job ID: 570-16743-1

Laboratory: Eurofins Calscience LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arizona	State	AZ0781	03-13-20
California	Los Angeles County Sanitation Districts	10109	09-29-20
California	SCAQMD LAP	17LA0919	11-30-20
California	State	2944	09-29-20
Guam	State	20-003R	10-31-20
Hawaii	State	<cert No.>	07-02-20
Nevada	State	CA00111	07-31-20
Washington	State	C916-18	10-11-20

Method Summary

Client: Babcock Laboratories, Inc.
Project/Site: B9L3020

Job ID: 570-16743-1

Method	Method Description	Protocol	Laboratory
365.1	Phosphorus, Total	EPA	ECL 1
365.2/365.3/365	Phosphorus, Total	MCAWW	ECL 1

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

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Sample Summary

Client: Babcock Laboratories, Inc.
Project/Site: B9L3020

Job ID: 570-16743-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
570-16743-1	B9L3020-01	Water	12/20/19 10:30	12/27/19 09:30	
570-16743-2	B9L3020-02	Water	12/20/19 09:45	12/27/19 09:30	
570-16743-3	B9L3020-03	Water	12/20/19 09:00	12/27/19 09:30	
570-16743-4	B9L3020-04	Water	12/20/19 08:10	12/27/19 09:30	
570-16743-5	B9L3020-05	Water	12/20/19 09:00	12/27/19 09:30	

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SUBCONTRACT ORDER

Printed: 12/26/2019 11:27

Babcock Laboratories, Inc.

B9L3020

SENDING LABORATORY:

Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, CA 92507-0704
Phone: (951) 653-3351
Fax: (951) 653-1662
Project Manager: Cindy A. Waddell

RECEIVING LABORATORY:

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove, CA 92841-1427
Phone : (714) 895-5494
Fax: (714) 894-7501



570-16743 Chain of Custody

Copy/Relog from B9J2877. System Name: Wood Environment & Infrastructure Solutions, Inc
Sampler: Kate Buckley

Please include MDLs and EXCEL EDD

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: B9L3020-01 Liquid		Sampled: 12/20/19 10:30	CL07	Proj.No.: <u>Lake</u> <u>Elsinore/Canyon Lake</u>
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	01/17/20 23:59	12/30/19 10:30	Low Level Total Phosphorus	
Sample ID: B9L3020-02 Liquid		Sampled: 12/20/19 09:45	CL08	Proj.No.: <u>Lake</u> <u>Elsinore/Canyon Lake</u>
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	01/17/20 23:59	12/30/19 09:45	Low Level Total Phosphorus	
Sample ID: B9L3020-03 Liquid		Sampled: 12/20/19 09:00	CL09	Proj.No.: <u>Lake</u> <u>Elsinore/Canyon Lake</u>
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	01/17/20 23:59	12/30/19 09:00	Low Level Total Phosphorus	
Sample ID: B9L3020-04 Liquid		Sampled: 12/20/19 08:10	CL10	Proj.No.: <u>Lake</u> <u>Elsinore/Canyon Lake</u>
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	01/17/20 23:59	12/30/19 08:10	Low Level Total Phosphorus	
Sample ID: B9L3020-05 Liquid		Sampled: 12/20/19 09:00	LE02	Proj.No.: <u>Lake</u> <u>Elsinore/Canyon Lake</u>
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	01/17/20 23:59	12/30/19 09:00	Low Level Total Phosphorus	

16743

SUBCONTRACT ORDER
Babcock Laboratories, Inc.
B9L3020

Printed: 12/26/2019 11:27

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- 10
- 11
- 12

All Containers Intact: Yes No
 Samples Preserved Properly: Yes No
 Samples Received at _____ oC
 Sample Labels / COC Agree: Yes No
 Custody Seals Present: Yes No

Please forward all acknowledgements of sample receipt, final reports and invoices to data@babcocklabs.com
NO HARDCOPIES PLEASE.

Released By	Date	Received By	Date
		<i>[Signature]</i>	12/27/19 0930
		Received/By	Date

2-513-0 546
2/18/2020 (Rev. 1)

Login Sample Receipt Checklist

Client: Babcock Laboratories, Inc.

Job Number: 570-16743-1

Login Number: 16743
List Number: 1
Creator: Soriano, Precy

List Source: Eurofins Calscience

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	





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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA 92123

Analytical Report: Page 1 of 16
Project Name: Amec Foster Wheeler-Lake Elsir
Project Number: LECL TMDL Monitoring

Report Date: 03-Mar-2020

Work Order Number: C0B2047
Received on Ice (Y/N): Yes Temp: 7 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
C0B2047-01	CL07	Liquid	02/18/20 10:25	Kate Buckley	02/18/20 14:57	Courier (Victor Diaz)-DE
C0B2047-02	CL08	Liquid	02/18/20 9:45	Kate Buckley	02/18/20 14:57	Courier (Victor Diaz)-DE
C0B2047-03	CL09	Liquid	02/18/20 8:55	Kate Buckley	02/18/20 14:57	Courier (Victor Diaz)-DE
C0B2047-04	CL10	Liquid	02/18/20 8:10	Kate Buckley	02/18/20 14:57	Courier (Victor Diaz)-DE
C0B2047-05	LE02	Liquid	02/18/20 8:45	Kate Buckley	02/18/20 14:57	Courier (Victor Diaz)-DE



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 2 of 16
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 03-Mar-2020

Work Order Number: C0B2047
 Received on Ice (Y/N): Yes Temp: 7 °C

Laboratory Reference Number

C0B2047-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL07	Liquid	02/18/20 10:25	02/18/20 14:57

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	02/18/20 18:38	ATR	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	02/18/20 18:38	ATR	
Solids								
Total Dissolved Solids	390	10	10	mg/L	SM 2540C	02/21/20 13:35	CAA	
Total Suspended Solids	6	2	2	mg/L	SM 2540D	02/19/20 11:00	DSS	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	02/19/20 13:45	DSS	
Nutrients								
Ammonia-Nitrogen	0.25	0.10	0.044	mg/L	SM4500NH3H G	02/24/20 11:56	AJH	
Kjeldahl Nitrogen	0.93	0.10	0.093	mg/L	EPA 351.2	02/20/20 09:19	SLL	
Ortho Phosphate Phosphorus	ND	0.050	0.050	mg/L	EPA 300.0	02/19/20 14:27	ATR	
Metals and Metalloids								
Aluminum-Dissolved	ND	200	33	ug/L	EPA 200.7	02/20/20 19:43	KRV	N_pFilt
Aluminum	68	100	33	ug/L	EPA 200.7	02/20/20 23:39	KRV	J



BABCOCK Laboratories, Inc.
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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 3 of 16
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 03-Mar-2020

Work Order Number: C0B2047
 Received on Ice (Y/N): Yes Temp: 7 °C

Laboratory Reference Number

C0B2047-02

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL08	Liquid	02/18/20 09:45	02/18/20 14:57

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	02/18/20 19:16	ATR	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	02/18/20 19:16	ATR	
Solids								
Total Dissolved Solids	390	10	10	mg/L	SM 2540C	02/21/20 13:35	CAA	
Total Suspended Solids	8	2	2	mg/L	SM 2540D	02/19/20 11:00	DSS	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	02/19/20 13:45	DSS	
Nutrients								
Ammonia-Nitrogen	0.14	0.10	0.044	mg/L	SM4500NH3H G	02/24/20 11:58	AJH	
Kjeldahl Nitrogen	1.1	0.10	0.093	mg/L	EPA 351.2	02/20/20 09:20	SLL	
Ortho Phosphate Phosphorus	ND	0.050	0.050	mg/L	EPA 300.0	02/19/20 15:10	ATR	
Metals and Metalloids								
Aluminum-Dissolved	ND	200	33	ug/L	EPA 200.7	02/20/20 19:45	KRV	N_pFilt
Aluminum	71	100	33	ug/L	EPA 200.7	02/24/20 18:34	KRV	J



BABCOCK Laboratories, Inc.
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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 4 of 16
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 03-Mar-2020

Work Order Number: C0B2047
 Received on Ice (Y/N): Yes Temp: 7 °C

Laboratory Reference Number

C0B2047-03

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL09	Liquid	02/18/20 08:55	02/18/20 14:57

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	02/18/20 19:32	ATR	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	02/18/20 19:32	ATR	
Solids								
Total Dissolved Solids	510	10	10	mg/L	SM 2540C	02/21/20 13:35	CAA	
Total Suspended Solids	5	2	2	mg/L	SM 2540D	02/19/20 11:00	DSS	
General Inorganics								
Sulfide	1.3	0.10	0.10	mg/L	SM 4500S2 D	02/19/20 13:45	DSS	
Nutrients								
Ammonia-Nitrogen	0.86	0.10	0.044	mg/L	SM4500NH3H G	02/24/20 12:04	AJH	
Kjeldahl Nitrogen	0.86	0.10	0.093	mg/L	EPA 351.2	02/20/20 09:22	SLL	
Ortho Phosphate Phosphorus	0.19	0.050	0.050	mg/L	EPA 300.0	02/19/20 15:25	ATR	
Metals and Metalloids								
Aluminum-Dissolved	ND	200	33	ug/L	EPA 200.7	02/20/20 19:47	KRV	N_pFilt
Aluminum	ND	100	33	ug/L	EPA 200.7	02/25/20 21:44	KRV	



BABCOCK Laboratories, Inc.
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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 5 of 16
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 03-Mar-2020

Work Order Number: C0B2047
 Received on Ice (Y/N): Yes Temp: 7 °C

Laboratory Reference Number

C0B2047-04

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL10	Liquid	02/18/20 08:10	02/18/20 14:57

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	02/18/20 19:45	ATR	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	02/18/20 19:45	ATR	
Solids								
Total Dissolved Solids	510	10	10	mg/L	SM 2540C	02/21/20 13:35	CAA	
Total Suspended Solids	10	2	2	mg/L	SM 2540D	02/19/20 11:00	DSS	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	02/19/20 13:45	DSS	
Nutrients								
Ammonia-Nitrogen	0.067	0.10	0.044	mg/L	SM4500NH3H G	02/24/20 12:05	AJH	J
Kjeldahl Nitrogen	1.4	0.10	0.093	mg/L	EPA 351.2	02/20/20 09:23	SLL	
Ortho Phosphate Phosphorus	ND	0.050	0.050	mg/L	EPA 300.0	02/19/20 15:39	ATR	
Metals and Metalloids								
Aluminum-Dissolved	ND	200	33	ug/L	EPA 200.7	02/20/20 19:49	KRV	N_pFilt
Aluminum	71	100	33	ug/L	EPA 200.7	02/25/20 21:46	KRV	J



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 6 of 16
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 03-Mar-2020

Work Order Number: C0B2047
 Received on Ice (Y/N): Yes Temp: 7 °C

Laboratory Reference Number

C0B2047-05

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
LE02	Liquid	02/18/20 08:45	02/18/20 14:57

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	0.23	0.20	0.16	mg/L	EPA 300.0	02/18/20 19:58	ATR	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	02/18/20 19:58	ATR	
Solids								
Total Dissolved Solids	2100	40	40	mg/L	SM 2540C	02/21/20 13:35	CAA	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	02/19/20 13:45	DSS	
Nutrients								
Ammonia-Nitrogen	0.073	0.10	0.044	mg/L	SM4500NH3H G	02/24/20 12:07	AJH J	
Kjeldahl Nitrogen	0.97	0.10	0.093	mg/L	EPA 351.2	02/20/20 09:27	SLL	
Ortho Phosphate Phosphorus	ND	0.050	0.050	mg/L	EPA 300.0	02/19/20 15:54	ATR	



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Client Name: Wood Environment&Infrastructure Solutions, In
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Analytical Report: Page 7 of 16
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 03-Mar-2020

Work Order Number: C0B2047
 Received on Ice (Y/N): Yes Temp: 7 °C

Anions - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0B18133 - Analyzed as Received IC										
Blank (0B18133-BLK1)				Prepared & Analyzed: 02/18/20						
Nitrite as N	ND	0.10	0.091	mg/L						
Nitrate as N	ND	0.20	0.16	mg/L						
LCS (0B18133-BS1)				Prepared & Analyzed: 02/18/20						
Nitrite as N	2.32	0.10	0.091	mg/L	2.50	93.0	90-110			
Nitrate as N	5.47	0.20	0.16	mg/L	5.65	96.8	90-110			
Matrix Spike (0B18133-MS1)				Source: C0B1956-01 Prepared & Analyzed: 02/18/20						
Nitrite as N	2.31	0.10	0.091	mg/L	2.50	0.118	87.8	80-120		
Nitrate as N	6.60	0.20	0.16	mg/L	5.65	0.934	100	75-131		
Matrix Spike (0B18133-MS2)				Source: C0B2052-04 Prepared & Analyzed: 02/18/20						
Nitrite as N	1.23	0.10	0.091	mg/L	2.50	ND	49.4	80-120		QFpas, QMout
Nitrate as N	5.88	0.20	0.16	mg/L	5.65	0.289	99.0	75-131		
Matrix Spike Dup (0B18133-MSD1)				Source: C0B1956-01 Prepared & Analyzed: 02/18/20						
Nitrite as N	2.38	0.10	0.091	mg/L	2.50	0.118	90.7	80-120	3.09	20
Nitrate as N	6.74	0.20	0.16	mg/L	5.65	0.934	103	75-131	1.97	20



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Client Name: Wood Environment&Infrastructure Solutions, In
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Analytical Report: Page 8 of 16
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 03-Mar-2020

Work Order Number: C0B2047
 Received on Ice (Y/N): Yes Temp: 7 °C

Solids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0B19088 - Analyzed as received										
Blank (0B19088-BLK1) Prepared & Analyzed: 02/19/20										
Total Suspended Solids	ND	0.5	0.5	mg/L						
Duplicate (0B19088-DUP1) Source: C0B1972-03 Prepared & Analyzed: 02/19/20										
Total Suspended Solids	144	10	10	mg/L	162			11.8	25	
Duplicate (0B19088-DUP2) Source: C0B2004-05 Prepared & Analyzed: 02/19/20										
Total Suspended Solids	468	20	20	mg/L	580			21.4	25	
Batch 0B21045 - Analyzed as received										
Blank (0B21045-BLK1) Prepared & Analyzed: 02/21/20										
Total Dissolved Solids	ND	10	10	mg/L						
Duplicate (0B21045-DUP1) Source: C0B1992-01 Prepared & Analyzed: 02/21/20										
Total Dissolved Solids	528	10	10	mg/L	548			3.72	20	
Duplicate (0B21045-DUP2) Source: C0B2042-02 Prepared & Analyzed: 02/21/20										
Total Dissolved Solids	601	10	10	mg/L	593			1.34	20	



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Client Name: Wood Environment&Infrastructure Solutions, In
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Analytical Report: Page 9 of 16
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 03-Mar-2020

Work Order Number: C0B2047
 Received on Ice (Y/N): Yes Temp: 7 °C

General Inorganics - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0B19123 - Analyzed as received										
Blank (0B19123-BLK1) Prepared & Analyzed: 02/19/20										
Sulfide	ND	0.10	0.10	mg/L						
LCS (0B19123-BS1) Prepared & Analyzed: 02/19/20										
Sulfide	0.300	0.10	0.10	mg/L	0.400	75.0	50-150			
Matrix Spike (0B19123-MS1) Source: C0B2171-01 Prepared & Analyzed: 02/19/20										
Sulfide	0.300	0.10	0.10	mg/L	0.400	ND	75.0	50-150		
Matrix Spike Dup (0B19123-MSD1) Source: C0B2171-01 Prepared & Analyzed: 02/19/20										
Sulfide	0.300	0.10	0.10	mg/L	0.400	ND	75.0	50-150	0.00	30



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Client Name: Wood Environment&Infrastructure Solutions, In
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Analytical Report: Page 10 of 16
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 03-Mar-2020

Work Order Number: C0B2047
 Received on Ice (Y/N): Yes Temp: 7 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RD	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0B19121 - Analyzed as Received IC										
Blank (0B19121-BLK1) Prepared & Analyzed: 02/19/20										
Ortho Phosphate Phosphorus	ND	0.050	0.050	mg/L						
LCS (0B19121-BS1) Prepared & Analyzed: 02/19/20										
Ortho Phosphate Phosphorus	0.304	0.050	0.050	mg/L	0.300	101	90-110			
Matrix Spike (0B19121-MS1) Source: C0B2047-01 Prepared & Analyzed: 02/19/20										
Ortho Phosphate Phosphorus	0.336	0.050	0.050	mg/L	0.300	ND	112	80-120		
Matrix Spike Dup (0B19121-MSD1) Source: C0B2047-01 Prepared & Analyzed: 02/19/20										
Ortho Phosphate Phosphorus	0.367	0.050	0.050	mg/L	0.300	ND	122	80-120	9.02	20 QMS(D)
Batch 0B19127 - Acid Digest										
Blank (0B19127-BLK1) Prepared: 02/19/20 Analyzed: 02/20/20										
Kjeldahl Nitrogen	ND	0.10	0.093	mg/L						
LCS (0B19127-BS1) Prepared: 02/19/20 Analyzed: 02/20/20										
Kjeldahl Nitrogen	0.839	0.10	0.093	mg/L	1.00		83.9	80-120		
Matrix Spike (0B19127-MS1) Source: C0B2124-10 Prepared: 02/19/20 Analyzed: 02/20/20										
Kjeldahl Nitrogen	116	8.0	7.4	mg/L	80.0	57.7	72.6	42-154		
Matrix Spike Dup (0B19127-MSD1) Source: C0B2124-10 Prepared: 02/19/20 Analyzed: 02/20/20										
Kjeldahl Nitrogen	111	8.0	7.4	mg/L	80.0	57.7	66.5	42-154	4.31	25
Batch 0B24081 - Analyzed as received										
Blank (0B24081-BLK1) Prepared & Analyzed: 02/24/20										
Ammonia-Nitrogen	ND	0.10	0.044	mg/L						



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 Address: 9210 Sky Park Court #200
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Analytical Report: Page 11 of 16
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 03-Mar-2020

Work Order Number: C0B2047
 Received on Ice (Y/N): Yes Temp: 7 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0B24081 - Analyzed as received										
LCS (0B24081-BS1)				Prepared & Analyzed: 02/24/20						
Ammonia-Nitrogen	1.02	0.10	0.044	mg/L	1.00	102	90-110			
Matrix Spike (0B24081-MS1)				Source: C0B2129-03 Prepared & Analyzed: 02/24/20						
Ammonia-Nitrogen	1.11	0.10	0.044	mg/L	1.00	ND	111	80-120		
Matrix Spike Dup (0B24081-MSD1)				Source: C0B2129-03 Prepared & Analyzed: 02/24/20						
Ammonia-Nitrogen	1.02	0.10	0.044	mg/L	1.00	ND	102	80-120	8.32	20



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Analytical Report: Page 12 of 16
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 03-Mar-2020

Work Order Number: C0B2047
 Received on Ice (Y/N): Yes Temp: 7 °C

Metals and Metalloids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0B20041 - EPA 200.2										
Blank (0B20041-BLK1) Prepared & Analyzed: 02/20/20										
Aluminum	ND	100	16	ug/L						
LCS (0B20041-BS1) Prepared & Analyzed: 02/20/20										
Aluminum	1120	100	16	ug/L	1170	96.2	85-115			
Matrix Spike (0B20041-MS1) Source: C0B1669-01 Prepared & Analyzed: 02/20/20										
Aluminum	1270	2000	330	ug/L	1170	ND	NR	70-130		J
Matrix Spike Dup (0B20041-MSD1) Source: C0B1669-01 Prepared & Analyzed: 02/20/20										
Aluminum	1230	2000	330	ug/L	1170	ND	NR	70-130	3.28	20 J
Batch 0B20070 - 200.7/ No Digest										
Blank (0B20070-BLK1) Prepared & Analyzed: 02/20/20										
Aluminum-Dissolved	45.2	100	16	ug/L						QBfil, J
Blank (0B20070-BLK2) Prepared & Analyzed: 02/20/20										
Aluminum-Dissolved	ND	100	16	ug/L						QBfil
Blank (0B20070-BLK3) Prepared & Analyzed: 02/20/20										
Aluminum-Dissolved	ND	100	16	ug/L						
LCS (0B20070-BS1) Prepared & Analyzed: 02/20/20										
Aluminum-Dissolved	319	100	16	ug/L	334	95.5	85-115			
Matrix Spike (0B20070-MS1) Source: C0B2047-04 Prepared & Analyzed: 02/20/20										
Aluminum-Dissolved	626	200	34	ug/L	668	ND	93.7	70-130		



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 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
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Analytical Report: Page 13 of 16
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL Monitoring

Report Date: 03-Mar-2020

Work Order Number: C0B2047
 Received on Ice (Y/N): Yes Temp: 7 °C

Metals and Metalloids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0B20070 - 200.7/ No Digest										
Matrix Spike Dup (0B20070-MSD1) Source: C0B2047-04 Prepared & Analyzed: 02/20/20										
Aluminum-Dissolved	630	200	34	ug/L	668	ND	94.3	70-130	0.629	20
Batch 0B24110 - EPA 200.2										
Blank (0B24110-BLK1) Prepared & Analyzed: 02/24/20										
Aluminum	ND	100	16	ug/L						
LCS (0B24110-BS1) Prepared & Analyzed: 02/24/20										
Aluminum	1100	100	16	ug/L	1170		94.3	85-115		
Matrix Spike (0B24110-MS1) Source: C0B2606-01 Prepared & Analyzed: 02/24/20										
Aluminum	1180	200	33	ug/L	1170	47.3	97.1	70-130		
Matrix Spike Dup (0B24110-MSD1) Source: C0B2606-01 Prepared & Analyzed: 02/24/20										
Aluminum	1160	200	33	ug/L	1170	47.3	95.7	70-130	1.40	20
Batch 0B25069 - EPA 200.2										
Blank (0B25069-BLK1) Prepared & Analyzed: 02/25/20										
Aluminum	ND	100	16	ug/L						
LCS (0B25069-BS1) Prepared & Analyzed: 02/25/20										
Aluminum	1120	100	16	ug/L	1170		96.4	85-115		
Matrix Spike (0B25069-MS1) Source: C0B2216-02 Prepared & Analyzed: 02/25/20										
Aluminum	1150	500	82	ug/L	1170	ND	98.3	70-130		



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Client Name: Wood Environment&Infrastructure Solutions, In
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Analytical Report: Page 14 of 16
Project Name: Amec Foster Wheeler-Lake Elsir
Project Number: LECL TMDL Monitoring

Report Date: 03-Mar-2020

Work Order Number: C0B2047
Received on Ice (Y/N): Yes Temp: 7 °C

Metals and Metalloids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0B25069 - EPA 200.2										
Matrix Spike Dup (0B25069-MSD1)										
				Source: C0B2216-02		Prepared & Analyzed: 02/25/20				
Aluminum	1120	500	82	ug/L	1170	ND	96.1	70-130	2.18	20



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Client Name: Wood Environment&Infrastructure Solutions, In
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Analytical Report: Page 15 of 16
Project Name: Amec Foster Wheeler-Lake Elsir
Project Number: LECL TMDL Monitoring

Report Date: 03-Mar-2020

Work Order Number: C0B2047
Received on Ice (Y/N): Yes Temp: 7 °C

Notes and Definitions

- J Estimated value
- N_pFilt Sample filtered and preserved upon receipt to the laboratory.
- QBfil Method blank was filtered prior to processing.
- QFpas Follow-up result within laboratory acceptance criteria.
- QMout MS and/or MSD recovery did not meet laboratory acceptance criteria.
- QMS(D) Matrix spike recovery was out of acceptance criteria. Precision and accuracy demonstrated by remaining matrix spike results.
- ND: Analyte NOT DETECTED at or above the Method Detection Limit (**if MDL is reported**), otherwise at or above the Reportable Detection Limit (RDL)
- NR: Not Reported
- RDL: Reportable Detection Limit
- MDL: Method Detection Limit

* / (Non-NELAP): NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Standard_No Alias.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.

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EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
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Analytical Report: Page 16 of 16
Project Name: Amec Foster Wheeler-Lake Elsi
Project Number: LECL TMDL Monitoring

Report Date: 03-Mar-2020

Work Order Number: COB2047
Received on Ice (Y/N): Yes Temp: 7 °C

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www.babcocklabs.com

Chain of Custody & Sample Information Record

Client: Wood E&I Solutions, Inc.		Contact: John Rudolph		Phone No. 858-243-8158	
FAX No.		Email: john.rudolph@woodplc.com		Additional Reporting Requests	
Project Name: LECL TMDL Monitoring		Turn Around Time: <u>Routine</u>		<input type="checkbox"/> Yes <input type="checkbox"/> No Include QC Data Package:	
Project Number: 1915100402		Lab TAT Approval: By:		<input type="checkbox"/> Yes <input type="checkbox"/> No FAX Results:	
Name: <u>Kate Burkney</u> Employer: Wood E&I Solutions, Inc. Signature: <u>Kate Burkney</u>		*3-5 Day Rush *48 Hour Rush *24 Hour Rush *Additional Charges May Apply		<input type="checkbox"/> Yes <input type="checkbox"/> No Email Results: <input type="checkbox"/> Yes <input type="checkbox"/> No State EDT:	
Sampler Information Name: <u>Kate Burkney</u> Employer: Wood E&I Solutions, Inc. Signature: <u>Kate Burkney</u>		# of Containers & Preservatives Unpreserved H2SO4 HCl HNO3 NaOH Na2S2O3 NaOH/ZnAcetate NH4Cl MCAA Frozen		Analysis Requested TSS Nitrate - Nitrite TDS TKN Ammonia Total Phosphorus SRP/Ortho-P Total Sulfide Total AL Dissolved AL	
Matrix DW = Drinking Water WW = Wastewater GW = Groundwater S = Soil SG = Sludge L = Liquid M = Miscellaneous		Notes No lab filtration required for Ortho-P (field filtered) <u>★</u> Total Phosphorus - Sub to Eurofins Calscience. RUSH TAT Dissolved Al is not field filtered			
Sample ID	Date	Time	Total # of Containers	Sample Type	Notes
CL07	2/18/20	1025			
CL08		0945			
CL09		0855			
CL10		0810			
LE02		0845			
Relinquished By (sign)		Print Name / Company		Date / Time	
<u>[Signature]</u>		Tyler Hoff / Wood		2/18/2020 14:00	
<u>[Signature]</u>		Victor D / DE		2/18/2020 14:57	
		Brock Babcock / ESB			

(For Lab Use Only)		Sample Integrity Upon Receipt		Lab Notes	
Sample(s) Submitted on Ice?	Yes <input checked="" type="radio"/> No <input type="radio"/>	Temperature			
Custody Seal(s) Intact?	Yes <input type="radio"/> No <input checked="" type="radio"/> N/A	7 °C			
Sample(s) Intact?	Yes <input checked="" type="radio"/> No <input type="radio"/>	<input type="checkbox"/> Cooler Blank			

COB2047
Rc'd: 02/18/2020 14:57
EVS Temp Gun Id :62

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P.O Box 432
Riverside, CA 92502-0432

location
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EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Sc
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA, 92123

Analytical Report: Page 1 of 2
 Project Name: Amec Foster Wheeler-Lake
 Project Number: LECL TMDL 1915100402.0
Work Order Number: C0B2113

Report Date: 13-Apr-2020

Received on Ice (Y/N Yes Temp: 7 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
C0B2113-01	CL07-Int	Solid	2/18/20 10:25	Kate Buckley	2/18/20 14:57	Courier (Victor Diaz)-DE
C0B2113-02	CL07-Surf	Solid	2/18/20 10:35	Kate Buckley	2/18/20 14:57	Courier (Victor Diaz)-DE
C0B2113-03	CL08-Int	Solid	2/18/20 9:45	Kate Buckley	2/18/20 14:57	Courier (Victor Diaz)-DE
C0B2113-04	CL08-Surf	Solid	2/18/20 9:55	Kate Buckley	2/18/20 14:57	Courier (Victor Diaz)-DE
C0B2113-05	CL09-Int	Solid	2/18/20 8:55	Kate Buckley	2/18/20 14:57	Courier (Victor Diaz)-DE
C0B2113-06	CL09-Surf	Solid	2/18/20 9:00	Kate Buckley	2/18/20 14:57	Courier (Victor Diaz)-DE
C0B2113-07	CL10-Int	Solid	2/18/20 8:10	Kate Buckley	2/18/20 14:57	Courier (Victor Diaz)-DE
C0B2113-08	CL10-Surf	Solid	2/18/20 8:15	Kate Buckley	2/18/20 14:57	Courier (Victor Diaz)-DE
C0B2113-09	LE02-Int	Solid	2/18/20 8:45	Kate Buckley	2/18/20 14:57	Courier (Victor Diaz)-DE
C0B2113-10	LE02-Surf	Solid	2/18/20 9:30	Kate Buckley	2/18/20 14:57	Courier (Victor Diaz)-DE

Note: Analysis for Chlorophyll a was subcontracted to Tuesdail Laboratories, Inc.



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The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 2 of 2
Project Name: Amec Foster Wheeler-Lake
Project Number: LECL TMDL 1915100402.0
Work Order Number: C0B2113

Report Date: 13-Apr-2020

Received on Ice (Y/N) Yes Temp: 7 °C

Included in this Data Package please find an amended report for the work order referenced below.

Work Order: C0B2113

Reason for Amendment:

This work order was amended to appropriately split data into the correct project numbers.

This report supersedes the report issued on 07-Apr-2020.

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Case Narrative+ COC.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.



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Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 1 of 2
Project Name: Amec Foster Wheeler-Lake
Project Number: LECL TMDL 1915100402.0
Work Order Number: **COB2113**

Report Date: 13-Apr-2020

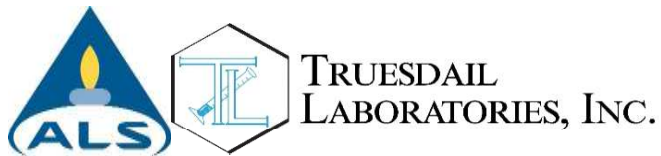
Received on Ice (Y/N) Yes Temp: 7 °C

E.S. Babcock & Sons, Inc. Environmental Laboratories Chain of Custody & Sample Information Record
(951) 653-3351 FAX (951) 653-1662
www.babcocklabs.com

Client: Wood E&I Solutions, Inc.		Contact: John Rudolph		Phone No. 858-243-8158	
FAX No.		Email: john.rudolph@woodplc.com		Additional Reporting Requests	
Project Name: LECL TMDL Monitoring		Turn Around Time: Routine		*3-5 Day *48 Hour *24 Hour Rush Rush Rush	
Project Number: 1915100402		*Lab TAT Approval: By:		*Additional Charges May Apply	
Sampler Information		# of Containers & Preservatives		Sample Type	
Name: <u>Kate Buckley</u>		Unpreserved		Routine	
Employer: Wood E&I Solutions, Inc.		H2SO4		Resample	
Signature: <u>Kate Buckley</u>		HCl		Special	
		HNO3		Total Sulfide	
		Na2SO3		Nitrate - Nitrite	
		NaOH		TDS	
		NaOH/Zn Acetate		TKN	
		NH4Cl		Ammonia	
		MCAA		Total Phosphorus	
		Frozen		SRP/Ortho-P	
				Chlorophyll-a	
				Matrix	
				Notes	
				DW = Drinking Water	
				WW = Wastewater	
				GW = Groundwater	
				S = Soil	
				SG = Sludge	
				L = Liquid	
				M = Miscellaneous	
Sample ID	Date	Time			
CL07 - Int	2/18/20	1025			Filter Volume: 500mL
CL07 - Surf		1035			Filter Volume: 450mL
CL08 - Int		0945			Filter Volume: 385mL
CL08 - Surf		0955			Filter Volume: 500mL
CL09 - Int		0855			Filter Volume: 500mL
CL09 - Surf		0900			Filter Volume: 500mL
CL10 - Int		0810			Filter Volume: 385mL
CL10 - Surf		0815			Filter Volume: 435mL
LE02 - Int		0845			Filter Volume: 300mL
LE02 - Surf		0930			Filter Volume: 250mL
Relinquished By (sign)	Print Name / Company	Date / Time	Received By (Sign)	Print Name / Company	
<u>[Signature]</u>	Kate Buckley/Wood	2/18/2020 10:25	<u>[Signature]</u>	Victor D / DE	
<u>[Signature]</u>	Victor D / DE	2/18/2020 14:57	<u>[Signature]</u>	Brock Adcock/ESB	

(For Lab Use Only) Sample Integrity Upon Receipt		Lab Notes	
Sample(s) Submitted on Ice?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Temperature	
Custody Seal(s) Intact?	Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/> N/A	7 °C	
Sample(s) Intact?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	<input type="checkbox"/> Cooler Blank	

COB2113
Rc'd: 02/18/2020 14:57
JLH Temp Gun Id: 62



Report

Client: Babcock Laboratories, Inc.
6100 Quail Valley Ct
Riverside, CA 92507

Work Order No.: 20B0409

Printed: 03/03/2020

Attention: Amanda C. Porter

Project Name: Chlorophyll

CASE NARRATIVE

SAMPLE RECEIPT SUMMARY

Table with 6 columns: Sample ID, Laboratory ID, Matrix, Type, Date Sampled, Date Received. Contains 10 rows of sample data.

DEFINITIONS

Table with 2 columns: Symbol, Definition. Lists DF (Dilution Factor), MDL (Method Detection Limit), ND (Not Detected), and RL (Reporting Limit).

Respectfully yours,

Handwritten signature of Aldo B. Minano

Aldo B. Minano
Project Manager



COB2113-01

20B0409-01 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	17.5	1.00	1.00	mg/m ³	1	2002465	03/03/2020 13:28	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COB2113-02

20B0409-02 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	40.6	1.00	1.00	mg/m ³	1	2002465	03/03/2020 13:28	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COB2113-03

20B0409-03 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	25.3	1.00	1.00	mg/m ³	1	2002465	03/03/2020 13:28	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COB2113-04

20B0409-04 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	30.7	1.00	1.00	mg/m ³	1	2002465	03/03/2020 13:28	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COB2113-05

20B0409-05 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

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COB2113-05 (Continued)
20B0409-05 (Filter) (Continued)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	13.2	1.00	1.00	mg/m ³	1	2002465	03/03/2020 13:28	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COB2113-06
20B0409-06 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	9.58	1.00	1.00	mg/m ³	1	2002465	03/03/2020 13:28	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COB2113-07
20B0409-07 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	16.7	1.00	1.00	mg/m ³	1	2002465	03/03/2020 13:28	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COB2113-08
20B0409-08 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	17.1	1.00	1.00	mg/m ³	1	2002465	03/03/2020 13:28	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COB2113-09
20B0409-09 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

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TRUESDAIL
LABORATORIES, INC.

Client: Babcock Laboratories, Inc.

Project Name: Chlorophyll

Printed: 03/03/2020

COB2113-09 (Continued)

20B0409-09 (Filter) (Continued)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	56.8	1.00	1.00	mg/m ³	1	2002465	03/03/2020 13:28	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COB2113-10

20B0409-10 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	77.6	1.00	1.00	mg/m ³	1	2002465	03/03/2020 13:28	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

This report applies to the sample(s), or product(s), investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed. This report shall not be reproduced without the written consent of ALS-Truesdail Laboratories, Inc., and must be reproduced in its entirety.

20B0409

SUBCONTRACT ORDER

Printed: 2/19/2020 12:32

Babcock Laboratories, Inc.

C0B2113

Ref:	Date: 20Feb20	SHIPPING:	16.56
Dep:	Wgt: 6.00 LBS	SPECIAL:	0.91
	DV:	HANDLING:	0.00
	0.00	TOTAL:	17.47

Svcs: PRIORITY OVERNIGHT
TRACK: 1520 2088 0229

All Containers Intact: Yes No Samples Preserved Properly: Yes No

Samples Received at 1.4 oC Sample Labels / COC Agree: Yes No Custody Seals Present: Yes No

Please forward all acknowledgements of sample receipt, final reports and invoices to data@babcocklabs.com

NO HARDCOPIES PLEASE.

<u>Babcock</u>	<u>2:20.2020</u>	<u>[Signature]</u>	<u>02/19/20 9:35 AM</u>
Released By	Date	Received By	Date

Released By	Date	Received By	Date
-------------	------	-------------	------

20B0409

SUBCONTRACT ORDER

Printed: 2/19/2020 12:32

Babcock Laboratories, Inc.

C0B2113

Analysis	Due	Expires Regulatory Days		Laboratory ID	Comments
		Past Date Sampled			
Sample ID: C0B2113-07 Solid		Sampled: 02/18/20 08:10		CL10-Int	<i>Proj.No.:</i> <u>LECL TMDL</u> <u>1915100402</u>
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	02/28/20 23:59	02/28/20 08:10		Report Chlorophyll a / Filter Volume = 385mL	
Sample ID: C0B2113-08 Solid		Sampled: 02/18/20 08:15		CL10-Surf	<i>Proj.No.:</i> <u>LECL TMDL</u> <u>1915100402</u>
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	02/28/20 23:59	02/28/20 08:15		Report Chlorophyll a / Filter Volume = 435mL	
Sample ID: C0B2113-09 Solid		Sampled: 02/18/20 08:45		LE02-Int	<i>Proj.No.:</i> <u>LECL TMDL</u> <u>1915100402</u>
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	02/28/20 23:59	02/28/20 08:45		Report Chlorophyll a / Filter Volume = 300mL	
Sample ID: C0B2113-10 Solid		Sampled: 02/18/20 09:30		LE02-Surf	<i>Proj.No.:</i> <u>LECL TMDL</u> <u>1915100402</u>
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	02/28/20 23:59	02/28/20 09:30		Report Chlorophyll a / Filter Volume = 250mL	

20B0409

SUBCONTRACT ORDER

Printed: 2/19/2020 12:32

Babcock Laboratories, Inc.

C0B2113

SENDING LABORATORY:

Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, CA 92507-0704
Phone: (951) 653-3351
Fax: (951) 653-1662
Project Manager: Cindy A. Waddell

RECEIVING LABORATORY:

Truesdail Laboratories - Subcontract
3337 Michelson Drive Suite CN750
Irvine, CA 92614
Phone : (714) 730-6239
Fax: (714) 730-6462

Copy/Relog from B9I.3018. System Name: Wood Environmental&Infrastructure Solutions, Inc
Sampler: Kate Buckley

Please include MDLs and EXCEL EDD

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: C0B2113-01 Solid		Sampled: 02/18/20 10:25	CL07-Int	<u>Proj.No.:LECL TMDL</u> <u>1915100402</u>
Subout	02/28/20 23:59	02/28/20 10:25	Report Chlorophyll a / Filter Volume = 500mL	
<i>Containers Supplied:</i> Whirl-Pak (A)				
Sample ID: C0B2113-02 Solid		Sampled: 02/18/20 10:35	CL07-Surf	<u>Proj.No.:LECL TMDL</u> <u>1915100402</u>
Subout	02/28/20 23:59	02/28/20 10:35	Report Chlorophyll a / Filter Volume = 450mL	
<i>Containers Supplied:</i> Whirl-Pak (A)				
Sample ID: C0B2113-03 Solid		Sampled: 02/18/20 09:45	CL08-Int	<u>Proj.No.:LECL TMDL</u> <u>1915100402</u>
Subout	02/28/20 23:59	02/28/20 09:45	Report Chlorophyll a / Filter Volume = 385mL	
<i>Containers Supplied:</i> Whirl-Pak (A)				
Sample ID: C0B2113-04 Solid		Sampled: 02/18/20 09:55	CL08-Surf	<u>Proj.No.:LECL TMDL</u> <u>1915100402</u>
Subout	02/28/20 23:59	02/28/20 09:55	Report Chlorophyll a / Filter Volume = 500mL	
<i>Containers Supplied:</i> Whirl-Pak (A)				
Sample ID: C0B2113-05 Solid		Sampled: 02/18/20 08:55	CL09-Int	<u>Proj.No.:LECL TMDL</u> <u>1915100402</u>
Subout	02/28/20 23:59	02/28/20 08:55	Report Chlorophyll a / Filter Volume = 500mL	
<i>Containers Supplied:</i> Whirl-Pak (A)				
Sample ID: C0B2113-06 Solid		Sampled: 02/18/20 09:00	CL09-Surf	<u>Proj.No.:LECL TMDL</u> <u>1915100402</u>
Subout	02/28/20 23:59	02/28/20 09:00	Report Chlorophyll a / Filter Volume = 500mL	
<i>Containers Supplied:</i> Whirl-Pak (A)				



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Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 1 of 1
Project Name: Amec Foster Wheeler-Lake
Project Number: LECL TMDL 1915100402.0
Work Order Number: C0B2114

Report Date: 26-Feb-2020

Received on Ice (Y/N Yes Temp: 7 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
C0B2114-01	CL07	Liquid	2/18/20 10:25	Kate Buckley	2/18/20 14:57	Courier (Victor Diaz)-DE
C0B2114-02	CL08	Liquid	2/18/20 9:45	Kate Buckley	2/18/20 14:57	Courier (Victor Diaz)-DE
C0B2114-03	CL09	Liquid	2/18/20 8:55	Kate Buckley	2/18/20 14:57	Courier (Victor Diaz)-DE
C0B2114-04	CL10	Liquid	2/18/20 8:10	Kate Buckley	2/18/20 14:57	Courier (Victor Diaz)-DE
C0B2114-05	LE02	Liquid	2/18/20 8:45	Kate Buckley	2/18/20 14:57	Courier (Victor Diaz)-DE

Note: Requested Low Level Total Phosphorus analysis was subcontracted to Eurofins CalScience.

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Case Narrative+ COC.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.



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Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 1 of 1
Project Name: Amec Foster Wheeler-Lake
Project Number: LECL TMDL 1915100402.0
Work Order Number: COB2114

Report Date: 26-Feb-2020

Received on Ice (Y/N) Yes Temp: 7 °C

E.S. Babcock & Sons, Inc. Environmental Laboratories
(951) 653-3351 FAX (951) 653-1662
www.babcocklabs.com

Chain of Custody & Sample Information Record

Client: Wood E&I Solutions, Inc.		Contact: John Rudolph		Phone No. 858-243-8158	
FAX No.		Email: john.rudolph@woodplc.com		Additional Reporting Requests	
Project Name: LECL TMDL Monitoring		Turn Around Time: Routine		*3-5 Day *48 Hour *24 Hour Rush Rush Rush	
Project Number: 1915100402		Lab TAT Approval: By:		*Additional Charges May Apply	
Sampler Information Name: <i>Kate Buckley</i> Employer: Wood E&I Solutions, Inc. Signature: <i>Kate Buckley</i>		# of Containers & Preservatives Unpreserved H2SO4 HCl HNO3 Na2S2O3 NaOH NaOH/ZnAcetate NH4Cl MCAA Frozen		Sample Type Routine Resample Special	
Analysis Requested TSS Nitrate - Nitrite TDS TKN Ammonia Total Phosphorus SRP/Ortho-P Total Sulfide Total AL Dissolved AL		Matrix DW = Drinking Water WW = Wastewater GW = Groundwater S = Soil SG = Sludge L = Liquid M = Miscellaneous		Notes No lab filtration required for Ortho-P (field filtered) <i>★</i> Total Phosphorus - Sub to Eurofins Calscience. RUSH TAT Dissolved Al is not field filtered <i>Subout</i>	
Sample ID	Date	Time			
CL07	2/18/20	1025			
CL08		0945			
CL09		0855			
CL10		0810			
LE02	↓	0845			
Relinquished By (sign)		Print Name / Company		Date / Time	
<i>[Signature]</i>		Tyler K. [Signature]		2/18/2020 14:00	
<i>[Signature]</i>		Victor D / DE		2/19/2020 14:57	
		Received By (Sign)		Print Name / Company	
		<i>[Signature]</i>		Victor D / DE	
		<i>[Signature]</i>		Brock Adcock / ESB	

(For Lab Use Only) Sample Integrity Upon Receipt		Temp #62		Lab Notes	
Sample(s) Submitted on Ice?	Yes No	Temperature	7		
Custody Seal(s) Intact?	Yes No	°C			
Sample(s) Intact?	Yes No	☐ Cooler Blank			

COB2114
Rc'd: 02/18/2020 14:57
JLH Temp Gun Id : 62

ANALYTICAL REPORT

Eurofins Calscience LLC
7440 Lincoln Way
Garden Grove, CA 92841
Tel: (714)895-5494

Laboratory Job ID: 570-21457-1
Client Project/Site: C0B2114

For:

Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, California 92507

Attn: Cindy A Waddell



*Authorized for release by:
2/26/2020 8:22:37 AM*

Carla Hollowell, Project Manager I
(714)895-5494
carlahollowell@eurofinsus.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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QC Sample Results	6
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Sample Summary	10
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Definitions/Glossary

Client: Babcock Laboratories, Inc.
Project/Site: C0B2114

Job ID: 570-21457-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Babcock Laboratories, Inc.
Project/Site: C0B2114

Job ID: 570-21457-1

Job ID: 570-21457-1

Laboratory: Eurofins Calscience LLC

Narrative

Job Narrative
570-21457-1

Comments

No additional comments.

Receipt

The samples were received on 2/21/2020 10:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.8° C.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Client Sample Results

Client: Babcock Laboratories, Inc.
Project/Site: C0B2114

Job ID: 570-21457-1

General Chemistry

Client Sample ID: C0B2114-01
Date Collected: 02/18/20 10:25
Date Received: 02/21/20 10:15

Lab Sample ID: 570-21457-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.0641		0.0100	0.00281	mg/L		02/25/20 10:40	02/25/20 14:56	1

Client Sample ID: C0B2114-02
Date Collected: 02/18/20 09:45
Date Received: 02/21/20 10:15

Lab Sample ID: 570-21457-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.0564		0.0100	0.00281	mg/L		02/25/20 10:40	02/25/20 14:57	1

Client Sample ID: C0B2114-03
Date Collected: 02/18/20 08:55
Date Received: 02/21/20 10:15

Lab Sample ID: 570-21457-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.203		0.0100	0.00281	mg/L		02/25/20 10:40	02/25/20 14:59	1

Client Sample ID: C0B2114-04
Date Collected: 02/18/20 08:10
Date Received: 02/21/20 10:15

Lab Sample ID: 570-21457-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.0758		0.0100	0.00281	mg/L		02/25/20 10:40	02/25/20 15:00	1

Client Sample ID: C0B2114-05
Date Collected: 02/18/20 08:45
Date Received: 02/21/20 10:15

Lab Sample ID: 570-21457-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.182		0.0100	0.00281	mg/L		02/25/20 10:40	02/25/20 15:02	1

QC Sample Results

Client: Babcock Laboratories, Inc.
Project/Site: C0B2114

Job ID: 570-21457-1

Method: 365.1 - Phosphorus, Total

Lab Sample ID: MB 570-53240/5-A
Matrix: Water
Analysis Batch: 53279

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 53240

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	ND		0.0100	0.00281	mg/L		02/25/20 10:40	02/25/20 14:44	1

Lab Sample ID: LCS 570-53240/6-A
Matrix: Water
Analysis Batch: 53279

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 53240

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.200	0.1970		mg/L		98	90 - 110

Lab Sample ID: LCSD 570-53240/7-A
Matrix: Water
Analysis Batch: 53279

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 53240

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphorus, Total	0.200	0.2004		mg/L		100	90 - 110	2	20

Lab Sample ID: 570-21457-1 MS
Matrix: Water
Analysis Batch: 53279

Client Sample ID: C0B2114-01
Prep Type: Total/NA
Prep Batch: 53240

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.0641		0.200	0.2547		mg/L		95	90 - 110

Lab Sample ID: 570-21457-1 MSD
Matrix: Water
Analysis Batch: 53279

Client Sample ID: C0B2114-01
Prep Type: Total/NA
Prep Batch: 53240

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphorus, Total	0.0641		0.200	0.2511		mg/L		94	90 - 110	1	25

Lab Chronicle

Client: Babcock Laboratories, Inc.
Project/Site: C0B2114

Job ID: 570-21457-1

Client Sample ID: C0B2114-01

Lab Sample ID: 570-21457-1

Date Collected: 02/18/20 10:25

Matrix: Water

Date Received: 02/21/20 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	53240	02/25/20 10:40	UXCH	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	53279	02/25/20 14:56	UXCH	ECL 1
Instrument ID: ACA1										

Client Sample ID: C0B2114-02

Lab Sample ID: 570-21457-2

Date Collected: 02/18/20 09:45

Matrix: Water

Date Received: 02/21/20 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	53240	02/25/20 10:40	UXCH	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	53279	02/25/20 14:57	UXCH	ECL 1
Instrument ID: ACA1										

Client Sample ID: C0B2114-03

Lab Sample ID: 570-21457-3

Date Collected: 02/18/20 08:55

Matrix: Water

Date Received: 02/21/20 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	53240	02/25/20 10:40	UXCH	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	53279	02/25/20 14:59	UXCH	ECL 1
Instrument ID: ACA1										

Client Sample ID: C0B2114-04

Lab Sample ID: 570-21457-4

Date Collected: 02/18/20 08:10

Matrix: Water

Date Received: 02/21/20 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	53240	02/25/20 10:40	UXCH	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	53279	02/25/20 15:00	UXCH	ECL 1
Instrument ID: ACA1										

Client Sample ID: C0B2114-05

Lab Sample ID: 570-21457-5

Date Collected: 02/18/20 08:45

Matrix: Water

Date Received: 02/21/20 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	53240	02/25/20 10:40	UXCH	ECL 1
Total/NA	Analysis	365.1		1	50 mL	50 mL	53279	02/25/20 15:02	UXCH	ECL 1
Instrument ID: ACA1										

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

Accreditation/Certification Summary

Client: Babcock Laboratories, Inc.
Project/Site: C0B2114

Job ID: 570-21457-1

Laboratory: Eurofins Calscience LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arizona	State	AZ0781	03-13-20
California	Los Angeles County Sanitation Districts	10109	09-29-20
California	SCAQMD LAP	17LA0919	11-30-20
California	State	2944	09-29-20
Guam	State	20-003R	10-31-20
Hawaii	State	<cert No.>	07-02-20
Nevada	State	CA00111	07-31-20
Oregon	NELAP	CA300001	01-29-21
USDA	US Federal Programs	P330-20-00034	02-10-23
Washington	State	C916-18	10-11-20

Method Summary

Client: Babcock Laboratories, Inc.
Project/Site: C0B2114

Job ID: 570-21457-1

Method	Method Description	Protocol	Laboratory
365.1	Phosphorus, Total	EPA	ECL 1
365.2/365.3/365	Phosphorus, Total	MCAWW	ECL 1

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

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Sample Summary

Client: Babcock Laboratories, Inc.
Project/Site: C0B2114

Job ID: 570-21457-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
570-21457-1	C0B2114-01	Water	02/18/20 10:25	02/21/20 10:15	
570-21457-2	C0B2114-02	Water	02/18/20 09:45	02/21/20 10:15	
570-21457-3	C0B2114-03	Water	02/18/20 08:55	02/21/20 10:15	
570-21457-4	C0B2114-04	Water	02/18/20 08:10	02/21/20 10:15	
570-21457-5	C0B2114-05	Water	02/18/20 08:45	02/21/20 10:15	

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SUBCONTRACT ORDER

Printed: 2/19/2020 12:27

Babcock Laboratories, Inc.

C0B2114

SENDING LABORATORY:

Babcock Laboratories, Inc.
 6100 Quail Valley Court
 Riverside, CA 92507-0704
 Phone: (951) 653-3351
 Fax: (951) 653-1662
 Project Manager: Cindy A. Waddell

RECEIVING LABORATORY:

Eurofins Calscience, Inc.
 7440 Lincoln Way
 Garden Grove, CA 92841-1427
 Phone : (714) 895-5494
 Fax: (714) 894-7501



570-21457 Chain of Custody

System Name: Wood Environment & Infrastructure Solutions, Inc
 Sampler: Kate Buckley

Please include MDLs and EXCEL EDD
 PLEASE EXPEDITE

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: C0B2114-01 Liquid		Sampled: 02/18/20 10:25	CL07	<i>Proj.No.:</i> <u>LECL TMDL</u> <u>1915100402.0003</u>
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	02/24/20 23:59	02/28/20 10:25	Low Level Total Phosphorus	
Sample ID: C0B2114-02 Liquid		Sampled: 02/18/20 09:45	CL08	<i>Proj.No.:</i> <u>LECL TMDL</u> <u>1915100402.0003</u>
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	02/24/20 23:59	02/28/20 09:45	Low Level Total Phosphorus	
Sample ID: C0B2114-03 Liquid		Sampled: 02/18/20 08:55	CL09	<i>Proj.No.:</i> <u>LECL TMDL</u> <u>1915100402.0003</u>
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	02/24/20 23:59	02/28/20 08:55	Low Level Total Phosphorus	
Sample ID: C0B2114-04 Liquid		Sampled: 02/18/20 08:10	CL10	<i>Proj.No.:</i> <u>LECL TMDL</u> <u>1915100402.0003</u>
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	02/24/20 23:59	02/28/20 08:10	Low Level Total Phosphorus	
Sample ID: C0B2114-05 Liquid		Sampled: 02/18/20 08:45	LE02	<i>Proj.No.:</i> <u>LECL TMDL</u> <u>1915100402.0003</u>
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	02/24/20 23:59	02/28/20 08:45	Low Level Total Phosphorus	

21457

SUBCONTRACT ORDER

Printed: 2/19/2020 12:27

Babcock Laboratories, Inc.

C0B2114

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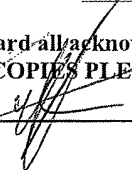
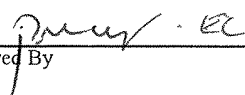
Ref: Date: 20Feb20 SHIPPING: 21.17
 Dep: Wgt: 11.00 LBS SPECIAL: 1.18
 DV: 0.00 HANDLING: 0.00
 TOTAL: 22.33

Sves: PRIORITY OVERNIGHT
 TRACK: 1520 2088 0240

All Containers Intact: Yes No Samples Preserved Properly: Yes No

Samples Received at oC Sample Labels / COC Agree: Yes No Custody Seals Present: Yes No

Please forward all acknowledgements of sample receipt, final reports and invoices to data@babcocklabs.com
NO HARDCOPIES PLEASE.

Released By		Date	2-20-2020	Received By		Date	2/21/20 10:15
Released By		Date		Received By		Date	

3-7/2-8
 500
 Page 2 of 2

21457



570-21457 Waybill

ORIGIN ID: ONTA (951) 653-3351
BABCOCK LABORATORIES

6100 QUAIL VALLEY CT

RIVERSIDE, CA 92507
UNITED STATES US

SHIP DATE: 20FEB20
ACTWGT: 11.00 LB MAN
CAD: 0266194/CAFE3311
DIMS: 14x14x12 IN

BILL SENDER

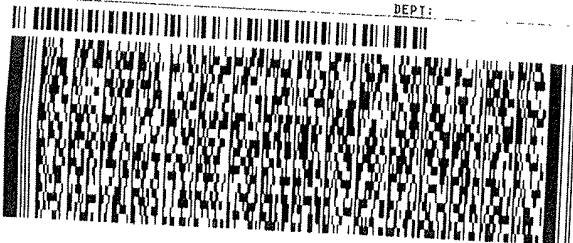
TO **SAMPLE RECEIVING**
EUROFINS CALSCIENCE, INC.
7440 LINCOLN WAY

GARDEN GROVE CA 92841

(714) 896-5484

REF:

DEPT:



FedEx
Express

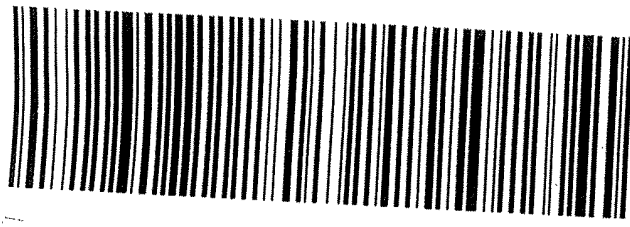


TRK# 1520 2088 0240
0201

FRI - 21 FEB 10:30A
PRIORITY OVERNIGHT

92 APVA

92841
CA-US **SNA**



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Login Sample Receipt Checklist

Client: Babcock Laboratories, Inc.

Job Number: 570-21457-1

Login Number: 21457

List Number: 1

Creator: Soriano, Precy

List Source: Eurofins Calscience

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	





BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 1 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 27-Apr-2020

Work Order Number: C0D1622
 Received on Ice (Y/N): Yes Temp: 1 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
C0D1622-01	CL07	Liquid	04/13/20 8:40	Client	04/13/20 16:08	Courier (Victor Diaz)-DE
C0D1622-02	CL08	Liquid	04/13/20 9:20	Client	04/13/20 16:08	Courier (Victor Diaz)-DE
C0D1622-03	CL09	Liquid	04/13/20 10:05	Client	04/13/20 16:08	Courier (Victor Diaz)-DE
C0D1622-04	CL10	Liquid	04/13/20 10:45	Client	04/13/20 16:08	Courier (Victor Diaz)-DE
C0D1622-05	LE02	Liquid	04/13/20 8:45	Client	04/13/20 16:08	Courier (Victor Diaz)-DE



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 2 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 27-Apr-2020

Work Order Number: C0D1622
 Received on Ice (Y/N): Yes Temp: 1 °C

Laboratory Reference Number

C0D1622-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL07	Liquid	04/13/20 08:40	04/13/20 16:08

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	04/14/20 04:28	KBS	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	04/14/20 04:28	KBS	
Solids								
Total Dissolved Solids	330	10	10	mg/L	SM 2540C	04/15/20 14:30	CAA	
Total Suspended Solids	4	2	2	mg/L	SM 2540D	04/20/20 07:40	AJH	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	04/14/20 13:25	CAA	
Nutrients								
Ammonia-Nitrogen	0.35	0.10	0.044	mg/L	SM4500NH3H G	04/21/20 12:15	SLL	
Kjeldahl Nitrogen	1.1	0.40	0.37	mg/L	EPA 351.2	04/20/20 11:52	SLL	
Ortho Phosphate Phosphorus	0.21	0.050	0.050	mg/L	EPA 300.0	04/13/20 23:55	ATR	
Metals and Metalloids								
Aluminum-Dissolved	ND	100	33	ug/L	EPA 200.7	04/21/20 17:32	KRV	N_pFilt
Aluminum	210	200	33	ug/L	EPA 200.7	04/20/20 23:05	KRV	



BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 3 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 27-Apr-2020

Work Order Number: C0D1622
 Received on Ice (Y/N): Yes Temp: 1 °C

Laboratory Reference Number

C0D1622-02

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL08	Liquid	04/13/20 09:20	04/13/20 16:08

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	04/14/20 04:43	KBS	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	04/14/20 04:43	KBS	
Solids								
Total Dissolved Solids	310	10	10	mg/L	SM 2540C	04/15/20 14:30	CAA	
Total Suspended Solids	6	2	2	mg/L	SM 2540D	04/20/20 07:40	AJH	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	04/14/20 13:25	CAA	
Nutrients								
Ammonia-Nitrogen	0.24	0.10	0.044	mg/L	SM4500NH3H G	04/21/20 12:17	SLL	
Kjeldahl Nitrogen	0.93	0.10	0.093	mg/L	EPA 351.2	04/19/20 09:36	SLL	
Ortho Phosphate Phosphorus	0.17	0.050	0.050	mg/L	EPA 300.0	04/14/20 00:12	ATR	
Metals and Metalloids								
Aluminum-Dissolved	ND	100	33	ug/L	EPA 200.7	04/21/20 17:34	KRV	N_pFilt
Aluminum	720	200	33	ug/L	EPA 200.7	04/20/20 23:07	KRV	



BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 4 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 27-Apr-2020

Work Order Number: C0D1622
 Received on Ice (Y/N): Yes Temp: 1 °C

Laboratory Reference Number

C0D1622-03

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL09	Liquid	04/13/20 10:05	04/13/20 16:08

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	0.19	0.20	0.16	mg/L	EPA 300.0	04/14/20 04:57	KBS	J
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	04/14/20 04:57	KBS	
Solids								
Total Dissolved Solids	380	10	10	mg/L	SM 2540C	04/15/20 14:30	CAA	
Total Suspended Solids	16	2	2	mg/L	SM 2540D	04/20/20 07:40	AJH	
General Inorganics								
Sulfide	0.50	0.10	0.10	mg/L	SM 4500S2 D	04/14/20 13:25	CAA	
Nutrients								
Ammonia-Nitrogen	0.40	0.10	0.044	mg/L	SM4500NH3H G	04/21/20 12:19	SLL	
Kjeldahl Nitrogen	1.6	0.10	0.093	mg/L	EPA 351.2	04/19/20 09:37	SLL	
Ortho Phosphate Phosphorus	0.43	0.050	0.050	mg/L	EPA 300.0	04/14/20 01:01	ATR	
Metals and Metalloids								
Aluminum-Dissolved	ND	100	33	ug/L	EPA 200.7	04/21/20 17:36	KRV	N_pFilt
Aluminum	960	200	33	ug/L	EPA 200.7	04/20/20 23:09	KRV	



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 5 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 27-Apr-2020

Work Order Number: C0D1622
 Received on Ice (Y/N): Yes Temp: 1 °C

Laboratory Reference Number

C0D1622-04

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL10	Liquid	04/13/20 10:45	04/13/20 16:08

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	0.27	0.20	0.16	mg/L	EPA 300.0	04/14/20 05:11	KBS	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	04/14/20 05:11	KBS	
Solids								
Total Dissolved Solids	360	10	10	mg/L	SM 2540C	04/15/20 14:30	KAJ	
Total Suspended Solids	13	2	2	mg/L	SM 2540D	04/20/20 07:40	AJH	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	04/14/20 13:25	KAJ	
Nutrients								
Ammonia-Nitrogen	0.073	0.10	0.044	mg/L	SM4500NH3H G	04/21/20 12:21	SLL	J
Kjeldahl Nitrogen	1.3	0.10	0.093	mg/L	EPA 351.2	04/19/20 09:39	SLL	
Ortho Phosphate Phosphorus	0.44	0.050	0.050	mg/L	EPA 300.0	04/14/20 01:18	ATR	
Metals and Metalloids								
Aluminum-Dissolved	ND	100	33	ug/L	EPA 200.7	04/21/20 17:38	KRV	N_pFilt
Aluminum	1000	200	33	ug/L	EPA 200.7	04/20/20 23:11	KRV	



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Analytical Report: Page 6 of 15
Project Name: Amec Foster Wheeler-Lake Elsir
Project Number: LECL TMDL 1915100402.0003

Report Date: 27-Apr-2020

Work Order Number: C0D1622
Received on Ice (Y/N): Yes Temp: 1 °C

Laboratory Reference Number

C0D1622-05

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
LE02	Liquid	04/13/20 08:45	04/13/20 16:08

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	04/14/20 05:25	KBS	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	04/14/20 05:25	KBS	
Solids								
Total Dissolved Solids	1700	40	40	mg/L	SM 2540C	04/15/20 14:30	CAA	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	04/14/20 13:25	CAA	
Nutrients								
Ammonia-Nitrogen	ND	0.10	0.044	mg/L	SM4500NH3H G	04/21/20 12:22	SLL	
Kjeldahl Nitrogen	3.9	0.50	0.46	mg/L	EPA 351.2	04/19/20 10:45	SLL	
Ortho Phosphate Phosphorus	ND	0.050	0.050	mg/L	EPA 300.0	04/14/20 01:35	ATR	



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Client Name: Wood Environment&Infrastructure Solutions, In
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 Address: 9210 Sky Park Court #200
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Analytical Report: Page 7 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 27-Apr-2020

Work Order Number: C0D1622
 Received on Ice (Y/N): Yes Temp: 1 °C

Anions - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0D13137 - Analyzed as Received IC										
Blank (0D13137-BLK1)				Prepared & Analyzed: 04/14/20						
Nitrite as N	ND	0.10	0.091	mg/L						
Nitrate as N	ND	0.20	0.11	mg/L						
LCS (0D13137-BS1)				Prepared & Analyzed: 04/14/20						
Nitrite as N	2.42	0.10	0.091	mg/L	2.50	97	90-110			
Nitrate as N	5.50	0.20	0.11	mg/L	5.65	97	90-110			
Matrix Spike (0D13137-MS1)				Source: C0D1257-01			Prepared & Analyzed: 04/14/20			
Nitrite as N	2.37	0.10	0.091	mg/L	2.50	ND	95	80-120		
Nitrate as N	12.4	0.20	0.11	mg/L	5.65	5.67	119	80-114		QMS(D)
Matrix Spike (0D13137-MS2)				Source: C0D1626-03			Prepared & Analyzed: 04/14/20			
Nitrite as N	2.34	0.10	0.091	mg/L	2.50	ND	93	80-120		
Nitrate as N	5.26	0.20	0.11	mg/L	5.65	ND	93	80-114		
Matrix Spike Dup (0D13137-MSD1)				Source: C0D1257-01			Prepared & Analyzed: 04/14/20			
Nitrite as N	2.46	0.10	0.091	mg/L	2.50	ND	98	80-120	3	20
Nitrate as N	11.8	0.20	0.11	mg/L	5.65	5.67	108	80-114	5	20



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
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Analytical Report: Page 8 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 27-Apr-2020

Work Order Number: C0D1622
 Received on Ice (Y/N): Yes Temp: 1 °C

Solids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0D15110 - Analyzed as received										
Blank (0D15110-BLK1) Prepared & Analyzed: 04/15/20										
Total Dissolved Solids	ND	10	10	mg/L						
Duplicate (0D15110-DUP1) Source: C0D1543-01 Prepared & Analyzed: 04/15/20										
Total Dissolved Solids	423	10	10	mg/L	425			0.5	20	
Duplicate (0D15110-DUP2) Source: C0D1589-01 Prepared & Analyzed: 04/15/20										
Total Dissolved Solids	320	10	10	mg/L	310			3	20	
Batch 0D20059 - Analyzed as received										
Blank (0D20059-BLK1) Prepared & Analyzed: 04/20/20										
Total Suspended Solids	ND	0.5	0.5	mg/L						
Duplicate (0D20059-DUP1) Source: C0D1645-01 Prepared & Analyzed: 04/20/20										
Total Suspended Solids	33.5	2	2	mg/L	36.0			7	25	
Duplicate (0D20059-DUP2) Source: C0D1648-03RE1 Prepared & Analyzed: 04/20/20										
Total Suspended Solids	112	10	10	mg/L	126			12	25	



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 Contact: John Rudolph
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 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 27-Apr-2020

Work Order Number: C0D1622
 Received on Ice (Y/N): Yes Temp: 1 °C

General Inorganics - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0D14131 - Analyzed as received										
Blank (0D14131-BLK1) Prepared & Analyzed: 04/14/20										
Sulfide	ND	0.10	0.10	mg/L						
LCS (0D14131-BS1) Prepared & Analyzed: 04/14/20										
Sulfide	0.300	0.10	0.10	mg/L	0.400	75	50-150			
Matrix Spike (0D14131-MS1) Source: C0D1438-02 Prepared & Analyzed: 04/14/20										
Sulfide	0.400	0.10	0.10	mg/L	0.400	ND	100	50-150		
Matrix Spike Dup (0D14131-MSD1) Source: C0D1438-02 Prepared & Analyzed: 04/14/20										
Sulfide	0.400	0.10	0.10	mg/L	0.400	ND	100	50-150	0	30



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 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 27-Apr-2020

Work Order Number: C0D1622
 Received on Ice (Y/N): Yes Temp: 1 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RD	LD	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0D13147 - Analyzed as Received IC											
Blank (0D13147-BLK1)					Prepared & Analyzed: 04/13/20						
Ortho Phosphate Phosphorus	ND	0.050	0.050	mg/L							
LCS (0D13147-BS1)					Prepared & Analyzed: 04/13/20						
Ortho Phosphate Phosphorus	0.288	0.050	0.050	mg/L	0.300		96	90-110			
Matrix Spike (0D13147-MS1)					Source: C0D1619-01 Prepared & Analyzed: 04/13/20						
Ortho Phosphate Phosphorus	0.321	0.050	0.050	mg/L	0.300	ND	107	80-120			
Matrix Spike Dup (0D13147-MSD1)					Source: C0D1619-01 Prepared & Analyzed: 04/13/20						
Ortho Phosphate Phosphorus	0.311	0.050	0.050	mg/L	0.300	ND	104	80-120	3	20	
Batch 0D16087 - Acid Digest											
Blank (0D16087-BLK1)					Prepared: 04/16/20 Analyzed: 04/19/20						
Kjeldahl Nitrogen	ND	0.10	0.093	mg/L							
LCS (0D16087-BS1)					Prepared: 04/16/20 Analyzed: 04/19/20						
Kjeldahl Nitrogen	0.952	0.10	0.093	mg/L	1.00		95	80-120			
Matrix Spike (0D16087-MS1)					Source: C0D1622-01 Prepared: 04/16/20 Analyzed: 04/19/20						
Kjeldahl Nitrogen	2.02	0.10	0.093	mg/L	1.00	1.75	27	42-154			QFpas, QMoRo
Matrix Spike Dup (0D16087-MSD1)					Source: C0D1622-01 Prepared: 04/16/20 Analyzed: 04/19/20						
Kjeldahl Nitrogen	2.15	0.10	0.093	mg/L	1.00	1.75	40	42-154	6	25	QFpas, QMoRo
Batch 0D19091 - Acid Digest											
Blank (0D19091-BLK1)					Prepared & Analyzed: 04/20/20						
Kjeldahl Nitrogen	ND	0.10	0.093	mg/L							



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 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 27-Apr-2020

Work Order Number: C0D1622
 Received on Ice (Y/N): Yes Temp: 1 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0D19091 - Acid Digest										
LCS (0D19091-BS1) Prepared & Analyzed: 04/20/20										
Kjeldahl Nitrogen	1.02	0.10	0.093	mg/L	1.00	102	80-120			
Matrix Spike (0D19091-MS1) Source: C0D1622-01RE1 Prepared & Analyzed: 04/20/20										
Kjeldahl Nitrogen	4.86	0.40	0.37	mg/L	4.00	1.14	93	42-154		
Matrix Spike Dup (0D19091-MSD1) Source: C0D1622-01RE1 Prepared & Analyzed: 04/20/20										
Kjeldahl Nitrogen	4.74	0.40	0.37	mg/L	4.00	1.14	90	42-154	2	25
Batch 0D21098 - Analyzed as received										
Blank (0D21098-BLK1) Prepared & Analyzed: 04/21/20										
Ammonia-Nitrogen	ND	0.10	0.044	mg/L						
LCS (0D21098-BS1) Prepared & Analyzed: 04/21/20										
Ammonia-Nitrogen	0.978	0.10	0.044	mg/L	1.00	98	90-110			
Matrix Spike (0D21098-MS1) Source: C0D1619-01 Prepared & Analyzed: 04/21/20										
Ammonia-Nitrogen	1.08	0.10	0.044	mg/L	1.00	ND	108	80-120		
Matrix Spike Dup (0D21098-MSD1) Source: C0D1619-01 Prepared & Analyzed: 04/21/20										
Ammonia-Nitrogen	0.938	0.10	0.044	mg/L	1.00	ND	94	80-120	14	20



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
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Analytical Report: Page 12 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 27-Apr-2020

Work Order Number: C0D1622
 Received on Ice (Y/N): Yes Temp: 1 °C

Metals and Metalloids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0D20079 - EPA 200.2										
Blank (0D20079-BLK1) Prepared & Analyzed: 04/20/20										
Aluminum	ND	100	16	ug/L						
LCS (0D20079-BS1) Prepared & Analyzed: 04/20/20										
Aluminum	1130	100	16	ug/L	1170	97	85-115			
Matrix Spike (0D20079-MS1) Source: C0D1865-01 Prepared & Analyzed: 04/20/20										
Aluminum	1130	200	33	ug/L	1170	ND	97	70-130		
Matrix Spike Dup (0D20079-MSD1) Source: C0D1865-01 Prepared & Analyzed: 04/20/20										
Aluminum	1140	200	33	ug/L	1170	ND	98	70-130	0.7	20
Batch 0D21126 - 200.7/ No Digest										
Blank (0D21126-BLK1) Prepared & Analyzed: 04/21/20										
Aluminum-Dissolved	ND	100	16	ug/L						QBfil
Blank (0D21126-BLK2) Prepared & Analyzed: 04/21/20										
Aluminum-Dissolved	ND	100	16	ug/L						QBfil
Blank (0D21126-BLK3) Prepared & Analyzed: 04/21/20										
Aluminum-Dissolved	ND	100	16	ug/L						QBfil
Blank (0D21126-BLK4) Prepared & Analyzed: 04/21/20										
Aluminum-Dissolved	ND	100	16	ug/L						QBfil
Blank (0D21126-BLK5) Prepared & Analyzed: 04/21/20										
Aluminum-Dissolved	ND	100	16	ug/L						QBfil



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
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Analytical Report: Page 13 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 27-Apr-2020

Work Order Number: C0D1622
 Received on Ice (Y/N): Yes Temp: 1 °C

Metals and Metalloids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0D21126 - 200.7/ No Digest										
LCS (0D21126-BS1)				Prepared & Analyzed: 04/21/20						
Aluminum-Dissolved	336	100	16	ug/L	334	101	85-115			
Matrix Spike (0D21126-MS1)				Source: C0D1622-01 Prepared & Analyzed: 04/21/20						
Aluminum-Dissolved	671	200	34	ug/L	668	ND	100	70-130		
Matrix Spike Dup (0D21126-MSD1)				Source: C0D1622-01 Prepared & Analyzed: 04/21/20						
Aluminum-Dissolved	654	200	34	ug/L	668	ND	98	70-130	3	20



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Analytical Report: Page 14 of 15
Project Name: Amec Foster Wheeler-Lake Elsir
Project Number: LECL TMDL 1915100402.0003

Report Date: 27-Apr-2020

Work Order Number: C0D1622
Received on Ice (Y/N): Yes Temp: 1 °C

Notes and Definitions

- J Estimated value
- N_pFilt Sample filtered and preserved upon receipt to the laboratory.
- QBfil Method blank was filtered prior to processing.
- QFpas Follow-up result within laboratory acceptance criteria.
- QMoRo MSD recovery and the MS/MSD RPD value did not meet laboratory acceptance criteria.
- QMS(D) Matrix spike recovery was out of acceptance criteria. Precision and accuracy demonstrated by remaining matrix spike results.
- ND: Analyte NOT DETECTED at or above the Method Detection Limit (**if MDL is reported**), otherwise at or above the Reportable Detection Limit (RDL)
- NR: Not Reported
- RDL: Reportable Detection Limit
- MDL: Method Detection Limit

* / (Non-NELAP): NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Standard_No Alias.rpt

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EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
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Analytical Report: Page 15 of 15
Project Name: Amec Foster Wheeler-Lake Elsi
Project Number: LECL TMDL 1915100402.0003

Report Date: 27-Apr-2020

Work Order Number: COD1622
Received on Ice (Y/N): Yes Temp: 1 °C

E.S. Babcock & Sons, Inc. Environmental Laboratories
(951) 653-3351 FAX (951) 653-1662
www.babcocklabs.com

Chain of Custody & Sample Information Record

Client: Wood E&I Solutions, Inc.		Contact: John Rudolph		Phone No. 858-243-8158	
FAX No.		Email: john.rudolph@woodplc.com		Additional Reporting Requests Include QC Data Package: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No FAX Results: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Email Results: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No State EDT: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Include Source Number in Notes)	
Project Name: LECL TMDL Monitoring		Turn Around Time: <u>Routine</u>		*3-5 Day *48 Hour *24 Hour Rush Rush Rush *Additional Charges May Apply	
Project Number: 1915100402		Lab TAT Approval: By:			
Sampler Information		# of Containers & Preservatives		Analysis Requested	
Name: _____		Unpreserved		Total # of Containers	
Employer: Wood E&I Solutions, Inc.		H2SO4		Routine	
Signature: _____		HCl		Resample	
		HNO3		Special	
		Na2S2O3		TSS	
		NaOH		Nitrate - Nitrite	
		NaOH/ZnAcetate		TDS	
		NH4Cl		TKN	
		MCAA		Ammonia	
		Frozen		Total Phosphorus	
				SRP/Ortho-P	
				Total Sulfide	
				Total AL	
				Dissolved AL	
Sample ID		Date Time		Matrix	
CL07		04/13/20 0840		DW = Drinking Water	
CL08		04/13/20 0920		WW = Wastewater	
CL09		04/13/20 0905		GW = Groundwater	
CL10		04/13/20 0945		S = Soil	
LE02		04/13/20 0845		SG = Sludge	
				L = Liquid	
				M = Miscellaneous	
				Notes	
				No lab filtration required for Ortho-P (field filtered).	
				Total Phosphorus - Sub to Eurofins Calscience. RUSH TAT	
				Dissolved Al is not field filtered	
Relinquished By (sign)		Print Name / Company		Date / Time	
Kate Buckley		Kate Buckley, Wood		4/13/20 1320	
Victor Diaz		Victor Diaz, DE		4/13/20 1608	
Received By (Sign)		Print Name / Company			
Victor Diaz		Victor Diaz, DE			
Brock Adams		Brock Adams			

(For Lab Use Only)	Sample Integrity Upon Receipt	Lab Notes
Sample(s) Submitted on Ice?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Temperature _____ °C <input type="checkbox"/> Cooler Blank
Custody Seal(s) Intact?	Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample(s) Intact?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

COD1622
Rc'd: 04/13/2020 16:08
AG



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Client Name: Wood Environment&Infrastructure Sc
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
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Analytical Report: Page 1 of 3
 Project Name: Amec Foster Wheeler-Lake
 Project Number: LECL TMDL 1915100402.0
Work Order Number: C0D1635

Report Date: 11-May-2020

Received on Ice (Y/N Yes Temp: 1 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
C0D1635-01	CL07-Int	Solid	4/13/20 8:40	Client	4/13/20 16:08	Courier (Victor Diaz)-DE
C0D1635-02	CL07-Surf	Solid	4/13/20 8:45	Client	4/13/20 16:08	Courier (Victor Diaz)-DE
C0D1635-03	CL08-Int	Solid	4/13/20 9:20	Client	4/13/20 16:08	Courier (Victor Diaz)-DE
C0D1635-04	CL08-Surf	Solid	4/13/20 9:25	Client	4/13/20 16:08	Courier (Victor Diaz)-DE
C0D1635-05	CL09-Int	Solid	4/13/20 10:05	Client	4/13/20 16:08	Courier (Victor Diaz)-DE
C0D1635-06	CL09-Surf	Solid	4/13/20 10:10	Client	4/13/20 16:08	Courier (Victor Diaz)-DE
C0D1635-07	CL10-Int	Solid	4/13/20 10:45	Client	4/13/20 16:08	Courier (Victor Diaz)-DE
C0D1635-08	CL10-Surf	Solid	4/13/20 10:50	Client	4/13/20 16:08	Courier (Victor Diaz)-DE
C0D1635-09	LE02-Int	Solid	4/13/20 9:15	Client	4/13/20 16:08	Courier (Victor Diaz)-DE
C0D1635-10	LE02-Surf	Solid	4/13/20 9:30	Client	4/13/20 16:08	Courier (Victor Diaz)-DE

Note: Analysis for Chlorophyll a was subcontracted to Truesdail Laboratories, Inc.



BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 2 of 3
Project Name: Amec Foster Wheeler-Lake
Project Number: LECL TMDL 1915100402.0
Work Order Number: C0D1635

Report Date: 11-May-2020

Received on Ice (Y/N) Yes Temp: 1 °C

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Case Narrative+ COC.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.



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Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 3 of 3
Project Name: Amec Foster Wheeler-Lake
Project Number: LECL TMDL 1915100402.0
Work Order Number: C0D1635

Report Date: 11-May-2020

Received on Ice (Y/N) Yes Temp: 1 °C

E.S. Babcock & Sons, Inc. Environmental Laboratories Chain of Custody & Sample Information Record
(951) 653-3351 FAX (951) 653-1662

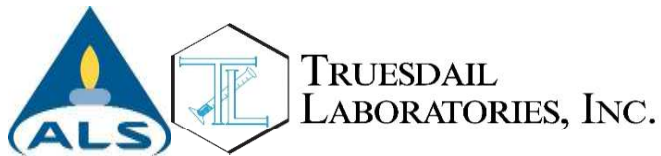
www.babcocklabs.com

Client: Wood E&I Solutions, Inc.	Contact: John Rudolph	Phone No. 858-243-8158																						
FAX No.	Email: john.rudolph@woodplc.com	Additional Reporting Requests Include QC Data Package: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No FAX Results: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Email Results: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No State EDT: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Include Source Number in Notes)																						
Project Name: LECL TMDL Monitoring	Turn Around Time: Routine *3-5 Day *48 Hour *24 Hour Rush Rush Rush																							
Project Number: 1915100402	*Lab TAT Approval: By: *Additional Charges May Apply																							
Sampler Information			# of Containers & Preservatives			Sample Type	Analysis Requested							Matrix	Notes									
Sample ID	Date	Time	Unpreserved	H2SO4	HCl		HNO3	Na2S2O3	NaOH	NaOH/ZnAcetate	NH4Cl	MCAA	Frozen	Total # of Containers	Total Sulfide	Nitrate - Nitrite	TDS	TKN	Ammonia	Total Phosphorus	SRP/Ortho-P	Chlorophyll-a	DW = Drinking Water WW = Wastewater GW = Groundwater S = Soil SG = Sludge L = Liquid M = Miscellaneous	
CL07 - Int	04/13	0840																			X	DW	Filter Volume: 375	
CL07 - Surf	04/13	0845																				X	DW	Filter Volume: 500
CL08 - Int	04/13	0920																				X	DW	Filter Volume: 500
CL08 - Surf	04/13	0925																				X	DW	Filter Volume: 325
CL09 - Int	04/13	1005																				X	DW	Filter Volume: 360
CL09 - Surf	04/13	1010																				X	DW	Filter Volume: 350
CL10 - Int	04/13	1045																				X	DW	Filter Volume: 325
CL10 - Surf	04/13	1050																				X	DW	Filter Volume: 325
LE02 - Int	04/13	0915																				X	DW	Filter Volume: 240
LE02 - Surf	04/13	0930																				X	DW	Filter Volume: 325
Relinquished By (sign)	Print Name / Company	Date / Time	Received By (Sign)		Print Name / Company																			
<i>[Signature]</i>	Kate Buckley, Wood	4/13/20 1320	<i>[Signature]</i>		Victor Diaz, DE																			
<i>[Signature]</i>	Victor Diaz, DE	4/13/2020 1608	<i>[Signature]</i>		Brock Adcock/ESB																			

(For Lab Use Only) Sample Integrity Upon Receipt

Sample(s) Submitted on Ice? Yes No	Temperature
Custody Seal(s) Intact? Yes No N/A	°C
Sample(s) Intact? Yes No	<input type="checkbox"/> Cooler Blank

C0D1635
c'd: 04/13/2020 16:08
.H



ALS - Truesdail Laboratories
3337 Michelson Drive, Suite CN750
Irvine, CA 92612
T +1 714 730 6239

Report

Client: Babcock Laboratories, Inc.
6100 Quail Valley Ct
Riverside, CA 92507

Work Order No.: 20D0247

Printed: 04/22/2020

Attention: Amanda C. Porter

Project Name: Chlorophyll

CASE NARRATIVE

SAMPLE RECEIPT SUMMARY

Table with 6 columns: Sample ID, Laboratory ID, Matrix, Type, Date Sampled, Date Received. Contains 10 rows of sample data.

DEFINITIONS

Table with 2 columns: Symbol, Definition. Lists symbols DF, MDL, ND, RL and their corresponding definitions.

Respectfully yours,

Aldo B. Minano
Project Manager

This report applies to the sample(s), or product(s), investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed. This report shall not be reproduced without the written consent of ALS-Truesdail Laboratories, Inc., and must be reproduced in its entirety.



COD1635-01

20D0247-01 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	4.64	1.00	1.00	mg/m ³	1	2004331	04/22/2020 11:42	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COD1635-02

20D0247-02 (Water)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	6.65	1.00	1.00	mg/m ³	1	2004331	04/22/2020 11:42	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COD1635-03

20D0247-03 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	4.33	1.00	1.00	mg/m ³	1	2004331	04/22/2020 11:42	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COD1635-04

20D0247-04 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	5.53	1.00	1.00	mg/m ³	1	2004331	04/22/2020 11:42	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COD1635-05

20D0247-05 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

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COD1635-05 (Continued)
20D0247-05 (Filter) (Continued)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	9.00	1.00	1.00	mg/m ³	1	2004331	04/22/2020 11:42	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COD1635-06
20D0247-06 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	28.5	1.00	1.00	mg/m ³	1	2004331	04/22/2020 11:42	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COD1635-07
20D0247-07 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	8.85	1.00	1.00	mg/m ³	1	2004331	04/22/2020 11:42	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COD1635-08
20D0247-08 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	17.6	1.00	1.00	mg/m ³	1	2004331	04/22/2020 11:42	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COD1635-09
20D0247-09 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

This report applies to the sample(s), or product(s), investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed. This report shall not be reproduced without the written consent of ALS-Truesdail Laboratories, Inc., and must be reproduced in its entirety.



COD1635-09 (Continued)
20D0247-09 (Filter) (Continued)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	99.5	1.00	1.00	mg/m ³	1	2004331	04/22/2020 11:42	EGV	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COD1635-10
20D0247-10 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	105	1.00	1.00	mg/m ³	1	2004331	04/22/2020 11:42	EGV	EPA 10200 H	
---------------	-----	------	------	-------------------	---	---------	------------------	-----	-------------	--

2000247

SUBCONTRACT ORDER

Printed: 4/14/2020 13:34

Babcock Laboratories, Inc.

C0D1635

SENDING LABORATORY:

Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, CA 92507-0704
Phone: (951) 653-3351
Fax: (951) 653-1662
Project Manager: Cindy A. Waddell

RECEIVING LABORATORY:

Truesdail Laboratories - Subcontract
3337 Michelson Drive Suite CN750
Irvine, CA 92614
Phone : (714) 730-6239
Fax: (714) 730-6462

Copy/Relog from C0B2113. System Name: Wood Environmental&Infrastructure Solutions, Inc
Sampler: Client

Please include MDLs and EXCEL EDD

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: C0D1635-01 Solid		Sampled: 04/13/20 08:40	CL07-Int	Proj.No.:LECL TMDL 1915100402.0003
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	04/23/20 23:59	04/23/20 08:40		Report Chlorophyll a / Filter Volume = 375mL
Sample ID: C0D1635-02 Solid		Sampled: 04/13/20 08:45	CL07-Surf	Proj.No.:LECL TMDL 1915100402.0003
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	04/23/20 23:59	04/23/20 08:45		Report Chlorophyll a / Filter Volume = 500mL
Sample ID: C0D1635-03 Solid		Sampled: 04/13/20 09:20	CL08-Int	Proj.No.:LECL TMDL 1915100402.0003
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	04/23/20 23:59	04/23/20 09:20		Report Chlorophyll a / Filter Volume = 500mL
Sample ID: C0D1635-04 Solid		Sampled: 04/13/20 09:25	CL08-Surf	Proj.No.:LECL TMDL 1915100402.0003
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	04/23/20 23:59	04/23/20 09:25		Report Chlorophyll a / Filter Volume = 325mL
Sample ID: C0D1635-05 Solid		Sampled: 04/13/20 10:05	CL09-Int	Proj.No.:LECL TMDL 1915100402.0003
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	04/23/20 23:59	04/23/20 10:05		Report Chlorophyll a / Filter Volume = 360mL
Sample ID: C0D1635-06 Solid		Sampled: 04/13/20 10:10	CL09-Surf	Proj.No.:LECL TMDL 1915100402.0003
Subout <i>Containers Supplied:</i> Whirl-Pak (A)	04/23/20 23:59	04/23/20 10:10		Report Chlorophyll a / Filter Volume = 350mL

Tracking No.
77833561481

20D0247

Printed: 4/14/2020 13:34

SUBCONTRACT ORDER

Babcock Laboratories, Inc.

C0D1635

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: C0D1635-07 Solid		Sampled: 04/13/20 10:45	CL10-Int	Proj.No.: <u>LECL TMDL</u> <u>1915100402.0003</u>
Subout	04/23/20 23:59	04/23/20 10:45	Report Chlorophyll a / Filter Volume = 325mL	
Containers Supplied: Whirl-Pak (A)				
Sample ID: C0D1635-08 Solid		Sampled: 04/13/20 10:50	CL10-Surf	Proj.No.: <u>LECL TMDL</u> <u>1915100402.0003</u>
Subout	04/23/20 23:59	04/23/20 10:50	Report Chlorophyll a / Filter Volume = 325mL	
Containers Supplied: Whirl-Pak (A)				
Sample ID: C0D1635-09 Solid		Sampled: 04/13/20 09:15	LE02-Int	Proj.No.: <u>LECL TMDL</u> <u>1915100402.0003</u>
Subout	04/23/20 23:59	04/23/20 09:15	Report Chlorophyll a / Filter Volume = 240mL	
Containers Supplied: Whirl-Pak (A)				
Sample ID: C0D1635-10 Solid		Sampled: 04/13/20 09:30	LE02-Surf	Proj.No.: <u>LECL TMDL</u> <u>1915100402.0003</u>
Subout	04/23/20 23:59	04/23/20 09:30	Report Chlorophyll a / Filter Volume = 325mL	
Containers Supplied: Whirl-Pak (A)				

Tracking No. 77833561481

All Containers Intact: Yes No Samples Preserved Properly: Yes No
 Samples Received at °C Sample Labels / COC Agree: Yes No Custody Seals Present: Yes No

Please forward all acknowledgements of sample receipt, final reports and invoices to data@babcocklabs.com
NO HARDCOPIES PLEASE.

Released By: [Signature] Date: 4/14/2020 Received By: [Signature] Date: 04/15/2020 11:50

Released By: _____ Date: _____ Received By: _____ Date: _____

1.4/0.5



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Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 1 of 1
Project Name: Amec Foster Wheeler-Lake
Project Number: LECL TMDL 1915100402.0
Work Order Number: C0D1639

Report Date: 20-Apr-2020

Received on Ice (Y/N Yes Temp: 1 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
C0D1639-01	CL07	Liquid	4/13/20 8:40	Client	4/13/20 16:08	Courier (Victor Diaz)-DE
C0D1639-02	CL08	Liquid	4/13/20 9:20	Client	4/13/20 16:08	Courier (Victor Diaz)-DE
C0D1639-03	CL09	Liquid	4/13/20 10:05	Client	4/13/20 16:08	Courier (Victor Diaz)-DE
C0D1639-04	CL10	Liquid	4/13/20 10:45	Client	4/13/20 16:08	Courier (Victor Diaz)-DE
C0D1639-05	LE02	Liquid	4/13/20 8:45	Client	4/13/20 16:08	Courier (Victor Diaz)-DE

Note: Requested Low Level Total Phosphorus analysis was subcontracted to Eurofins CalScience.

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Case Narrative+ COC.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.



BABCOCK Laboratories, Inc.
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Client Name: Wood Environment&Infrastructure Sc
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 1 of 1
Project Name: Amec Foster Wheeler-Lake
Project Number: LECL TMDL 1915100402.0
Work Order Number: C0D1639

Report Date: 20-Apr-2020

Received on Ice (Y/N Yes Temp: 1 °C

E.S. Babcock & Sons, Inc. Environmental Laboratories
(951) 653-3351 FAX (951) 653-1662
www.babcocklabs.com

Chain of Custody & Sample Information Record

Client: Wood E&I Solutions, Inc.		Contact: John Rudolph		Phone No. 858-243-8158	
FAX No.		Email: john.rudolph@woodplc.com		Additional Reporting Requests Include QC Data Package: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No FAX Results: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Email Results: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No State EDT: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Include Source Number in Notes)	
Project Name: LECL TMDL Monitoring		Turn Around Time: Routine *3-5 Day *48 Hour *24 Hour Rush Rush Rush		*Additional Charges May Apply	
Project Number: 1915100402		Lab TAT Approval: By:			
Sampler Information Name: _____ Employer: Wood E&I Solutions, Inc. Signature: _____		# of Containers & Preservatives Unpreserved H2SO4 HCl HNO3 NaOH NaOH/ZnAcetate NH4Cl BCAA Frozen		Analysis Requested Routine Resample Special TSS Nitrate - Nitrite TDS TKN Ammonia Total Phosphorus SRP/Ortho-P Total Sulfide Total AL Dissolved AL	
Matrix DW = Drinking Water WW = Wastewater GW = Groundwater S = Soil SG = Sludge L = Liquid M = Miscellaneous		Total # of Containers		Notes No lab filtration required for Ortho-P (field filtered). Total Phosphorus - Sub to Eurofins Calscience: RUSH TAT Dissolved Al is not field filtered Subout	
Sample ID	Date	Time			
CL07	04/13/20	08:40			
CL08	04/13/20	09:20			
CL09	04/13/20	09:05			
CL10	04/13/20	10:45			
LE02	04/13/20	16:45			
Relinquished By (sign)		Print Name / Company		Date / Time	
[Signature]		Kate Buckley, Wood		4/13/20 13:20	
[Signature]		Victor Diaz / DB		4/13/20 16:09	
Received By (Sign)		Print Name / Company			
[Signature]		Victor Diaz / D.E.			
[Signature]		BRAD ADAMS			

(For Lab Use Only)	Sample Integrity Upon Receipt	Temperature	Lab Notes
Sample(s) Submitted on Ice?	Yes No	/ °C	
Custody Seal(s) Intact?	Yes No N/A		
Sample(s) Intact?	Yes No	<input type="checkbox"/> Cooler Blank	

C0D1639
c'd: 04/13/2020 16:08
.H

ANALYTICAL REPORT

Eurofins Calscience LLC
7440 Lincoln Way
Garden Grove, CA 92841
Tel: (714)895-5494

Laboratory Job ID: 570-25837-1
Client Project/Site: C0D1639

For:

Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, California 92507

Attn: Cindy A Waddell



*Authorized for release by:
4/20/2020 9:15:03 AM*

Carla Hollowell, Project Manager I
(714)895-5494
carlahollowell@eurofinsus.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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QC Sample Results	6
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Sample Summary	10
Chain of Custody	11
Receipt Checklists	14

Definitions/Glossary

Client: Babcock Laboratories, Inc.
Project/Site: C0D1639

Job ID: 570-25837-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Babcock Laboratories, Inc.
Project/Site: C0D1639

Job ID: 570-25837-1

Job ID: 570-25837-1

Laboratory: Eurofins Calscience LLC

Narrative

Job Narrative 570-25837-1

Comments

No additional comments.

Receipt

The samples were received on 4/15/2020 10:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.5° C.

General Chemistry

Method 365.1: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 570-63689 and analytical batch 570-63750 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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Client Sample Results

Client: Babcock Laboratories, Inc.
Project/Site: C0D1639

Job ID: 570-25837-1

General Chemistry

Client Sample ID: C0D1639-01
Date Collected: 04/13/20 08:40
Date Received: 04/15/20 10:15

Lab Sample ID: 570-25837-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.211		0.0200	0.00490	mg/L		04/17/20 06:30	04/17/20 09:37	1

Client Sample ID: C0D1639-02
Date Collected: 04/13/20 09:20
Date Received: 04/15/20 10:15

Lab Sample ID: 570-25837-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.223		0.0200	0.00490	mg/L		04/17/20 06:30	04/17/20 09:39	1

Client Sample ID: C0D1639-03
Date Collected: 04/13/20 10:05
Date Received: 04/15/20 10:15

Lab Sample ID: 570-25837-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.448		0.0200	0.00490	mg/L		04/17/20 06:30	04/17/20 09:40	1

Client Sample ID: C0D1639-04
Date Collected: 04/13/20 10:45
Date Received: 04/15/20 10:15

Lab Sample ID: 570-25837-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.432		0.0200	0.00490	mg/L		04/17/20 06:30	04/17/20 09:42	1

Client Sample ID: C0D1639-05
Date Collected: 04/13/20 08:45
Date Received: 04/15/20 10:15

Lab Sample ID: 570-25837-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.174	F1	0.0200	0.00490	mg/L		04/17/20 06:30	04/17/20 09:43	1

QC Sample Results

Client: Babcock Laboratories, Inc.
Project/Site: C0D1639

Job ID: 570-25837-1

Method: 365.1 - Phosphorus, Total

Lab Sample ID: MB 570-63689/5-A
Matrix: Water
Analysis Batch: 63750

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 63689

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	ND		0.0200	0.00490	mg/L		04/17/20 06:30	04/17/20 09:19	1

Lab Sample ID: LCS 570-63689/6-A
Matrix: Water
Analysis Batch: 63750

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 63689

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.200	0.1988		mg/L		99	93 - 107

Lab Sample ID: LCSD 570-63689/7-A
Matrix: Water
Analysis Batch: 63750

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 63689

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Phosphorus, Total	0.200	0.1982		mg/L		99	93 - 107	0	4

Lab Sample ID: 570-25837-5 MS
Matrix: Water
Analysis Batch: 63750

Client Sample ID: C0D1639-05
Prep Type: Total/NA
Prep Batch: 63689

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.174	F1	0.200	0.3493	F1	mg/L		88	93 - 107

Lab Sample ID: 570-25837-5 MSD
Matrix: Water
Analysis Batch: 63750

Client Sample ID: C0D1639-05
Prep Type: Total/NA
Prep Batch: 63689

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Phosphorus, Total	0.174	F1	0.200	0.3499	F1	mg/L		88	93 - 107	0	4

Lab Chronicle

Client: Babcock Laboratories, Inc.
Project/Site: C0D1639

Job ID: 570-25837-1

Client Sample ID: C0D1639-01

Lab Sample ID: 570-25837-1

Date Collected: 04/13/20 08:40

Matrix: Water

Date Received: 04/15/20 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	63689	04/17/20 06:30	YR9U	ECL 1
Total/NA	Analysis	365.1		1	5 mL	5 mL	63750	04/17/20 09:37	YR9U	ECL 1
Instrument ID: ACA1										

Client Sample ID: C0D1639-02

Lab Sample ID: 570-25837-2

Date Collected: 04/13/20 09:20

Matrix: Water

Date Received: 04/15/20 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	63689	04/17/20 06:30	YR9U	ECL 1
Total/NA	Analysis	365.1		1	5 mL	5 mL	63750	04/17/20 09:39	YR9U	ECL 1
Instrument ID: ACA1										

Client Sample ID: C0D1639-03

Lab Sample ID: 570-25837-3

Date Collected: 04/13/20 10:05

Matrix: Water

Date Received: 04/15/20 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	63689	04/17/20 06:30	YR9U	ECL 1
Total/NA	Analysis	365.1		1	5 mL	5 mL	63750	04/17/20 09:40	YR9U	ECL 1
Instrument ID: ACA1										

Client Sample ID: C0D1639-04

Lab Sample ID: 570-25837-4

Date Collected: 04/13/20 10:45

Matrix: Water

Date Received: 04/15/20 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	63689	04/17/20 06:30	YR9U	ECL 1
Total/NA	Analysis	365.1		1	5 mL	5 mL	63750	04/17/20 09:42	YR9U	ECL 1
Instrument ID: ACA1										

Client Sample ID: C0D1639-05

Lab Sample ID: 570-25837-5

Date Collected: 04/13/20 08:45

Matrix: Water

Date Received: 04/15/20 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	63689	04/17/20 06:30	YR9U	ECL 1
Total/NA	Analysis	365.1		1	5 mL	5 mL	63750	04/17/20 09:43	YR9U	ECL 1
Instrument ID: ACA1										

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

Accreditation/Certification Summary

Client: Babcock Laboratories, Inc.
Project/Site: C0D1639

Job ID: 570-25837-1

Laboratory: Eurofins Calscience LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	Los Angeles County Sanitation Districts	10109	09-29-20
California	SCAQMD LAP	17LA0919	11-30-20
California	State	2944	09-29-20
Guam	State	20-003R	10-31-20
Nevada	State	CA00111	07-31-20
Oregon	NELAP	CA300001	01-29-21
USDA	US Federal Programs	P330-20-00034	02-10-23
Washington	State	C916-18	10-11-20

Method Summary

Client: Babcock Laboratories, Inc.
Project/Site: C0D1639

Job ID: 570-25837-1

Method	Method Description	Protocol	Laboratory
365.1	Phosphorus, Total	EPA	ECL 1
365.2/365.3/365	Phosphorus, Total	MCAWW	ECL 1

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

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Sample Summary

Client: Babcock Laboratories, Inc.
Project/Site: COD1639

Job ID: 570-25837-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
570-25837-1	COD1639-01	Water	04/13/20 08:40	04/15/20 10:15	
570-25837-2	COD1639-02	Water	04/13/20 09:20	04/15/20 10:15	
570-25837-3	COD1639-03	Water	04/13/20 10:05	04/15/20 10:15	
570-25837-4	COD1639-04	Water	04/13/20 10:45	04/15/20 10:15	
570-25837-5	COD1639-05	Water	04/13/20 08:45	04/15/20 10:15	

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SUBCONTRACT ORDER

Printed: 4/14/2020 13:21

Babcock Laboratories, Inc.

C0D1639

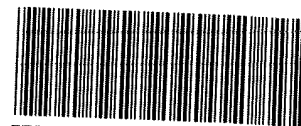
SENDING LABORATORY:

Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, CA 92507-0704
Phone: (951) 653-3351
Fax: (951) 653-1662
Project Manager: Cindy A. Waddell

RECEIVING LABORATORY:

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove, CA 92841-1427
Phone: (714) 895-5494
Fax: (714) 894-7501

Copy/Relog from C0B2114. System Name: Wood Environment & Infrastructure Solutions, Inc
Sampler: Client



570-25837 Chain of Custody

Please include MDLs and EXCEL EDD
PLEASE EXPEDITE

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: C0D1639-01 Liquid		Sampled: 04/13/20 08:40	CL07	Proj.No.: LECL TMDL 1915100402.0003
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	04/17/20 23:59	04/23/20 08:40		Low Level Total Phosphorus
Sample ID: C0D1639-02 Liquid		Sampled: 04/13/20 09:20	CL08	Proj.No.: LECL TMDL 1915100402.0003
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	04/17/20 23:59	04/23/20 09:20		Low Level Total Phosphorus
Sample ID: C0D1639-03 Liquid		Sampled: 04/13/20 10:05	CL09	Proj.No.: LECL TMDL 1915100402.0003
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	04/17/20 23:59	04/23/20 10:05		Low Level Total Phosphorus
Sample ID: C0D1639-04 Liquid		Sampled: 04/13/20 10:45	CL10	Proj.No.: LECL TMDL 1915100402.0003
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	04/17/20 23:59	04/23/20 10:45		Low Level Total Phosphorus
Sample ID: C0D1639-05 Liquid		Sampled: 04/13/20 08:45	LE02	Proj.No.: LECL TMDL 1915100402.0003
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	04/17/20 23:59	04/23/20 08:45		Low Level Total Phosphorus

Tracking No.
77833561448

25 837

SUBCONTRACT ORDER
Babcock Laboratories, Inc.
C0D1639

Printed: 4/14/2020 13:21

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Tracking No.
77833561448

All Containers Intact: Yes No Samples Preserved Properly: Yes No
 Samples Received at oC Sample Labels / COC Agree: Yes No Custody Seals Present: Yes No

Please forward all acknowledgements of sample receipt, final reports and invoices to data@babcocklabs.com
NO HARDCOPIES PLEASE.

Released By [Signature] Date 4/14/2020 Received By [Signature] Date 4/15/20 10:10

Released By _____ Date _____ Received By _____ Date _____

3-4/20-5-506

25837



570-25837 Waybill

ORIGIN ID: ONTA (801) 497-7106
ATTN: JARED TUBES
KEYSVILLE CITY UCHRA
LANE

SHIP DATE: 15MAR20
ACTWT: 25.00 LB MAN
CRD: 0266194/CAFE3311
DIMS: 16x16x

ORIGIN ID: ONTA (953) 653-3351
BRECKOCK LABORATORIES
6100 QUAIL VALLEY CT
RIVERSIDE, CA 92507
UNITED STATES US

SHIP DATE: 14APR20
ACTWT: 25.00 LB MAN
CRD: 0266194/CAFE3311

BILL SENDER

TO
SAMPLE RECEIVING
EUROFINS CALSCIENCE, INC.
7440 LINCOLN WAY

GARDEN GROVE CA 92841

REF: (714) 886-5484

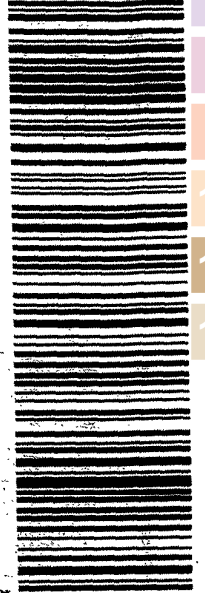


WED - 15 APR 10:30A
PRIORITY OVERNIGHT

TRK# 1778 3356 1448
0201

92 APVA

92841
CA-US SNA



RT # 156149-434 RIT2 EXP 06/20

555CA/278A/0582

41912190820014

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Login Sample Receipt Checklist

Client: Babcock Laboratories, Inc.

Job Number: 570-25837-1

Login Number: 25837

List Source: Eurofins Calscience

List Number: 1

Creator: Soriano, Precy

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 1 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 13-Jul-2020

Work Order Number: C0F3378
 Received on Ice (Y/N): Yes Temp: 8 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
C0F3378-01	CL07	Liquid	06/26/20 11:00	Client	06/26/20 14:53	Courier (Eliseo Vera)-DE
C0F3378-02	CL08	Liquid	06/26/20 10:25	Client	06/26/20 14:53	Courier (Eliseo Vera)-DE
C0F3378-03	CL09	Liquid	06/26/20 9:45	Client	06/26/20 14:53	Courier (Eliseo Vera)-DE
C0F3378-04	CL10	Liquid	06/26/20 9:15	Client	06/26/20 14:53	Courier (Eliseo Vera)-DE
C0F3378-05	LE02	Liquid	06/26/20 9:15	Client	06/26/20 14:53	Courier (Eliseo Vera)-DE



BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 2 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 13-Jul-2020

Work Order Number: C0F3378
 Received on Ice (Y/N): Yes Temp: 8 °C

Laboratory Reference Number

C0F3378-01

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL07	Liquid	06/26/20 11:00	06/26/20 14:53

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	06/26/20 19:47	ATR	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	06/26/20 19:47	ATR	
Solids								
Total Dissolved Solids	350	10	10	mg/L	SM 2540C	06/29/20 23:20	JGZ	
Total Suspended Solids	4	2	2	mg/L	SM 2540D	07/02/20 09:25	ATR	
General Inorganics								
Sulfide	3.3	0.10	0.10	mg/L	SM 4500S2 D	06/28/20 15:45	DSS	
Nutrients								
Ammonia-Nitrogen	1.3	0.50	0.22	mg/L	SM4500NH3H G	06/29/20 10:28	AJH	
Kjeldahl Nitrogen	1.7	0.10	0.093	mg/L	EPA 351.2	06/29/20 12:35	SLL	
Ortho Phosphate Phosphorus	0.10	0.050	0.050	mg/L	EPA 300.0	06/26/20 20:14	ATR	
Metals and Metalloids								
Aluminum-Dissolved	27	100	16	ug/L	EPA 200.7	06/29/20 16:12	AP	J, N_pFilt
Aluminum	41	100	16	ug/L	EPA 200.7	07/01/20 16:12	AP	J



BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 3 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 13-Jul-2020

Work Order Number: C0F3378
 Received on Ice (Y/N): Yes Temp: 8 °C

Laboratory Reference Number

C0F3378-02

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL08	Liquid	06/26/20 10:25	06/26/20 14:53

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	06/26/20 20:02	ATR	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	06/26/20 20:02	ATR	
Solids								
Total Dissolved Solids	340	10	10	mg/L	SM 2540C	06/29/20 23:20	JGZ	
Total Suspended Solids	4	2	2	mg/L	SM 2540D	07/02/20 09:25	ATR	
General Inorganics								
Sulfide	3.0	0.10	0.10	mg/L	SM 4500S2 D	06/28/20 15:45	DSS	
Nutrients								
Ammonia-Nitrogen	0.29	0.10	0.044	mg/L	SM4500NH3H G	06/29/20 11:57	AJH	
Kjeldahl Nitrogen	1.1	0.10	0.093	mg/L	EPA 351.2	06/29/20 12:36	SLL	
Ortho Phosphate Phosphorus	ND	0.050	0.050	mg/L	EPA 300.0	06/26/20 20:31	ATR	
Metals and Metalloids								
Aluminum-Dissolved	18	100	16	ug/L	EPA 200.7	06/29/20 16:14	AP	J, N_pFilt
Aluminum	42	100	16	ug/L	EPA 200.7	07/01/20 16:14	AP	J



BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 4 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 13-Jul-2020

Work Order Number: C0F3378
 Received on Ice (Y/N): Yes Temp: 8 °C

Laboratory Reference Number

C0F3378-03

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL09	Liquid	06/26/20 09:45	06/26/20 14:53

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	06/26/20 20:17	ATR	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	06/26/20 20:17	ATR	
Solids								
Total Dissolved Solids	450	10	10	mg/L	SM 2540C	06/29/20 23:20	JGZ	
Total Suspended Solids	5	2	2	mg/L	SM 2540D	07/02/20 09:25	ATR	
General Inorganics								
Sulfide	ND	0.10	0.10	mg/L	SM 4500S2 D	06/28/20 15:45	DSS	
Nutrients								
Ammonia-Nitrogen	0.75	0.10	0.044	mg/L	SM4500NH3H G	06/29/20 11:59	AJH	
Kjeldahl Nitrogen	2.5	0.10	0.093	mg/L	EPA 351.2	06/29/20 12:38	SLL	
Ortho Phosphate Phosphorus	ND	0.050	0.050	mg/L	EPA 300.0	06/26/20 20:47	ATR	
Metals and Metalloids								
Aluminum-Dissolved	41	100	16	ug/L	EPA 200.7	06/29/20 16:21	AP	J, N_pFilt
Aluminum	100	100	16	ug/L	EPA 200.7	07/01/20 16:16	AP	



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA 92123

Analytical Report: Page 5 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 13-Jul-2020

Work Order Number: C0F3378
 Received on Ice (Y/N): Yes Temp: 8 °C

Laboratory Reference Number

C0F3378-04

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
CL10	Liquid	06/26/20 09:15	06/26/20 14:53

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	06/26/20 20:31	ATR	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	06/26/20 20:31	ATR	
Solids								
Total Dissolved Solids	310	10	10	mg/L	SM 2540C	06/29/20 23:20	JGZ	
Total Suspended Solids	15	2	2	mg/L	SM 2540D	07/02/20 09:25	ATR	
General Inorganics								
Sulfide	0.80	0.10	0.10	mg/L	SM 4500S2 D	06/28/20 15:45	DSS	
Nutrients								
Ammonia-Nitrogen	0.22	0.10	0.044	mg/L	SM4500NH3H G	06/29/20 12:01	AJH	
Kjeldahl Nitrogen	2.2	0.10	0.093	mg/L	EPA 351.2	06/29/20 12:39	SLL	
Ortho Phosphate Phosphorus	ND	0.050	0.050	mg/L	EPA 300.0	06/26/20 21:04	ATR	
Metals and Metalloids								
Aluminum-Dissolved	38	100	16	ug/L	EPA 200.7	06/29/20 16:23	AP	J, N_pFilt
Aluminum	110	100	16	ug/L	EPA 200.7	07/01/20 16:18	AP	



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 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 13-Jul-2020

Work Order Number: C0F3378
 Received on Ice (Y/N): Yes Temp: 8 °C

Laboratory Reference Number

C0F3378-05

<u>Sample Description</u>	<u>Matrix</u>	<u>Sampled Date/Time</u>	<u>Received Date/Time</u>
LE02	Liquid	06/26/20 09:15	06/26/20 14:53

<u>Analyte(s)</u>	<u>Result</u>	<u>RDL</u>	<u>MDL</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>	<u>Flag</u>
Anions								
Nitrate as N	ND	0.20	0.16	mg/L	EPA 300.0	06/26/20 20:46	ATR	
Nitrite as N	ND	0.10	0.091	mg/L	EPA 300.0	06/26/20 20:46	ATR	
Solids								
Total Dissolved Solids	3500	20	20	mg/L	SM 2540C	06/29/20 23:20	JGZ	
General Inorganics								
Sulfide	0.40	0.10	0.10	mg/L	SM 4500S2 D	06/28/20 15:45	DSS	
Nutrients								
Ammonia-Nitrogen	0.41	0.10	0.044	mg/L	SM4500NH3H G	06/29/20 09:49	AJH	
Kjeldahl Nitrogen	4.6	0.50	0.46	mg/L	EPA 351.2	06/29/20 13:47	SLL	
Ortho Phosphate Phosphorus	ND	0.050	0.050	mg/L	EPA 300.0	06/26/20 21:20	ATR	



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Client Name: Wood Environment&Infrastructure Solutions, In
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Analytical Report: Page 7 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 13-Jul-2020

Work Order Number: C0F3378
 Received on Ice (Y/N): Yes Temp: 8 °C

Anions - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0F26029 - Analyzed as Received IC										
Blank (0F26029-BLK1) Prepared & Analyzed: 06/26/20										
Nitrite as N	ND	0.10	0.091	mg/L						
Nitrate as N	ND	0.20	0.16	mg/L						
LCS (0F26029-BS1) Prepared & Analyzed: 06/26/20										
Nitrite as N	2.24	0.10	0.091	mg/L	2.50	90	90-110			
Nitrate as N	5.32	0.20	0.16	mg/L	5.65	94	90-110			
Matrix Spike (0F26029-MS1) Source: C0F3173-01 Prepared & Analyzed: 06/26/20										
Nitrite as N	1.98	0.10	0.091	mg/L	2.50	ND	79	80-120		QFnt, QMout
Nitrate as N	5.20	0.20	0.16	mg/L	5.65	ND	92	75-131		
Matrix Spike (0F26029-MS2) Source: C0F3378-05 Prepared & Analyzed: 06/26/20										
Nitrite as N	2.15	0.10	0.091	mg/L	2.50	ND	86	80-120		
Nitrate as N	5.33	0.20	0.16	mg/L	5.65	ND	94	75-131		
Matrix Spike Dup (0F26029-MSD1) Source: C0F3173-01 Prepared & Analyzed: 06/26/20										
Nitrite as N	1.98	0.10	0.091	mg/L	2.50	ND	79	80-120	0.1	20 QFnt, QMout
Nitrate as N	5.29	0.20	0.16	mg/L	5.65	ND	94	75-131	2	20



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
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Analytical Report: Page 8 of 15
 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 13-Jul-2020

Work Order Number: C0F3378
 Received on Ice (Y/N): Yes Temp: 8 °C

Solids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0F29110 - Analyzed as received										
Blank (0F29110-BLK1) Prepared & Analyzed: 06/29/20										
Total Dissolved Solids	ND	10	10	mg/L						
Duplicate (0F29110-DUP1) Source: C0F3378-01 Prepared & Analyzed: 06/29/20										
Total Dissolved Solids	341	10	10	mg/L	351			3	20	
Duplicate (0F29110-DUP2) Source: C0F3378-02 Prepared & Analyzed: 06/29/20										
Total Dissolved Solids	338	10	10	mg/L	339			0.3	20	
Batch 0G02069 - Analyzed as received										
Blank (0G02069-BLK1) Prepared & Analyzed: 07/02/20										
Total Suspended Solids	ND	0.5	0.5	mg/L						
Duplicate (0G02069-DUP1) Source: C0F3149-02 Prepared & Analyzed: 07/02/20										
Total Suspended Solids	3.50	2	2	mg/L	3.00			15	25	
Duplicate (0G02069-DUP2) Source: C0F3158-01 Prepared & Analyzed: 07/02/20										
Total Suspended Solids	106	10	10	mg/L	110			4	25	



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Client Name: Wood Environment&Infrastructure Solutions, In
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 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 13-Jul-2020

Work Order Number: C0F3378
 Received on Ice (Y/N): Yes Temp: 8 °C

General Inorganics - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0F28080 - Analyzed as received										
Blank (0F28080-BLK1) Prepared & Analyzed: 06/28/20										
Sulfide	ND	0.10	0.10	mg/L						
LCS (0F28080-BS1) Prepared & Analyzed: 06/28/20										
Sulfide	0.400	0.10	0.10	mg/L	0.400	100	50-150			
Matrix Spike (0F28080-MS1) Source: C0F3360-02 Prepared & Analyzed: 06/28/20										
Sulfide	0.400	0.10	0.10	mg/L	0.400	ND	100	50-150		
Matrix Spike Dup (0F28080-MSD1) Source: C0F3360-02 Prepared & Analyzed: 06/28/20										
Sulfide	0.400	0.10	0.10	mg/L	0.400	ND	100	50-150	0	30



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 Contact: John Rudolph
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 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 13-Jul-2020

Work Order Number: C0F3378
 Received on Ice (Y/N): Yes Temp: 8 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0F26047 - Analyzed as Received IC										
Blank (0F26047-BLK1) Prepared & Analyzed: 06/26/20										
Ortho Phosphate Phosphorus	ND	0.050	0.050	mg/L						
LCS (0F26047-BS1) Prepared & Analyzed: 06/26/20										
Ortho Phosphate Phosphorus	0.271	0.050	0.050	mg/L	0.300	90	90-110			
Matrix Spike (0F26047-MS1) Source: C0F3379-02 Prepared & Analyzed: 06/26/20										
Ortho Phosphate Phosphorus	0.282	0.050	0.050	mg/L	0.300	ND	94	80-120		
Matrix Spike Dup (0F26047-MSD1) Source: C0F3379-02 Prepared & Analyzed: 06/26/20										
Ortho Phosphate Phosphorus	0.282	0.050	0.050	mg/L	0.300	ND	94	80-120	0.1	20
Batch 0F29072 - Acid Digest										
Blank (0F29072-BLK1) Prepared & Analyzed: 06/29/20										
Kjeldahl Nitrogen	ND	0.10	0.093	mg/L						
LCS (0F29072-BS1) Prepared & Analyzed: 06/29/20										
Kjeldahl Nitrogen	0.912	0.10	0.093	mg/L	1.00	91	80-120			
Matrix Spike (0F29072-MS1) Source: C0F3379-01 Prepared & Analyzed: 06/29/20										
Kjeldahl Nitrogen	1.39	0.10	0.093	mg/L	1.00	0.527	86	42-154		
Matrix Spike Dup (0F29072-MSD1) Source: C0F3379-01 Prepared & Analyzed: 06/29/20										
Kjeldahl Nitrogen	1.44	0.10	0.093	mg/L	1.00	0.527	91	42-154	4	25
Batch 0F29073 - Analyzed as received										
Blank (0F29073-BLK1) Prepared & Analyzed: 06/29/20										
Ammonia-Nitrogen	ND	0.10	0.044	mg/L						



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 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 13-Jul-2020

Work Order Number: C0F3378
 Received on Ice (Y/N): Yes Temp: 8 °C

Nutrients - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0F29073 - Analyzed as received										
LCS (0F29073-BS1)				Prepared & Analyzed: 06/29/20						
Ammonia-Nitrogen	0.980	0.10	0.044	mg/L	1.00	98	90-110			
Matrix Spike (0F29073-MS1)				Source: C0F3379-01 Prepared & Analyzed: 06/29/20						
Ammonia-Nitrogen	1.11	0.10	0.044	mg/L	1.00	0.0484	106	80-120		
Matrix Spike Dup (0F29073-MSD1)				Source: C0F3379-01 Prepared & Analyzed: 06/29/20						
Ammonia-Nitrogen	1.00	0.10	0.044	mg/L	1.00	0.0484	95	80-120	11	20
Batch 0F29074 - Analyzed as received										
Blank (0F29074-BLK1)				Prepared & Analyzed: 06/29/20						
Ammonia-Nitrogen	ND	0.10	0.044	mg/L						
LCS (0F29074-BS1)				Prepared & Analyzed: 06/29/20						
Ammonia-Nitrogen	0.981	0.10	0.044	mg/L	1.00	98	90-110			
Matrix Spike (0F29074-MS1)				Source: C0F3369-01 Prepared & Analyzed: 06/29/20						
Ammonia-Nitrogen	3.04	0.20	0.088	mg/L	2.00	0.899	107	80-120		
Matrix Spike Dup (0F29074-MSD1)				Source: C0F3369-01 Prepared & Analyzed: 06/29/20						
Ammonia-Nitrogen	2.96	0.20	0.088	mg/L	2.00	0.899	103	80-120	2	20



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Client Name: Wood Environment&Infrastructure Solutions, In
 Contact: John Rudolph
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 Project Name: Amec Foster Wheeler-Lake Elsir
 Project Number: LECL TMDL 1915100402.0003

Report Date: 13-Jul-2020

Work Order Number: C0F3378
 Received on Ice (Y/N): Yes Temp: 8 °C

Metals and Metalloids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0F29090 - 200.7/ No Digest										
Blank (0F29090-BLK1)				Prepared & Analyzed: 06/29/20						
Aluminum-Dissolved	ND	100	16	ug/L						
Blank (0F29090-BLK2)				Prepared & Analyzed: 06/29/20						
Aluminum-Dissolved	ND	100	16	ug/L						QBfil
Blank (0F29090-BLK3)				Prepared & Analyzed: 06/29/20						
Aluminum-Dissolved	ND	100	16	ug/L						QBfil
Blank (0F29090-BLK4)				Prepared & Analyzed: 06/29/20						
Aluminum-Dissolved	ND	100	16	ug/L						
LCS (0F29090-BS1)				Prepared & Analyzed: 06/29/20						
Aluminum-Dissolved	343	100	16	ug/L	334	103	85-115			
Matrix Spike (0F29090-MS1)				Source: C0F3051-03 Prepared & Analyzed: 06/29/20						
Aluminum-Dissolved	377	100	16	ug/L	334	ND	113	70-130		
Matrix Spike Dup (0F29090-MSD1)				Source: C0F3051-03 Prepared & Analyzed: 06/29/20						
Aluminum-Dissolved	368	100	16	ug/L	334	ND	110	70-130	2	20
Batch 0G01089 - EPA 200.2										
Blank (0G01089-BLK1)				Prepared & Analyzed: 07/01/20						
Aluminum	ND	100	16	ug/L						
LCS (0G01089-BS1)				Prepared & Analyzed: 07/01/20						
Aluminum	1260	100	16	ug/L	1170	108	85-115			



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Client Name: Wood Environment&Infrastructure Solutions, In
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Analytical Report: Page 13 of 15
Project Name: Amec Foster Wheeler-Lake Elsir
Project Number: LECL TMDL 1915100402.0003

Report Date: 13-Jul-2020

Work Order Number: C0F3378
Received on Ice (Y/N): Yes Temp: 8 °C

Metals and Metalloids - Batch Quality Control

Analyte(s)	Result	RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0G01089 - EPA 200.2										
Matrix Spike (0G01089-MS1)		Source: C0F3378-04			Prepared & Analyzed: 07/01/20					
Aluminum	1370	100	16	ug/L	1170	108	109	70-130		
Matrix Spike Dup (0G01089-MSD1)		Source: C0F3378-04			Prepared & Analyzed: 07/01/20					
Aluminum	1420	100	16	ug/L	1170	108	112	70-130	3	20



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Project Name: Amec Foster Wheeler-Lake Elsir
Project Number: LECL TMDL 1915100402.0003

Report Date: 13-Jul-2020

Work Order Number: C0F3378
Received on Ice (Y/N): Yes Temp: 8 °C

Notes and Definitions

- J Estimated value
- N_pFilt Sample filtered and preserved upon receipt to the laboratory.
- QBfil Method blank was filtered prior to processing.
- QFnt The referenced sample did not require this QC analyte, so a follow-up is not needed.
- QMout MS and/or MSD recovery did not meet laboratory acceptance criteria.
- ND: Analyte NOT DETECTED at or above the Method Detection Limit (**if MDL is reported**), otherwise at or above the Reportable Detection Limit (RDL)
- NR: Not Reported
- RDL: Reportable Detection Limit
- MDL: Method Detection Limit

* / (Non-NELAP): NELAP does not offer accreditation for this analyte/method/matrix combination

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

e-Standard_No Alias.rpt

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.

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EPA No. CA00102
NELAP No. OR4035
LACSD No. 10119



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Client Name: Wood Environment&Infrastructure Solutions, In
Contact: John Rudolph
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Analytical Report: Page 15 of 15
Project Name: Amec Foster Wheeler-Lake Elsi
Project Number: LECL TMDL 1915100402.0003

Report Date: 13-Jul-2020

Work Order Number: C0F3378
Received on Ice (Y/N): Yes Temp: 8 °C

E.S. Babcock & Sons, Inc. Environmental Laboratories
(951) 653-3351 FAX (951) 653-1662
www.babcocklabs.com

Chain of Custody & Sample Information Record

Client: Wood E&I Solutions, Inc.		Contact: John Rudolph		Phone No. 858-243-8158								
FAX No.		Email: john.rudolph@woodplc.com		Additional Reporting Requests								
Project Name: LECL TMDL Monitoring		Turn Around Time: Routine		*3-5 Day *48 Hour *24 Hour								
Project Number: 1915100402		Lab TAT Approval: By:		Rush Rush Rush								
Sampler Information		# of Containers & Preservatives		Analysis Requested								
Name: _____		Unpreserved H2SO4 HCl HNO3 Na2S2O3 NaOH NaOH/ZnAcetate NH4Cl MCAA Frozen		Matrix								
Employer: Wood E&I Solutions, Inc.		Total # of Containers		Notes								
Signature: _____		Routine Resample Special		No lab filtration required for Ortho-P (field filtered). Total Phosphorus - Sub to Eurofins Calscience. RUSH TAT Dissolved Al is not field filtered <i>In house</i>								
Sample ID	Date	Time	TSS	Nitrate - Nitrite	TDS	TKN	Ammonia	Total Phosphorus	SRP/Ortho-P	Total Sulfide	Total Al	Dissolved Al
CL07	6/26/20	1100	X	X	X	X	X	X	X	X	X	X
CL08	6/26/20	1025	X	X	X	X	X	X	X	X	X	X
CL09	6/26/20	0945	X	X	X	X	X	X	X	X	X	X
CL10	6/26/20	0915	X	X	X	X	X	X	X	X	X	X
LE02	6/26/20	0915	X	X	X	X	X	X	X	X	X	X
Relinquished By (sign)	Print Name / Company	Date / Time	Received By (Sign)		Print Name / Company							
<i>[Signature]</i>	Tyler Koff / L5005	1415 6/26/20	<i>[Signature]</i>		E.S. Babcock / L5005							
<i>[Signature]</i>	E.S. Babcock	1455 6/26/20	<i>[Signature]</i>		Cathy Hernandez / L5005							

(For Lab Use Only)	Sample Integrity Upon Receipt	Temp	Lab Notes
Sample(s) Submitted on Ice?	Yes No	Temperature	
Custody Seal(s) Intact?	Yes No (N/A)	8 °C	
Sample(s) Intact?	Yes No	<input type="checkbox"/> Cooler Blank	

C0F3378
Rc'd: 06/26/2020 14:53
.H



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Client Name: Wood Environment&Infrastructure Solutic
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
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Analytical Report: Page 1 of 3
 Project Name: Amec Foster Wheeler-Lake Elsin
 Project Number: LECL TMDL 1915100402.0003
Work Order Number: C0F3380

Report Date: 07-Jul-2020

Received on Ice (Y/N) Yes Temp: 8 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
C0F3380-01	CL07	Liquid	6/26/20 11:00	Client	6/26/20 14:53	Courier (Eliseo Vera)-DE
C0F3380-02	CL08	Liquid	6/26/20 10:25	Client	6/26/20 14:53	Courier (Eliseo Vera)-DE
C0F3380-03	CL09	Liquid	6/26/20 9:45	Client	6/26/20 14:53	Courier (Eliseo Vera)-DE
C0F3380-04	CL10	Liquid	6/26/20 9:15	Client	6/26/20 14:53	Courier (Eliseo Vera)-DE
C0F3380-05	LE02	Liquid	6/26/20 9:15	Client	6/26/20 14:53	Courier (Eliseo Vera)-DE

Note: Requested Low Level Total Phosphorus analysis was subcontracted to Eurofins CalScience.



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Client Name: Wood Environment&Infrastructure Solutic
Contact: John Rudolph
Address: 9210 Sky Park Court #200
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Analytical Report: Page 2 of 3
Project Name: Amec Foster Wheeler-Lake Elsin
Project Number: LECL TMDL 1915100402.0003
Work Order Number: C0F3380

Report Date: 07-Jul-2020

Received on Ice (Y/N) Yes Temp: 8 °C

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

E-CASE NARRATIVE+ COC.RPT

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BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutic
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 3 of 3
Project Name: Amec Foster Wheeler-Lake Elsin
Project Number: LECL TMDL 1915100402.0003
Work Order Number: C0F3380

Report Date: 07-Jul-2020

Received on Ice (Y/N) Yes Temp: 8 °C

E.S. Babcock & Sons, Inc. Environmental Laboratories Chain of Custody & Sample Information Record
(951) 653-3351 FAX (951) 653-1662
www.babcocklabs.com

Client: Wood E&I Solutions, Inc.		Contact: John Rudolph		Phone No. 858-243-8158				
FAX No.		Email: john.rudolph@woodplc.com		Additional Reporting Requests Include QC Data Package: <input type="checkbox"/> Yes <input type="checkbox"/> No FAX Results: <input type="checkbox"/> Yes <input type="checkbox"/> No Email Results: <input type="checkbox"/> Yes <input type="checkbox"/> No State EDT: <input type="checkbox"/> Yes <input type="checkbox"/> No (Include Source Number in Notes)				
Project Name: LECL TMDL Monitoring		Turn Around Time: <u>Routine</u>		*3-5 Day	*48 Hour			
Project Number: 1915100402		Lab TAT Approval: By:		Rush	Rush			
Sampler Information		# of Containers & Preservatives		Analysis Requested				
Name: _____		Unpreserved	Total # of Containers	Routine	Matrix	Notes		
Employer: Wood E&I Solutions, Inc.		HCl		Resample			DW = Drinking Water	No lab filtration required for Ortho-P (field filtered). Total Phosphorus - Sub to Eurofins Calscience. RUSH TAT Dissolved Al is not field filtered Subout
Signature: _____		HNO3		Special			WW = Wastewater	
Sample ID	Date	Time		TSS			GW = Groundwater	
CL07	6/26/20	1100		Nitrate - Nitrite			S = Soil	
CL08	6/26/20	1025		TDS			SG = Sludge	
CL09	6/26/20	0945		TKN			L = Liquid	
CL10	6/26/20	0915	Ammonia	M = Miscellaneous				
LE02	6/26/20	0915	Total Phosphorus					
			SRP/Ortho-P					
			Total Sulfide					
			Total AL					
			Dissolved AL					
Relinquished By (sign)		Print Name / Company		Date / Time				
		Tyler K... / WOOD		1415 6/26/20				
		S.I.S.E.V.S.T.A		1453 6/26/20				
Received By (Sign)		Print Name / Company						
		S.I.S.E.V.S.T.A		Cassidy Hernandez 7/1/20				

(For Lab Use Only) Sample Integrity Upon Receipt		Lab Notes	
Sample(s) Submitted on Ice?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Temperature	
Custody Seal(s) Intact?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	8 °C	
Sample(s) Intact?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	<input type="checkbox"/> Cooler Blank	

C0F3380
Rc'd: 06/26/2020 14:53
.H

ANALYTICAL REPORT

Eurofins Calscience LLC
7440 Lincoln Way
Garden Grove, CA 92841
Tel: (714)895-5494

Laboratory Job ID: 570-32264-1
Client Project/Site: C0F3380

For:

Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, California 92507

Attn: Cindy A Waddell



*Authorized for release by:
7/6/2020 8:47:32 PM*

Carla Hollowell, Project Manager I
(714)895-5494
carlahollowell@eurofinsus.com

LINKS

Review your project
results through
TotalAccess

Have a Question?



Visit us at:

www.eurofinsus.com/Env

The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Definitions/Glossary

Client: Babcock Laboratories, Inc.
Project/Site: C0F3380

Job ID: 570-32264-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Babcock Laboratories, Inc.
Project/Site: C0F3380

Job ID: 570-32264-1

Job ID: 570-32264-1

Laboratory: Eurofins Calscience LLC

Narrative

Job Narrative
570-32264-1

Comments

No additional comments.

Receipt

The samples were received on 7/1/2020 9:45 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.1° C.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Client Sample Results

Client: Babcock Laboratories, Inc.
Project/Site: C0F3380

Job ID: 570-32264-1

General Chemistry

Client Sample ID: C0F3380-01
Date Collected: 06/26/20 11:00
Date Received: 07/01/20 09:45

Lab Sample ID: 570-32264-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.161		0.0200	0.00490	mg/L		07/02/20 06:30	07/02/20 09:25	1

Client Sample ID: C0F3380-02
Date Collected: 06/26/20 10:25
Date Received: 07/01/20 09:45

Lab Sample ID: 570-32264-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.0770		0.0200	0.00490	mg/L		07/02/20 06:30	07/02/20 09:26	1

Client Sample ID: C0F3380-03
Date Collected: 06/26/20 09:45
Date Received: 07/01/20 09:45

Lab Sample ID: 570-32264-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.0530		0.0200	0.00490	mg/L		07/02/20 06:30	07/02/20 09:28	1

Client Sample ID: C0F3380-04
Date Collected: 06/26/20 09:15
Date Received: 07/01/20 09:45

Lab Sample ID: 570-32264-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.0565		0.0200	0.00490	mg/L		07/02/20 06:30	07/02/20 09:29	1

Client Sample ID: C0F3380-05
Date Collected: 06/26/20 09:15
Date Received: 07/01/20 09:45

Lab Sample ID: 570-32264-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.226		0.0200	0.00490	mg/L		07/02/20 06:30	07/02/20 09:31	1

QC Sample Results

Client: Babcock Laboratories, Inc.
Project/Site: C0F3380

Job ID: 570-32264-1

Method: 365.1 - Phosphorus, Total

Lab Sample ID: MB 570-79068/5-A
Matrix: Water
Analysis Batch: 79097

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 79068

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	ND		0.0200	0.00490	mg/L		07/02/20 06:30	07/02/20 09:13	1

Lab Sample ID: LCS 570-79068/6-A
Matrix: Water
Analysis Batch: 79097

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 79068

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.200	0.2033		mg/L		102	93 - 107

Lab Sample ID: LCSD 570-79068/7-A
Matrix: Water
Analysis Batch: 79097

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 79068

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Phosphorus, Total	0.200	0.2046		mg/L		102	93 - 107	1	4

Lab Sample ID: 570-32264-5 MS
Matrix: Water
Analysis Batch: 79097

Client Sample ID: C0F3380-05
Prep Type: Total/NA
Prep Batch: 79068

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.226		0.200	0.4338		mg/L		104	93 - 107

Lab Sample ID: 570-32264-5 MSD
Matrix: Water
Analysis Batch: 79097

Client Sample ID: C0F3380-05
Prep Type: Total/NA
Prep Batch: 79068

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Phosphorus, Total	0.226		0.200	0.4335		mg/L		104	93 - 107	0	4

Lab Chronicle

Client: Babcock Laboratories, Inc.
Project/Site: C0F3380

Job ID: 570-32264-1

Client Sample ID: C0F3380-01

Lab Sample ID: 570-32264-1

Date Collected: 06/26/20 11:00

Matrix: Water

Date Received: 07/01/20 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	79068	07/02/20 06:30	YR9U	ECL 1
Total/NA	Analysis	365.1		1	5 mL	5 mL	79097	07/02/20 09:25	YR9U	ECL 1
Instrument ID: ACA1										

Client Sample ID: C0F3380-02

Lab Sample ID: 570-32264-2

Date Collected: 06/26/20 10:25

Matrix: Water

Date Received: 07/01/20 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	79068	07/02/20 06:30	YR9U	ECL 1
Total/NA	Analysis	365.1		1	5 mL	5 mL	79097	07/02/20 09:26	YR9U	ECL 1
Instrument ID: ACA1										

Client Sample ID: C0F3380-03

Lab Sample ID: 570-32264-3

Date Collected: 06/26/20 09:45

Matrix: Water

Date Received: 07/01/20 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	79068	07/02/20 06:30	YR9U	ECL 1
Total/NA	Analysis	365.1		1	5 mL	5 mL	79097	07/02/20 09:28	YR9U	ECL 1
Instrument ID: ACA1										

Client Sample ID: C0F3380-04

Lab Sample ID: 570-32264-4

Date Collected: 06/26/20 09:15

Matrix: Water

Date Received: 07/01/20 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	79068	07/02/20 06:30	YR9U	ECL 1
Total/NA	Analysis	365.1		1	5 mL	5 mL	79097	07/02/20 09:29	YR9U	ECL 1
Instrument ID: ACA1										

Client Sample ID: C0F3380-05

Lab Sample ID: 570-32264-5

Date Collected: 06/26/20 09:15

Matrix: Water

Date Received: 07/01/20 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			50 mL	50 mL	79068	07/02/20 06:30	YR9U	ECL 1
Total/NA	Analysis	365.1		1	5 mL	5 mL	79097	07/02/20 09:31	YR9U	ECL 1
Instrument ID: ACA1										

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

Accreditation/Certification Summary

Client: Babcock Laboratories, Inc.
Project/Site: C0F3380

Job ID: 570-32264-1

Laboratory: Eurofins Calscience LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	Los Angeles County Sanitation Districts	10109	09-29-20
California	SCAQMD LAP	17LA0919	11-30-20
California	State	2944	09-29-20
Guam	State	20-003R	10-31-20
Nevada	State	CA00111	07-31-20
Oregon	NELAP	CA300001	01-29-21
USDA	US Federal Programs	P330-20-00034	02-10-23
Washington	State	C916-18	10-11-20

Method Summary

Client: Babcock Laboratories, Inc.
Project/Site: C0F3380

Job ID: 570-32264-1

Method	Method Description	Protocol	Laboratory
365.1	Phosphorus, Total	EPA	ECL 1
365.2/365.3/365	Phosphorus, Total	MCAWW	ECL 1

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

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Sample Summary

Client: Babcock Laboratories, Inc.
Project/Site: C0F3380

Job ID: 570-32264-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
570-32264-1	C0F3380-01	Water	06/26/20 11:00	07/01/20 09:45	
570-32264-2	C0F3380-02	Water	06/26/20 10:25	07/01/20 09:45	
570-32264-3	C0F3380-03	Water	06/26/20 09:45	07/01/20 09:45	
570-32264-4	C0F3380-04	Water	06/26/20 09:15	07/01/20 09:45	
570-32264-5	C0F3380-05	Water	06/26/20 09:15	07/01/20 09:45	

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SUBCONTRACT ORDER

Printed: 6/30/2020 12:44

Babcock Laboratories, Inc.

Loc: 570

C0F3380

32264

SENDING LABORATORY:

Babcock Laboratories, Inc.
 6100 Quail Valley Court
 Riverside, CA 92507-0704
 Phone: (951) 653-3351
 Fax: (951) 653-1662
 Project Manager: Cindy A. Waddell

RECEIVING LABORATORY:

Eurofins Calscience, Inc.
 7440 Lincoln Way
 Garden Grove, CA 92841-1427
 Phone : (714) 895-5494
 Fax: (714) 894-7501



Copy/Relog from C0D1639. System Name: Wood Environment & Infrastructure Solutions, Inc
 Sampler: Client

Please include MDLs and EXCEL EDD
 PLEASE EXPEDITE

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: C0F3380-01 Liquid		Sampled: 06/26/20 11:00	CL07	Proj.No.:LECL TMDL 1915100402.0003
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	07/02/20 23:59	07/06/20 11:00	Low Level Total Phosphorus	
Sample ID: C0F3380-02 Liquid		Sampled: 06/26/20 10:25	CL08	Proj.No.:LECL TMDL 1915100402.0003
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	07/02/20 23:59	07/06/20 10:25	Low Level Total Phosphorus	
Sample ID: C0F3380-03 Liquid		Sampled: 06/26/20 09:45	CL09	Proj.No.:LECL TMDL 1915100402.0003
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	07/02/20 23:59	07/06/20 09:45	Low Level Total Phosphorus	
Sample ID: C0F3380-04 Liquid		Sampled: 06/26/20 09:15	CL10	Proj.No.:LECL TMDL 1915100402.0003
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	07/02/20 23:59	07/06/20 09:15	Low Level Total Phosphorus	
Sample ID: C0F3380-05 Liquid		Sampled: 06/26/20 09:15	LE02	Proj.No.:LECL TMDL 1915100402.0003
Subout_02 <i>Containers Supplied:</i> 500 mL Poly H2SO4 (A)	07/02/20 23:59	07/06/20 09:15	Low Level Total Phosphorus	

32264

SUBCONTRACT ORDER
Babcock Laboratories, Inc.
C0F3380

Printed: 6/30/2020 12:44

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- 10
- 11
- 12

Tracking No.
00808210986

All Containers Intact: Yes No Samples Preserved Properly: Yes No
 Samples Received at _____ oC Sample Labels / COC Agree: Yes No Custody Seals Present: Yes No

Please forward all acknowledgements of sample receipt, final reports and invoices to data@babcocklabs.com
NO HARDCOPIES PLEASE.

<i>[Signature]</i>	6.30.2020	<i>[Signature]</i>	7/2/2020
Released By	Date	Received By	Date
<i>[Signature]</i>	6.30.2020	<i>[Signature]</i>	7/2/2020
Released By	Date	Received By	Date

3.5 / 3.1.2020

32264

ORIGIN ID: ONTA (951) 653-3351
BABCOCK LABORATORIES

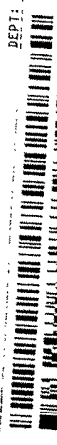
6100 QUAIL VALLEY ST,
RIVERSIDE, CA 92507
UNITED STATES US

10 **SAMPLE RECEIVING**
EUROFINS CALSCIENCE, INC.
7440 LINCOLN WAY

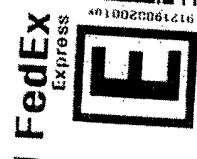
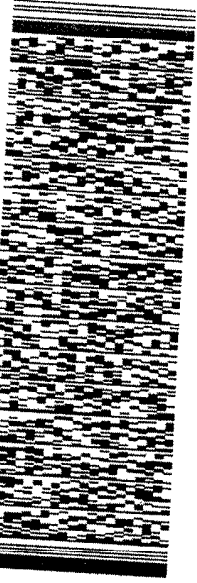
SHIP DATE: 30 JUN 20
ACT WT: 24.20 LB MAX
CAD: 0266194/CAFE3313

BILL SENDER

GARDEN GROVE CA 92841
(714) 895-5484
REF: PO:



DEPT:

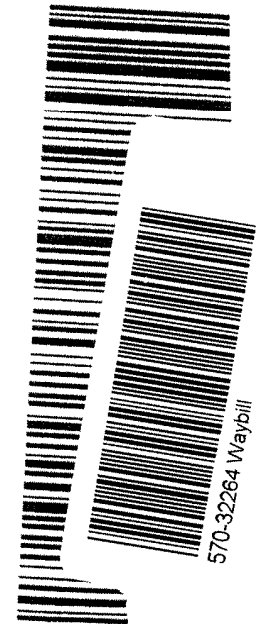


WED - 01 JUL 10:30A
PRIORITY OVERNIGHT

TRK# 9008 0821 0986

92 APVA

92841
CA - US SNA



570-32264 Waybill



Login Sample Receipt Checklist

Client: Babcock Laboratories, Inc.

Job Number: 570-32264-1

Login Number: 32264
List Number: 1
Creator: Soriano, Precy

List Source: Eurofins Calscience

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	





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The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutic
 Contact: John Rudolph
 Address: 9210 Sky Park Court #200
 San Diego, CA, 92123

Analytical Report: Page 1 of 3
 Project Name: Amec Foster Wheeler-Lake Elsin
 Project Number: LECL TMDL 1915100402.0003
Work Order Number: C0F3387

Report Date: 31-Jul-2020

Received on Ice (Y/N) Yes Temp: 4 °C

Attached is the analytical report for the sample(s) received for your project. Below is a list of the individual sample descriptions with the corresponding laboratory number(s). Also, enclosed is a copy of the Chain of Custody document (if received with your sample(s)). Please note any unused portion of the sample(s) may be responsibly discarded after 30 days from the above report date, unless you have requested otherwise.

Thank you for the opportunity to serve your analytical needs. If you have any questions or concerns regarding this report please contact our client service department.

Sample Identification

<u>Lab Sample #</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>By</u>	<u>Date Submitted</u>	<u>By</u>
C0F3387-01	CL07-Int	Solid	6/26/20 11:00	Client	6/26/20 14:53	Courier (Eliseo Vera)-DE
C0F3387-02	CL07-Surf	Solid	6/26/20 11:05	Client	6/26/20 14:53	Courier (Eliseo Vera)-DE
C0F3387-03	CL08-Int	Solid	6/26/20 10:25	Client	6/26/20 14:53	Courier (Eliseo Vera)-DE
C0F3387-04	CL08-Surf	Solid	6/26/20 10:30	Client	6/26/20 14:53	Courier (Eliseo Vera)-DE
C0F3387-05	CL09-Int	Solid	6/26/20 9:45	Client	6/26/20 14:53	Courier (Eliseo Vera)-DE
C0F3387-06	CL09-Surf	Solid	6/26/20 9:50	Client	6/26/20 14:53	Courier (Eliseo Vera)-DE
C0F3387-07	CL10-Int	Solid	6/26/20 9:15	Client	6/26/20 14:53	Courier (Eliseo Vera)-DE
C0F3387-08	CL10-Surf	Solid	6/26/20 9:20	Client	6/26/20 14:53	Courier (Eliseo Vera)-DE
C0F3387-09	LE02-Int	Solid	6/26/20 9:15	Client	6/26/20 14:53	Courier (Eliseo Vera)-DE
C0F3387-10	LE02-Surf	Solid	6/26/20 14:53	Client	6/26/20 14:53	Courier (Eliseo Vera)-DE

Note: Analysis for Chlorophyll a was subcontracted to Truesdail Laboratories, Inc.



BABCOCK Laboratories, Inc.
The Standard of Excellence for Over 100 Years

Client Name: Wood Environment&Infrastructure Solutic
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 2 of 3
Project Name: Amec Foster Wheeler-Lake Elsin
Project Number: LECL TMDL 1915100402.0003
Work Order Number: C0F3387

Report Date: 31-Jul-2020

Received on Ice (Y/N) Yes Temp: 4 °C

Approval

Enclosed are the analytical results for the submitted sample(s). Babcock Laboratories certify the data presented as part of this report meet the minimum quality standards in the referenced analytical methods. Any exceptions have been noted.

Alexis Nicole Harold For Cindy A. Waddell

cc:

E-CASE NARRATIVE+ COC.RPT

This report applies only to the sample(s) analyzed. As a mutual protection to clients, the public, and Babcock Laboratories, Inc., this report is submitted and accepted for the exclusive use of the Client to whom it is addressed. Interpretation and use of the information contained within this report are the sole responsibility of the Client. Babcock Laboratories, Inc. is not responsible for any misinformation or consequences that may result from misinterpretation or improper use of this report. This report is not to be modified or abbreviated in any way. Additionally, this report is not to be used, in whole or in part, in any advertising or publicity matter without written authorization from Babcock Laboratories, Inc. The liability of Babcock Laboratories, Inc. is limited to the actual cost of the requested analyses, unless otherwise agreed upon in writing. There is no other warranty expressed or implied.



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Client Name: Wood Environment&Infrastructure Solutic
Contact: John Rudolph
Address: 9210 Sky Park Court #200
San Diego, CA, 92123

Analytical Report: Page 3 of 3
Project Name: Amec Foster Wheeler-Lake Elsin
Project Number: LECL TMDL 1915100402.0003
Work Order Number: C0F3387

Report Date: 31-Jul-2020

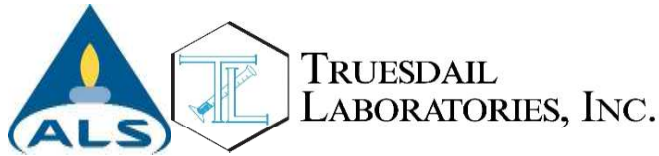
Received on Ice (Y/N) Yes Temp: 4 °C

E.S. Babcock & Sons, Inc. Environmental Laboratories Chain of Custody & Sample Information Record
(951) 653-3351 FAX (951) 653-1662
www.babcocklabs.com

Client: Wood E&I Solutions, Inc.		Contact: John Rudolph		Phone No. 858-243-8158																						
FAX No.		Email: john.rudolph@woodplc.com		Additional Reporting Requests																						
Project Name: LECL TMDL Monitoring		Turn Around Time: Routine *3-5 Day *48 Hour *24 Hour Rush Rush Rush		Include QC Data Package: <input type="checkbox"/> Yes <input type="checkbox"/> No FAX Results: <input type="checkbox"/> Yes <input type="checkbox"/> No Email Results: <input type="checkbox"/> Yes <input type="checkbox"/> No State EDT: <input type="checkbox"/> Yes <input type="checkbox"/> No (Include Source Number in Notes)																						
Project Number: 1915100402		*Lab TAT Approval: By:		*Additional Charges May Apply																						
Sampler Information			# of Containers & Preservatives				Sample Type		Analysis Requested		Matrix	Notes														
Name: _____			Unpreserved	H2SO4	HCl	HNO3	Na2S2O3	NaOH	NaOH/ZnAcetate	NH4Cl	MCAA	Frozen	Total # of Containers	Routine	Resample	Special	Total Sulfide	Nitrate - Nitrite	TDS	TKN	Ammonia	Total Phosphorus	SRP/Ortho-P	Chlorophyll-a	DW = Drinking Water WW = Wastewater GW = Groundwater S = Soil SG = Sludge L = Liquid M = Miscellaneous	Chi-a samples on 0.7 um GFF
Employer: Wood E&I Solutions, Inc.																										
Sample ID	Date	Time																								
CL07 - Int	6/26/20	1100																							Filter Volume: 500mL	
CL07 - Surf	6/26/20	1105																							Filter Volume: 500mL	
CL08 - Int	6/26/20	1025																							Filter Volume: 500mL	
CL08 - Surf	6/26/20	1030																							Filter Volume: 500mL	
CL09 - Int	6/26/20	0945																							Filter Volume: 500mL	
CL09 - Surf	6/26/20	0950																							Filter Volume: 500mL	
CL10 - Int	6/26/20	0915																							Filter Volume: 430mL	
CL10 - Surf	6/26/20	0920																							Filter Volume: 450mL	
LE02 - Int	6/26/20	0915																							Filter Volume: 325mL	
LE02 - Surf	6/26/20	0900																							Filter Volume: 250mL	
Relinquished By (sign)		Print Name / Company		Date / Time		Received By (Sign)		Print Name / Company																		
		Tyler Huff/LJW		14:15 6/26/20				EISEN VSP/IDE																		
		EISEN VSP		14:53/6/26/20				Cassidy Hermy/LJW																		

(For Lab Use Only)		Sample Integrity Upon Receipt		Lab Notes	
Sample(s) Submitted on Ice?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Temperature	7 HCO		
Custody Seal(s) Intact?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	4 °C			
Sample(s) Intact?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	<input type="checkbox"/> Cooler Blank			

C0F3387
c'd: 06/26/2020 14:53
VS



ALS - Truesdail Laboratories
3337 Michelson Drive, Suite CN750
Irvine, CA 92612
+1 714 730 6239

Report

Client: Babcock Laboratories, Inc.
6100 Quail Valley Ct
Riverside, CA 92507

Work Order No.: 20G0078
Printed: 07/30/2020

Attention: Cindy A. Waddell
Project Name: Chlorophyll
Project Number: LECL TMDL Monitoring

CASE NARRATIVE

SAMPLE RECEIPT SUMMARY

Table with 6 columns: Sample ID, Laboratory ID, Matrix, Type, Date Sampled, Date Received. Contains 10 rows of sample data.

DEFINITIONS

Table with 2 columns: Symbol, Definition. Lists symbols U, DF, MDL, ND, RL and their corresponding definitions.

Respectfully yours,

Aldo B. Minano
Project Manager

This report applies to the sample(s), or product(s), investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed. This report shall not be reproduced without the written consent of ALS-Truesdail Laboratories, Inc., and must be reproduced in its entirety.



TRUESDAIL
LABORATORIES, INC.

Client: Babcock Laboratories, Inc.

Project Name: Chlorophyll
Project Number: LECL TMDL Monitoring

Printed: 07/30/2020

COF3387-01

20G0078-01 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	15.7	1.00	1.00	mg/m ³	1	2007368	07/20/2020 18:00	GDG	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COF3387-02

20G0078-02 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	23.4	1.00	1.00	mg/m ³	1	2007368	07/20/2020 18:00	GDG	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COF3387-03

20G0078-03 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	38.0	1.00	1.00	mg/m ³	1	2007368	07/20/2020 18:00	GDG	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COF3387-04

20G0078-04 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	16.1	1.00	1.00	mg/m ³	1	2007368	07/20/2020 18:00	GDG	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COF3387-05

20G0078-05 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

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COF3387-05 (Continued)

20G0078-05 (Filter) (Continued)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	19.9	1.00	1.00	mg/m ³	1	2007368	07/20/2020 18:00	GDG	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COF3387-06

20G0078-06 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	31.3	1.00	1.00	mg/m ³	1	2007368	07/20/2020 18:00	GDG	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COF3387-07

20G0078-07 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
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ALS Truesdail

Microbiology

Chlorophyll a	47.0	1.00	1.00	mg/m ³	1	2007368	07/20/2020 18:00	GDG	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COF3387-08

20G0078-08 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	59.4	1.00	1.00	mg/m ³	1	2007368	07/20/2020 18:00	GDG	EPA 10200 H	
---------------	------	------	------	-------------------	---	---------	------------------	-----	-------------	--

COF3387-09

20G0078-09 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail



TRUESDAIL
LABORATORIES, INC.

Client: Babcock Laboratories, Inc.

Project Name: Chlorophyll

Project Number: LECL TMDL Monitoring

Printed: 07/30/2020

COF3387-09 (Continued)

20G0078-09 (Filter) (Continued)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	171	1.00	1.00	mg/m ³	1	2007368	07/20/2020 18:00	GDG	EPA 10200 H	
---------------	-----	------	------	-------------------	---	---------	------------------	-----	-------------	--

COF3387-10

20G0078-10 (Filter)

Analyte	Result	MDL	RL	Units	DF	Batch	Analyzed	Analyst	Method	Notes
---------	--------	-----	----	-------	----	-------	----------	---------	--------	-------

ALS Truesdail

Microbiology

Chlorophyll a	149	1.00	1.00	mg/m ³	1	2007368	07/20/2020 18:00	GDG	EPA 10200 H	
---------------	-----	------	------	-------------------	---	---------	------------------	-----	-------------	--

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TRUESDAIL
LABORATORIES, INC.

Client: Babcock Laboratories, Inc.

Project Name: Chlorophyll

Project Number: LECL TMDL Monitoring

Printed: 07/30/2020

QUALITY CONTROL

Microbiology

ALS Truesdail

Analyte	Result	RL	Units	Spike Level	Source Result	%REC	% Rec Limits	RPD	RPD Limit	Note
---------	--------	----	-------	-------------	---------------	------	--------------	-----	-----------	------

Batch: 2007368 - EPA 10200

Blank (2007368-BLK1)

Prepared & Analyzed: 7/20/2020

Chlorophyll a	ND	1.00	mg/m ³							U
---------------	----	------	-------------------	--	--	--	--	--	--	---

This report applies to the sample(s), or product(s), investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed. This report shall not be reproduced without the written consent of ALS-Truesdail Laboratories, Inc., and must be reproduced in its entirety.

2060078

SUBCONTRACT ORDER

Printed: 7/6/2020 13:01

Babcock Laboratories, Inc.

C0F3387

SENDING LABORATORY:

Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, CA 92507-0704
Phone: (951) 653-3351
Fax: (951) 653-1662
Project Manager: Cindy A. Waddell

RECEIVING LABORATORY:

Truesdail Laboratories - Subcontract
3337 Michelson Drive Suite CN750
Irvine, CA 92614
Phone : (714) 730-6239
Fax: (714) 730-6462

Copy/Relog from C0D1635. System Name: Wood Environmental&Infrastructure Solutions, Inc
Sampler: Client

Please include MDLs and EXCEL EDD

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: C0F3387-01 Solid		Sampled: 06/26/20 11:00	CL07-Int	Proj.No.:LECL TMDL Monitoring
Subout Containers Supplied: Whirl-Pak (A)	07/23/20 23:59	07/06/20 11:00		Report Chlorophyll a / Filter Volume = 500mL
Sample ID: C0F3387-02 Solid		Sampled: 06/26/20 11:05	CL07-Surf	Proj.No.:LECL TMDL Monitoring
Subout Containers Supplied: Whirl-Pak (A)	07/23/20 23:59	07/06/20 11:05		Report Chlorophyll a / Filter Volume = 500mL
Sample ID: C0F3387-03 Solid		Sampled: 06/26/20 10:25	CL08-Int	Proj.No.:LECL TMDL Monitoring
Subout Containers Supplied: Whirl-Pak (A)	07/23/20 23:59	07/06/20 10:25		Report Chlorophyll a / Filter Volume = 500mL
Sample ID: C0F3387-04 Solid		Sampled: 06/26/20 10:30	CL08-Surf	Proj.No.:LECL TMDL Monitoring
Subout Containers Supplied: Whirl-Pak (A)	07/23/20 23:59	07/06/20 10:30		Report Chlorophyll a / Filter Volume = 500mL
Sample ID: C0F3387-05 Solid		Sampled: 06/26/20 09:45	CL09-Int	Proj.No.:LECL TMDL Monitoring
Subout Containers Supplied: Whirl-Pak (A)	07/23/20 23:59	07/06/20 09:45		Report Chlorophyll a / Filter Volume = 500mL
Sample ID: C0F3387-06 Solid		Sampled: 06/26/20 09:50	CL09-Surf	Proj.No.:LECL TMDL Monitoring
Subout Containers Supplied: Whirl-Pak (A)	07/23/20 23:59	07/06/20 09:50		Report Chlorophyll a / Filter Volume = 500mL

Tracking No.
900808211950

2060078

SUBCONTRACT ORDER
Babcock Laboratories, Inc.
C0F3387

Printed: 7/6/2020 13:01

Analysis	Due	Expires Regulatory Days Past Date Sampled	Laboratory ID	Comments
Sample ID: C0F3387-07 Solid		Sampled: 06/26/20 09:15	CL10-Int	Proj.No.: <u>LECL TMDL Monitoring</u>
Subout Containers Supplied: Whirl-Pak (A)	07/23/20 23:59	07/06/20 09:15		Report Chlorophyll a / Filter Volume = 430mL
Sample ID: C0F3387-08 Solid		Sampled: 06/26/20 09:20	CL10-Surf	Proj.No.: <u>LECL TMDL Monitoring</u>
Subout Containers Supplied: Whirl-Pak (A)	07/23/20 23:59	07/06/20 09:20		Report Chlorophyll a / Filter Volume = 450mL
Sample ID: C0F3387-09 Solid		Sampled: 06/26/20 09:15	LE02-Int	Proj.No.: <u>LECL TMDL Monitoring</u>
Subout Containers Supplied: Whirl-Pak (A)	07/23/20 23:59	07/06/20 09:15		Report Chlorophyll a / Filter Volume = 325mL
Sample ID: C0F3387-10 Solid		Sampled: 06/26/20 14:53	LE02-Surf	Proj.No.: <u>LECL TMDL Monitoring</u>
Subout Containers Supplied: Whirl-Pak (A)	07/23/20 23:59	07/06/20 14:53		Report Chlorophyll a / Filter Volume = 250mL

Tracking No.
900808211950

All Containers Intact: Yes No Samples Preserved Properly: Yes No
 Samples Received at _____ oC Sample Labels / COC Agree: Yes No Custody Seals Present: Yes No

Please forward all acknowledgements of sample receipt, final reports and invoices to data@babcocklabs.com
NO HARDCOPIES PLEASE.

Released By: [Signature] Date: 7/6/2020 Received By: [Signature] Date: 7/7/2020 1030

Released By: _____ Date: _____ Received By: _____ Date: _____

APPENDIX D - SATELLITE DATA REPORTS

Delivery Report

Water Quality Monitoring Lake Elsinore & Canyon Lake

Date: 2019-07-31

Client: Wood Plc

Delivery no.: 1773_Delivery_EOMAP2WoodPlc_Vs08_20190731

Authors:

Philip Klinger
Karin Schenk

Mail:

klinger@eomap.de
schenk@eomap.de

Telephone:

+49 8152 9986 115
+49 8152 9986 112

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LIST OF DELIVERED FILES (ONE PRODUCT EXAMPLE).....	3
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1. Service Provision Report

Contractor Details	Service Provider Details
Wood Environment & Infrastructure Solutions, Inc.	EOMAP GmbH & Co. KG
9210 Sky Park Court, Suite 200	Schlosshof 4, 82229 Seefeld, Germany
San Diego, CA 92123, USA	
Point of Contact	Point of Contact
John D. Rudolph	Philip Klinger
john.rudolph@woodplc.com	klinger@eomap.de, +49 (0)8152 9986115

Contractor PO / Reference number	
Contractor project title	
Service Provider reference number	1773
Date of delivery	2019-07-31
Version	8

List of all delivered scenes

Sensor	Time of record
Landsat 8	2019-06-24 18:22:25 UTC

Content

Product	Abbreviation	Yes/No
Total Absorption	ABS	<input type="checkbox"/>
Aerosol Optical Thickness	AOT	<input type="checkbox"/>
Yellow Substances	CDM	<input type="checkbox"/>
Chlorophyll-a	CHL	<input checked="" type="checkbox"/>
Ratio of Absorption and Scattering	DIV	<input type="checkbox"/>
Harmful Algae Bloom Indicator	HAB	<input checked="" type="checkbox"/>
Diffuse Attenuation Coefficient	KDC	<input type="checkbox"/>
Quality Coding	QUC	<input checked="" type="checkbox"/>
Total Quality	QUT	<input checked="" type="checkbox"/>
True Color/False Color Composite	RGB	<input checked="" type="checkbox"/>
Remote Sensing Reflectance	RRS	<input type="checkbox"/>
Secchi Disc Depth	SDD	<input type="checkbox"/>
Sum of Inorganic Absorption	SIA	<input type="checkbox"/>
Sum of Organic Absorption	SOA	<input type="checkbox"/>
Surface Temperature	SST	<input type="checkbox"/>
Turbidity	TUR	<input checked="" type="checkbox"/>
Trophic State Index (Chlorophyll)	TSC	<input type="checkbox"/>
Total Suspended Matter	TSM	<input type="checkbox"/>
Light Penetration Depth	Z90	<input type="checkbox"/>
Water Body Extent	WEX	<input type="checkbox"/>

List of delivered files (one product example)

File name	File format	Content
1773_Delivery_EOMAP2WoodPlc_Vs08_20190731.pdf	PDF	Delivery Report
CHL_us-california040037_EOMAP_20190726_182233_LSAT8_m0030.tif	GeoTIFF	Product raster file, 8bit scaled and coloured
CHL_us-california040037_EOMAP_20190726_182233_LSAT8_m0030_32bit.tif	GeoTIFF	Product raster file, 32bit real values
CHL_us-california040037_EOMAP_20190726_182233_LSAT8_m0030_wgs84_xyz.txt	ASCII	Product text file, real values
CHL_us-california040037_EOMAP_20190726_182233_LSAT8_m0030.kmz	KMZ	GoogleEarth overlay
CHL_us-california040037_EOMAP_20190726_182233_LSAT8_m0030_metadata.xml	XML	Metadata
CHL_us-california040037_EOMAP_20190726_182233_LSAT8_m0030_overview.pdf	PDF	Overview PDF, metadata and quicklook

File naming

[Product abbreviation]_[Country code]-[Area]_EOMAP_[Date of satellite image recording]_[Time of satellite image recording]_[sensor code]_[spatial resolution]_[optional]

With

[Product abbreviation]	see list of product abbreviations
[Country code]	Country ID following ISO 3166 ALPHA-2 standards
[Area]	name of city/region or other relevant area characterization
[Date of satellite image rec.]	Satellite image date used for the analysis in YYYYMMDD (YY= Year, MM = Month, DD = Date) in UTC
[Time of satellite image rec.]	Satellite image date used for the analysis in HHMMSS (HH= Hours, MM = Minute, SS = Seconds) in UTC time
[sensor code]	Sensor in use
[spatial resolution]	Spatial resolution/grid spacing in meters
[optional]	is an optional parameter which can be used to support the intuitive use of the data, such as 'metadata' or 'XYZQ' for metadata files and ASCII XYZQ files.

Notes (e.g. technical issues, exceptional conditions, etc.)

- Some areas affected by sunglint flagged on Lake Elsinore
- Eastern part of Canyon Lake is too narrow for Landsat 8 spatial resolution of 30m.

Data Analyst



Philip Klinger

QA/QC



Karin Schenk

2. Methodology and Products

2.1 Modular Inversion and Processing System (MIP)

For the retrieval of satellite-derived water quality data, the physics-based Modular Inversion and Processing System (MIP), developed by EOMAP, has been applied to the satellite imagery. This sensor-independent approach includes all the relevant processing steps to guarantee a robust, standardised and operational retrieval of water quality parameters from various satellite data sources. The advantage of physics-based methods is that they do not require a priori information about the study area and can therefore be applied independently of satellite type and study area.

MIP imbeds sensor-independent algorithms and processing modules to derive consistent water quality parameters for multiple scales through a number of different satellite sensors. The algorithms take all relevant environmental impacts into account and do so for each individual measurement and pixel according to the current state-of-the-art, including:

- a. water, land, cloud identification
- b. estimation and correction of atmosphere and aerosol impacts^{1 2}
- c. correction altitude level impacts³
- d. correction of adjacency impact (light scattering into the water signal from adjacent land surfaces)⁴
- e. correction⁵ or flagging⁶ of sunglitter impact
- f. retrieval of in-water absorption and scattering as physical measures⁷
- g. accounting for varying spectral slopes of specific inherent optical properties⁸
- h. provision of uncertainty measures and flagging procedures
- i. accounting for the full bidirectional effects in the atmosphere, at the water-atmosphere boundary layers and in-water, using a fully coupled radiative transfer model
- j. application of procedures to minimize errors, resulting from the coupled interaction of light between atmosphere, water surface and in-water on the signal, through coupled inversion procedures

The different workflow steps from satellite raw imagery import to value-added water quality retrieval are displayed in Figure 1.

¹ Heege, T., Kiselev, V., Wettle, M., Hung N.N. (2014): Operational multi-sensor monitoring of turbidity for the entire Mekong Delta . Int. J. Remote Sensing, Special Issues Remote Sensing of the Mekong, Vol. 35 (8), pp. 2910-2926

² Richter, R., Heege, T., Kiselev, V., Schläpfer, D. (2014): Correction of ozone influence on TOA radiance. Int. J. of Remote Sensing. Vol. 35(23), pp. 8044-8056, doi: 10.1080/01431161.2014.978041

³ Heege, T., Fischer, J. (2004): Mapping of water constituents in Lake Constance using multispectral airborne scanner data and a physically based processing scheme. Can. J. Remote Sensing, Vol. 30, No. 1, pp. 77-86

⁴ Kiselev, V., Bulgarelli, B. and Heege, T., (2015). Sensor independent adjacency correction algorithm for coastal and inland water systems. Remote Sensing of Environment, 157: 85-95. , ISSN 0034-4257, <http://dx.doi.org/10.1016/j.rse.2014.07.025>

⁵ Heege, T. & Fischer, J. (2000): Sun glitter correction in remote sensing imaging spectrometry. SPIE Ocean Optics XV Conference, Monaco, Oct. 16-20.

⁶ EU FP7-Projekt GLASS: WP4 Validation report (29.2.2016): www.glass-project.eu/assets/Deliverables/GLaSS-D4.2.pdf

⁷ Bumberger J., Heege T., Klinger P., et al. (2017): Towards a Harmonized Validation Procedure for Inland Water Optical Remote Sensing Data using Inherent Optical Properties, Rem. Sens. 2017(9), 21p, submitted 28 Feb. 2017

⁸ Heege T., Schenk K., Klinger P., Broszeit A., Wenzel J., Kiselev V. (2015): Monitoring status and trends of water quality in inland waters using earth observation technologies. Proceedings "Water Quality in Europe: Challenges and Best Practice" UNESCO-IHP European Regional Consultation Workshop, Koblenz, Germany, Dec 2015, p. 1-4

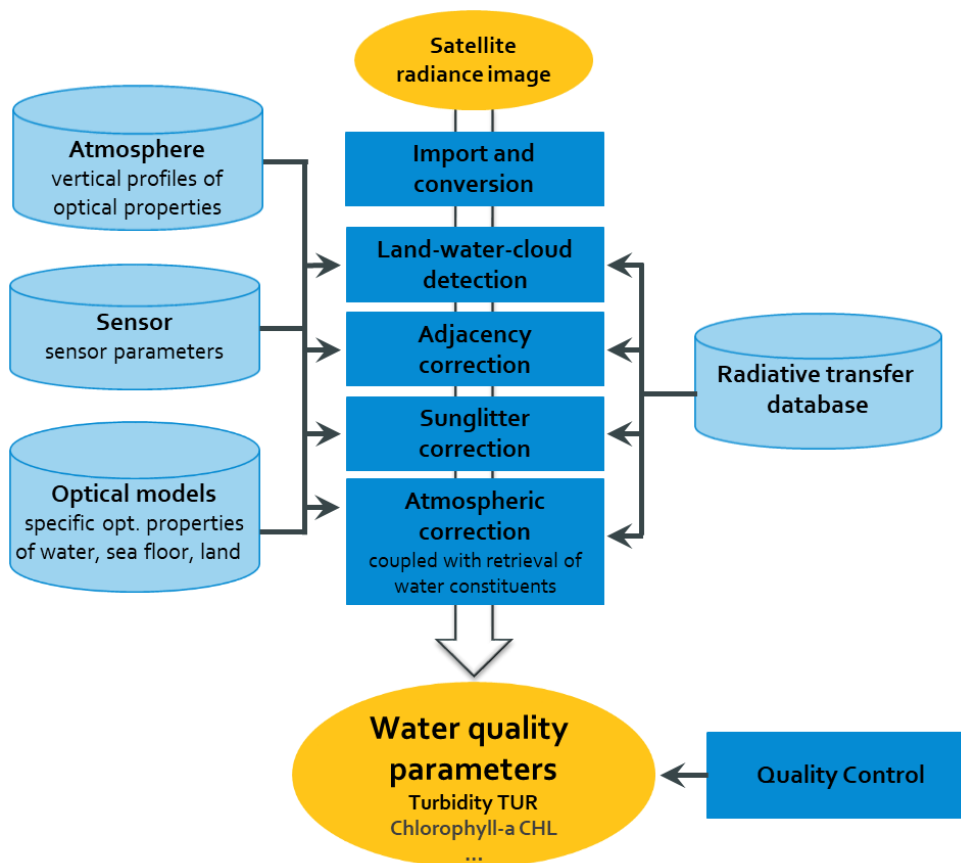


Figure 1: EOMAP's physics-based workflow to derive satellite-based water quality

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2.2 Products

Turbidity (TUR) is a key parameter of water quality and is linearly related to the backward scattering of light of organic and inorganic particles in water. Turbidity is also linearly related to Total Suspended Matter (TSM) at low to moderate turbidity values. The measurement unit is Nephelometric Turbidity Unit (NTU). Satellite-derived turbidity is determined by the backward scattering of light between 450 to 800nm, which is physically retrieved using satellite data. The standard relation of EOMAP concentrations to inherent optical properties is defined as $1 \text{ NTU} = 0.0118 \text{ 1/m backward scattering at } 550\text{nm}$, or $1 \text{ NTU} = 0.619 \text{ 1/m total scattering at } 550\text{nm}$ for an assumed ratio $bb/b = 0.019$. The linear relation between turbidity and suspended matter/solids in low to moderate concentrations is in most cases a regional constant, but can vary with particle size distribution. Note that the geometrical properties of an in-situ measurement device, and the wavelength in use, may differ in comparison to the satellite product. For example, the standard FTU determination, a measure of turbidity similar to NTU, is based on the measurement of light scattered within a 90° angle from a beam directed at the water sample. Alongside temporal differences in satellite and in situ measurements, different sampling depths and the measurement location, this needs to be considered when comparing and interpreting satellite derived vs. in situ measured turbidity values. The Turbidity product from 2019-07-26 is shown in Figure 2.

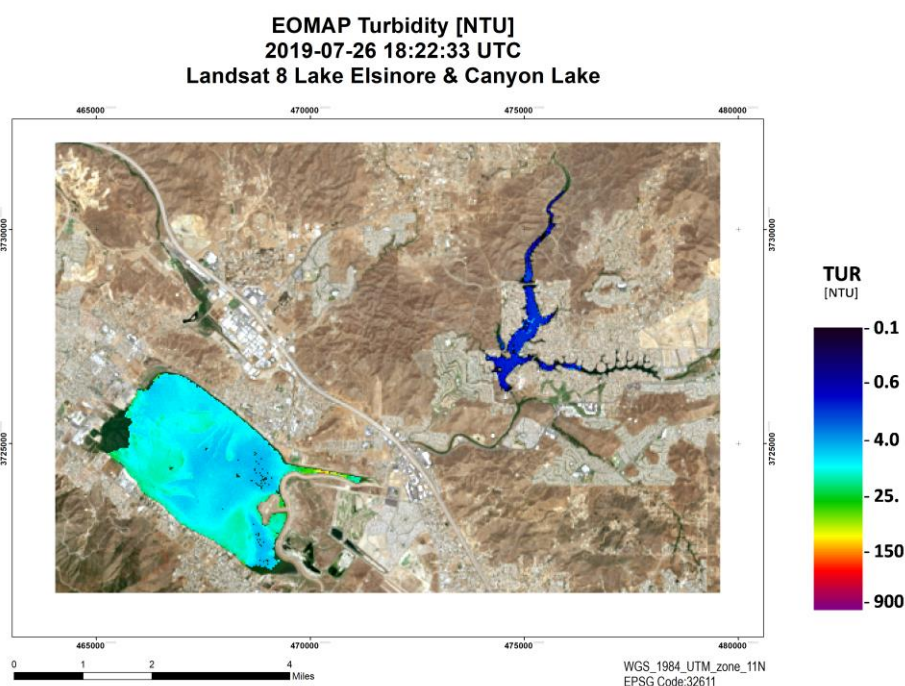


Figure 2: Turbidity product from 2019-07-26

Chlorophyll-a (CHL) retrieval is based on the derived information of in-water organic absorption, in-water turbidity and spectral characteristics of each water body. Chlorophyll-a in $[\mu\text{g/l}]$, is provided as a measure linearly related to the pigment-specific absorption at 440nm, with $1 \mu\text{g/l Chl}$ equal to $0.035 \text{ 1/m pigment absorption}$. Phaeophytin and further pigments cannot be discriminated methodologically with the spectral resolution provided by Landsat 8/Sentinel-2 and similar sensors and is therefore included in this product. The pigment-related absorption is always smaller than the absorption of organic components (SOA). For clear water condi-

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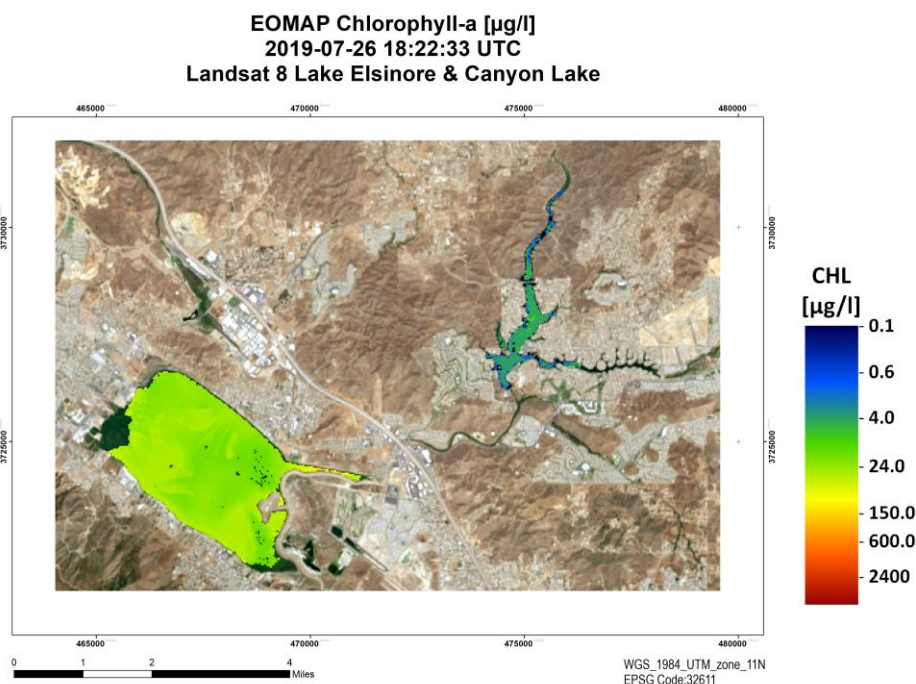


Figure 3: Chlorophyll-a product from 2019-07-26

The **Harmful Algae Bloom Indicator (HAB)** refers to the presence of cyanobacteria. It is sensitive to the appearance of cyanobacteria-related pigments, i.e. phycocyanin and phycoerythrin. Both pigments show absorption features in green wavelengths from 500 nm to approx. 640 nm; phycoerythrin shows its absorption maximum at 540-570 nm, phycocyanin at 610-620 (Colyer et al. 2005). Most satellite sensors support the identification of this feature with only two bands, i.e. one in the green wavelength region (e.g. L7 and L8 at 530 – 590 nm) and in the red wavelength region at approx. 640 – 670 nm. The used standard parameterisation of phytoplankton absorption in MIP as described above, however, does not account phycocyanin and phycoerythrin absorption in the retrieval process. The modelled phytoplankton absorption therefore lacks the absorption features of these pigments. Nonetheless, if these pigments are present in the water a slight spectral mismatch between modelled water leaving reflectance ($R_{modelled}$) and satellite derived reflectance ($R_{satellite}$) occurs. The algorithm then compares the slope of $R_{modelled}$ and $R_{satellite}$ between the green and red band ($\delta R = R_{green} - R_{red}$) in order to classify pixels with regard to phycocyanin and phycoerythrin occurrence, i.e. harmful algae bloom probability. The HAB indicator from 2019-07-26 is shown in Figure 4.

⁹ Bricaud, A., Babin, M., Morel, A., Claustre, H. (1995): Variability in the chlorophyll-specific absorption coefficients of natural phytoplankton: Analysis and parametrization. *Journal of Geophysical Research Atmospheres*, 100(C7):13,321-13,332

¹⁰ Broszeit, A., 2015. Assessing long-term inland water quality using satellite imagery: A Feasibility and validation study of different lake types. MSc Thesis, Julius-Maximilian-University Würzburg, 96p

**EOMAP Harmful Algae Bloom Indicator
2019-07-26 18:22:33 UTC
Landsat 8 Lake Elsinore & Canyon Lake**

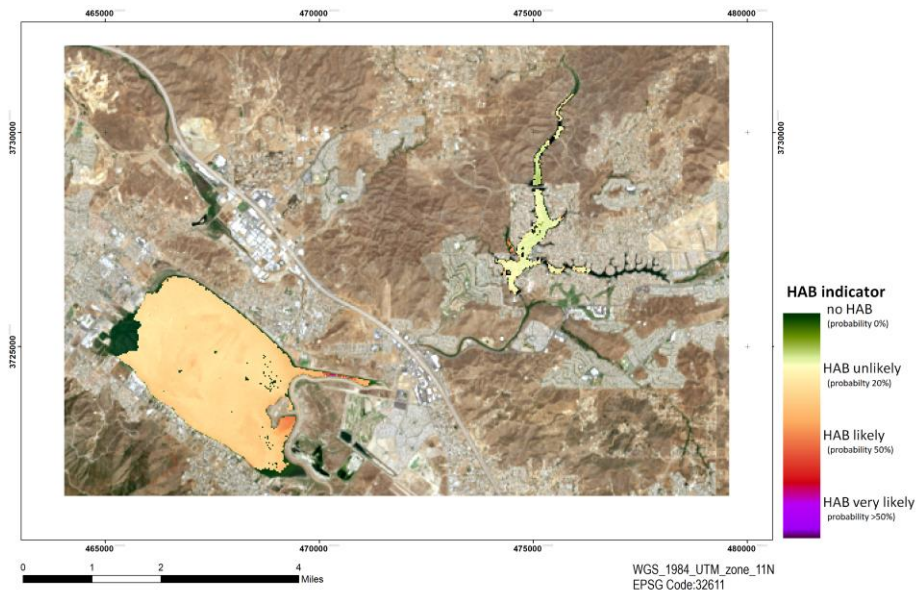


Figure 4: Harmful Algae Bloom Indicator product from 2019-07-26

RGB composite images represent the area of interest in true colour or false colour modes by combining pre-defined bands, depending on the sensor in use.

2.3 Quality Control and Flagging

As a standard output of the processing, an accuracy or quality indicator is calculated for each retrieved parameter and for each detected water pixel. This measure comprises a comprehensive range of factors that can impact the derived product quality, including:

- the geometry between sun, target, and sensor,
- the estimated sun glint probability,
- the retrieved aerosol optical depth,
- residuals of the measured and modelled sensor radiances and subsurface reflectances,
- the comparison of retrieved water species concentrations to extreme values as defined in the configuration files,
- pixels affected by cloud shadow and
- shallow water areas.

Threshold values define distinct values when a parameter is assumed to influence the quality. All parameters are integrated into one remaining quality parameter, allowing both an improved flagging and a quality weighting of pixels, that can later be merged into integrated 3rd level products.

The quality information is part of each standard geodata delivery and is visualized by two different 8bit Geo-TIFFs:

- QUT - Total Quality, quantifying the overall quality of each pixel from low to high. Only valid water pixels - excluding land, cloud or flagged pixels - are represented in QUT indicator (Figure 5).
- QUC – EOMAP Quality coding (Figure 6), revealing the processor's internal quality check, split into the defined indicators (e.g. sunglint, shallow water risk, etc.). These are classified into 'no quality concerns', 'quality risk and 'bad quality' (flag). Note that 'quality risk' pixels are marked as such but not flagged.

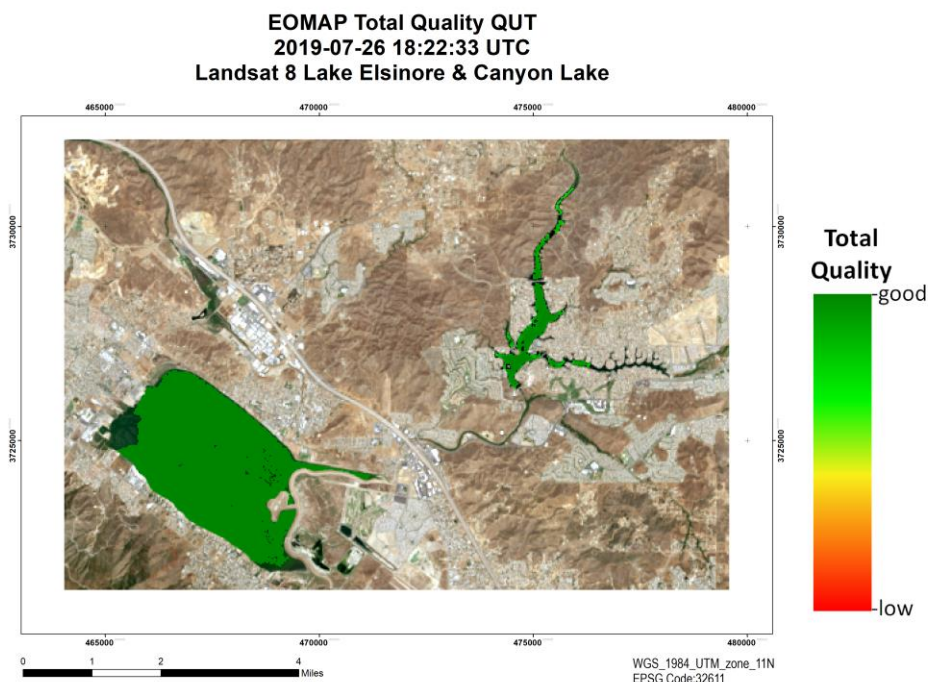


Figure 5: QUT product from 2019-07-26

EOMAP Quality Coding QUC
2019-07-26 18:22:33 UTC
Landsat 8 Lake Elsinore & Canyon Lake

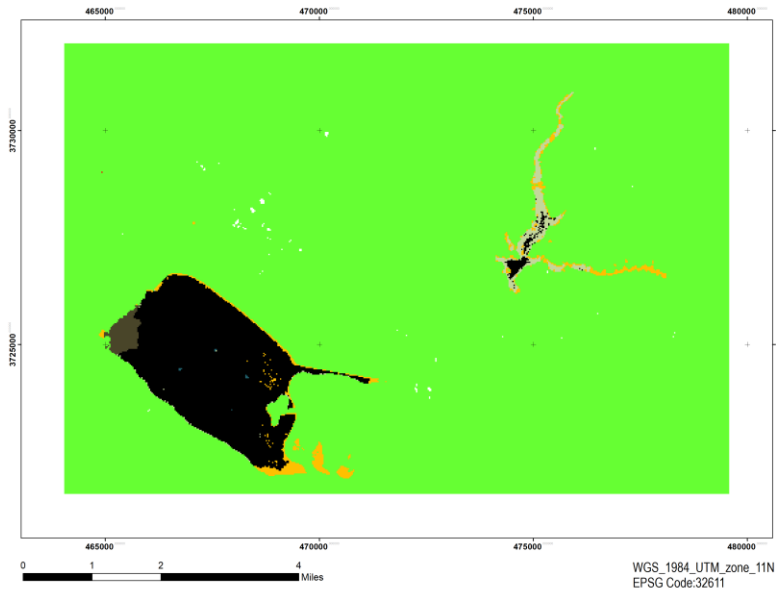


Figure 6: QUC product from 2019-07-26

The QUC file indicates the main quality influencing parameter using a specific EOMAP quality coding classification scheme with corresponding grey values (GV), shown in Figure 7 .

Professional version allow combination of the two most relevant flags:					
First number = most relevant flag					
1-digit-number refer to second relevant flag, e.g. 1 for sunglint risk, 2 for large solar zenith angle					
Examples: 25 Warning flag for large zenit solar angle and Whitecaps					
114 Critical flag for sunglint, plus warning for aerosol above limits					
GV	GV range	Flag status	Flag description	Color code	Color
0	0	Water	No risk identified	0 0 0	
10	10 - 19	Warning	sunglint risk	148 138 84	
20	20 - 29	Warning	large solar zenith angle	83 141 213	
30	30 - 39	Warning	large spacecraft zenith angle	218 150 148	
40	40 - 49	Warning	Aerosol above limit or Cirrus risk	196 215 155	
50	50 - 59	Warning	Cloud Shadow	177 160 199	
60	60 - 69	Warning	Shallow water risk	146 205 220	
70	70 - 79	Warning	Mixed pixel risk	250 191 143	
80	80 - 89	Warning	Retrieved concentration at configuration limit	190 190 190	
90	90 - 99	Warning	Retrieval / processor warning	210 210 210	
110	110 - 119	Critical	sunglint risk	73 69 41	
120	120 - 129	Critical	large solar zenith angle	22 54 92	
130	130 - 139	Critical	large spacecraft zenith angle	150 54 52	
140	140 - 149	Critical	Aerosol above limit or Cirrus risk	118 147 60	
150	150 - 159	Critical	Cloud Shadow	96 73 122	
160	160 - 169	Critical	Shallow water risk	49 134 155	
170	170 - 179	Critical	Mixed pixel risk	226 107 10	
180	180 - 189	Critical	Retrieved concentration at configuration limit	120 120 120	
190	190 - 199	Critical	Retrieval / processor warning	130 130 130	
220	220	No value	Transition Zone	102 255 51	
221	221	Unreliable	Shallow water automatically	146 205 220	
222	222	Unreliable	Shallow water manually	60 159 186	
223	223	Unreliable	Floating material	32 95 107	
230	230	No water	Land	102 255 51	
232	232	Unreliable	Invalid pixel manually	255 192 0	
240	240	No water	Cloud	255 255 255	
242	242	Unreliable	Cloud Shadow manually	96 73 122	
244	244	Unreliable	Hill shadow	73 57 93	
250	250	No retrieval	No retrieval / out of AOI or image extend	255 0 0	

Figure 7: EOMAP QUC quality coding

EOMAP's water quality products are accompanied by the processor's internal quality control mechanisms QUT and QUC, resulting in pixel flagging in case of unreliable values. Moreover, a manual quality check and - if required - additional masking is applied to each product.

As an example, cloud shadow effects typically occur in the vicinity of clouds, resulting in unrealistically low water parameter values. In order to detect and flag these areas, EOMAP has developed a specific algorithm based on geometric models, considering the sun angle and sensor viewing geometry, the retrieved aerosol properties, the height of the clouds, an analysis of the blue channel radiances and a statistical anomaly detection of the water species concentrations. When applying this cloud shadow detection algorithm, approx. 85% of the cloud shadows are detected and masked. Remaining cloud shadows are manually flagged and can be identified in the QUC file by GV 242.

Due to the spatial extent of single pixels (Sentinel-2: 10*10m, Landsat 8: 30*30m), it is likely that spectral mixing of signals from land and water can affect the pixels along the edge of the water body, leading to unreliable retrieval of water parameter values. Such pixels are labelled with the quality flag 'transition zone'. EOMAP uses a high-resolution land-water-mask database to determine the land-water-boundary, which is then filtered to create a transition zone that is automatically flagged during processing. In the 8bit water constituent products the transition zone is marked by GV 251, whereas in the QUC product it is 220.

2.4 Data Format

The water quality data is delivered as 32bit real value GeoTIFF as well as 8bit scaled and colored GeoTIFF for easier visualization. The colours currently used are a suggestion/standard, but can be changed according to client specific request. In addition, metadata is stored in the .xml and the metadata .pdf files.

2.5 Data Sources

EOMAP uses the following data hubs to access and download satellite raw data from different sensors:

- Sentinel-3: PEPS <https://peps.cnes.fr>
- Landsat-8 Amazon Web Services, <https://landsat-pds.s3.amazonaws.com>
- Sentinel-2: ESA Sentinel HUB <https://scihub.copernicus.eu/dhus/#/home>
- MODIS Aqua and Terra: USGS <https://earthexplorer.usgs.gov/>

Contact

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Delivery Report

Water Quality Monitoring Lake Elsinore & Canyon Lake

Date: 2019-09-03

Client: Wood Plc

Delivery no.: 1773_Delivery_EOMAP2WoodPlc_Vs09_20190903

Authors:

Philip Klinger
Karin Schenk

Mail:

klinger@eomap.de
schenk@eomap.de

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+49 8152 9986 115
+49 8152 9986 112

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1. Service Provision Report

Contractor Details	Service Provider Details
Wood Environment & Infrastructure Solutions, Inc.	EOMAP GmbH & Co. KG
9210 Sky Park Court, Suite 200	Schlosshof 4, 82229 Seefeld, Germany
San Diego, CA 92123, USA	
Point of Contact	Point of Contact
John D. Rudolph	Philip Klinger
john.rudolph@woodplc.com	klinger@eomap.de, +49 (0)8152 9986115

Contractor PO / Reference number	
Contractor project title	
Service Provider reference number	1773
Date of delivery	2019-09-03
Version	9

List of all delivered scenes

Sensor	Time of record
Landsat 8	2019-08-27 18:22:44 UTC

Content

Product	Abbreviation	Yes/No
Total Absorption	ABS	<input type="checkbox"/>
Aerosol Optical Thickness	AOT	<input type="checkbox"/>
Yellow Substances	CDM	<input type="checkbox"/>
Chlorophyll-a	CHL	<input checked="" type="checkbox"/>
Ratio of Absorption and Scattering	DIV	<input type="checkbox"/>
Harmful Algae Bloom Indicator	HAB	<input checked="" type="checkbox"/>
Diffuse Attenuation Coefficient	KDC	<input type="checkbox"/>
Quality Coding	QUC	<input checked="" type="checkbox"/>
Total Quality	QUT	<input checked="" type="checkbox"/>
True Color/False Color Composite	RGB	<input checked="" type="checkbox"/>
Remote Sensing Reflectance	RRS	<input type="checkbox"/>
Secchi Disc Depth	SDD	<input type="checkbox"/>
Sum of Inorganic Absorption	SIA	<input type="checkbox"/>
Sum of Organic Absorption	SOA	<input type="checkbox"/>
Surface Temperature	SST	<input type="checkbox"/>
Turbidity	TUR	<input checked="" type="checkbox"/>
Trophic State Index (Chlorophyll)	TSC	<input type="checkbox"/>
Total Suspended Matter	TSM	<input type="checkbox"/>
Light Penetration Depth	Z90	<input type="checkbox"/>
Water Body Extent	WEX	<input type="checkbox"/>

List of delivered files (one product example)

File name	File format	Content
1773_Delivery_EOMAP2WoodPlc_Vs09_20190903.pdf	PDF	Delivery Report
CHL_us-california040037_EOMAP_20190827_182244_LSAT8_m0030.tif	GeoTIFF	Product raster file, 8bit scaled and coloured
CHL_us-california040037_EOMAP_20190827_182244_LSAT8_m0030_32bit.tif	GeoTIFF	Product raster file, 32bit real values
CHL_us-california040037_EOMAP_20190827_182244_LSAT8_m0030_wgs84_xyz.txt	ASCII	Product text file, real values
CHL_us-california040037_EOMAP_20190827_182244_LSAT8_m0030.kmz	KMZ	GoogleEarth overlay
CHL_us-california040037_EOMAP_20190827_182244_LSAT8_m0030_metadata.xml	XML	Metadata
CHL_us-california040037_EOMAP_20190827_182244_LSAT8_m0030_overview.pdf	PDF	Overview PDF, metadata and quicklook

File naming

[Product abbreviation]_[Country code]-[Area]_EOMAP_[Date of satellite image recording]_[Time of satellite image recording]_[sensor code]_[spatial resolution]_[optional]


With

[Product abbreviation]	see list of product abbreviations
[Country code]	Country ID following ISO 3166 ALPHA-2 standards
[Area]	name of city/region or other relevant area characterization
[Date of satellite image rec.]	Satellite image date used for the analysis in YYYYMMDD (YY= Year, MM = Month, DD = Date) in UTC
[Time of satellite image rec.]	Satellite image date used for the analysis in HHMMSS (HH= Hours, MM = Minute, SS = Seconds) in UTC time
[sensor code]	Sensor in use
[spatial resolution]	Spatial resolution/grid spacing in meters
[optional]	is an optional parameter which can be used to support the intuitive use of the data, such as 'metadata' or 'XYZQ' for metadata files and ASCII XYZQ files.

Notes (e.g. technical issues, exceptional conditions, etc.)

- Eastern part of Canyon Lake is too narrow for Landsat 8 spatial resolution of 30m.

Data Analyst



Philip Klinger

QA/QC



Karin Schenk

2. Methodology and Products

2.1 Modular Inversion and Processing System (MIP)

For the retrieval of satellite-derived water quality data, the physics-based Modular Inversion and Processing System (MIP), developed by EOMAP, has been applied to the satellite imagery. This sensor-independent approach includes all the relevant processing steps to guarantee a robust, standardised and operational retrieval of water quality parameters from various satellite data sources. The advantage of physics-based methods is that they do not require a priori information about the study area and can therefore be applied independently of satellite type and study area.

MIP imbeds sensor-independent algorithms and processing modules to derive consistent water quality parameters for multiple scales through a number of different satellite sensors. The algorithms take all relevant environmental impacts into account and do so for each individual measurement and pixel according to the current state-of-the-art, including:

- a. water, land, cloud identification
- b. estimation and correction of atmosphere and aerosol impacts^{1 2}
- c. correction altitude level impacts³
- d. correction of adjacency impact (light scattering into the water signal from adjacent land surfaces)⁴
- e. correction⁵ or flagging⁶ of sunglitter impact
- f. retrieval of in-water absorption and scattering as physical measures⁷
- g. accounting for varying spectral slopes of specific inherent optical properties⁸
- h. provision of uncertainty measures and flagging procedures
- i. accounting for the full bidirectional effects in the atmosphere, at the water-atmosphere boundary layers and in-water, using a fully coupled radiative transfer model
- j. application of procedures to minimize errors, resulting from the coupled interaction of light between atmosphere, water surface and in-water on the signal, through coupled inversion procedures

The different workflow steps from satellite raw imagery import to value-added water quality retrieval are displayed in Figure 1.

¹ Heege, T., Kiselev, V., Wettle, M., Hung N.N. (2014): Operational multi-sensor monitoring of turbidity for the entire Mekong Delta . Int. J. Remote Sensing, Special Issues Remote Sensing of the Mekong, Vol. 35 (8), pp. 2910-2926

² Richter, R., Heege, T., Kiselev, V., Schläpfer, D. (2014): Correction of ozone influence on TOA radiance. Int. J. of Remote Sensing. Vol. 35(23), pp. 8044-8056, doi: 10.1080/01431161.2014.978041

³ Heege, T., Fischer, J. (2004): Mapping of water constituents in Lake Constance using multispectral airborne scanner data and a physically based processing scheme. Can. J. Remote Sensing, Vol. 30, No. 1, pp. 77-86

⁴ Kiselev, V., Bulgarelli, B. and Heege, T., (2015). Sensor independent adjacency correction algorithm for coastal and inland water systems. Remote Sensing of Environment, 157: 85-95. , ISSN 0034-4257, <http://dx.doi.org/10.1016/j.rse.2014.07.025>

⁵ Heege, T. & Fischer, J. (2000): Sun glitter correction in remote sensing imaging spectrometry. SPIE Ocean Optics XV Conference, Monaco, Oct. 16-20.

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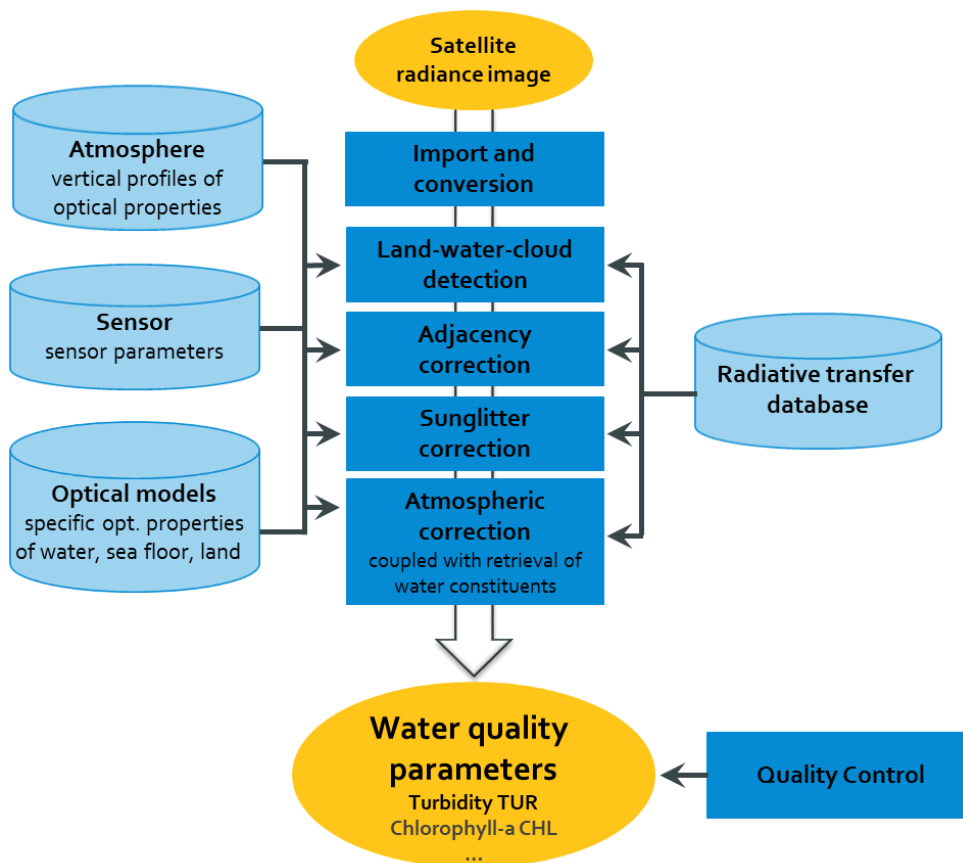


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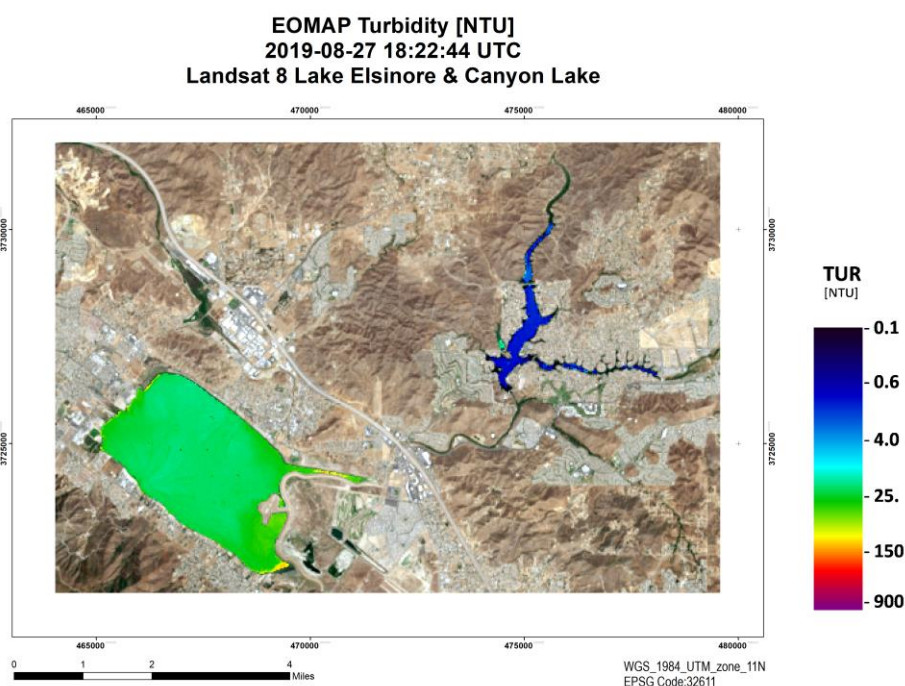


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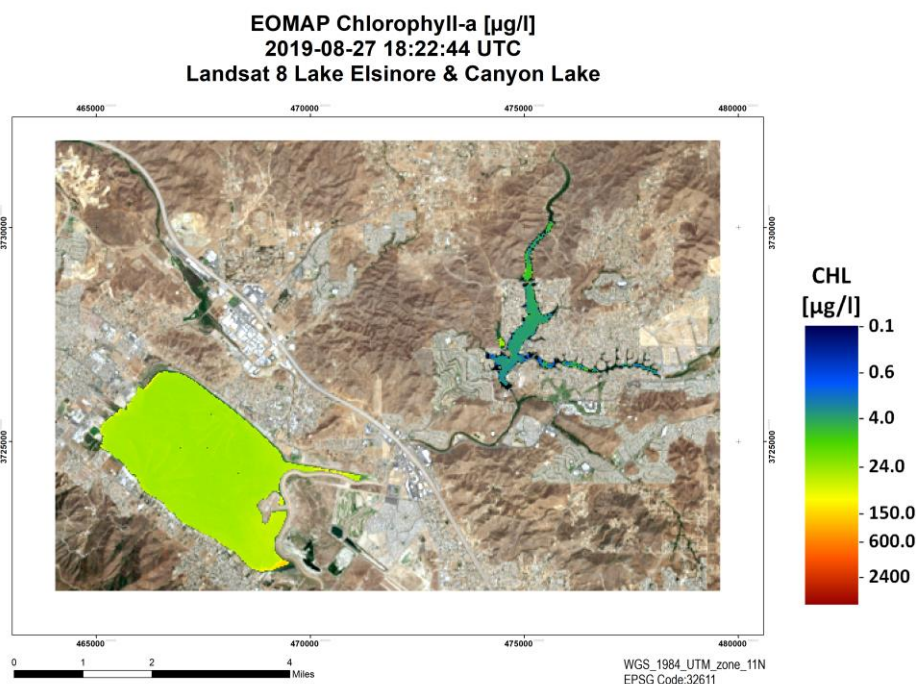


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¹⁰ Broszeit, A., 2015. Assessing long-term inland water quality using satellite imagery: A Feasibility and validation study of different lake types. MSc Thesis, Julius-Maximilian-University Würzburg, 96p

**EOMAP Harmful Algae Bloom Indicator
2019-08-27 18:22:44 UTC
Landsat 8 Lake Elsinore & Canyon Lake**

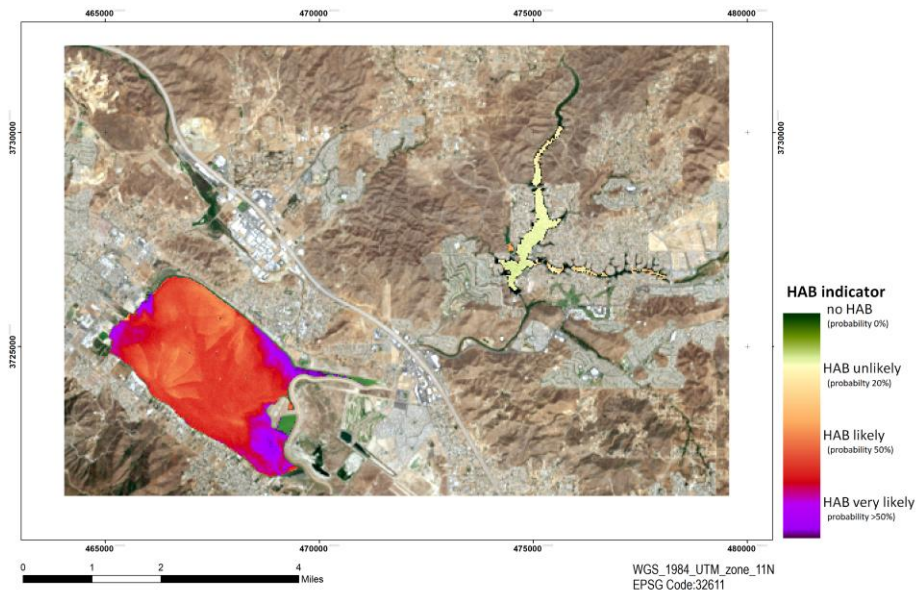


Figure 4: Harmful Algae Bloom Indicator product from 2019-08-27

RGB composite images represent the area of interest in true colour or false colour modes by combining pre-defined bands, depending on the sensor in use.

2.3 Quality Control and Flagging

As a standard output of the processing, an accuracy or quality indicator is calculated for each retrieved parameter and for each detected water pixel. This measure comprises a comprehensive range of factors that can impact the derived product quality, including:

- the geometry between sun, target, and sensor,
- the estimated sun glint probability,
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Threshold values define distinct values when a parameter is assumed to influence the quality. All parameters are integrated into one remaining quality parameter, allowing both an improved flagging and a quality weighting of pixels, that can later be merged into integrated 3rd level products.

The quality information is part of each standard geodata delivery and is visualized by two different 8bit Geo-TIFFs:

- QUT - Total Quality, quantifying the overall quality of each pixel from low to high. Only valid water pixels - excluding land, cloud or flagged pixels - are represented in QUT indicator (Figure 5).
- QUC – EOMAP Quality coding (Figure 6), revealing the processor's internal quality check, split into the defined indicators (e.g. sunglint, shallow water risk, etc.). These are classified into 'no quality concerns', 'quality risk and 'bad quality' (flag). Note that 'quality risk' pixels are marked as such but not flagged.

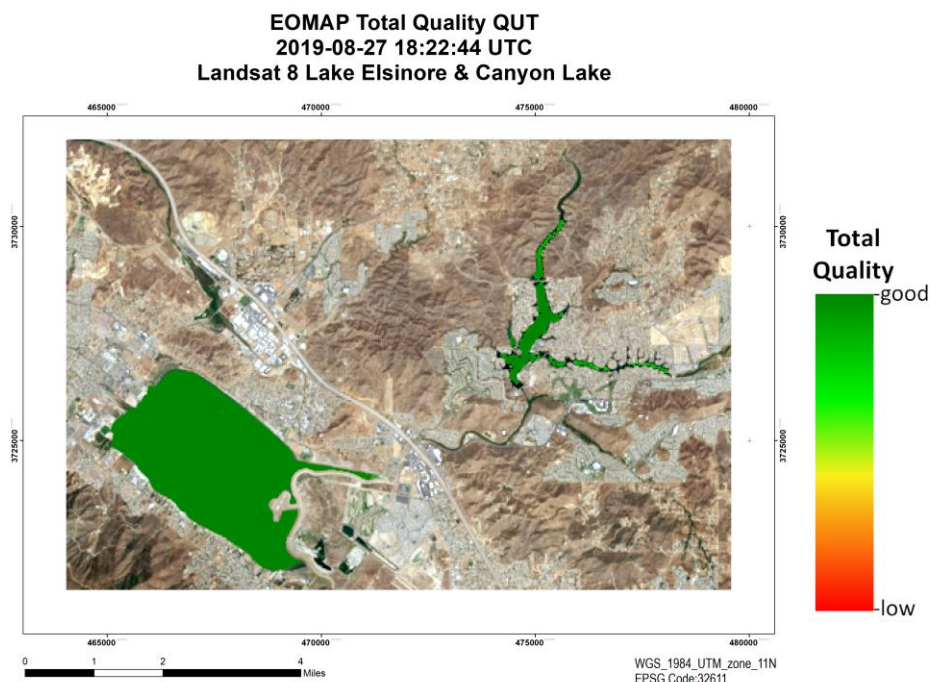


Figure 5: QUT product from 2019-08-27

EOMAP Quality Coding QUC
2019-08-27 18:22:44 UTC
Landsat 8 Lake Elsinore & Canyon Lake

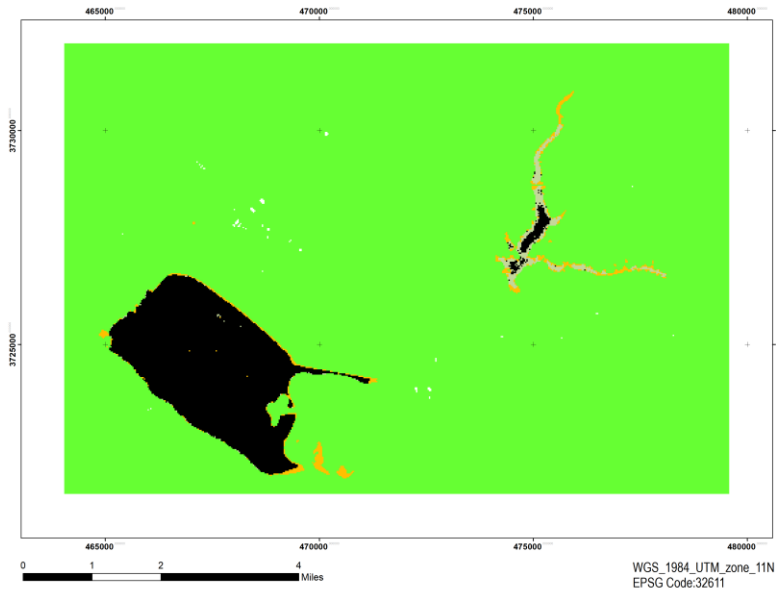


Figure 6: QUC product from 2019-08-27

The QUC file indicates the main quality influencing parameter using a specific EOMAP quality coding classification scheme with corresponding grey values (GV), shown in Figure 7 .

Professional version allow combination of the two most relevant flags:					
First number = most relevant flag					
1-digit-number refer to second relevant flag, e.g. 1 for sunglint risk, 2 for large solar zenith angle					
Examples: 25 Warning flag for large zenit solar angle and Whitecaps					
114 Critical flag for sunglint, plus warning for aerosol above limits					
GV	GV range	Flag status	Flag description	Color code	Color
0	0	Water	No risk identified	0 0 0	
10	10 - 19	Warning	sunglint risk	148 138 84	
20	20 - 29	Warning	large solar zenith angle	83 141 213	
30	30 - 39	Warning	large spacecraft zenith angle	218 150 148	
40	40 - 49	Warning	Aerosol above limit or Cirrus risk	196 215 155	
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140	140 - 149	Critical	Aerosol above limit or Cirrus risk	118 147 60	
150	150 - 159	Critical	Cloud Shadow	96 73 122	
160	160 - 169	Critical	Shallow water risk	49 134 155	
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250	250	No retrieval	No retrieval / out of AOI or image extend	255 0 0	

Figure 7: EOMAP QUC quality coding

EOMAP's water quality products are accompanied by the processor's internal quality control mechanisms QUT and QUC, resulting in pixel flagging in case of unreliable values. Moreover, a manual quality check and - if required - additional masking is applied to each product.

As an example, cloud shadow effects typically occur in the vicinity of clouds, resulting in unrealistically low water parameter values. In order to detect and flag these areas, EOMAP has developed a specific algorithm based on geometric models, considering the sun angle and sensor viewing geometry, the retrieved aerosol properties, the height of the clouds, an analysis of the blue channel radiances and a statistical anomaly detection of the water species concentrations. When applying this cloud shadow detection algorithm, approx. 85% of the cloud shadows are detected and masked. Remaining cloud shadows are manually flagged and can be identified in the QUC file by GV 242.

Due to the spatial extent of single pixels (Sentinel-2: 10*10m, Landsat 8: 30*30m), it is likely that spectral mixing of signals from land and water can affect the pixels along the edge of the water body, leading to unreliable retrieval of water parameter values. Such pixels are labelled with the quality flag 'transition zone'. EOMAP uses a high-resolution land-water-mask database to determine the land-water-boundary, which is then filtered to create a transition zone that is automatically flagged during processing. In the 8bit water constituent products the transition zone is marked by GV 251, whereas in the QUC product it is 220.

2.4 Data Format

The water quality data is delivered as 32bit real value GeoTIFF as well as 8bit scaled and colored GeoTIFF for easier visualization. The colours currently used are a suggestion/standard, but can be changed according to client specific request. In addition, metadata is stored in the .xml and the metadata .pdf files.

2.5 Data Sources

EOMAP uses the following data hubs to access and download satellite raw data from different sensors:

- Sentinel-3: PEPS <https://peps.cnes.fr>
- Landsat-8 Amazon Web Services, <https://landsat-pds.s3.amazonaws.com>
- Sentinel-2: ESA Sentinel HUB <https://scihub.copernicus.eu/dhus/#/home>
- MODIS Aqua and Terra: USGS <https://earthexplorer.usgs.gov/>

Contact

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Delivery Report

Water Quality Monitoring Lake Elsinore & Canyon Lake

Date: 2020-01-27

Client: Wood Plc

Delivery no.: 1773_Delivery_EOMAP2WoodPlc_Vs12_20200127

Authors:

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1. Service Provision Report

Contractor Details	Service Provider Details
Wood Environment & Infrastructure Solutions, Inc.	EOMAP GmbH & Co. KG
9210 Sky Park Court, Suite 200	Schlosshof 4, 82229 Seefeld, Germany
San Diego, CA 92123, USA	
Point of Contact	Point of Contact
John D. Rudolph	Philip Klinger
john.rudolph@woodplc.com	klinger@eomap.de, +49 (0)8152 9986115

Contractor PO / Reference number	
Contractor project title	
Service Provider reference number	1773
Date of delivery	2020-01-27
Version	12

List of all delivered scenes

Sensor	Time of record
Sentinel-2A	2019-09-21 18:44:59 UTC

Content

Product	Abbreviation	Yes/No
Total Absorption	ABS	<input type="checkbox"/>
Aerosol Optical Thickness	AOT	<input type="checkbox"/>
Yellow Substances	CDM	<input type="checkbox"/>
Chlorophyll-a	CHL	<input checked="" type="checkbox"/>
Ratio of Absorption and Scattering	DIV	<input type="checkbox"/>
Harmful Algae Bloom Indicator	HAB	<input checked="" type="checkbox"/>
Diffuse Attenuation Coefficient	KDC	<input type="checkbox"/>
Quality Coding	QUC	<input checked="" type="checkbox"/>
Total Quality	QUT	<input checked="" type="checkbox"/>
True Color/False Color Composite	RGB	<input checked="" type="checkbox"/>
Remote Sensing Reflectance	RRS	<input type="checkbox"/>
Secchi Disc Depth	SDD	<input type="checkbox"/>
Sum of Inorganic Absorption	SIA	<input type="checkbox"/>
Sum of Organic Absorption	SOA	<input type="checkbox"/>
Surface Temperature	SST	<input type="checkbox"/>
Turbidity	TUR	<input checked="" type="checkbox"/>
Trophic State Index (Chlorophyll)	TSC	<input type="checkbox"/>
Total Suspended Matter	TSM	<input type="checkbox"/>
Light Penetration Depth	Z90	<input type="checkbox"/>
Water Body Extent	WEX	<input type="checkbox"/>

List of delivered files (one product example)

File name	File format	Content
1773_Delivery_EOMAP2WoodPlc_Vs12_20200127.pdf	PDF	Delivery Report
CHL_us-california_EOMAP_20190921_184459_SENT2_m0010.tif	GeoTIFF	Product raster file, 8bit scaled and coloured
CHL_us-california_EOMAP_20190921_184459_SENT2_m0010_32bit.tif	GeoTIFF	Product raster file, 32bit real values
CHL_us-california_EOMAP_20190921_184459_SENT2_m0010_wgs84_xyz.txt	ASCII	Product text file, real values
CHL_us-california_EOMAP_20190921_184459_SENT2_m0010.kmz	KMZ	GoogleEarth overlay
CHL_us-california_EOMAP_20190921_184459_SENT2_m0010_metadata.xml	XML	Metadata
CHL_us-california_EOMAP_20190921_184459_SENT2_m0010_overview.pdf	PDF	Overview PDF, metadata and quicklook

File naming

[Product abbreviation]_[Country code]-[Area]_EOMAP_[Date of satellite image recording]_[Time of satellite image recording]_[sensor code]_[spatial resolution]_[optional]

With

[Product abbreviation]	see list of product abbreviations
[Country code]	Country ID following ISO 3166 ALPHA-2 standards
[Area]	name of city/region or other relevant area characterization
[Date of satellite image rec.]	Satellite image date used for the analysis in YYYYMMDD (YY= Year, MM = Month, DD = Date) in UTC
[Time of satellite image rec.]	Satellite image date used for the analysis in HHMMSS (HH= Hours, MM = Minute, SS = Seconds) in UTC time
[sensor code]	Sensor in use
[spatial resolution]	Spatial resolution/grid spacing in meters
[optional]	is an optional parameter which can be used to support the intuitive use of the data, such as 'metadata' or 'XYZQ' for metadata files and ASCII XYZQ files.

Notes (e.g. technical issues, exceptional conditions, etc.)

Data Analyst



Philip Klinger

QA/QC



Karin Schenk

2. Methodology and Products

2.1 Modular Inversion and Processing System (MIP)

For the retrieval of satellite-derived water quality data, the physics-based Modular Inversion and Processing System (MIP), developed by EOMAP, has been applied to the satellite imagery. This sensor-independent approach includes all the relevant processing steps to guarantee a robust, standardised and operational retrieval of water quality parameters from various satellite data sources. The advantage of physics-based methods is that they do not require a priori information about the study area and can therefore be applied independently of satellite type and study area.

MIP imbeds sensor-independent algorithms and processing modules to derive consistent water quality parameters for multiple scales through a number of different satellite sensors. The algorithms take all relevant environmental impacts into account and do so for each individual measurement and pixel according to the current state-of-the-art, including:

- a. water, land, cloud identification
- b. estimation and correction of atmosphere and aerosol impacts^{1 2}
- c. correction altitude level impacts³
- d. correction of adjacency impact (light scattering into the water signal from adjacent land surfaces)⁴
- e. correction⁵ or flagging⁶ of sunglitter impact
- f. retrieval of in-water absorption and scattering as physical measures⁷
- g. accounting for varying spectral slopes of specific inherent optical properties⁸
- h. provision of uncertainty measures and flagging procedures
- i. accounting for the full bidirectional effects in the atmosphere, at the water-atmosphere boundary layers and in-water, using a fully coupled radiative transfer model
- j. application of procedures to minimize errors, resulting from the coupled interaction of light between atmosphere, water surface and in-water on the signal, through coupled inversion procedures

The different workflow steps from satellite raw imagery import to value-added water quality retrieval are displayed in Figure 1.

¹ Heege, T., Kiselev, V., Wettle, M., Hung N.N. (2014): Operational multi-sensor monitoring of turbidity for the entire Mekong Delta . Int. J. Remote Sensing, Special Issues Remote Sensing of the Mekong, Vol. 35 (8), pp. 2910-2926

² Richter, R., Heege, T., Kiselev, V., Schläpfer, D. (2014): Correction of ozone influence on TOA radiance. Int. J. of Remote Sensing. Vol. 35(23), pp. 8044-8056, doi: 10.1080/01431161.2014.978041

³ Heege, T., Fischer, J. (2004): Mapping of water constituents in Lake Constance using multispectral airborne scanner data and a physically based processing scheme. Can. J. Remote Sensing, Vol. 30, No. 1, pp. 77-86

⁴ Kiselev, V., Bulgarelli, B. and Heege, T., (2015). Sensor independent adjacency correction algorithm for coastal and inland water systems. Remote Sensing of Environment, 157: 85-95. , ISSN 0034-4257, <http://dx.doi.org/10.1016/j.rse.2014.07.025>

⁵ Heege, T. & Fischer, J. (2000): Sun glitter correction in remote sensing imaging spectrometry. SPIE Ocean Optics XV Conference, Monaco, Oct. 16-20.

⁶ EU FP7-Projekt GLASS: WP4 Validation report (29.2.2016): www.glass-project.eu/assets/Deliverables/GLaSS-D4.2.pdf

⁷ Bumberger J., Heege T., Klinger P., et al. (2017): Towards a Harmonized Validation Procedure for Inland Water Optical Remote Sensing Data using Inherent Optical Properties, Rem. Sens. 2017(9), 21p, submitted 28 Feb. 2017

⁸ Heege T., Schenk K., Klinger P., Broszeit A., Wenzel J., Kiselev V. (2015): Monitoring status and trends of water quality in inland waters using earth observation technologies. Proceedings "Water Quality in Europe: Challenges and Best Practice" UNESCO-IHP European Regional Consultation Workshop, Koblenz, Germany, Dec 2015, p. 1-4

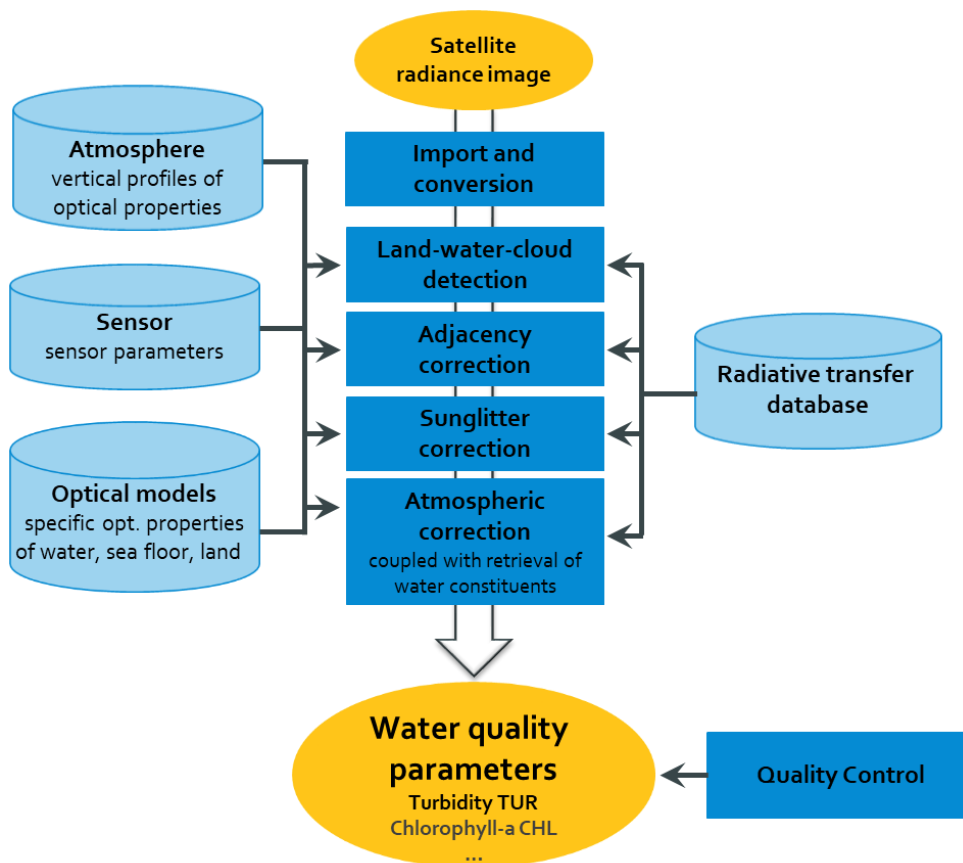


Figure 1: EOMAP's physics-based workflow to derive satellite-based water quality

MIP is the most established, sensor-independent and operational aquatic remote sensing processing system for the full range of high, medium and low-resolution satellite sensors. Fully-automated water monitoring processors are installed in satellite ground segments worldwide (Europe, Australia, Asia and America), to ensure fast and efficient access to a wide range of satellite data. The data processing and orchestration software, the EOMAP Workflow System (EWS) allows for continuous, daily production.

2.2 Products

Turbidity (TUR) is a key parameter of water quality and is linearly related to the backward scattering of light of organic and inorganic particles in water. Turbidity is also linearly related to Total Suspended Matter (TSM) at low to moderate turbidity values. The measurement unit is Nephelometric Turbidity Unit (NTU). Satellite-derived turbidity is determined by the backward scattering of light between 450 to 800nm, which is physically retrieved using satellite data. The standard relation of EOMAP concentrations to inherent optical properties is defined as $1 \text{ NTU} = 0.0118 \text{ 1/m backward scattering at } 550\text{nm}$, or $1 \text{ NTU} = 0.619 \text{ 1/m total scattering at } 550\text{nm}$ for an assumed ratio $bb/b = 0.019$. The linear relation between turbidity and suspended matter/solids in low to moderate concentrations is in most cases a regional constant, but can vary with particle size distribution. Note that the geometrical properties of an in-situ measurement device, and the wavelength in use, may differ in comparison to the satellite product. For example, the standard FTU determination, a measure of turbidity similar to NTU, is based on the measurement of light scattered within a 90° angle from a beam directed at the water sample. Alongside temporal differences in satellite and in situ measurements, different sampling depths and the measurement location, this needs to be considered when comparing and interpreting satellite derived vs. in situ measured turbidity values. The Turbidity product from 2019-09-21 is shown in Figure 2.

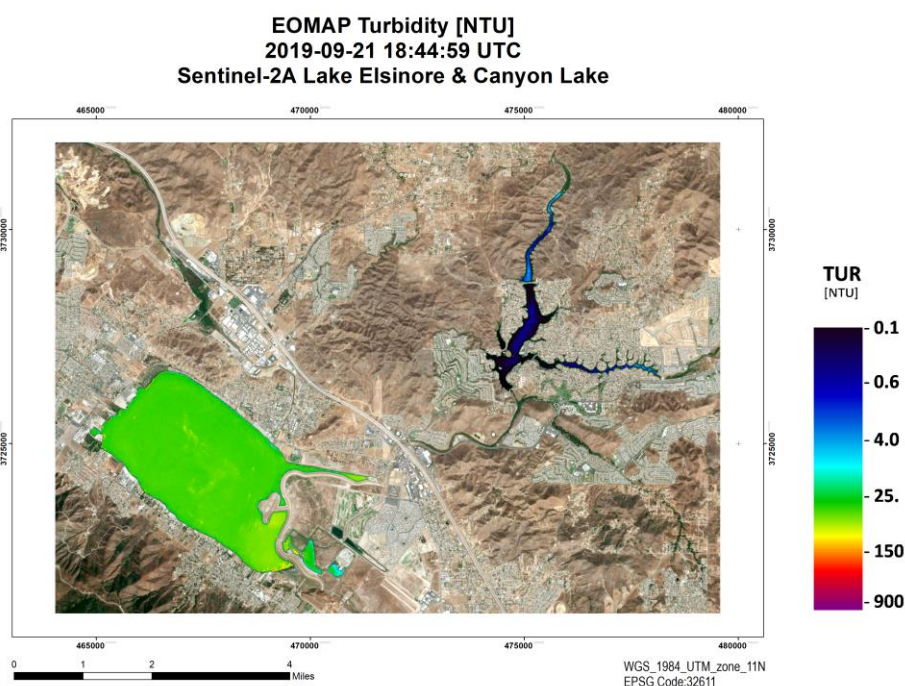


Figure 2: Turbidity product from 2019-09-21

Chlorophyll-a (CHL) retrieval is based on the derived information of in-water organic absorption, in-water turbidity and spectral characteristics of each water body. Chlorophyll-a in $[\mu\text{g/l}]$, is provided as a measure linearly related to the pigment-specific absorption at 440nm, with $1 \mu\text{g/l Chl}$ equal to $0.035 \text{ 1/m pigment absorption}$. Phaeophytin and further pigments cannot be discriminated methodologically with the spectral resolution provided by Landsat 8/Sentinel-2 and similar sensors and is therefore included in this product. The pigment-related absorption is always smaller than the absorption of organic components (SOA). For clear water condi-

tions (low chlorophyll/total suspended solids), the specific absorption chlorophyll increases significantly (Bricaud et al. 1995⁹). Chlorophyll values can vary over 4 magnitudes, for marine waters or clear lakes typical concentrations between 0.01 and 10 µg/l, while for eutrophic lakes concentrations can reach 100 µg/l and more. The chlorophyll products are typically reliable within a range of 10 – 50 % in comparison to in situ measures (Broszeit 2015¹⁰), which are typically based on one of three different methods, which include photometric, fluorescence and HPLC approaches and their subcategories. The Chlorophyll-a product from 2019-09-21 is shown in Figure 3.

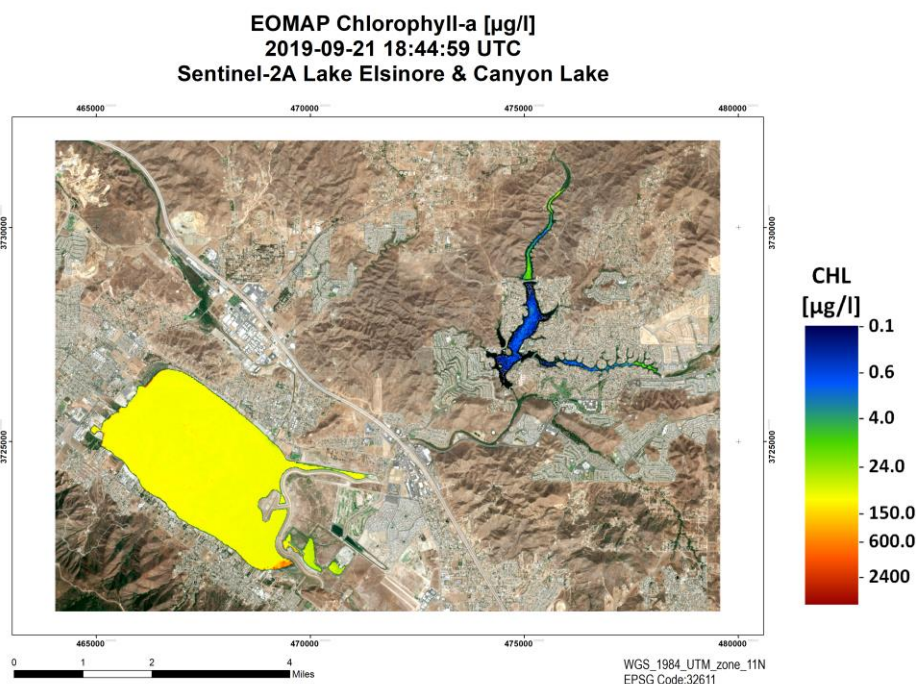


Figure 3: Chlorophyll-a product from 2019-09-21

The **Harmful Algae Bloom Indicator (HAB)** refers to the presence of cyanobacteria. It is sensitive to the appearance of cyanobacteria-related pigments, i.e. phycocyanin and phycoerythrin. Both pigments show absorption features in green wavelengths from 500 nm to approx. 640 nm; phycoerythrin shows its absorption maximum at 540-570 nm, phycocyanin at 610-620 (Colyer et al. 2005). Most satellite sensors support the identification of this feature with only two bands, i.e. one in the green wavelength region (e.g. L7 and L8 at 530 – 590 nm) and in the red wavelength region at approx. 640 – 670 nm. The used standard parameterisation of phytoplankton absorption in MIP as described above, however, does not account phycocyanin and phycoerythrin absorption in the retrieval process. The modelled phytoplankton absorption therefore lacks the absorption features of these pigments. Nonetheless, if these pigments are present in the water a slight spectral mismatch between modelled water leaving reflectance ($R_{modelled}$) and satellite derived reflectance ($R_{satellite}$) occurs. The algorithm then compares the slope of $R_{modelled}$ and $R_{satellite}$ between the green and red band ($\delta R = R_{green} - R_{red}$) in order to classify pixels with regard to phycocyanin and phycoerythrin occurrence, i.e. harmful algae bloom probability. The HAB indicator from 2019-09-21 is shown in Figure 4.

⁹ Bricaud, A., Babin, M., Morel, A., Claustre, H. (1995): Variability in the chlorophyll-specific absorption coefficients of natural phytoplankton: Analysis and parametrization. *Journal of Geophysical Research Atmospheres*, 100(C7):13,321-13,332

¹⁰ Broszeit, A., 2015. Assessing long-term inland water quality using satellite imagery: A Feasibility and validation study of different lake types. MSc Thesis, Julius-Maximilian-University Würzburg, 96p

**EOMAP Harmful Algae Bloom Indicator
2019-09-21 18:44:57 UTC
Sentinel-2A Lake Elsinore & Canyon Lake**

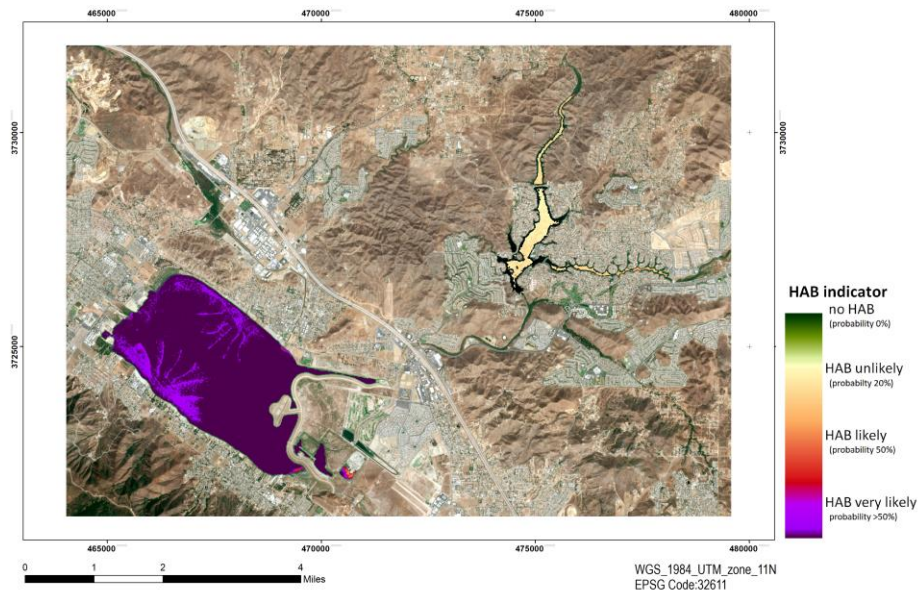


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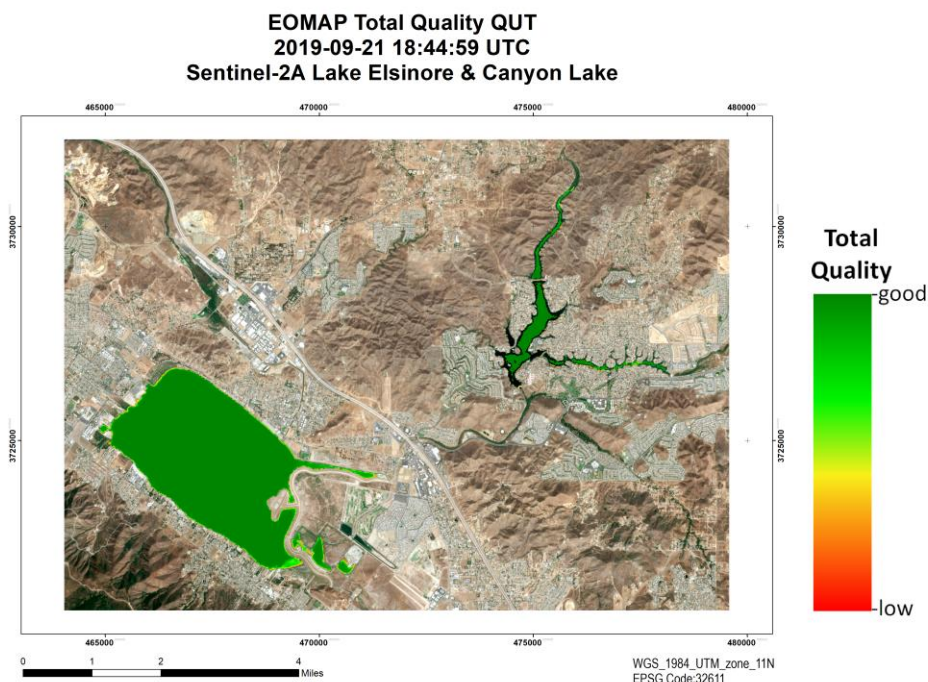


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EOMAP Quality Coding QUC
2019-09-21 18:44:59 UTC
Sentinel-2A Lake Elsinore & Canyon Lake

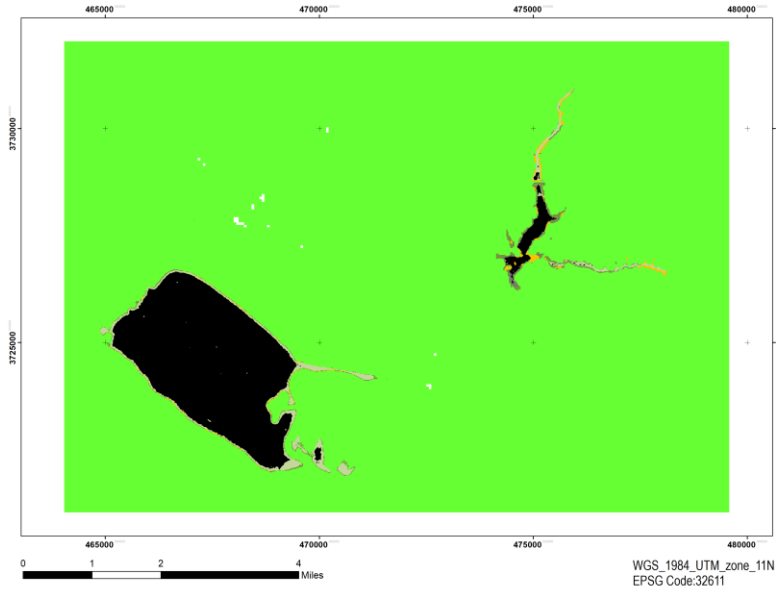


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EOMAP uses the following data hubs to access and download satellite raw data from different sensors:

- Sentinel-3: PEPS <https://peps.cnes.fr>
- Landsat-8 Amazon Web Services, <https://landsat-pds.s3.amazonaws.com>
- Sentinel-2: ESA Sentinel HUB <https://scihub.copernicus.eu/dhus/#/home>
- MODIS Aqua and Terra: USGS <https://earthexplorer.usgs.gov/>

Contact

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Delivery Report

Water Quality Monitoring Lake Elsinore & Canyon Lake

Date: 2019-10-24

Client: Wood Plc

Delivery no.: 1773_Delivery_EOMAP2WoodPlc_Vs10.2_20191024

Authors:

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1. Service Provision Report

Contractor Details	Service Provider Details
Wood Environment & Infrastructure Solutions, Inc.	EOMAP GmbH & Co. KG
9210 Sky Park Court, Suite 200	Schlosshof 4, 82229 Seefeld, Germany
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Contractor PO / Reference number	
Contractor project title	
Service Provider reference number	1773
Date of delivery	2019-10-24
Version	10.2

List of all delivered scenes

Sensor	Time of record
Landsat 8	2019-10-14 18:22:56 UTC

Content

Product	Abbreviation	Yes/No
Total Absorption	ABS	<input type="checkbox"/>
Aerosol Optical Thickness	AOT	<input type="checkbox"/>
Yellow Substances	CDM	<input type="checkbox"/>
Chlorophyll-a	CHL	<input checked="" type="checkbox"/>
Ratio of Absorption and Scattering	DIV	<input type="checkbox"/>
Harmful Algae Bloom Indicator	HAB	<input checked="" type="checkbox"/>
Diffuse Attenuation Coefficient	KDC	<input type="checkbox"/>
Quality Coding	QUC	<input checked="" type="checkbox"/>
Total Quality	QUT	<input checked="" type="checkbox"/>
True Color/False Color Composite	RGB	<input checked="" type="checkbox"/>
Remote Sensing Reflectance	RRS	<input type="checkbox"/>
Secchi Disc Depth	SDD	<input type="checkbox"/>
Sum of Inorganic Absorption	SIA	<input type="checkbox"/>
Sum of Organic Absorption	SOA	<input type="checkbox"/>
Surface Temperature	SST	<input type="checkbox"/>
Turbidity	TUR	<input checked="" type="checkbox"/>
Trophic State Index (Chlorophyll)	TSC	<input type="checkbox"/>
Total Suspended Matter	TSM	<input type="checkbox"/>
Light Penetration Depth	Z90	<input type="checkbox"/>
Water Body Extent	WEX	<input type="checkbox"/>

List of delivered files (one product example)

File name	File format	Content
1773_Delivery_EOMAP2WoodPlc_Vs102._20191024.pdf	PDF	Delivery Report
CHL_us-california040037_EOMAP_20191014_182256_LSAT8_m0030.tif	GeoTIFF	Product raster file, 8bit scaled and coloured
CHL_us-california040037_EOMAP_20191014_182256_LSAT8_m0030_32bit.tif	GeoTIFF	Product raster file, 32bit real values
CHL_us-california040037_EOMAP_20191014_182256_LSAT8_m0030_wgs84_xyz.txt	ASCII	Product text file, real values
CHL_us-california040037_EOMAP_20191014_182256_LSAT8_m0030.kmz	KMZ	GoogleEarth overlay
CHL_us-california040037_EOMAP_20191014_182256_LSAT8_m0030_metadata.xml	XML	Metadata
CHL_us-california040037_EOMAP_20191014_182256_LSAT8_m0030_overview.pdf	PDF	Overview PDF, metadata and quicklook

File naming

[Product abbreviation]_[Country code]-[Area]_EOMAP_[Date of satellite image recording]_[Time of satellite image recording]_[sensor code]_[spatial resolution]_[optional]


With

[Product abbreviation]	see list of product abbreviations
[Country code]	Country ID following ISO 3166 ALPHA-2 standards
[Area]	name of city/region or other relevant area characterization
[Date of satellite image rec.]	Satellite image date used for the analysis in YYYYMMDD (YY= Year, MM = Month, DD = Date) in UTC
[Time of satellite image rec.]	Satellite image date used for the analysis in HHMMSS (HH= Hours, MM = Minute, SS = Seconds) in UTC time
[sensor code]	Sensor in use
[spatial resolution]	Spatial resolution/grid spacing in meters
[optional]	is an optional parameter which can be used to support the intuitive use of the data, such as 'metadata' or 'XYZQ' for metadata files and ASCII XYZQ files.

Notes (e.g. technical issues, exceptional conditions, etc.)

- Eastern part of Canyon Lake is too narrow for Landsat 8 spatial resolution of 30m.

Data Analyst



Philip Klinger

QA/QC



Karin Schenk

2. Methodology and Products

2.1 Modular Inversion and Processing System (MIP)

For the retrieval of satellite-derived water quality data, the physics-based Modular Inversion and Processing System (MIP), developed by EOMAP, has been applied to the satellite imagery. This sensor-independent approach includes all the relevant processing steps to guarantee a robust, standardised and operational retrieval of water quality parameters from various satellite data sources. The advantage of physics-based methods is that they do not require a priori information about the study area and can therefore be applied independently of satellite type and study area.

MIP imbeds sensor-independent algorithms and processing modules to derive consistent water quality parameters for multiple scales through a number of different satellite sensors. The algorithms take all relevant environmental impacts into account and do so for each individual measurement and pixel according to the current state-of-the-art, including:

- a. water, land, cloud identification
- b. estimation and correction of atmosphere and aerosol impacts^{1 2}
- c. correction altitude level impacts³
- d. correction of adjacency impact (light scattering into the water signal from adjacent land surfaces)⁴
- e. correction⁵ or flagging⁶ of sunglitter impact
- f. retrieval of in-water absorption and scattering as physical measures⁷
- g. accounting for varying spectral slopes of specific inherent optical properties⁸
- h. provision of uncertainty measures and flagging procedures
- i. accounting for the full bidirectional effects in the atmosphere, at the water-atmosphere boundary layers and in-water, using a fully coupled radiative transfer model
- j. application of procedures to minimize errors, resulting from the coupled interaction of light between atmosphere, water surface and in-water on the signal, through coupled inversion procedures

The different workflow steps from satellite raw imagery import to value-added water quality retrieval are displayed in Figure 1.

¹ Heege, T., Kiselev, V., Wettle, M., Hung N.N. (2014): Operational multi-sensor monitoring of turbidity for the entire Mekong Delta . Int. J. Remote Sensing, Special Issues Remote Sensing of the Mekong, Vol. 35 (8), pp. 2910-2926

² Richter, R., Heege, T., Kiselev, V., Schläpfer, D. (2014): Correction of ozone influence on TOA radiance. Int. J. of Remote Sensing. Vol. 35(23), pp. 8044-8056, doi: 10.1080/01431161.2014.978041

³ Heege, T., Fischer, J. (2004): Mapping of water constituents in Lake Constance using multispectral airborne scanner data and a physically based processing scheme. Can. J. Remote Sensing, Vol. 30, No. 1, pp. 77-86

⁴ Kiselev, V., Bulgarelli, B. and Heege, T., (2015). Sensor independent adjacency correction algorithm for coastal and inland water systems. Remote Sensing of Environment, 157: 85-95. , ISSN 0034-4257, <http://dx.doi.org/10.1016/j.rse.2014.07.025>

⁵ Heege, T. & Fischer, J. (2000): Sun glitter correction in remote sensing imaging spectrometry. SPIE Ocean Optics XV Conference, Monaco, Oct. 16-20.

⁶ EU FP7-Projekt GLASS: WP4 Validation report (29.2.2016): www.glass-project.eu/assets/Deliverables/GLaSS-D4.2.pdf

⁷ Bumberger J., Heege T., Klinger P., et al. (2017): Towards a Harmonized Validation Procedure for Inland Water Optical Remote Sensing Data using Inherent Optical Properties, Rem. Sens. 2017(9), 21p, submitted 28 Feb. 2017

⁸ Heege T., Schenk K., Klinger P., Broszeit A., Wenzel J., Kiselev V. (2015): Monitoring status and trends of water quality in inland waters using earth observation technologies. Proceedings "Water Quality in Europe: Challenges and Best Practice" UNESCO-IHP European Regional Consultation Workshop, Koblenz, Germany, Dec 2015, p. 1-4

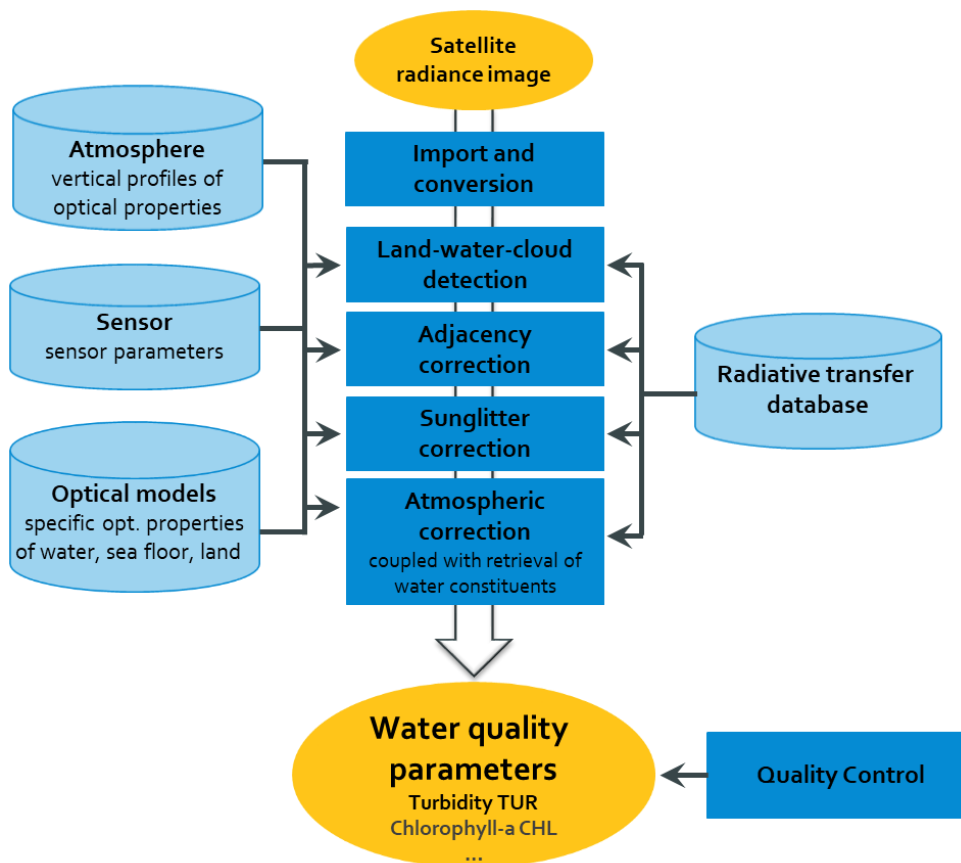


Figure 1: EOMAP's physics-based workflow to derive satellite-based water quality

MIP is the most established, sensor-independent and operational aquatic remote sensing processing system for the full range of high, medium and low-resolution satellite sensors. Fully-automated water monitoring processors are installed in satellite ground segments worldwide (Europe, Australia, Asia and America), to ensure fast and efficient access to a wide range of satellite data. The data processing and orchestration software, the EOMAP Workflow System (EWS) allows for continuous, daily production.

2.2 Products

Turbidity (TUR) is a key parameter of water quality and is linearly related to the backward scattering of light of organic and inorganic particles in water. Turbidity is also linearly related to Total Suspended Matter (TSM) at low to moderate turbidity values. The measurement unit is Nephelometric Turbidity Unit (NTU). Satellite-derived turbidity is determined by the backward scattering of light between 450 to 800nm, which is physically retrieved using satellite data. The standard relation of EOMAP concentrations to inherent optical properties is defined as $1 \text{ NTU} = 0.0118 \text{ 1/m backward scattering at 550nm}$, or $1 \text{ NTU} = 0.619 \text{ 1/m total scattering at 550nm}$ for an assumed ratio $bb/b = 0.019$. The linear relation between turbidity and suspended matter/solids in low to moderate concentrations is in most cases a regional constant, but can vary with particle size distribution. Note that the geometrical properties of an in-situ measurement device, and the wavelength in use, may differ in comparison to the satellite product. For example, the standard FTU determination, a measure of turbidity similar to NTU, is based on the measurement of light scattered within a 90° angle from a beam directed at the water sample. Alongside temporal differences in satellite and in situ measurements, different sampling depths and the measurement location, this needs to be considered when comparing and interpreting satellite derived vs. in situ measured turbidity values. The Turbidity product from 2019-10-14 is shown in Figure 2.

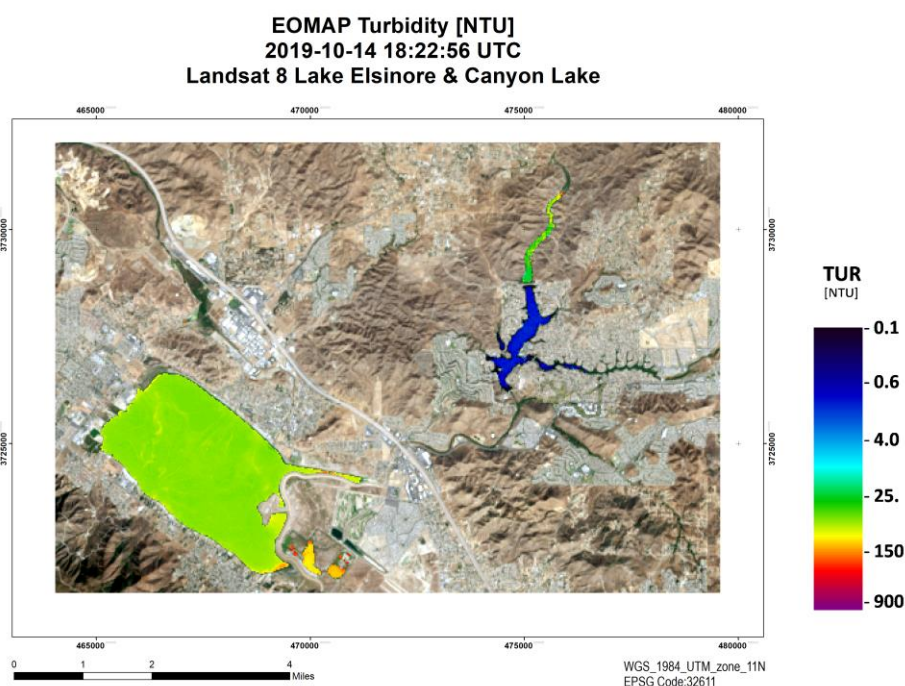


Figure 2: Turbidity product from 2019-10-14

Chlorophyll-a (CHL) retrieval is based on the derived information of in-water organic absorption, in-water turbidity and spectral characteristics of each water body. Chlorophyll-a in $[\mu\text{g/l}]$, is provided as a measure linearly related to the pigment-specific absorption at 440nm, with $1 \mu\text{g/l Chl}$ equal to $0.035 \text{ 1/m pigment absorption}$. Phaeophytin and further pigments cannot be discriminated methodologically with the spectral resolution provided by Landsat 8/Sentinel-2 and similar sensors and is therefore included in this product. The pigment-related absorption is always smaller than the absorption of organic components (SOA). For clear water condi-

tions (low chlorophyll/total suspended solids), the specific absorption chlorophyll increases significantly (Bricaud et al. 1995⁹). Chlorophyll values can vary over 4 magnitudes, for marine waters or clear lakes typical concentrations between 0.01 and 10 µg/l, while for eutrophic lakes concentrations can reach 100 µg/l and more. The chlorophyll products are typically reliable within a range of 10 – 50 % in comparison to in situ measures (Broszeit 2015¹⁰), which are typically based on one of three different methods, which include photometric, fluorescence and HPLC approaches and their subcategories. The Chlorophyll-a product from 2019-10-14 is shown in Figure 3.

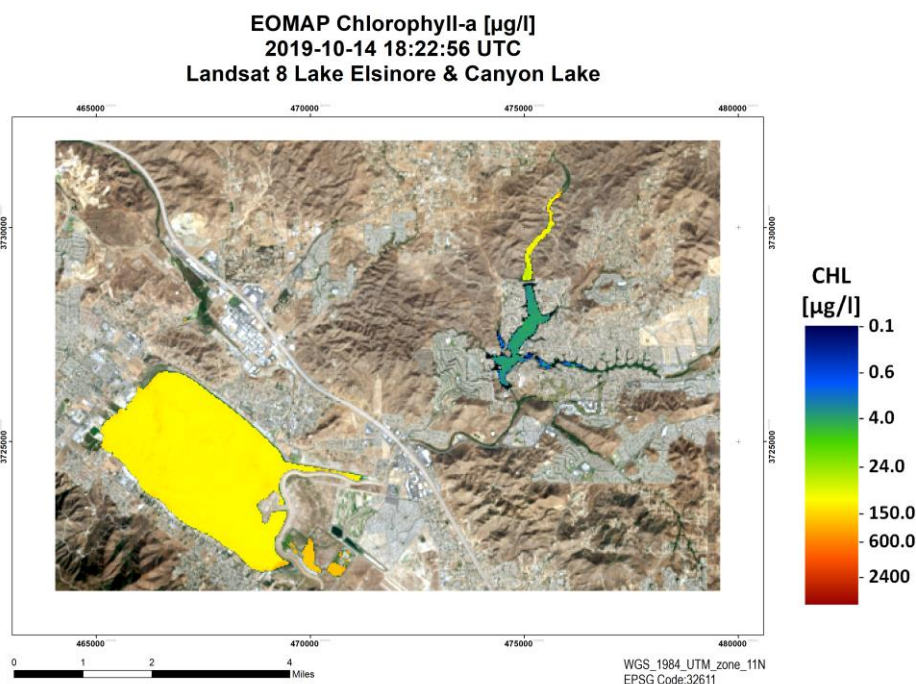


Figure 3: Chlorophyll-a product from 2019-10-14

The **Harmful Algae Bloom Indicator (HAB)** refers to the presence of cyanobacteria. It is sensitive to the appearance of cyanobacteria-related pigments, i.e. phycocyanin and phycoerythrin. Both pigments show absorption features in green wavelengths from 500 nm to approx. 640 nm; phycoerythrin shows its absorption maximum at 540-570 nm, phycocyanin at 610-620 (Colyer et al. 2005). Most satellite sensors support the identification of this feature with only two bands, i.e. one in the green wavelength region (e.g. L7 and L8 at 530 – 590 nm) and in the red wavelength region at approx. 640 – 670 nm. The used standard parameterisation of phytoplankton absorption in MIP as described above, however, does not account phycocyanin and phycoerythrin absorption in the retrieval process. The modelled phytoplankton absorption therefore lacks the absorption features of these pigments. Nonetheless, if these pigments are present in the water a slight spectral mismatch between modelled water leaving reflectance ($R_{modelled}$) and satellite derived reflectance ($R_{satellite}$) occurs. The algorithm then compares the slope of $R_{modelled}$ and $R_{satellite}$ between the green and red band ($\delta R = R_{green} - R_{red}$) in order to classify pixels with regard to phycocyanin and phycoerythrin occurrence, i.e. harmful algae bloom probability. The HAB indicator from 2019-10-14 is shown in Figure 4.

⁹ Bricaud, A., Babin, M., Morel, A., Claustre, H. (1995): Variability in the chlorophyll-specific absorption coefficients of natural phytoplankton: Analysis and parametrization. *Journal of Geophysical Research Atmospheres*, 100(C7):13,321-13,332

¹⁰ Broszeit, A., 2015. Assessing long-term inland water quality using satellite imagery: A Feasibility and validation study of different lake types. MSc Thesis, Julius-Maximilian-University Würzburg, 96p

**EOMAP Harmful Algae Bloom Indicator
2019-10-14 18:22:56 UTC
Landsat 8 Lake Elsinore & Canyon Lake**

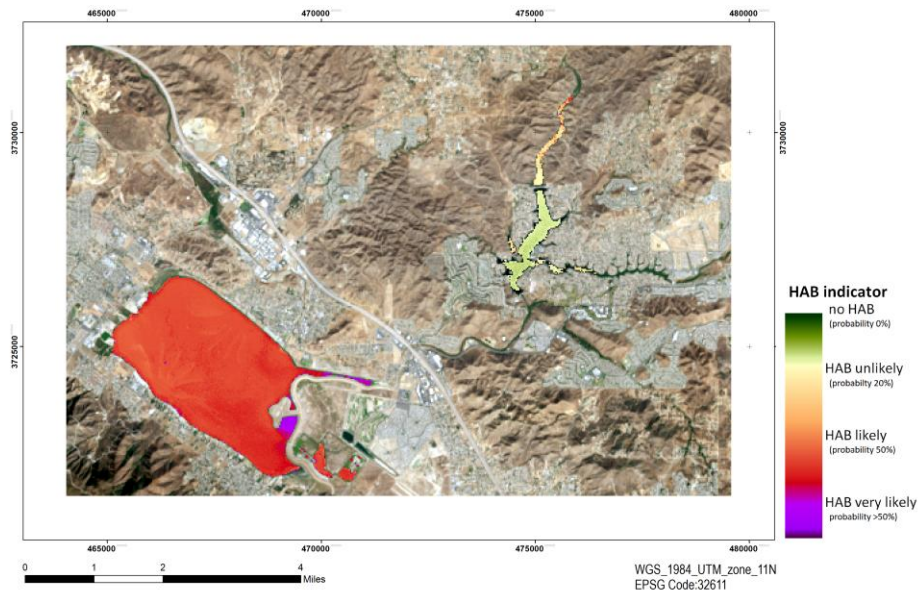


Figure 4: Harmful Algae Bloom Indicator product from 2019-10-14

RGB composite images represent the area of interest in true colour or false colour modes by combining pre-defined bands, depending on the sensor in use.

2.3 Quality Control and Flagging

As a standard output of the processing, an accuracy or quality indicator is calculated for each retrieved parameter and for each detected water pixel. This measure comprises a comprehensive range of factors that can impact the derived product quality, including:

- the geometry between sun, target, and sensor,
- the estimated sun glint probability,
- the retrieved aerosol optical depth,
- residuals of the measured and modelled sensor radiances and subsurface reflectances,
- the comparison of retrieved water species concentrations to extreme values as defined in the configuration files,
- pixels affected by cloud shadow and
- shallow water areas.

Threshold values define distinct values when a parameter is assumed to influence the quality. All parameters are integrated into one remaining quality parameter, allowing both an improved flagging and a quality weighting of pixels, that can later be merged into integrated 3rd level products.

The quality information is part of each standard geodata delivery and is visualized by two different 8bit Geo-TIFFs:

- QUT - Total Quality, quantifying the overall quality of each pixel from low to high. Only valid water pixels - excluding land, cloud or flagged pixels - are represented in QUT indicator (Figure 5).
- QUC – EOMAP Quality coding (Figure 6), revealing the processor's internal quality check, split into the defined indicators (e.g. sunglint, shallow water risk, etc.). These are classified into 'no quality concerns', 'quality risk and 'bad quality' (flag). Note that 'quality risk' pixels are marked as such but not flagged.

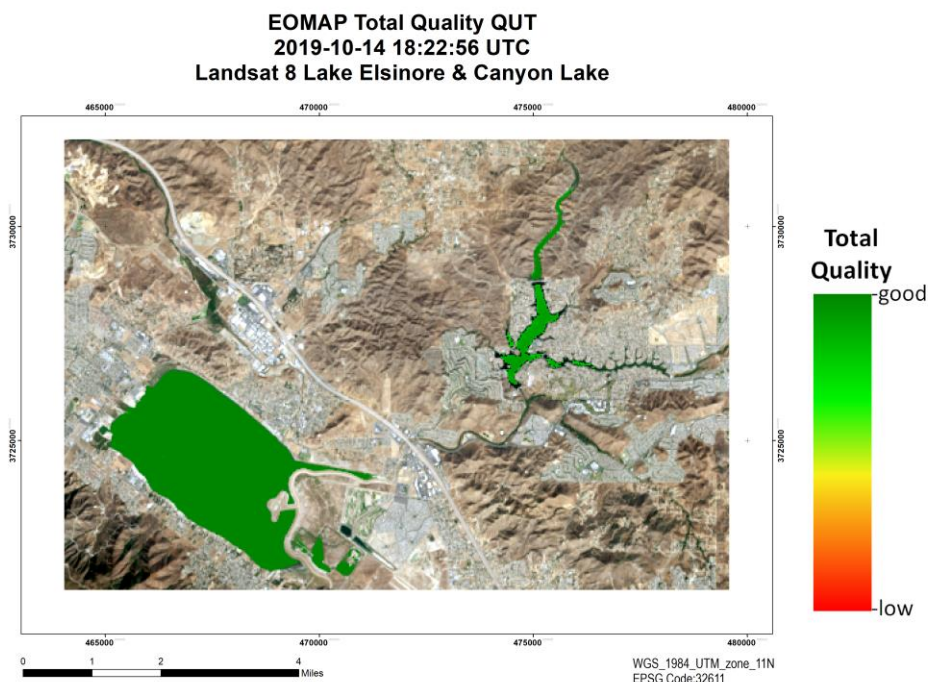


Figure 5: QUT product from 2019-10-14

**EOMAP Quality Coding QUC
2019-10-14 18:22:56 UTC
Landsat 8 Lake Elsinore & Canyon Lake**

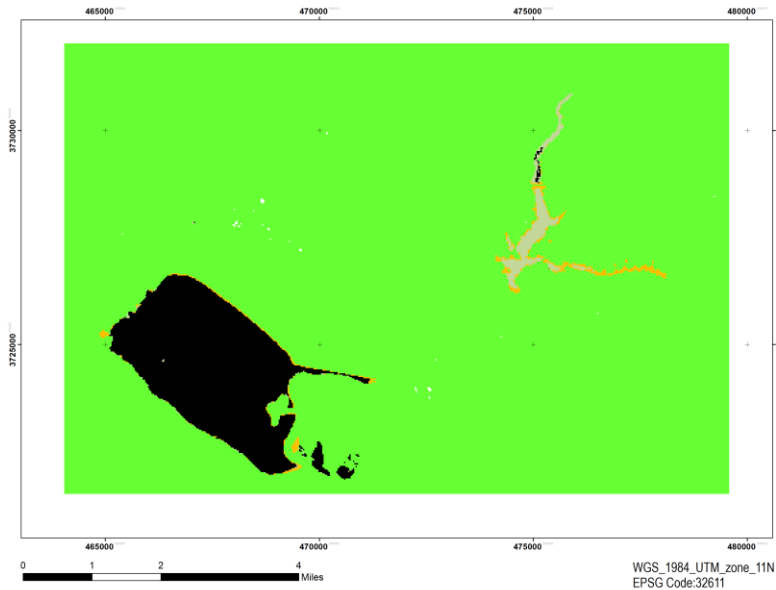


Figure 6: QUC product from 2019-10-14

The QUC file indicates the main quality influencing parameter using a specific EOMAP quality coding classification scheme with corresponding grey values (GV), shown in Figure 7 .

Professional version allow combination of the two most relevant flags:					
First number = most relevant flag					
1-digit-number refer to second relevant flag, e.g. 1 for sunglint risk, 2 for large solar zenith angle					
Examples: 25 Warning flag for large zenit solar angle and Whitecaps					
114 Critical flag for sunglint, plus warning for aerosol above limits					
GV	GV range	Flag status	Flag description	Color code	Color
0	0	Water	No risk identified	0 0 0	
10	10 - 19	Warning	sunglint risk	148 138 84	
20	20 - 29	Warning	large solar zenith angle	83 141 213	
30	30 - 39	Warning	large spacecraft zenith angle	218 150 148	
40	40 - 49	Warning	Aerosol above limit or Cirrus risk	196 215 155	
50	50 - 59	Warning	Cloud Shadow	177 160 199	
60	60 - 69	Warning	Shallow water risk	146 205 220	
70	70 - 79	Warning	Mixed pixel risk	250 191 143	
80	80 - 89	Warning	Retrieved concentration at configuration limit	190 190 190	
90	90 - 99	Warning	Retrieval / processor warning	210 210 210	
110	110 - 119	Critical	sunglint risk	73 69 41	
120	120 - 129	Critical	large solar zenith angle	22 54 92	
130	130 - 139	Critical	large spacecraft zenith angle	150 54 52	
140	140 - 149	Critical	Aerosol above limit or Cirrus risk	118 147 60	
150	150 - 159	Critical	Cloud Shadow	96 73 122	
160	160 - 169	Critical	Shallow water risk	49 134 155	
170	170 - 179	Critical	Mixed pixel risk	226 107 10	
180	180 - 189	Critical	Retrieved concentration at configuration limit	120 120 120	
190	190 - 199	Critical	Retrieval / processor warning	130 130 130	
220	220	No value	Transition Zone	102 255 51	
221	221	Unreliable	Shallow water automatically	146 205 220	
222	222	Unreliable	Shallow water manually	60 159 186	
223	223	Unreliable	Floating material	32 95 107	
230	230	No water	Land	102 255 51	
232	232	Unreliable	Invalid pixel manually	255 192 0	
240	240	No water	Cloud	255 255 255	
242	242	Unreliable	Cloud Shadow manually	96 73 122	
244	244	Unreliable	Hill shadow	73 57 93	
250	250	No retrieval	No retrieval / out of AOI or image extend	255 0 0	

Figure 7: EOMAP QUC quality coding

EOMAP's water quality products are accompanied by the processor's internal quality control mechanisms QUT and QUC, resulting in pixel flagging in case of unreliable values. Moreover, a manual quality check and - if required - additional masking is applied to each product.

As an example, cloud shadow effects typically occur in the vicinity of clouds, resulting in unrealistically low water parameter values. In order to detect and flag these areas, EOMAP has developed a specific algorithm based on geometric models, considering the sun angle and sensor viewing geometry, the retrieved aerosol properties, the height of the clouds, an analysis of the blue channel radiances and a statistical anomaly detection of the water species concentrations. When applying this cloud shadow detection algorithm, approx. 85% of the cloud shadows are detected and masked. Remaining cloud shadows are manually flagged and can be identified in the QUC file by GV 242.

Due to the spatial extent of single pixels (Sentinel-2: 10*10m, Landsat 8: 30*30m), it is likely that spectral mixing of signals from land and water can affect the pixels along the edge of the water body, leading to unreliable retrieval of water parameter values. Such pixels are labelled with the quality flag 'transition zone'. EOMAP uses a high-resolution land-water-mask database to determine the land-water-boundary, which is then filtered to create a transition zone that is automatically flagged during processing. In the 8bit water constituent products the transition zone is marked by GV 251, whereas in the QUC product it is 220.

2.4 Data Format

The water quality data is delivered as 32bit real value GeoTIFF as well as 8bit scaled and colored GeoTIFF for easier visualization. The colours currently used are a suggestion/standard, but can be changed according to client specific request. In addition, metadata is stored in the .xml and the metadata .pdf files.

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- Landsat-8 Amazon Web Services, <https://landsat-pds.s3.amazonaws.com>
- Sentinel-2: ESA Sentinel HUB <https://scihub.copernicus.eu/dhus/#/home>
- MODIS Aqua and Terra: USGS <https://earthexplorer.usgs.gov/>

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Delivery Report

Water Quality Monitoring Lake Elsinore & Canyon Lake

Date: 2020-01-08

Client: Wood Plc

Delivery no.: 1773_Delivery_EOMAP2WoodPlc_Vs11_20200108

Authors:

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1. Service Provision Report

Contractor Details	Service Provider Details
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9210 Sky Park Court, Suite 200	Schlosshof 4, 82229 Seefeld, Germany
San Diego, CA 92123, USA	
Point of Contact	Point of Contact
John D. Rudolph	Philip Klinger
john.rudolph@woodplc.com	klinger@eomap.de, +49 (0)8152 9986115

Contractor PO / Reference number	
Contractor project title	
Service Provider reference number	1773
Date of delivery	2020-01-08
Version	11

List of all delivered scenes

Sensor	Time of record
Sentinel-2B	2019-10-16 18:45:00 UTC

Content

Product	Abbreviation	Yes/No
Total Absorption	ABS	<input type="checkbox"/>
Aerosol Optical Thickness	AOT	<input type="checkbox"/>
Yellow Substances	CDM	<input type="checkbox"/>
Chlorophyll-a	CHL	<input checked="" type="checkbox"/>
Ratio of Absorption and Scattering	DIV	<input type="checkbox"/>
Harmful Algae Bloom Indicator	HAB	<input checked="" type="checkbox"/>
Diffuse Attenuation Coefficient	KDC	<input type="checkbox"/>
Quality Coding	QUC	<input checked="" type="checkbox"/>
Total Quality	QUT	<input checked="" type="checkbox"/>
True Color/False Color Composite	RGB	<input checked="" type="checkbox"/>
Remote Sensing Reflectance	RRS	<input type="checkbox"/>
Secchi Disc Depth	SDD	<input type="checkbox"/>
Sum of Inorganic Absorption	SIA	<input type="checkbox"/>
Sum of Organic Absorption	SOA	<input type="checkbox"/>
Surface Temperature	SST	<input type="checkbox"/>
Turbidity	TUR	<input checked="" type="checkbox"/>
Trophic State Index (Chlorophyll)	TSC	<input type="checkbox"/>
Total Suspended Matter	TSM	<input type="checkbox"/>
Light Penetration Depth	Z90	<input type="checkbox"/>
Water Body Extent	WEX	<input type="checkbox"/>

List of delivered files (one product example)

File name	File format	Content
1773_Delivery_EOMAP2WoodPlc_Vs11_20200108.pdf	PDF	Delivery Report
CHL_us-california_EOMAP_20191220_184453_SENT2_m0010.tif	GeoTIFF	Product raster file, 8bit scaled and coloured
CHL_us-california_EOMAP_20191220_184453_SENT2_m0010_32bit.tif	GeoTIFF	Product raster file, 32bit real values
CHL_us-california_EOMAP_20191220_184453_SENT2_m0010_wgs84_xyz.txt	ASCII	Product text file, real values
CHL_us-california_EOMAP_20191220_184453_SENT2_m0010.kmz	KMZ	GoogleEarth overlay
CHL_us-california_EOMAP_20191220_184453_SENT2_m0010_metadata.xml	XML	Metadata
CHL_us-california_EOMAP_20191220_184453_SENT2_m0010_overview.pdf	PDF	Overview PDF, metadata and quicklook

File naming

[Product abbreviation]_[Country code]-[Area]_EOMAP_[Date of satellite image recording]_[Time of satellite image recording]_[sensor code]_[spatial resolution]_[optional]

With

[Product abbreviation]	see list of product abbreviations
[Country code]	Country ID following ISO 3166 ALPHA-2 standards
[Area]	name of city/region or other relevant area characterization
[Date of satellite image rec.]	Satellite image date used for the analysis in YYYYMMDD (YY= Year, MM = Month, DD = Date) in UTC
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Notes (e.g. technical issues, exceptional conditions, etc.)

Data Analyst



Philip Klinger

QA/QC



Karin Schenk

2. Methodology and Products

2.1 Modular Inversion and Processing System (MIP)

For the retrieval of satellite-derived water quality data, the physics-based Modular Inversion and Processing System (MIP), developed by EOMAP, has been applied to the satellite imagery. This sensor-independent approach includes all the relevant processing steps to guarantee a robust, standardised and operational retrieval of water quality parameters from various satellite data sources. The advantage of physics-based methods is that they do not require a priori information about the study area and can therefore be applied independently of satellite type and study area.

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- a. water, land, cloud identification
- b. estimation and correction of atmosphere and aerosol impacts^{1 2}
- c. correction altitude level impacts³
- d. correction of adjacency impact (light scattering into the water signal from adjacent land surfaces)⁴
- e. correction⁵ or flagging⁶ of sunglitter impact
- f. retrieval of in-water absorption and scattering as physical measures⁷
- g. accounting for varying spectral slopes of specific inherent optical properties⁸
- h. provision of uncertainty measures and flagging procedures
- i. accounting for the full bidirectional effects in the atmosphere, at the water-atmosphere boundary layers and in-water, using a fully coupled radiative transfer model
- j. application of procedures to minimize errors, resulting from the coupled interaction of light between atmosphere, water surface and in-water on the signal, through coupled inversion procedures

The different workflow steps from satellite raw imagery import to value-added water quality retrieval are displayed in Figure 1.

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³ Heege, T., Fischer, J. (2004): Mapping of water constituents in Lake Constance using multispectral airborne scanner data and a physically based processing scheme. Can. J. Remote Sensing, Vol. 30, No. 1, pp. 77-86

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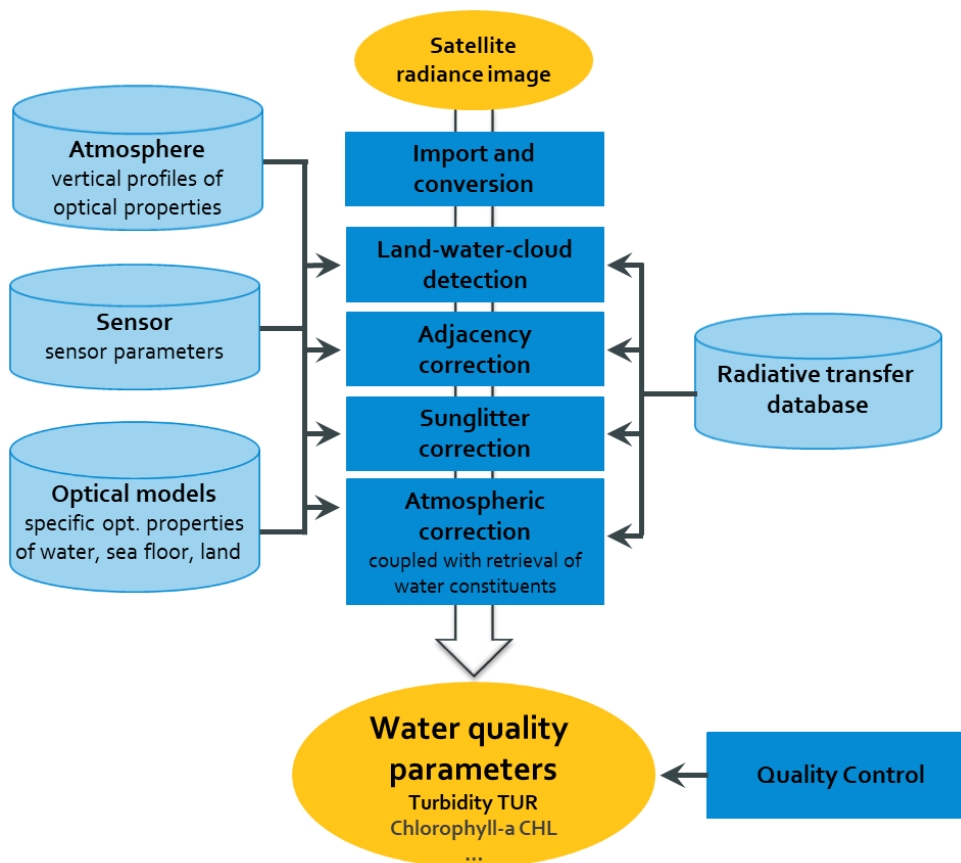


Figure 1: EOMAP's physics-based workflow to derive satellite-based water quality

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Turbidity (TUR) is a key parameter of water quality and is linearly related to the backward scattering of light of organic and inorganic particles in water. Turbidity is also linearly related to Total Suspended Matter (TSM) at low to moderate turbidity values. The measurement unit is Nephelometric Turbidity Unit (NTU). Satellite-derived turbidity is determined by the backward scattering of light between 450 to 800nm, which is physically retrieved using satellite data. The standard relation of EOMAP concentrations to inherent optical properties is defined as $1 \text{ NTU} = 0.0118 \text{ 1/m backward scattering at } 550\text{nm}$, or $1 \text{ NTU} = 0.619 \text{ 1/m total scattering at } 550\text{nm}$ for an assumed ratio $bb/b = 0.019$. The linear relation between turbidity and suspended matter/solids in low to moderate concentrations is in most cases a regional constant, but can vary with particle size distribution. Note that the geometrical properties of an in-situ measurement device, and the wavelength in use, may differ in comparison to the satellite product. For example, the standard FTU determination, a measure of turbidity similar to NTU, is based on the measurement of light scattered within a 90° angle from a beam directed at the water sample. Alongside temporal differences in satellite and in situ measurements, different sampling depths and the measurement location, this needs to be considered when comparing and interpreting satellite derived vs. in situ measured turbidity values. The Turbidity product from 2019-12-20 is shown in Figure 2.

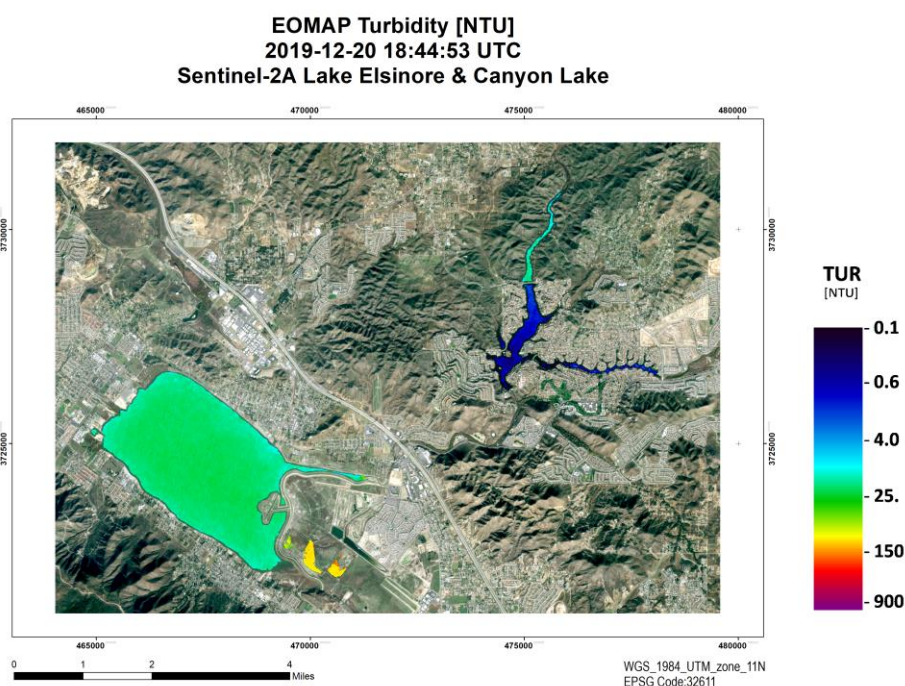


Figure 2: Turbidity product from 2019-12-20

Chlorophyll-a (CHL) retrieval is based on the derived information of in-water organic absorption, in-water turbidity and spectral characteristics of each water body. Chlorophyll-a in $[\mu\text{g/l}]$, is provided as a measure linearly related to the pigment-specific absorption at 440nm, with $1 \mu\text{g/l Chl}$ equal to $0.035 \text{ 1/m pigment absorption}$. Phaeophytin and further pigments cannot be discriminated methodologically with the spectral resolution provided by Landsat 8/Sentinel-2 and similar sensors and is therefore included in this product. The pigment-related absorption is always smaller than the absorption of organic components (SOA). For clear water condi-

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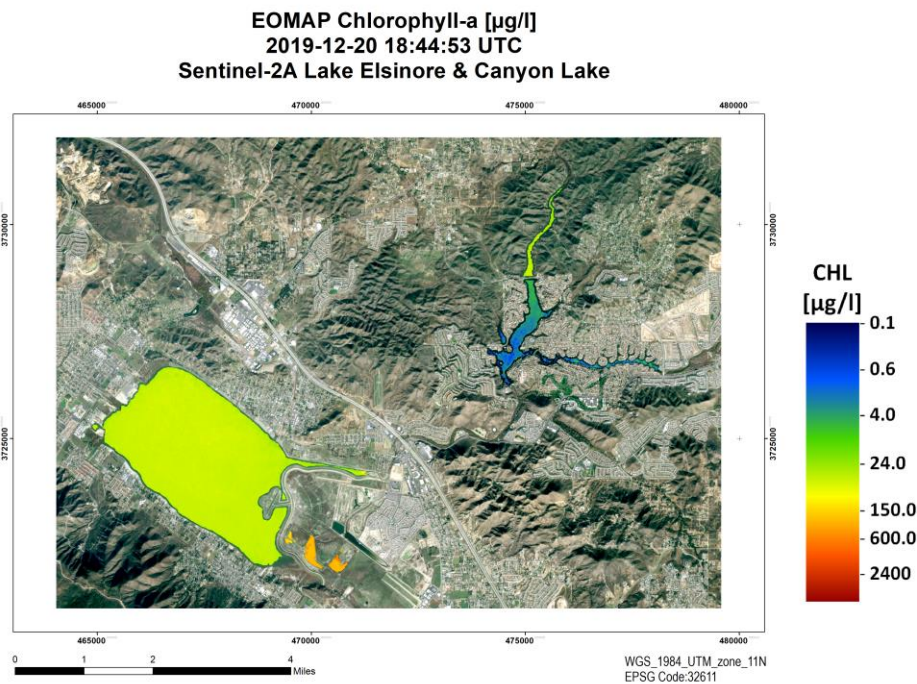


Figure 3: Chlorophyll-a product from 2019-12-20

The **Harmful Algae Bloom Indicator (HAB)** refers to the presence of cyanobacteria. It is sensitive to the appearance of cyanobacteria-related pigments, i.e. phycocyanin and phycoerythrin. Both pigments show absorption features in green wavelengths from 500 nm to approx. 640 nm; phycoerythrin shows its absorption maximum at 540-570 nm, phycocyanin at 610-620 (Colyer et al. 2005). Most satellite sensors support the identification of this feature with only two bands, i.e. one in the green wavelength region (e.g. L7 and L8 at 530 – 590 nm) and in the red wavelength region at approx. 640 – 670 nm. The used standard parameterisation of phytoplankton absorption in MIP as described above, however, does not account phycocyanin and phycoerythrin absorption in the retrieval process. The modelled phytoplankton absorption therefore lacks the absorption features of these pigments. Nonetheless, if these pigments are present in the water a slight spectral mismatch between modelled water leaving reflectance ($R_{modelled}$) and satellite derived reflectance ($R_{satellite}$) occurs. The algorithm then compares the slope of $R_{modelled}$ and $R_{satellite}$ between the green and red band ($\delta R = R_{green} - R_{red}$) in order to classify pixels with regard to phycocyanin and phycoerythrin occurrence, i.e. harmful algae bloom probability. The HAB indicator from 2019-12-20 is shown in Figure 4.

⁹ Bricaud, A., Babin, M., Morel, A., Claustre, H. (1995): Variability in the chlorophyll-specific absorption coefficients of natural phytoplankton: Analysis and parametrization. *Journal of Geophysical Research Atmospheres*, 100(C7):13,321-13,332

¹⁰ Broszeit, A., 2015. Assessing long-term inland water quality using satellite imagery: A Feasibility and validation study of different lake types. MSc Thesis, Julius-Maximilian-University Würzburg, 96p

**EOMAP Harmful Algae Bloom Indicator
2019-12-20 18:44:53 UTC
Sentinel-2A Lake Elsinore & Canyon Lake**

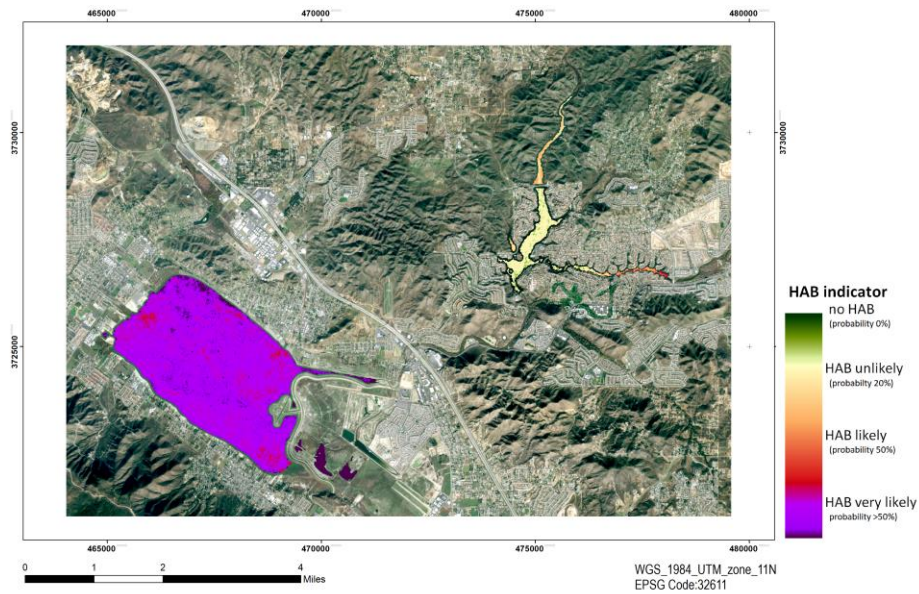


Figure 4: Harmful Algae Bloom Indicator product from 2019-12-20

RGB composite images represent the area of interest in true colour or false colour modes by combining pre-defined bands, depending on the sensor in use.

EOMAP Quality Coding QUC
2019-12-20 18:44:53 UTC
Sentinel-2A Lake Elsinore & Canyon Lake

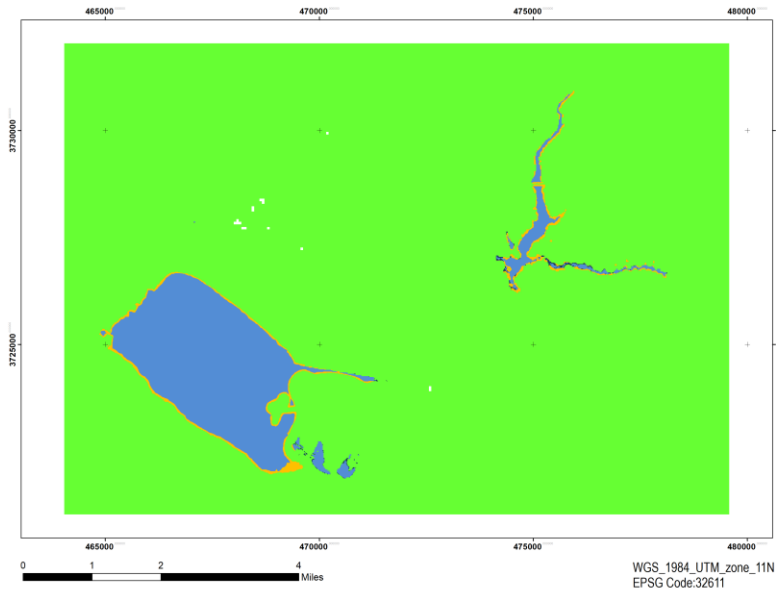


Figure 6: QUC product from 2019-12-20

The QUC file indicates the main quality influencing parameter using a specific EOMAP quality coding classification scheme with corresponding grey values (GV), shown in Figure 7 .

Professional version allow combination of the two most relevant flags:					
First number = most relevant flag					
1-digit-number refer to second relevant flag, e.g. 1 for sunglint risk, 2 for large solar zenith angle					
Examples: 25 Warning flag for large zenit solar angle and Whitecaps					
114 Critical flag for sunglint, plus warning for aerosol above limits					
GV	GV range	Flag status	Flag description	Color code	Color
0	0	Water	No risk identified	0 0 0	
10	10 - 19	Warning	sunglint risk	148 138 84	
20	20 - 29	Warning	large solar zenith angle	83 141 213	
30	30 - 39	Warning	large spacecraft zenith angle	218 150 148	
40	40 - 49	Warning	Aerosol above limit or Cirrus risk	196 215 155	
50	50 - 59	Warning	Cloud Shadow	177 160 199	
60	60 - 69	Warning	Shallow water risk	146 205 220	
70	70 - 79	Warning	Mixed pixel risk	250 191 143	
80	80 - 89	Warning	Retrieved concentration at configuration limit	190 190 190	
90	90 - 99	Warning	Retrieval / processor warning	210 210 210	
110	110 - 119	Critical	sunglint risk	73 69 41	
120	120 - 129	Critical	large solar zenith angle	22 54 92	
130	130 - 139	Critical	large spacecraft zenith angle	150 54 52	
140	140 - 149	Critical	Aerosol above limit or Cirrus risk	118 147 60	
150	150 - 159	Critical	Cloud Shadow	96 73 122	
160	160 - 169	Critical	Shallow water risk	49 134 155	
170	170 - 179	Critical	Mixed pixel risk	226 107 10	
180	180 - 189	Critical	Retrieved concentration at configuration limit	120 120 120	
190	190 - 199	Critical	Retrieval / processor warning	130 130 130	
220	220	No value	Transition Zone	102 255 51	
221	221	Unreliable	Shallow water automatically	146 205 220	
222	222	Unreliable	Shallow water manually	60 159 186	
223	223	Unreliable	Floating material	32 95 107	
230	230	No water	Land	102 255 51	
232	232	Unreliable	Invalid pixel manually	255 192 0	
240	240	No water	Cloud	255 255 255	
242	242	Unreliable	Cloud Shadow manually	96 73 122	
244	244	Unreliable	Hill shadow	73 57 93	
250	250	No retrieval	No retrieval / out of AOI or image extend	255 0 0	

Figure 7: EOMAP QUC quality coding

EOMAP's water quality products are accompanied by the processor's internal quality control mechanisms QUT and QUC, resulting in pixel flagging in case of unreliable values. Moreover, a manual quality check and - if required - additional masking is applied to each product.

As an example, cloud shadow effects typically occur in the vicinity of clouds, resulting in unrealistically low water parameter values. In order to detect and flag these areas, EOMAP has developed a specific algorithm based on geometric models, considering the sun angle and sensor viewing geometry, the retrieved aerosol properties, the height of the clouds, an analysis of the blue channel radiances and a statistical anomaly detection of the water species concentrations. When applying this cloud shadow detection algorithm, approx. 85% of the cloud shadows are detected and masked. Remaining cloud shadows are manually flagged and can be identified in the QUC file by GV 242.

Due to the spatial extent of single pixels (Sentinel-2: 10*10m, Landsat 8: 30*30m), it is likely that spectral mixing of signals from land and water can affect the pixels along the edge of the water body, leading to unreliable retrieval of water parameter values. Such pixels are labelled with the quality flag 'transition zone'. EOMAP uses a high-resolution land-water-mask database to determine the land-water-boundary, which is then filtered to create a transition zone that is automatically flagged during processing. In the 8bit water constituent products the transition zone is marked by GV 251, whereas in the QUC product it is 220.

2.4 Data Format

The water quality data is delivered as 32bit real value GeoTIFF as well as 8bit scaled and colored GeoTIFF for easier visualization. The colours currently used are a suggestion/standard, but can be changed according to client specific request. In addition, metadata is stored in the .xml and the metadata .pdf files.

2.5 Data Sources

EOMAP uses the following data hubs to access and download satellite raw data from different sensors:

- Sentinel-3: PEPS <https://peps.cnes.fr>
- Landsat-8 Amazon Web Services, <https://landsat-pds.s3.amazonaws.com>
- Sentinel-2: ESA Sentinel HUB <https://scihub.copernicus.eu/dhus/#/home>
- MODIS Aqua and Terra: USGS <https://earthexplorer.usgs.gov/>

Contact

Head Office	EOMAP GmbH & Co. KG, Schlosshof 4, 82229 Seefeld, Germany
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Delivery Report

Water Quality Monitoring Lake Elsinore & Canyon Lake

Date: 2020-01-08

Client: Wood Plc

Delivery no.: 1773_Delivery_EOMAP2WoodPlc_Vs11_20200108

Authors:

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Karin Schenk

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klinger@eomap.de
schenk@eomap.de

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+49 8152 9986 115
+49 8152 9986 112



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1. Service Provision Report

Contractor Details	Service Provider Details
Wood Environment & Infrastructure Solutions, Inc.	EOMAP GmbH & Co. KG
9210 Sky Park Court, Suite 200	Schlosshof 4, 82229 Seefeld, Germany
San Diego, CA 92123, USA	
Point of Contact	Point of Contact
John D. Rudolph	Philip Klinger
john.rudolph@woodplc.com	klinger@eomap.de, +49 (0)8152 9986115

Contractor PO / Reference number	
Contractor project title	
Service Provider reference number	1773
Date of delivery	2020-01-08
Version	11

List of all delivered scenes

Sensor	Time of record
Sentinel-2B	2019-10-16 18:45:00 UTC

Content

Product	Abbreviation	Yes/No
Total Absorption	ABS	<input type="checkbox"/>
Aerosol Optical Thickness	AOT	<input type="checkbox"/>
Yellow Substances	CDM	<input type="checkbox"/>
Chlorophyll-a	CHL	<input checked="" type="checkbox"/>
Ratio of Absorption and Scattering	DIV	<input type="checkbox"/>
Harmful Algae Bloom Indicator	HAB	<input checked="" type="checkbox"/>
Diffuse Attenuation Coefficient	KDC	<input type="checkbox"/>
Quality Coding	QUC	<input checked="" type="checkbox"/>
Total Quality	QUT	<input checked="" type="checkbox"/>
True Color/False Color Composite	RGB	<input checked="" type="checkbox"/>
Remote Sensing Reflectance	RRS	<input type="checkbox"/>
Secchi Disc Depth	SDD	<input type="checkbox"/>
Sum of Inorganic Absorption	SIA	<input type="checkbox"/>
Sum of Organic Absorption	SOA	<input type="checkbox"/>
Surface Temperature	SST	<input type="checkbox"/>
Turbidity	TUR	<input checked="" type="checkbox"/>
Trophic State Index (Chlorophyll)	TSC	<input type="checkbox"/>
Total Suspended Matter	TSM	<input type="checkbox"/>
Light Penetration Depth	Z90	<input type="checkbox"/>
Water Body Extent	WEX	<input type="checkbox"/>

List of delivered files (one product example)

File name	File format	Content
1773_Delivery_EOMAP2WoodPlc_Vs11_20200108.pdf	PDF	Delivery Report
CHL_us-california_EOMAP_20191220_184453_SENT2_m0010.tif	GeoTIFF	Product raster file, 8bit scaled and coloured
CHL_us-california_EOMAP_20191220_184453_SENT2_m0010_32bit.tif	GeoTIFF	Product raster file, 32bit real values
CHL_us-california_EOMAP_20191220_184453_SENT2_m0010_wgs84_xyz.txt	ASCII	Product text file, real values
CHL_us-california_EOMAP_20191220_184453_SENT2_m0010.kmz	KMZ	GoogleEarth overlay
CHL_us-california_EOMAP_20191220_184453_SENT2_m0010_metadata.xml	XML	Metadata
CHL_us-california_EOMAP_20191220_184453_SENT2_m0010_overview.pdf	PDF	Overview PDF, metadata and quicklook

File naming

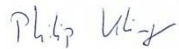
[Product abbreviation]_[Country code]-[Area]_EOMAP_[Date of satellite image recording]_[Time of satellite image recording]_[sensor code]_[spatial resolution]_[optional]

With

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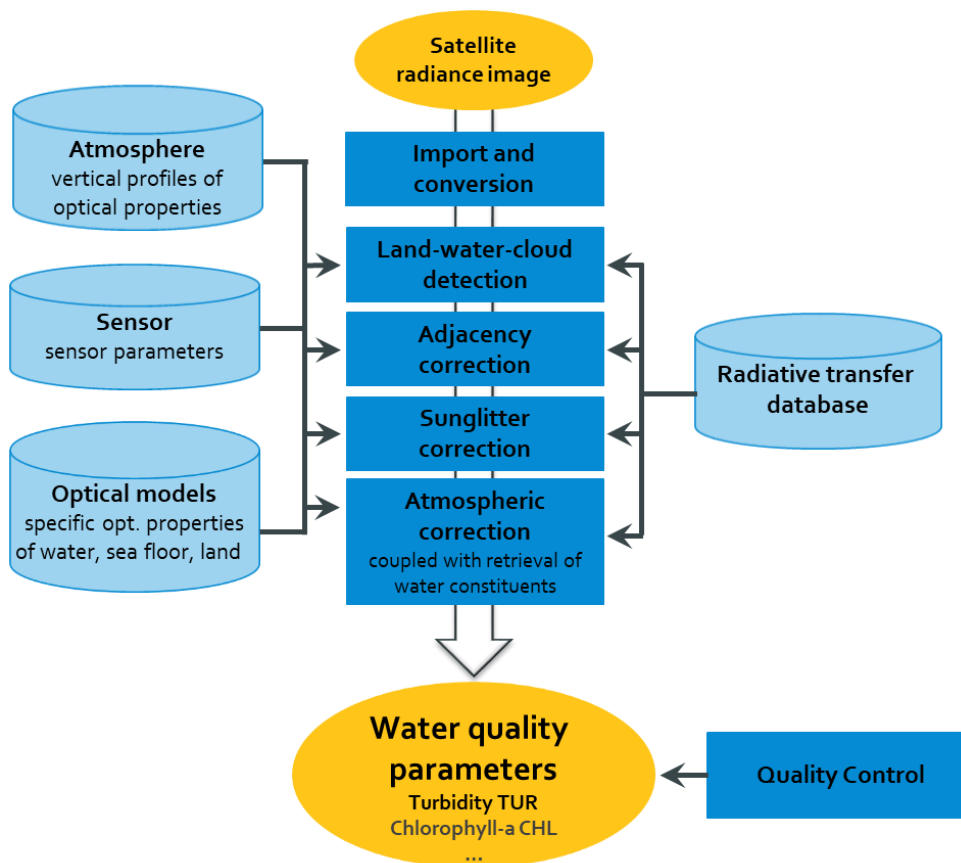


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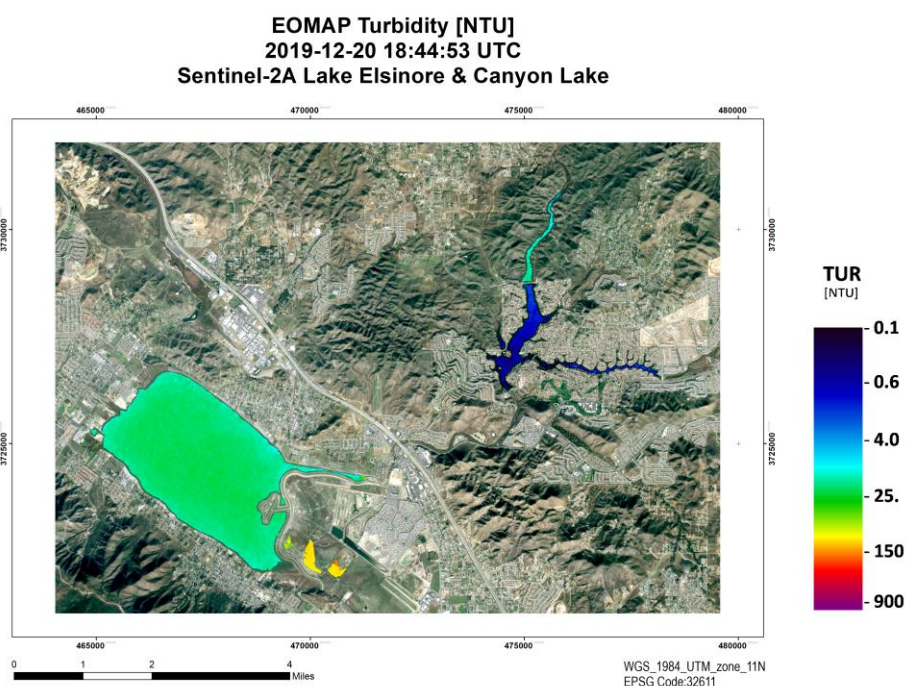


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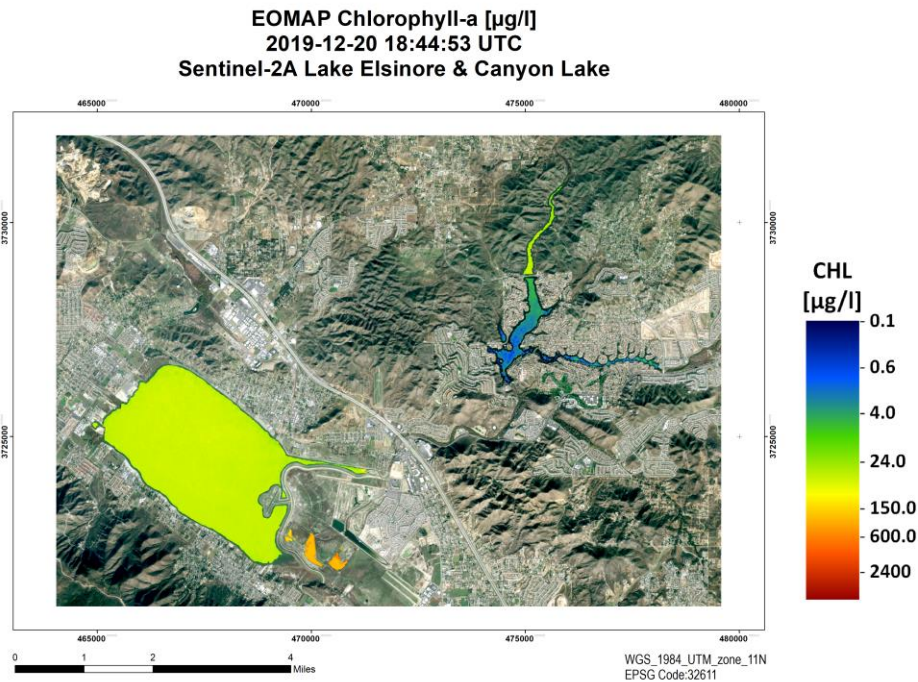


Figure 3: Chlorophyll-a product from 2019-12-20

The **Harmful Algae Bloom Indicator (HAB)** refers to the presence of cyanobacteria. It is sensitive to the appearance of cyanobacteria-related pigments, i.e. phycocyanin and phycoerythrin. Both pigments show absorption features in green wavelengths from 500 nm to approx. 640 nm; phycoerythrin shows its absorption maximum at 540-570 nm, phycocyanin at 610-620 (Colyer et al. 2005). Most satellite sensors support the identification of this feature with only two bands, i.e. one in the green wavelength region (e.g. L7 and L8 at 530 – 590 nm) and in the red wavelength region at approx. 640 – 670 nm. The used standard parameterisation of phytoplankton absorption in MIP as described above, however, does not account phycocyanin and phycoerythrin absorption in the retrieval process. The modelled phytoplankton absorption therefore lacks the absorption features of these pigments. Nonetheless, if these pigments are present in the water a slight spectral mismatch between modelled water leaving reflectance ($R_{modelled}$) and satellite derived reflectance ($R_{satellite}$) occurs. The algorithm then compares the slope of $R_{modelled}$ and $R_{satellite}$ between the green and red band ($\delta R = R_{green} - R_{red}$) in order to classify pixels with regard to phycocyanin and phycoerythrin occurrence, i.e. harmful algae bloom probability. The HAB indicator from 2019-12-20 is shown in Figure 4.

⁹ Bricaud, A., Babin, M., Morel, A., Claustre, H. (1995): Variability in the chlorophyll-specific absorption coefficients of natural phytoplankton: Analysis and parametrization. *Journal of Geophysical Research Atmospheres*, 100(C7):13,321-13,332
¹⁰ Broszeit, A., 2015. Assessing long-term inland water quality using satellite imagery: A Feasibility and validation study of different lake types. MSc Thesis, Julius-Maximilian-University Würzburg, 96p

**EOMAP Harmful Algae Bloom Indicator
2019-12-20 18:44:53 UTC
Sentinel-2A Lake Elsinore & Canyon Lake**

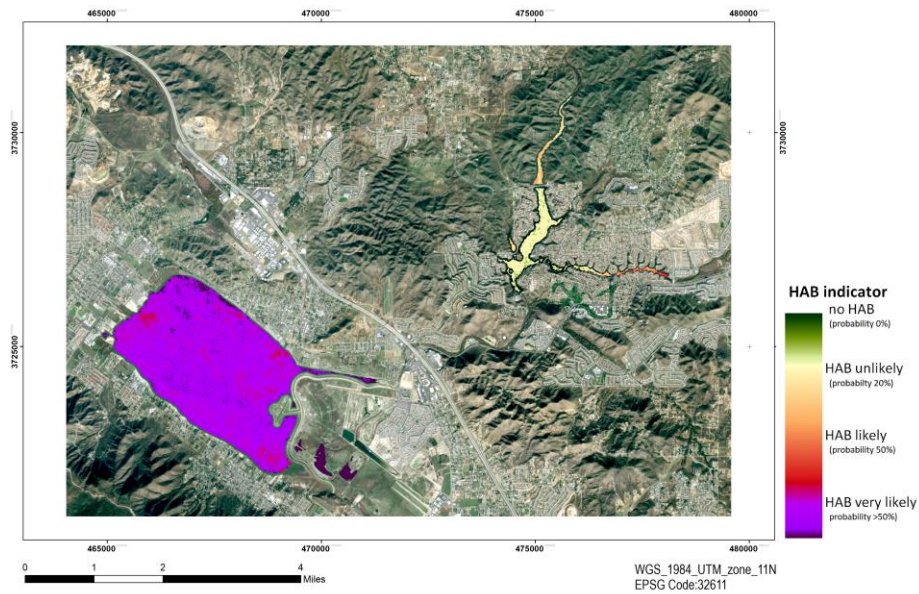


Figure 4: Harmful Algae Bloom Indicator product from 2019-12-20

RGB composite images represent the area of interest in true colour or false colour modes by combining pre-defined bands, depending on the sensor in use.

2.3 Quality Control and Flagging

As a standard output of the processing, an accuracy or quality indicator is calculated for each retrieved parameter and for each detected water pixel. This measure comprises a comprehensive range of factors that can impact the derived product quality, including:

- the geometry between sun, target, and sensor,
- the estimated sun glint probability,
- the retrieved aerosol optical depth,
- residuals of the measured and modelled sensor radiances and subsurface reflectances,
- the comparison of retrieved water species concentrations to extreme values as defined in the configuration files,
- pixels affected by cloud shadow and
- shallow water areas.

Threshold values define distinct values when a parameter is assumed to influence the quality. All parameters are integrated into one remaining quality parameter, allowing both an improved flagging and a quality weighting of pixels, that can later be merged into integrated 3rd level products.

The quality information is part of each standard geodata delivery and is visualized by two different 8bit Geo-TIFFs:

- QUT - Total Quality, quantifying the overall quality of each pixel from low to high. Only valid water pixels - excluding land, cloud or flagged pixels - are represented in QUT indicator (Figure 5).
- QUC – EOMAP Quality coding (Figure 6), revealing the processor's internal quality check, split into the defined indicators (e.g. sunglint, shallow water risk, etc.). These are classified into 'no quality concerns', 'quality risk and 'bad quality' (flag). Note that 'quality risk' pixels are marked as such but not flagged.

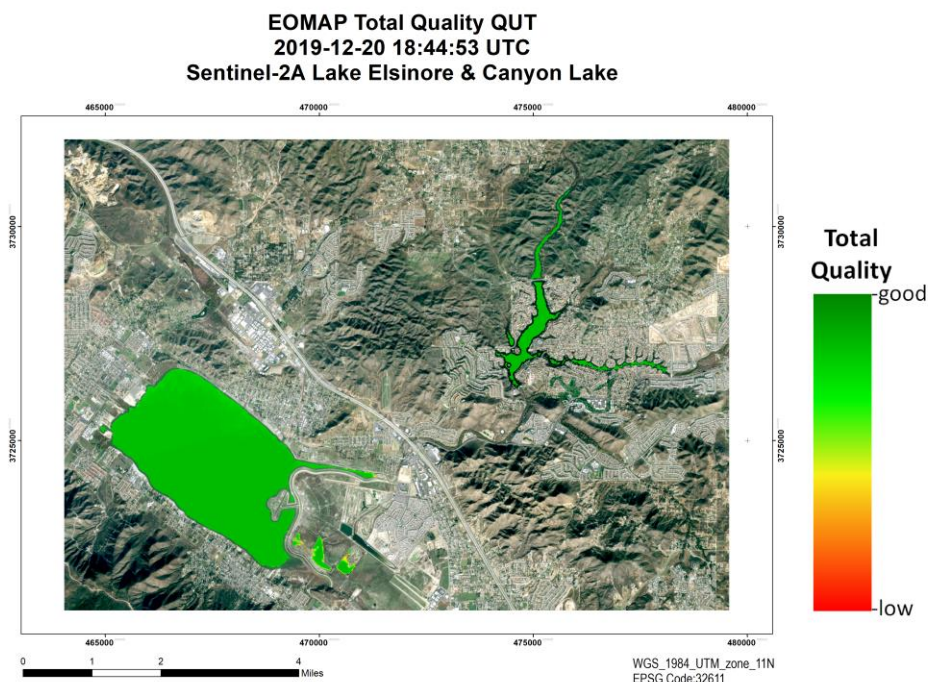


Figure 5: QUT product from 2019-12-20

EOMAP Quality Coding QUC
2019-12-20 18:44:53 UTC
Sentinel-2A Lake Elsinore & Canyon Lake

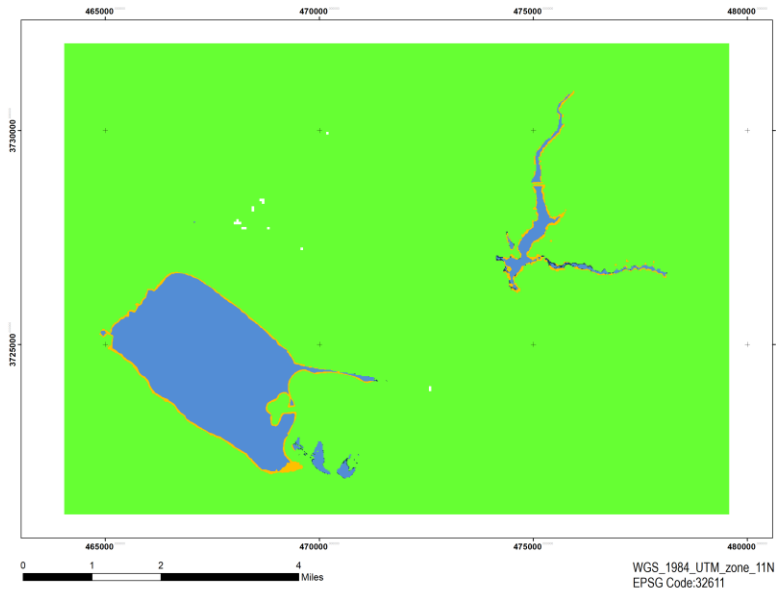


Figure 6: QUC product from 2019-12-20

The QUC file indicates the main quality influencing parameter using a specific EOMAP quality coding classification scheme with corresponding grey values (GV), shown in Figure 7 .

Professional version allow combination of the two most relevant flags:					
First number = most relevant flag					
1-digit-number refer to second relevant flag, e.g. 1 for sunglint risk, 2 for large solar zenith angle					
Examples: 25 Warning flag for large zenit solar angle and Whitecaps					
114 Critical flag for sunglint, plus warning for aerosol above limits					
GV	GV range	Flag status	Flag description	Color code	Color
0	0	Water	No risk identified	0 0 0	
10	10 - 19	Warning	sunglint risk	148 138 84	
20	20 - 29	Warning	large solar zenith angle	83 141 213	
30	30 - 39	Warning	large spacecraft zenith angle	218 150 148	
40	40 - 49	Warning	Aerosol above limit or Cirrus risk	196 215 155	
50	50 - 59	Warning	Cloud Shadow	177 160 199	
60	60 - 69	Warning	Shallow water risk	146 205 220	
70	70 - 79	Warning	Mixed pixel risk	250 191 143	
80	80 - 89	Warning	Retrieved concentration at configuration limit	190 190 190	
90	90 - 99	Warning	Retrieval / processor warning	210 210 210	
110	110 - 119	Critical	sunglint risk	73 69 41	
120	120 - 129	Critical	large solar zenith angle	22 54 92	
130	130 - 139	Critical	large spacecraft zenith angle	150 54 52	
140	140 - 149	Critical	Aerosol above limit or Cirrus risk	118 147 60	
150	150 - 159	Critical	Cloud Shadow	96 73 122	
160	160 - 169	Critical	Shallow water risk	49 134 155	
170	170 - 179	Critical	Mixed pixel risk	226 107 10	
180	180 - 189	Critical	Retrieved concentration at configuration limit	120 120 120	
190	190 - 199	Critical	Retrieval / processor warning	130 130 130	
220	220	No value	Transition Zone	102 255 51	
221	221	Unreliable	Shallow water automatically	146 205 220	
222	222	Unreliable	Shallow water manually	60 159 186	
223	223	Unreliable	Floating material	32 95 107	
230	230	No water	Land	102 255 51	
232	232	Unreliable	Invalid pixel manually	255 192 0	
240	240	No water	Cloud	255 255 255	
242	242	Unreliable	Cloud Shadow manually	96 73 122	
244	244	Unreliable	Hill shadow	73 57 93	
250	250	No retrieval	No retrieval / out of AOI or image extend	255 0 0	

Figure 7: EOMAP QUC quality coding

EOMAP's water quality products are accompanied by the processor's internal quality control mechanisms QUT and QUC, resulting in pixel flagging in case of unreliable values. Moreover, a manual quality check and - if required - additional masking is applied to each product.

As an example, cloud shadow effects typically occur in the vicinity of clouds, resulting in unrealistically low water parameter values. In order to detect and flag these areas, EOMAP has developed a specific algorithm based on geometric models, considering the sun angle and sensor viewing geometry, the retrieved aerosol properties, the height of the clouds, an analysis of the blue channel radiances and a statistical anomaly detection of the water species concentrations. When applying this cloud shadow detection algorithm, approx. 85% of the cloud shadows are detected and masked. Remaining cloud shadows are manually flagged and can be identified in the QUC file by GV 242.

Due to the spatial extent of single pixels (Sentinel-2: 10*10m, Landsat 8: 30*30m), it is likely that spectral mixing of signals from land and water can affect the pixels along the edge of the water body, leading to unreliable retrieval of water parameter values. Such pixels are labelled with the quality flag 'transition zone'. EOMAP uses a high-resolution land-water-mask database to determine the land-water-boundary, which is then filtered to create a transition zone that is automatically flagged during processing. In the 8bit water constituent products the transition zone is marked by GV 251, whereas in the QUC product it is 220.

2.4 Data Format

The water quality data is delivered as 32bit real value GeoTIFF as well as 8bit scaled and colored GeoTIFF for easier visualization. The colours currently used are a suggestion/standard, but can be changed according to client specific request. In addition, metadata is stored in the .xml and the metadata .pdf files.

2.5 Data Sources

EOMAP uses the following data hubs to access and download satellite raw data from different sensors:

- Sentinel-3: PEPS <https://peps.cnes.fr>
- Landsat-8 Amazon Web Services, <https://landsat-pds.s3.amazonaws.com>
- Sentinel-2: ESA Sentinel HUB <https://scihub.copernicus.eu/dhus/#/home>
- MODIS Aqua and Terra: USGS <https://earthexplorer.usgs.gov/>

Contact

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Website	www.eomap.com

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Delivery Report

Water Quality Monitoring Lake Elsinore & Canyon Lake

Date: 2020-04-27

Client: Wood Plc

Delivery no.: 1773_Delivery_EOMAP2WoodPlc_Vs14_20200427

Authors:

Philip Klinger
Karin Schenk

Mail:

klinger@eomap.de
schenk@eomap.de

Telephone:

+49 8152 9986 115
+49 8152 9986 112

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1. Service Provision Report

Contractor Details	Service Provider Details
Wood Environment & Infrastructure Solutions, Inc.	EOMAP GmbH & Co. KG
9210 Sky Park Court, Suite 200	Schlosshof 4, 82229 Seefeld, Germany
San Diego, CA 92123, USA	
Point of Contact	Point of Contact
John D. Rudolph	Philip Klinger
john.rudolph@woodplc.com	klinger@eomap.de, +49 (0)8152 9986115

Contractor PO / Reference number	
Contractor project title	
Service Provider reference number	1773
Date of delivery	2020-04-27
Version	14

List of all delivered scenes

Sensor	Time of record
Sentinel-2B	2020-04-23 18:44:53 UTC

Content

Product	Abbreviation	Yes/No
Total Absorption	ABS	<input type="checkbox"/>
Aerosol Optical Thickness	AOT	<input type="checkbox"/>
Yellow Substances	CDM	<input type="checkbox"/>
Chlorophyll-a	CHL	<input checked="" type="checkbox"/>
Ratio of Absorption and Scattering	DIV	<input type="checkbox"/>
Harmful Algae Bloom Indicator	HAB	<input checked="" type="checkbox"/>
Diffuse Attenuation Coefficient	KDC	<input type="checkbox"/>
Quality Coding	QUC	<input checked="" type="checkbox"/>
Total Quality	QUT	<input checked="" type="checkbox"/>
True Color/False Color Composite	RGB	<input checked="" type="checkbox"/>
Remote Sensing Reflectance	RRS	<input type="checkbox"/>
Secchi Disc Depth	SDD	<input type="checkbox"/>
Sum of Inorganic Absorption	SIA	<input type="checkbox"/>
Sum of Organic Absorption	SOA	<input type="checkbox"/>
Surface Temperature	SST	<input type="checkbox"/>
Turbidity	TUR	<input checked="" type="checkbox"/>
Trophic State Index (Chlorophyll)	TSC	<input type="checkbox"/>
Total Suspended Matter	TSM	<input type="checkbox"/>
Light Penetration Depth	Z90	<input type="checkbox"/>
Water Body Extent	WEX	<input type="checkbox"/>

List of delivered files (one product example)

File name	File format	Content
1773_Delivery_EOMAP2WoodPlc_Vs14_20200423.pdf	PDF	Delivery Report
CHL_us-california_11smt_EOMAP_20200423_184453_SENT2_m0010.tif	GeoTIFF	Product raster file, 8bit scaled and coloured
CHL_us-california_11smt_EOMAP_20200423_184453_SENT2_m0010	GeoTIFF	Product raster file, 32bit real values
CHL_us-california_11smt_EO-MAP_20200423_184453_SENT2_m0010_wgs84_xyz.txt	ASCII	Product text file, real values
CHL_us-california_11smt_EOMAP_20200423_184453_SENT2_m0010.kmz	KMZ	GoogleEarth overlay
CHL_us-california_11smt_EOMAP_20200423_184453_SENT2_m0010_metadata.xml	XML	Metadata
CHL_us-california_11smt_EOMAP_20200423_184453_SENT2_m0010_overview.pdf	PDF	Overview PDF, metadata and quicklook

File naming

[Product abbreviation]_[Country code]-[Area]_EOMAP_[Date of satellite image recording]_[Time of satellite image recording]_[sensor code]_[spatial resolution]_[optional]

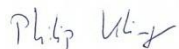
With

[Product abbreviation]	see list of product abbreviations
[Country code]	Country ID following ISO 3166 ALPHA-2 standards
[Area]	name of city/region or other relevant area characterization
[Date of satellite image rec.]	Satellite image date used for the analysis in YYYYMMDD (YY= Year, MM = Month, DD = Date) in UTC
[Time of satellite image rec.]	Satellite image date used for the analysis in HHMMSS (HH= Hours, MM = Minute, SS = Seconds) in UTC time
[sensor code]	Sensor in use
[spatial resolution]	Spatial resolution/grid spacing in meters
[optional]	is an optional parameter which can be used to support the intuitive use of the data, such as 'metadata' or 'XYZQ' for metadata files and ASCII XYZQ files.

Notes (e.g. technical issues, exceptional conditions, etc.)

- Sun glint on parts of Canyon Lake could not be corrected sufficiently and is therefore flagged.

Data Analyst



Philip Klinger

QA/QC



Karin Schenk

2. Methodology and Products

2.1 Modular Inversion and Processing System (MIP)

For the retrieval of satellite-derived water quality data, the physics-based Modular Inversion and Processing System (MIP), developed by EOMAP, has been applied to the satellite imagery. This sensor-independent approach includes all the relevant processing steps to guarantee a robust, standardised and operational retrieval of water quality parameters from various satellite data sources. The advantage of physics-based methods is that they do not require a priori information about the study area and can therefore be applied independently of satellite type and study area.

MIP imbeds sensor-independent algorithms and processing modules to derive consistent water quality parameters for multiple scales through a number of different satellite sensors. The algorithms take all relevant environmental impacts into account and do so for each individual measurement and pixel according to the current state-of-the-art, including:

- a. water, land, cloud identification
- b. estimation and correction of atmosphere and aerosol impacts^{1 2}
- c. correction altitude level impacts³
- d. correction of adjacency impact (light scattering into the water signal from adjacent land surfaces)⁴
- e. correction⁵ or flagging⁶ of sunglitter impact
- f. retrieval of in-water absorption and scattering as physical measures⁷
- g. accounting for varying spectral slopes of specific inherent optical properties⁸
- h. provision of uncertainty measures and flagging procedures
- i. accounting for the full bidirectional effects in the atmosphere, at the water-atmosphere boundary layers and in-water, using a fully coupled radiative transfer model
- j. application of procedures to minimize errors, resulting from the coupled interaction of light between atmosphere, water surface and in-water on the signal, through coupled inversion procedures

The different workflow steps from satellite raw imagery import to value-added water quality retrieval are displayed in Figure 1.

¹ Heege, T., Kiselev, V., Wettle, M., Hung N.N. (2014): Operational multi-sensor monitoring of turbidity for the entire Mekong Delta . Int. J. Remote Sensing, Special Issues Remote Sensing of the Mekong, Vol. 35 (8), pp. 2910-2926

² Richter, R., Heege, T., Kiselev, V., Schläpfer, D. (2014): Correction of ozone influence on TOA radiance. Int. J. of Remote Sensing. Vol. 35(23), pp. 8044-8056, doi: 10.1080/01431161.2014.978041

³ Heege, T., Fischer, J. (2004): Mapping of water constituents in Lake Constance using multispectral airborne scanner data and a physically based processing scheme. Can. J. Remote Sensing, Vol. 30, No. 1, pp. 77-86

⁴ Kiselev, V., Bulgarelli, B. and Heege, T., (2015). Sensor independent adjacency correction algorithm for coastal and inland water systems. Remote Sensing of Environment, 157: 85-95. , ISSN 0034-4257, <http://dx.doi.org/10.1016/j.rse.2014.07.025>

⁵ Heege, T. & Fischer, J. (2000): Sun glitter correction in remote sensing imaging spectrometry. SPIE Ocean Optics XV Conference, Monaco, Oct. 16-20.

⁶ EU FP7-Projekt GLASS: WP4 Validation report (29.2.2016): www.glass-project.eu/assets/Deliverables/GLaSS-D4.2.pdf

⁷ Bumberger J., Heege T., Klinger P., et al. (2017): Towards a Harmonized Validation Procedure for Inland Water Optical Remote Sensing Data using Inherent Optical Properties, Rem. Sens. 2017(9), 21p, submitted 28 Feb. 2017

⁸ Heege T., Schenk K., Klinger P., Broszeit A., Wenzel J., Kiselev V. (2015): Monitoring status and trends of water quality in inland waters using earth observation technologies. Proceedings "Water Quality in Europe: Challenges and Best Practice" UNESCO-IHP European Regional Consultation Workshop, Koblenz, Germany, Dec 2015, p. 1-4

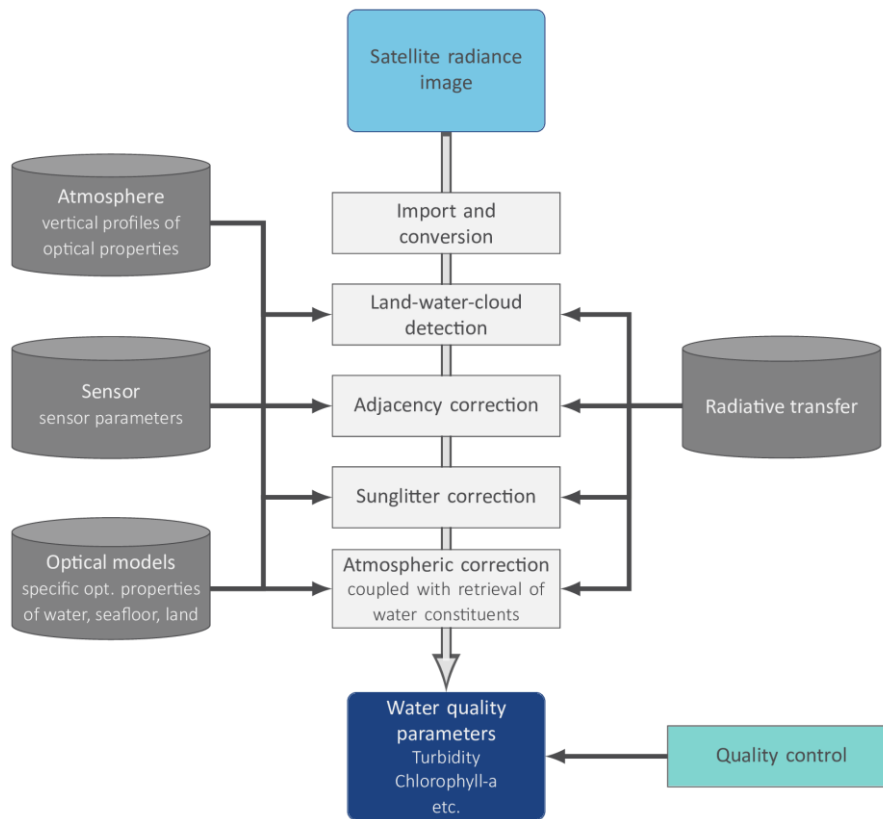


Figure 1: EOMAP's physics-based workflow to derive satellite-based water quality

MIP is the most established, sensor-independent and operational aquatic remote sensing processing system for the full range of high, medium and low-resolution satellite sensors. Fully-automated water monitoring processors are installed in satellite ground segments worldwide (Europe, Australia, Asia and America), to ensure fast and efficient access to a wide range of satellite data. The data processing and orchestration software, the EOMAP Workflow System (EWS) allows for continuous, daily production.

2.2 Products

Turbidity (TUR) is a key parameter of water quality and is linearly related to the backward scattering of light of organic and inorganic particles in water. Turbidity is also linearly related to Total Suspended Matter (TSM) at low to moderate turbidity values. The measurement unit is Nephelometric Turbidity Unit (NTU). Satellite-derived turbidity is determined by the backward scattering of light between 450 to 800nm, which is physically retrieved using satellite data. The standard relation of EOMAP concentrations to inherent optical properties is defined as $1 \text{ NTU} = 0.0118 \text{ 1/m backward scattering at } 550\text{nm}$, or $1 \text{ NTU} = 0.619 \text{ 1/m total scattering at } 550\text{nm}$ for an assumed ratio $bb/b = 0.019$. The linear relation between turbidity and suspended matter/solids in low to moderate concentrations is in most cases a regional constant, but can vary with particle size distribution. Note that the geometrical properties of an in-situ measurement device, and the wavelength in use, may differ in comparison to the satellite product. For example, the standard FTU determination, a measure of turbidity similar to NTU, is based on the measurement of light scattered within a 90° angle from a beam directed at the water sample. Alongside temporal differences in satellite and in situ measurements, different sampling depths and the measurement location, this needs to be considered when comparing and interpreting satellite derived vs. in situ measured turbidity values. The Turbidity product from 2020-04-23 is shown in Figure 2.

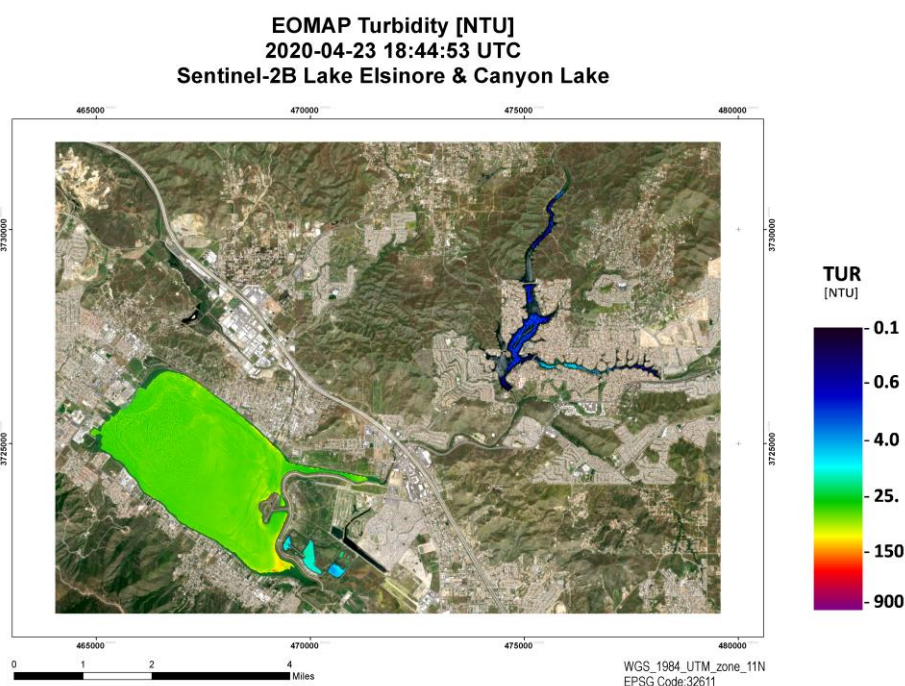


Figure 2: Turbidity product from 2020-04-23

Chlorophyll-a (CHL) retrieval is based on the derived information of in-water organic absorption, in-water turbidity and spectral characteristics of each water body. Chlorophyll-a in $[\mu\text{g/l}]$, is provided as a measure linearly related to the pigment-specific absorption at 440nm, with $1 \mu\text{g/l Chl}$ equal to $0.035 \text{ 1/m pigment absorption}$. Phaeophytin and further pigments cannot be discriminated methodologically with the spectral resolution provided by Landsat 8/Sentinel-2 and similar sensors and is therefore included in this product. The pigment-related absorption is always smaller than the absorption of organic components (SOA). For clear water condi-

tions (low chlorophyll/total suspended solids), the specific absorption chlorophyll increases significantly (Bricaud et al. 1995⁹). Chlorophyll values can vary over 4 magnitudes, for marine waters or clear lakes typical concentrations between 0.01 and 10 µg/l, while for eutrophic lakes concentrations can reach 100 µg/l and more. The chlorophyll products are typically reliable within a range of 10 – 50 % in comparison to in situ measures (Broszeit 2015¹⁰), which are typically based on one of three different methods, which include photometric, fluorescence and HPLC approaches and their subcategories. The Chlorophyll-a product from 2020-04-33 is shown in Figure 3.

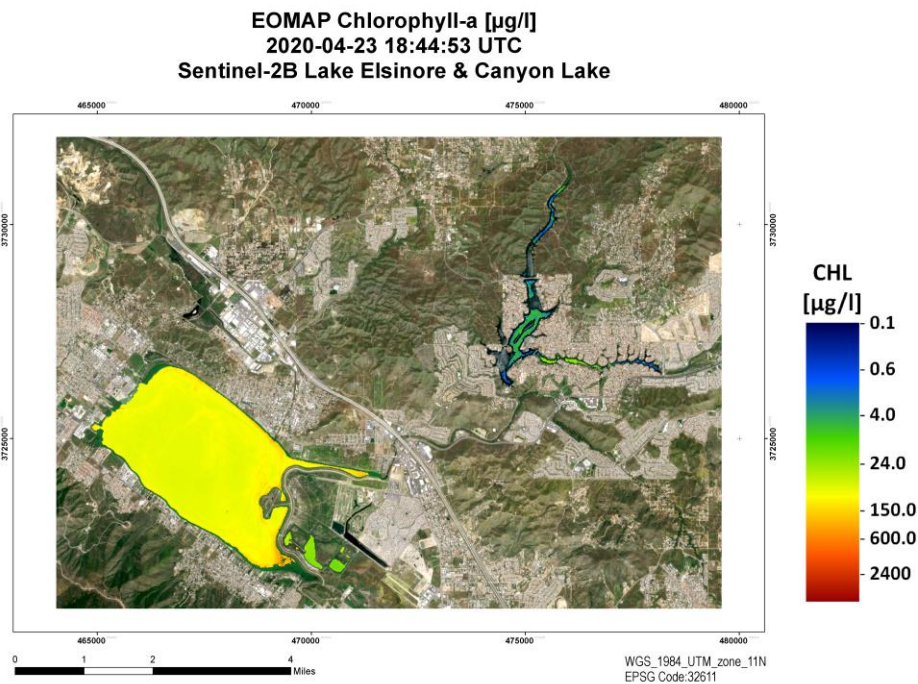


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⁹ Bricaud, A., Babin, M., Morel, A., Claustre, H. (1995): Variability in the chlorophyll-specific absorption coefficients of natural phytoplankton: Analysis and parametrization. *Journal of Geophysical Research Atmospheres*, 100(C7):13,321-13,332

¹⁰ Broszeit, A., 2015. Assessing long-term inland water quality using satellite imagery: A Feasibility and validation study of different lake types. MSc Thesis, Julius-Maximilian-University Würzburg, 96p

**EOMAP Harmful Algae Bloom Indicator
2020-04-23 18:44:53 UTC
Sentinel-2B Lake Elsinore & Canyon Lake**

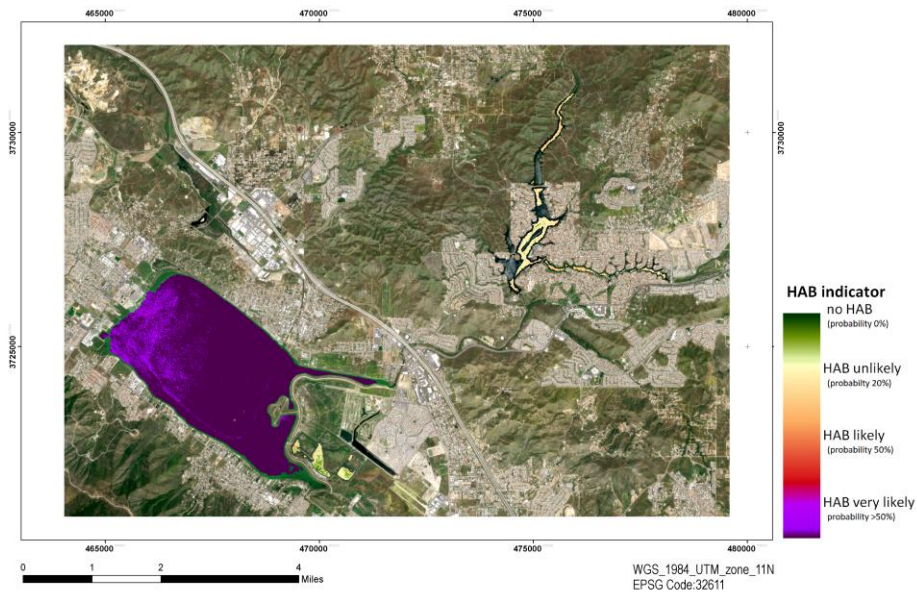


Figure 4: Harmful Algae Bloom Indicator product from 2020-04-23

RGB composite images represent the area of interest in true colour or false colour modes by combining pre-defined bands, depending on the sensor in use.

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- QUC – EOMAP Quality coding (Figure 6), revealing the processor's internal quality check, split into the defined indicators (e.g. sunglint, shallow water risk, etc.). These are classified into 'no quality concerns', 'quality risk and 'bad quality' (flag). Note that 'quality risk' pixels are marked as such but not flagged.

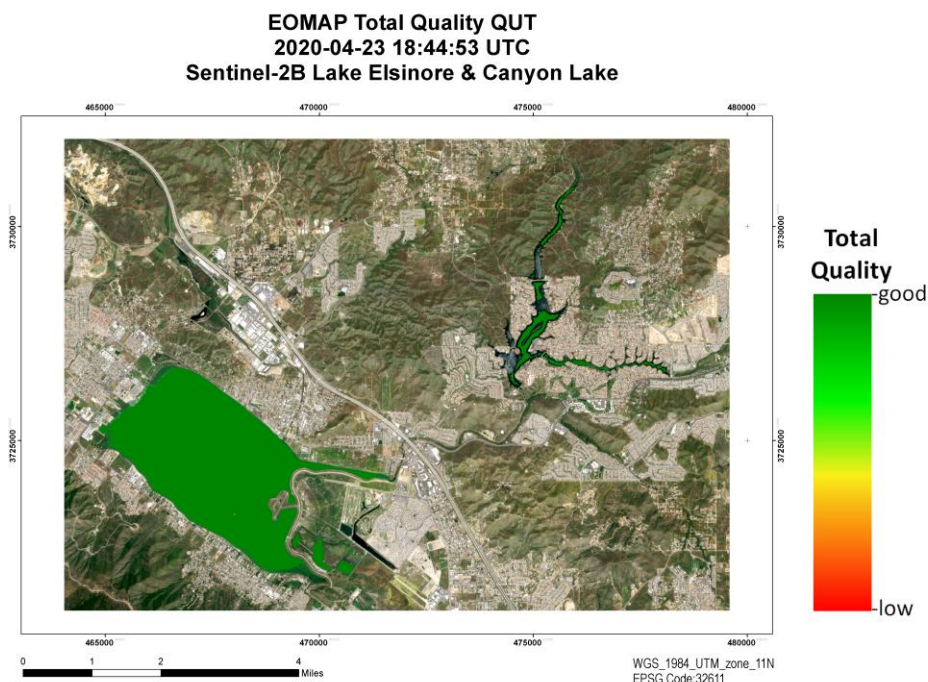


Figure 5: QUT product from 2020-04-23

EOMAP Quality Coding QUC
2020-04-23 18:44:53 UTC
Sentinel-2B Lake Elsinore & Canyon Lake

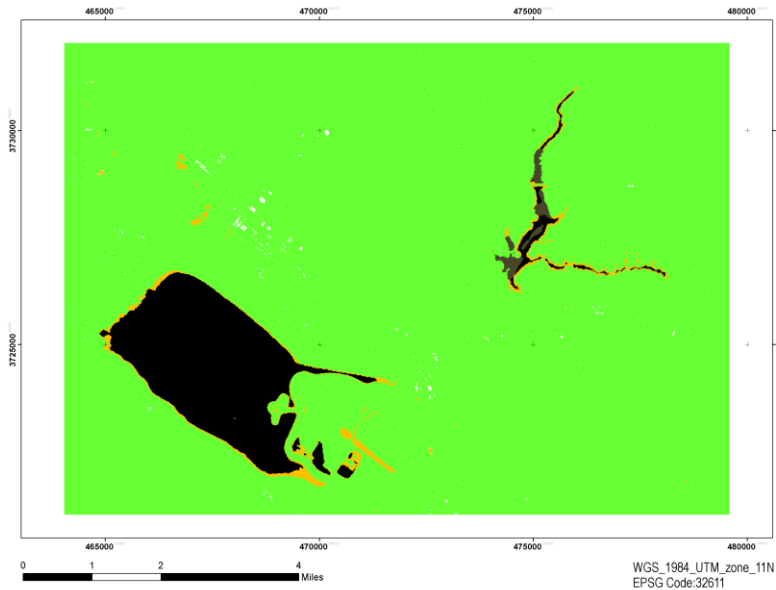


Figure 6: QUC product from 2020-04-23

The QUC file indicates the main quality influencing parameter using a specific EOMAP quality coding classification scheme with corresponding grey values (GV), shown in Figure 7 .

Professional version allow combination of the two most relevant flags:					
First number = most relevant flag					
1-digit-number refer to second relevant flag, e.g. 1 for sunglint risk, 2 for large solar zenith angle					
Examples: 25 Warning flag for large zenit solar angle and Whitecaps					
114 Critical flag for sunglint, plus warning for aerosol above limits					
GV	GV range	Flag status	Flag description	Color code	Color
0	0	Water	No risk identified	0 0 0	
10	10 - 19	Warning	sunglint risk	148 138 84	
20	20 - 29	Warning	large solar zenith angle	83 141 213	
30	30 - 39	Warning	large spacecraft zenith angle	218 150 148	
40	40 - 49	Warning	Aerosol above limit or Cirrus risk	196 215 155	
50	50 - 59	Warning	Cloud Shadow	177 160 199	
60	60 - 69	Warning	Shallow water risk	146 205 220	
70	70 - 79	Warning	Mixed pixel risk	250 191 143	
80	80 - 89	Warning	Retrieved concentration at configuration limit	190 190 190	
90	90 - 99	Warning	Retrieval / processor warning	210 210 210	
110	110 - 119	Critical	sunglint risk	73 69 41	
120	120 - 129	Critical	large solar zenith angle	22 54 92	
130	130 - 139	Critical	large spacecraft zenith angle	150 54 52	
140	140 - 149	Critical	Aerosol above limit or Cirrus risk	118 147 60	
150	150 - 159	Critical	Cloud Shadow	96 73 122	
160	160 - 169	Critical	Shallow water risk	49 134 155	
170	170 - 179	Critical	Mixed pixel risk	226 107 10	
180	180 - 189	Critical	Retrieved concentration at configuration limit	120 120 120	
190	190 - 199	Critical	Retrieval / processor warning	130 130 130	
220	220	No value	Transition Zone	102 255 51	
221	221	Unreliable	Shallow water automatically	146 205 220	
222	222	Unreliable	Shallow water manually	60 159 186	
223	223	Unreliable	Floating material	32 95 107	
230	230	No water	Land	102 255 51	
232	232	Unreliable	Invalid pixel manually	255 192 0	
240	240	No water	Cloud	255 255 255	
242	242	Unreliable	Cloud Shadow manually	96 73 122	
244	244	Unreliable	Hill shadow	73 57 93	
250	250	No retrieval	No retrieval / out of AOI or image extend	255 0 0	

Figure 7: EOMAP QUC quality coding

EOMAP's water quality products are accompanied by the processor's internal quality control mechanisms QUT and QUC, resulting in pixel flagging in case of unreliable values. Moreover, a manual quality check and - if required - additional masking is applied to each product.

As an example, cloud shadow effects typically occur in the vicinity of clouds, resulting in unrealistically low water parameter values. In order to detect and flag these areas, EOMAP has developed a specific algorithm based on geometric models, considering the sun angle and sensor viewing geometry, the retrieved aerosol properties, the height of the clouds, an analysis of the blue channel radiances and a statistical anomaly detection of the water species concentrations. When applying this cloud shadow detection algorithm, approx. 85% of the cloud shadows are detected and masked. Remaining cloud shadows are manually flagged and can be identified in the QUC file by GV 242.

Due to the spatial extent of single pixels (Sentinel-2: 10*10m, Landsat 8: 30*30m), it is likely that spectral mixing of signals from land and water can affect the pixels along the edge of the water body, leading to unreliable retrieval of water parameter values. Such pixels are labelled with the quality flag 'transition zone'. EOMAP uses a high-resolution land-water-mask database to determine the land-water-boundary, which is then filtered to create a transition zone that is automatically flagged during processing. In the 8bit water constituent products the transition zone is marked by GV 251, whereas in the QUC product it is 220.

2.4 Data Format

The water quality data is delivered as 32bit real value GeoTIFF as well as 8bit scaled and colored GeoTIFF for easier visualization. The colours currently used are a suggestion/standard, but can be changed according to client specific request. In addition, metadata is stored in the .xml and the metadata .pdf files.

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- Sentinel-2: ESA Sentinel HUB <https://scihub.copernicus.eu/dhus/#/home>
- MODIS Aqua and Terra: USGS <https://earthexplorer.usgs.gov/>

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Delivery Report

Water Quality Monitoring Lake Elsinore & Canyon Lake

Date: 2020-06-30

Client: Wood Plc

Delivery no.: 1773_Delivery_EOMAP2WoodPlc_Vs15_20200630

Authors:

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1. Service Provision Report

Contractor Details	Service Provider Details
Wood Environment & Infrastructure Solutions, Inc.	EOMAP GmbH & Co. KG
9210 Sky Park Court, Suite 200	Schlosshof 4, 82229 Seefeld, Germany
San Diego, CA 92123, USA	
Point of Contact	Point of Contact
John D. Rudolph	Philip Klinger
john.rudolph@woodplc.com	klinger@eomap.de, +49 (0)8152 9986115

Contractor PO / Reference number	
Contractor project title	
Service Provider reference number	1773
Date of delivery	2020-06-30
Version	15

List of all delivered scenes

Sensor	Time of record
Landsat-8	2020-06-26 18:22:17 UTC

Content

Product	Abbreviation	Yes/No
Total Absorption	ABS	<input type="checkbox"/>
Aerosol Optical Thickness	AOT	<input type="checkbox"/>
Yellow Substances	CDM	<input type="checkbox"/>
Chlorophyll-a	CHL	<input checked="" type="checkbox"/>
Ratio of Absorption and Scattering	DIV	<input type="checkbox"/>
Harmful Algae Bloom Indicator	HAB	<input checked="" type="checkbox"/>
Diffuse Attenuation Coefficient	KDC	<input type="checkbox"/>
Quality Coding	QUC	<input checked="" type="checkbox"/>
Total Quality	QUT	<input checked="" type="checkbox"/>
True Color/False Color Composite	RGB	<input checked="" type="checkbox"/>
Remote Sensing Reflectance	RRS	<input type="checkbox"/>
Secchi Disc Depth	SDD	<input type="checkbox"/>
Sum of Inorganic Absorption	SIA	<input type="checkbox"/>
Sum of Organic Absorption	SOA	<input type="checkbox"/>
Surface Temperature	SST	<input type="checkbox"/>
Turbidity	TUR	<input checked="" type="checkbox"/>
Trophic State Index (Chlorophyll)	TSC	<input type="checkbox"/>
Total Suspended Matter	TSM	<input type="checkbox"/>
Light Penetration Depth	Z90	<input type="checkbox"/>
Water Body Extent	WEX	<input type="checkbox"/>

List of delivered files (one product example)

File name	File format	Content
1773_Delivery_EOMAP2WoodPlc_Vs18_20200630.pdf	PDF	Delivery Report
CHL_us-california_040037_EOMAP_20200626_182217_LSAT8_m0030.tif	GeoTIFF	Product raster file, 8bit scaled and coloured
CHL_us-california_040037_EOMAP_20200626_182217_LSAT8_m0030_32bit.tif	GeoTIFF	Product raster file, 32bit real values
CHL_us-california_040037_EO-MAP_20200626_182217_LSAT8_m0030_wgs84_xyz.txt	ASCII	Product text file, real values
CHL_us-california_040037_EOMAP_20200626_182217_LSAT8_m0030.kmz	KMZ	GoogleEarth overlay
CHL_us-california_040037_EO-MAP_20200626_182217_LSAT8_m0030_metadata.xml	XML	Metadata
CHL_us-california_040037_EOMAP_20200626_182217_LSAT8_m0030_overview.pdf	PDF	Overview PDF, metadata and quicklook

File naming

[Product abbreviation]_[Country code]-[Area]_EOMAP_[Date of satellite image recording]_[Time of satellite image recording]_[sensor code]_[spatial resolution]_[optional]

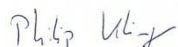
With

[Product abbreviation]	see list of product abbreviations
[Country code]	Country ID following ISO 3166 ALPHA-2 standards
[Area]	name of city/region or other relevant area characterization
[Date of satellite image rec.]	Satellite image date used for the analysis in YYYYMMDD (YY= Year, MM = Month, DD = Date) in UTC
[Time of satellite image rec.]	Satellite image date used for the analysis in HHMMSS (HH= Hours, MM = Minute, SS = Seconds) in UTC time
[sensor code]	Sensor in use
[spatial resolution]	Spatial resolution/grid spacing in meters
[optional]	is an optional parameter which can be used to support the intuitive use of the data, such as 'metadata' or 'XYZQ' for metadata files and ASCII XYZQ files.

Notes (e.g. technical issues, exceptional conditions, etc.)

- Sun glint on parts of Lake Elsinore could not be corrected sufficiently and is therefore flagged.
 - Increased uncertainty of water constituent concentrations in eastern arm of Canyon Lake due to resolution of the used sensor (30m Landsat-8).
-

Data Analyst



Philip Klinger

QA/QC



Karin Schenk

2. Methodology and Products

2.1 Modular Inversion and Processing System (MIP)

For the retrieval of satellite-derived water quality data, the physics-based Modular Inversion and Processing System (MIP), developed by EOMAP, has been applied to the satellite imagery. This sensor-independent approach includes all the relevant processing steps to guarantee a robust, standardised and operational retrieval of water quality parameters from various satellite data sources. The advantage of physics-based methods is that they do not require a priori information about the study area and can therefore be applied independently of satellite type and study area.

MIP imbeds sensor-independent algorithms and processing modules to derive consistent water quality parameters for multiple scales through a number of different satellite sensors. The algorithms take all relevant environmental impacts into account and do so for each individual measurement and pixel according to the current state-of-the-art, including:

- a. water, land, cloud identification
- b. estimation and correction of atmosphere and aerosol impacts^{1 2}
- c. correction altitude level impacts³
- d. correction of adjacency impact (light scattering into the water signal from adjacent land surfaces)⁴
- e. correction⁵ or flagging⁶ of sunglitter impact
- f. retrieval of in-water absorption and scattering as physical measures⁷
- g. accounting for varying spectral slopes of specific inherent optical properties⁸
- h. provision of uncertainty measures and flagging procedures
- i. accounting for the full bidirectional effects in the atmosphere, at the water-atmosphere boundary layers and in-water, using a fully coupled radiative transfer model
- j. application of procedures to minimize errors, resulting from the coupled interaction of light between atmosphere, water surface and in-water on the signal, through coupled inversion procedures

The different workflow steps from satellite raw imagery import to value-added water quality retrieval are displayed in Figure 1.

¹ Heege, T., Kiselev, V., Wettle, M., Hung N.N. (2014): Operational multi-sensor monitoring of turbidity for the entire Mekong Delta . Int. J. Remote Sensing, Special Issues Remote Sensing of the Mekong, Vol. 35 (8), pp. 2910-2926

² Richter, R., Heege, T., Kiselev, V., Schläpfer, D. (2014): Correction of ozone influence on TOA radiance. Int. J. of Remote Sensing. Vol. 35(23), pp. 8044-8056, doi: 10.1080/01431161.2014.978041

³ Heege, T., Fischer, J. (2004): Mapping of water constituents in Lake Constance using multispectral airborne scanner data and a physically based processing scheme. Can. J. Remote Sensing, Vol. 30, No. 1, pp. 77-86

⁴ Kiselev, V., Bulgarelli, B. and Heege, T., (2015). Sensor independent adjacency correction algorithm for coastal and inland water systems. Remote Sensing of Environment, 157: 85-95. , ISSN 0034-4257, <http://dx.doi.org/10.1016/j.rse.2014.07.025>

⁵ Heege, T. & Fischer, J. (2000): Sun glitter correction in remote sensing imaging spectrometry. SPIE Ocean Optics XV Conference, Monaco, Oct. 16-20.

⁶ EU FP7-Projekt GLASS: WP4 Validation report (29.2.2016): www.glass-project.eu/assets/Deliverables/GLaSS-D4.2.pdf

⁷ Bumberger J., Heege T., Klinger P., et al. (2017): Towards a Harmonized Validation Procedure for Inland Water Optical Remote Sensing Data using Inherent Optical Properties, Rem. Sens. 2017(9), 21p, submitted 28 Feb. 2017

⁸ Heege T., Schenk K., Klinger P., Broszeit A., Wenzel J., Kiselev V. (2015): Monitoring status and trends of water quality in inland waters using earth observation technologies. Proceedings "Water Quality in Europe: Challenges and Best Practice" UNESCO-IHP European Regional Consultation Workshop, Koblenz, Germany, Dec 2015, p. 1-4

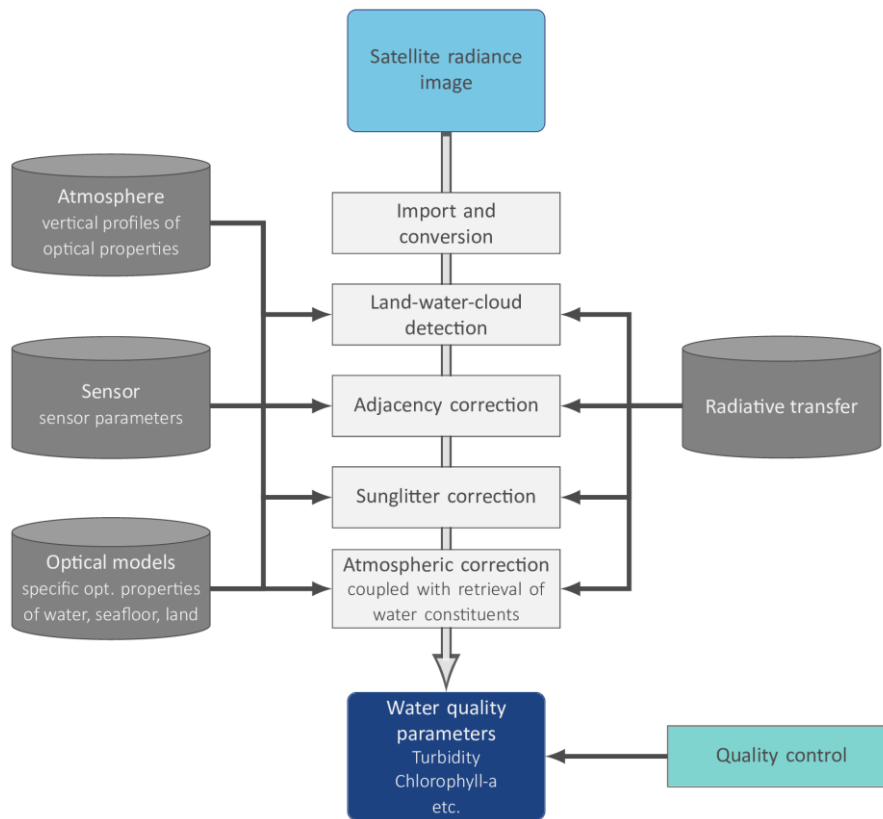


Figure 1: EOMAP's physics-based workflow to derive satellite-based water quality

MIP is the most established, sensor-independent and operational aquatic remote sensing processing system for the full range of high, medium and low-resolution satellite sensors. Fully-automated water monitoring processors are installed in satellite ground segments worldwide (Europe, Australia, Asia and America), to ensure fast and efficient access to a wide range of satellite data. The data processing and orchestration software, the EOMAP Workflow System (EWS) allows for continuous, daily production.

2.2 Products

Turbidity (TUR) is a key parameter of water quality and is linearly related to the backward scattering of light of organic and inorganic particles in water. Turbidity is also linearly related to Total Suspended Matter (TSM) at low to moderate turbidity values. The measurement unit is Nephelometric Turbidity Unit (NTU). Satellite-derived turbidity is determined by the backward scattering of light between 450 to 800nm, which is physically retrieved using satellite data. The standard relation of EOMAP concentrations to inherent optical properties is defined as $1 \text{ NTU} = 0.0118 \text{ 1/m backward scattering at } 550\text{nm}$, or $1 \text{ NTU} = 0.619 \text{ 1/m total scattering at } 550\text{nm}$ for an assumed ratio $bb/b = 0.019$. The linear relation between turbidity and suspended matter/solids in low to moderate concentrations is in most cases a regional constant, but can vary with particle size distribution. Note that the geometrical properties of an in-situ measurement device, and the wavelength in use, may differ in comparison to the satellite product. For example, the standard FTU determination, a measure of turbidity similar to NTU, is based on the measurement of light scattered within a 90° angle from a beam directed at the water sample. Alongside temporal differences in satellite and in situ measurements, different sampling depths and the measurement location, this needs to be considered when comparing and interpreting satellite derived vs. in situ measured turbidity values. The Turbidity product from 2020-06-26 is shown in Figure 2.

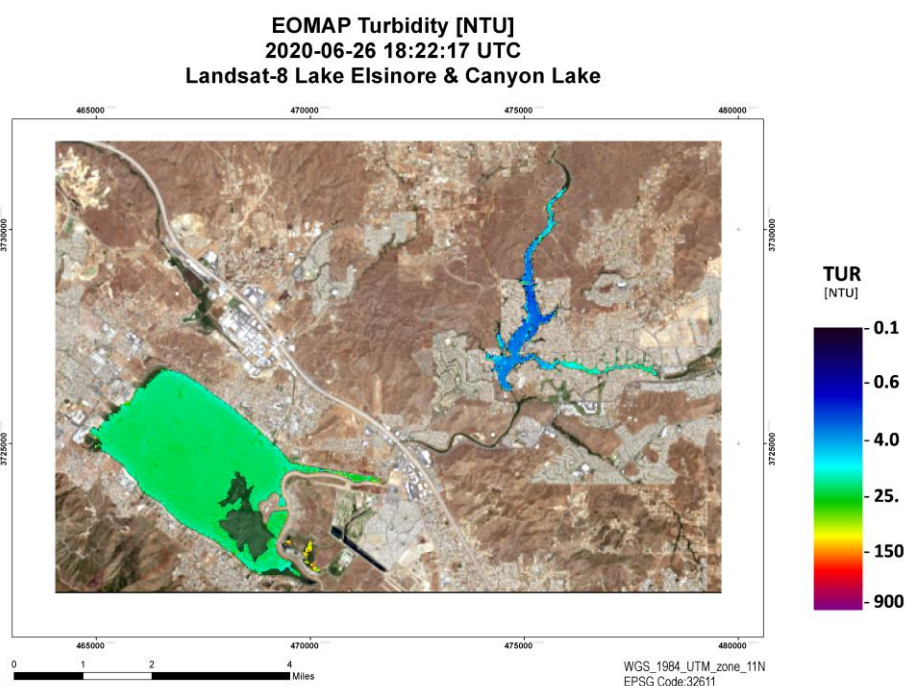


Figure 2: Turbidity product from 2020-06-26

Chlorophyll-a (CHL) retrieval is based on the derived information of in-water organic absorption, in-water turbidity and spectral characteristics of each water body. Chlorophyll-a in $[\mu\text{g/l}]$, is provided as a measure linearly related to the pigment-specific absorption at 440nm, with $1 \mu\text{g/l Chl}$ equal to $0.035 \text{ 1/m pigment absorption}$. Phaeophytin and further pigments cannot be discriminated methodologically with the spectral resolution provided by Landsat 8/Sentinel-2 and similar sensors and is therefore included in this product. The pigment-related absorption is always smaller than the absorption of organic components (SOA). For clear water condi-

tions (low chlorophyll/total suspended solids), the specific absorption chlorophyll increases significantly (Bricaud et al. 1995⁹). Chlorophyll values can vary over 4 magnitudes, for marine waters or clear lakes typical concentrations between 0.01 and 10 µg/l, while for eutrophic lakes concentrations can reach 100 µg/l and more. The chlorophyll products are typically reliable within a range of 10 – 50 % in comparison to in situ measures (Broszeit 2015¹⁰), which are typically based on one of three different methods, which include photometric, fluorescence and HPLC approaches and their subcategories. The Chlorophyll-a product from 2020-06-26 is shown in Figure 3.

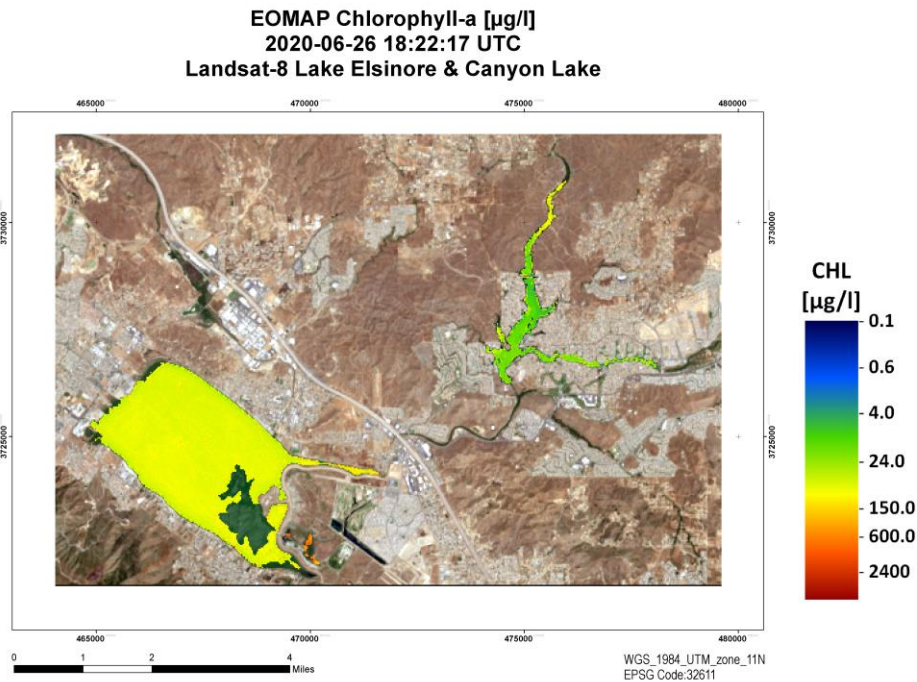


Figure 3: Chlorophyll-a product from 2020-06-26

The **Harmful Algae Bloom Indicator (HAB)** refers to the presence of cyanobacteria. It is sensitive to the appearance of cyanobacteria-related pigments, i.e. phycocyanin and phycoerythrin. Both pigments show absorption features in green wavelengths from 500 nm to approx. 640 nm; phycoerythrin shows its absorption maximum at 540-570 nm, phycocyanin at 610-620 (Colyer et al. 2005). Most satellite sensors support the identification of this feature with only two bands, i.e. one in the green wavelength region (e.g. L7 and L8 at 530 – 590 nm) and in the red wavelength region at approx. 640 – 670 nm. The used standard parameterisation of phytoplankton absorption in MIP as described above, however, does not account phycocyanin and phycoerythrin absorption in the retrieval process. The modelled phytoplankton absorption therefore lacks the absorption features of these pigments. Nonetheless, if these pigments are present in the water a slight spectral mismatch between modelled water leaving reflectance ($R_{modelled}$) and satellite derived reflectance ($R_{satellite}$) occurs. The algorithm then compares the slope of $R_{modelled}$ and $R_{satellite}$ between the green and red band ($\delta R = R_{green} - R_{red}$) in order to classify pixels with regard to phycocyanin and phycoerythrin occurrence, i.e. harmful algae bloom probability. The HAB indicator from 2020-06-26 is shown in Figure 4.

⁹ Bricaud, A., Babin, M., Morel, A., Claustre, H. (1995): Variability in the chlorophyll-specific absorption coefficients of natural phytoplankton: Analysis and parametrization. *Journal of Geophysical Research Atmospheres*, 100(C7):13,321-13,332
¹⁰ Broszeit, A., 2015. Assessing long-term inland water quality using satellite imagery: A Feasibility and validation study of different lake types. MSc Thesis, Julius-Maximilian-University Würzburg, 96p

**EOMAP Harmful Algae Bloom Indicator
2020-06-26 18:22:17 UTC
Landsat-8 Lake Elsinore & Canyon Lake**

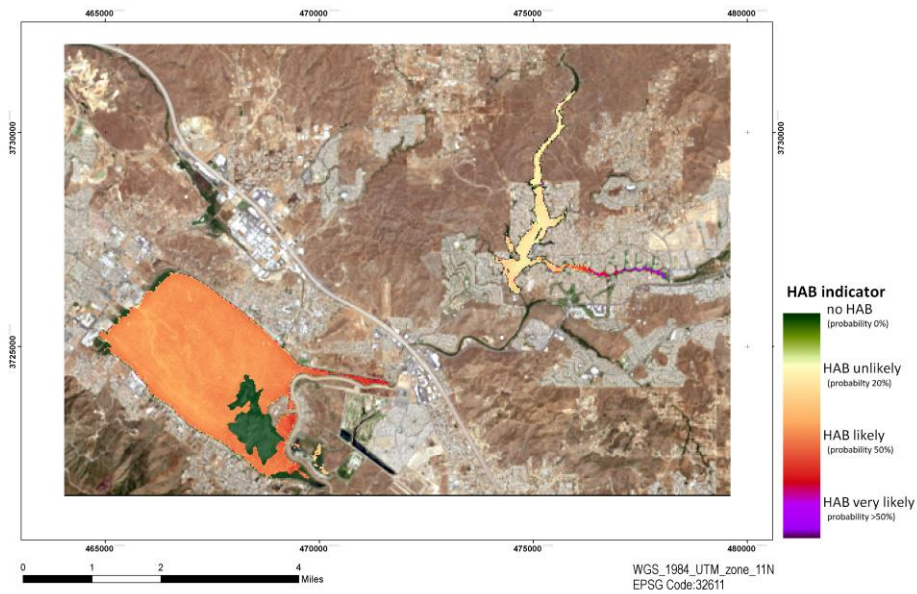


Figure 4: Harmful Algae Bloom Indicator product from 2020-06-26

RGB composite images represent the area of interest in true colour or false colour modes by combining pre-defined bands, depending on the sensor in use.

2.3 Quality Control and Flagging

As a standard output of the processing, an accuracy or quality indicator is calculated for each retrieved parameter and for each detected water pixel. This measure comprises a comprehensive range of factors that can impact the derived product quality, including:

- the geometry between sun, target, and sensor,
- the estimated sun glint probability,
- the retrieved aerosol optical depth,
- residuals of the measured and modelled sensor radiances and subsurface reflectances,
- the comparison of retrieved water species concentrations to extreme values as defined in the configuration files,
- pixels affected by cloud shadow and
- shallow water areas.

Threshold values define distinct values when a parameter is assumed to influence the quality. All parameters are integrated into one remaining quality parameter, allowing both an improved flagging and a quality weighting of pixels, that can later be merged into integrated 3rd level products.

The quality information is part of each standard geodata delivery and is visualized by two different 8bit Geo-TIFFs:

- QUT - Total Quality, quantifying the overall quality of each pixel from low to high. Only valid water pixels - excluding land, cloud or flagged pixels - are represented in QUT indicator (Figure 5).
- QUC – EOMAP Quality coding (Figure 6), revealing the processor's internal quality check, split into the defined indicators (e.g. sunglint, shallow water risk, etc.). These are classified into 'no quality concerns', 'quality risk and 'bad quality' (flag). Note that 'quality risk' pixels are marked as such but not flagged.

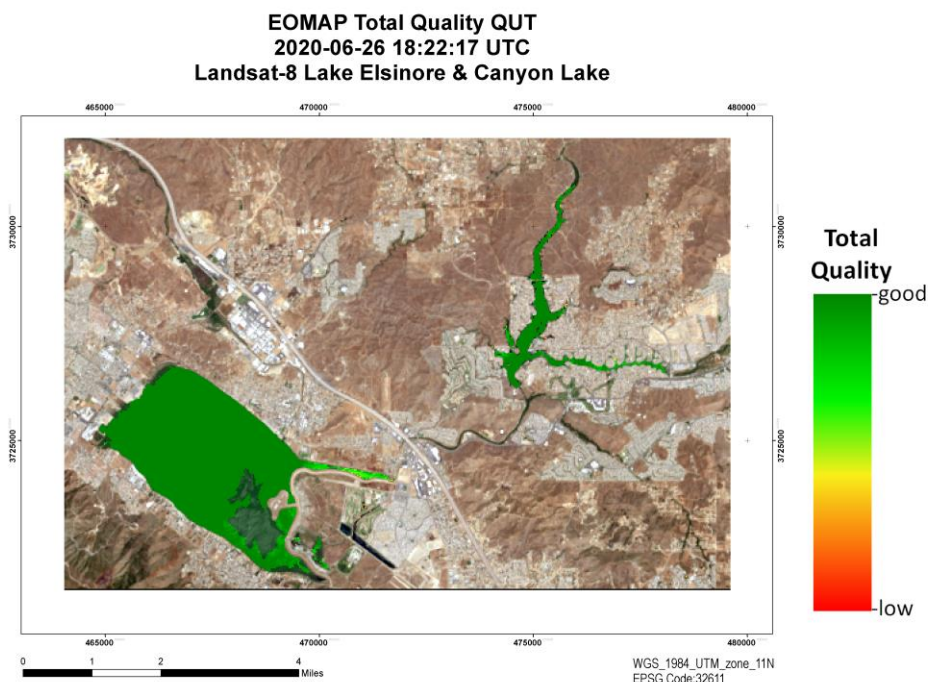


Figure 5: QUT product from 2020-06-26

EOMAP Quality Coding QUC
2020-06-26 18:22:17 UTC
Landsat-8 Lake Elsinore & Canyon Lake

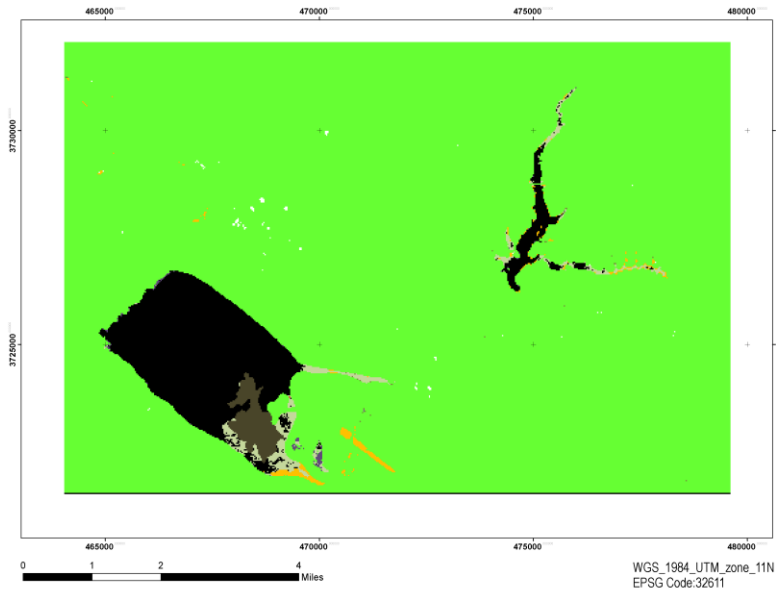


Figure 6: QUC product from 2020-06-26

The QUC file indicates the main quality influencing parameter using a specific EOMAP quality coding classification scheme with corresponding grey values (GV), shown in Figure 7 .

Professional version allow combination of the two most relevant flags:					
First number = most relevant flag					
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- Sentinel-2: ESA Sentinel HUB <https://scihub.copernicus.eu/dhus/#/home>
- MODIS Aqua and Terra: USGS <https://earthexplorer.usgs.gov/>

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Website	www.eomap.com

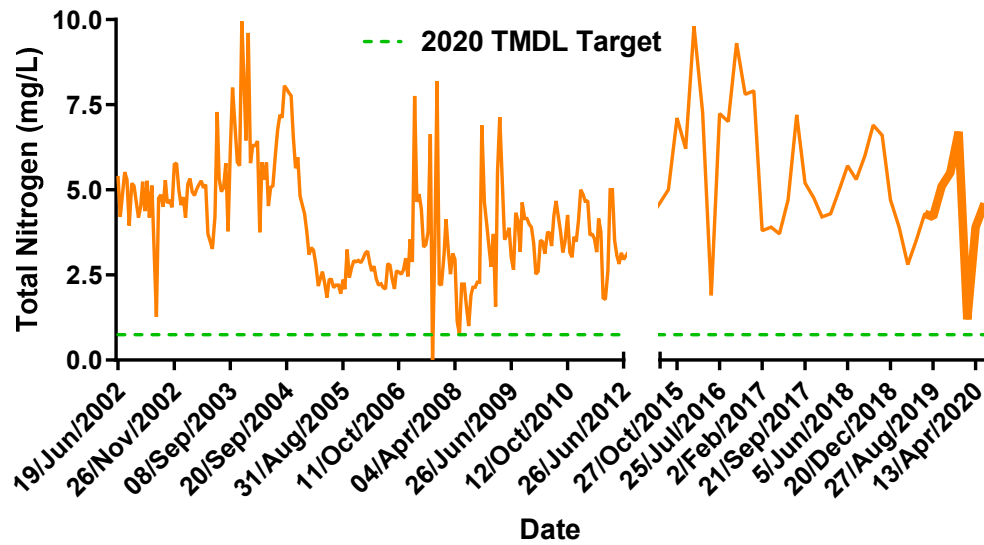
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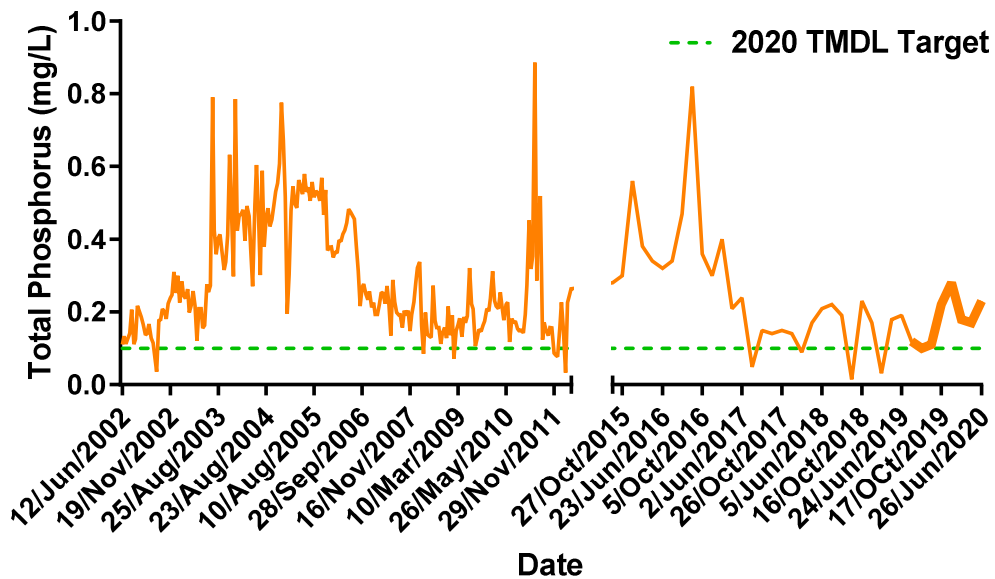
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APPENDIX E - CURRENT DATA IN HISTORICAL CONTEXT

Lake Elsinore- Historical Monitoring Results

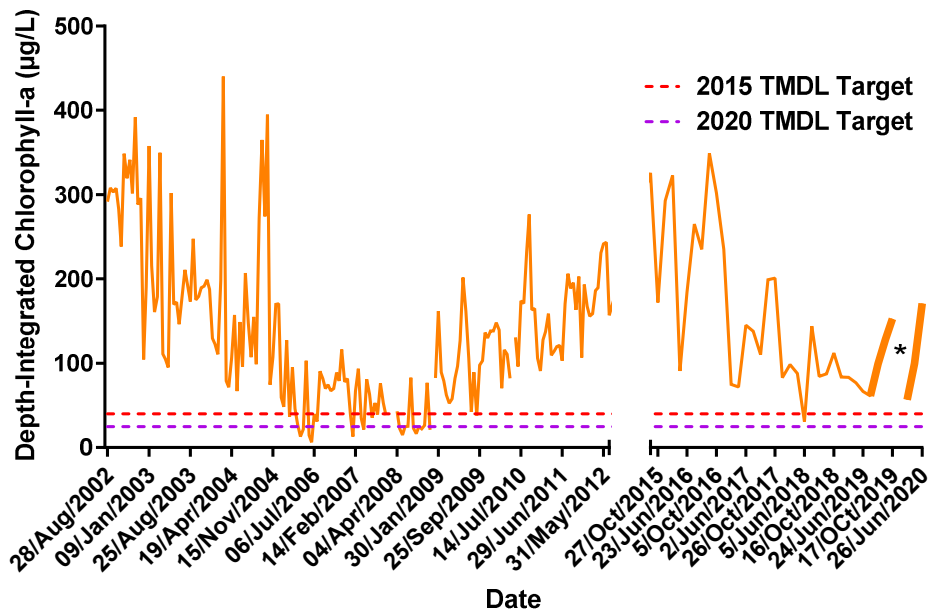


No data available from June 2012-July2015
 TMDL target of 0.75 mg/L is annual average to be attained by 2020
 Bold represents current monitoring year July 2019-June 2020

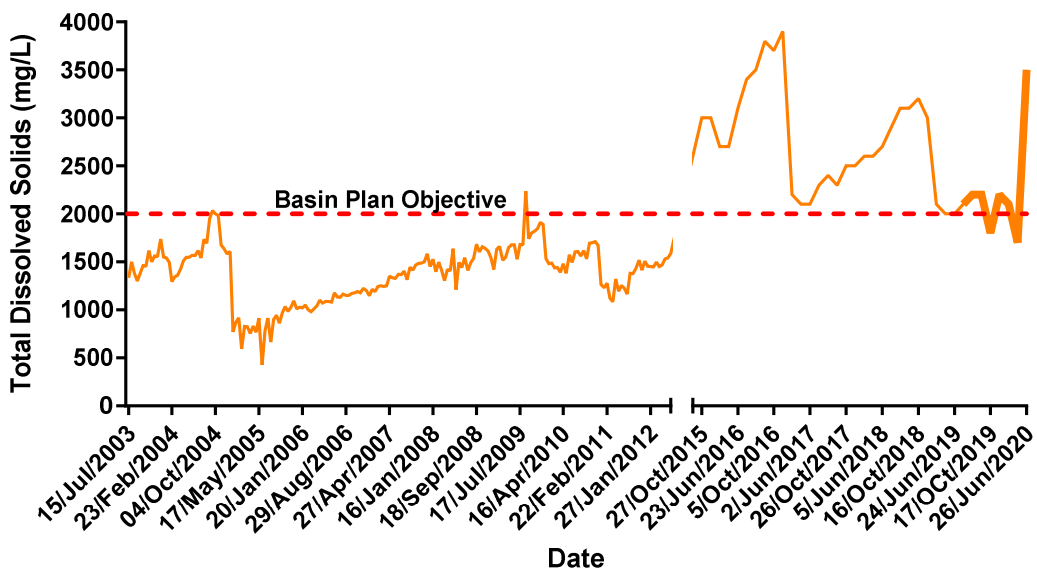


No data available from June 2012-July2015
 TMDL target of 0.75 mg/L is annual average to be attained by 2020
 Bold represents current monitoring year July 2019-June 2020

Lake Elsinore- Historical Monitoring Results (continued)

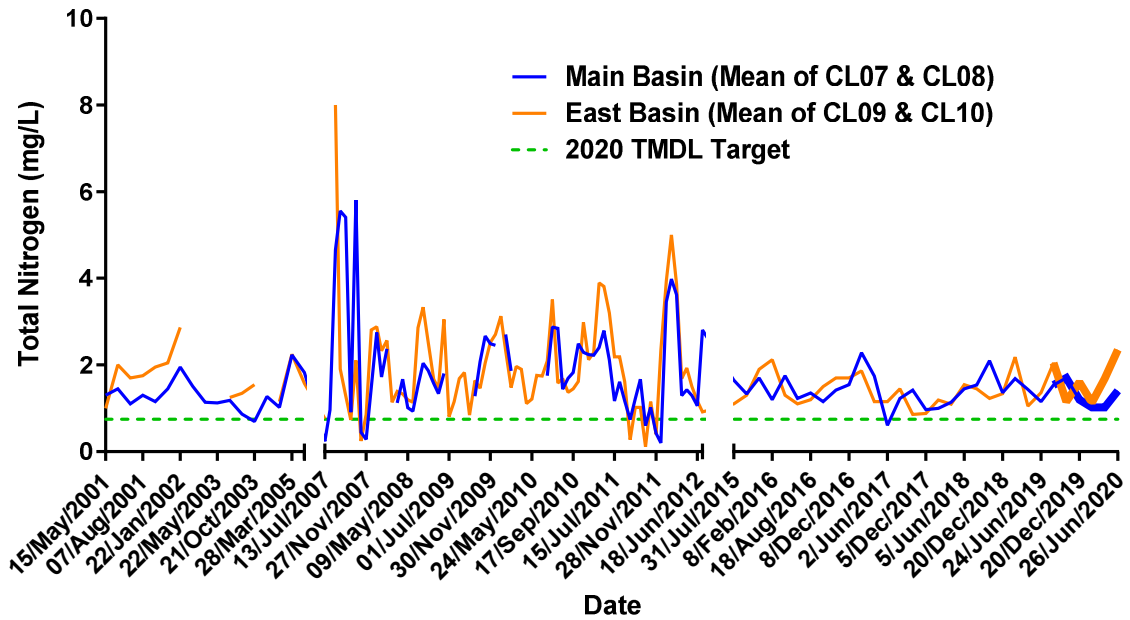


No data available from June 2012-July 2015
 2015 TMDL target of 40 µg/L is annual average to be attained by 2015
 2020 TMDL target of 25 µg/L is annual average to be attained by 2020
Bold represents current monitoring year July 2019-June 2020
 *No results for December 2019 sample. See report for details.

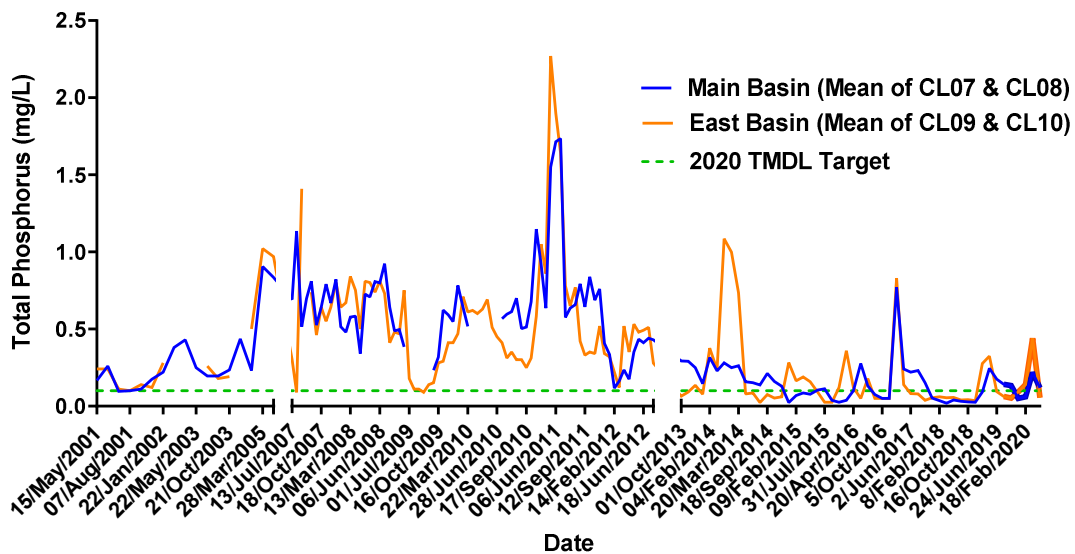


No data available from June 2012-July 2015
Bold represents current monitoring year July 2019-June 2020

Canyon Lake- Historical Monitoring Results

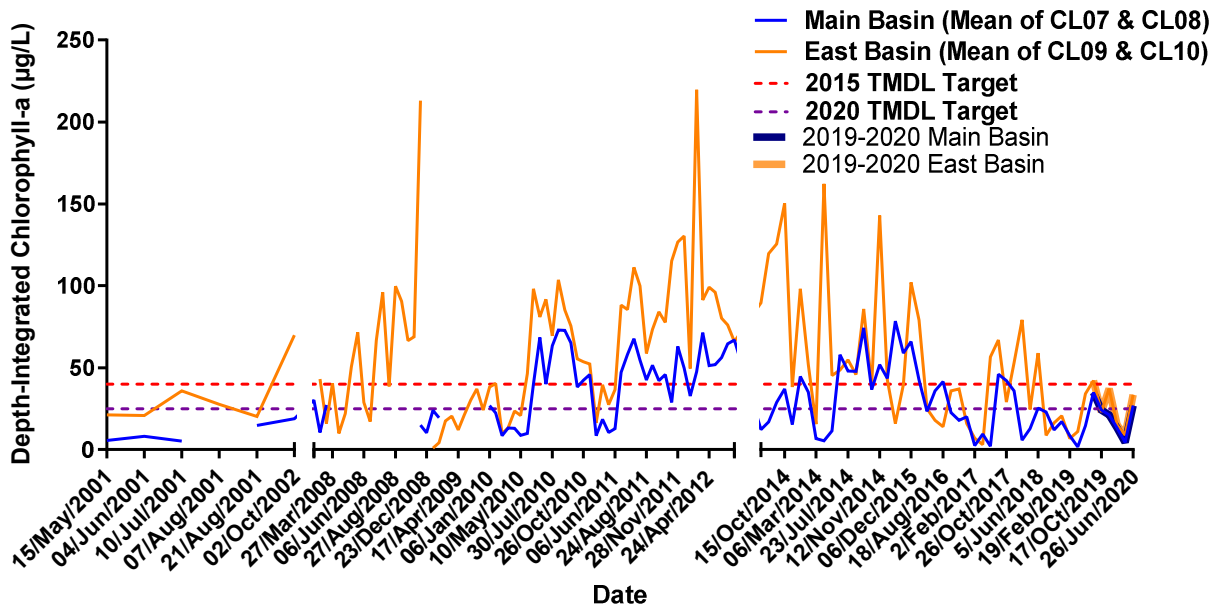


No data available from May 2005-July 2007; June 2012-July 2015
 TMDL target of 0.75 mg/L is annual average to be attained by 2020
 Bold represents current monitoring year July 2019-June 2020

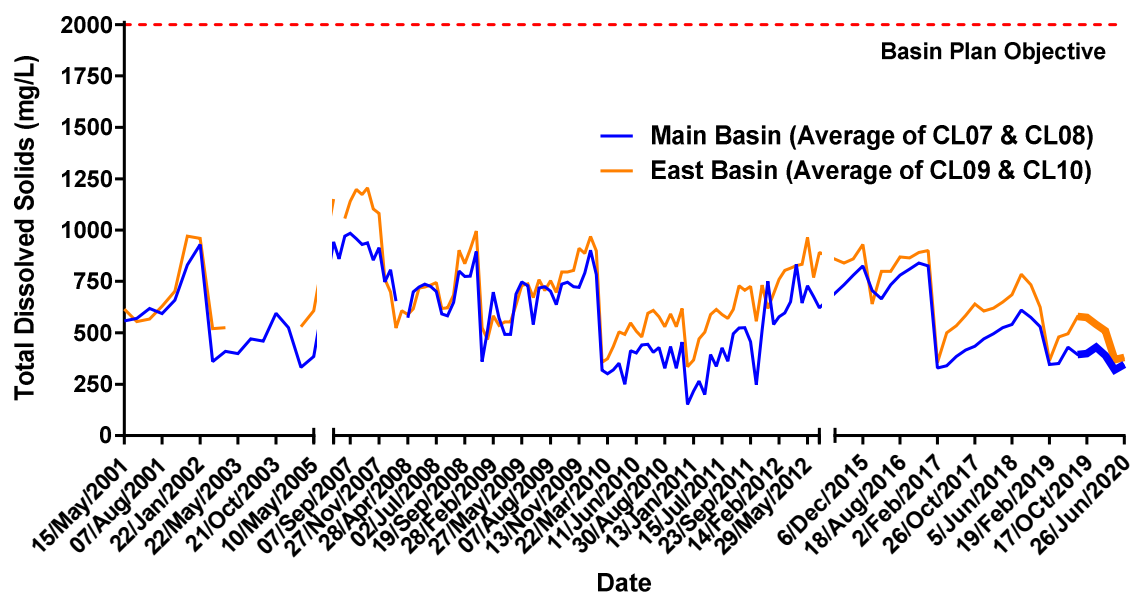


No data available from May 2005-July 2007; June 2012-Sept 2013
 TMDL target of 0.75 mg/L is annual average to be attained by 2020
 Bold represents current monitoring year July 2019-June 2020

Canyon Lake- Historical Monitoring Results (continued)



No data available from June 2012-July 2015
 2015 TMDL target of 40 µg/L is annual average to be attained by 2015
 2020 TMDL target of 25 µg/L is annual average to be attained by 2020
 Bold represents current monitoring year July 2019-June 2020



No data available from May 2005-July 2007; June 2012-July 2015
 Bold represents current monitoring year July 2019-June 2020