Appendix G

Sediment Quantity and Nutrient Load Reduction Report
The Holy Fire, a wildfire that began in August 2018, burned approximately 23,000 acres of the Cleveland National Forest. In anticipation of future debris flows sourcing from the Holy Fire burn area during storm season, the Riverside County Flood Control and Water Conservation District ("District") immediately began “capacity preparation” at two District facilities, Leach Canyon Dam and McVicker Canyon Basin. These facilities drain to Lake Elsinore, a 303(d) listed “impaired” waterbody for nutrients and organic enrichment/low dissolved oxygen. As efforts continued from November 2018 to April 2019, the sediment removal maintenance provided protection to downstream communities, enhanced debris basin capacity; meanwhile, preventing sediment and nutrient loads from reaching Lake Elsinore and impacting water quality.

The District’s effective post Holy Fire response activities in 2018-2019 resulted in the removal of approximately 178,904 CY of wet sediment material from 2 debris basins, which otherwise would have been conveyed by storm flows to Lake Elsinore. This memo presents an evaluation of the nutrient load effected by the removal of this debris flow material.

**SAMPLE APPROACH:**

District staff collected sediment samples from both Leach Canyon Dam and McVicker Canyon Basin on March 1, 2019, in order to evaluate the quality of Total Nitrogen and Total Phosphorus excavated and removed. For safety reasons, staff considered the level of accessibility at each location and concluded that they would collect samples in the sediment stockpiles adjacent to areas in order to maintain a safe distance from with heavy equipment and maintenance crews performing operations. District staff marked global positioning system (GPS) coordinates for each sample and mapped the locations within the boundaries of the District facilities (refer to Figure 1, Figure 2, and Figure 3). The latitude and longitude for each sample location are provided in Table 1. Using pre-cleansed sampling equipment, samples were collected and transferred to three 8-ounce glass jars provided by the laboratory. Staff ensured the sample was properly labeled and contained a sufficient amount of sediment for all analyses to be successfully completed.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC3</td>
<td>33.678619</td>
<td>-117.409432</td>
</tr>
<tr>
<td>MV2</td>
<td>33.687664</td>
<td>-117.402245</td>
</tr>
</tbody>
</table>
MAPS AND FIGURES:

Figure 1 - Sample Locations
Figure 2 - Leach Canyon Dam (LC3)
Figure 3 - McVicker Canyon Basin (MV2)
Figure 4 - Leach Canyon Dam (Upstream View) immediately after the 2/14/2019 storm event.

Figure 5 - Leach Canyon Dam (Upstream view) in March 2019.
Figure 6 - Leach Canyon Dam (Downstream View) at stockpile staging area.

Figure 7 - McVicker Canyon Basin (Upstream View) excavation area.
Figure 8 - McVicker Canyon Basin (Downstream View) at stockpile staging area.
LABORATORY ANALYSIS:

Samples were analyzed for nutrients and other physical properties, as described in Table 2.

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Method</th>
</tr>
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<tbody>
<tr>
<td><strong>Nutrients</strong></td>
<td></td>
</tr>
<tr>
<td>Total kjeldahl nitrogen (TKN)</td>
<td>EPA 351.2</td>
</tr>
<tr>
<td>Nitrate as N</td>
<td>EPA 300.0</td>
</tr>
<tr>
<td>Nitrite as N</td>
<td>EPA 300.0</td>
</tr>
<tr>
<td>Total nitrogen (TN)</td>
<td>EPA 300.0 (Calculation)</td>
</tr>
<tr>
<td>Total phosphorus (TP)</td>
<td>EPA 200.7</td>
</tr>
<tr>
<td><strong>Conventional</strong></td>
<td></td>
</tr>
<tr>
<td>Total organic carbon (% TOC)</td>
<td>EPA 9060</td>
</tr>
<tr>
<td>Total Solids (% TS)</td>
<td>SM 2450G</td>
</tr>
<tr>
<td>Grain Particle Size Analysis</td>
<td>ASTM D4464M</td>
</tr>
</tbody>
</table>

QUALITY CONTROL:

Prior to sampling, all equipment was cleaned with Liquonox™ solution and distilled water air-dried, and stored in a clean plastic bag until used in the field. Sediment sampling was completed in accordance with United States Environmental Protection Agency (USEPA) soil sampling operating procedure (USEPA, 2007¹). For field quality control, a new pair of disposable gloves was used by staff for sample collection and all equipment was decontaminated between site visits with Liquonox™ solution and distilled water. Samples were chilled, labeled, and transported in a cooler, within holding times, to the Babcock Laboratories, Inc., accompanied by a completed chain-of-custody (COCs).

FIELD OBSERVATIONS:

Following the February 14th, 2019 storm, excavations continued at Leach Canyon Dam in order to return the facility to the designed debris storage capacity. Upon arrival on March 1, 2019, District staff observed large excavators and front-loaders transferring post-fire debris flow material to several dump trucks for transport behind the west toe of the dam, refer to Figure 4 and Figure 5. During the time of sampling, no flows were observed to be entering the basin from upstream. Due to maintenance crew activity at Leach Canyon Dam monitoring staff collected samples from the sediment stockpile drying area on the dam’s east toe (refer to Figure 2 and Figure 6). Appearance of the sediment showed variation of aggregate size, textures, organics (e.g., tree litter), consistency, and color.

Upon arrival on March 1, 2019, District staff observed significant amounts of sediment, boulders and vegetation in the McVicker Canyon Basin, which appeared to have been deposited in a short period of time likely due to the unique topographical characteristics and narrow canyons upstream of the McVicker Canyon Basin. Staff observed flowing residual stormwater as it moved through hillside rills and entered the project site (refer to Figure 7). At the time of sampling, District maintenance and operations (O&M) crews were actively clearing and transporting material from the basin (refer to Figure 3). Similar to Leach Canyon Dam, site conditions prompted monitoring staff to sample from the safely accessed sediment stockpile staging area (see Figure 8). The sediment collected was highly saturated with variations of aggregate type, textures, organics (e.g., tree litter), consistency, and color.

LABORATORY RESULTS:

The nutrient and general chemistry results from samples collected in Leach Canyon Dam and McVicker Canyon Basin are shown below in Table 3 and the grain particle size characterizations per location are shown below in Table 4.

<table>
<thead>
<tr>
<th>Sample Location</th>
<th>Leach Canyon Dam (LC3)</th>
<th>McVicker Canyon Basin (MV2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyte</td>
<td>Sample Results (mg/kg)</td>
<td></td>
</tr>
<tr>
<td>Total kjeldahl nitrogen (TKN)</td>
<td>20,000</td>
<td>47,000</td>
</tr>
<tr>
<td>Nitrate as N</td>
<td>(1.7)J*</td>
<td>ND (&lt;1.7)</td>
</tr>
<tr>
<td>Nitrite as N</td>
<td>ND (&lt;1.6)</td>
<td>ND (&lt;1.6)</td>
</tr>
<tr>
<td>Total nitrogen (TN)</td>
<td>20,000</td>
<td>47,000</td>
</tr>
<tr>
<td>Total phosphorus (TP)</td>
<td>368</td>
<td>689</td>
</tr>
<tr>
<td>Other Analyte</td>
<td>Sample Results (%)</td>
<td></td>
</tr>
<tr>
<td>Total organic carbon (%TOC)</td>
<td>1.8</td>
<td>4.0</td>
</tr>
<tr>
<td>Total Solids (%TS)</td>
<td>63</td>
<td>62</td>
</tr>
</tbody>
</table>

ND = not detected at the indicated detection limit.

J = Qualified with a “J” flag, results were evaluated to the MDL, reported concentration is >MDL and <reporting limit.

<table>
<thead>
<tr>
<th>Sample Location</th>
<th>Gravel</th>
<th>Course Sand</th>
<th>Medium Sand</th>
<th>Fine Sand</th>
<th>Silt</th>
<th>Clay</th>
<th>ASTM Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>22.82</td>
<td>67.49</td>
<td>9.69</td>
<td>Silt</td>
</tr>
<tr>
<td>MV2</td>
<td>0</td>
<td>0</td>
<td>1.1</td>
<td>11.35</td>
<td>51.63</td>
<td>35.93</td>
<td>Silt</td>
</tr>
</tbody>
</table>

1 Percent Composition (%) = “Weight Percent” in Lab Analysis Report.
SEDIMENT DATA RESULTS:

The District used a standardized formula to estimate the total mass of sediment removed from Leach Canyon Dam and McVicker Canyon Basin during the sediment removal activities from September 2018 to April 2019. In addition, the District used the nutrient concentrations to estimate the total load of nutrients removed in the sediment. District facility from September 2018 to April 2019, District staff recorded the following sediment removal metrics from each site location per month:

- Total wet sediment volume removed (cubic yards);
- Number of truckloads (# of trucks);
- Average wet sediment weight per single truckload (tons)

To calculate the dry sediment weight removed from Leach Canyon Dam and McVicker Canyon Basin in tons ($W_d$), the wet sediment weight ($T_w$) was multiplied by number of trucks ($N$) and then multiplied by the dry weight conversion factor ($CF$). See equation (1) presented and associated variables below:

$$W_d = N \cdot T_w \cdot CF$$

where:

- $W_d$ = Total sediment, dry weight (tons)
- $N$ = Number of trucks
- $T_w$ = Total sediment, wet weight (tons)
- $CF$ = Conversion factor of 0.7, wet to dry sediment weight

To calculate nutrient load removed from Leach Canyon Dam and McVicker Canyon Basin in tons ($M_x$), dry sediment weight ($W_d$) from formula above was multiplied by analyte concentration in mg/kg ($C_x$) and then divided by the unit conversion factor, $10^6 \text{ mg/kg}$ ($F$). See equation (2) and associated variables presented below.

$$M_x = \frac{W_d \cdot C_x}{F}$$

where:

- $M_x$ = Nutrient “x” removed, (tons)
- $W_d$ = Total sediment, dry weight (tons)
- $C_x$ = Analyte “x” concentration (mg/kg)
- $F$ = Unit conversion factor, divide by $10^6$ (mg/kg)

---

The detailed calculations and results for Leach Canyon Dam and McVicker Canyon Basin are provided in **Attachment 5**. General information about the District facilities, including debris capacity, water level capacity and historical accumulation removed are shown portion of **Table 5**. An average truckload weight and approximate number of trucks was estimated by District staff to calculate the approximate wet sediment weight removed. A summary of sediment quantities removed from Leach Canyon Dam and McVicker Canyon Basin during the sediment removal activities from September 2018 to April 2019 are show in **Table 5**, including both historical (pre-season) and operational (throughout 2018-2019 storm season) activities.

**Table 5 - Summary of Sediment Quantities**

<table>
<thead>
<tr>
<th>Sample Location</th>
<th>Leach Canyon Dam (LC)</th>
<th>McVicker Canyon Basin (MV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debris Capacity</td>
<td>95,649 CY1</td>
<td>182,492 CY2</td>
</tr>
<tr>
<td>Water Level Capacity</td>
<td>52,595 CY (32.6 ac-ft)</td>
<td>66,529 CY (41.2 ac-ft)</td>
</tr>
<tr>
<td>Historical Accumulation Removed</td>
<td>46,325 CY</td>
<td>10,000 CY</td>
</tr>
<tr>
<td>Wet Sediment Removed</td>
<td>31,000 tons (20,000 CY)</td>
<td>153,884 tons (79,424 CY)</td>
</tr>
<tr>
<td>Truckloads, # of trucks</td>
<td>2,000</td>
<td>9,928</td>
</tr>
<tr>
<td>Conversion of Wet to Dry Sediment Removed</td>
<td>21,700 tons</td>
<td>107,719 tons</td>
</tr>
</tbody>
</table>

*Results, date ranges, and volumes removed are approximate due to data estimations. Volumes displayed in parenthesis are equivalent values. Dry sediment volume removed calculated by assuming Morgan State University Conversion Factor is used to address unknown moisture content.

(1) Debris capacity (“As-built”)
(2) Design Grade Improvements for additional debris capacity (Attachment 6)
(3) Estimated historically accumulated sediment value is a subtotal of total wet sediment collectively removed across pre/during storm preparation, varied by basin.
(4) Average load weight per truck = 15.5 tons
(5) Using wet to dry conversion factor (Morgan State University, 2018)².

Based on the Leach Canyon Dam “assumed As-Built”, the dam has a debris capacity of 95,649
CY, however, according to the 2018 Post-Holy Fire Digital Terrain Model (DTM) debris capacity survey with 4% debris slope, Leach Canyon Dam has 141,974 CY of debris capacity, see Attachment 6 and Attachment 7. Prior to dam capacity improvements, District maintenance crews removed 20,000 CY of wet sediment. As the storm season progressed and leading up to the February 14th, 2019 storm event, District maintenance crews removed 59,376 CY of wet sediment (approximately 46,325 CY of it had accumulated historically). An additional 20,048 CY of wet sediment was removed just after the February 14th storm. In total, from September 2018 through April 2019, District maintenance crews removed approximately 99,424 CY of wet sediment from Leach Canyon Dam, which is equivalent to 11,928 truckloads hauled.

McVicker Canyon Basin has an “assumed As-Built” debris capacity of 242,000 CY, and there was approximately 10,000 CY of historically accumulated wet sediment removed during the pre-storm facility preparation. For McVicker Canyon Basin depth to volume capacity, see Attachment 8 and Attachment 9. Prior to the major February 14th, 2019 storm, District maintenance crews removed approximately 41,992 CY of wet sediment from the debris basin. An additional 27,488 CY was removed from the basin to maintain capacity just after the February 14th storm. In total, from September 2018 through April 2019, District maintenance crews removed approximately 79,480 CY of wet sediment from the McVicker Canyon Basin, which is equivalent to 9,685 truckloads hauled.

Approximately, 178,904 CY of wet sediment was collectively removed from both District facilities and prevented from entering Leach Canyon Channel that outlets into Lake Elsinore.

<table>
<thead>
<tr>
<th>Sample Location</th>
<th>Leach Canyon Dam (LC)</th>
<th>McVicker Canyon Basin (MV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyte Concentrations¹</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TN (mg/kg)</td>
<td>20,000</td>
<td>47,000</td>
</tr>
<tr>
<td>TP (mg/kg)</td>
<td>368</td>
<td>689</td>
</tr>
<tr>
<td>Estimated Nutrient Load Reduction²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TN (tons)</td>
<td>2,588</td>
<td>4,939</td>
</tr>
<tr>
<td>TP (tons)</td>
<td>48</td>
<td>72</td>
</tr>
<tr>
<td>Total nitrogen removed (tons)</td>
<td>7,527</td>
<td></td>
</tr>
<tr>
<td>Total phosphorus removed (tons)</td>
<td>120</td>
<td></td>
</tr>
</tbody>
</table>

¹Based on nutrient concentrations from samples collected on 3/1/2019. Which were used to represent sediment removed from each basin throughout wet season, see Attachment 1-4 for lab reports and Attachment 5 for calculations.
²Results estimated based on approximate dry sediment volumes removed calculated in Table 5.
Using the nutrient concentrations reported and estimated sediment volume removed from the basins, District staff determined that approximately 7,527 (dry tons) of Total nitrogen and 120 (dry tons) of Total phosphorus were collectively removed from Leach Canyon Dam and McVicker Canyon Basin, see Table 6 above for nutrient data summary.

CONCLUSIONS:
Overall, this study suggests that a significant amount of nutrient and sediment loads were removed from both District facilities between September 2018 and April 2019 in order to improve and maintain overall debris capacity, capture eroding sediment mobilized by major rain events, protect downstream communities, and prevent further impacts to a receiving water listed as “impaired” for nutrients and low dissolved oxygen.

ATTACHMENTS:
Attachment 1: Babcock Analytical Results – LC3 (TP/Grain Size Test), 4/9/19 (B9C0040-01)
Attachment 2: Babcock Analytical Results – LC3 (General/Nutrients), 9/18/19 (B9C0031) Revised-0101
Attachment 3: Babcock Analytical Results – MV2 (TP/Grain Size Test), 4/9/19 (B9C0039-01)
Attachment 4: Babcock Analytical Results – MV2 (General/Nutrients), 4/9/19 (B9C0037-01)
Attachment 5: Post Holy Fire Sediment Quantity and Nutrient Load Calculations
Attachment 6: Leach Canyon Dam Pre and Post Fire Comparison of Water and Debris Capacity
Attachment 7: Leach Canyon Debris Capacity
Attachment 8: McVicker Depth to Volume Capacity
Attachment 9: McVicker Capacity Curve
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

<table>
<thead>
<tr>
<th>Lab Sample #</th>
<th>Client Sample ID</th>
<th>Matrix</th>
<th>Date Sampled</th>
<th>By</th>
<th>Date Submitted</th>
<th>By</th>
</tr>
</thead>
<tbody>
<tr>
<td>B9C0040-01</td>
<td>1819-LC3-S1-01</td>
<td>Solid</td>
<td>3/1/19</td>
<td>10:55 A. Suter/M. Varela</td>
<td>3/1/19 11:55</td>
<td>Abigail Suter</td>
</tr>
</tbody>
</table>

Note: Total Phos was subcontracted to FGL Environmental.

Note: Grain Size (ASTM D4464) was subcontracted to PTS Laboratories.

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.

K. Marshall

KayeLani A. Marshall

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.

e-Case Narrative+ COC.rpt

Page 1 of 1
**Work Order Number:** B9C0040

**Analytical Report:** Page 1 of 1

**Project Name:** RCFC - Post Fire Soil

**Project Number:** Post Fire Sediment - LC

**Report Date:** 09-Apr-2019

**Contact:** Rebekah Guill

**Address:** 1995 Market Street
Riverside, CA, 92501

**Temp:** 16 °C

**Received on Ice (Y/N):** Yes

---

### Chain of Custody Sample Information Record

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<thead>
<tr>
<th>Client: RCFC &amp; WCD</th>
<th>Project Name: Post Fire Sediment</th>
<th>Phone No: (951) 955.2901 / 955.1724</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAX No. 951.788.3960</td>
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<td>Additional Reporting Requests</td>
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<tr>
<td>Project Name:</td>
<td>Radine</td>
<td>Rush</td>
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<tr>
<td>Station ID:</td>
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<tr>
<td>Station Location: Leach Canyon</td>
<td><em>Subcont</em></td>
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<tr>
<td>Reporter: Abigail Suter</td>
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<td></td>
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<tr>
<td>Sample Information:</td>
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<tr>
<td>Sample ID: 1819-LC3-S1-01</td>
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<tr>
<td>Date/Time:</td>
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<td>Received By (Sign):</td>
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<td>Reclaimed By (Sign):</td>
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<tr>
<td>Print Name / Company</td>
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<tr>
<td>Date/Time</td>
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<tr>
<td>Received By (Sign):</td>
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</tr>
</tbody>
</table>

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**Received on Ice (Y/N):** Yes

**Temp:** 16 °C

**mailing location**
P.O. Box 432
Riverside, CA 92502-0432

**P.O. Box 432**
Riverside, CA 92502-0432

**P 951 653 3351**
F 951 653 1662

**www.babcocklabs.com**

**mailing location**

---

**E.S. Babcock Sons, Inc. Environmental Laboratories**
(951) 653-3351 FAX (951) 653-1662
www.babcocklabs.com

---

**CA ELAP No. 2698**
EPA No. CA00102
NELAP No.OR4035
LACSD No., 10119
## SUBCONTRACT ORDER
Babcock Laboratories, Inc.
B9C0040

**SENDING LABORATORY:**
Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, CA 92507-0704
Phone: (951) 653-3351
Fax: (951) 653-1662
Project Manager: KayeLani A. Marshall

**RECEIVING LABORATORY:**
FGL Environmental, Inc. - Subcontracts
853 Corporation Street
Santa Paula, CA 93060
Phone: (805) 392-2000
Fax: (805) 525-4172

Client: Riverside County Flood Control
Sampler: A. Suter/M. Varela

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Due</th>
<th>Expires Regulatory Days</th>
<th>Past Date Sampled</th>
<th>Laboratory ID</th>
<th>Comments</th>
<th>Proj.No.: Post Fire Sediment - LC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample ID: B9C0040-01 Solid</td>
<td>Sampled: 03/01/19 10:55</td>
<td>03/15/19 23:59</td>
<td>03/29/19 10:55</td>
<td>1819-LC3-S1-01</td>
<td>Call ESB for total Solids</td>
<td></td>
</tr>
</tbody>
</table>

**Containers Supplied:**
8 oz. jar (A)

---

All Containers Intact: _____ 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 HARD COPIES PLEASE.

Released By: 
Date: 3-4-19

Received By: 
Date: 3-5-19

Page 1 of 1
March 25, 2019

Babcock Laboratories, Inc.
P.O. Box 432
Riverside, CA 92502

Lab ID : SP 1903019
Customer : 2-14

Laboratory Report

Introduction: This report package contains total of 3 pages divided into 3 sections:

- Case Narrative (1 pages) : An overview of the work performed at FGL.
- Sample Results (1 page) : Results for each sample submitted.
- Quality Control (1 page) : Supporting Quality Control (QC) results.

Case Narrative

This Case Narrative pertains to the following samples:

<table>
<thead>
<tr>
<th>Sample Description</th>
<th>Date Sampled</th>
<th>Date Received</th>
<th>FGL Lab ID #</th>
<th>Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>1819-LC3-S1-01</td>
<td>03/01/2019</td>
<td>03/05/2019</td>
<td>SP 1903019-001</td>
<td>Sld</td>
</tr>
</tbody>
</table>

Sampling and Receipt Information: All samples were received in acceptable condition and within temperature requirements, unless noted on the Condition Upon Receipt (CUR) form. All samples arrived at 6 °C. All samples were prepared and analyzed within the method specified hold time. All samples were checked for pH if acid or base preservation is required (except for VOAs). For details of sample receipt information, please see the attached Chain of Custody and Condition Upon Receipt Form.

Quality Control: All samples were prepared and analyzed according to the following tables:

Inorganic - Metals QC

<table>
<thead>
<tr>
<th>Inorganic - Metals QC</th>
<th>Date Sampled</th>
<th>Date Received</th>
<th>FGL Lab ID #</th>
<th>Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>200.7</td>
<td>03/19/2019:203934</td>
<td>All analysis quality controls are within established criteria.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3050</td>
<td>03/14/2019:202809</td>
<td>All preparation quality controls are within established criteria, except: The following note applies to Phosphorus: 435 Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Certification:: I certify that this data package is in compliance with ELAP standards, both technically and for completeness, except for any conditions listed above. Release of the data contained in this data package is authorized by the Laboratory Director or his designee, as verified by the following electronic signature.

KD:DMB

Reviewed and Approved By: Kelly A. Dunnahoo, B.S.
Digitally signed by Kelly A. Dunnahoo, B.S.
Title: Laboratory Director
Date: 2019-03-25
March 25, 2019

Babcock Laboratories, Inc.
P.O. Box 432
Riverside, CA 92502

Sampled On: March 1, 2019-10:55
Sampled By: A.Suter/M.Varela
Received On: March 5, 2019-11:30
Matrix: Solid
Description: 1819-LC3-S1-01
Project: Riverside County Flood Control (B9C0040-01)

Sample Result - Inorganic (Dry Weight)

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Result</th>
<th>PQL</th>
<th>Units</th>
<th>Note</th>
<th>Sample Preparation Method</th>
<th>Date/ID</th>
<th>Sample Analysis Method</th>
<th>Date/ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metals, Total</td>
<td>368</td>
<td>5</td>
<td>mg/kg</td>
<td></td>
<td>3050</td>
<td>03/14/19:202809</td>
<td>200.7</td>
<td>03/19/19:203934</td>
</tr>
<tr>
<td>Phosphorus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

ND=Non-Detected. PQL=Practical Quantitation Limit. * PQL adjusted for dilution.
Quality Control - Inorganic

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Method</th>
<th>Date/ID</th>
<th>Type</th>
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<th>Conc.</th>
<th>QC Data</th>
<th>DQO</th>
<th>Note</th>
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<tr>
<td>Metals</td>
<td>Phosphorus</td>
<td>200.7</td>
<td>03/19/19:203934AC</td>
<td>CCV</td>
<td>ppm</td>
<td>5.000</td>
<td>98.1 %</td>
<td>90-110</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CCB</td>
<td>ppm</td>
<td>-0.001</td>
<td>0.1</td>
<td>90-110</td>
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<td></td>
<td></td>
<td>CCV</td>
<td>ppm</td>
<td>5.000</td>
<td>96.9 %</td>
<td>90-110</td>
</tr>
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<td></td>
<td>CCB</td>
<td>ppm</td>
<td>-0.002</td>
<td>0.1</td>
<td>90-110</td>
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<td>3050</td>
<td>03/14/19:202809EMM</td>
<td>Blank</td>
<td>mg/kg</td>
<td>ND</td>
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<td>mg/kg</td>
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<td></td>
<td></td>
<td>MSD</td>
<td>mg/kg</td>
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<td></td>
<td>MSRPD</td>
<td>mg/kg</td>
<td>200.0</td>
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<td></td>
<td>PDS</td>
<td>mg/kg</td>
<td>200.0</td>
</tr>
</tbody>
</table>

**Definition**

- **PDS**: PDS failed, matrix - Post Digestion Spike (PDS) not within Acceptance Range (AR) because of matrix interferences affecting this analyte. Data was accepted based on the LCS recovery.
- **CCV**: Continuing Calibration Verification - Analyzed to verify the instrument calibration is within criteria.
- **CCB**: Continuing Calibration Blank - Analyzed to verify the instrument baseline is within criteria.
- **Blank**: Method Blank - Prepared to verify that the preparation process is not contributing contamination to the samples.
- **LCS**: Laboratory Control Standard/Sample - Prepared to verify that the preparation process is not affecting analyte recovery.
- **MS**: Matrix Spikes - A random sample is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.
- **MSD**: Matrix Spike Duplicate of MS/MSD pair - A random sample duplicate is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.
- **MSRPD**: MS/MSD Relative Percent Difference (RPD) - The MS relative percent difference is an indication of precision for the preparation and analysis.
- **ND**: Non-detect - Result was below the DQO listed for the analyte.
- **DQO**: Data Quality Objective - This is the criteria against which the quality control data is compared.

**Explanation**

435: Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.
March 8, 2019

KayeLani A. Marshall,
Project Manager,
Babcock Laboratories, Inc.
6100 Quail Valley Court,
Riverside, CA 92507-0704.

Re: PTS File No: 49026
   Project Name: B9C0040
   Job Number: B9C0040

Subject: Laser Particle Size Analyses – [1 Sample – B9C0040-01].

Dear KayeLani A. Marshall:

Please find enclosed report for Physical Properties analyses conducted upon one (1) soil samples received from the above referenced project.

All analyses were performed by applicable ASTM, EPA, or API methodologies. The sample is currently in storage and will be retained for thirty days past completion of testing at no charge. Please note that the sample will be disposed of at that time. You may contact me regarding storage, disposal, or return of the sample.

PTS Laboratories appreciates the opportunity to be of service. If you have any questions or require additional information, please contact me or Emeka Anazodo at (713) 316-1800.

Sincerely,
PTS Laboratories, Inc.

C.A. Umeh
Chidi Umeh
Flow Laboratory Supervisor

Encl.
## TEST PROGRAM - 20190308

<table>
<thead>
<tr>
<th>CORE ID</th>
<th>Depth</th>
<th>Core Recovery</th>
<th>Grain Size Analysis</th>
<th>ASTM D4444M</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>B9C0040-01</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Laboratory Test Program Notes**

**Contaminant Identification:**

Standard TAT for basic analysis is 10-15 business days.

**Grain Size Analysis:** Laser or sieve method; includes tabular data, graphics and statistical sorting in Excel format.
# PARTICLE SIZE SUMMARY
(METHODOLGY: ASTM D422/D4484M)

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Depth, ft.</th>
<th>Mean Grain Size Description (1)</th>
<th>Median Grain Size, mm</th>
<th>Particle Size Distribution, wt. percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>B9C0040-01</td>
<td>N/A</td>
<td>Silt</td>
<td>0.041</td>
<td>Gravel: 0.00 Coarse: 0.00 Medium: 0.00 Fine: 22.82 Silt: 67.49 Clay: 9.69</td>
</tr>
</tbody>
</table>

(1) Based on Mean from Trask
### Particle Size Analysis - ASTM D4464M

**Client:** Babcock Laboratories, Inc.  
**PTS File No:** 49026  
**Project:** B9C0040  
**Sample ID:** B9C0040-01  
**Depth, ft:** N/A

<table>
<thead>
<tr>
<th>Opening Phi of U.S. Weight, Weight, Weight, Weight Phi Particle Size</th>
<th>Opening Phi of U.S. Weight, Weight, Weight, Weight Phi Particle Size</th>
<th>Opening Phi of U.S. Weight, Weight, Weight, Weight Phi Particle Size</th>
<th>Opening Phi of U.S. Weight, Weight, Weight, Weight Phi Particle Size</th>
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</thead>
<tbody>
<tr>
<td>Inches</td>
<td>Millimeters</td>
<td>No.</td>
<td>Screen</td>
</tr>
<tr>
<td>0.2500</td>
<td>6.351</td>
<td>1.00</td>
<td>1.50</td>
</tr>
<tr>
<td>0.1873</td>
<td>4.757</td>
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<td>0.1324</td>
<td>3.364</td>
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<td>0.0787</td>
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<td>0.0468</td>
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<td>0.0331</td>
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<td>0.0278</td>
<td>0.707</td>
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<td>0.0234</td>
<td>0.595</td>
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<td>0.0197</td>
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<td>0.0166</td>
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</table>

**Cumulative Weight Percent greater than**

<table>
<thead>
<tr>
<th>Weight percent</th>
<th>Phi Value</th>
<th>Particle Size</th>
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</thead>
<tbody>
<tr>
<td>Weight percent</td>
<td>Phi Value</td>
<td>Particle Size</td>
</tr>
<tr>
<td>Weight percent</td>
<td>Phi Value</td>
<td>Particle Size</td>
</tr>
</tbody>
</table>

**Measure**  
- **Trask:** 4.48  
- **Inman:** 4.80  
- **Folk-Ward:** 4.80

**Grain Size Description**  
- **Silt (ASTM-USCS Scale):**

<table>
<thead>
<tr>
<th>Description</th>
<th>Retained on Sieve #</th>
<th>Weight Percent</th>
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</thead>
<tbody>
<tr>
<td>Gravel</td>
<td>4</td>
<td>0.00</td>
</tr>
<tr>
<td>Coarse Sand</td>
<td>10</td>
<td>0.00</td>
</tr>
<tr>
<td>Medium Sand</td>
<td>40</td>
<td>0.00</td>
</tr>
<tr>
<td>Fine Sand</td>
<td>200</td>
<td>22.82</td>
</tr>
<tr>
<td>Silt</td>
<td>&gt;0.005 mm</td>
<td>67.49</td>
</tr>
<tr>
<td>Clay</td>
<td>&lt;0.005 mm</td>
<td>9.89</td>
</tr>
</tbody>
</table>

**Grain Size Description** (based on Mean from Trask)

- **Sorting:** 1.933  
- **Skewness:** 0.885  
- **Kurtosis:** 1.100

**TOTALS**

- 99.90  
- 100.00  
- 100.00

© PTS Laboratories, Inc.  
Phone: (713) 316-1800  
Fax: (877) 255-9953
## SUBCONTRACT ORDER

**Babcock Laboratories, Inc.**

**B9C0040**

### SENDING LABORATORY:

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

### RECEIVING LABORATORY:

PTS Laboratories
5730 Centralcrest Street
Houston, TEXAS 77092
Phone: (713) 316-1800
Fax: -

### Analysis

<table>
<thead>
<tr>
<th>Sample ID: B9C0040-01</th>
<th>Solid</th>
<th>Due</th>
<th>Expires Regulatory Days Past Date Sampled</th>
<th>Laboratory ID</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sampled: 03/01/19 10:55</td>
<td>1819-LC3-S1-01</td>
<td></td>
</tr>
</tbody>
</table>

Subcut
Containers Supplied:
8 oz. jar (B)

Expires Regulatory Days Past Date Sampled: 03/27/19 23:59 03/11/19 10:55
Gran Size ASTM D4464

**Proj. No.: Post Fire Sediment · LC**

---

All Containers Intact: Yes No
Samples Preserved Properly: Yes No

Samples Received at 11.8 oC
Sample Labels / COC Agree: Yes No
Custody Seals Present: No

---

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

**NO HARDCOPIES PLEASE.**

Released By 3-4-19
Received By 3-5-19

Page 1 of 1
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**

<table>
<thead>
<tr>
<th>Lab Sample #</th>
<th>Client Sample ID</th>
<th>Matrix</th>
<th>Date Sampled</th>
<th>By</th>
<th>Date Submitted</th>
<th>By</th>
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<tbody>
<tr>
<td>B9C0031-01</td>
<td>1819-LC3-S1-01</td>
<td>Sludge</td>
<td>03/1/19</td>
<td>Abigail Suter/M. Varela</td>
<td>03/01/19 11:55</td>
<td>Abigail Suter</td>
</tr>
</tbody>
</table>

Included in this Data Package please find an amended report for the work order referenced below.

**Work Order:** B9C0031

**Reason for Amendment:**

As per client request, this report has been reissued to include the updated Total Nitrogen result. This report supersedes the report issued on 09-Apr-2019.
<table>
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<th>Analyte(s)</th>
<th>Result</th>
<th>RDL</th>
<th>MDL</th>
<th>Units</th>
<th>Method</th>
<th>Analysis Date</th>
<th>Analyst</th>
<th>Flag</th>
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<tbody>
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<td>Anions</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Nitrate as N</td>
<td>1.7</td>
<td>3.2</td>
<td>1.7</td>
<td>mg/kg dry</td>
<td>EPA 300.0</td>
<td>03/02/19 02:14</td>
<td>KBS</td>
<td>N_WEX, J</td>
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<tr>
<td>Nitrite as N</td>
<td>ND</td>
<td>1.6</td>
<td>1.6</td>
<td>mg/kg dry</td>
<td>EPA 300.0</td>
<td>03/02/19 02:14</td>
<td>KBS</td>
<td>N_WEX</td>
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<tr>
<td>Solids</td>
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<tr>
<td>Total Solids</td>
<td>63</td>
<td>0.10</td>
<td>0.10</td>
<td>% SM 2540G</td>
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<td>03/01/19 16:47</td>
<td>TML</td>
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<td>Aggregate Organic Compounds</td>
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<tr>
<td>Total Organic Carbon</td>
<td>1.8</td>
<td>0.20</td>
<td>0.050</td>
<td>% dry weight</td>
<td>EPA 9060</td>
<td>03/15/19 12:41</td>
<td>MEL</td>
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<td>Nutrients</td>
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<tr>
<td>Kjeldahl Nitrogen</td>
<td>20000</td>
<td>1600</td>
<td>1600</td>
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<td>100</td>
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<td>mg/kg dry</td>
<td>Calculation</td>
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</tbody>
</table>
**Client Name:** Riverside County Flood Control  
**Contact:** Rebekah Guill  
**Address:** 1995 Market Street  
Riverside, CA 92501  
**Report Date:** 18-Sep-2019

**Analytical Report:** Page 3 of 8  
**Project Name:** RCFC - Post Fire Soil  
**Project Number:** Post Fire Sediment LC  
**Work Order Number:** B9C0031  
**Received on Ice (Y/N):** Yes  
**Temp: 16 °C**

---

### Anions - Batch Quality Control

<table>
<thead>
<tr>
<th>Analyte(s)</th>
<th>Result</th>
<th>RDL</th>
<th>Units</th>
<th>Spike Level</th>
<th>Source</th>
<th>%REC</th>
<th>%REC Limits</th>
<th>RPD Limit</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Batch 9C01067 - Water Extraction-IC</strong></td>
<td></td>
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<tr>
<td>Blank (9C01067-BLK1)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Nitrite as N</td>
<td>ND</td>
<td>0.10</td>
<td>mg/kg wet</td>
<td>0.10</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Nitrate as N</td>
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<td>mg/kg wet</td>
<td>0.11</td>
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<td>Nitrite as N</td>
<td>2.50</td>
<td>0.10</td>
<td>mg/kg wet</td>
<td>2.50</td>
<td>100</td>
<td>90-110</td>
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</tr>
<tr>
<td>Nitrate as N</td>
<td>5.24</td>
<td>0.20</td>
<td>mg/kg wet</td>
<td>5.65</td>
<td>92.8</td>
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<td>Matrix Spike (9C01067-MS1)</td>
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<tr>
<td>Nitrite as N</td>
<td>42.7</td>
<td>1.6</td>
<td>mg/kg dry</td>
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<td>ND</td>
<td>107</td>
<td>62-121</td>
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<td>Nitrate as N</td>
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<td>mg/kg dry</td>
<td>90.5</td>
<td>ND</td>
<td>93.6</td>
<td>80-120</td>
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<td>Matrix Spike Dup (9C01067-MSD1)</td>
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</tr>
<tr>
<td>Nitrite as N</td>
<td>42.2</td>
<td>1.6</td>
<td>mg/kg dry</td>
<td>40.0</td>
<td>ND</td>
<td>105</td>
<td>62-121</td>
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<td>85.0</td>
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<td>mg/kg dry</td>
<td>90.5</td>
<td>ND</td>
<td>93.9</td>
<td>80-120</td>
<td>0.362</td>
<td>20</td>
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</table>
### Solids - Batch Quality Control

<table>
<thead>
<tr>
<th>Analyte(s)</th>
<th>Result</th>
<th>RDL</th>
<th>Units</th>
<th>Spike Level</th>
<th>Source Result</th>
<th>%REC</th>
<th>%REC Limits</th>
<th>RPD</th>
<th>RPD Limit</th>
<th>Flag</th>
</tr>
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<tbody>
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</tr>
<tr>
<td>Blank (9C01050-BLK1)</td>
<td>ND</td>
<td>0.10</td>
<td>0.10</td>
<td>%</td>
<td>Prepared &amp; Analyzed: 03/01/19</td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Total Solids</td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>Duplicate (9C01050-DUP1)</td>
<td>Source: B9C0031-01</td>
<td>Prepared &amp; Analyzed: 03/01/19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Solids</td>
<td>63.8</td>
<td>0.10</td>
<td>0.10</td>
<td>%</td>
<td>63.2</td>
<td>1.01</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analyte(s)</td>
<td>Result</td>
<td>RDL</td>
<td>%REC</td>
<td>Units</td>
<td>Level</td>
<td>Source</td>
<td>%REC Limits</td>
<td>RPD Limit</td>
<td>Flag</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>--------</td>
<td>-----</td>
<td>------</td>
<td>-------</td>
<td>-------</td>
<td>--------</td>
<td>-------------</td>
<td>-----------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>Blank (9C12166-BLK1)</td>
<td>Prepared &amp; Analyzed: 03/15/19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Organic Carbon</td>
<td>ND</td>
<td>0.20</td>
<td>0.050</td>
<td>% dry weight</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCS (9C12166-BS1)</td>
<td>Prepared &amp; Analyzed: 03/15/19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Organic Carbon</td>
<td>1.62</td>
<td>0.20</td>
<td>0.050</td>
<td>% dry weight</td>
<td>1.59</td>
<td>102</td>
<td>70-130</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matrix Spike (9C12166-MS1)</td>
<td>Source: B9C0031-01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Organic Carbon</td>
<td>3.00</td>
<td>0.20</td>
<td>0.050</td>
<td>% dry weight</td>
<td>1.59</td>
<td>1.84</td>
<td>73.5</td>
<td>41-139</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matrix Spike Dup (9C12166-MSD1)</td>
<td>Source: B9C0031-01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Organic Carbon</td>
<td>3.78</td>
<td>0.20</td>
<td>0.050</td>
<td>% dry weight</td>
<td>1.59</td>
<td>1.84</td>
<td>122</td>
<td>41-139</td>
<td>22.7</td>
<td>25</td>
</tr>
</tbody>
</table>

Aggregate Organic Compounds - Batch Quality Control

Work Order Number: B9C0031
Received on Ice (Y/N): Yes
Temp: 16 °C
## Nutrients - Batch Quality Control

### Batch 9C04113 - Acid Digest

<table>
<thead>
<tr>
<th>Analyte(s)</th>
<th>Result</th>
<th>RDL</th>
<th>Units</th>
<th>Spike Level</th>
<th>Source Result</th>
<th>%REC</th>
<th>%REC Limits</th>
<th>RPD Limit</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blank (9C04113-BLK1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kjeldahl Nitrogen</td>
<td>ND</td>
<td>100</td>
<td>100</td>
<td>mg/kg wet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCS (9C04113-BS1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kjeldahl Nitrogen</td>
<td>825</td>
<td>100</td>
<td>100</td>
<td>mg/kg wet</td>
<td>800</td>
<td>103</td>
<td>80-120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duplicate (9C04113-DUP1)</td>
<td>Source: B9C0031-01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kjeldahl Nitrogen</td>
<td>19600</td>
<td>1600</td>
<td>1600</td>
<td>mg/kg dry</td>
<td>19500</td>
<td>0.116</td>
<td>25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Notes and Definitions

\textbf{J} Estimated value

\textbf{N\_WEX} Analyte determined on a 1:10 water extract from the sample.

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

\textbf{NR:} Not Reported

\textbf{NRLcf:} RL for analyte does not meet the SWAMP / CTR required RL.

\textbf{RDL:} Reportable Detection Limit

\textbf{MDL:} Method Detection Limit

\textbf{* / (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.

\textbf{K. Marshall}  
KayeLani A. Marshall

\textbf{cc:}

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.
### Field Sampling Data

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Date</th>
<th>Time</th>
<th>Location</th>
<th>Contents</th>
<th>Total Nitrogen (TN)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1819-LO3-31-01</td>
<td>3/19 10 55</td>
<td></td>
<td>Leach Canyon</td>
<td>Sediment</td>
<td></td>
<td>Total phosphorus requested by client</td>
</tr>
</tbody>
</table>

---

### Requisition By (Sign)

Print Name / Company: A. Suter / RCFD & WCD  
Date / Time: 3/21/19 11:55

---

### Received By (Sign)

Print Name / Company: J. Marshall  
Date / Time: 3/21/19 14:55

---

### Additional Reporting Requirements

- Include QC Data Package
- Fax Results: N
- Email Results: N
- Data Set: N

---

### Notes

- Do not analyze Sample 07 with (+) for Toxicity.

---

### Caulfield Laboratories

Email: mail@riverside-landscaping.com  
Website: www.caulfieldlandscaping.com
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

<table>
<thead>
<tr>
<th>Lab Sample #</th>
<th>Client Sample ID</th>
<th>Matrix</th>
<th>Date Sampled</th>
<th>By</th>
<th>Date Submitted</th>
<th>By</th>
</tr>
</thead>
<tbody>
<tr>
<td>B9C0039-01</td>
<td>1819-MV2-S1-01</td>
<td>Solid</td>
<td>3/1/19</td>
<td>10:25</td>
<td>3/1/19</td>
<td>11:55</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A. Suter/M. Varela</td>
<td></td>
<td>Abigail Suter</td>
</tr>
</tbody>
</table>

Note: Total Phos was subcontracted to FGL Environmental.

Note: Grain Size (ASTM D4464) was subcontracted to PTS Laboratories.

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.

K. Marshall

KayeLani A. Marshall

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.
**Work Order Number:** B9C0039  

**Report Date:** 09-Apr-2019  

**Client Name:** Riverside County Flood Control  
**Contact:** Rebekah Guill  
**Address:** 1995 Market Street  
Riverside, CA, 92501

**Received on Ice (Y/N):** Yes  
**Temp:** 16 °C  

---

### Chain of Custody Sample Information Record

**Client:** Riverside County Flood Control  
**Contact:** Rebekah Guill / Abigail Suter  
**Phone No.:** (951) 955.2901 / 955.1734

**Client Number:** B9C0039  
**Date:** 3/01/19  
**Time:** 11:55

**Sample Information**

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1819-MV2-S1-01</td>
<td>3/1/19</td>
<td>10:25</td>
</tr>
</tbody>
</table>

**Notes:**

- **Subcont:**  
- Do not use Sample ID with (VO) for Toxicity.

---

**Received by (Sign):** "Karin"  
**Date/Time:** 3/01/19 11:55

---

**E.S. Babcock Sons, Inc. Environmental Laboratories**  
(951) 653-3351  FAX (951) 653-1662  
www.babcocklabs.com

**Additional Requested:**  
- DO EDX Package
- EPA Results (NO)
- Email Results (NO)
- Data (NO)

---

**EPA No.:** CA00102  
**CA ELAP No.:** 2698  
**NELAP No.:** OR4035  
**LACSD No.:** 10119
**SUBCONTRACT ORDER**
Babcock Laboratories, Inc.
B9C0039

**SENDING LABORATORY:**
Babcock Laboratories, Inc.
6100 Quail Valley Court
Riverside, CA 92507-0704
Phone: (951) 653-3351
Fax: (951) 653-1662
Project Manager: KayeLani A. Marshall

**RECEIVING LABORATORY:**
FGL Environmental, Inc. - Subcontracts
853 Corporation Street
Santa Paula, CA 93060
Phone: (805) 392-2000
Fax: (805) 525-4172

Client: Riverside County Flood Control
Sampler: A. Suter/M. Varela

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Expires Regulatory Days</th>
<th>Due</th>
<th>Past Date Sampled</th>
<th>Laboratory ID</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample ID: B9C0039-01</td>
<td></td>
<td></td>
<td></td>
<td>1819-MV2-S1-01</td>
<td>Proj.No.: Post Fire</td>
</tr>
<tr>
<td>Solid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sediment - MV</td>
</tr>
<tr>
<td>Phos-Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Call ESB for total Solids</td>
</tr>
</tbody>
</table>

Containers Supplied:
8 oz. jar (A)

---

All Containers Intact:   Yes   No
Samples Preserved Properly:   Yes   No
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 HARD COPIES PLEASE.

Released By: 3-4-19
Received By: 3-19-19

Date
Date
March 25, 2019

Babcock Laboratories, Inc.  
Lab ID : SP 1903020  
Customer : 2-14  
P.O. Box 432  
Riverside, CA 92502

Laboratory Report

Introduction: This report package contains a total of 3 pages divided into 3 sections:

- Case Narrative (1 page): An overview of the work performed at FGL.
- Sample Results (1 page): Results for each sample submitted.
- Quality Control (1 page): Supporting Quality Control (QC) results.

Case Narrative

This Case Narrative pertains to the following samples:

<table>
<thead>
<tr>
<th>Sample Description</th>
<th>Date Sampled</th>
<th>Date Received</th>
<th>FGL Lab ID #</th>
<th>Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>1819-MV2-S1-01</td>
<td>03/01/2019</td>
<td>03/05/2019</td>
<td>SP 1903020-001</td>
<td>Sld</td>
</tr>
</tbody>
</table>

Sampling and Receipt Information: All samples were received in acceptable condition and within temperature requirements, unless noted on the Condition Upon Receipt (CUR) form. All samples arrived at 6 °C. All samples were prepared and analyzed within the method specified hold time. All samples were checked for pH if acid or base preservation is required (except for VOAs). For details of sample receipt information, please see the attached Chain of Custody and Condition Upon Receipt Form.

Quality Control: All samples were prepared and analyzed according to the following tables:

<table>
<thead>
<tr>
<th>Inorganic - Metals QC</th>
</tr>
</thead>
<tbody>
<tr>
<td>200.7</td>
</tr>
<tr>
<td>03/19/2019:203934</td>
</tr>
<tr>
<td>All analysis quality controls are within established criteria.</td>
</tr>
</tbody>
</table>

| 3050                  |
| 03/14/2019:202809     |
| All preparation quality controls are within established criteria, except: |
| The following note applies to Phosphorus: |
| 435 Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery. |

Certification: I certify that this data package is in compliance with ELAP standards, both technically and for completeness, except for any conditions listed above. Release of the data contained in this data package is authorized by the Laboratory Director or his designee, as verified by the following electronic signature.

KD:DMB
**Sample Result - Inorganic (Dry Weight)**

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Result</th>
<th>PQL</th>
<th>Units</th>
<th>Note</th>
<th>Sample Preparation Method</th>
<th>Date/ID</th>
<th>Sample Analysis Method</th>
<th>Date/ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metals, Total</td>
<td>689</td>
<td>5</td>
<td>mg/kg</td>
<td>3050</td>
<td>03/14/19:202809</td>
<td>200.7</td>
<td>03/19/19:203934</td>
<td></td>
</tr>
<tr>
<td>Phosphorus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ND=Non-Detected. PQL=Practical Quantitation Limit. * PQL adjusted for dilution.
Quality Control - Inorganic

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Method</th>
<th>Date/ID</th>
<th>Type</th>
<th>Units</th>
<th>Conc.</th>
<th>QC Data</th>
<th>DQO</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phosphorus</td>
<td>200.7</td>
<td>03/19/19:203934AC</td>
<td>CCV</td>
<td>ppm</td>
<td>5.000</td>
<td>96.9 %</td>
<td>90-110</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CCB</td>
<td>ppm</td>
<td>-0.002</td>
<td>97.1 %</td>
<td>90-110</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CCV</td>
<td>ppm</td>
<td>5.000</td>
<td>97.1 %</td>
<td>90-110</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CCB</td>
<td>ppm</td>
<td>0.0004</td>
<td>97.1 %</td>
<td>90-110</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>3050</td>
<td>03/14/19:202809EMM</td>
<td>Blank</td>
<td>mg/kg</td>
<td>ND</td>
<td>93.6 %</td>
<td>80-120</td>
<td>&lt;5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LCS</td>
<td>mg/kg</td>
<td>200.0</td>
<td>117 %</td>
<td>75-125</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MS</td>
<td>mg/kg</td>
<td>200.0</td>
<td>117 %</td>
<td>75-125</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MSD</td>
<td>mg/kg</td>
<td>200.0</td>
<td>114 %</td>
<td>75-125</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MSRDP</td>
<td>mg/kg</td>
<td>200.0</td>
<td>8.8 %</td>
<td>75-125</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PDS</td>
<td>mg/kg</td>
<td>200.0</td>
<td>121 %</td>
<td>75-125</td>
<td></td>
</tr>
</tbody>
</table>

Definition

PDS: PDS failed, matrix - Post Digestion Spike (PDS) not within Acceptance Range (AR) because of matrix interferences affecting this analyte. Data was accepted based on the LCS recovery.

CCV: Continuing Calibration Verification - Analyzed to verify the instrument calibration is within criteria.

CCB: Continuing Calibration Blank - Analyzed to verify the instrument baseline is within criteria.

Blank: Method Blank - Prepared to verify that the preparation process is not contributing contamination to the samples.

LCS: Laboratory Control Standard/Sample - Prepared to verify that the preparation process is not affecting analyte recovery.

MS: Matrix Spikes - A random sample is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.

MSD: Matrix Spike Duplicate of MS/MSD pair - A random sample duplicate is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.

MSRPD: MS/MSD Relative Percent Difference (RPD) - The MS relative percent difference is an indication of precision for the preparation and analysis.

ND: Non-detect - Result was below the DQO listed for the analyte.

DQO: Data Quality Objective - This is the criteria against which the quality control data is compared.

Explanation

435: Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.
March 8, 2019

KayeLani A. Marshall,
Project Manager,
Babcock Laboratories, Inc.
6100 Quail Valley Court,
Riverside, CA 92507-0704.

Re: PTS File No: 49025
  Project Name: B9C0039
  Job Number: B9C0039

Subject: Laser Particle Size Analyses – [1 Sample – B9C0039-01].

Dear KayeLani A. Marshall:

Please find enclosed report for Physical Properties analyses conducted upon one (1) soil samples received from the above referenced project.

All analyses were performed by applicable ASTM, EPA, or API methodologies. The sample is currently in storage and will be retained for thirty days past completion of testing at no charge. Please note that the sample will be disposed of at that time. You may contact me regarding storage, disposal, or return of the sample.

PTS Laboratories appreciates the opportunity to be of service. If you have any questions or require additional information, please contact me or Emeka Anazodo at (713) 316-1800.

Sincerely,
PTS Laboratories, Inc.

C.A. Umeh

Chidi Umeh
Flow Laboratory Supervisor

Encl.
## TEST PROGRAM - 20180306

<table>
<thead>
<tr>
<th>CORE ID</th>
<th>Depth ft</th>
<th>Core Recovery</th>
<th>Grain Size Analysis</th>
<th>ASTM D4464/M</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>B9C0039-01</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTALS:**

- 1

**Laboratory Test Program Notes**

**Contaminant Identification:**

*Standard TAT for basic analysis is 10-15 business days.*

**Grain Size Analysis:** Laser or sieve method; includes tabular data, graphics and statistical sorting in Excel format.
### Particle Size Summary

**Methodology:** ASTM D422/D4484M

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Depth, ft</th>
<th>Mean Grain Size Description (1)</th>
<th>Median Grain Size mm</th>
<th>Particle Size Distribution, wt. percent</th>
<th>Silt &amp; Clay</th>
</tr>
</thead>
<tbody>
<tr>
<td>B9C0039-01</td>
<td>N/A</td>
<td>Silt</td>
<td>0.009</td>
<td>0.00 0.00 11.35 51.63 35.93 87.55</td>
<td></td>
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</tbody>
</table>

(1) Based on Mean from Trask
# Particle Size Analysis - ASTM D4464M

**Client:** Babcock Laboratories, Inc.  
**PTS File No:** 49025  
**Project:** B9C0039  
**Sample ID:** B9C0039-01  
**Depth, ft:** N/A

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<th>Opening</th>
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<th>Increment Weight, percent</th>
<th>Cumulative Weight, percent</th>
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**Cumulative Weight Percent greater than**

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**Measure**

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**Grain Size Description**

- **ASTM-USCS Scale**
- **(based on Mean from Trask)**

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© PTS Laboratories, Inc.  
Phone: (713) 316-1800  
Fax: (877) 255-9953
**SUBCONTRACT ORDER**

Babcock Laboratories, Inc.

**B9C0039**

**SENDING LABORATORY:**

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

**RECEIVING LABORATORY:**

PTS Laboratories
5730 Centralcrest Street
Houston, TX 77092
Phone: (713) 316-1800
Fax: -

Client: Riverside County Flood Control
Sampler: A. Suter/M. Varela

<table>
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<th>Analysis</th>
<th>Due</th>
<th>Expires Regulatory Days</th>
<th>Laboratory ID</th>
<th>Comments</th>
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<td>Past Date Sampled 03/11/19 10:25</td>
<td>1819-MV2-S1-01</td>
<td>Gran size ASTM D4464 (2)</td>
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<td>Solid</td>
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All Containers Intact: Yes ✔ No
Samples Preserved Properly: Yes ✔ No

Samples Received at **11°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: L. Lopez
Date: 3-4-19

Received By: 3-5-19

Page 1 of 1
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

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<th>By</th>
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Abigail Suter
### Analytical Report

**Client Name:** Riverside County Flood Control  
**Contact:** Rebekah Guill  
**Address:** 1995 Market Street  
Riverside, CA 92501  
**Report Date:** 09-Apr-2019

**Analytical Report:** Page 2 of 8  
**Project Name:** RCFC - Post Fire Soil  
**Project Number:** Post Fire Sediment MV  
**Work Order Number:** B9C0037  
**Received on Ice (Y/N):** Yes  
**Temp:** 16 °C

---

#### Laboratory Reference Number

**B9C0037-01**

**Sample Description**  
1819-MV2-S1-01

**Matrix**  
Sludge

**Sample Date/Time**  
03/01/19 10:25

**Received Date/Time**  
03/01/19 11:55

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**Location**  
6100 Quail Valley Court  
Riverside, CA 92507-0704  
**Webpage:** www.babcocklabs.com  
**Phone:** 951 653 3351  
**Fax:** 951 653 1662  
**EPA No.:** CA00102  
**NELAP No.:** OR4035  
**LACSD No.:** 10119  
**Mailing Address:**  
P.O Box 432  
Riverside, CA 92502-0432  
**CA ELAP No.:** 2698
### Anions - Batch Quality Control

#### Batch 9C01067 - Water Extraction-IC

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<td>Matrix Spike (9C01067-MS1)</td>
<td>Source: B9C0037-01</td>
<td>Prepared &amp; Analyzed: 03/02/19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrite as N</td>
<td>42.7</td>
<td>1.6</td>
<td>mg/kg dry</td>
<td>40.0</td>
<td>ND</td>
<td>62-121</td>
<td>107</td>
<td></td>
</tr>
<tr>
<td>Nitrate as N</td>
<td>84.7</td>
<td>3.2</td>
<td>mg/kg dry</td>
<td>90.5</td>
<td>ND</td>
<td>80-120</td>
<td>93.6</td>
<td></td>
</tr>
<tr>
<td>Matrix Spike Dup (9C01067-MSD1)</td>
<td>Source: B9C0037-01</td>
<td>Prepared &amp; Analyzed: 03/02/19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrite as N</td>
<td>42.2</td>
<td>1.6</td>
<td>mg/kg dry</td>
<td>40.0</td>
<td>ND</td>
<td>62-121</td>
<td>105</td>
<td>1.15</td>
</tr>
<tr>
<td>Nitrate as N</td>
<td>85.0</td>
<td>3.2</td>
<td>mg/kg dry</td>
<td>90.5</td>
<td>ND</td>
<td>80-120</td>
<td>93.9</td>
<td>0.362</td>
</tr>
</tbody>
</table>
### Solids - Batch Quality Control

<table>
<thead>
<tr>
<th>Analyte(s)</th>
<th>Result</th>
<th>RDL</th>
<th>Units</th>
<th>Spike</th>
<th>Source</th>
<th>%REC</th>
<th>%REC Limits</th>
<th>RPD</th>
<th>RPD Limit</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Batch 9C01050 - Analyzed as received</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Blank (9C01050-BLK1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Solids</td>
<td>ND</td>
<td>0.10</td>
<td>0.10</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duplicate (9C01050-DUP1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Total Solids</td>
<td>63.8</td>
<td>0.10</td>
<td>0.10</td>
<td>%</td>
<td><a href="#">9C0031-01</a></td>
<td>63.2</td>
<td></td>
<td>1.01</td>
<td>25</td>
<td></td>
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</tbody>
</table>

Blank (9C01050-BLK1) Prepared & Analyzed: 03/01/19
Duplicate (9C01050-DUP1) Source: [9C0031-01](#) Prepared & Analyzed: 03/01/19

---

**location**
P.O Box 432
Riverside, CA 92502-0432

**mailing**
P.O Box 432
Riverside, CA 92502-0432

**P.O Box 432**
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
### Aggregate Organic Compounds - Batch Quality Control

<table>
<thead>
<tr>
<th>Analyte(s)</th>
<th>Result</th>
<th>RDL</th>
<th>Units</th>
<th>Spike Level</th>
<th>Source</th>
<th>%REC</th>
<th>%REC Limits</th>
<th>RPD Limit</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batch 9C12166 - Analyzed as received</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blank (9C12166-BLK1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Organic Carbon</td>
<td>ND</td>
<td>0.20</td>
<td>0.050% dry weight</td>
<td>%</td>
<td>Prepared &amp; Analyzed: 03/15/19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCS (9C12166-BS1)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Organic Carbon</td>
<td>1.62</td>
<td>0.20</td>
<td>0.050% dry weight</td>
<td>1.59</td>
<td>102</td>
<td>70-130</td>
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</tr>
<tr>
<td>Matrix Spike (9C12166-MS1)</td>
<td>Source: B9C0031-01</td>
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</tr>
<tr>
<td>Total Organic Carbon</td>
<td>3.00</td>
<td>0.20</td>
<td>0.050% dry weight</td>
<td>1.59</td>
<td>1.84</td>
<td>73.5</td>
<td>41-139</td>
<td></td>
<td></td>
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<tr>
<td>Matrix Spike Dup (9C12166-MSD1)</td>
<td>Source: B9C0031-01</td>
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<tr>
<td>Total Organic Carbon</td>
<td>3.78</td>
<td>0.20</td>
<td>0.050% dry weight</td>
<td>1.59</td>
<td>1.84</td>
<td>122</td>
<td>41-139</td>
<td>22.7</td>
<td>25</td>
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</tbody>
</table>

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

**Location**

6100 Quail Valley Court
Riverside, CA 92507-0704

**Mailing**

P.O Box 432
Riverside, CA 92502-0432

**P 951 653 3351**
**F 951 653 1662**
**www.babcocklabs.com**

**CA ELAP No. 2698**
**EPA No. CA00102**
**NELAP No. OR4035**
**LACSD No. 10119**
## Nutrients - Batch Quality Control

<table>
<thead>
<tr>
<th>Analyte(s)</th>
<th>Result</th>
<th>RDL</th>
<th>Units</th>
<th>Spike Level</th>
<th>Source</th>
<th>%REC</th>
<th>%REC Limits</th>
<th>RPD</th>
<th>RPD Limit</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Batch 9C04113 - Acid Digest</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Blank (9C04113-BLK1)</td>
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<td></td>
</tr>
<tr>
<td>Kjeldahl Nitrogen</td>
<td>ND</td>
<td>100</td>
<td>100</td>
<td>mg/kg wet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepared: 03/04/19  Analyzed: 03/05/19</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCS (9C04113-BS1)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kjeldahl Nitrogen</td>
<td>825</td>
<td>100</td>
<td>100</td>
<td>mg/kg wet</td>
<td>800</td>
<td>103</td>
<td>80-120</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Prepared: 03/04/19  Analyzed: 03/05/19</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Duplicate (9C04113-DUP1)</td>
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<td></td>
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<td>B9C0031-01</td>
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<td></td>
<td>0.116</td>
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<tr>
<td>Kjeldahl Nitrogen</td>
<td>19600</td>
<td>1600</td>
<td>1600</td>
<td>mg/kg dry</td>
<td>19500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source: B9C0031-01</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepared: 03/04/19  Analyzed: 03/05/19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Notes and Definitions

N_WEX  Analyte determined on a 1:10 water extract from the sample.
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
NR_RL:  RL for analyte does not meet the SWAMP / CTR required RL.
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.

K. Marshall

cc: KayeLani A. Marshall

e-Standard_RFCN2_rpt
### Chain of Custody Sample Information Record

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>Post Fire Sediment</th>
<th>Turn Around Time:</th>
<th>Sample ID</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station ID:</td>
<td>MV</td>
<td></td>
<td>1819-MV2-S1-Q1</td>
<td>21/12/2019</td>
<td>6:25</td>
</tr>
</tbody>
</table>

**Notes:**
- Total No. tests: 70C
- Present Send: and total 70C was requested by client on 3/6/2019
- Received by: (Sign) JMG
- Print Name / Company: JMG
- Date / Time: 3/01/2019 11:55

**Received on Ice (Y/N):** Yes
**Temp:** 16 °C

---

**Contact:** Rebekah Guill / Abigail Suter
**Phone No.:** (951) 955.2901 / 955.1734

---

**Additional Reporting Requests:**
- Include QC Data Package: [ ]
- Include QA Results: [ ]
- Include EDI Results: [ ]
- Include Bill of Lading: [ ]

---

**E.S. Babcock Sons, Inc. Environmental Laboratories**
(951) 953-3351 FAX (951) 953-1662
www.babcocklabs.com

**Analysis Requested:**
- BWA = Bacterial Water Analysis (No. 15)
- BI = Biological Indicator (No. 17)
- K = Total Kjeldahl (No. 18)
- L = Liquefied (No. 19)
- M = Microbiology

---

**Location:**
- Babcock Laboratories, Inc.
  - 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
## Post Holy Fire Sediment Quantity and Nutrient Load Calculations

<table>
<thead>
<tr>
<th>Site</th>
<th>Approximate Date Range</th>
<th>Approximate Volume Removed (CY)</th>
<th>Approximate Truckloads (# of Trucks)</th>
<th>Average Truck Weight1 (tons)</th>
<th>Approximate Wet Weight (tons) = (N·AW)</th>
<th>Approximate Dry Weight (tons) = (T_w·CF)</th>
<th>Total Nitrogen (mg/kg)</th>
<th>Total Phosphorus (mg/kg)</th>
<th>Total Nitrogen (Tons)</th>
<th>Total Phosphorus (Tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leach Canyon Dam (LC3) Pre-Storm Season</td>
<td>9/1/2018 - 11/27/2018</td>
<td>20,000</td>
<td>2,000</td>
<td>15.5</td>
<td>31,000</td>
<td>21,700</td>
<td>20,000</td>
<td>368</td>
<td>434</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>11/28/2018 - 2/15/2019</td>
<td>59,376</td>
<td>7,422</td>
<td>15.5</td>
<td>115,041</td>
<td>80,529</td>
<td>20,000</td>
<td>368</td>
<td>1,611</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>2/16/2019 - 4/8/2019</td>
<td>20,048</td>
<td>2,506</td>
<td>15.5</td>
<td>38,843</td>
<td>27,190</td>
<td>20,000</td>
<td>368</td>
<td>544</td>
<td>10</td>
</tr>
<tr>
<td>McVicker Canyon Basin (MV2) Pre-Storm Season</td>
<td>9/1/2018 - 11/27/2018</td>
<td>10,000</td>
<td>1,000</td>
<td>15.5</td>
<td>15,500</td>
<td>10,850</td>
<td>47,000</td>
<td>689</td>
<td>510</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>11/28/2018 - 2/15/2019</td>
<td>41,992</td>
<td>5,249</td>
<td>15.5</td>
<td>81,360</td>
<td>56,952</td>
<td>47,000</td>
<td>689</td>
<td>2,677</td>
<td>39</td>
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<tr>
<td></td>
<td>2/16/2019 - 4/5/2019</td>
<td>27,488</td>
<td>3,436</td>
<td>15.5</td>
<td>53,258</td>
<td>37,281</td>
<td>47,000</td>
<td>689</td>
<td>1,752</td>
<td>26</td>
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</table>

<table>
<thead>
<tr>
<th>Notes:</th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Average Truck Weight calculated from all weigh tickets throughout project</td>
<td>AW: Average truckload weight</td>
<td>T_w = Approximate wet weight of sediment (tons)</td>
<td>W_d = Approximate, dry weight (tons)</td>
<td>N = Number of trucks</td>
<td>CF = Conversion factor of 0.7, wet to dry sediment weight</td>
<td>M_x = Nutrient “x” removed, (tons)</td>
<td>W_d = Total sediment, dry weight (tons)</td>
<td>C_x = Analyte “x” concentration (mg/kg)</td>
<td>F = Unit conversion factor, divide by 10^6 (mg/kg)</td>
<td></td>
</tr>
</tbody>
</table>

### Calculations:

\[
W_d = N \cdot T_w \cdot CF
\]

\[
M_x = \frac{W_d \cdot C_x}{F}
\]
# Leach Canyon Dam

## Pre and Post Fire Comparison of Water and Debris Capacity

3/7/2019 MGZ

<table>
<thead>
<tr>
<th>Topography Source</th>
<th>Level Water Pool Capacity</th>
<th>Debris Capacity with 4-Percent As-Built Slope Beginning at Spillway Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(yd³)</td>
<td>(ac-ft)</td>
</tr>
<tr>
<td>1956 Design As-Built Line Topo(^a)</td>
<td>52,595 (27,427)</td>
<td>32.6 (17)</td>
</tr>
<tr>
<td>1963.02.23 Line Topo</td>
<td>24,523</td>
<td>15.2</td>
</tr>
<tr>
<td>2016 Pre Holy Fire DTM(^b)</td>
<td>21,619</td>
<td>13.4</td>
</tr>
<tr>
<td>2018 Post Holy Fire DTM(^c)</td>
<td>26,011</td>
<td>16.1</td>
</tr>
<tr>
<td>2019 Design Grade Improvements DTM(^d)</td>
<td>66,529</td>
<td>41.2</td>
</tr>
</tbody>
</table>

**Notes:**

- As-built backup is lacking. Plans contain contentious data. As-built line work does not match quantities written on as-built.  
  32.6 (17) = results from generated DTM (information written on as-built)  
- 2016 DTM insufficient for debris analysis.  
- DTM generated after area was flown via drone on 8-29-2018.  
- Original DTM used from 8-29-2018 drone flight and was modified with grading changes to improve dam capacity (includes 2 feet of dead storage).
Leach Debris Capacity

DEBRIS CAPACITY = 94,000 cu yds

* AS-BUILT BACKUP IS LACKING. PLANS CONTAIN CONTENTIOUS DATA.
<table>
<thead>
<tr>
<th>Elevation</th>
<th>Area</th>
<th>Volume (CF)</th>
<th>Incr Volume (ACRE FT)</th>
<th>Cum Volume (ACRE FT)</th>
<th>Cum Volume (CY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>27.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>28</td>
<td>11602</td>
<td>2900.5</td>
<td>0.07</td>
<td>0.1</td>
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<tr>
<td>30</td>
<td>47723</td>
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<td>1.36</td>
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<td>35</td>
<td>65846</td>
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<td>40</td>
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<tr>
<td>45</td>
<td>104833</td>
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<td>27.4</td>
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<td>50</td>
<td>127108</td>
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<td>40.7</td>
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<tr>
<td>61.5</td>
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<td>280353.1</td>
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<td>65</td>
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