



## **BACWA Executive Board Meeting – Special Meeting**

**Monday, October 26 10:30-11am**

Public comment guidelines: <https://bacwa.org/general/bacwa-public-comments-guidelines/>

Zoom meeting link: <https://zoom.us/j/98715606898?pwd=c1lzSHhlaTdOTINhYlFSRUx1YTRRdz09>

Meeting ID: 987 1560 6898

Passcode: 610078

One tap mobile

+16699009128,,98715606898#,,,,,0#,,610078# US (San Jose)

+12532158782,,98715606898#,,,,,0#,,610078# US (Tacoma)

1. Introductions/roll call / public comment
2. Instructions and etiquette
3. Approvals and Authorizations
  - a) Approval: SGS AXYS Contract for \$60,932, PFAS Phase I study analytical costs.
  - b) Approval: UC Davis contract on behalf of BABC for \$64,500 Study of plant Uptake of PFAS Grown in Biosolid-Amended Soils.
4. Adjournment



## EXECUTIVE BOARD AUTHORIZATION REQUEST

AGENDA NO.: 3 a

FILE NO.: 21-19

MEETING DATE: Oct 26, 2020

**TITLE: Request for BACWA Executive Board Approval to Execute Agreement with the SGS AXYS for Chemical Analysis for Phase 1: Per- and Polyfluoroalkyl Substances (PFAS) Monitoring for Bay Area Publicly-Owned Treatment Works.**

☐ RECEIPT

☐ DISCUSSION

☐ RESOLUTION

☒ APPROVAL

### RECOMMENDED ACTION

Authorize the execution of an agreement with SGS AXYS to perform analysis of Per- and Polyfluoroalkyl Substances (PFAS) Monitoring for Bay Area Publicly-Owned Treatment Works, Phase 1 in an amount not to exceed \$60,932.

### SUMMARY

In July 2020, the State Water Board issued a 13267 Investigative Order to POTWs around the State to complete one year of monitoring for a suite of PFAS compounds in influent, effluent, and biosolids. The State Water Board estimated that the total cost for each facility of conducting the sampling and preparing the reports required by this Order is in the range of \$5,000 to \$25,000 for sampling and reporting. Region 2 POTWs were excluded from this Order with the understanding that they would work with SFEI's San Francisco Bay Regional Monitoring Program (RMP) to develop a POTW monitoring study that focuses more on data management and synthesis, in return for reduced monitoring compared to the 13267 Order. BACWA will fund and manage the study on behalf of its members. The BACWA Executive Board approved a contract with SFEI at the August 21, 2020 Board meeting to develop and manage the study. The study is currently envisioned as a two-phase study, with Phase II to be developed and funded in Fiscal Year 21.

SFEI and BACWA staff worked together on an informal solicitation for a contract laboratory to carry out the chemical analysis of PFAS compounds as described in the proposed Phase I sampling plan. Two laboratories were identified based on their reputation among PFAS experts, and they provided estimates based on a proposed sample list supplied by SFEI. SGS AXYS was selected as the preferred laboratory because their quote was slightly lower than that of their competitor, and because they support an analyte list which includes additional PFAS compounds not available from other labs. They are also familiar with SFEI's data management services and reporting to CEDEN.

The attached scope of work will provide shipping of sampling materials to facilities participating in the Per- and Polyfluoroalkyl Substances Monitoring for Bay Area Publicly-Owned Treatment Works, Phase 1, as well as the chemical analysis that will be described by the Phase I sampling plan. For more details, please see the Statement of work and budget provided in Exhibit A of the attached contract.

## **FISCAL IMPACT**

The FY21 April 17, 2020 budget includes a line item for General Technical Support, which will fund the analytical costs associated with the study. Phase II efforts are expected to be funded from the FY22 budget.

## **ALTERNATIVES**

1. Do not complete this work: This alternative is not recommended since it would also require terminating the contract with SFEI. In this case, each member agency would then be responsible for conducting their own monitoring and reporting under a 13267 Order, at a greater total cost to the POTW community.
2. Select another consultant to conduct the work: This alternative is not recommended since SGS AXYS has a strong track record in collaborating with SFEI on CEC studies, and analysis costs were slightly below that of another highly reputable contract laboratory.

Attachments: FY21 Contract with SGS AXYS for \$60,932.

Approved: \_\_\_\_\_  
Amit Mutsuddy, Chair,  
BACWA Executive Board

Date: October 26, 2020

## **BAY AREA CLEAN WATER AGENCIES PROFESSIONAL SERVICES CONTRACT**

This PROFESSIONAL SERVICES CONTRACT, effective 10/16/2020, is between Bay Area Clean Water Agencies ("BACWA"), a joint powers agency which exists as a public entity separate and apart from its Member Agencies, created January 4, 1984 by a Joint Powers Agreement between Central Contra Costa Sanitary District, East Bay Dischargers Association, East Bay Municipal Utility District, the City and County of San Francisco and the City of San Jose, with a mailing address of P.O. Box 24055, MS 702, Oakland, CA 94623, and SGS AXYS Analytical Services Ltd. ("Consultant"), a Foreign-Owned corporation doing business at 2045 Mills Road West Sidney, BC V8L 5X2 for professional services as described in any Exhibit A attached hereto.

In consideration of the mutual covenants, stipulations and agreements, the parties agree as follows:

### **Description and Standard of Services to be Performed**

1. Consultant will perform the Services as described by and in accordance with Exhibit A in a manner acceptable to BACWA.
2. Consultant shall not contract with or otherwise use any subconsultants, subcontractors or other nonemployee persons or entities ("Subconsultants") to perform the Services without the prior written approval of BACWA. If Consultant and BACWA agree that Subconsultants shall be used, Consultant shall ensure Subconsultants' compliance with all the terms and conditions of this agreement.
3. Consultant will exercise that degree of care in performing the Services in accordance with that prevailing among firms of comparable standing in the State of California ("Professional Standard"). Consultant will promptly correct or re-perform those Services not meeting the Professional Standard without additional compensation.
4. Consultant warrants that it is fully licensed, registered and otherwise fully authorized to perform the Services in the State of California to the extent applicable law requires such licensure, registration or authorization.
5. BACWA's review, approval, acceptance, use, or payment for all or any part of the Services hereunder will not alter the Consultant's obligations or BACWA's rights hereunder, and will not excuse or diminish Consultant's responsibility for performing all Services consistent with this Contract.

### **Payment for Services**

6. BACWA will pay Consultant based on the lump sum amounts for the various tasks shown in the scope of work in Exhibit A, up to a maximum amount payable of \$60,932. Consultant will not exceed the maximum amount payable without obtaining prior written approval from BACWA.
7. Consultant shall submit invoices quarterly (March, June, September, December), or upon completion of major project milestones, with progress made on each task as indicated by a percent of task completed. Payment will be made based on the lump sum for the task and the percentage of the task completed, as listed in Exhibit B. Invoices shall include the lump sum amount requested and a brief description of the work performed.
8. Payments under this Contract will be due thirty (30) days after BACWA's receipt of invoices. BACWA may withhold from any progress or final payment any damages, backcharges or claims incurred or anticipated by BACWA to the extent caused by Consultant.

#### Document Ownership and Retention

9. Consultant will maintain all financial records relating to this Contract in accordance with generally accepted accounting principles and for at least three years following termination of this Contract. Consultant will grant BACWA and its representatives access upon request to all such records and all other books, documents, papers, drawings, and writings of Consultant that refer or relate to this Contract.
10. All drawings, specifications, reports, programs, manuals, and other work product of Consultant that result from this Contract ("Work Product") will be considered the exclusive property of BACWA. Consultant agrees that it will not use, disclose, communicate, publish or otherwise make available to third parties any products, analyses, data, compilations, studies, proposals, technical or business information, and any other information related to the Services provided to BACWA without BACWA's prior written approval.

#### Indemnification

11. To the fullest extent allowed by law, Consultant will indemnify, hold harmless, reimburse and defend BACWA, its Member Agencies, and each of their officers, directors, employees and agents from, for and against any and all claims, demands, damages, losses, expenses, liabilities and penalties, including but not limited to reasonable attorneys' and expert witnesses' fees, arising out of or relating to the Services but only to the extent caused by the negligent or other wrongful acts or omissions of Consultant or any person or entity for whose acts or omissions any of them are responsible, or by the failure of any such party to perform as required by this Contract.

#### Insurance

12. Consultant will purchase and maintain, at Consultant's expense, the following types of insurance, covering Consultant, its employees and agents:
  - a. Workers' Compensation Insurance as required by law, subject to a waiver of subrogation in favor of BACWA;
  - b. Employers Liability Insurance with a per accident value at \$1,000,000, Policy Limit of \$1,000,000 and Each Employee of \$1,000,000, subject to a waiver of subrogation in favor of BACWA.
  - c. Comprehensive General Liability Insurance covering personal injury and property damage with a combined single limit, or the equivalent, of not less than \$1,000,000.00 each occurrence, \$2,000,000.00 general aggregate, and naming BACWA as an additional insured.
  - d. Business Automobile Liability Insurance with combined single limit coverage of not less than \$1,000,000.00 aggregate for each claim, incident, or occurrence; and naming BACWA as an additional insured.

#### Assignment

13. Consultant will not assign or transfer any of its interest in this Contract, in whole or in part, without the prior written consent of BACWA. BACWA may assign this Contract and any rights relating to this Contract (including but not limited to its right to assert claims and defenses against Consultant) at BACWA's discretion.

#### Independent Contractor

14. Consultant will perform the Services as an independent contractor. Although Consultant will perform its Services for the benefit of BACWA, and although BACWA reserves the right to determine the schedule for the Services and to evaluate the quality of the completed performance, BACWA does not control the means or methods of Consultant's performance. Consultant is solely responsible for determining the appropriate means and methods of performing the Services, and Consultant's liability will not be diminished by any review, approval, acceptance, use or payment for the same by BACWA or any other party.

#### Termination of Contract; Suspension of Services

15. This contract shall automatically terminate on June 30, 2021. Either party may also terminate this Contract in whole or in part at any time for its convenience. For a termination for convenience, the termination will be effective thirty (30) days following receipt of a written notice of termination by one party from the other. BACWA may terminate this Contract in whole or in part for cause, in which event the termination will be effective ten (10) days after Consultant's receipt of BACWA's written notice and Consultant's failure during that period to cure the default.

#### Dispute Resolution

16. Consultant will give prompt written notice to BACWA of any claim, dispute or other matter in question, but in no event will Consultant give such notice later than ten (10) days after Consultant's becoming aware of the event or circumstance giving rise to the claim, dispute or matter in question.
17. All claims, disputes and other matters in question between BACWA and Consultant arising out of or relating to this Contract will be subject to alternative dispute resolution. If both parties agree to arbitration it will be conducted in accordance with the Commercial Arbitration Rules of the American Arbitration Association then in effect. Notice of the demand for arbitration will be filed in writing with the other party to this Contract and with the American Arbitration Association. Any arbitration arising out of or relating to this Contract will include, by consolidation, joinder or joint filing, any other person or entity not a party to this Contract that is substantially involved in a common issue of law or fact and whose involvement in the consolidated arbitration is necessary to achieve a final resolution of a matter in controversy therein. This agreement to arbitrate will be specifically enforceable by any court with jurisdiction thereof.
18. A demand for dispute resolution by either party will be made within a reasonable time after the claim, dispute, or other matter in question has arisen, and in no event will it be made after the date when institution of court litigation based on such claim, dispute or other matter in question would be barred by the applicable period of limitations. For all claims by BACWA against Consultant, the applicable period of limitations will not commence to run, and any alleged cause of action will not be deemed to have accrued (whether such action is based on negligence, strict liability, indemnity, intentional tort or other tort, breach of contract, breach of implied or express warranty, or any other legal or equitable theory), unless and until BACWA is fully aware of all three of the following: (1) the identity of the party(ies) responsible, (2) the magnitude of the damage or injury and (3) the cause(s) of the damage or injury. The contractual limitations period and discovery rule provided herein applies in lieu of any otherwise applicable statute or related case law.
19. The failure of either party to enforce any provision of this Contract will not constitute a waiver by that party of that or any other provision of this Contract.

Severability

20. BACWA and Consultant agree that if any term or provision of this Contract is determined to be illegal, in conflict with any law, void or otherwise unenforceable, and if the essential terms and provisions of this Contract remain unaffected, then the validity of the remaining terms and provisions will not be affected and the offending provision will be given the fullest meaning and effect allowed by law.

Survival

21. All rights and obligations set out in this Contract and arising hereunder will survive the termination of this Contract (i) as to the parties' rights and obligations that arose prior to such termination and (ii) as is necessary to give effect to rights and obligations that arise after such termination but derive from a breach or performance failure that occurred prior to the termination.

This Contract constitutes the entire, legally binding contract between the parties regarding its subject matter. No waiver, consent, modification or change of terms of this Contract is binding unless in writing and signed by both parties.

The following documents are incorporated into and made a part of this Contract. Any conflicts between these documents and this Contract will be resolved in favor of this Contract.

Exhibit A – Statement of Work and Budget


CONSULTANT: SGS AXYS Analytical Services Ltd.

2045 Mills Rd.

Street Address  
Sidney, BC Canada V8L 5X2

City, State, Zip Code  
98-0164200

Tax Identification No.

  
Consultant Signature

16-Oct-2020

Date

Shea Hewage, General Manager

Name, Title



October 26, 2020

---

BACWA Signature

Amit Mutsuddy, BACWA Executive Board Chair

---

Date

---

Name, Title



## Exhibit A: Statement of Work

### PROJECT MANAGEMENT

The work will be under the direction of CONTRACTOR's Principal Investigator as shown below.

Questions regarding technical matters relating to this contract should be addressed to:

Agency	<b>SGS AXYS</b>	<b>SFEI/ASC</b>
Name	Sean Campbell	Diana Lin
Title	Principal Investigator	Principal Investigator
Address	2045 Mills Rd.	4911 Central Ave.
	Sidney, BC Canada V8L 5X2	Richmond, CA 94804
Phone	250-655-5834	510-746-7385
Email	sean.campbell@sgs.com	<a href="mailto:diana@sfei.org">diana@sfei.org</a>

No substitution may be made for CONTRACTOR's principal investigator or technical matter contact without the prior written concurrence of SFEI/ASC and BACWA.

The contacts for business matters relating to the work performed hereunder are:

Agency	<b>SGS AXYS</b>	<b>BACWA</b>
Name	Richard Grace	Lorien Fono
Title	Director - Sales, Marketing, and Service	Executive Director
Address	2045 Mills Rd.	
	Sidney, BC Canada V8L 5X2	
Phone	905-484-2314	
Email	richard.grace@sgs.com	

## **Exhibit A – Statement of Work**

### **PROJECT NAME**

Per- and Polyfluoroalkyl Substances Monitoring for Bay Area Publicly-Owned Treatment Works, Phase 1.

### **PROJECT DESCRIPTION**

In November 2020, SFEI will coordinate with not more than 15 Bay Area Clean Water Agency Publicly-Owned Treatment Works members to collect wastewater samples for per- and polyfluoroalkyl substances (PFAS). Wastewater samples will include influent, effluent, reverse osmosis concentrate, and biosolids. The CONTRACTOR shall perform laboratory analyses on the samples as described in the Work Tasks below.

#### **1. Provide cleaned/certified containers and supplies**

The CONTRACTOR shall coordinate with the SFEI regarding sample containers and sample handling instructions (contact Diana Lin, (510)746-7385 or diana@sfei.org).

**The CONTRACTOR shall be responsible for supplying pre-cleaned/certified containers to each participating facility (contact name, address, phone, and email will be provided by SFEI)**

#### **2. Perform laboratory analysis on environmental samples**

The CONTRACTOR shall analyze the number and type of environmental and quality assurance/quality control samples as specified in the budget table in Exhibit B.

#### **3. Follow quality assurance and quality control and procedures for the RMP**

The CONTRACTOR shall follow all the field sampling, quality assurance/quality control, storage/archiving and waste disposal protocols specified in Exhibit C.

#### **4. Report results using California Environmental Data Exchange Network templates**

The CONTRACTOR shall report analytical results, including associated quality control sample results and associated metadata, according to the protocols in Exhibit C. The results shall be reported to SFEI within 6 weeks days of when the CONTRACTOR receives the samples.

## Exhibit B: Budget

### PFAS Monitoring in Bay Area Publicly-Owned Treatment Works, Phase 1 (Q4 2020)

Service	Sample Type	Number of Field Samples or Supplies	Number of Billable QA/QC Samples <sup>2</sup>	Unit Cost	Budget
BACWA PFAS Study - Phase 1					
Laboratory Analyses <sup>1</sup>					
PFAS target analysis, MSU 110	Influent	32	6	\$385	\$14,630
PFAS target analysis, MSU 110	Effluent	32	6	\$385	\$14,630
PFAS target analysis, MSU 110	Biosolids	20	3	\$405	\$9,315
PFAS target analysis, MSU 110	RO Concentrate	3	0	\$385	\$1,155
PFAS TOP analysis, MSU-111	Influent	15	0	\$355	\$5,325
PFAS TOP analysis, MSU-111	Biosolids	20	0	\$390	\$7,800
PFAS TOP analysis, MSU-111	RO Concentrate	2	0	\$355	\$710
Percent Solids	Biosolids	40			Included
Influent sample containers for target analysis (500 mL + 60 mL)	Sample containers	38			Included
Influent sample containers for TOP analysis (2 x 60 mL)	Sample containers	30			Included
Effluent + ROC sample containers for target analysis (500 mL)	Sample containers	41			Included
Biosolids sample containers for target and TOP analysis (250 mL)	Sample containers	20			Included
Services					
Level IV data package		124	15	\$35	\$4,865
CEDEN		124	15	\$15	\$2,085
Environmental disposal fee		124	15	\$3	\$417
Total					\$60,932

#### Budget Table Notes

<sup>1</sup>Details of the laboratory methods and target analytes to be reported are listed in Exhibit C, Section 2.

<sup>2</sup>In addition to any field duplicates or field blanks (which are included with the field samples), the laboratory will conduct QA/QC tests in compliance with Department of Defense (DoD) Quality Systems Manual dated 2019, version 5.3 Table 15B or later.

## Exhibit C: Budget

### Exhibit C: SPECIAL PROVISIONS FOR RMP LABORATORY SUBCONTRACTORS

Laboratories and other subcontractors performing monitoring services for the Regional Monitoring Program (RMP) shall conform to the following procedures and practices unless otherwise authorized, in writing, by the RMP Program Manager, RMP Quality Assurance Officer, or the RMP Data Manager.

#### RMP Program Manager

Melissa Foley  
SFEI  
510-746-7345  
melissaf@sfei.org

#### RMP QA Officer

Don Yee  
SFEI  
510-746-7369  
don@sfei.org

#### RMP Data Manager

Adam Wong  
SFEI  
510-746-7394  
adamw@sfei.org

## 1. Quality Assurance and Quality Control

Laboratories shall review the 2019 Quality Assurance Program Plan (QAPP) of the RMP dated 12/16/19 and available on the web at:

[https://www.sfei.org/sites/default/files/biblio\\_files/2019\\_RMP\\_QAPP\\_Final\\_0.pdf](https://www.sfei.org/sites/default/files/biblio_files/2019_RMP_QAPP_Final_0.pdf).

The RMP laboratory methodology is performance based. Suggested methods for analyses (used in past RMP monitoring) are listed in the RMP QAPP Table 11-1. Alternatives providing similar sensitivity and specificity may be suggested by the laboratory and used after consultation with and approval by the SFEI Program Manager and QA Officer. Please notify SFEI of any suggested changes or differences in methods.

All scientific activities undertaken by laboratories must adhere to quality assurance and quality control procedures as developed in the QAPP. This will include requirements for documenting chain of custody for samples, proper sample storage and holding times, data validation methods, and analysis of quality control samples, laboratory blanks and spikes, laboratory replicates, and standard reference materials (when available). Laboratories will be required to provide concise and complete reports of analyses of quality control samples to verify that Data Quality Objectives (DQOs) from the QAPP are being met. If DQOs are not being met, re-analysis of samples may be necessary.

## 2. Target Analytes

Laboratories shall test for the target analytes and report the results using the analyte names and reporting units as shown below. This list represents SFEI's minimum desired analyte list as well

as the matrix, unit, fraction and method that should be used when reporting the data in the CEDEN template. See Appendix A for the list of target analytes.

### **3. Storage and Waste Disposal**

After receipt of samples, laboratories will be responsible for proper storage of samples during the project, and disposal of samples after the project is complete. To the extent that any samples collected, or other materials used, are considered hazardous waste, laboratories will be responsible for disposing of these materials in accordance with all applicable Federal, State and/or Local laws.

### **4. Archiving**

Whenever possible, laboratories will retain sufficient amounts of sample or sample extract to allow for future reanalysis. Samples or extracts will be archived using appropriate storage techniques. Sample materials will not be discarded until all work described in this contract has been submitted to SFEI, validated, verified and BACWA has paid the final invoice. Laboratories may charge an archiving fee if samples need to be held longer.

### **5. Reporting of Results**

Subcontractors for field data and sample collection shall provide the collection information in the appropriate California Environmental Data Exchange Network (CEDEN) template available at [http://www.ceden.org/ceden\\_datatemplates.shtml](http://www.ceden.org/ceden_datatemplates.shtml).

Subcontractors shall send copies of the Chain of Custody forms to SFEI immediately after the samples have been shipped to a laboratory, archives, or any other entity besides the field collection subcontractor.

Laboratory personnel will verify, screen, validate, and prepare all data, including QA/QC results, in accordance with the RMP's QAPP and will provide (upon request) detailed QA/QC documentation that can be referred to for an explanation of any factors affecting data quality or interpretation. Any detailed QA/QC data not submitted as part of the reporting package (see below) should be maintained in the laboratory's database for future reference.

Laboratories submitting analytical data are required to populate all elements of the appropriate CEDEN Electronic Data Deliverable (EDD) template, provided by SFEI at the time of sample submission, including associated QA/QC information, as outlined below. Laboratories shall validate the completed EDDs via the web at [http://ceden.org/CEDEN\\_checker/Checker/index.htm](http://ceden.org/CEDEN_checker/Checker/index.htm) and shall submit finalized EDDs, case narratives, SOPs, and CRM certificates through email to Data Services, [DS@sfei.org](mailto:DS@sfei.org). All questions regarding populating the EDD templates should be directed to SFEI's Data Services team at [DS@sfei.org](mailto:DS@sfei.org).

**The Level IV data package will consist of the following four components: analytical and QA data results, Case Narrative, SOPs, and certificates for certified reference materials (CRMs). If there are any questions regarding vocabulary please contact DS@sfei.org.**

**I. Analytical and QA data results:** Results will be submitted in the SFEI-provided electronic data deliverable (EDD) template, as well as the Level IV data package. Tabulated data will include the following information for each sample (when applicable):

**A. Sample identification:** Unique sample ID, station code, sample date, analysis date and time, sample type (field sample or QA/QC), matrix (sample water, sediment, tissue).

**B. Analytical methods:** Preparation, extraction, and quantification methods (codes should reference SOPs submitted with the data submission package). Also include preparation, extraction, and analysis dates.

**C. Analytical results:** Analyte name, fraction, result, unit, method detection limit (MDL), and reporting limit (RL) for all target parameters (*see Appendix A for naming convention and reporting units*). When applicable, state whether the results are reported in wet or dry weight, and submit the appropriate QA/QC data qualifiers with the results.

**D. Required additional data** include:

1. Quality assurance information for each analytical chemistry batch for the QA/QC samples specified Exhibit B-2:
  - i. Matrix spike results (or similar samples), include for each analyte: target amount spiked plus parent sample result in the ExpectedValue field, actual recovery concentrations in the Result field, calculated % recovery and relative percent difference (where applicable) in the LabResultComments field. Please see details on [page 50 of the 2019 QAPP](#).
  - iii. Method blank sample results in units equivalent to field sample results (see Section C-2). Please see details on [page 52 of the 2019 QAPP](#).
  - iv. Field and lab replicate results and calculated %RPD and/or %RSD should be reported in the LabResultComments field. Please see details beginning on [page 49 of the 2019 QAPP](#).

**II. Case Narrative:** The following topics will be addressed in the narrative:

**A. Overview of Work Performed, Analytical Methodology and Reporting**

- Number of samples received and analyzed.
- Describe handling/storage/preparation of samples.
- Summarize extraction method.
- Summarize analysis method.
- Concentration range(s) used to generate calibration curves.

- Reporting units and basis (See Table 1; field and method blank results should be in the same units and basis)
- Define qualifiers used to qualify the results.
- Are results for corrective actions (e.g., reanalysis results, contamination study)?

## **B. Completeness**

- Were all sample results reported?
- Describe reason for any missing results.

## **C. Detection Limits**

- Provide detection and reporting limits and how they were estimated.
- Estimate proportion of unquantified results given detection limits for target analytes.

## **D. Batch Specific Discussion of Results**

- Provide a brief summary of results for each analytical batch.
- Describe number and type of samples analyzed in each laboratory batch.
- Indicate if results were blank or surrogate recovery corrected.
- Discuss analytical problems and any corrective actions.

### **1. Laboratory Blanks**

- Describe type(s) of blanks analyzed and summarize method blank results.

### **2. Accuracy**

- Summarize accuracy achieved by parameter and how measured (matrix spikes, certified reference materials, etc.).
- Are Expected Values (native+spike, certified, or target/reference concentration) and percent recovery calculations reported?

### **3. Precision**

- Summarize precision achieved from replicates and how measured (replicates of field samples, MS/MSDs, etc.).
- Are RPD (and/or RSD) calculations reported?

**III. Standard Operating Procedures (SOPs):** The laboratory's standard operating procedures for preparation, digest, or extraction, and analytical methods will be submitted along with the analytical results via email to DS@sfei.org.



## BACWA EXECUTIVE BOARD ACTION REQUEST

AGENDA NO.: 3b

FILE NO.: 21-20

MEETING DATE: October 26, 2020

**TITLE: Request for BACWA Executive Board Approval for Contract with The Regents of the University of California**

☐ RECEIPT

☐ DISCUSSION

☐ RESOLUTION

☒ APPROVAL

### RECOMMENDED ACTION

Authorize contract with UC Davis on behalf of the Bay Area Biosolids Coalition to provide \$64,500 in funding for study entitled Plant Uptake of Per- and Polyfluorinated Compounds Grown in Biosolid-Amended Soils.

### SUMMARY

The Bay Area Biosolids Coalition (BABC) is a Program of Special Benefit of BACWA. BACWA provides administrative services for BABC, but BABC programs are funded by its own member dues, and projects are approved, managed and overseen by the BABC steering committee. BACWA staff time used to support BABC is reimbursed by BABC.

BABC works to advance the use of biosolids management practices which benefit the environment and are cost efficient. One of the Coalition's focus areas is the support of research to demonstrate the efficacy of biosolids as a soil amendment and to ensure the safety of biosolids to stakeholders. This year the Coalition has voted to fund a research project implemented by UC Davis to investigate PFAS in soils and PFAS plant uptake. The research project will compare PFAS levels in soils which have received biosolids and compost, as well as soils that have not received either amendment. The project will then look at plant uptake of PFAS from these soils. The full scope of the research project is attached.

The Coalition has the funding for this project, and plans to deliver funds as a one-time lump sum to UC Davis. Due to the nature of the research occurring on working farm fields, compost needs to be applied to the field before the rainy season. The funding for this compost application needs to be disbursed to UC Davis for this to occur.

### FISCAL IMPACT

This item will be funded by BABC, and will have no impact on the BACWA Budget.

### ALTERNATIVES

No alternatives presented, as the BABC Steering Committee voted to approve to the study.

*Attachments:* Agreement between BACWA and Regents of the University of California  
Exhibit A - Proposal Scope of Work

Approved: \_\_\_\_\_

Amit Mutsuddy, Chair,  
BACWA Executive Board

Date: October 26, 2020



**AGREEMENT NUMBER A21-2817**  
**BAY AREA CLEAN WATER AGENCIES**

**And**

**THE REGENTS OF THE UNIVERSITY OF CALIFORNIA**

---

The Agreement to provide services is entered on October 1, 2020 ("Effective Date") by and between **Bay Area Clean Water Agencies**, with a place of business at P.O. Box 24055, MS 702, Oakland, CA 94623 ("Sponsor"), and **The Regents of the University of California**, with a place of business at 1850 Research Park Drive, Davis, CA 95618 ("University"), collectively "Parties" for the study entitled "Plant Uptake of Per- and Polyfluorinated Compounds Grown in Biosolid-Amended Soils".

1. During the period of October 1, 2020 through April 1, 2022, University agrees to provide services (or conduct activities) detailed in **Exhibit A**, attached.
2. Sponsor hereby agrees to pay the cost of providing the above services in the fixed amount of \$64,500, as shown in **Exhibit A**.

Please reference the subject Agreement Number No. A21-2817 when submitting payment, which shall be made to:

The Regents of the University of California  
University of California, Davis  
Cashier's Office  
P.O. Box 989062  
West Sacramento, CA 95798-9062

IN WITNESS WHEREOF, the Parties have executed this Agreement on the dates noted below.

**Bay Area Clean Water Agencies**  
("Sponsor")

**The Regents of The University of California,  
Davis** ("University")

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

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

Grace Liu, J.D.

Associate Director of Sponsored Programs

Name: Amit Mutsuddy

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

Title: BACWA Executive Board Chair

Date: October 26, 2020

## **Plant Uptake of Per- and Polyfluorinated Compounds Grown in Biosolid-Amended Soils**

Thomas M. Young and Gabrielle P. Black  
Department of Civil and Environmental Engineering  
University of California, Davis  
One Shields Ave., Davis, CA 95616

September 9, 2020

---

### ***Rationale***

Per- and polyfluoroalkyl substances (PFASs) are ubiquitous in consumer products and packaging, and many are highly persistent and widely detected in waste streams. Additionally, other fluorinated compounds can transform into PFASs during waste treatment, increasing their concentrations in wastewater treatment plant effluent. Their presence in biosolids is a potential route of introduction to the landscape where they are applied and potentially to the crops grown on these plots. Understanding the concentrations and transport of PFASs in soil and mature biomass following amendment with biosolids will provide information critical to assessing the risks that they pose in terrestrial ecosystems. The key research questions underlying the proposed study are: *(1) to what extent are PFASs in soil amendments (biosolids and food waste derived compost) retained in soils? and (2) to what extent are PFASs in amended soils transferred to crops grown on them?*

### ***Research Objectives***

The working hypothesis in this study, based largely on previous research that will be summarized in a 2-page review of the literature, is that the extent of PFAS uptake in above-ground biomass grown in biosolid-amended soils is minimal, and that PFAS levels in above-ground biomass will be comparable between biosolid and compost-amended soils.<sup>1</sup> The hypothesis will be investigated by pursuing the following research objectives:

1. Determine the fate of PFASs in agricultural applications of biosolids and compost by measuring: *(1)* background PFAS levels in soils, *(2)* PFASs in biosolids and food waste-derived compost, and *(3)* mature crops grown in soils receiving these amendments. PFAS's in Table 1 will be quantified in all samples. Additional PFAS's (Table 2) will be evaluated using the chosen method and compounds with recoveries greater than 60% in fortified samples will additionally be quantified.
2. Use this information to assess the relative risk of using biosolids as a soil amendment in comparison to compost in agricultural applications.

Compound	Cnum	Abbrev.	Class
Perfluorobutanoic acid	4	PFBA	PFCA
Perfluorobutane sulfonic acid	4	PFBS	PFSA
Perfluoropentane sulfonic acid	5	PFPeS	PFSA
Perfluoropentanoic acid	5	PFPeA	PFCA
Perfluorohexanoic acid	6	PFHxA	PFCA
Perfluorohexane sulfonic acid	6	PFHxS	PFSA
Perfluoroheptane sulfonic acid	7	PFHpS	PFSA
Perfluoroheptanoic acid	7	PFHpA	PFCA
Perfluorooctanoic acid	8	PFOA	PFCA
Perfluorooctane sulfonic acid	8	PFOS	PFSA
Perfluorooctanesulfonamide	8	PFOSA	PFSA
Perfluorononanoic acid	9	PFNA	PFCA
Perfluorodecanoic acid	10	PFDA	PFCA
Perfluorodecane sulfonic acid	10	PFDS	PFSA
Perfluoroundecanoic acid	11	PFUnA	PFCA
Perfluorododecanoic acid	12	PFDoA	PFCA
N-ethyl perfluorooctane sulfonamido acetic acid	12	N-EtFOSAA	PFSA
Perfluorotridecanoic acid	13	PFTrA	PFCA
Perfluorotetradecanoic acid	14	PFTeA	PFCA
8:2 Chlorinated perfluoroether sulfonic acid	10 (8 CF)	8:2 Cl-PFESA	CFeSAs
6:2 Chlorinated perfluoroether sulfonic acid (F-53B)	8 (6 CF)	6:2 Cl-PFESA	CFeSAs
N-Methylperfluorooctane sulfonamidoacetic acid	11 (9 CF)	N-MetFOSAA	PFSA
8:2 Fluorotelomer sulfonic acid	10 (8 CF)	8:2 FTS	FTS
4:2 Fluorotelomer sulfonic acid	6 (4 CF)	4:2 FTS	FTS
6:2 Fluorotelomer sulfonic acid	8 (6 CF)	6:2 FTS	FTS
6:2 Fluorotelomer phosphate diester	16 (12 CF)	6:2 diPAP	PFAP

Table 1 Per- and polyfluoroalkyl target compounds to be quantified in soil and mature plant material

Compound	Cnum	Abbrev.	Class
Hexafluoropropylene Oxide Dimer Acid	6	HFPO-DA	PFECA
9-Chlorohexadecafluoro-3-oxanonane-1- sulfonic acid	8	9-Cl-PF3ONS	PFSA
N-Methyl perfluorooctane sulfonamide	9	MeFOSA	PFSA
N-Ethyl perfluorooctane sulfonamide	10	EtFOSA	PFSA
11-Chloroeicosafluoro-3-oxaundecane-1- sulfonic acid	10	11-Cl-PF3OU	PFSA
4,8-Dioxa-3H-perfluorononanoic acid	10	ADONA	PFECA
N-Methyl perfluorooctane sulfonamide ethanol	11	MeFOSE	PFSE
N-Ethyl perfluorooctane sulfonamide ethanol	12	EtFOSE	PFSE

Table 2 Additional per- and polyfluoroalkyl compounds to be evaluated

## Tasks

1. *Validate analytical method for soils and plant material for 26 target compounds.* Coggan et al's (2019) published method for quantifying 21 fluorinated compounds in biosolids will be used to quantify 26 targets (Table 1). The method will be evaluated for quantification of an additional 8 compounds (Table 2), and if applicable, quantification of these targets will be performed as well. This method will be optimized for freeze-dried biomass and soil samples and analyzed using High-Resolution Liquid Chromatography Quadrupole Time-of-Flight Mass Spectrometry. If an EPA method for analyzing PFASs in solid matrices (e.g., soils, sediments, or sludges) has been finalized one month from the start of the project, it will be evaluated as a replacement to the method of Coggan et al.
2. *Measure PFAS concentrations in amendments, soils, and harvested crops.* Soils, amendments, and harvested crops subjected to three different treatment types in

Northern California (plots identified by the BABC) will be analyzed. The following treatments will be evaluated:

- a. *Biosolids*
- b. *Food waste-derived compost*
- c. *Historic conventional amendments (manures, composts, etc.)*
- d. *No treatment (reference site)*

Soils will be sampled prior to receiving any amendment, the amendments themselves will be sampled, then soil will be sampled after the growing season in addition to biomass samples. The preapplication sample will account for historic use of biosolids or compost on research plots. Sites will be chosen to ensure that additional treatments will not be employed prior to harvest. To the extent possible among available sites, similar soil composition (clay, loam, sandy, etc.) will be sought as representatives of groups (a-c) above. Soil samples from selected sites will be characterized for bulk density, pH, organic matter, particle size, and electroconductivity prior to amendment. Treatment selections may be modified slightly based on mutual consent of UC Davis and the BABC, but all plots will remain anonymous in the final reports.

3. *Analyze plant uptake in various treatment methods.* To better understand partitioning of these contaminants, and to inform future monitoring techniques, PFAS concentrations will be measured in the soil amendments collected at the time of their most recent application, and in the soils to which they are being applied prior to adding amendments to establish baseline levels of PFASs. At the conclusion of the growing season, PFASs will be measured in mature crops to quantify plant uptake. Crop species used in this study will be consistent amongst treatment plot types and will be determined once potential field sites have been identified. Subsequent soil samples will be analyzed at the time of harvest to understand the degree to which PFASs applied earlier have persisted in soils over the growing season. Samples will be taken at 5 cm deeper than the depth at which amendments are integrated.

1. Wen B, Pan Y, Shi X, et al. Behavior of N-ethyl perfluorooctane sulfonamido acetic acid (N-EtFOSAA) in biosolids amended soil-plant microcosms of seven plant species: Accumulation and degradation. *Sci Total Environ.* 2018;642:366-373. doi:10.1016/j.scitotenv.2018.06.073
2. Coggan TL, Moodie D, Kolobaric A, et al. An investigation into per- and polyfluoroalkyl substances (PFAS) in nineteen Australian wastewater treatment plants (WWTPs). *Heliyon.* 2019;5(8):e02316. doi:10.1016/j.heliyon.2019.e02316

### ***Project Schedule***

Task	2020	2021			
	Q4	Q1	Q2	Q3	Q4
<i>1. Validate analytical method for soils and plant material for 26 target compounds</i>					
<i>2. Establish baseline PFC concentrations in amendments and pre-amended soils</i>					
			<i>Growing season</i>		
<i>3. Analyze plant uptake from different treatment plots</i>					
<i>3. Prepare final report</i>					

All deliverables will be provided upon submission of the final report.

***Proposal Budget***

**Budget Period:** October 1, 2020 through April 1, 2022

	<b>Year 1</b>	<b>Year 2</b>	<b>Cumulative</b>
Salaries	\$ 30,228.00	\$ 5,264.00	\$ 35,492.00
Fringe Benefits	\$ 11,293.00	\$ 1,469.00	\$ 12,762.00
Supplies & Materials	\$ 14,200.00	\$ 2,000.00	\$ 16,200.00
<b>Total Costs</b>	<b>\$ 55,721.00</b>	<b>\$ 8,733.00</b>	<b>\$ 64,454.00</b>