Study of Per- and Polyfluoroalkyl Substances in Bay Area POTWs: Phase 2

Sampling and Analysis Plan

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1. Introduction

This Sampling and Analysis Plan (SAP) details the plan associated with the Per- and Polyfluoroalkyl Substances Monitoring for San Francisco Bay Area Publicly-Owned Treatment Works, Phase 2: Investigation of PFAS Sources in Sewershed to Inform PFAS Management. This study was developed to investigate per- and polyfluoroalkyl substances (PFAS) in matrices from Bay Area publicly-owned treatment works (POTWs) to inform the monitoring strategy and program decisions for the Regional Monitoring Program for Water Quality in San Francisco Bay (RMP) and address monitoring needs for the State Water Board. The study is a two-part study, and this plan details the tasks associated with Phase 2 of the study. Phase 1 analysis was completed in 2021 and informed the study design of Phase 2.

In the Phase 1 study, wastewater influent, effluent, and biosolids were collected from sixteen treatment facilities within the San Francisco Bay Region to assess the presence of per- and polyfluoroalkyl substances (PFAS). The POTWs included in Phase 1 were carefully selected to be representative of various characteristics of Bay POTWs, providing a representative sample set to analyze the range of PFAS concentrations in wastewater matrices and evaluate various characteristics that may influence PFAS concentration that could be later investigated. Samples were analyzed by LC-MS/MS and 40 PFAS analytes were quantified by isotope dilution/internal standard quantification methods (target method). Additionally, the presence of PFAS precursors for influent and biosolids were assessed by converting oxidizable PFAS to terminal PFAS in samples prior to analysis by LC-MS/MS (Total Oxidizable Precursors or TOP assay). Through target analysis, sampled municipal POTWS exhibited comparable concentrations for the sum of quantified PFAS, with median concentrations of 27 ng/L in influent, 58 ng/L in effluent, and 178 ng/g dw in biosolids. The sum of quantified PFAS TOP concentrations were significantly higher than target concentrations across matrices studied, with median concentrations of 231 ng/L in influent and 594 ng/g dw in biosolids. TOP method was not conducted on effluent samples.

The purpose of the present Phase 2 study is to answer the following primary study questions:

- Are residential flows an important source of PFAS to participating POTWs?
- Can specific industries (e.g., industrial laundry, food waste, semiconductor manufacturing) be identified as discharging higher than average concentrations of PFAS (including oxidizable precursors and end products) to POTWs?

Secondary questions that we will investigate to the extent possible with the available data and resources are:

- How do PFAS concentrations (including TOP) compare in influent, effluent, and biosolids from participating POTWs?

- Are there significant amounts of organofluorine in wastewater samples not captured by TOP?
- How do biosolid digestion processes at POTWs affect the transformation and levels of measurable PFAS in biosolids (compare undigested to digested biosolids)?
- Can we identify PFAS “fingerprints” within influent samples linked to specific sources?

Sampling locations representing specific residential or industrial/commercial wastewater discharges will be collected and analyzed for PFAS to answer the study questions. Sewershed sampling locations were developed through discussions with study participants from the Bay Area Clean Water Agencies (BACWA) who volunteered to participate to provide information that will inform the region and state. Influent, effluent, biosolids samples will be analyzed from a subset of POTWs who participated in Phase 1 study to address follow up study questions. Additionally, Adsorbable Organofluorine Analysis (AOF) analysis will be included to further elucidate concentrations of organofluorine compounds in wastewater influent and effluent where target compounds are adsorbed onto activated carbon and inorganic fluorine is removed prior to analysis of all fluorine in the sample through combustion ion chromatography. Another addition is that groundwater samples will be collected from one POTW to assess the potential transport of PFAS to groundwater from biosolids stored at the facility.

The specific objectives of this sampling effort are:

1. Collect sewershed samples capturing wastewater discharges from residential communities (See Section 4.1) for PFAS target and TOP analyses from the following POTWs:

    a. San Francisco Public Utilities Commission Southeast and Oceanside Water Pollution Control Plants (SFPUC_SE and SFPUC_OS)
    b. East Bay Municipal Utility District Main Wastewater Treatment Plant (EBMUD)
    c. Central Contra Costa Sanitary District Wastewater Treatment Plant (CCCSD)

2. Collect sewershed samples capturing wastewater discharges from industrial and commercial operations for PFAS target and TOP analyses from the following POTWs:

    a. San Jose-Santa Clara Regional Wastewater Facility (SJSC)
    b. San Francisco Public Utilities Commission Southeast and Oceanside Water Pollution Control Plants (SFPUC_SE and SFPUC_OS)
    c. East Bay Municipal Utility District Main Wastewater Treatment Plant (EBMUD)
    d. Dublin San Ramon Services District Wastewater Treatment Plant (DSRSD)

e. Central Contra Costa Sanitary District Wastewater Treatment Plant (CCCSD)

Industrial and commercial operations included at a screening level in this study include industrial laundry operations, semiconductor/electronics/chemical manufacturers that are suspected to use PFAS, operations with chrome reduction/chrome plating, and hospitals. Wastewater from car washes and paperboard manufacturing are also included.

3. Collect influent and final effluent samples for PFAS target, TOP, and AOF analyses from the following POTWs:

    a. San Jose-Santa Clara Regional Wastewater Facility (SJSC)
    b. Southeast Water Pollution Control Plant, San Francisco (SFPUC_SE)
    c. Oceanside Water Pollution Control Plant, San Francisco (SFPUC_OS)
    d. East Bay Municipal Utility District Main Wastewater Treatment Plant (EBMUD)
    e. Dublin San Ramon Services District Wastewater Treatment Plant (DSRSD)
    f. Central Contra Costa Sanitary District Wastewater Treatment Plant (CCCSD)
    g. City of San Mateo Wastewater Treatment Plant (CSM)

4. Collect treated biosolids for PFAS target and TOP analyses from the following POTWs:

    a. Southeast Water Pollution Control Plant, San Francisco (SFPUC_SE)
    b. Oceanside Water Pollution Control Plant, San Francisco (SFPUC_OS)
    c. East Bay Municipal Utility District Main Wastewater Treatment Plant (EBMUD)
    d. Dublin San Ramon Services District Wastewater Treatment Plant (DSRSD)
    e. City of San Mateo Wastewater Treatment Plant (CSM)

5. Collect undigested blended solids (biosolids prior to digestion) for PFAS target, TOP from the following POTWs:

    a. Southeast Water Pollution Control Plant, San Francisco (SFPUC_SE)
    b. Oceanside Water Pollution Control Plant, San Francisco (SFPUC_OS)
    c. East Bay Municipal Utility District Main Wastewater Treatment Plant (EBMUD)

6. Collect blended food waste (trucked to EBMUD and added to feed prior to digestion) for PFAS target and TOP analyses from EBMUD.

7. Collect groundwater samples for PFAS target and TOP analyses from DSRSD.

2. Key Personnel and Approvals

The personnel who will review and approve this SAP before it is finalized are shown in Table 2.1.

Table 2.1. Key Personnel Approvals for this SAP.

Name	Affiliation	Duties	Date of Review and Approval
Diana Lin	SFEI	Project Manager/Lead Scientist	3/11/2022
Rebecca Sutton	SFEI	Co-lead Scientist	2/20/2022
Don Yee	SFEI	RMP QA Officer	3/1/2022
Adam Wong	SFEI	RMP Data Manager	3/1/2022
Lorien Fono	BACWA	Executive Director	3/11/2022
Wendy Linck	State Water Board	Senior Engineering Geologist	3/11/2022
Richard Grace	SGS AXYS	Director - Sales, Marketing, and Service	2/23/2022
Sean Campbell	SGS AXYS	Business and Technical Consultant	2/23/2022

The personnel who should be contacted in case of any questions regarding this SAP are shown in Table 2.2.

Table 2.2. Key Personnel for PFAS Sampling 2021 Contact Information.

Name	Affiliation	Duties	Contact Information (email/phone/cell)
Diana Lin	SFEI	Project Manager/Lead Scientist	diana@sfei.org (510) 746-7385 / (714) 932-8085
Miguel Mendez	SFEI	Assistant Environmental	miguelm@sfei.org (510) 746-7319 / (773) 698-5472
Adam Wong	SFEI	RMP Data Manager	adamw@sfei.org (510) 746-7309

The personnel who should be contacted at each participating POTW in case of any questions regarding PFAS monitoring are shown in Table 2.3.

Table 2.3. POTW Contact Information.

Name	Affiliation	Title/Duties	Contact Information (email/phone)
Blake Brown	CCCSD	Supervising Chemist	bbrown@centralsan.org (925) 229-7237
Mary Lou Esparza	CCCSD	Laboratory Program Administrator	mesparza@centralsan.org (925) 335-7751
Tim Potter	CCCSD	Environmental Compliance Program Administrator	tpotter@centralsan.org (925) 229-7380
Xiongbing Liang	CSM	Laboratory Supervisor	xliang@cityofsanmateo.org (650) 522-7388
Kristy Fournier	DSRSD	Laboratory And Environmental Compliance Manager	fournier@dsrsd.com (925) 875-2325
Alicia Chakrabarti	EBMUD	Manager of WW Environmental Services	alicia.chakrabarti@ebmud.com (510) 287 2059
Ryan Batjiaka	SFPUC_OS & SFPUC_SE	Regulatory Specialist (SFPUC Wastewater Enterprise)	RBatjiaka@sfwater.org (628) 233-4807
Eric Dunlavey	SJSC	Environmental Program Manager	eric.dunlavey@sanjoseca.gov (408) 635-4017
Casey Fitzgerald	SJSC	Pretreatment Program Manager	casey.Fitzgerald@sanjoseca.gov

The personnel who should be contacted at SGS AXYS in case of any questions on analysis of PFAS are shown in Table 2.4.

Table 2.4. Laboratory Contact Information

Lab / Company	Name	Phone	Email	Shipping Address
SGS AXYS	Sean Campbell	(250) 655-5834	Sean.Campbell@sgs.com	2045 Mills Rd W V8L5X2 Sidney, British Columbia, CA

3. Sampling Schedule

Table 3.1. Anticipated Schedule for 2022 BACWA PFAS Study, Phase 2

Date	Activity
Feb 2022	SAP finalized and approved
Mar–May, 2022	Sample collection
Late May 2022	Samples shipped to SGS AXYS for analysis
Aug 2022	Laboratory analysis of samples. Final results provided to SFEI within 60 days of receiving the last sample.
Sep–Nov 2022	Data QA
Dec 2022–Feb 2023	Upload data and monitoring report to Geotracker
Dec 2022–Feb 2023	Data analysis and interpretation
Feb–April 2023	Discussion of results
June 2023	Draft Report
September 2023	Final Report

*Dates are subject to change earlier or later based on project progress.

4. Study Design

4.1 Residential Sewershed Site Selection and Sampling Plan

Sewershed sampling locations representing diverse residential areas will be sampled and analyzed for PFAS and compared to average influent concentrations from receiving POTWs to assess whether residential sources are an important source of PFAS. Therefore, to the extent feasible, the following factors were considered to select sample sites that will represent the range of PFAS concentrations in residential flows in the Bay area.

- Sample locations receive only residential flows, or include less than 10% of other uses that are not expected to have significantly different sources of PFAS compared to residential. Any exception to residential flows is noted in Table 4.1.
- Diversity in housing types (e.g., multi-unit dwellings, single family homes), neighborhoods, infrastructure age, geographic locations. This also captures diversity in sampling households in different socio-economic groups. Many household items contain PFAS products, but it is unknown what the major sources of PFAS are for residential discharges. A separate study led by University of California Irvine and Orange County Sanitary District will measure PFAS from different parts of the house. In this study, we attempt to sample diversity in types of households to capture variations from different residential communities.
- Sample replicates are included to assess variations due to sampling.
- At select sites, samples will be collected on different days of the week to screen for any significant changes in PFAS concentrations.

Table 4.1. Description of prioritized residential sampling sites and planned sample collection. Each "sample" is collected in 4 separate containers (2 x 125 mL (for MLA-110 target analysis) and 2 x 60 mL (MLA-111 TOP analysis). [1,2]

POTW	Description	# of Samples	Notes
SFPUC	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	4	Composite sample + 1 replicate + 1 other weekday + 1 weekend sample)
SFPUC	Park Merced Apartments (458 units) Font Blvd circle at Cambon Dr.	1	
SFPUC	San Rafael and Monterey (438 units)	1	
SFPUC	Rutland and Raymond (984 dwelling units in 965 buildings, single-family homes, includes liquor store and two schools)	2	1 weekday sample + 1 weekend sample
SFPUC	Urbano and Alviso (370 houses)	1	
SFPUC	Dewey Circle (~330 houses) 240 Montalvo Ave	1	
SFPUC	Quintara Steps (~110 houses) 60 Fanning Way	1	
SFPUC	Ventura Ave (~100 houses)	1	
SFPUC	30 block neighborhood with high concentration of food businesses and light industries	1	Included for comparison
CCCSD	Ruth Drive, Pleasant Hill – 47B5 M23.9 (~240 single-family homes)	2	Sample + replicate
CCCSD	Rosincrest Drive, San Ramon – 102D3 M4 (~252 single-family homes)	1	
CCCSD	Creekside Drive, Walnut Creek – 75C4 M10 (9 apartment complexes – includes community center)	1	
EBMUD	Berkeley Hills (~800 single-family homes)	1	
EBMUD	East Oakland (~270 units)	1	
SFPUC	Field blank	1	
SFPUC	Equipment rinse blank	1	
CCCSD	Field blank	1	
Total: 22 samples (14 locations, 3 blanks)			

[1] See Appendix A for a full list of sample IDs and sample volumes expected. Additional sample volumes needed for laboratory QC samples (e.g., MS/MSD) will be specified.
[2] Information about the sampled population will be requested in the field sampling form.

4.2 Industrial and Commercial Sewershed Site Selection and Sampling Plan

Many industrial and commercial operations and products may contain PFAS. Previous State Water Resource Control Board (SWRCB) investigations have identified landfills, chrome plating operations, airports, and bulk fuel terminals/refineries as potential sources of PFAS, and have issued investigation orders to specific facilities within these categories. Data from many of these facilities' orders have been reported to Geotracker. Some Bay Area facilities have received investigation orders, and data are anticipated to be uploaded to Geotracker. This study will avoid duplicating PFAS sampling that has already been conducted at specific sites and reported to Geotracker.

Additionally, SWRCB intends to send PFAS investigation orders to industrial facilities near PFAS-impacted supply wells. The SWRCB intends to focus on several potential PFAS industrial sources, including: semiconductor, circuit board and electronics manufacturers; former chrome plating facilities, non-chrome metal plating and finishing facilities; former refineries or bulk fuel terminals; junkyards; auto repair shops; herbicide/pesticide manufacturers; mining industry; textile manufacturers and processors; furniture manufacturers and upholsterers; carpet manufacturers; cardboard/paper packaging and food packaging manufacturers; surface coatings/paints/varnish manufacturers and high-volume users; manufacturers of non-stick or known PFAS-containing products[1]. Dry cleaners are also recognized as a potential source, but are not planned to be included in investigation efforts due to limited resources. Since the timeline for issuing these additional investigations is currently unclear, results from this study may inform SWRCB PFAS investigations.

The goal of this study is to screen a limited number of industries discharging to BACWA POTWs to evaluate if these may be important PFAS sources in wastewater discharged to the Bay. To the extent feasible, the following factors were considered in the selection of industrial and commercial sewershed sampling locations:

- More than one facility for each targeted industry are available and included because industrial discharges can vary significantly among different facilities. At industries that are lower priority, fewer sampling locations are included.
- Field replicates are included to assess variations due to sampling and analysis. See Section 5.4 for specific sampling instructions. For example, field replicates for grab samples will be collected in sequence.
- At a limited number of sites, samples will be collected from different dates in order to avoid missing potential short-term "pulse" PFAS discharges from facility operations. For the same reason, 24-hour composite samples are preferred when available. Grab samples will be collected when composite sampling

[1] Email correspondence with Kimberlee West, San Francisco Bay Regional Water Quality Control Board on 10/26/2021.

equipment is not feasible to set up at the site or there is significant risk of contamination.

- Textiles, carpets, and upholstery are known to be treated for PFAS for stain resistance, and recent investigations have measured PFAS in textiles in Norway (Herzke et al., 2012), as well as in dry cleaning solvent and wastewater in Florida (Barnes et al., 2021). In this study, we evaluate industrial laundry as a potential source of PFAS potentially derived from textiles, and a variety of sites are identified below. Santa Rita jail also has a large laundry onsite, and is included in this study. The Santa Rita Jail will be sampled at the permit compliance point.

- Chrome platers are suspected PFAS sources due to use of PFAS as a vapor suppressant in the metal plating bath to reduce chromium-VI air emissions. To our understanding, the chrome platers included in this study were not included in previous SWRCB PFAS investigation orders. The centralized waste treatment facility in San Jose was selected based on information that the facility operates a chrome reduction batch process.

- The semiconductor facility in San Jose was selected based on CERS (California Environmental Records System) records indicating these facilities use AZ Aquatar coatings with PFAS derivatives. The chemical manufacturer was selected because they use semiconductor coating, which may contain PFAS.

- The pulp paperboard facility was selected due to the known presence of PFAS in food packaging and previous detections of elevated discharges from related facilities (Clara et al., 2008; Kim Lazcano et al., 2020; Langberg et al., 2021). While paperboard manufacturing is not common in the Bay Area, measurements from this study may inform other PFAS investigations in the State.

- The Camp Parks military base has AFFF onsite and is permitted to use it in the case of an aircraft crash. Although the risk is low that the base is contributing to PFAS levels seen at the plant, it is still a site of interest for the study.

- PFAS coatings are used in a variety of medical textiles, materials, and products[2], and to our knowledge wastewater discharges from hospitals have not been investigated and reported for PFAS.

- These selected facilities have industrial wastewater discharge permits and are sampled regularly for compliance monitoring. The sampling for this study is designed to be consistent with the existence compliance schedule at the facility.

A summary of the industrial and commercial sewershed sources that will be sampled is summarized in Table 4.2.

[2] https://www.teflon.com/en/industries-and-solutions/industries/medical

Table 4.2. Description of prioritized industrial and commercial sewershed sampling sites and planned sample collection. Alternating colors note different samples within a specific industrial sector. Each "sample" is collected in 4 separate containers (2 x 125 mL (for MLA 110 target analysis) and 2 x 60 mL (MLA 111 TOP analysis). [1,2]

POTW	Industry	Description	# of Samples	Notes
SJSC	Industrial Laundry	Prudential Overall Supply (MI-040B) 1429 N Milpitas Blvd, Milpitas 95035	3	grab sample during setup + 1 grab replicate + 1 composite
SJSC	Industrial Laundry	Alsco (SJ-546B) 2275 Junction Ave San Jose 95131	1	
SFPUC	Industrial laundry	ALSCO, Inc. 1575 Indiana St. OR Bay Area Linens and Valet Service. 100 Cypress St.	1	
EBMUD	Industrial laundry	Aramark Uniform & Career Apparel, LLC (Oakland)	2	second sample collected on different day
CCCSD	Industrial laundry	Nu West Textile 1910 Mark Court Concord, CA 94520	1	
DSRSD	On-site laundry/Jail	Santa Rita Jail	2	second sample collected on different day
SJSC	Chrome plater	A & E Anodizing (SJ-314B) 652 Charles St Suite A, San Jose 95112	2	grab sample during setup + 1 composite
SJSC	Chrome plater	Amex Plating, Inc. (SC-182B) 3333 Woodward Ave, Santa Clara 95054	2	grab sample during setup + 1 composite
SJSC	Chrome reduction processes/ Centralized Waste Treatment	Clean Harbors San Jose, LLC (SJ-487A) 1021 Berryessa Rd, San Jose 95133	2	second composite from different month
SFPUC	Electronics manufacturing	(Tentative, may not be available) Tempo Automation 2460 ALAMEDA ST	2	second sample collected on different day
SJSC	Semiconductor	Lumentum Operations LLC (SJ-673B) 80 Rose Orchard Way, San Jose 95134	4	1 composite + composite replicate, 1 grab + grab replicate
SJSC	Chemical Manufacturer	Honeywell International (SC-225B) 3500 Garrett Dr, Santa Clara 95054	2	1 composite 1 grab

POTW	Industry	Description	# of Samples	Notes
DSRSD	AFFF on-site/ Military Operations	Camp Parks	2	second sample collected on different day
SFPUC	Car wash	Tower Car Wash 1601 Mission St.	1	
SFPUC	Car wash	Shell Oil Car Wash	1	
SFPUC	Car wash	Auto City Car Wash	1	
SFPUC	Hospital	UCSF Mission Bay	1	
SFPUC	Hospital	SF General Hospital	1	
CCCSD	Hospital	John Muir Medical Center 1601 Ygnacio Valley Road Walnut Creek, CA 94596 (2 sample points)	2	1 from each sample point
CCCSD	Hospital	San Ramon Regional Medical Center 6001 Norris Canyon Road San Ramon, CA 94583	1	
SJSC	Pulp Paperboard	Greif Corporation (The Newark Group) (SC-459B) 525 Mathew St, Santa Clara 95050	2	grab sample during setup + 1 composite
SJSC	Field Blank	San Jose	1	
SFPUC	Field Blank	San Francisco	1	
SJSC	Equipment Rinse Blank	San Jose	1	
Total: 39 samples (21 locations, 3 blanks)				

[1] See Appendix A for a full list of sample IDs and sample volumes expected. Additional sample volumes needed for laboratory QC samples (e.g., MS/MSD) will be specified.

[2] Information about the industrial users operations will be requested in the field sampling form.

In the following sections, sampling locations are grouped by facility, since each POTW will be conducting its own sample collection.

4.3 Influent, Effluent, Biosolids Sampling at POTWs

Influent, effluent, and biosolid samples will be collected at the same locations as the Phase 1 study (Mendez et al., 2020), and will also address monitoring needs for the State Water Board. The Phase 1 study (Mendez et al., 2021) found PFAS concentrations in wastewater samples from municipal facilities to be comparable. Sum of target PFAS concentrations in influent, effluent, and biosolids from a diverse set of twelve municipal facilities were within an order of magnitude. Therefore, for this Phase 2 study, it is sufficient to conduct a second round of sampling at a subset of the facilities. The main focus of this Phase 2 is to conduct the sewershed sampling to assess contributions from upstream residential and industrial sewershed sources.

Sampling of wastewater (influent, effluent, and biosolids) at the POTW will also allow comparison of the PFAS in sewershed samples to average concentrations at POTWs to evaluate which sewershed sources may contribute a higher proportion of PFAS. We recommend POTW samples be collected within the same month as residential and industrial sewershed samples to allow better comparison. Analyzing these samples via target PFAS, TOP PFAS, and AOF PFAS (See Section 8 Laboratory Analytical Methods) will also allow us to evaluate the study questions: How do TOP concentrations compare in influent, effluent, and biosolids from participating POTWs? Are there significant amounts of organofluorine in wastewater samples not captured by TOP?

Influent and effluent samples will be collected at the following seven POTW facilities and analyzed for PFAS:

- SJSC
- SFPUC_SE
- SFPUC_OC
- EBMUD
- CCCSD
- DSRSD
- CSM

The goal is to collect representative influent and effluent samples from each POTW. Where possible, influent and effluent samples will be collected as 24-hour composites. If sampling equipment is not set up at the sample location, grab samples will be collected. Field sampling forms should note whether samples are collected as 24-hour composites or grab samples, as well as the sampling times. This sampling plan does not require samples to be collected at a specific time, or that influent and effluent samples be timed to capture the same unit of water transported through the POTW.

Additional sample volumes for influent and effluent samples are collected for AOF analyses. For clarity, requested sample volumes for target, TOP, and AOF analyses are included as separate columns in the table below.

Table 4.8. Influent and effluent samples collected by participating POTWs. Each influent "sample" is collected in 6 separate containers (4 x 125 mL (for MLA 110 target analysis and AOF analysis) and 2 x 60 mL (MLA 111 TOP analysis)). Each effluent "sample" is also collected in 6 separate containers (2 x 500 mL (for MLA 110 target analysis) and 2 x 125 mL (MLA 119 AOF analysis) and 2 x 60 mL (MLA 111 TOP analysis)).

POTW	Matrix	# of Samples
SJSC	Influent	1
SFPUC_SE	Influent	1
SFPUC_OS	Influent	1
DSRSD	Influent	1
EBMUD	Influent	2 (second sample is replicate)
CCCSD	Influent	1
CSM	Influent	1
CCCSD	Field Blank (Influent)	1
CCCSD	Equipment Rinse Blank (Influent)	1
SJSC	Effluent	1
SFPUC_SE	Effluent	1
SFPUC_OS	Effluent	1
DSRSD	Effluent	1
EBMUD	Effluent	2 (second sample is replicate)
CCCSD	Effluent	1
CSM	Effluent	1
	Total:	**18**

[1] See Appendix A for a full list of sample IDs and sample volumes expected. Additional sample volumes needed for laboratory QC samples (e.g., MS/MSD) will be specified.

Biosolid samples will be collected at the same facilities, except for SJSC and CCCSD that have unique biosolids digestion processes. At SJSC, digested sludge is stabilized in large lagoons for about 3 years, after which the material is dredged, dried, and hauled away for disposal. SJSC is also changing the way they process biosolids. For both these reasons, SJSC biosolids will not be sampled because samples will not be representative of the final biosolids produced. At CCCSD, sludge is incinerated to form ash. In the previous Phase 1 study, we detected minimal levels of PFAS in the ash sample. AOF analysis is not yet available for biosolid samples by the analytical laboratory.

Table 4.10. Final digested biosolids samples collected by participating POTWs. Samples are collected into a 250 mL jar half-filled. Both target and TOP samples will be sub-sampled from the same container.[1]

POTW	Matrix	# of Samples
SFPUC_SE	Biosolids	2 (second sample from different date)
SFPUC_OS	Biosolids	2 (second sample from different date)
DSRSD	Biosolids	1
EBMUD	Biosolids	3 (replicate + second sample from different date)
CSM	Biosolids	1
DSRSD	Field Blank	1
DSRSD	Equipment Rinse Blank	1
	Total:	**11**

[1] See Appendix A for a full list of sample IDs and sample volumes expected. Additional sample volumes needed for laboratory QC samples (e.g., MS/MSD) will be specified.

Additionally, undigested blended solids feed into the digester will be collected at three facilities to investigate changes in PFAS in biosolids from the digestion process. The expected total solids content is 4-6%.

Additionally, food waste received at EBMUD will be sampled for PFAS as a potential source of PFAS. A recent study led by USGS measured PFAS in food process wastewater, with the sum of PFAS measured up to 185 µg/L (Hubbard et al., 2021). PFAS measurements can inform whether food waste and food packaging may be important sources of PFAS.

EBMUD receives approximately 15 tons per day of source-separated food waste (five days per week), which is collected from restaurants, groceries, and cafeterias in Central Contra Costa County. The material is ground and delivered to the EBMUD Main Wastewater Treatment Plant, where it is tipped into an underground tank. It is then slurried with treated wastewater to a total solids concentration of ~8%. It is further processed through a rotocut (grinder type device) and a paddle finisher (screening contamination). The finished food waste or pulp from the paddle finisher, which is what will be sampled, then goes to the blend tanks, where it is mixed with primary sludge and thickened waste activated sludge, and high-strength liquid organic wastes before being fed to the digesters. Contamination is removed at the source, as well as through the processing steps at the transfer station and at EBMUD; however, there is some de minimis remaining micro-contamination, including plastics and possible food packaging. The character is fairly consistent day to day. The food waste sample will be analyzed as a solid sample.

Table 4.11. Blended solids feed into the digester will be collected by participating POTWs. Samples are collected into a 250 mL jar half-filled. Both target and TOP samples will be sub-sampled from the same container.

Matrix	POTW	# of Samples
Undigested solid feed	SFPUC_SE	2 (sample from different date)
Undigested solid feed	SFPUC_OS	2 (second sample from different date)
Trucked Food Waste	EBMUD	2 (second sample from different date)
Undigested solid feed	EBMUD	3 (replicate + second sample from different date)
	Total:	**9**

[1] See Appendix A for a full list of sample IDs and sample volumes expected. Additional sample volumes needed for laboratory QC samples (e.g., MS/MSD) will be specified.

See Appendix C for individual POTW processing diagrams and location of influent, effluent, biosolid sampling sites at each POTW facility.

4.4 Groundwater Sampling Sites

Groundwater samples at DSRSD will be collected and analyzed to evaluate potential transport PFAS to on-site groundwater from on-site processing and storage of biosolids at the Facultative Sludge Lagoons (FSLs) and Dedicated Land Disposal Site (DLD). DSRSD has conducted site investigations and selected the sites below for monitoring.

MW5 (upper aquiclude): Located between FSLs and in the center of the groundwater mount. This well is the most likely to be affected by plant operations and least likely to be affected by off-site sources (aquiclude wells in peripheral locations are more likely to also be affected by off-site sources).

MW3 (upper aquifer): Located adjacent to and directly downgradient of FSL-1, and near MW5. Based on groundwater flow conditions, more likely to be affected by plant operations and less likely to be affected by off-site sources than the other aquifer wells.

NW-75 (upper aquifer): Peripherally located and consistently crossgradient from FSLs and DLDs. Based on groundwater flow conditions, less likely to be affected by plant operations and more likely to be affected by off-site sources than the other aquifer wells.

Each sample will be collected into 4 containers (2 x 500 mL + 2 x 60 mL) for target and TOP analysis.

Table 4.12. Groundwater samples collected by DSRSD. Each “sample” is collected in 4 separate containers (2 x 500 mL (for MLA 110 target analysis) and 2 x 60 mL (MLA 111 TOP analysis).

Matrix	POTW	Well ID	# of Samples
Groundwater	DSRSD	**MW5** (upper aquiclude)	1
Groundwater	DSRSD	**MW3** (upper aquifer)	1
Groundwater	DSRSD	**NW-75** (upper aquifer)	1
		Total:	**3**

[1] See Appendix A for a full list of sample IDs and sample volumes expected. Additional sample volumes needed for laboratory QC samples (e.g., MS/MSD) will be specified.

5. Sampling Procedure

The following guidelines were adapted from the PFAS Phase 1 Sampling and Analysis Plan (Mendez et al., 2020) with use of guidance documents from the California State Water Resources Control Board (California State Water Resources Control Board, 2020), Michigan Department of Environmental Quality (Michigan Department of Environmental Quality, 2018), and current literature on PFAS background contamination (Bartlett and Davis, 2018; Rodowa et al., 2020). Recent studies examining sources of PFAS contamination during sampling indicate background contamination may not be as common as previously suggested. To be consistent with published guidance, previous studies, and in an abundance of caution, several materials are best avoided if they do not compromise safety or practicality.

5.1 Sample Equipment: Acceptable and Prohibited Materials

The typical field sampling environment has many potential sources of PFAS including sampling equipment, field documentation, personal protective equipment, clothing, and personal care products. As this can lead to background contamination, common materials in the field sampling environment have been separated into three categories as defined below:

Acceptable Materials: These materials are known not to be sources of PFAS cross contamination and can be used during all sampling stages and in the immediate sampling environment.

Non-contact materials: These materials may contain PFAS; they should not come into direct contact with the sample and also used away from all sampling equipment. Thoroughly wash hands and use new gloves after handling any of these materials.

Prohibited materials: These materials are known to contain PFAS that may present a threat to sample integrity and should not be used during any stage of sampling.

Each facility has been provided with a PFAS field sampling kit including sample containers and shipping materials to collect and ship all requested samples. The contents of each kit shipped to participating POTWs is found in Appendix D.

All Sampling Equipment

Prohibited: Any and all sampling equipment that contain PFAS-based (fluoropolymer) parts that would be in direct contact with the sample or sampling environment. These fluoropolymers include, but are not limited to:

- Polytetrafluoroethylene (PTFE), including the trademark Teflon® and Hostaflon®, which can be in the ball lining of some hoses and tubing, and some objects that require the sliding action of parts.

- Polyvinylidene fluoride (PVDF), including the trademark Kynar®, which can be in tubing and films/coatings on aluminum, galvanized or aluminized steel.
- Polychlorotrifluoroethylene (PCTFE), including the trademark Neoflon®, which can be in many valves, seals, and gaskets.
- Ethylene-tetrafluoro-ethylene (ETFE), including the trademark Tefzel®, which can be in many wire and cable insulation and covers, liners in pipes, and some cable tie wraps.
- Fluorinated ethylene propylene (FEP), including the trademarks Teflon® FEP and Hostaflon® FEP, and may also include Neoflon®, which can be in wire and cable insulation and covers, pipe linings, and some labware.

Non-contact materials: Low density polyethylene (LDPE) should be avoided if it comes into direct contact with the sample. If absolutely necessary, LDPE parts may be used if an equipment blank has confirmed it is PFAS-free. LDPE resealable storage bags (i.e., Ziploc bags) may be used for storage and shipping.

Sample Containers

Acceptable: High-density polyethylene (HDPE) containers of various sizes (500 mL, 125 mL, and/or 60 mL) provided by SGS AXYS.

Pumps, Tubing and Sampling Instruments

Acceptable: Supplies must be made from acceptable materials known to be PFAS free, which include HDPE, polypropylene, silicone, stainless steel, nylon (e.g., cable ties), polyvinyl chloride (PVC), acetate, and cotton. Glass may be used as long as it is known to be PFAS-free (or decontaminated; see Section 4.2) and comes into contact with the sample for a short period of time (e.g. use for immediate collection and then transfer of a sample to a non-glass bottle).

To collect composite samples, automatic samplers may be used, though there may be an increased potential for cross-contamination because the tubing, valves, strainers, suction lines, distribution nozzles, and other parts may be made from PFAS (fluoropolymers). It is recommended that parts on the sampler be screened prior to sampling by reviewing the safety data sheets (if available) and collection of an equipment blank to verify that the parts are PFAS-free.

Field Documentation

Acceptable: Ballpoint pens and Sharpie® markers (only fine or ultra-fine) for writing and labeling. Loose paper (non-waterproof, non-recycled) as well as aluminum, polypropylene, or Masonite field clipboards may be used.

Non-contact materials: Rite in the Rain® notebooks, provided gloves are changed after note taking.

Prohibited: Regular and thick sized markers of any brand, sticky notes, plastic clipboards, or waterproof paper and notebooks.

Personal Protective Equipment and Other Clothing

Personal safety is paramount and should not be compromised to prevent cross-contamination. Therefore, if the use of PPE is necessary to ensure the health and safety of sampling personnel and no PFAS-free alternative is available, then note the use in the field sampling form. Please wash hands and change gloves after handling any PFAS containing products (including items designated only to the staging-area).

Acceptable: Synthetic or 100% cotton clothing that has been well-laundered without the use of fabric softeners. Any clothing (including shoes) made of or with polyurethane, PVC, wax coated fabrics, rubber and neoprene. Powderless nitrile gloves for all sampling events.

Non-contact materials: Non PFAS-free boots and first aid adhesive wrappers.

Prohibited: Anti-fogging lens spray, wipes, or solutions for glasses or safety goggles - recent investigations have identified high levels of PFAS in these products (Herkert et al., 2022). Latex gloves, new or unwashed clothing, any clothes recently treated with fabric softeners, fabric protectors, insect resistance and water/stain/dirt-resistant chemicals. Anything made with water/stain/dirt-resistant fabrics such as Coated Tyvek®, Gore-Tex®, Scotchgard™, and RUCO®.

Personal Care Products

If possible, please try to avoid use of personal care products (hair products, make-up, perfume/cologne, moisturizers, anti-fogging lens spray or wipes for glasses or safety goggles, etc.) on the day of sampling. If any are used on the day of sampling, record in the field sampling form.

Non-contact materials: Sunscreens and insect repellents, preferably from products known to not contain PFAS (nonexhaustive list provided from the Michigan PFAS Sampling Quick Reference Field Guide).

Prohibited: Application of any personal care products in the sampling area.

Food Packaging Materials

Prohibited: PFAS are known to be prevalent in food packaging, including paper plates, aluminum foil, paper towels, food containers, bags, and wraps. Food and beverages should not be consumed at the sampling site. If they must be consumed during the sampling event, a dedicated eating area should be identified (see section 4.3).

5.2 Sample Equipment Cleaning and Decontamination Procedures

Sample equipment that comes into contact with the sampling media (i.e., buckets, carboys, extension rods, scoops, tubing, parts of automatic samplers) should be cleaned and decontaminated (or new) prior to use where possible. Automatic samplers should be decontaminated, or the strainer replaced between each sampling event. If new tubing is used, decontamination procedures are not necessary. Sampling equipment can be scrubbed using a polyethylene or PVC brush to remove particulates.

The following procedure is recommended for cleaning and decontamination: Wash with PFAS-free soap (i.e., Alconox®), scrub (if applicable). Follow up with a methanol rinse and rinse with PFAS free water. Please note any changes to this cleaning procedure in the field sampling form (e.g., if a methanol rinse is not used due to safety concerns). The laboratory will provide PFAS free reagent water for a final rinse collected for an equipment blank. Please note if this, or any other cleaning method, has been used in the field sampling form.

5.3 General Sampling Guidelines

In order to prevent cross-contamination, a sampling sequence should be established going from areas suspected to be least contaminated to those thought to be most contaminated. Therefore, we recommend sampling influent and effluent samples at the POTW, prior to collecting biosolid samples. For example, when sampling directly at a POTW, the following order of samples collection is recommended:

Site Set-Up

The sampling site should be evaluated prior to sampling to identify potential contamination risks. As applicable, it is also recommended to select dedicated eating, staging, and sampling areas as defined below:

1. Eating Area: The eating area is separate from the sampling and staging areas, and the only place where food and drink should be stored and consumed. Food packaging must not be in the sampling and staging areas due to the potential for PFAS cross-contamination.

2. Staging Area: The staging area is where equipment is set-up and personal protective equipment is put on and taken off. PFAS-free over-boots cover and PPE should be put on in the staging area prior to sampling activities.

3. Sampling Area: Sampling areas are the areas of the field where samples are collected. When staff need to leave the site, they should move to the staging area before removing gloves, coveralls, and any other appropriate PPE, if worn.

Sample Collection

A variety of samples will be collected for this study, with most being conducted using the composite sampling method to minimize background contamination, increase method consistency, and best ensure each facility has the capabilities to meet sampling needs.

Samples should be collected as 24-hour composites when possible. Even when samples are collected over shorter intervals, sample sets to be used as lab replicates or for parent/MS/MSD sets should be generated as field composites whenever possible; e.g., filling each bottle ¼ at a time, or filling into a larger container and subsampling well-homogenized aliquots into the final sample containers. SFEI will work with SGS AXYS and sample collection agencies to select samples used as lab replicates or parent/MS/MSD sets, and we anticipate selecting 24-hour composites for these QC sample sets.

The following protocols should be followed when collecting any PFAS samples:

- Powderless nitrile gloves must be worn on hands before collecting samples, handling sample containers, or handling sampling equipment.
- The sample container must be kept sealed and only opened during sample collection. The sampling container cap or lid should never be placed on the ground or on any other surface unless it is PFAS-free. If it is necessary to set the cap down, it should be set on a clean surface (cotton sheeting, HDPE sheeting, triple rinsed cooler lid, etc.).
- Do not insert or let tubing or any materials inside the sample bottle. Dust and fibers must be kept out of sample bottles.
- Containers should be filled to 80-90% capacity (providing 10-20% volume headspace) to allow for expansion during freezing

Sample Storage

It is recommended that aqueous and biosolids samples to be analyzed for PFAS be frozen (below 0°C) as soon as possible. When frozen, the hold time for wastewater influent and effluent is 90 days from collection, while the hold time is extended to one year for biosolids.

If samples cannot be frozen on site after collection, samples should be shipped immediately to SGS AXYS (see section 7). Samples will be frozen there on arrival.

Field Sampling Form

For all sampling events, fill out the associated (sewershed, influent/effluent, or biosolids) field sampling form shown in Appendix B. The information requested specifically relates to each sampling event including sampling equipment used, procedures followed, and daily conditions at the POTW. Field sampling forms will be sent as excel files to each facility and include sampling IDs. The form may be completed after each sampling event and once all information requested is available. Please send completed forms to diana@sfei.org and miguelm@sfei.org.

5.4 Matrix-Specific Guidelines

Composite Sampling

Overall, influent/sewershed and effluent samples should be collected as 24-hour composites, when possible, using autosamplers. If possible, new tubing should be used for each sampling event. Automatic samplers should be decontaminated or the strainer replaced between each sampling event. Record if tubing and strainers were decontaminated prior to use or new in the field sampling form. HDPE containers can be filled directly from the autosampler or poured from a PFAS-free container where a larger composite is collected.

Weekend flow patterns at POTWs tend to be different from weekday flow patterns due to differences in activities from the serviced population, so samples should be collected during the weekday unless specified otherwise. (Two representative weekend samples will be collected from residential sewershed samples to evaluate potential differences between weekday and weekend PFAS flow patterns).

Influent

Influent samples should be collected at a location and in a manner that is representative of all influent received by the facility prior to treatment. Influent samples should be collected in a well-mixed location prior to primary settling, which include but are not limited to the headworks of the inlet to the grit chamber or prior to any biological treatment. If possible, samples should be collected after bar screening and grit removal but before fine screening to obtain a representative influent sample. Please note any treatment processes before the influent sampling location in the field sampling form. The sampling location is also marked in the facility diagrams in Appendix C.

Each sample will be collected in six containers (i.e., 4 x 125 mL, 2 x 60 mL). The target and AOF sample size is 125 mL. TOP analysis sample size is 60 mL. The second container for each size is collected as a backup. Extra HDPE containers will be provided, particularly if needed to pour off into smaller sample container. Containers should be filled to 80-90% capacity (providing 10-20% volume headspace) to allow for expansion during freezing.

Effluent

Effluent should be collected at a location and in a manner that is representative of final effluent discharged to receiving waters. Each sample will be collected in six containers (i.e., 2 x 500 mL, 2 x 60 mL, 2 x 125 mL). Target analysis will be conducted using the 500 mL sample. TOP analysis will be conducted on the 60 mL container. AOF will be conducted on the 125 mL container. The second container for each size is collected as a backup. Extra HDPE containers will be provided, particularly if needed to pour off into a smaller sample container. Containers should be filled to 80-90% capacity (providing 10-20% volume headspace) to allow for expansion during freezing.

Sewershed

Sewershed samples should be collected at a location and in a manner that is representative of the discharge of specific industries or residential sectors to POTWs. If possible and information is available to make the determination, sewershed samples should be collected at times when PFAS discharge concentrations would be expected to be highest. This is particularly important if grab samples will be collected (see below).

Sewershed samples will be collected similarly to influent samples and collected in four containers (i.e., 2 x 125 mL, 2 x 60 mL). The target sample size is 125 mL. TOP analysis sample size is 60 mL. The second container for each size is collected for backup. Extra HDPE containers will be provided, particularly if needed to pour off into s smaller sample container. Containers should be filled to 80-90% capacity (providing 10-20% volume headspace) to allow for expansion during freezing.

Groundwater

At groundwater wells, depth to water and total depth should be measured to determine the volume of water in the well. Most importantly, sample collection should be at the center of the well screen. Field parameters including temperature, electrical conductivity, pH, and turbidity should be measured and noted on the field sample form along with the method used for purging. Groundwater samples will be collected similarly to effluent samples and collected in six containers (i.e. 2 x 500 mL, 2 x 60 mL). Target analysis will be collected using the 500 mL sample. TOP analysis will be conducted on the 60 mL container. The second container for each size is collected for backup. Please indicate in the field sample form if these are collected as composite or grab samples.

Extra HDPE containers will be provided, particularly if needed to pour off into s smaller sample container. Containers should be filled to 80-90% capacity (providing 10-20% volume headspace) to allow for expansion during freezing.

Field Replicate

A field replicate is a replicate or split sample collected in the field concurrently with the parent sample and submitted to the laboratory as one of two or more different field samples. Field replicates are intended to capture the temporal and spatial heterogeneity of the sampled location and matrix (e.g., the variation of sampling a specific moment and point, rather than 1 minute later or 1 meter away).

Influent and effluent field replicates will be collected in HDPE containers provided by SGS AXYS using the same procedures as in the sections above. While the ideal field replicate would be sampled on the same day but from different sips from the composite sampler or from a different compositer, participation POTWs indicate that this is not practical at most sampling sites. Therefore, field replicates for aqueous samples (i.e. sewershed/influent, effluent) will be split samples poured from a larger composite bottle on the same day, making sure the larger composite bottle is well-mixed and homogenized before pouring. This is to prevent gross differences in solids content and their associated PFAS in field replicates.

Solid sample field replicates (i.e., biosolids, undigested feed, trucked food waste) should come from different grab samples from the same day.

Laboratory replicates

Laboratory replicates are repeated analysis of a separate portion of a sample taken through the extraction and analysis procedure. This characterizes the combined impact of variations in subsampling homogeneity, extraction efficiency, and analytical quantitation. Where possible, lab replicates should be generated by subsampling the same container. While generating lab replicates from homogenized solid samples is possible, this is not feasible for aqueous samples for PFAS analysis. This is because the analytical method requires the entire sample plus bottle rinsate to be extracted as a single sample (DoD QSM 5.4; Draft EPA 1663; MLA-110).

Where the analysis requires the entire volume or mass of a sample container, lab replicates should be created from separately collected samples that are expected or have previously been demonstrated to be nearly identical (e.g., simultaneous collection, or composites with minimal separation in time of A-B aliquots). Unlike extra volume collected for field replicates, samples for lab replicates should **never** be collected as sequential grabs, nor from separate points (even if ostensibly similar) in a facility. Even in cases where a sample is normally collected as a grab, containers for lab replicates should be made from short term composites such as alternating ¼ fills of replicate bottles. We have not yet demonstrated that separately collected samples in the field will have nearly identical PFAS concentrations, and there is no perfect way to make the samples uniform.

Laboratory replicates for aqueous samples may be generated using reagent water.

Matrix Spike (MS) and Matrix Spike Duplicate (MSD)

Matrix spikes samples are field samples to which known amounts of target analytes are added, indicating potential matrix bias present in field samples and errors and losses in analyses not accounted for by isotope dilution / recovery correction (MLA-110).

Similar to the case for lab replicates, analytical laboratory subsample from a single larger field sample to generate parent/MS/MSD sets for solid samples, but this is not possible for aqueous samples.

Specified POTWs will collect additional sample volume for the MS/MSD similar to a field replicates, and as much as possible collect sample to be as identical as possible. SFEI will work with SGS AXYS and sample collection agencies to select samples used as parent/MS/MSD sets, which should be 24-hour composites (rather than grabs) for these QC sample sets. The reason for using composite samples for the parent/MS/MSD sets is to reduce heterogeneity among the samples. Spiking of separate samples with unknown variability may cause erroneous estimates of recovery. Generating MS/MSDs from uncomposited separate containers should only be considered in cases where compositing is impossible, and variability of simultaneously collected samples has been previously demonstrated to be small. Evaluation of parent/MS/MSD results should consider possible variability among samples.

Field Blank

The field blank is collected to verify that the ambient sampling environment does not introduce PFAS and cross-contaminate samples during the sampling event. The field blank is collected by opening a container of PFAS-free water (provided by the analytical lab), and pouring 500 mL into a sample container in the same location that field samples are collected. The field blank is treated the same throughout field and laboratory procedures as other collected field samples. A field blank will be collected at specific sites to be representative of typical POTW sampling environments.

Equipment Rinse Blank

The equipment rinse blank is collected to evaluate potential contamination from equipment used during sampling, including automated samplers used to collect aqueous samples, and scoops used to collect biosolids. Generally, the equipment rinse blank is collected prior to sample collection by rinsing the decontaminated sampling equipment with PFAS-free water (provided by the analytical lab) and collecting the rinsate into a sample container.

If a larger composite container is used to collect samples prior to pouring into the sample container, the composite container should also be rinsed. For automatic samplers, equipment blanks are collected from a final rinse by passing PFAS-free reagent water (provided by the analytical lab) over or through field sampling equipment (i.e., tubing) before the collection of samples. Each equipment blank should fill up to 450 mL in the provided HDPE containers. The equipment rinse blank is treated the same throughout field and laboratory procedures as other collected field samples. Equipment blanks will be collected to be representative of typical POTW sampling environments.

Grab Sampling

Groundwater and biosolids samples will be definitively collected by grab sampling, with aqueous samples only collected as grab samples when composite sampling is not possible. Various types of immersion sampling equipment may be used for grab sampling. Equipment used must be PFAS-free (see section 4.1), new or decontaminated (see section 4.2), and may include extension rods to immerse the laboratory sample bottle at the sample location, cable ties, beakers, and peristaltic pumps with tubing that extends into the wastewater. Samples will be directly collected in the appropriate HDPE bottles provided by SGS AXYS. If this is not possible, a container made of a known PFAS-free material (examples of allowable materials listed above) may be used to pour into the HDPE bottles. Alternatively, a sampling port or pump may also be used.

Weekend flow patterns at POTWs tend to be different from weekday flow patterns due to differences in activities from the serviced population, so samples should be collected during the weekday.

Field replicates should be collected in the same way as the original sample and submitted to the laboratory as two different samples. Blank samples are collected in a similar manner as described in the composite sampling section above.

Sampling locations for all facilities are shown in process diagrams in Appendix C. Please document the use of any equipment or materials that come in direct contact with the sample and any change in sampling location in the field sampling form.

Biosolids Samples

Biosolids samples should be collected from the final step in the treatment process at each facility to represent the final product (highest solids content possible) that is produced and removed from each POTW. If liquids are present, a representative whole sample aliquot that includes both liquid and solid fractions should be collected.

Samples should be collected in a way that is representative of biosolids produced by the facility. A single grab sample is appropriate if collected from a well-mixed treatment process. The 250 mL HDPE containers should be filled half-way (125 mL) by directly pouring or scooping from a well mixed location. If biosolids piles are heterogeneous, several grab samples may be collected and composited to create a representative sample of biosolids. The analytical lab will homogenize the sample prior to analysis. Please note the sampling method in the field sampling form.

Undigested feed and trucked food waste should also be collected in a way that is representative of material processed at the facility. Undigested feed could be collected as a composite of 4 grab samples collected 15 minutes apart.

6. Sample Labeling

The sample ID system used for the PFAS POTW analytical samples is as follows:

Facility Acronym - Matrix - Unique Number

- Facility Acronym = CCCSD (Central Contra Costa Sanitary District), CSM (City of San Mateo), EBMUD (East Bay Municipal Utilities District, SFPUCOS (Oceanside Water Pollution Control Plant, San Francisco), SFPUCSE (Southeast Water Pollution Control Plant, San Francisco), SJSC (San Jose-Santa Clara), DSRSD (Dublin San Ramon Sanitary District),

- Matrix = INF (Influent), EFF (Effluent), BIO (Biosolids), BF (Blended Feed), FW (Food Waste), RS (Residential sewershed), IS (Industrial Sewershed), Groundwater (GW)
  - Field Blanks: FBINF (Field Blank Influent), FBS (Field Blank Residential/Industrial Sewershed), FBBIO (Field Blank Biosolids)
  - Equipment Rinse Blanks: EBINF (Equipment Rinse Blanks Influent), EBBIO (Equipment Rinse Blanks Biosolids),

- Unique Number = SFEI assigned number for each sample, see Sample ID list in Appendix A.
  - All samples ended with the same last 2 digits were collected from the sample field sample composite (e.g. 0001, 1001, 2001)
  - Samples starting with "0" are for Taget analysis (e.g. 0001, 0002)
  - Sample starting with "1,000" are back-up samples for Target analysis (e.g. 1001, 1002)
  - Samples starting with "2,000" are for TOP analysis (e.g. 2001, 2002)
  - Samples starting with "3,000" are back-up samples for TOP analysis (e.g. 3001, 3002)
  - Samples starting with "4,000" are for AOF analysis (e.g, 4001, 4002)
  - Samples starting with "5,000" are back-up samples for AOF analysis (e.g. 5001, 5002)
  - Samples starting with "6,000" are solid samples for Target and TOP analysis (e.g. 6001, 6002)

Example: CCCSD-RS-001

Every sample will be labeled with a unique sample ID following this system; note that replicates (except for blind replicates), containers intended for different analyses, and backup samples will have the same Sample ID as requested by the analytical laboratory. See Appendix A for a full list of sample IDs expected from each facility. The sample ID should be recorded on the field sampling form, including information about the sample location, sample date, collection method (composite or grab).

7. Sample Handling and Custody

Chain of custody (COC) records will be maintained throughout the course of the sampling effort. SFEI will provide pre-filled COC forms for each facility listing the expected samples collected and indicate the requested laboratory analysis for each sample. We recommend samples be frozen at the POTW until they are ready to be shipped to the analytical laboratory. We recommend samples be frozen at the POTW, and shipped when after all samples for each POTW are ready (no need to coordinate among all POTWs). Samples can be shipped to the laboratory in separate batches if there is insufficient storage at the POTW. Influent, effluent, and biosolid samples collected at the POTW facility may be shipped as one batch to the analytical laboratory when complete. Each participating facility will complete the COC form by filling out any missing information, include the original form with the sample shipment, and provide an electronic copy of the form to SFEI at the time of the shipment.

Samples must be chilled during storage and shipment. It is preferred for samples to be frozen (below 0°C) as soon as possible at the facility until samples can be shipped to SGS AXYS in batches. Once frozen, hold time is one year for the biosolids and 90 days for aqueous matrices (influent, effluent, sewershed, and groundwater). Otherwise, the samples should be shipped immediately to the analytical laboratory, where they will be frozen when they arrive. SGS AXYS will begin analysis when samples are released for analysis by SFEI. SFEI will coordinate with SGS AXYS to specify sample analysis batches. SFEI expects to receive final analytical results within eight weeks of receiving the last field sample and samples are released for analysis.

When preparing samples for shipment, it is recommended to double-bag samples (especially influent) using PFAS-free bags. HDPE bags are preferred, though LDPE bags may be used if they do not come into direct contact with the sample media. As much double-bagged wet ice as will fit in the cooler should be used for transporting and shipping liquid and frozen samples. Chemical or blue ice should not be used.

Samples must be shipped by FEDEX priority overnight service on Monday, Tuesday, or Wednesday to avoid any issues with weekend shipping. As this is an international shipment, a commercial invoice (CI) is needed. The CI will be partially completed by SGS AXYS and sent together with the PFAS field sampling kit, which will also include specific facility packaging and shipping instructions (also found in Appendix D). Both SFEI (diana@sfei.org; miguelm@sfei.org) and SGS AXYS (Sean.Campbell@sgs.com) should be included in any FedEx shipment notifications.

8. Laboratory Analytical Methods

Aqueous (influent/sewershed, effluent, groundwater, field blanks, equipment blanks) and solids (biosolids, undigested feed, trucked food waste) samples will be analyzed for PFAS with LC-MS/MS by EPA Method 1633 (SGS AXYS Method MLA 110 [Target PFAS]. The target analytes and reporting limits (Table 8.1) are consistent with the analytical method conducted in the Phase 1 study (Mendez et al., 2020). Biosolids samples will also be analyzed for Percent Solids. Aqueous samples will be reported in units of ng/L; biosolid samples will be reported in units of ng/g dry weight, and percent solids content (%).

Additionally, all field samples will be analyzed by LC-MS/MS after oxidation of PFAS precursors to terminal PFAS (SGS AXYS Method MLA-111 [TOP or Total Oxidizable Precursors analysis]). The target analytes and reporting limits (Table 8.2) are consistent with the method conducted in the Phase 1 study (Mendez et al., 2020). TOP analysis is used to evaluate the presence of precursors (specifically precursors that will oxidize to terminal perfluorinated carboxylates) that may not be included in the target analyte list. TOP samples are analyzed after oxidation using heat activated persulfate at high alkaline pH. Results from the Phase 1 study indicated that the sum of PFAS measured via TOP was significantly greater than sum of PFAS measured via Target method in influenced and biosolid samples. Effluent samples were not analyzed using the TOP method in the Phase 1 study. Therefore, including TOP analysis is important for quantifying a greater portion of the total PFAS present in aqueous and solid samples, and results will be used to compare PFAS levels across samples and matrices.

Influent and effluent samples will also be analyzed via Adsorbable Organofluorine Analysis (AOF). The method description and reporting limits are not yet available, and will be included as an Appendix E when available. Briefly, the sample is passed through an activated carbon column that adsorbs organic material including PFAS. Inorganic fluorine salts are removed by rinsing the column with neutral nitrate solution. The remaining AC column is subjected to the combustion process and ion chromatography is used to measure the total organic fluorine in the sample. AOF is used as a screening measure of “worst-case” measurement of possible PFAS in the sample and compare results to TOP and target results (which will be converted to total organic fluorine for comparison). Results should be interpreted cautiously because results may be influenced by fluorine from non-PFAS compounds. This method is only applicable for aqueous samples with limited solids content, and methods for analyzing solids sample and total fluorine are in development by SGS AXYS.

The method information including analytical list, reporting limits, and laboratory QA/QC measures can be directly obtained from SGS AXYS. Analytical SOPs will be requested from the laboratory and stored at SFEI, but will not be released to external parties without prior consent of the laboratory.

Table 8.1. Target PFAS analyte list (USEPA Method 1633 [MLA-110, SGS AXYS]) including reporting limits (RLs) for aqueous and biosolid samples.

Abbreviation	Geotracker PARLABEL	PFAS Chemical Name	Aqueous DLs * (ng/L)	Aqueous RLs* (ng/L)	Biosolids DLs* (ng/g)	Biosolids RLs* (ng/g)
PFBA	PFTBA	Perfluorobutanoic acid	1.6	6.4	1.6	6.4
PFPeA	PFPA	Perfluoropentanoic acid	0.8	3.2	0.8	3.2
PFHxA	PFHA	Perfluorohexanoic acid	0.4	1.6	0.4	1.6
PFHpA	PFHPA	Perfluoroheptanoic acid	0.4	1.6	0.4	1.6
PFOA	PFOA	Perfluorooctanoic acid	0.4	1.6	0.4	1.6
PFNA	PFNA	Perfluorononanoic acid	0.4	1.6	0.4	1.6
PFDA	PFNDCA	Perfluorodecanoic acid	0.4	1.6	0.4	1.6
PFUnA	PFUNDCA	Perfluoroundecanoic acid	0.4	1.6	0.4	1.6
PFDoA	PFDOA	Perfluorododecanoic acid	0.4	1.6	0.4	1.6
PFTrDA	PFTRIDA	Perfluorotridecanoic acid	0.4	1.6	0.4	1.6
PFTeDA	PFTEDA	Perfluorotetradecanoic acid	0.4	1.6	0.4	1.6
PFBS	PFBSA	Perfluorobutanesulfonic acid	0.4	1.6	0.4	1.6
PFPeS	PFPES	Perfluoropentanesulfonic acid	0.4	1.6	0.4	1.6
PFHxS	PFHXSA	Perfluorohexanesulfonic acid	0.4	1.6	0.4	1.6
PFHpS	PFHPSA	Perfluoroheptanesulfonic acid	0.4	1.6	0.4	1.6
PFOS	PFOS	Perfluorooctanesulfonic acid	0.4	1.6	0.4	1.6
PFNS	PFNS	Perfluorononanesulfonic acid	0.4	1.6	0.4	1.6

Abbreviation	Geotracker PARLABEL	PFAS Chemical Name	Aqueous DLs * (ng/L)	Aqueous RLs* (ng/L)	Biosolids DLs* (ng/g)	Biosolids RLs* (ng/g)
PFDS	PFDSA	Perfluorodecanesulfonic acid	0.4	1.6	0.4	1.6
PFDoS	-	Perfluorododecanesulfonic acid	0.4	1.6	0.4	1.6
4:2 FTS	4:2FTS	1H, 1H, 2H, 2H-perfluorohexane sulfonic acid	1.6	6.4	1.6	6.4
6:2 FTS	6:2FTS	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid	1.6	6.4	1.6	6.4
8:2 FTS	8:2FTS	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid	1.6	6.4	1.6	6.4
3:3 FTCA	3:3FTCA	2H, 2H, 3H, 3H-perfluorohexanoic acid	1.6	6.4	1.6	6.4
5:3 FTCA	5:3FTCA	2H, 2H, 3H, 3H-perfluorooctanoic acid	10	40	10	40
7:3 FTCA	7:3FTCA	2H, 2H, 3H, 3H-perfluorodecanoic acid	10	40	10	40
PFOSA	PFOSA	Perfluorooctanesulfonamide	0.4	1.6	0.4	1.6
N-MeFOSA	MEFOSA	N-Methylperfluorooctanesulfonamide	0.4	1.6	0.4	1.6
N-EtFOSA	ETFOSA	N-Ethylperfluorooctanesulfonamide	0.4	1.6	0.4	1.6
N-MeFOSAA	NMEFOSAA	N-Methylperfluoro-1-octanesulfonamidoacetic acid	0.4	1.6	0.4	1.6
N-EtFOSAA	NETFOSAA	N-Ethylperfluoro-1-octanesulfonamidoacetic acid	0.4	1.6	0.4	1.6
N-MeFOSE	MEFOSE	N-Methylperfluoro-1-octanesulfonamidoethanol	4	16	4	16
N-EtFOSE	ETFOSE	N-Ethylperfluoro-1-octanesulfonamidoethanol	4	16	4	16
HFPO-DA (GenX)	HFPO-DA	2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoro -propoxy)propionic acid	1.6	6.4	1.6	6.4
ADONA	ADONA	Decafluoro-3H-4,8-dioxanonoate	1.6	6.4	1.6	6.4
NFDHA	NFDHA	Perfluoro-3,6-dioxaheptanoate	0.8	3.2	0.8	3.2
PFMBA	PFMBA	Perfluoro-3-methoxypropanoate	0.4	1.6	0.4	1.6

Abbreviation	Geotracker PARLABEL	PFAS Chemical Name	Aqueous DLs * (ng/L)	Aqueous RLs* (ng/L)	Biosolids DLs* (ng/g)	Biosolids RLs* (ng/g)
PFMPA	PFMPA	Perfluoro-4-methoxybutanoate	0.8	3.2	0.8	3.2
9Cl-PF3ONS	9-Cl-PF3ONS	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	1.6	6.4	1.6	6.4
11Cl-PF3OUdS	11-Cl-PF3OUdS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	1.6	6.4	1.6	6.4
PFEESA	PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	0.4	1.6	0.4	1.6

* Detection limits (DL) and Reporting Limits (RL) are prorated to sample size. DLs and RLs shown are based on a standard sample size of 0.5L for aqueous and 0.5g for biosolids.

Table 8.2. TOP PFAS analyte list (MLA-111, SGS AXYS) including reporting limits (RLs) for aqueous samples.

Abbreviation	PFAS Chemical Name	Aqueous RLs* (ng/L)
PFBA	Perfluorobutanoate	13.3
PFPeA	Perfluoropentanoate	6.7
PFHxA	Perfluorohexanoate	3.3
PFHpA	Perfluoroheptanoate	3.3
PFOA	Perfluorooctanoate	3.3
PFNA	Perfluorononanoate	3.3
PFDA	Perfluorodecanoate	3.3
PFUnA	Perfluoroundecanoate	3.3
PFDoA	Perfluorododecanoate	3.3
PFTrDA	Perfluorotridecanoate	3.3
PFTeDA	Perfluorotetradecanoate	3.3
PFBS	Perfluorobutanesulfonate	3.3

Abbreviation	PFAS Chemical Name	Aqueous RLs* (ng/L)
PFPeS	Perfluoropentanesulfonate	3.3
PFHxS	Perfluorohexanesulfonate	3.3
PFHpS	Perfluoroheptanesulfonate	3.3
PFOS	Perfluorooctanesulfonate	3.3
PFNS	Perfluorononanesulfonate	3.3
PFDS	Perfluorodecanesulfonate	3.3
PFDoS	Perfluorododecanesulfonate	3.3
4:2 FTS	4:2 fluorotelomersulfonate	13.3
6:2 FTS	6:2 fluorotelomersulfonate	13.3
8:2 FTS	8:2 fluorotelomersulfonate	13.3
N-MeFOSAA	N-Methylperfluorooctanesulfonamidoacetic acid	3.3
N-EtFOSAA	N-Ethylperfluorooctanesulfonamidoacetic acid	3.3
PFOSA	Perfluorooctanesulfonamide	3.3
N-MeFOSA	N-Methylperfluorooctanesulfonamide	3.3
N-EtFOSA	N-Ethylperfluorooctanesulfonamide	3.3
N-MeFOSE	N-Methylperfluorooctanesulfonamidoethanol	33.3
N-EtFOSE	N-Ethylperfluorooctanesulfonamidoethanol	33.3

*Reporting limits (RL) shown are based on standard sample size of 0.060L.

9. Quality Control Requirements

This SAP includes analysis of some samples that have not been widely analyzed for PFAS, such as the trucked food waste and sewershed samples. Application of the following QA/QC requirements have been developed for more typical sample matrices, such as influent, effluent, and biosolids. While the following QA/AC criteria will be applied to all samples, interpretation should consider that many samples are not typical and have unknown PFAS levels and variability.

Field Quality Control Samples

The field blank is collected to verify that the ambient sampling environment does not introduce PFAS and cross-contaminate samples during the sampling event. Additionally, the equipment rinse blank is collected to evaluate potential contamination from equipment used during sampling, including automated samplers used to collect aqueous samples and scoops used to collect biosolids. Sampling instructions for the field blank and equipment rinse blank are described above (Section 5.4). The field blank and equipment blank will be analyzed using target PFAS analysis (MLA-110) and TOP analytical methods (MLA-111).

Influent/effluent and biosolid field replicates and field blanks are collected from one POTW. Field quality control samples are meant to be representative for all participating facilities. Field blanks and field replicates are also included for sewershed samples. The results are meant to provide some measure of potential contamination and variability from similar locations, but may not be representative of all industries sampled.

At a minimum, sample results will be evaluated using the RMP Quality Assurance Program Plan (QAPP) (Yee et al., 2019).

Laboratory Quality Control Procedures

Laboratory QC measures for MLA-110 (target analyses) will comply with QA/QC criteria specified in Draft EPA method 1633 and/or DoD Table B-24 of Quality Systems Manual (QSM), version 5.4. Samples will be analyzed in batches containing 7-20 samples per matrix. The batch is carried through the complete analytical process as a unit. For sample data to be reportable, the batch QC data must meet the established acceptance criteria tabulated in the laboratory's operating procedures or be narrated using professional judgment regarding the impact of the data, after consultation with SFEI. At a minimum, each analytical batch should include the following, which is consistent with draft EPA method 1633 and DoD QSM 5.4 Table 24-B. Target recoveries for Ongoing Precisions and Recovery Standards (OPR) should meet specifications in draft EPA method 1633 and MLA-110, and summarized below briefly.

1. **Method Blank:** Method/Procedural Blanks are samples of a clean (PFAS-free reagent water) taken through the entire analytical procedure, including

preservatives, reagents, and equipment used in preparation and quantitation of analytes in samples.

2. **Laboratory Control Sample or Ongoing Precision and Recovery (OPR) Quality Control Samples**: OPR are blanks spiked with native analytes at concentration at mid-level calibration concentration; LLOPR are low-level OPRs spiked at 2X the LOQ. Sample is created by the laboratory as from clean matrix reference samples, sufficiently homogeneous and stable for target analytes to track performance across batches. For TOP analysis, isotope labeled extraction standards (terminal carboxylates and sulfonates) and a isotope labeled oxidation monitoring standard is included. The isotope labeled labeled extraction standard contains C4-C14 carboxylates and C4-C11 and C12 sulfonates to each sample matrix. During the oxidation procedure, the model precursors in the OPR react to form terminal perfluorinated acids, and conversion (disappearance) to terminal products is monitored. Recovery values of the perfluorinated acids spiked plus the predicted reaction products are determined to quantify recovery and used as indication of overall method conversion completeness; see the tables below for acceptance ranges. SGS AXYS MLA-111 contains QC acceptance criteria including method blank, OPR, duplicate, and conversion monitoring.

3. **Surrogate (or internal) Standards**: Labeled isotopes of target compounds (direct analogues or compounds of similar behavior and chemistry) introduced to samples to measure and correct for matrix bias, losses, and errors. Recoveries and corrections to reported values are reported for each sample individually.

4. **Lab Replicates**: Repeated analysis of a separate portion of a sample taken through the extraction and analysis procedure. This characterizes the combined impact of variations in subsampling homogeneity, extraction efficiency, and analytical quantitation. Generally these are generated from subsamples of a larger sample, which will be done for solid (i.e., biosolids, undigested digester feed, trucked food waste) samples. Since target PFAS analysis (draft EPA 1633) requires the entire sample volume and rinseate be analyzed for each aqueous sample, additional sample volume from the same field composite will be collected into separate sample containers. SGS AXYS may decide if compositing sample volumes to produce a lab replicate is appropriate. Since the variation in field generated splits or composites taken in lieu of lab replicates is currently not known, it is recognized that RPD targets for lab replicates may not always be routinely achievable; re-analysis is not expected even if there are larger RPDs among field generated splits or replicates.

5. **Matrix Spike and Matrix Spike Duplicates (MS/MSDs):** MS/MSDs are usually field samples to which known amounts of target analytes are added, indicating potential matrix bias present in field samples and errors or losses in analyses not accounted for by surrogate or internal standard correction. Where possible these should be generated from subsamples of a larger volume to obtain the

concentration of analytes in the unspiked sample, although solids distribution and container wall losses may be variables.

Since target PFAS analysis (draft EPA 1633) requires the entire sample volume and rinseate be analyzed for each aqueous sample, additional sample volume from the same field composite will be collected into separate sample containers. SGS AXYS may decide if compositing sample volumes to produce parent/MS/MSD samples is appropriate. Since the variation in field generated splits or composites taken in lieu of lab replicates is currently not known, it is recognized that RPD targets may not be routinely achievable, and results should be interpreted using professional judgment.

Adsorbable organofluorine analysis results will also include the above QC criteria, unless otherwise specified by SGS AXYS.

10. Data Management

SFEI will request information about the field sampling parameters from each facility in the field sampling form. SFEI will use the information provided by the facility to fill out the appropriate CEDEN/electronic data format.

SGS AXYS will provide data to SFEI in the appropriate CEDEN/electronic data format templates (as provided by SFEI) within the timeframe stipulated in the contract (8 weeks from release of all samples for analyses). SGS AXYS should use the current on-line data checker to review data for vocabulary and business rule violations prior to submitting to SFEI using the SFEI Data Submittal Portal https://rdcdataupload.sfei.org/ (contact DS@sfei.org for the current login and password). SFEI will work with the laboratory to address vocabulary and business rule issues identified from using the data checker.

SFEI will require data to be corrected and resubmitted if any of the following issues are encountered:

- Data submittal is missing target analytes listed in the contract
- Missing field or QA/QC sample results
- Results not reported in the units and basis requested in the contract
- Field and QC samples not reported in equivalent units and basis for a given analyte.

The QA officer (QAO) or designee will review the data for quality assurance and quality control and appropriate QA codes will be applied to the dataset. The QAO or designee writes a report for each dataset outlining the quality of the data. This report highlights any issues that need to be addressed by the laboratory, project manager, or data management staff.

11. Reporting

11.1 Influent, Effluent, Biosolids, and Groundwater Reporting to Geotracker

SFEI will upload an Electronic Data Format (EDF) of analytical results for influent, effluent, biosolid, and groundwater results from EPA method 1633 (SGS AXYS MLA-110 [target PFAS]) to the State Water Board's GeoTracker system on behalf of BACWA and participating POTWs. Only target PFAS analytical results for influent, effluent, biosolids, and groundwater will be uploaded to GeoTracker. POTWs will be responsible for providing SFEI the POTW's Geotracker Global ID and Field Point Names associated with the study. (Analytical results from MLA-111 (TOP) and MLA-119 (AOF) will not be uploaded to avoid misinterpretation of the results).

SFEI will develop one monitoring report summarizing the influent, effluent, biosolid, and groundwater results from the six participating facilities. The monitoring report will be uploaded to GeoTracker's ESI portal on behalf of each facility. The monitoring report will include a QA/QC evaluation from the QA officer, and any deviations from the SAP. Laboratory reports and Chain of Custody forms will be included in Appendices and uploaded as separate PDF files.

11.2 Summary Report

SFEI will analyze, synthesize all data from this SAP in a technical report combined with Phase 1 data results. Results will be interpreted in the context of published studies, including monitoring data from state-wide POTW wastewater data sources (if synthesized and published) and a few relevant published references.

12. Data Validation and Usability

Data quality objectives for field and laboratory measurements evaluate the following:

- Field measurements – sensitivity, precision, accuracy, completeness
- Laboratory chemical analyses – sensitivity, precision, accuracy, completeness, contamination

SFEI staff will examine the data set for completeness (e.g., correct numbers of samples and analyses, appropriate QC sample data included) and accuracy (e.g., in sample IDs). The SFEI QAO or designee will examine submitted target PFAS QA data for conformance with MQOs, specified in DoD Table B-15 of Quality Systems Manual (QSM), version 5.4 (Department of Defense (DOD) and Department of Energy (DOE), 2019). Data that are incomplete, inaccurate, or failing MQOs without appropriate explanation will be referred back to the laboratory for correction or clarification. The QAO will discuss data failing MQOs with laboratory staff to determine whether modifications to analytical methods can be made to improve results on reanalysis. If problems cannot be readily corrected (insufficient sample, irremovable interferences, or blank contamination based on past attempts with the lab), results outside the MQOs may be flagged to alert data users to uncertainties in quantitation. Results will not be censored.

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Appendix A: Sample ID List

Appendix A: Final Sample ID List (date 3/28/2022)

POTW	Matrix	Unique Sample Number	Sample ID	Container	Analysis	Industry or Matrix	Location or Description	Sampling Notes
CCCSD	IS	0021	CCCSD-IS-0021	HDPE 125 mL	Target	Hospital	John Muir Medical Center, Sample Point 1	
CCCSD	IS	1021	CCCSD-IS-1021	HDPE 125 mL	Backup	Hospital	John Muir Medical Center, Sample Point 1	
CCCSD	IS	2021	CCCSD-IS-2021	HDPE 60 mL	TOP	Hospital	John Muir Medical Center, Sample Point 1	
CCCSD	IS	3021	CCCSD-IS-3021	HDPE 60 mL	Backup	Hospital	John Muir Medical Center, Sample Point 1	
CCCSD	IS	0105	CCCSD-IS-0105	HDPE 125 mL	Target	Hospital	John Muir Medical Center, Sample Point 2	
CCCSD	IS	1105	CCCSD-IS-1105	HDPE 125 mL	Backup	Hospital	John Muir Medical Center, Sample Point 2	
CCCSD	IS	2104	CCCSD-IS-2104	HDPE 60 mL	TOP	Hospital	John Muir Medical Center, Sample Point 2	
CCCSD	IS	3105	CCCSD-IS-3105	HDPE 60 mL	Backup	Hospital	John Muir Medical Center, Sample Point 2	
CCCSD	IS	0022	CCCSD-IS-0022	HDPE 125 mL	Target	Hospital 2	San Ramon Regional Medical Center	
CCCSD	IS	1022	CCCSD-IS-1022	HDPE 125 mL	Backup	Hospital 2	San Ramon Regional Medical Center	
CCCSD	IS	2022	CCCSD-IS-2022	HDPE 60 mL	TOP	Hospital 2	San Ramon Regional Medical Center	
CCCSD	IS	3022	CCCSD-IS-3022	HDPE 60 mL	Backup	Hospital 2	San Ramon Regional Medical Center	
CCCSD	IS	0025	CCCSD-IS-0025	HDPE 125 mL	Target	Industrial laundry	Nu West Textiles	
CCCSD	IS	1025	CCCSD-IS-1025	HDPE 125 mL	Backup	Industrial laundry	Nu West Textiles	
CCCSD	IS	2025	CCCSD-IS-2025	HDPE 60 mL	TOP	Industrial laundry	Nu West Textiles	
CCCSD	IS	3025	CCCSD-IS-3025	HDPE 60 mL	Backup	Industrial laundry	Nu West Textiles	
CCCSD	RS	0037	CCCSD-RS-0037	HDPE 125 mL	Target	Residential	Ruth Drive, Pleasant Hill – 47B5 M23.9	Sample
CCCSD	RS	1037	CCCSD-RS-1037	HDPE 125 mL	Backup	Residential	Ruth Drive, Pleasant Hill – 47B5 M23.9	
CCCSD	RS	2037	CCCSD-RS-2037	HDPE 60 mL	TOP	Residential	Ruth Drive, Pleasant Hill – 47B5 M23.9	
CCCSD	RS	3037	CCCSD-RS-3037	HDPE 60 mL	Backup	Residential	Ruth Drive, Pleasant Hill – 47B5 M23.9	
CCCSD	RS	0038	CCCSD-RS-0038	HDPE 125 mL	Target	Residential	Ruth Drive, Pleasant Hill – 47B5 M23.9	Replicate
CCCSD	RS	1038	CCCSD-RS-1038	HDPE 125 mL	Backup	Residential	Ruth Drive, Pleasant Hill – 47B5 M23.9	
CCCSD	RS	2038	CCCSD-RS-2038	HDPE 60 mL	TOP	Residential	Ruth Drive, Pleasant Hill – 47B5 M23.9	
CCCSD	RS	3038	CCCSD-RS-3038	HDPE 60 mL	Backup	Residential	Ruth Drive, Pleasant Hill – 47B5 M23.9	
CCCSD	RS	0039	CCCSD-RS-0039	HDPE 125 mL	Target	Residential	Rosincrest Drive, San Ramon – 102D3 M4	
CCCSD	RS	1039	CCCSD-RS-1039	HDPE 125 mL	Backup	Residential	Rosincrest Drive, San Ramon – 102D3 M4	
CCCSD	RS	2039	CCCSD-RS-2039	HDPE 60 mL	TOP	Residential	Rosincrest Drive, San Ramon – 102D3 M4	
CCCSD	RS	3039	CCCSD-RS-3039	HDPE 60 mL	Backup	Residential	Rosincrest Drive, San Ramon – 102D3 M4	
CCCSD	RS	0040	CCCSD-RS-0040	HDPE 125 mL	Target	Residential	Creekside Drive, Walnut Creek – 75C4 M10	
CCCSD	RS	1040	CCCSD-RS-1040	HDPE 125 mL	Backup	Residential	Creekside Drive, Walnut Creek – 75C4 M10	
CCCSD	RS	2040	CCCSD-RS-2040	HDPE 60 mL	TOP	Residential	Creekside Drive, Walnut Creek – 75C4 M10	
CCCSD	RS	3040	CCCSD-RS-3040	HDPE 60 mL	Backup	Residential	Creekside Drive, Walnut Creek – 75C4 M10	
CCCSD	FBS	0041	CCCSD-FBS-0041	HDPE 500 mL	Target	Field Blank	Residential field blank	
CCCSD	FBS	1041	CCCSD-FBS-1041	HDPE 500 mL	Backup	Field Blank	Residential field blank	
CCCSD	FBS	2041	CCCSD-FBS-2041	HDPE 60 mL	TOP	Field Blank	Residential field blank	
CCCSD	FBS	3041	CCCSD-FBS-3041	HDPE 60 mL	Backup	Field Blank	Residential field blank	
CCCSD	INF	0063	CCCSD-INF-0063	HDPE 125 mL	Target	Influent	Influent at CCCSD	
CCCSD	INF	1063	CCCSD-INF-1063	HDPE 125 mL	Backup	Influent	Influent at CCCSD	
CCCSD	INF	2063	CCCSD-INF-2063	HDPE 60 mL	TOP	Influent	Influent at CCCSD	
CCCSD	INF	3063	CCCSD-INF-3063	HDPE 60 mL	Backup	Influent	Influent at CCCSD	
CCCSD	INF	4063	CCCSD-INF-4063	HDPE 125 mL	AOF	Influent	Influent at CCCSD	
CCCSD	INF	5063	CCCSD-INF-5063	HDPE 125 mL	Backup	Influent	Influent at CCCSD	
CCCSD	FBINF	0064	CCCSD-FBINF-0064	HDPE 500 mL	Target	Field Blank	Field Blank at Influent sampling location at CCCSD	
CCCSD	FBINF	1064	CCCSD-FBINF-1064	HDPE 500 mL	Backup	Field Blank	Field Blank at Influent sampling location at CCCSD	

Appendix A: Final Sample ID List (date 3/28/2022)

POTW	Matrix	Unique Sample Number	Sample ID	Container	Analysis	Industry or Matrix	Location or Description	Sampling Notes
CCCSD	FBINF	2064	CCCSD-FBINF-2064	HDPE 60 mL	TOP	Field Blank	Field Blank at Influent sampling location at CCCSD	
CCCSD	FBINF	3064	CCCSD-FBINF-3064	HDPE 60 mL	Backup	Field Blank	Field Blank at Influent sampling location at CCCSD	
CCCSD	FBINF	4064	CCCSD-FBINF-4064	HDPE 125 mL	AOF	Field Blank	Field Blank at Influent sampling location at CCCSD	
CCCSD	FBINF	5064	CCCSD-FBINF-5064	HDPE 125 mL	Backup	Field Blank	Field Blank at Influent sampling location at CCCSD	
CCCSD	EBINF	0065	CCCSD-EBINF-0065	HDPE 500 mL	Target	Equipment Rinse Blank	Equipment rinse blank for influent sampling equipment at CCCSD	
CCCSD	EBINF	1065	CCCSD-EBINF-1065	HDPE 500 mL	Backup	Equipment Rinse Blank	Equipment rinse blank for influent sampling equipment at CCCSD	
CCCSD	EBINF	2065	CCCSD-EBINF-2065	HDPE 60 mL	TOP	Equipment Rinse Blank	Equipment rinse blank for influent sampling equipment at CCCSD	
CCCSD	EBINF	3065	CCCSD-EBINF-3065	HDPE 60 mL	Backup	Equipment Rinse Blank	Equipment rinse blank for influent sampling equipment at CCCSD	
CCCSD	INF	0073	CCCSD-INF-0073	HDPE 125 mL	Target	Influent	Influent at CCCSD	
CCCSD	INF	1073	CCCSD-INF-1073	HDPE 125 mL	Backup	Influent	Influent at CCCSD	
CCCSD	INF	2073	CCCSD-INF-2073	HDPE 60 mL	TOP	Influent	Influent at CCCSD	
CCCSD	INF	3073	CCCSD-INF-3073	HDPE 60 mL	Backup	Influent	Influent at CCCSD	
CCCSD	INF	4073	CCCSD-INF-4073	HDPE 125 mL	AOF	Influent	Influent at CCCSD	
CCCSD	INF	5073	CCCSD-INF-5073	HDPE 125 mL	Backup	Influent	Influent at CCCSD	
CCCSD	EFF	0106	CCCSD-EFF-0106	HDPE 500 mL	Target	Effluent	Effluent at CCCSD	
CCCSD	EFF	1106	CCCSD-EFF-1106	HDPE 500 mL	Backup	Effluent	Effluent at CCCSD	
CCCSD	EFF	2106	CCCSD-EFF-2106	HDPE 60 mL	TOP	Effluent	Effluent at CCCSD	
CCCSD	EFF	3106	CCCSD-EFF-3106	HDPE 60 mL	Backup	Effluent	Effluent at CCCSD	
CCCSD	EFF	4106	CCCSD-EFF-4106	HDPE 125 mL	AOF	Effluent	Effluent at CCCSD	
CCCSD	EFF	5106	CCCSD-EFF-5106	HDPE 125 mL	Backup	Effluent	Effluent at CCCSD	
CSM	INF	0066	CSM-INF-0066	HDPE 125 mL	Target	Influent	Influent at CSM	
CSM	INF	1066	CSM-INF-1066	HDPE 125 mL	Backup	Influent	Influent at CSM	
CSM	INF	2066	CSM-INF-2066	HDPE 60 mL	TOP	Influent	Influent at CSM	
CSM	INF	3066	CSM-INF-3066	HDPE 60 mL	Backup	Influent	Influent at CSM	
CSM	INF	4066	CSM-INF-4066	HDPE 125 mL	AOF	Influent	Influent at CSM	
CSM	INF	5066	CSM-INF-5066	HDPE 125 mL	Backup	Influent	Influent at CSM	
CSM	EFF	0074	CSM-EFF-0074	HDPE 500 mL	Target	Effluent	Effluent at CSM	
CSM	EFF	1074	CSM-EFF-1074	HDPE 500 mL	Backup	Effluent	Effluent at CSM	
CSM	EFF	2074	CSM-EFF-2074	HDPE 60 mL	TOP	Effluent	Effluent at CSM	
CSM	EFF	3074	CSM-EFF-3074	HDPE 60 mL	Backup	Effluent	Effluent at CSM	
CSM	EFF	4074	CSM-EFF-4074	HDPE 125 mL	AOF	Effluent	Effluent at CSM	
CSM	EFF	5074	CSM-EFF-5074	HDPE 125 mL	Backup	Effluent	Effluent at CSM	
CSM	BIO	0083	CSM-BIO-0083	HDPE 250 mL	Target and TOP	Final Biosolids	Final digested biosolids from CSM	
DSRSD	GW	0017	DSRSD-GW-0017	HDPE 500 mL	Target	Groundwater	Groundwater at MW5 (upper aquiclude)	
DSRSD	GW	1017	DSRSD-GW-1017	HDPE 500 mL	Backup	Groundwater	Groundwater at MW5 (upper aquiclude)	
DSRSD	GW	2017	DSRSD-GW-2017	HDPE 60 mL	TOP	Groundwater	Groundwater at MW5 (upper aquiclude)	
DSRSD	GW	3017	DSRSD-GW-3017	HDPE 60 mL	Backup	Groundwater	Groundwater at MW5 (upper aquiclude)	
DSRSD	GW	0018	DSRSD-GW-0018	HDPE 500 mL	Target	Groundwater	Groundwater at MW3 (uper aquifer)	
DSRSD	GW	1018	DSRSD-GW-1018	HDPE 500 mL	Backup	Groundwater	Groundwater at MW3 (uper aquifer)	
DSRSD	GW	2018	DSRSD-GW-2018	HDPE 60 mL	TOP	Groundwater	Groundwater at MW3 (uper aquifer)	

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POTW	Matrix	Unique Sample Number	Sample ID	Container	Analysis	Industry or Matrix	Location or Description	Sampling Notes
DSRSD	GW	3018	DSRSD-GW-3018	HDPE 60 mL	Backup	Groundwater	Groundwater at MW3 (uper aquifer)	
DSRSD	GW	0019	DSRSD-GW-0019	HDPE 500 mL	Target	Groundwater	Groundwater at NW-75 (uper aquifer)	
DSRSD	GW	1019	DSRSD-GW-1019	HDPE 500 mL	Backup	Groundwater	Groundwater at NW-75 (uper aquifer)	
DSRSD	GW	2019	DSRSD-GW-2019	HDPE 60 mL	TOP	Groundwater	Groundwater at NW-75 (uper aquifer)	
DSRSD	GW	3019	DSRSD-GW-3019	HDPE 60 mL	Backup	Groundwater	Groundwater at NW-75 (uper aquifer)	
DSRSD	IS	0026	DSRSD-IS-0026	HDPE 125 mL	Target	On-site laundry/Jail	Santa Rita Jail	
DSRSD	IS	1026	DSRSD-IS-1026	HDPE 125 mL	Backup	On-site laundry/Jail	Santa Rita Jail	
DSRSD	IS	2026	DSRSD-IS-2026	HDPE 60 mL	TOP	On-site laundry/Jail	Santa Rita Jail	
DSRSD	IS	3026	DSRSD-IS-3026	HDPE 60 mL	Backup	On-site laundry/Jail	Santa Rita Jail	
DSRSD	IS	0027	DSRSD-IS-0027	HDPE 125 mL	Target	On-site laundry/Jail	Santa Rita Jail sample collected from different date	second sample collected on different day
DSRSD	IS	1027	DSRSD-IS-1027	HDPE 125 mL	Backup	On-site laundry/Jail	Santa Rita Jail sample collected from different date	
DSRSD	IS	2027	DSRSD-IS-2027	HDPE 60 mL	TOP	On-site laundry/Jail	Santa Rita Jail sample collected from different date	
DSRSD	IS	3027	DSRSD-IS-3027	HDPE 60 mL	Backup	On-site laundry/Jail	Santa Rita Jail sample collected from different date	
DSRSD	IS	0035	DSRSD-IS-0035	HDPE 125 mL	Target	AFFF on-site/Miltary Operations	Camp Parks	Sample on day 1
DSRSD	IS	1035	DSRSD-IS-1035	HDPE 125 mL	Backup	AFFF on-site/Miltary Operations	Camp Parks	
DSRSD	IS	2035	DSRSD-IS-2035	HDPE 60 mL	TOP	AFFF on-site/Miltary Operations	Camp Parks	
DSRSD	IS	3035	DSRSD-IS-3035	HDPE 60 mL	Backup	AFFF on-site/Miltary Operations	Camp Parks	
DSRSD	IS	0036	DSRSD-IS-0036	HDPE 125 mL	Target	AFFF on-site/Miltary Operations	Camp Parks	Sample on day 2
DSRSD	IS	1036	DSRSD-IS-1036	HDPE 125 mL	Backup	AFFF on-site/Miltary Operations	Camp Parks	
DSRSD	IS	2036	DSRSD-IS-2036	HDPE 60 mL	TOP	AFFF on-site/Miltary Operations	Camp Parks	
DSRSD	IS	3036	DSRSD-IS-3036	HDPE 60 mL	Backup	AFFF on-site/Miltary Operations	Camp Parks	
DSRSD	INF	0067	DSRSD-INF-0067	HDPE 125 mL	Target	Influent	Influent at DSRSD	
DSRSD	INF	1067	DSRSD-INF-1067	HDPE 125 mL	Backup	Influent	Influent at DSRSD	
DSRSD	INF	2067	DSRSD-INF-2067	HDPE 60 mL	TOP	Influent	Influent at DSRSD	
DSRSD	INF	3067	DSRSD-INF-3067	HDPE 60 mL	Backup	Influent	Influent at DSRSD	
DSRSD	INF	4067	DSRSD-INF-4067	HDPE 125 mL	AOF	Influent	Influent at DSRSD	
DSRSD	INF	5067	DSRSD-INF-5067	HDPE 125 mL	Backup	Influent	Influent at DSRSD	
DSRSD	EFF	0075	DSRSD-EFF-0075	HDPE 500 mL	Target	Effluent	Effluent at DSRSD	
DSRSD	EFF	1075	DSRSD-EFF-1075	HDPE 500 mL	Backup	Effluent	Effluent at DSRSD	
DSRSD	EFF	2075	DSRSD-EFF-2075	HDPE 60 mL	TOP	Effluent	Effluent at DSRSD	
DSRSD	EFF	3075	DSRSD-EFF-3075	HDPE 60 mL	Backup	Effluent	Effluent at DSRSD	
DSRSD	EFF	4075	DSRSD-EFF-4075	HDPE 125 mL	AOF	Effluent	Effluent at DSRSD	
DSRSD	EFF	5075	DSRSD-EFF-5075	HDPE 125 mL	Backup	Effluent	Effluent at DSRSD	
DSRSD	BIO	0084	DSRSD-BIO-0084	HDPE 250 mL	Target and TOP	Final Biosolids	Final digested biosolids from DSRSD	
DSRSD	FBBIO	0085	DSRSD-FBBIO-0085	HDPE 500 mL	Target	Field Blank	Field blank for biosolids collection at DSRSD	

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POTW	Matrix	Unique Sample Number	Sample ID	Container	Analysis	Industry or Matrix	Location or Description	Sampling Notes
DSRSD	FBBIO	0086	DSRSD-FBBIO-0086	HDPE 500 mL	Backup	Field Blank	Field blank for biosolids collection at DSRSD	
DSRSD	EBBIO	0087	DSRSD-EBBIO-0087	HDPE 500 mL	Target	Equipment Rinse Blank	Equipment rinse blank for biosolids collection at DSRSD	
DSRSD	EBBIO	0088	DSRSD-EBBIO-0088	HDPE 500 mL	Backup	Equipment Rinse Blank	Equipment rinse blank for biosolids collection at DSRSD	
EBMUD	FW	0081	EBMUD-FW-0081	HDPE 250 mL	Target and TOP	Food waste	Trucked liquid organics food waste slurry received directly at EBMUD	Composite from day 1
EBMUD	FW	0082	EBMUD-FW-0082	HDPE 250 mL	Target and TOP	Food waste	Trucked liquid organics food waste slurry received directly at EBMUD from different date	Composite from day 2
EBMUD	IS	0028	EBMUD-IS-0028	HDPE 125 mL	Target	Industrial laundry	Aramark Uniform & Career Apparel, LLC (Oakland)	Original sample
EBMUD	IS	1028	EBMUD-IS-1028	HDPE 125 mL	Backup	Industrial laundry	Aramark Uniform & Career Apparel, LLC (Oakland)	
EBMUD	IS	2028	EBMUD-IS-2028	HDPE 60 mL	TOP	Industrial laundry	Aramark Uniform & Career Apparel, LLC (Oakland)	
EBMUD	IS	3028	EBMUD-IS-3028	HDPE 60 mL	Backup	Industrial laundry	Aramark Uniform & Career Apparel, LLC (Oakland)	
EBMUD	IS	0028	EBMUD-IS-0028	HDPE 125 mL	Target MS	Industrial laundry	Aramark Uniform & Career Apparel, LLC (Oakland)	Extra sample volume for lab MS/MSD
EBMUD	IS	0028	EBMUD-IS-0028	HDPE 125 mL	Target MSD	Industrial laundry	Aramark Uniform & Career Apparel, LLC (Oakland)	Extra sample volume for lab MS/MSD
EBMUD	IS	3028	EBMUD-IS-3028	HDPE 60 mL	TOP MS	Industrial laundry	Aramark Uniform & Career Apparel, LLC (Oakland)	Extra sample volume for lab MS/MSD
EBMUD	IS	3028	EBMUD-IS-3028	HDPE 60 mL	TOP MSD	Industrial laundry	Aramark Uniform & Career Apparel, LLC (Oakland)	Extra sample volume for lab MS/MSD
EBMUD	IS	0029	EBMUD-IS-0029	HDPE 125 mL	Target	Industrial laundry	Aramark Uniform & Career Apparel, LLC (Oakland)	second sample collected on different day
EBMUD	IS	1029	EBMUD-IS-1029	HDPE 125 mL	Backup	Industrial laundry	Aramark Uniform & Career Apparel, LLC (Oakland)	
EBMUD	IS	2029	EBMUD-IS-2029	HDPE 60 mL	TOP	Industrial laundry	Aramark Uniform & Career Apparel, LLC (Oakland)	
EBMUD	IS	3029	EBMUD-IS-3029	HDPE 60 mL	Backup	Industrial laundry	Aramark Uniform & Career Apparel, LLC (Oakland)	
EBMUD	RS	0042	EBMUD-RS-0042	HDPE 125 mL	Target	Residential	Berkeley Hills	
EBMUD	RS	1042	EBMUD-RS-1042	HDPE 125 mL	Backup	Residential	Berkeley Hills	
EBMUD	RS	2042	EBMUD-RS-2042	HDPE 60 mL	TOP	Residential	Berkeley Hills	
EBMUD	RS	3042	EBMUD-RS-3042	HDPE 60 mL	Backup	Residential	Berkeley Hills	
EBMUD	RS	0043	EBMUD-RS-0043	HDPE 125 mL	Target	Residential	East Oakland	
EBMUD	RS	1043	EBMUD-RS-1043	HDPE 125 mL	Backup	Residential	East Oakland	
EBMUD	RS	2043	EBMUD-RS-2043	HDPE 60 mL	TOP	Residential	East Oakland	
EBMUD	RS	3043	EBMUD-RS-3043	HDPE 60 mL	Backup	Residential	East Oakland	
EBMUD	INF	0068	EBMUD-INF-0068	HDPE 125 mL	Target	Influent	Influent at EBMUD	Composite sample
EBMUD	INF	1068	EBMUD-INF-1068	HDPE 125 mL	Backup	Influent	Influent at EBMUD	
EBMUD	INF	2068	EBMUD-INF-2068	HDPE 60 mL	TOP	Influent	Influent at EBMUD	
EBMUD	INF	3068	EBMUD-INF-3068	HDPE 60 mL	Backup	Influent	Influent at EBMUD	
EBMUD	INF	4068	EBMUD-INF-4068	HDPE 125 mL	AOF	Influent	Influent at EBMUD	

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POTW	Matrix	Unique Sample Number	Sample ID	Container	Analysis	Industry or Matrix	Location or Description	Sampling Notes
EBMUD	INF	5068	EBMUD-INF-5068	HDPE 125 mL	Backup	Influent	Influent at EBMUD	
EBMUD	INF	0069	EBMUD-INF-0069	HDPE 125 mL	Target	Influent	Influent at EBMUD	Composite replicate
EBMUD	INF	1069	EBMUD-INF-1069	HDPE 125 mL	Backup	Influent	Influent at EBMUD	
EBMUD	INF	2069	EBMUD-INF-2069	HDPE 60 mL	TOP	Influent	Influent at EBMUD	
EBMUD	INF	3069	EBMUD-INF-3069	HDPE 60 mL	Backup	Influent	Influent at EBMUD	
EBMUD	INF	4069	EBMUD-INF-4069	HDPE 125 mL	AOF	Influent	Influent at EBMUD	
EBMUD	INF	5069	EBMUD-INF-5069	HDPE 125 mL	Backup	Influent	Influent at EBMUD	
EBMUD	EFF	0076	EBMUD-EFF-0076	HDPE 500 mL	Target	Effluent	Effluent at EBMUD	
EBMUD	EFF	1076	EBMUD-EFF-1076	HDPE 500 mL	Backup	Effluent	Effluent at EBMUD	
EBMUD	EFF	2076	EBMUD-EFF-2076	HDPE 60 mL	TOP	Effluent	Effluent at EBMUD	
EBMUD	EFF	3076	EBMUD-EFF-3076	HDPE 60 mL	Backup	Effluent	Effluent at EBMUD	
EBMUD	EFF	4076	EBMUD-EFF-4076	HDPE 125 mL	AOF	Effluent	Effluent at EBMUD	
EBMUD	EFF	5076	EBMUD-EFF-5076	HDPE 125 mL	Backup	Effluent	Effluent at EBMUD	
EBMUD	EFF	0077	EBMUD-EFF-0077	HDPE 500 mL	Target	Effluent	Effluent replicate at EBMUD	
EBMUD	EFF	1077	EBMUD-EFF-1077	HDPE 500 mL	Backup	Effluent	Effluent replicate at EBMUD	
EBMUD	EFF	2077	EBMUD-EFF-2077	HDPE 60 mL	TOP	Effluent	Effluent replicate at EBMUD	
EBMUD	EFF	3077	EBMUD-EFF-3077	HDPE 60 mL	Backup	Effluent	Effluent replicate at EBMUD	
EBMUD	EFF	4077	EBMUD-EFF-4077	HDPE 125 mL	AOF	Effluent	Effluent replicate at EBMUD	
EBMUD	EFF	5077	EBMUD-EFF-5077	HDPE 125 mL	Backup	Effluent	Effluent replicate at EBMUD	
EBMUD	EFF	0077	EBMUD-EFF-0077	HDPE 500 mL	Target MS	Effluent	Effluent replicate at EBMUD	Extra sample volume for MS/MSD
EBMUD	EFF	0077	EBMUD-EFF-0077	HDPE 500 mL	Target MSD	Effluent	Effluent replicate at EBMUD	Extra sample volume for MS/MSD
EBMUD	EFF	2077	EBMUD-EFF-2077	HDPE 60 mL	TOP MS	Effluent	Effluent replicate at EBMUD	Extra sample volume for MS/MSD
EBMUD	EFF	2077	EBMUD-EFF-2077	HDPE 60 mL	TOP MSD	Effluent	Effluent replicate at EBMUD	Extra sample volume for MS/MSD
EBMUD	EFF	4077	EBMUD-EFF-4077	HDPE 125 mL	AOF MS	Effluent	Effluent replicate at EBMUD	Extra sample volume for MS/MSD
EBMUD	EFF	4077	EBMUD-EFF-4077	HDPE 125 mL	AOF MSD	Effluent	Effluent replicate at EBMUD	Extra sample volume for MS/MSD
EBMUD	BIO	0089	EBMUD-BIO-0089	HDPE 250 mL	Target and TOP	Final Biosolids	Final digested biosolids at EBMUD	Sample on day 1
EBMUD	BIO	0090	EBMUD-BIO-0090	HDPE 250 mL	Target and TOP	Final Biosolids	Final digested biosolids at EBMUD, replicate	Replicate on day 1
EBMUD	BIO	0091	EBMUD-BIO-0091	HDPE 250 mL	Target and TOP	Final Biosolids	Final digested biosolids at EBMUD, from different date	second sample collected on different day
EBMUD	BF	0096	EBMUD-BF-0096	HDPE 250 mL	Target and TOP	Blended Feed	Undigested blended feed at EMBUD	Sample on day 1
EBMUD	BF	0097	EBMUD-BF-0097	HDPE 250 mL	Target and TOP	Blended Feed	Undigested blended feed at EMBUD, replicate	Replicate on day 1
EBMUD	BF	0098	EBMUD-BF-0098	HDPE 250 mL	Target and TOP	Blended Feed	Undigested blended feed at EMBUD from different date	Sample on day 2
SFPUC	IS	0008	SFPUC-IS-0008	HDPE 125 mL	Target	Car wash	Tower Car Wash	
SFPUC	IS	1008	SFPUC-IS-1008	HDPE 125 mL	Backup	Car wash	Tower Car Wash	
SFPUC	IS	2008	SFPUC-IS-2008	HDPE 60 mL	TOP	Car wash	Tower Car Wash	
SFPUC	IS	3008	SFPUC-IS-3008	HDPE 60 mL	Backup	Car wash	Tower Car Wash	
SFPUC	IS	0016	SFPUC-IS-0016	HDPE 125 mL	Target	Car wash	Shell Oil Car Wash	
SFPUC	IS	1016	SFPUC-IS-1016	HDPE 125 mL	Backup	Car wash	Shell Oil Car Wash	
SFPUC	IS	2016	SFPUC-IS-2016	HDPE 60 mL	TOP	Car wash	Shell Oil Car Wash	
SFPUC	IS	3016	SFPUC-IS-3016	HDPE 60 mL	Backup	Car wash	Shell Oil Car Wash	
SFPUC	IS	0103	SFPUC-IS-0103	HDPE 125 mL	Target	Car wash	Auto City Car Wash	
SFPUC	IS	1103	SFPUC-IS-1103	HDPE 125 mL	Backup	Car wash	Auto City Car Wash	
SFPUC	IS	2103	SFPUC-IS-2103	HDPE 60 mL	TOP	Car wash	Auto City Car Wash	
SFPUC	IS	3013	SFPUC-IS-3013	HDPE 60 mL	Backup	Car wash	Auto City Car Wash	

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POTW	Matrix	Unique Sample Number	Sample ID	Container	Analysis	Industry or Matrix	Location or Description	Sampling Notes
SFPUC	IS	0009	SFPUC-IS-0009	HDPE 125 mL	Target	Electronics manufacturing	(Tentative, may not be available) Tempo Automation 2460 ALAMEDA ST	Original sample
SFPUC	IS	1009	SFPUC-IS-1009	HDPE 125 mL	Backup	Electronics manufacturing	(Tentative, may not be available) Tempo Automation 2460 ALAMEDA ST	
SFPUC	IS	2009	SFPUC-IS-2009	HDPE 60 mL	TOP	Electronics manufacturing	(Tentative, may not be available) Tempo Automation 2460 ALAMEDA ST	
SFPUC	IS	3009	SFPUC-IS-3009	HDPE 60 mL	Backup	Electronics manufacturing	(Tentative, may not be available) Tempo Automation 2460 ALAMEDA ST	
SFPUC	IS	0010	SFPUC-IS-0010	HDPE 125 mL	Target	Electronics manufacturing	(Tentative, may not be available) Tempo Automation 2460 ALAMEDA ST	second sample collected on different day
SFPUC	IS	1010	SFPUC-IS-1010	HDPE 125 mL	Backup	Electronics manufacturing	(Tentative, may not be available) Tempo Automation 2460 ALAMEDA ST	
SFPUC	IS	2010	SFPUC-IS-2010	HDPE 60 mL	TOP	Electronics manufacturing	(Tentative, may not be available) Tempo Automation 2460 ALAMEDA ST	
SFPUC	IS	3010	SFPUC-IS-3010	HDPE 60 mL	Backup	Electronics manufacturing	(Tentative, may not be available) Tempo Automation 2460 ALAMEDA ST	
SFPUC	IS	0020	SFPUC-IS-0020	HDPE 125 mL	Target	Hospital	UCSF Mission Bay	
SFPUC	IS	1020	SFPUC-IS-1020	HDPE 125 mL	Backup	Hospital	UCSF Mission Bay	
SFPUC	IS	2020	SFPUC-IS-2020	HDPE 60 mL	TOP	Hospital	UCSF Mission Bay	
SFPUC	IS	3020	SFPUC-IS-3020	HDPE 60 mL	Backup	Hospital	UCSF Mission Bay	
SFPUC	IS	0104	SFPUC-IS-0104	HDPE 125 mL	Target	Hospital	SF General Hospital	
SFPUC	IS	1104	SFPUC-IS-1104	HDPE 125 mL	Backup	Hospital	SF General Hospital	
SFPUC	IS	2104	SFPUC-IS-2104	HDPE 60 mL	TOP	Hospital	SF General Hospital	
SFPUC	IS	3104	SFPUC-IS-3104	HDPE 60 mL	Backup	Hospital	SF General Hospital	
SFPUC	IS	0030	SFPUC-IS-0030	HDPE 125 mL	Target	Industrial laundry	ALSCO, Inc. 1575 Indiana St. OR Bay Area Linens and Valet Service. 100 Cypress St.	
SFPUC	IS	1030	SFPUC-IS-1030	HDPE 125 mL	Backup	Industrial laundry	ALSCO, Inc. 1575 Indiana St. OR Bay Area Linens and Valet Service. 100 Cypress St.	
SFPUC	IS	2030	SFPUC-IS-2030	HDPE 60 mL	TOP	Industrial laundry	ALSCO, Inc. 1575 Indiana St. OR Bay Area Linens and Valet Service. 100 Cypress St.	
SFPUC	IS	3030	SFPUC-IS-3030	HDPE 60 mL	Backup	Industrial laundry	ALSCO, Inc. 1575 Indiana St. OR Bay Area Linens and Valet Service. 100 Cypress St.	
SFPUC	RS	0044	SFPUC-RS-0044	HDPE 125 mL	Target	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	Composite sample on day 1
SFPUC	RS	1044	SFPUC-RS-1044	HDPE 125 mL	Backup	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	
SFPUC	RS	2044	SFPUC-RS-2044	HDPE 60 mL	TOP	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	
SFPUC	RS	3044	SFPUC-RS-3044	HDPE 60 mL	Backup	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	
SFPUC	RS	0044	SFPUC-RS-0044	HDPE 125 mL	Target MS	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	Extra sample volume for lab QA sample - MS/MSD
SFPUC	RS	0044	SFPUC-RS-0044	HDPE 125 mL	Target MSD	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	Extra sample volume for lab QA sample - MS/MSD
SFPUC	RS	2044	SFPUC-RS-2044	HDPE 125 mL	TOP MS	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	Extra sample volume for lab QA sample - MS/MSD
SFPUC	RS	2044	SFPUC-RS-2044	HDPE 125 mL	TOP MSD	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	Extra sample volume for lab QA sample - MS/MSD

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POTW	Matrix	Unique Sample Number	Sample ID	Container	Analysis	Industry or Matrix	Location or Description	Sampling Notes
SFPUC	RS	0045	SFPUC-RS-0045	HDPE 125 mL	Target	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	Composite replicate on day 1
SFPUC	RS	1045	SFPUC-RS-1045	HDPE 125 mL	Backup	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	
SFPUC	RS	2045	SFPUC-RS-2045	HDPE 60 mL	TOP	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	
SFPUC	RS	3045	SFPUC-RS-3045	HDPE 60 mL	Backup	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	
SFPUC	RS	0046	SFPUC-RS-0046	HDPE 125 mL	Target	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	Composite sample on day 2 weekday
SFPUC	RS	1046	SFPUC-RS-1046	HDPE 125 mL	Backup	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	
SFPUC	RS	2046	SFPUC-RS-2046	HDPE 60 mL	TOP	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	
SFPUC	RS	3046	SFPUC-RS-3046	HDPE 60 mL	Backup	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	
SFPUC	RS	0047	SFPUC-RS-0047	HDPE 125 mL	Target	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	Composite sample on day 3 weekend
SFPUC	RS	1047	SFPUC-RS-1047	HDPE 125 mL	Backup	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	
SFPUC	RS	2047	SFPUC-RS-2047	HDPE 60 mL	TOP	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	
SFPUC	RS	3047	SFPUC-RS-3047	HDPE 60 mL	Backup	Residential	San Francisco Stories (1350 units) Portola Dr near Corbett Ave	
SFPUC	RS	0048	SFPUC-RS-0048	HDPE 125 mL	Target	Residential	Park Merced Apartments (458 units) Font Blvd circle at Cambon Dr.	
SFPUC	RS	1048	SFPUC-RS-1048	HDPE 125 mL	Backup	Residential	Park Merced Apartments (458 units) Font Blvd circle at Cambon Dr.	
SFPUC	RS	2048	SFPUC-RS-2048	HDPE 60 mL	TOP	Residential	Park Merced Apartments (458 units) Font Blvd circle at Cambon Dr.	
SFPUC	RS	3048	SFPUC-RS-3048	HDPE 60 mL	Backup	Residential	Park Merced Apartments (458 units) Font Blvd circle at Cambon Dr.	
SFPUC	RS	0049	SFPUC-RS-0049	HDPE 125 mL	Target	Residential	San Rafael and Monterey (438 units)	
SFPUC	RS	1049	SFPUC-RS-1049	HDPE 125 mL	Backup	Residential	San Rafael and Monterey (438 units)	
SFPUC	RS	2049	SFPUC-RS-2049	HDPE 60 mL	TOP	Residential	San Rafael and Monterey (438 units)	
SFPUC	RS	3049	SFPUC-RS-3049	HDPE 60 mL	Backup	Residential	San Rafael and Monterey (438 units)	
SFPUC	RS	0050	SFPUC-RS-0050	HDPE 125 mL	Target	Residential	Rutland and Raymond	Sample on day 1 weekday
SFPUC	RS	1050	SFPUC-RS-1050	HDPE 125 mL	Backup	Residential	Rutland and Raymond	
SFPUC	RS	2050	SFPUC-RS-2050	HDPE 60 mL	TOP	Residential	Rutland and Raymond	
SFPUC	RS	3050	SFPUC-RS-3050	HDPE 60 mL	Backup	Residential	Rutland and Raymond	
SFPUC	RS	0051	SFPUC-RS-0051	HDPE 125 mL	Target	Residential	Rutland and Raymond	Sample on day 2 weekend
SFPUC	RS	1051	SFPUC-RS-1051	HDPE 125 mL	Backup	Residential	Rutland and Raymond	
SFPUC	RS	2051	SFPUC-RS-2051	HDPE 60 mL	TOP	Residential	Rutland and Raymond	
SFPUC	RS	3051	SFPUC-RS-3051	HDPE 60 mL	Backup	Residential	Rutland and Raymond	
SFPUC	RS	0052	SFPUC-RS-0052	HDPE 125 mL	Target	Residential	Urbano and Alviso	
SFPUC	RS	1052	SFPUC-RS-1052	HDPE 125 mL	Backup	Residential	Urbano and Alviso	
SFPUC	RS	2052	SFPUC-RS-2052	HDPE 60 mL	TOP	Residential	Urbano and Alviso	
SFPUC	RS	3052	SFPUC-RS-3052	HDPE 60 mL	Backup	Residential	Urbano and Alviso	

Appendix A: Final Sample ID List (date 3/28/2022)

POTW	Matrix	Unique Sample Number	Sample ID	Container	Analysis	Industry or Matrix	Location or Description	Sampling Notes
SFPUC	RS	0053	SFPUC-RS-0053	HDPE 125 mL	Target	Residential	Dewey Circle. 240 Montalvo Ave	
SFPUC	RS	1053	SFPUC-RS-1053	HDPE 125 mL	Backup	Residential	Dewey Circle. 240 Montalvo Ave	
SFPUC	RS	2053	SFPUC-RS-2053	HDPE 60 mL	TOP	Residential	Dewey Circle. 240 Montalvo Ave	
SFPUC	RS	3053	SFPUC-RS-3053	HDPE 60 mL	Backup	Residential	Dewey Circle. 240 Montalvo Ave	
SFPUC	RS	0054	SFPUC-RS-0054	HDPE 125 mL	Target	Residential	Quintara Steps. 60 Fanning Way	
SFPUC	RS	1054	SFPUC-RS-1054	HDPE 125 mL	Backup	Residential	Quintara Steps. 60 Fanning Way	
SFPUC	RS	2054	SFPUC-RS-2054	HDPE 60 mL	TOP	Residential	Quintara Steps. 60 Fanning Way	
SFPUC	RS	3054	SFPUC-RS-3054	HDPE 60 mL	Backup	Residential	Quintara Steps. 60 Fanning Way	
SFPUC	RS	0055	SFPUC-RS-0055	HDPE 125 mL	Target	Residential	Ventura Ave	
SFPUC	RS	1055	SFPUC-RS-1055	HDPE 125 mL	Backup	Residential	Ventura Ave	
SFPUC	RS	2055	SFPUC-RS-2055	HDPE 60 mL	TOP	Residential	Ventura Ave	
SFPUC	RS	3055	SFPUC-RS-3055	HDPE 60 mL	Backup	Residential	Ventura Ave	
SFPUC	RS	0056	SFPUC-RS-0056	HDPE 125 mL	Target	Residential	high industry residential neighborhood	
SFPUC	RS	1056	SFPUC-RS-1056	HDPE 125 mL	Backup	Residential	high industry residential neighborhood	
SFPUC	RS	2056	SFPUC-RS-2056	HDPE 60 mL	TOP	Residential	high industry residential neighborhood	
SFPUC	RS	3056	SFPUC-RS-3056	HDPE 60 mL	Backup	Residential	high industry residential neighborhood	
SFPUC	FBS	0057	SFPUC-FBS-0057	HDPE 500 mL	Target	Equipment Rinse Blank	Equipment rinse blank for residential sampling	Indicate sampling location
SFPUC	FBS	1057	SFPUC-FBS-1057	HDPE 500 mL	Backup	Equipment Rinse Blank	Equipment rinse blank for residential sampling	
SFPUC	FBS	2057	SFPUC-FBS-2057	HDPE 60 mL	TOP	Equipment Rinse Blank	Equipment rinse blank for residential sampling	
SFPUC	FBS	3057	SFPUC-FBS-3057	HDPE 60 mL	Backup	Equipment Rinse Blank	Equipment rinse blank for residential sampling	
SFPUC	FBS	0058	SFPUC-FBS-0058	HDPE 500 mL	Target	Field Blank	Field blank for residential sampling	
SFPUC	FBS	1058	SFPUC-FBS-1058	HDPE 500 mL	Backup	Field Blank	Field blank for residential sampling	
SFPUC	FBS	2058	SFPUC-FBS-2058	HDPE 60 mL	TOP	Field Blank	Field blank for residential sampling	
SFPUC	FBS	3058	SFPUC-FBS-3058	HDPE 60 mL	Backup	Field Blank	Field blank for residential sampling	
SFPUC	FBS	0060	SFPUC-FBS-0060	HDPE 500 mL	Target	Field Blank	Field blank for industrial sewershed sampling	
SFPUC	FBS	1060	SFPUC-FBS-1060	HDPE 500 mL	Backup	Field Blank	Field blank for industrial sewershed sampling	
SFPUC	FBS	2060	SFPUC-FBS-2060	HDPE 60 mL	TOP	Field Blank	Field blank for industrial sewershed sampling	
SFPUC	FBS	3060	SFPUC-FBS-3060	HDPE 60 mL	Backup	Field Blank	Field blank for industrial sewershed sampling	
SFPUCOS	INF	0071	SFPUCOS-INF-0071	HDPE 125 mL	Target	Influent	Influent at SFPUC_OS	
SFPUCOS	INF	1071	SFPUCOS-INF-1071	HDPE 125 mL	Backup	Influent	Influent at SFPUC_OS	
SFPUCOS	INF	2071	SFPUCOS-INF-2071	HDPE 60 mL	TOP	Influent	Influent at SFPUC_OS	
SFPUCOS	INF	3071	SFPUCOS-INF-3071	HDPE 60 mL	Backup	Influent	Influent at SFPUC_OS	
SFPUCOS	INF	4071	SFPUCOS-INF-4071	HDPE 125 mL	AOF	Influent	Influent at SFPUC_OS	
SFPUCOS	INF	5071	SFPUCOS-INF-5071	HDPE 125 mL	Backup	Influent	Influent at SFPUC_OS	
SFPUCOS	EFF	0079	SFPUCOS-EFF-0079	HDPE 500 mL	Target	Effluent	Effluent at SFPUC_OS	
SFPUCOS	EFF	1079	SFPUCOS-EFF-1079	HDPE 500 mL	Backup	Effluent	Effluent at SFPUC_OS	
SFPUCOS	EFF	2079	SFPUCOS-EFF-2079	HDPE 60 mL	TOP	Effluent	Effluent at SFPUC_OS	
SFPUCOS	EFF	3079	SFPUCOS-EFF-3079	HDPE 60 mL	Backup	Effluent	Effluent at SFPUC_OS	
SFPUCOS	EFF	4079	SFPUCOS-EFF-4079	HDPE 125 mL	AOF	Effluent	Effluent at SFPUC_OS	
SFPUCOS	EFF	5079	SFPUCOS-EFF-5079	HDPE 125 mL	Backup	Effluent	Effluent at SFPUC_OS	

Appendix A: Final Sample ID List (date 3/28/2022)

POTW	Matrix	Unique Sample Number	Sample ID	Container	Analysis	Industry or Matrix	Location or Description	Sampling Notes
SFPUCOS	BIO	0094	SFPUCOS-BIO-0094	HDPE 250 mL	Target and TOP	Final Biosolids	Final digested biosolids at SFPUC_OS	Sample on day 1
SFPUCOS	BIO	0095	SFPUCOS-BIO-0095	HDPE 250 mL	Target and TOP	Final Biosolids	Final digested biosolids at SFPUC_OS, from different date	Sample on day 2
SFPUCOS	BF	0101	SFPUCOS-BF-0101	HDPE 250 mL	Target and TOP	Blended Feed	Undigested blended feed at SFPUC_OS	Sample on day 1
SFPUCOS	BF	0102	SFPUCOS-BF-0102	HDPE 250 mL	Target and TOP	Blended Feed	Undigested blended feed at SFPUC_OS from different date	Sample on day 2
SFPUCSE	INF	0070	SFPUCSE-INF-0070	HDPE 125 mL	Target	Influent	Influent at SFPUC_SE	
SFPUCSE	INF	1070	SFPUCSE-INF-1070	HDPE 125 mL	Backup	Influent	Influent at SFPUC_SE	
SFPUCSE	INF	2070	SFPUCSE-INF-2070	HDPE 60 mL	TOP	Influent	Influent at SFPUC_SE	
SFPUCSE	INF	3070	SFPUCSE-INF-3070	HDPE 60 mL	Backup	Influent	Influent at SFPUC_SE	
SFPUCSE	INF	4070	SFPUCSE-INF-4070	HDPE 125 mL	AOF	Influent	Influent at SFPUC_SE	
SFPUCSE	INF	5070	SFPUCSE-INF-5070	HDPE 125 mL	Backup	Influent	Influent at SFPUC_SE	
SFPUCSE	EFF	0078	SFPUCSE-EFF-0078	HDPE 500 mL	Target	Effluent	Effluent at SFPUC_SE	
SFPUCSE	EFF	1078	SFPUCSE-EFF-1078	HDPE 500 mL	Backup	Effluent	Effluent at SFPUC_SE	
SFPUCSE	EFF	2078	SFPUCSE-EFF-2078	HDPE 60 mL	TOP	Effluent	Effluent at SFPUC_SE	
SFPUCSE	EFF	3078	SFPUCSE-EFF-3078	HDPE 60 mL	Backup	Effluent	Effluent at SFPUC_SE	
SFPUCSE	EFF	4078	SFPUCSE-EFF-4078	HDPE 125 mL	AOF	Effluent	Effluent at SFPUC_SE	
SFPUCSE	EFF	5078	SFPUCSE-EFF-5078	HDPE 125 mL	Backup	Effluent	Effluent at SFPUC_SE	
SFPUCSE	BIO	0092	SFPUCSE-BIO-0092	HDPE 250 mL	Target and TOP	Final Biosolids	Final digested biosolids at SFPUC_SE	Sample on day 1
SFPUCSE	BIO	0093	SFPUCSE-BIO-0093	HDPE 250 mL	Target and TOP	Final Biosolids	Final digested biosolids at SFPUC_SE, from different date	Sample on day 2
SFPUCSE	BF	0099	SFPUCSE-BF-0099	HDPE 250 mL	Target and TOP	Blended Feed	Undigested blended feed at SFPUC_SE	Sample on day 1
SFPUCSE	BF	0100	SFPUCSE-BF-0100	HDPE 250 mL	Target and TOP	Blended Feed	Undigested blended feed at SFPUC_SE from different date	sample on day 2
SJSC	IS	0001	SJSC-IS-0001	HDPE 125 mL	Target	Chemical Manufacturer	Honeywell International (SC-225B)	Grab sample during setup
SJSC	IS	1001	SJSC-IS-1001	HDPE 125 mL	Backup	Chemical Manufacturer	Honeywell International (SC-225B)	
SJSC	IS	2001	SJSC-IS-2001	HDPE 60 mL	TOP	Chemical Manufacturer	Honeywell International (SC-225B)	
SJSC	IS	3001	SJSC-IS-3001	HDPE 60 mL	Backup	Chemical Manufacturer	Honeywell International (SC-225B)	
SJSC	IS	0011	SJSC-IS-0011	HDPE 125 mL	Target	Chemical Manufacturer	Honeywell International (SC-225B)	Composite sample
SJSC	IS	1011	SJSC-IS-1011	HDPE 125 mL	Backup	Chemical Manufacturer	Honeywell International (SC-225B)	
SJSC	IS	2011	SJSC-IS-2011	HDPE 60 mL	TOP	Chemical Manufacturer	Honeywell International (SC-225B)	
SJSC	IS	3011	SJSC-IS-3011	HDPE 60 mL	Backup	Chemical Manufacturer	Honeywell International (SC-225B)	
SJSC	IS	0002	SJSC-IS-0002	HDPE 125 mL	Target	Chrome plater	A & E Anodizing (SJ-314B)	grab sample during setup
SJSC	IS	1002	SJSC-IS-1002	HDPE 125 mL	Backup	Chrome plater	A & E Anodizing (SJ-314B)	
SJSC	IS	2002	SJSC-IS-2002	HDPE 60 mL	TOP	Chrome plater	A & E Anodizing (SJ-314B)	
SJSC	IS	3002	SJSC-IS-3002	HDPE 60 mL	Backup	Chrome plater	A & E Anodizing (SJ-314B)	
SJSC	IS	0003	SJSC-IS-0003	HDPE 125 mL	Target	Chrome plater	A & E Anodizing (SJ-314B)	Composite sample
SJSC	IS	1003	SJSC-IS-1003	HDPE 125 mL	Backup	Chrome plater	A & E Anodizing (SJ-314B)	
SJSC	IS	2003	SJSC-IS-2003	HDPE 60 mL	TOP	Chrome plater	A & E Anodizing (SJ-314B)	
SJSC	IS	3003	SJSC-IS-3003	HDPE 60 mL	Backup	Chrome plater	A & E Anodizing (SJ-314B)	
SJSC	IS	0004	SJSC-IS-0004	HDPE 125 mL	Target	Chrome plater	Amex Plating, Inc. (SC-182B)	grab sample during setup
SJSC	IS	1004	SJSC-IS-1004	HDPE 125 mL	Backup	Chrome plater	Amex Plating, Inc. (SC-182B)	
SJSC	IS	2004	SJSC-IS-2004	HDPE 60 mL	TOP	Chrome plater	Amex Plating, Inc. (SC-182B)	
SJSC	IS	3004	SJSC-IS-3004	HDPE 60 mL	Backup	Chrome plater	Amex Plating, Inc. (SC-182B)	
SJSC	IS	0005	SJSC-IS-0005	HDPE 125 mL	Target	Chrome plater	Amex Plating, Inc. (SC-182B)	Composite sample
SJSC	IS	1005	SJSC-IS-1005	HDPE 125 mL	Backup	Chrome plater	Amex Plating, Inc. (SC-182B)	
SJSC	IS	2005	SJSC-IS-2005	HDPE 60 mL	TOP	Chrome plater	Amex Plating, Inc. (SC-182B)	

Appendix A: Final Sample ID List (date 3/28/2022)

POTW	Matrix	Unique Sample Number	Sample ID	Container	Analysis	Industry or Matrix	Location or Description	Sampling Notes
SJSC	IS	3005	SJSC-IS-3005	HDPE 60 mL	Backup	Chrome plater	Amex Plating, Inc. (SC-182B)	
SJSC	IS	0006	SJSC-IS-0006	HDPE 125 mL	Target	Chrome reduction processes/Centralized Waste Treatment	Clean Harbors San Jose, LLC (SJ-487A)	grab sample during setup
SJSC	IS	1006	SJSC-IS-1006	HDPE 125 mL	Backup	Chrome reduction processes/Centralized Waste Treatment	Clean Harbors San Jose, LLC (SJ-487A)	
SJSC	IS	2006	SJSC-IS-2006	HDPE 60 mL	TOP	Chrome reduction processes/Centralized Waste Treatment	Clean Harbors San Jose, LLC (SJ-487A)	
SJSC	IS	3006	SJSC-IS-3006	HDPE 60 mL	Backup	Chrome reduction processes/Centralized Waste Treatment	Clean Harbors San Jose, LLC (SJ-487A)	
SJSC	IS	0007	SJSC-IS-0007	HDPE 125 mL	Target	Chrome reduction processes/Centralized Waste Treatment	Clean Harbors San Jose, LLC (SJ-487A) 1021 Berryessa Rd, San Jose 95133	second composite from different month
SJSC	IS	1007	SJSC-IS-1007	HDPE 125 mL	Backup	Chrome reduction processes/Centralized Waste Treatment	Clean Harbors San Jose, LLC (SJ-487A) 1021 Berryessa Rd, San Jose 95134	
SJSC	IS	2007	SJSC-IS-2007	HDPE 60 mL	TOP	Chrome reduction processes/Centralized Waste Treatment	Clean Harbors San Jose, LLC (SJ-487A) 1021 Berryessa Rd, San Jose 95135	
SJSC	IS	3007	SJSC-IS-3007	HDPE 60 mL	Backup	Chrome reduction processes/Centralized Waste Treatment	Clean Harbors San Jose, LLC (SJ-487A) 1021 Berryessa Rd, San Jose 95136	
SJSC	IS	0012	SJSC-IS-0012	HDPE 125 mL	Target	Semiconductor	Lumentum Operations LLC (SJ-673B)	Composite sample on first day
SJSC	IS	1012	SJSC-IS-1012	HDPE 125 mL	Backup	Semiconductor	Lumentum Operations LLC (SJ-673B)	
SJSC	IS	2012	SJSC-IS-2012	HDPE 60 mL	TOP	Semiconductor	Lumentum Operations LLC (SJ-673B)	
SJSC	IS	3012	SJSC-IS-3012	HDPE 60 mL	Backup	Semiconductor	Lumentum Operations LLC (SJ-673B)	
SJSC	IS	0013	SJSC-IS-0013	HDPE 125 mL	Target	Semiconductor	Lumentum Operations LLC (SJ-673B)	Composite replicate on first day
SJSC	IS	1013	SJSC-IS-1013	HDPE 125 mL	Backup	Semiconductor	Lumentum Operations LLC (SJ-673B)	
SJSC	IS	2013	SJSC-IS-2013	HDPE 60 mL	TOP	Semiconductor	Lumentum Operations LLC (SJ-673B)	
SJSC	IS	3013	SJSC-IS-3013	HDPE 60 mL	Backup	Semiconductor	Lumentum Operations LLC (SJ-673B)	
SJSC	IS	0012	SJSC-IS-0012	HDPE 125 mL	Target MS	Semiconductor	Lumentum Operations LLC (SJ-673B)	Extra sample volume for MS/MSD
SJSC	IS	0012	SJSC-IS-0012	HDPE 125 mL	Target MSD	Semiconductor	Lumentum Operations LLC (SJ-673B)	Extra sample volume for MS/MSD
SJSC	IS	2012	SJSC-IS-2012	HDPE 60 mL	TOP MS	Semiconductor	Lumentum Operations LLC (SJ-673B)	Extra sample volume for MS/MSD
SJSC	IS	2012	SJSC-IS-2012	HDPE 60 mL	TOP MSD	Semiconductor	Lumentum Operations LLC (SJ-673B)	Extra sample volume for MS/MSD
SJSC	IS	0014	SJSC-IS-0014	HDPE 125 mL	Target	Semiconductor	Lumentum Operations LLC (SJ-673B)	grab sample on first day
SJSC	IS	1014	SJSC-IS-1014	HDPE 125 mL	Backup	Semiconductor	Lumentum Operations LLC (SJ-673B)	
SJSC	IS	2014	SJSC-IS-2014	HDPE 60 mL	TOP	Semiconductor	Lumentum Operations LLC (SJ-673B)	
SJSC	IS	3014	SJSC-IS-3014	HDPE 60 mL	Backup	Semiconductor	Lumentum Operations LLC (SJ-673B)	
SJSC	IS	0015	SJSC-IS-0015	HDPE 125 mL	Target	Semiconductor	Lumentum Operations LLC (SJ-673B)	grab sample on first day
SJSC	IS	1015	SJSC-IS-1015	HDPE 125 mL	Backup	Semiconductor	Lumentum Operations LLC (SJ-673B)	
SJSC	IS	2015	SJSC-IS-2015	HDPE 60 mL	TOP	Semiconductor	Lumentum Operations LLC (SJ-673B)	
SJSC	IS	3015	SJSC-IS-3015	HDPE 60 mL	Backup	Semiconductor	Lumentum Operations LLC (SJ-673B)	
SJSC	FBS	0023	SJSC-FBS-0023	HDPE 500 mL	Target	Equipment Rinse Blank	Equipment rinse blank for industrial sampling locations.	Indicate what industrial site sample is collected.

Appendix A: Final Sample ID List (date 3/28/2022)

POTW	Matrix	Unique Sample Number	Sample ID	Container	Analysis	Industry or Matrix	Location or Description	Sampling Notes
SJSC	FBS	1023	SJSC-FBS-1023	HDPE 500 mL	Backup	Equipment Rinse Blank	Equipment rinse blank for industrial sampling locations.	
SJSC	FBS	2023	SJSC-FBS-2023	HDPE 60 mL	TOP	Equipment Rinse Blank	Equipment rinse blank for industrial sampling locations.	
SJSC	FBS	3023	SJSC-FBS-3023	HDPE 60 mL	Backup	Equipment Rinse Blank	Equipment rinse blank for industrial sampling locations.	
SJSC	FBS	0024	SJSC-FBS-0024	HDPE 500 mL	Target	Field Blank	Field blank for industrial sampling location.	Indicate what industrial site
SJSC	FBS	1024	SJSC-FBS-1024	HDPE 500 mL	Backup	Field Blank	Field blank for industrial sampling location.	
SJSC	FBS	2024	SJSC-FBS-2024	HDPE 60 mL	TOP	Field Blank	Field blank for industrial sampling location.	
SJSC	FBS	3024	SJSC-FBS-3024	HDPE 60 mL	Backup	Field Blank	Field blank for industrial sampling location.	
SJSC	IS	0031	SJSC-IS-0031	HDPE 125 mL	Target	Industrial Laundry	Prudential Overall Supply (MI-040B)	grab sample during setup
SJSC	IS	1031	SJSC-IS-1031	HDPE 125 mL	Backup	Industrial Laundry	Prudential Overall Supply (MI-040B)	
SJSC	IS	2031	SJSC-IS-2031	HDPE 60 mL	TOP	Industrial Laundry	Prudential Overall Supply (MI-040B)	
SJSC	IS	3031	SJSC-IS-3031	HDPE 60 mL	Backup	Industrial Laundry	Prudential Overall Supply (MI-040B)	
SJSC	IS	0032	SJSC-IS-0032	HDPE 125 mL	Target	Industrial Laundry	Prudential Overall Supply (MI-040B)	grab sample replicate
SJSC	IS	1032	SJSC-IS-1032	HDPE 125 mL	Backup	Industrial Laundry	Prudential Overall Supply (MI-040B)	
SJSC	IS	2032	SJSC-IS-2032	HDPE 60 mL	TOP	Industrial Laundry	Prudential Overall Supply (MI-040B)	
SJSC	IS	3032	SJSC-IS-3032	HDPE 60 mL	Backup	Industrial Laundry	Prudential Overall Supply (MI-040B)	
SJSC	IS	0033	SJSC-IS-0033	HDPE 125 mL	Target	Industrial Laundry	Prudential Overall Supply (MI-040B)	composite sample
SJSC	IS	1033	SJSC-IS-1033	HDPE 125 mL	Backup	Industrial Laundry	Prudential Overall Supply (MI-040B)	
SJSC	IS	2033	SJSC-IS-2033	HDPE 60 mL	TOP	Industrial Laundry	Prudential Overall Supply (MI-040B)	
SJSC	IS	3033	SJSC-IS-3033	HDPE 60 mL	Backup	Industrial Laundry	Prudential Overall Supply (MI-040B)	
SJSC	IS	0034	SJSC-IS-0034	HDPE 125 mL	Target	Industrial Laundry	Alsco (SJ-546B)	
SJSC	IS	1034	SJSC-IS-1034	HDPE 125 mL	Backup	Industrial Laundry	Alsco (SJ-546B)	
SJSC	IS	2034	SJSC-IS-2034	HDPE 60 mL	TOP	Industrial Laundry	Alsco (SJ-546B)	
SJSC	IS	3034	SJSC-IS-3034	HDPE 60 mL	Backup	Industrial Laundry	Alsco (SJ-546B)	
SJSC	FBS	0059	SJSC-FBS-0059	HDPE 500 mL	Target	Field Blank	Field blank for industrial sewershed sampling	
SJSC	FBS	1059	SJSC-FBS-1059	HDPE 500 mL	Backup	Field Blank	Field blank for industrial sewershed sampling	
SJSC	FBS	2059	SJSC-FBS-2059	HDPE 60 mL	TOP	Field Blank	Field blank for industrial sewershed sampling	
SJSC	FBS	3059	SJSC-FBS-3059	HDPE 60 mL	Backup	Field Blank	Field blank for industrial sewershed sampling	
SJSC	IS	0061	SJSC-IS-0061	HDPE 125 mL	Target	Pulp Paperboard	Greif Corporation (The Newark Group) (SC-459B)	grab sample during setup
SJSC	IS	1061	SJSC-IS-1061	HDPE 125 mL	Backup	Pulp Paperboard	Greif Corporation (The Newark Group) (SC-459B)	
SJSC	IS	2061	SJSC-IS-2061	HDPE 60 mL	TOP	Pulp Paperboard	Greif Corporation (The Newark Group) (SC-459B)	
SJSC	IS	3061	SJSC-IS-3061	HDPE 60 mL	Backup	Pulp Paperboard	Greif Corporation (The Newark Group) (SC-459B)	
SJSC	IS	0062	SJSC-IS-0062	HDPE 125 mL	Target	Pulp Paperboard	Greif Corporation (The Newark Group) (SC-459B)	Composite
SJSC	IS	1062	SJSC-IS-1062	HDPE 125 mL	Backup	Pulp Paperboard	Greif Corporation (The Newark Group) (SC-459B)	
SJSC	IS	2062	SJSC-IS-2062	HDPE 60 mL	TOP	Pulp Paperboard	Greif Corporation (The Newark Group) (SC-459B)	

Appendix A: Final Sample ID List (date 3/28/2022)

POTW	Matrix	Unique Sample Number	Sample ID	Container	Analysis	Industry or Matrix	Location or Description	Sampling Notes
SJSC	IS	3062	SJSC-IS-3062	HDPE 60 mL	Backup	Pulp Paperboard	Greif Corporation (The Newark Group) (SC-459B)	
SJSC	INF	0072	SJSC-INF-0072	HDPE 125 mL	Target	Influent	Influent at SJSC	
SJSC	INF	1072	SJSC-INF-1072	HDPE 125 mL	Backup	Influent	Influent at SJSC	
SJSC	INF	2072	SJSC-INF-2072	HDPE 60 mL	TOP	Influent	Influent at SJSC	
SJSC	INF	3072	SJSC-INF-3072	HDPE 60 mL	Backup	Influent	Influent at SJSC	
SJSC	INF	4072	SJSC-INF-4072	HDPE 125 mL	AOF	Influent	Influent at SJSC	
SJSC	INF	5072	SJSC-INF-5072	HDPE 125 mL	Backup	Influent	Influent at SJSC	
SJSC	INF	0072	SJSC-INF-0072	HDPE 125 mL	Target MS	Influent	Influent at SJSC	Extra sample volume for MS/MSD
SJSC	INF	0072	SJSC-INF-0072	HDPE 125 mL	Target MSD	Influent	Influent at SJSC	Extra sample volume for MS/MSD
SJSC	INF	2072	SJSC-INF-2072	HDPE 60 mL	TOP MS	Influent	Influent at SJSC	Extra sample volume for MS/MSD
SJSC	INF	2072	SJSC-INF-2072	HDPE 60 mL	TOP MSD	Influent	Influent at SJSC	Extra sample volume for MS/MSD
SJSC	INF	4072	SJSC-INF-4072	HDPE 125 mL	AOF MS	Influent	Influent at SJSC	Extra sample volume for MS/MSD
SJSC	INF	4072	SJSC-INF-4072	HDPE 125 mL	AOF MSD	Influent	Influent at SJSC	Extra sample volume for MS/MSD
SJSC	EFF	0080	SJSC-EFF-0080	HDPE 500 mL	Target	Effluent	Effluent at SJSC	
SJSC	EFF	1080	SJSC-EFF-1080	HDPE 500 mL	Backup	Effluent	Effluent at SJSC	
SJSC	EFF	2080	SJSC-EFF-2080	HDPE 60 mL	TOP	Effluent	Effluent at SJSC	
SJSC	EFF	3080	SJSC-EFF-3080	HDPE 60 mL	Backup	Effluent	Effluent at SJSC	
SJSC	EFF	4080	SJSC-EFF-4080	HDPE 125 mL	AOF	Effluent	Effluent at SJSC	
SJSC	EFF	5080	SJSC-EFF-5080	HDPE 125 mL	Backup	Effluent	Effluent at SJSC	

Appendix B: Field Sampling Forms

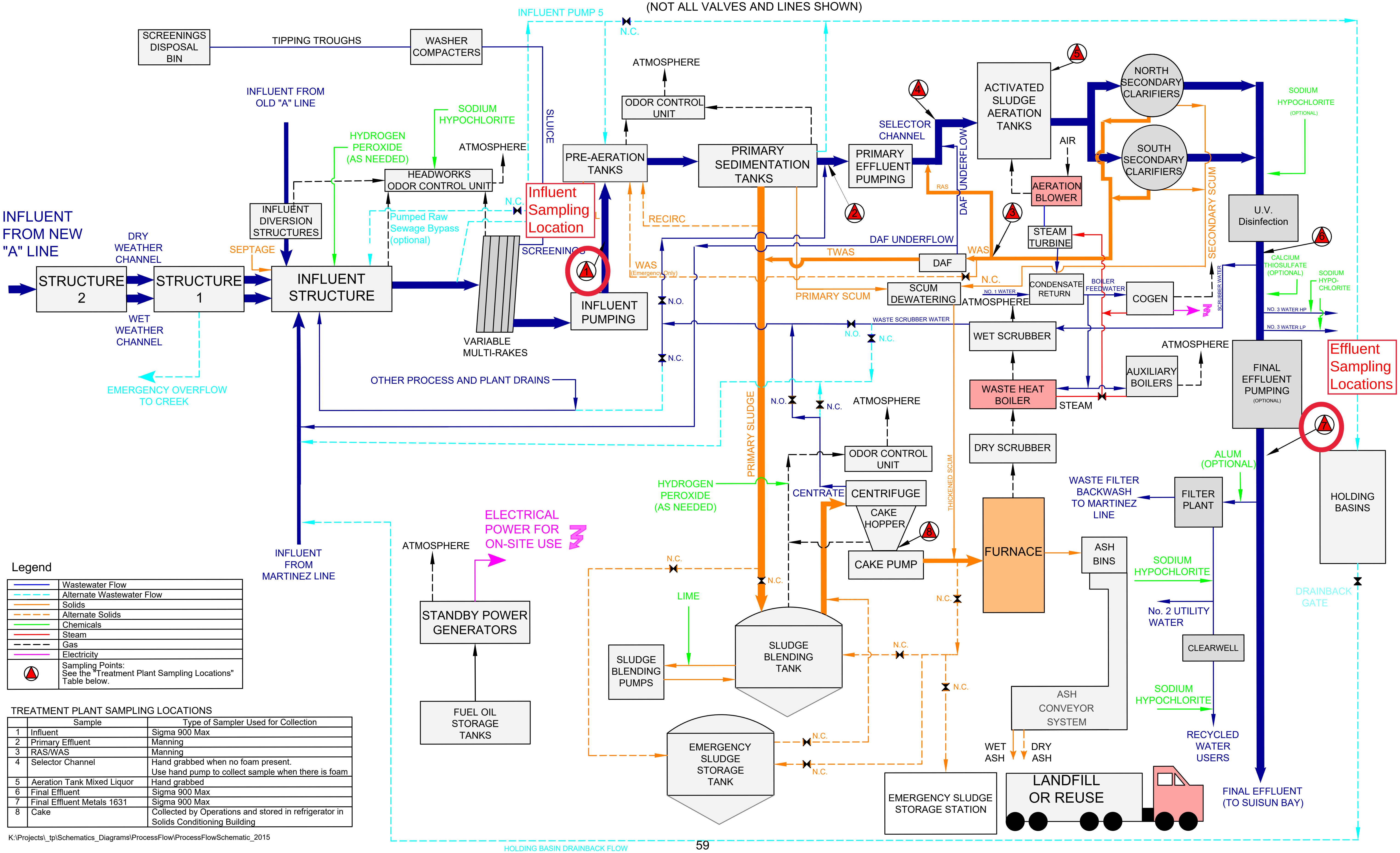
Field sampling forms will be provided to each facility for every sampling event as an excel file.

Appendix C: POTW Process and Sampling Diagrams

WASTEWATER TREATMENT PROCESS FLOW SCHEMATIC 2020

CENTRAL CONTRA COSTA SANITARY DISTRICT

(NOT ALL VALVES AND LINES SHOWN)



Legend

(blue line)	Wastewater Flow
(cyan dashed line)	Alternate Wastewater Flow
(orange line)	Solids
(orange dashed line)	Alternate Solids
(green line)	Chemicals
(red line)	Steam
(black dashed line)	Gas
(magenta line)	Electricity
(sampling point symbol)	Sampling Points: See the "Treatment Plant Sampling Locations" Table below.

TREATMENT PLANT SAMPLING LOCATIONS

	Sample	Type of Sampler Used for Collection
1	Influent	Sigma 900 Max
2	Primary Effluent	Manning
3	RAS/WAS	Manning
4	Selector Channel	Hand grabbed when no foam present. Use hand pump to collect sample when there is foam
5	Aeration Tank Mixed Liquor	Hand grabbed
6	Final Effluent	Sigma 900 Max
7	Final Effluent Metals 1631	Sigma 900 Max
8	Cake	Collected by Operations and stored in refrigerator in Solids Conditioning Building

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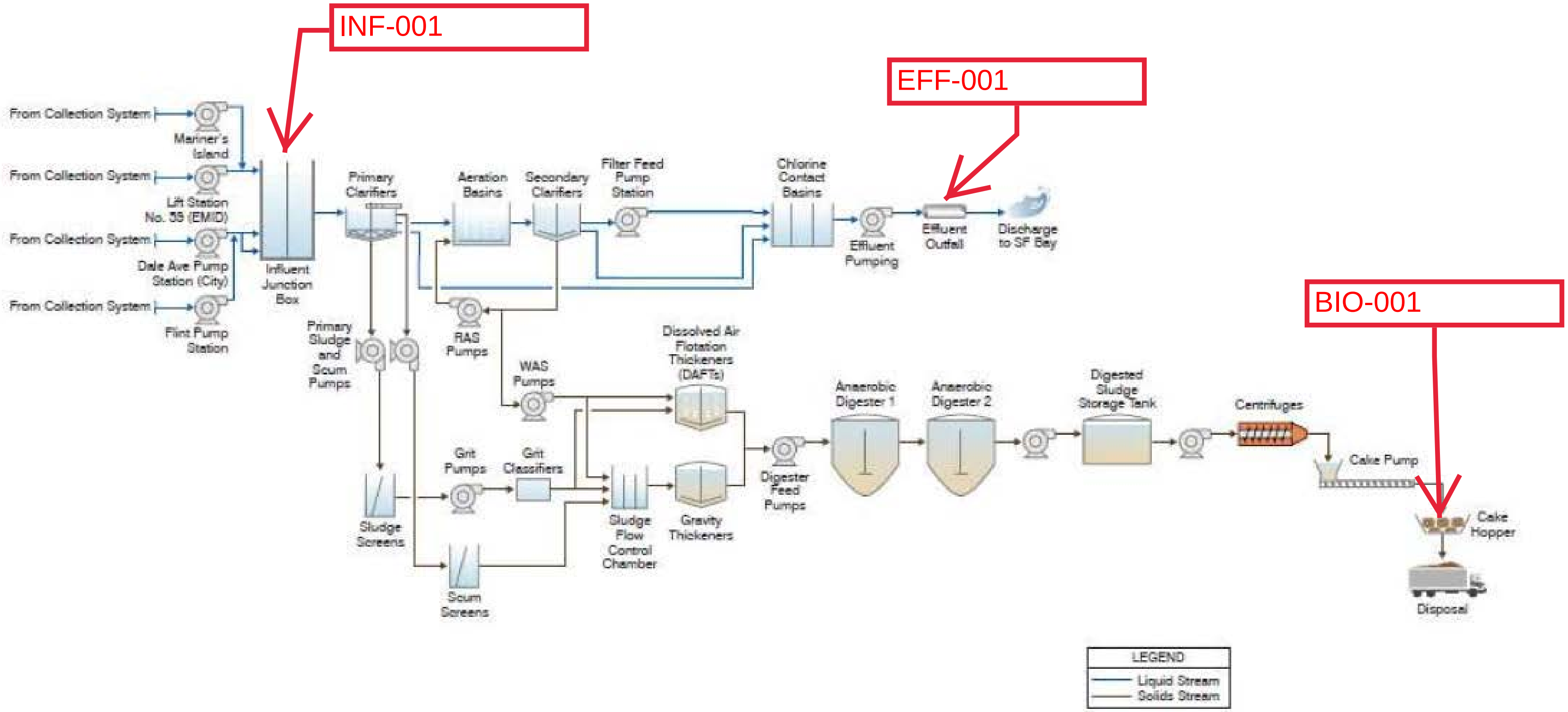
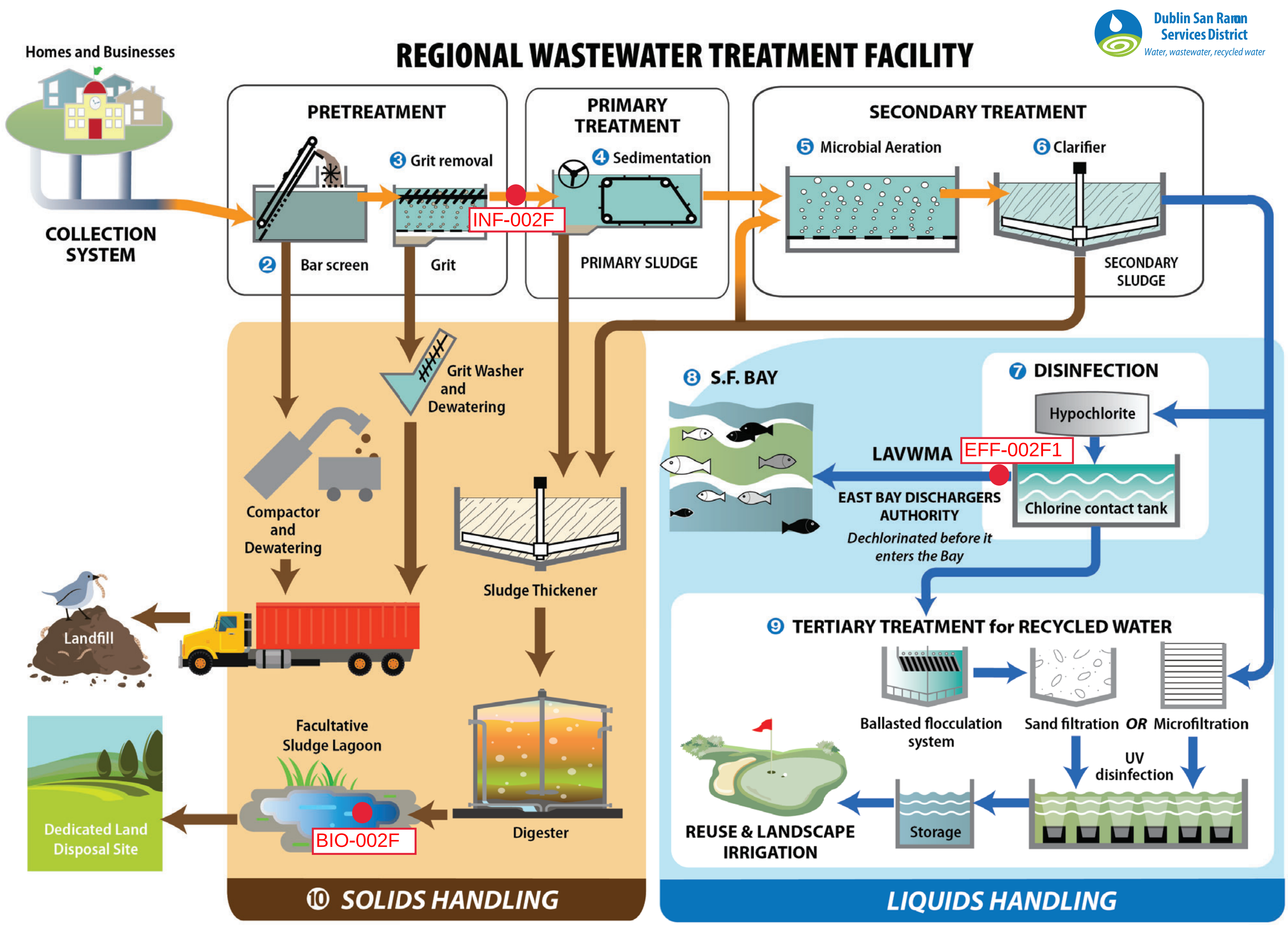
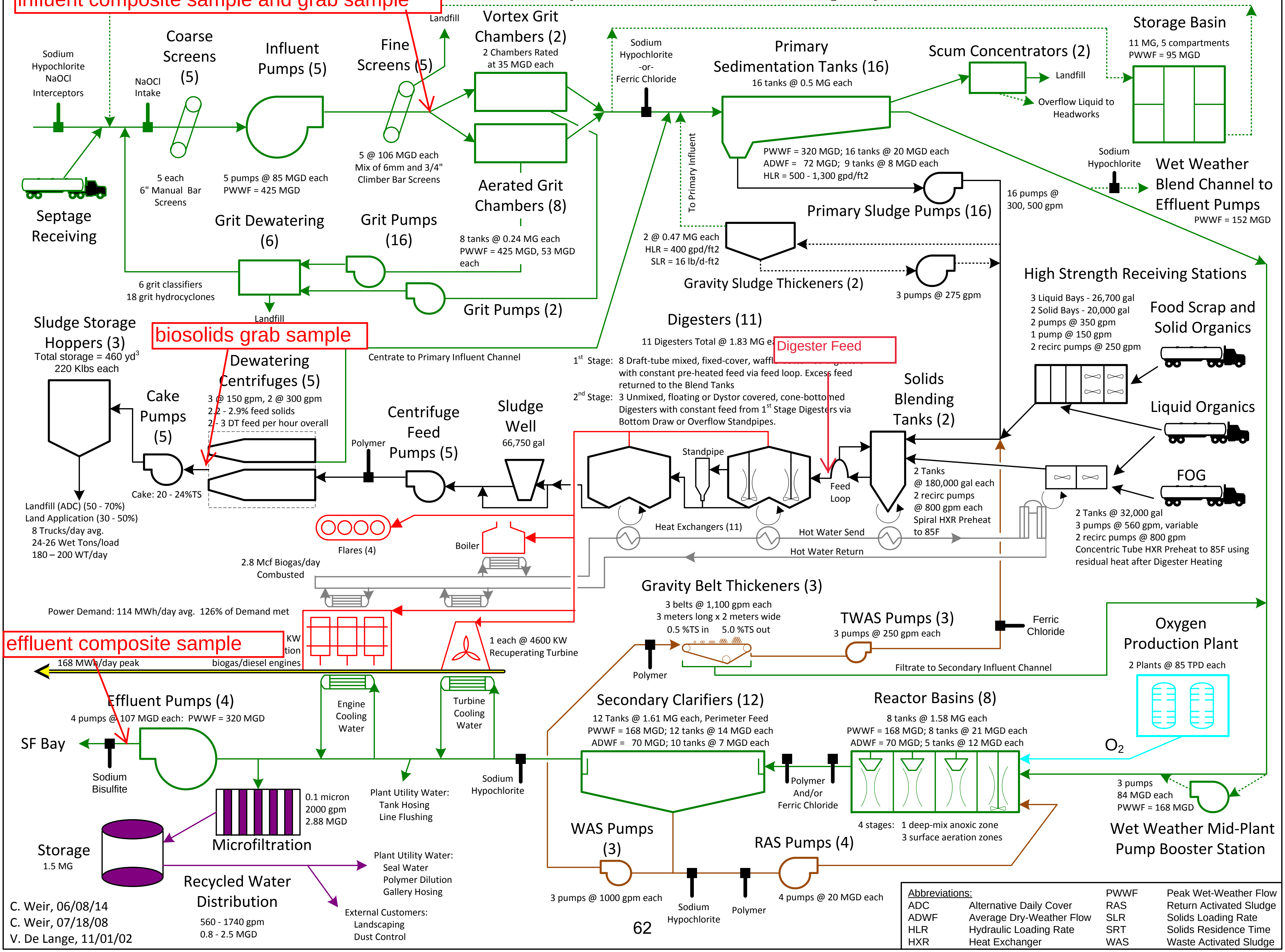
City of San Mateo WWTP



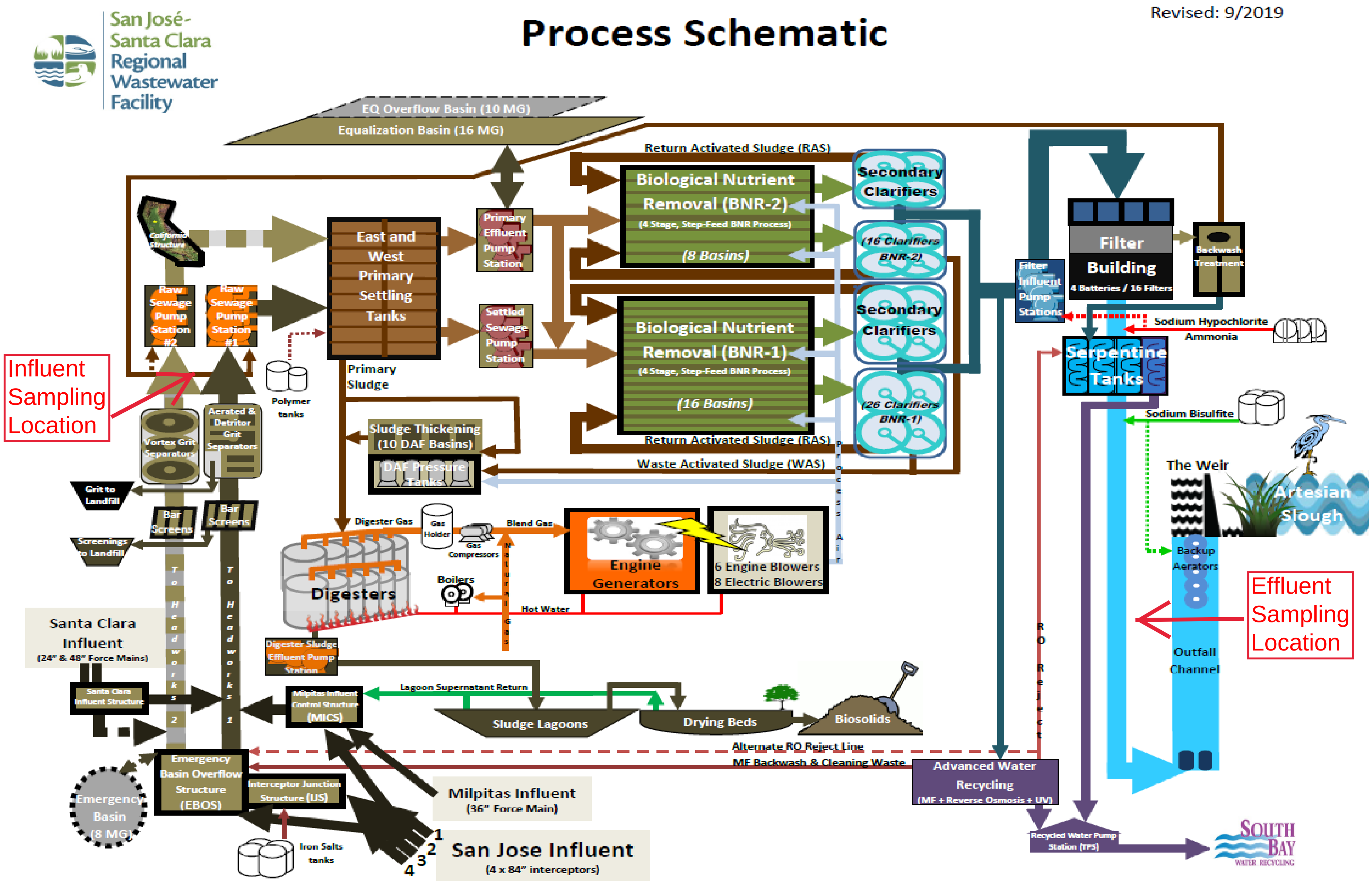


Dublin San Ramon Services District
Water, wastewater, recycled water
REGIONAL WASTEWATER TREATMENT FACILITY
Homes and Businesses
COLLECTION SYSTEM
PRETREATMENT
3 Grit removal
2 Bar screen
Grit
INF-002F
PRIMARY TREATMENT
4 Sedimentation
PRIMARY SLUDGE
SECONDARY TREATMENT
5 Microbial Aeration
6 Clarifier
SECONDARY SLUDGE
Grit Washer and Dewatering
Compactor and Dewatering
Landfill
Sludge Thickener
Digester
Facultative Sludge Lagoon
BIO-002F
Dedicated Land Disposal Site
10 SOLIDS HANDLING
8 S.F. BAY
7 DISINFECTION
Hypochlorite
LAVWMA
EFF-002F1
EAST BAY DISCHARGERS AUTHORITY
Dechlorinated before it enters the Bay
Chlorine contact tank
9 TERTIARY TREATMENT for RECYCLED WATER
Ballasted flocculation system
Sand filtration OR Microfiltration
UV disinfection
Storage
REUSE & LANDSCAPE IRRIGATION
LIQUIDS HANDLING

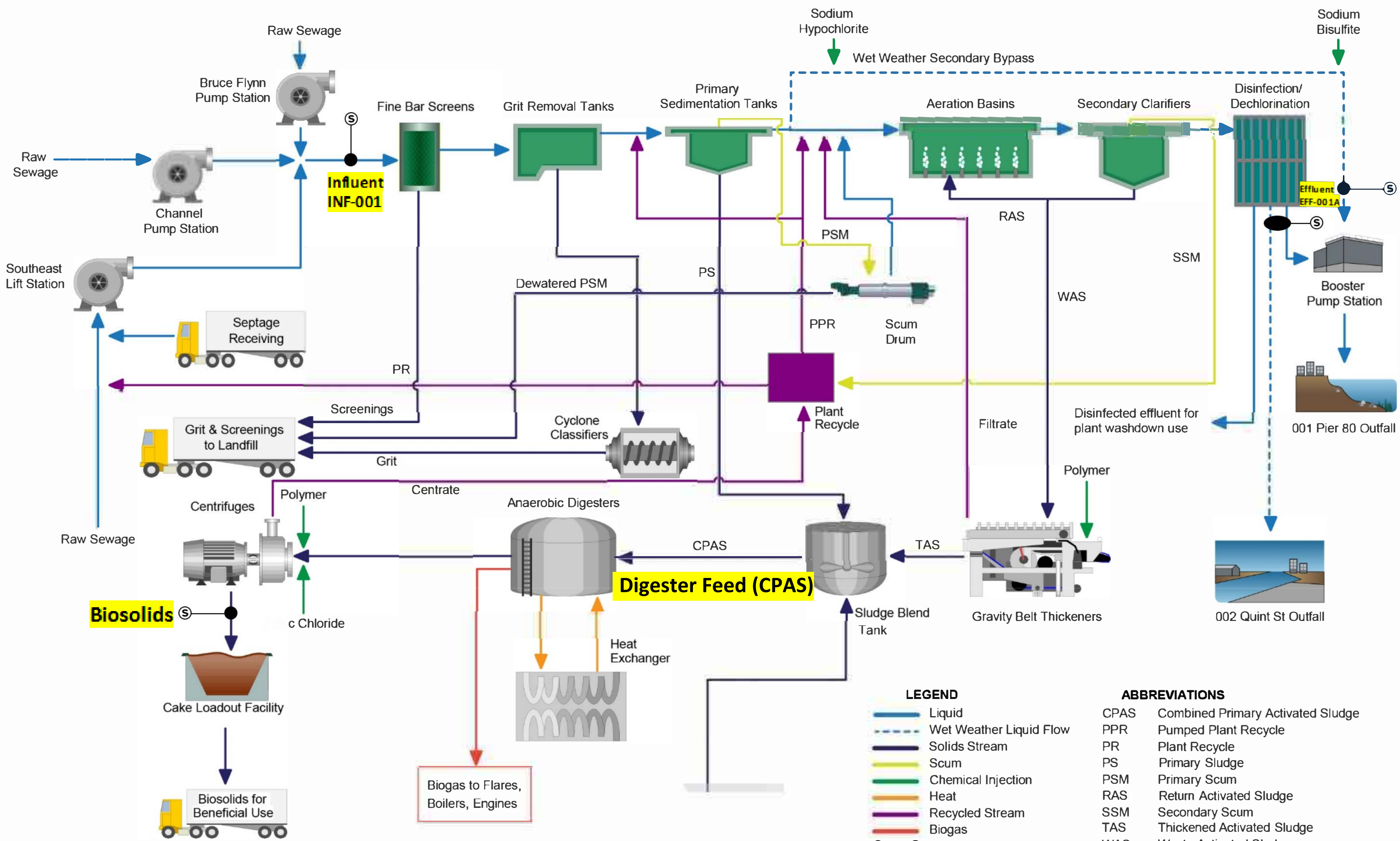
Figure 1 Summary of MWWTP Process and Capacity



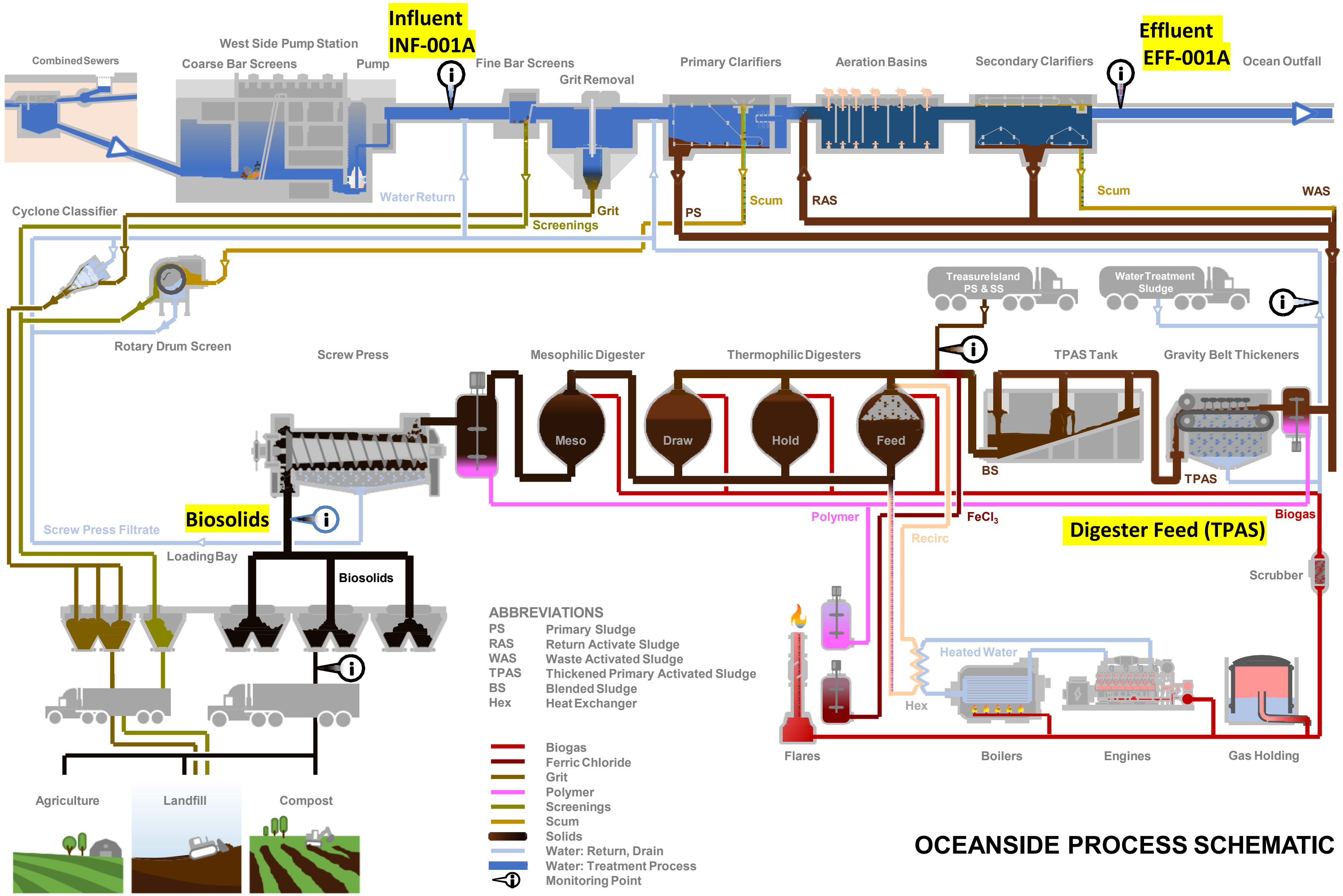
C.


San José-Santa Clara Regional Wastewater Facility
Process Schematic
Revised: 9/2019
EQ Overflow Basin (10 MG)
Equalization Basin (16 MG)
Return Activated Sludge (RAS)
Biological Nutrient Removal (BNR-2)
(4 Stage, Step-Feed BNR Process)
(8 Basins)
Secondary Clarifiers
(16 Clarifiers BNR-2)
Biological Nutrient Removal (BNR-1)
(4 Stage, Step-Feed BNR Process)
(16 Basins)
(26 Clarifiers BNR-1)
Waste Activated Sludge (WAS)
East and West Primary Settling Tanks
Primary Effluent Pump Station
Settled Sewage Pump Station
Primary Sludge
Raw Sewage Pump Station #2
Raw Sewage Pump Station #1
Polymer tanks
Influent Sampling Location
Vortex Grit Separators
Aerated & Detritor Grit Separators
Grit to Landfill
Bar Screens
Screenings to Landfill
Sludge Thickening (10 DAF Basins)
DAF Pressure Tanks
Digester Gas
Gas Holder
Gas Compressors
Blend Gas
Natural Gas
Engine Generators
6 Engine Blowers
8 Electric Blowers
Process Air
Digesters
Boilers
Hot Water
Digester Sludge Effluent Pump Station
Santa Clara Influent
(24" & 48" Force Mains)
Santa Clara Influent Structure
To Headworks 2
To Headworks 1
Milpitas Influent Control Structure (MICS)
Lagoon Supernatant Return
Sludge Lagoons
Drying Beds
Biosolids
Alternate RO Reject Line
MF Backwash & Cleaning Waste
RO Reject
Emergency Basin Overflow Structure (EBOS)
Emergency Basin (8 MG)
Interceptor Junction Structure (IJS)
Iron Salts tanks
Milpitas Influent
(36" Force Main)
San Jose Influent
(4 x 84" interceptors)
1 2 3 4
Filter Influent Pump Stations
Filter Building
4 Batteries / 16 Filters
Backwash Treatment
Sodium Hypochlorite
Ammonia
Serpentine Tanks
Sodium Bisulfite
The Weir
Artesian Slough
Backup Aerators
Effluent Sampling Location
Outfall Channel
Advanced Water Recycling
(MF + Reverse Osmosis + UV)
Recycled Water Pump Station (TPS)
South Bay Water Recycling

ATTACHMENT D
Plant Process Schematic
Southeast Water Pollution Control Plant



ATTACHMENT C
Plant Process Schematic
Oceanside Water Pollution Control Plant



Appendix D: Shipping Kit and Shipping Instructions

Facility	Shipping Address	500 mL HDPE Aqueous	125 mL HDPE Aqueous	60 mL HDPE Aqueous	250 mL HDPE solids	PFAS Free Reagent Water
CCCSD	ATTN: Blake Brown Central San 5019 Imhoff Place Martinez, CA 94553	9	33	33		6
CSM	ATTN: Xiongbing Liang City of San Mateo WWTP 2050 Detroit Dr San Mateo, CA 94404	4	9	6	3	2
DSRSD	DSRSD Laboratory Attn: Connie Sanchez 7399 Johnson Drive Pleasanton, CA 94588	15	18	23	3	5
EBMUD	ATTN: David Williams EBMUD WWTP, Field Services MS 59 2020 Wake Ave Oakland, CA 94607	8	30	25	11	2
SFPUC (POTW supplies)	ATTN: Dolson Kwan, PFAS Study Southeast Treatment Plant, Lab Sample Recieving 750 Phelps St. San Francisco, CA, 94124	8	20	10	12	2
SFPUC (sewershed supplies)	ATTN: Mark Middleton, PFAS Study SFPUC Field Monitoring Services 111 Bay St. San Francisco, CA, 94133	6	60	58		6
SJSC	ATTN: Alex Chieh/Sample Receiving San Jose-Santa Clara Regional Wastewater Facility, ESD Laboratory 4235 Zanker Road San Jose, CA 95134	12	60	65		6

SGS AXYS

PREPARING AND SHIPPING SAMPLES TO SGS AXYS

LABELING

- Follow procedures described in section 6 of Study of Per- and Polyfluoroalkyl Substances in Bay Area POTWs: Phase 1 Sampling and Analysis Plan.

CHAIN OF CUSTODY (COC)

- Follow procedures described in section 7 of Study of Per- and Polyfluoroalkyl Substances in Bay Area POTWs: Phase 1 Sampling and Analysis Plan.

- Original copy is placed inside a ziptop plastic bag and placed inside the cooler.

PACKAGING

1. Freeze all samples before packaging (if possible, also cool shipping container).
2. Place layer of bagged wet ice at bottom of cooler.
3. Place a layer of bubble wrap over the ice
4. Place each sample in a separate zip top bag lay over to of the bubble wrap layer.
5. Place a layer of bubble wrap over the sample containers.
6. Fill all remaining space with bagged wet ice.
7. Place Chain of Custody documents inside the cooler.
8. Close cooler and secure with tape.

SHIPPING DOCUMENTS

Complete and attach all required shipping documents to the **outside** of container.

- FedEx waybill – See waybill instructions and example waybill below.
- 3 Copies of Commercial Invoice - Sign; date; add waybill number* - 2 copies included with waybill; 3rd copy to courier

*FedEx waybill number is the tracking number (top right-hand corner).

Commercial Invoice

Fill the remaining sections of the commercial invoice

- Date of exportation
- Shipper/exporter information
- Waybill number (same as FedEx tracking number)
- No. of PKGS = number of coolers
- Qty. = number of samples
- Total value = QTY x $5
- Total invoice value = total value if one cooler
- Total invoice value = total value x no of PKGS if more than one cooler being shipped

International Air Waybill Instructions

<u>Section 1: "From"</u>

Enter Shipper's information as completely as possible

<u>Section 2: "To"</u>

Enter our address as follows:

Sample Receiving
SGS AXYS Analytical Services Ltd.
2045 Mills Road W
Sidney B.C. V8L 5X2
Phone: <u>250-655-5800</u>

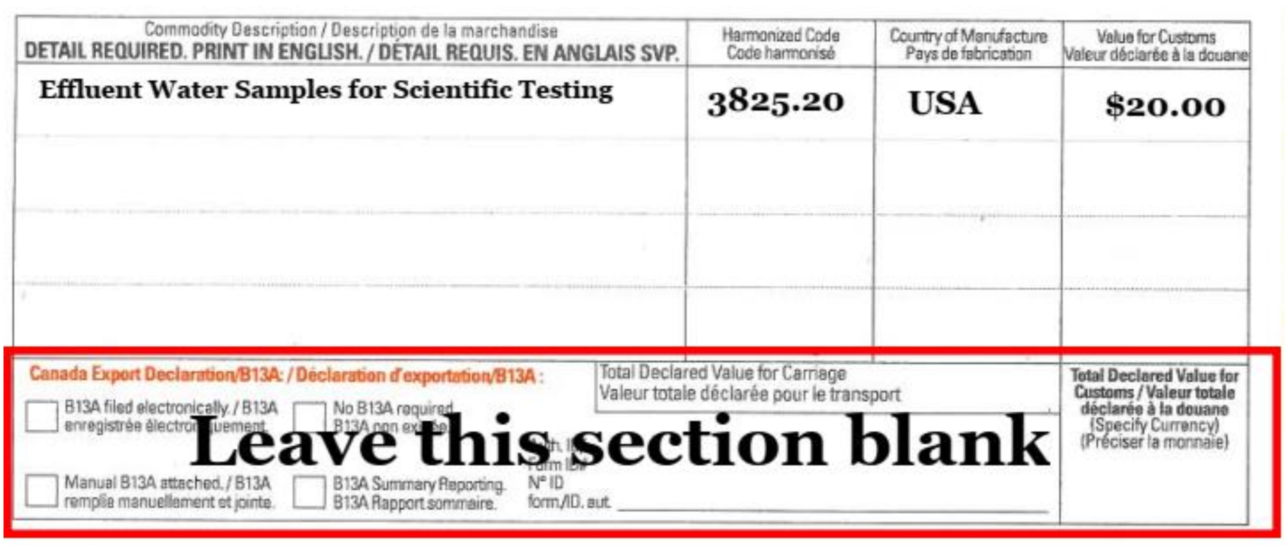
<u>Section 3: "Shipment Information"</u>

Enter total number of packages, total weight, and dimensions. Don't enter any declared value.

- Enter the approximate dimensions in the dimensions section.
- Commodity description can be taken from the commercial invoice. See example for 4 effluent samples below.
- Use Harmonized Sales Code **provided on commercial invoice.**
- Country of Manufacture is the USA.
- Enter the total customs value. Use a nominal value of $5.00 per bottle.

Note, Canada Export Declaration is not applicable. Leave this section blank.

Example:



Commodity Description / Description de la marchandise DETAIL REQUIRED. PRINT IN ENGLISH. / DÉTAIL REQUIS. EN ANGLAIS SVP.	Harmonized Code Code harmonisé	Country of Manufacture Pays de fabrication	Value for Customs Valeur déclarée à la douane
Effluent Water Samples for Scientific Testing	3825.20	USA	$20.00

Section 4: "Express Package Service"

- Select "**FedEx International Priority**",

Section 5: "Packaging"

- Select "Other" and write "cooler".

Section 6: "Special Handling and Delivery options"

- Select "Direct Signature"

Section 7: "Payment"

Bill transportation charges to:

- Select "Sender" and fill in your FedEx account number.

Bill Customs charges to:

- Select "Recipient"

Section 8: "Required Signature"

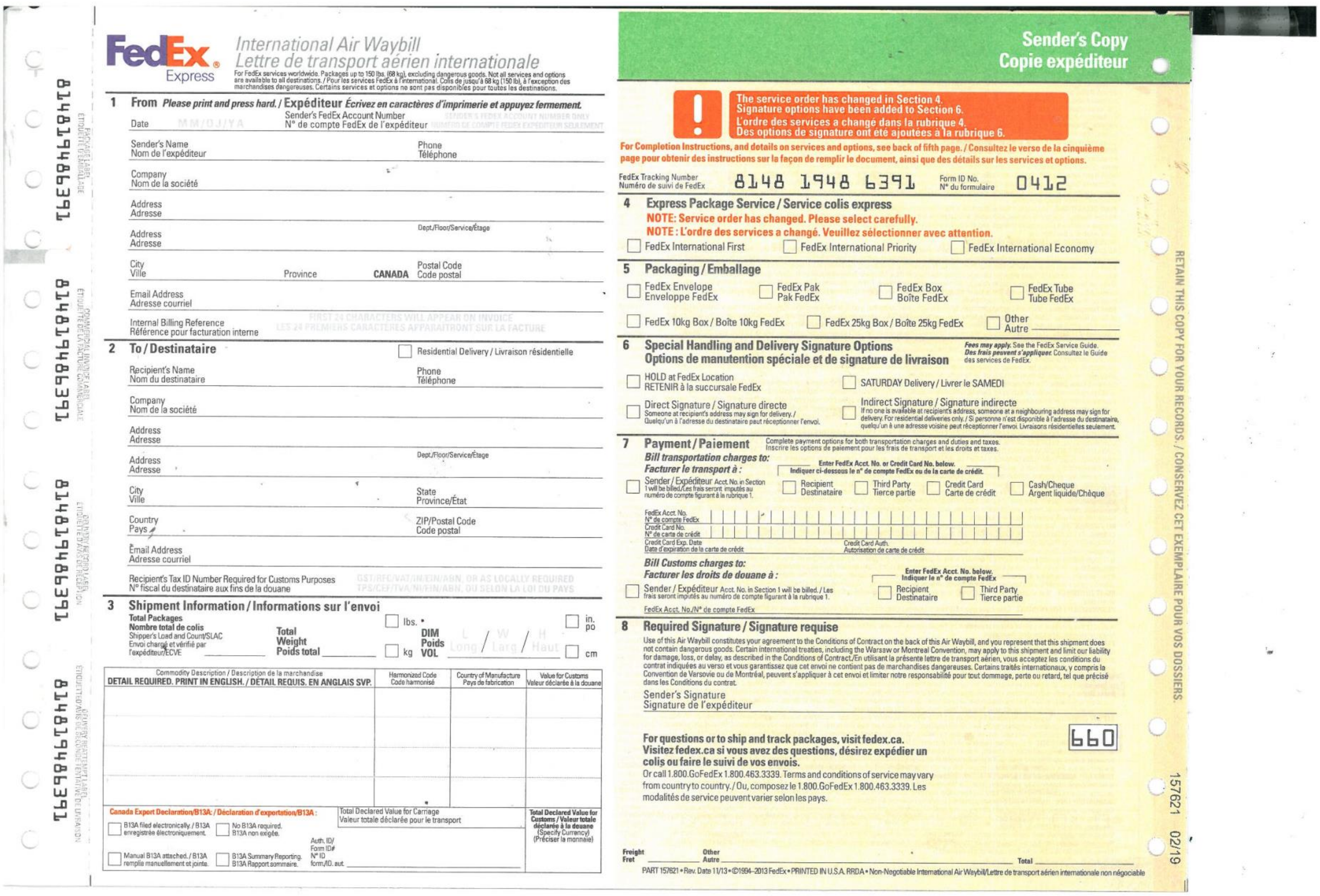
Sign your name

SHIPPING DATE

Please do not ship later than Wednesday afternoon to ensure that if there is delays samples are not sitting over the weekend.

Should you have any questions/concerns regarding the completion of the shipping documentation or packaging of samples, please contact your dedicated SGS AXYS Project Manager.

EXAMPLE FEDEX WAYBILL



FedEx Express — International Air Waybill / Lettre de transport aérien internationale

Sender's Copy / Copie expéditeur

The service order has changed in Section 4. Signature options have been added to Section 6.
L'ordre des services a changé dans la rubrique 4. Des options de signature ont été ajoutées à la rubrique 6.

FedEx Tracking Number / Numéro de suivi de FedEx: 8148 1948 6391 — Form ID No. / N° du formulaire: 0412

1 From / Expéditeur — Date; Sender's FedEx Account Number / N° de compte FedEx de l'expéditeur; Sender's Name / Nom de l'expéditeur; Phone / Téléphone; Company / Nom de la société; Address / Adresse; Dept./Floor/Service/Étage; City / Ville; Province; CANADA; Postal Code / Code postal; Email Address / Adresse courriel; Internal Billing Reference / Référence pour facturation interne

2 To / Destinataire — Residential Delivery / Livraison résidentielle; Recipient's Name / Nom du destinataire; Phone / Téléphone; Company / Nom de la société; Address / Adresse; City / Ville; State / Province/État; Country / Pays; ZIP/Postal Code / Code postal; Email Address / Adresse courriel; Recipient's Tax ID Number Required for Customs Purposes / N° fiscal du destinataire aux fins de la douane

3 Shipment Information / Informations sur l'envoi — Total Packages / Nombre total de colis; Total Weight / Poids total; DIM Poids VOL; lbs. / kg; in. / cm

Commodity Description / Description de la marchandise — DETAIL REQUIRED. PRINT IN ENGLISH. / DETAIL REQUIS. EN ANGLAIS SVP.	Harmonized Code / Code harmonisé	Country of Manufacture / Pays de fabrication	Value for Customs / Valeur déclarée à la douane

Canada Export Declaration/B13A / Déclaration d'exportation/B13A: B13A filed electronically; No B13A required; Manual B13A attached; B13A Summary Reporting. Total Declared Value for Carriage / Valeur totale déclarée pour le transport. Total Declared Value for Customs / Valeur totale déclarée à la douane (Specify Currency) / (Préciser la monnaie)

4 Express Package Service / Service colis express — FedEx International First; FedEx International Priority; FedEx International Economy

5 Packaging / Emballage — FedEx Envelope / Enveloppe FedEx; FedEx Pak / Pak FedEx; FedEx Box / Boîte FedEx; FedEx Tube / Tube FedEx; FedEx 10kg Box / Boîte 10kg FedEx; FedEx 25kg Box / Boîte 25kg FedEx; Other / Autre

6 Special Handling and Delivery Signature Options / Options de manutention spéciale et de signature de livraison — HOLD at FedEx Location / RETENIR à la succursale FedEx; SATURDAY Delivery / Livrer le SAMEDI; Direct Signature / Signature directe; Indirect Signature / Signature indirecte

7 Payment / Paiement — Bill transportation charges to / Facturer le transport à: Sender / Expéditeur; Recipient / Destinataire; Third Party / Tierce partie; Credit Card / Carte de crédit; Cash/Cheque / Argent liquide/Chèque. Bill Customs charges to / Facturer les droits de douane à: Sender / Expéditeur; Recipient / Destinataire; Third Party / Tierce partie

8 Required Signature / Signature requise — Sender's Signature / Signature de l'expéditeur

For questions or to ship and track packages, visit fedex.ca. Visitez fedex.ca si vous avez des questions, désirez expédier un colis ou faire le suivi de vos envois. Or call 1.800.GoFedEx 1.800.463.3339.

RETAIN THIS COPY FOR YOUR RECORDS. / CONSERVEZ CET EXEMPLAIRE POUR VOS DOSSIERS.

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Appendix E: AOF Reporting Limit