Prepared for

The Boeing Company
Santa Susana Site
5800 Woolsey Canyon Road
Canoga Park, California, 91304-1148

Santa Susana Field Laboratory

Site-Wide Stormwater Annual Report

2020/21 Reporting Year

Prepared by

The Surface Water Expert Panel

and

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engineers | scientists | innovators

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Abbreviations

CASQA	California Stormwater Quality Association
CM	Culvert Modification
COC	Constituent of Concern
DMR	Discharge Monitoring Report
DNQ	Detected not Quantified
DOE	Department of Energy
DTSC	Department of Toxic Substances Control
ELV	Expendable Launch Vehicle
GETS	Groundwater Extraction and Treatment System
ISRA	Interim Source Removal Action
LARWQCB	Los Angeles Regional Water Quality Control Board
LOE	Line of Evidence
LOX	Liquid Oxygen Plant
mg	milligram
µg/L	micrograms per liter
NASA	National Aeronautics and Space Administration
ND	Northern Drainage
NPDES	National Pollutant Discharge Elimination System
OF	Outfall
PL	Permit Effluent Limit
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Feasibility Investigation
RMHF	Radioactive Materials Handling Facility
RMMP	Restoration, Mitigation, and Monitoring Plan
SAP	Sampling and Analysis Plan
SSFL	Santa Susana Field Laboratory
SWPPP	Stormwater Pollution Prevention Plan
SWTS	Stormwater Conveyance and Treatment System
TCDD	Tetrachlorodibenzo-*p*-dioxin
TEQ	Toxic Equivalence
TSS	Total Suspended Solid

1 Introduction

The Santa Susana Field Laboratory (SSFL) occupies approximately 2,850 acres and is located at the top of Woolsey Canyon Road in the Simi Hills of Ventura County, California. During wet weather, the SSFL has the potential to discharge stormwater runoff impacted by constituents from the facility. As such, discharges from SSFL are currently regulated by the Los Angeles Regional Water Quality Control Board (LARWQCB) under *National Pollutant Discharge Elimination System (NPDES) Permit No. CA0001309 for the Boeing Company, SSFL, Canoga Park, CA, Order No. R4-2015-0033* ("2015 Permit") (LARWQCB, 2015). The 2015 Permit[1] became effective on April 1, 2015, and states the following:

> *"The Discharger has agreed to maintain the Surface Water Expert Panel. With input from the Surface Water Expert Panel, the Discharger shall submit annual reports that describe the previous year's monitoring results, evaluation of existing BMP performance, and submit a workplan that includes recommendations for modified and/or new storm water controls and monitoring that will address exceedances from any Outfall addressed by this Permit. The Discharger shall also support the Surface Water Expert Panel in organizing periodic public interaction events and encouraging public communication involvement. The first annual report shall be due within 6 months of the effective date of this Permit [October 1, 2015]."*

The *Site-Wide Stormwater Work Plan and 2014/15 Annual Report* ("2015 Work Plan") (Santa Susana Surface Water Expert Panel and Geosyntec Consultants, 2015a) was intended to meet this requirement. This 2020/21 Annual Report is intended to meet the commitments outlined in the 2015 Work Plan. The existing Work Plan and Permit will govern until a new Permit is issued and effective. This report focuses on the results and findings of the 2020/21 reporting year, covering the June 1, 2020 to May 31, 2021 period.

1.1 Background

The SSFL (the "site") is jointly owned by the Boeing Company (Boeing) and the federal government. The National Aeronautics and Space Administration (NASA) administers the portion of the property owned by the federal government. As shown in Figure 1, the site is divided into four administrative areas (Areas I, II, III, and IV) with undeveloped land areas to both the north and south. Administrative Areas I and III are operated by Boeing, which owns the majority of Area I and all of Area III. A portion of Area I (40 acres) and all of Area II are owned by the federal government and are administered by NASA. Boeing and predecessor contractors performed work at the Department of Energy (DOE) ETEC (Energy Technology Engineering Center) site in Area IV at Santa Susana Field Laboratory prior to the 1998 Department of Energy remediation contract with Boeing. While the land in Area IV is owned by Boeing, the Department of Energy is responsible for the cleanup. Boeing no longer serves as the Department of Energy's contractor. DOE owns specific facilities located on approximately 90 acres of Area IV. Industrial operations at the SSFL have ceased; current activities at the site include environmental monitoring and sampling, demolition, and remediation planning. The site also provides exceptional wildlife habitat and undeveloped land (open space).

[1] Prior to April 1, 2015 this site was regulated since 2010 under the *National Pollutant Discharge Elimination System (NPDES) Permit No. CA0001309 for the Boeing Company, SSFL, Canoga Park, CA, Order No. R4-2010-0090* ("2010 Permit")

Stormwater discharges[2] from the SSFL are typically captured and treated upstream of, or at, the outfalls, up to a design storm size. An exception to this Outfall-based treatment approach is at Outfalls 001 and 002 in the southern undeveloped land, where stormwater runoff consists of runoff from undeveloped areas with no or minimal history of industrial activity or known surface soil contamination, as well as treated stormwater from Outfalls 011 and 018, respectively. Runoff to Outfalls 001 and 002, downstream of Outfalls 011 and 018, is discharged without additional treatment. Another exception to this is at Outfalls 008 and 009, where the stormwater quality management strategy instead combines distributed source controls with natural treatment systems due to the challenge of treating stormwater at these canyon outfalls (i.e., Outfall-based treatment would require construction of large dams with substantial environmental impact and potential risk to the public downstream). At Outfalls 008 and 009, Interim Source Removal Action (ISRA) and Best Management Practices (BMP) programs were implemented beginning in 2009 with oversight and participation of the LARWQCB to improve compliance with the 2010 Permit limits through the dual approach of remediation of surface soils that are above defined thresholds for NPDES constituents of concern, and through distributed control and/or treatment of stormwater runoff from prioritized subareas, respectively. The BMP Plan for the Outfall 008 and 009 Watersheds (MWH et al., 2010) ("2010 BMP Plan") was developed under the oversight of the Surface Water Expert Panel (referred to herein as the "SWEP" or "Expert Panel"). The 2015 Work Plan replaced the 2010 BMP Plan, provides an overall strategy for improving NPDES compliance for stormwater discharges site-wide and continues the important process of public outreach and engagement on stormwater issues.

The Surface Water Expert Panel -- consisting of Dr. Robert Pitt (University of Alabama), Dr. Robert Gearheart (Humboldt State University), Dr. Michael Stenstrom (University of California Los Angeles), Dr. Michael Josselyn (WRA Environmental Consultants), and Jonathan Jones (Wright Water Engineers) -- continues to oversee stormwater planning and design work at the SSFL, as well as provide input on monitoring, source removal activities and other NPDES Permit issues. The Surface Water Expert Panel also oversees scientific studies related to SSFL stormwater quality issues and BMP design, reviewed the stormwater Human Health Risk Assessment (HHRA), and interfaces with the public on SSFL stormwater activities and related considerations. Their original mission, to improve stormwater at NPDES Outfalls 008 and 009, was expanded through the 2015 Work Plan to include all NPDES Outfalls as required through the 2015 Permit. This year, as in recent previous years, the Surface Water Expert Panel also reviewed the Quarterly Discharge Monitoring Reports (DMRs) and federal government construction SWPPPs, providing comments and perspective on these plans.

1.2 Site Overview

The outfalls regulated under the 2015 NPDES Permit are listed in Table 1 and depicted in Figure 1. The NPDES Permit states that 60% of the annual stormwater discharge from SSFL exits the property via two southerly discharge points (Outfalls 001 and 002) to Bell Creek, a tributary to the Los Angeles River. Upstream Outfalls that contribute to the discharge at Outfalls 001 and 002 include Outfalls 011 and 018. Outfall 019 is Permitted for the injection of treated groundwater, but not planned for the discharge of surface water. Outfall 020, while included in the NPDES Permit, is also not planned for the discharge of surface water. The Surface Water Expert Panel's scope does not include groundwater, unless

[2] Treated groundwater discharges are also covered in the 2015 Permit, however, the 2015 Work Plan scope is limited to stormwater discharges.

groundwater is known to comingle with stormwater and potentially contribute constituents of concern to the NPDES Outfalls. A separate Groundwater Expert Panel is active at SSFL and oversees Boeing related groundwater tasks, including addressing treated groundwater discharge and naturally occurring seeps and springs.

Stormwater from the northern areas of the site is transferred to Silvernale Pond for treatment prior to discharge at Outfall 018. Higher flows, beyond the storage/transfer system capacity, discharge at Outfalls 003 through 007 and 010. At Outfalls 011 and 018, stormwater conveyance and treatment systems (SWTSs) have been in place since 2012 for advanced treatment using ActiFlo coagulation and filtration systems which are pretreated by sedimentation and flow equalization in ponds. However, the SWTS at Outfall 011 has had periods where operations lapsed during its lifetime. Because of the location, size, and terrain of the Outfall 008 and 009 watersheds, coupled with the inability to practically store large amounts of stormwater in these watersheds, flows from these areas are not captured and treated by the SWTSs[3], and instead a distributed stormwater treatment and iterative (or adaptive management-based) approach is employed in both the Outfall 008 and 009 watersheds, as described in the 2010 BMP Plan. Thus, Outfall 009 naturally flows to Arroyo Simi, which subsequently flows to Calleguas Creek, and stormwater runoff from Happy Valley (Outfall 008) naturally flows via Dayton Canyon Creek to Chatsworth Creek. Chatsworth Creek flows south to Bell Creek southwest of the intersection of Shoup Avenue and Sherman Way. Bell Creek subsequently flows southeast to the Los Angeles River.

Table 1. NPDES Outfall Descriptions

Outfall*	Status/Discharge Description
001	Downstream of Outfall 011; discharge to Bell Creek
002	Downstream of Outfall 018; discharge to Bell Creek
003	Runoff transferred to Silvernale for treatment prior to discharge at Outfall 018[4]
004	Runoff transferred to Silvernale for treatment prior to discharge at Outfall 018[4]
005	Runoff transferred to Silvernale for treatment prior to discharge at Outfall 018[4]
006	Runoff transferred to Silvernale for treatment prior to discharge at Outfall 018[4]
007	Runoff transferred to Silvernale for treatment prior to discharge at Outfall 018[4]
008	Stormwater from Happy Valley; discharge to Dayton Creek
009	Stormwater from Northern Drainage; discharge to Arroyo Simi
010	Runoff transferred to Silvernale for treatment prior to discharge at Outfall 018[4]
011	Stormwater and perimeter pond (treated at Stormwater Treatment System [SWTS]); discharge to Outfall 001
018	Stormwater and R-2 pond (treated at SWTS); discharge to Outfall 002
019	Injection of treated groundwater (GET System); no surface discharge
020	Not planned for use; injection of treated groundwater (GET System); no surface discharge

*Outfalls 012 through 017 were excluded from the 2015 Permit

[3] An exception to this is at the helipad, located in Area II in the Outfall 009 watershed, where some runoff is captured and piped to Silvernale Pond for treatment in the Outfall 018 SWTS.

[4] If storage and transfer capacities to Silvernale are exceeded, stormwater runoff is treated in media filters at each individual Outfall before discharging to Calleguas Creek tributaries.

DRAINAGE TO MEIER CANYON

DRAINAGE TO ARROYO SIMI

AREA I (NASA)

AREA I

AREA II (NASA)

AREA III

AREA IV

OUTFALL 018 WATER TREATMENT SYSTEM

OUTFALL 011 WATER TREATMENT SYSTEM

Silvernale Pond

R-2B Pond

R-2A Pond

Coca Pond

Perimeter Pond

DRAINAGE TO DAYTON CANYON

UNDEVELOPED LAND

DRAINAGE TO BELL CANYON

DESCRIPTIONS OF DISCHARGE OUTFALL LOCATIONS

NPDES OUTFALL	DESCRIPTION	PRIMARY OVERSIGHT AGENCY
001	Stormwater, South Slope	RWQCB
002	Stormwater, South Slope	RWQCB
003	Stormwater, Radioactive Material Handling Facility	RWQCB
004	Stormwater, Sodium Reactor Experiment Area	RWQCB
005	Stormwater, Sodium Burn Pit 1	RWQCB
006	Stormwater, Sodium Burn Pit 2	RWQCB
007	Stormwater, Building 100	RWQCB
008	Stormwater, Happy Valley	RWQCB
009	Stormwater, WS-13 Drainage (Northern Drainage)	RWQCB
010	Stormwater, Building 203	RWQCB
011	Stormwater, Perimeter Pond (Treated at SWTS)	RWQCB
012	Stormwater, Alfa Test Stand (Removed from permit)	RWQCB
013	Stormwater, Bravo Test Stand (Removed from permit)	RWQCB
014	Stormwater, Advanced Propulsion Test Facility (Removed from permit)	RWQCB
015	STP-1 (Removed from permit)	--
016	STP-2 (Removed from permit)	--
017	STP-3 (Removed from permit)	--
018	Stormwater, R-2 Pond Spillway (Treated at SWTS)	RWQCB
019	Treated Groundwater (GET System)	RWQCB
020	Not planned for use	RWQCB

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. MAP COORDINATES IN STATE PLANE NAD 27, ZONE V.

LEGEND

- FORMER NPDES OUTFALL LOCATION
- NPDES OUTFALL LOCATION
- POSSIBLE FUTURE NPDES OUTFALL LOCATION
- GROUNDWATER EXTRACTION TREATMENT (GET) SYSTEM
- SSFL PROPERTY BOUNDARY
- ADMINISTRATIVE AREA BOUNDARY
- EXISTING BUILDING/STRUCTURE
- STORMWATER TREATMENT SYSTEM
- DIRT ROAD
- 25' ELEVATION CONTOUR
- SURFACE WATER DIVIDE
- NATURAL DRAINAGE
- EFFLUENT PATHWAY
- SURFACE WATER POND

N

0 1,200 2,400

SCALE IN FEET

HALEY ALDRICH

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

SITE MAP WITH DRAINAGES, DRAINAGE AREAS, OUTFALL LOCATIONS, AND SURFACE WATER BODIES

FIGURE 1

GIS FILE PATH: G:\40458_SSFL\Global\GIS\MapProjects\2016-10\40458-091-001-SiteMap.mxd — USER: gkm — LAST SAVED: 10/19/2016 11:17:24 AM

1.3 Existing Stormwater Treatment

BMPs have been implemented throughout the site to treat stormwater prior to discharge. The major structural treatment BMPs (i.e., excluding site-wide erosion and sediment controls, unpaved road control measures, and demolition of buildings and paved areas with subsequent soil scarification and revegetation) are summarized in the *ISRA Performance Monitoring and BMP Monitoring for the Outfalls 008 and 009 Watersheds, 2014/2015 Rainy Season* ("2015 Annual Report for Outfalls 008 and 009") (MWH *et al.*, 2015), the 2015 BMP Plan (Haley & Aldrich, 2015), and subsequent Annual Reports, and include the following (see Figure 2 for photos of each), by completion date:

- 2009: Outfall 009 Culvert Modifications (CMs)
- 2010: Outfall 008 ISRA Excavations
- 2011: Outfall 009 Helipad Berms and Pumps
- 2011: Outfall 011 Stormwater Conveyance and Treatment System (SWTS)
- 2011: Outfall 018 Stormwater Conveyance and Treatment System (SWTS)
- 2012: Outfall 009 B-1 Sedimentation Basin and Media Filter
- 2012: Outfall 009 Northern Drainage Restoration Measures
- 2012: Outfall 009 CM-9 Additional Improvements
- 2013: Outfall 009 Lower Parking Lot Sedimentation Basin and Biofilter
- 2013: Outfall 009 ISRA Excavations
- 2013: Outfall 009 ELV Treatment BMP[5]
- 2013: Outfall 009 LOX Sandbag Berms and Slope Drains
- 2015: Outfall 009 B1436 Detention Bioswales
- 2017: Outfall 009 Wattles added around Poles along Roads
- 2017: Outfall 009 Upper Parking Lot Media Filter
- 2017: Outfall 009 Roadway Diversion to CM-3
- 2017: Outfall 009 Administration Area Inlet Filters
- 2017: Outfall 009 Enhanced Erosion Controls in the Former Shooting Range Area
- 2017: Outfall 009 Roadway Diversion to CM-1
- 2018: Outfall 009 CM-1 Reconstruction
- 2019: Outfall 009 Mulch Sack Curb Extension in Lower Parking Lot
- 2019: Area II Utility Pole vegetation clearing and soil base stabilization
- 2020: Outfall 009 ELV and Biofilter Cistern Generators Added
- 2020: Outfall 009 CM-3 Check Dams Added and Media Filter Reconstruction
- 2020: Southern Buffer Zone Utility Pole BMPs
- 2021: Outfall 009 ELV Treatment BMP Media Filter Underdrain Layer Reconstruction

In addition, there has been extensive use of erosion and sediment control BMPs, revegetation, stabilization of repaved roads, and other activities to stabilize soil. Impervious surfaces, such as

[5] ELV Treatment BMP was not operational in the 2018/19 reporting year due to the Woolsey Fire burning the power supply connection. A generator was purchased and was installed in September 2019, so it was operational for the 2019/20 reporting year.

buildings and parking lots, have also been removed across the site and "disconnected" from one another, restoring those sites to more natural conditions.

Stormwater from Outfall 011 is pumped to a storage pond for settling and evaporation and, when runoff volumes are anticipated to exceed the pond storage capacity, stored stormwater is treated using an advanced treatment system. The treated stormwater then flows to Outfall 001. However, in November of 2018 the conveyance pipelines burned in the Woolsey wildfire. The OF011 SWTS was not operational in the following 2018/19 season, with flows from Outfall 011 instead treated only by the flow-through media filter at the Outfall. The OF011 SWTS was repaired in late 2019 and was operational prior to the first storm event of the 2019/20 season. All stormwater (up to a certain size design storm event that varies by Outfall based on site-specific pumping and storage capacities) from Outfalls 003, 004, 005, 006, 007, 009[6], and 010 is pumped to the Silvernale Pond for eventual treatment at the Outfall 018 SWTS and treated along with flows from the Outfall 018 watershed. The SWTS has been highly effective at reducing exceedances.

The various distributed BMPs in the Outfall 009 watershed (e.g., widespread revegetation, erosion and sediment controls, natural treatment BMPs) have also been effective at reducing the concentrations of the constituents of concern (COCs) in the watershed's stormwater. In general, the statistical evaluation of influent versus effluent BMP performance sample results included in this Annual Report indicate that significant COC load removals are occurring in these subareas, particularly for BMP influent samples that are above Permit Limits. Additionally, there was stabilization and ongoing inspections of the Northern Drainage, the primary stormwater conveyance in Outfall 009 watershed.

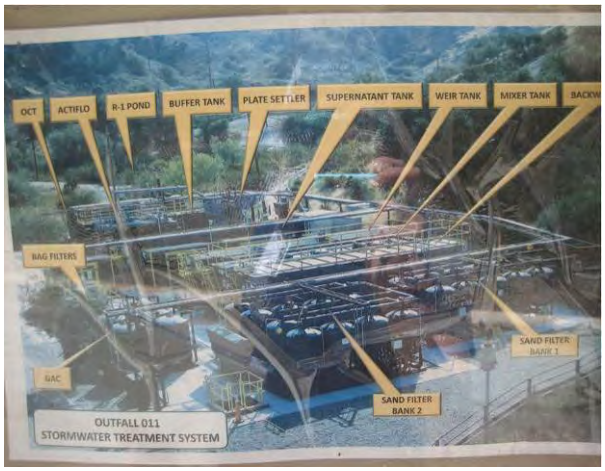
Limited runoff has occurred at Outfall 008 since the completion of ISRA activities (the identification, evaluation, remediation or stabilization, and restoration of areas of contaminated soil containing COCs that may have contributed to exceedances of NPDES Permit limits in stormwater) and installation of new erosion and sediment controls, revegetation, and unpaved road stabilization in 2012. During the 2013-2018 period, only a total of four discharges occurred, each sampled and analyzed for approximately 60-200 parameters, and only three results were at concentrations above the 2015 Permit Limits. This outcome reflects positive performance of the ISRA soil removal activities, revegetation/restoration, and erosion controls targeting sediment-bound COCs. While the 2018/19 year had nine samples collected and 11 results at concentrations above the 2015 Permit Limits, this increase in runoff and exceedances is likely due to a combination of the above average rainfall and post-Woolsey wildfire conditions that decreased vegetative cover and accelerated runoff. In the 2019/20 year, there were only five samples collected and none had concentrations above the 2015 Permit Limits. There were no discharges in 2020/21 due to the low rainfall year. These results further demonstrate the effectiveness of the iterative and distributed BMP approach that has been employed in these watersheds.

[6] Stormwater runoff from a small area within the Outfall 009 watershed (helipad area) is pumped to the storage pond for treatment prior to being discharged from Outfall 018, while stormwater runoff from the remaining, vast majority of the watershed flows to Outfall 009.

2009: Culvert Modifications

2010: Outfall 008 Watershed ISRA Excavations

2011: Helipad Berms and Pumps



2011: Outfall 011 SWTS

2011: Outfall 018 SWTS

2012: B-1 Sedimentation Basin and Media Filter

2012: Northern Drainage Restoration Measures

2012: CM-9 Additional Improvements (Perforated Pipe, Extended Sedimentation Area and Rip Rap Berm)

2013: Lower Parking Lot Sedimentation Basin and Biofilter

2013: Outfall 009 Watershed ISRA Excavations

2013: ELV Treatment BMP

2013: LOX Sandbag Berms and Slope Drains

2015: B1436 Detention Bioswales

2017: Wattles around Poles along Roads

2017: Upper Parking Lot Media Filter

2017: Roadway Diversion to CM-3

2017: Administration Area Inlet Filters (Filter Basket)

2017: Administration Area Weighted Wattle and Riprap at Culvert Inlet

2017: Enhanced Erosion and Sediment Controls in Former Shooting Range Area

2017: Roadway Diversion to CM-1

2018: CM-1 Reconstruction Including Enlargement

2019: Mulch Sack Curb Extension in Lower Parking Lot

2019: Area II Utility Pole Vegetation Clearing and Soil Base Stabilization

2020: Outfall 009 CM-3 Check Dams Added and Filter Media Reconstruction

2020: Outfall 009 CM-3 Check Dams Added and Media Filter Reconstruction

2020: Southern Buffer Zone Utility Pole BMPs

2020: Outfall 009 ELV and Biofilter Cistern Generators Added

2021: Outfall 009 ELV Treatment BMP Media Filter Reconstruction

Figure 2. Photos of Example Structural BMPs and Years of Construction

1.4 Permit History

An overview of past SSFL stormwater Permits, Expert Panel involvement, and Permit limit and benchmark exceedances (compared to the 2015 Permit effluent limits/benchmarks) at the regulated Outfalls over the past 20 years is provided in Figure 4. The number of Permit limit and benchmark exceedances that occur each year are a function of Permit changes, annual rainfall, treatment BMPs and stormwater discharge avoidance strategies implemented, and natural variability of stormwater quality. Notable milestones shown in Figure 4 include:

- **1998 NPDES Permit:** NPDES Permit No. CA0001309 was issued to regulate wastewater and stormwater discharged from SSFL.
- **2004 NPDES Permit:** The 2004 Permit included new CTR-based effluent limits and added 11 new compliance monitoring locations. As a result for the increased regulation, the number of benchmark and Permit limit exceedances increased.

- **2005 Topanga wildfire**: Approximately 97% of SSFL was burned resulting in an increased number of Permit limit exceedances compared to reporting years with similar rainfall.
- **2006 NPDES Permit:** The 2004 Permit was revised to also include the waste load allocations (WLAs) from the applicable TMDLs for the downstream waterbodies.
- **2007 Cease and Desist Order (CDO):** Through the CDO, the RWQCB required "the assembly of a panel to review site conditions, modeled flow, contaminants of concern, and evaluate the BMPs capable of providing treatment to meet the final effluent limits." The CDO also required BMP planning, performance evaluation, and reporting requirements.
- **2010 NPDES Permit:** No major changes to Permit. The Expert Panel continued to make data-informed BMP recommendations in the Outfall 008 and 009 watersheds, which were implemented at SSFL (see Section 1.3).
- In 2011, following the construction of the Outfall 018 SWTS, stormwater from Outfalls 003 through 007 and 010 was retained in storage tanks and transferred to Silvernale Pond and the SWTS, reducing the number of discharges and opportunities for exceedances site-wide.
- **2015 NPDES Permit:** Permit expanded the Expert Panel's charge to all regulated SSFL Outfalls. In response, the Panel reviews Permit limit and benchmark exceedances for all Outfalls and makes data-driven BMP recommendations on a site-wide basis. In the 2015-2018 drought period, the number of Permit limit and benchmark exceedances fell compared to years with similar rainfall.
- **2018 Woolsey wildfire:** Approximately 80% of SSFL was burned and above-average rainfall was measured. Because of the hydrophobicity[7] of the soil and the loss of vegetative cover due to the wildfire event, rain events after the fire produced significantly greater amounts of runoff compared to similar sized rains during non-fire years. There were an increased number of benchmark and Permit limit exceedances in the year immediately following the wildfire compared to reporting years with similar rainfall, however, water quality recovered to typical non-wildfire levels in the following year.

1.5 Report Organization

This report is organized as follows:

- Section 2: Monitoring Activities
- Section 3: BMP Activities
- Section 4: Key Findings
- Section 5: Recommendations
- Section 6: Milestones/Schedule
- Section 7: References

[7] Soils that exhibit hydrophobicity cause water to collect on the soil surface rather than infiltrate into the ground. Wildfires generally cause soils to be hydrophobic temporarily, which increases water repellency, surface runoff and erosion at post-burn sites.

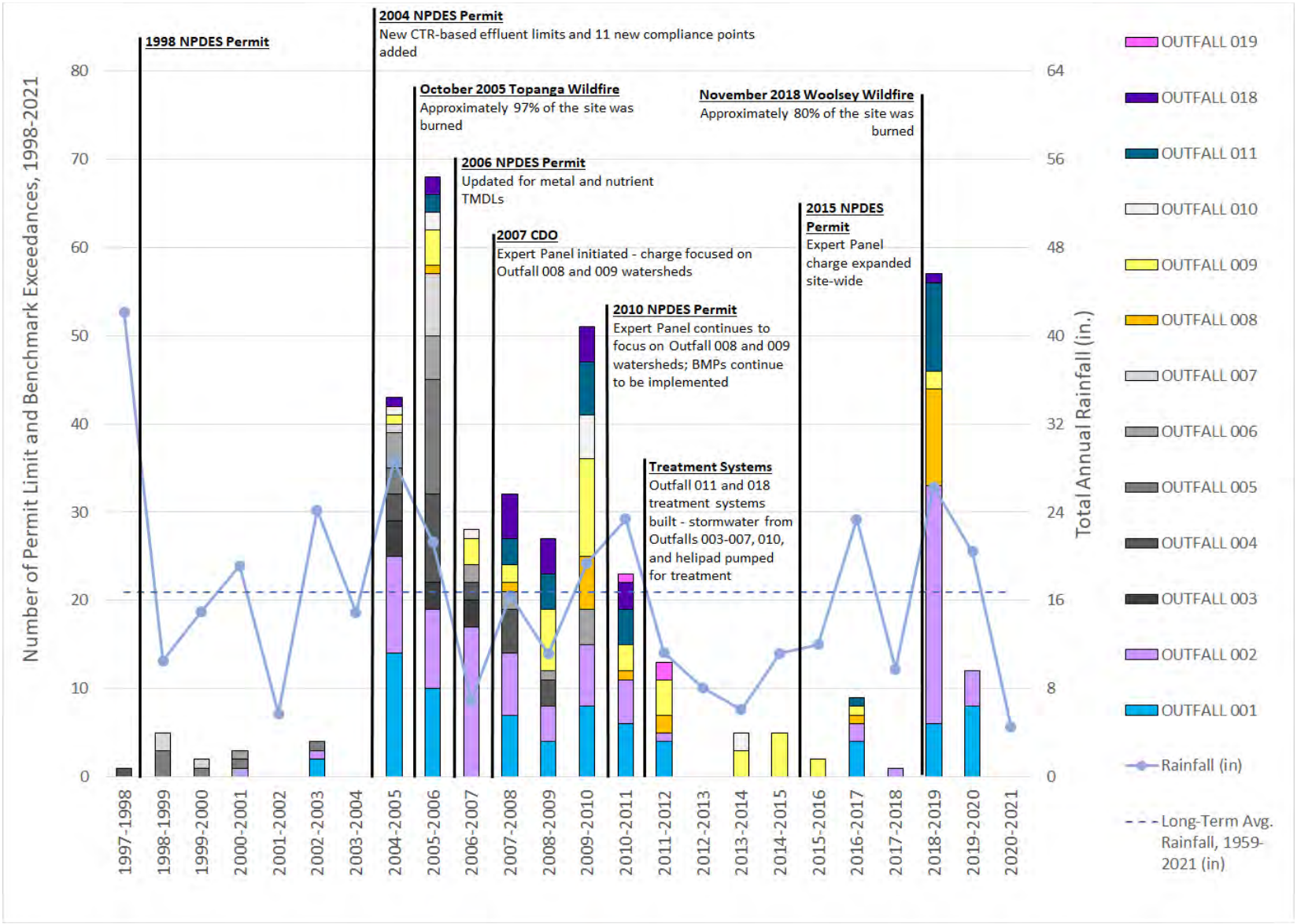


Figure 3. Summary of SSFL Permits, Surface Water Expert Panel Involvement, and Water Quality, 1998-2021

2 Monitoring Activities

This section describes the hydrologic characteristics of the past reporting year, as well as a summary of the results of stormwater samples collected at NPDES compliance Outfalls (in accordance with the 2015 NPDES Permit), BMP monitoring in the Outfall 009 watershed (in accordance with the 2018/19 Sampling and Analysis Plan [Stantec, 2018]), as well as a summary of monitoring activities conducted as part of the Northern Drainage assessment and the non-industrial sources special study (Santa Susana Surface Water Expert Panel and Geosyntec Consultants, 2015b).

2.1 2020/21 Rainfall

The long-term average annual rainfall at SSFL from 1959 to 2021 is 16.8 inches[8], primarily occurring as winter storms from October through March. Highly variable periods of above average and below average annual rainfall amounts are common. Little rainfall typically occurs during the April through September dry season. 4.54 inches of rainfall were measured in the 2020/21 reporting year (the reporting year is defined as June 1 – May 31). **This past season's rainfall was the lowest rain year in the 1959-2021 period of record and the only year in the 1998-2021 period of record without any stormwater discharge from the NPDES outfalls.** Five rain events (where a "rain event" is defined in the Permit as greater than 0.1 inches of rainfall in a 24-hour period and preceded by at least 72 hours of dry weather) occurred in the 2020/21 reporting year, with none of these storms producing observable flow at any Outfalls. For historical context, Table 2 summarizes the rainfall over the past twelve reporting years since submittal of the Surface Water Expert Panel Work Plan in 2010. Five of these twelve years have had above average rainfall.

Table 2. Historical Rainfall at SSFL, since 2010 Surface Water Expert Panel Work Plan

Reporting Year	Annual Rainfall	Percent of Average Annual Rainfall	Number of Rain Events
2020/21	4.54	27%	5
2019/20	**20.5**	**122%**	9
2018/19	**26.3**	**157%**	12
2017/18	9.8	58%	4
2016/17	**23.4**	**139%**	14
2015/16	12.0	71%	13
2014/15	11.2	67%	9
2013/14	6.1	36%	5
2012/13	8.1	48%	9
2011/12	11.3	67%	10
2010/11	**25.4**	**139%**	14
2009/10	**19.5**	**116%**	11

Above average annual rainfall amounts are **bolded**.

[8] Data from the Simi Hills – Rocketdyne Lab gauge (Ventura County Watershed Protection District site 249) was used to determine annual rainfall from 1958/59 through 2000/01. However, rainfall data are not available at this gauge from 1977/78 through 1984/85. Data from the Area 4 gauge (which was moved to Area 1 on January 1, 2013) were used to determine annual rainfall from 2001/02 through 2020/21. This results in a period of record of 55 years.

Table 3 summarizes the 2020/21 individual rainfall event characteristics, as well as the NPDES Outfalls sampled, and the number of watershed 009 BMP subarea monitoring samples. A total of 14 watershed BMP samples (collected at BMP performance, potential BMP subarea[9], and background locations) were collected in the 2020/21 reporting year. Figure 5 illustrates the cumulative rainfall and NPDES Outfall discharge samples collected during the 2020/21 reporting year.

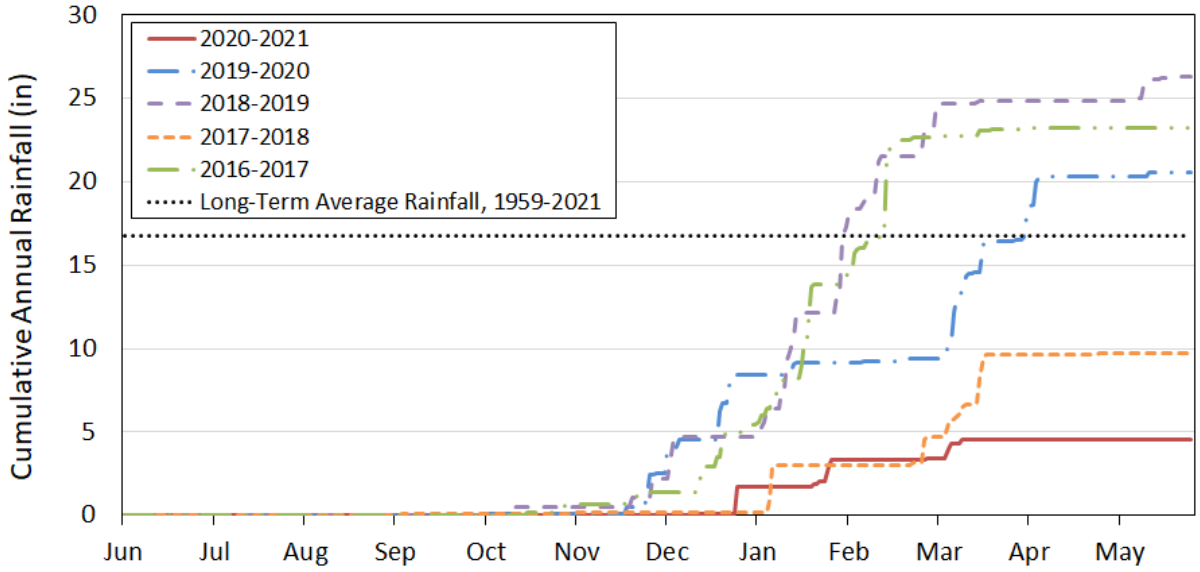


Figure 4. Annual Cumulative Rainfall, 2016-2021

The event with the highest total rainfall occurred December 27-29, 2020 (1.62-in), with a maximum rainfall intensity recurrence interval of less than 1-year across all durations (Figure 6). The next largest event occurred January 28-30, 2021 (1.32-in), which also had a maximum rainfall intensity recurrence interval of less than 1-year across all durations (Table 3 and Table 4).

Table 3. NOAA Point Precipitation Frequency Estimates for Event Intensity at SSFL

Average Recurrence Interval (years)	1	2	5	10	25	50
1- hr Precipitation Depth (in)	0.51	0.67	0.87	1.03	1.24	1.41
3- hr Precipitation Depth (in)	0.95	1.24	1.62	1.92	2.32	2.62
6- hr Precipitation Depth (in)	1.38	1.80	2.35	2.78	3.36	3.79
12- hr Precipitation Depth (in)	1.89	2.47	3.21	3.81	4.59	5.18
24- hr Precipitation Depth (in)	2.53	3.33	4.34	5.14	6.20	6.99

[9] "Potential BMP subarea monitoring locations" are defined here as drainage areas for stormwater runoff sampling points, and that include ISRA, RCRA Facility Investigation (RFI), and/or developed areas (i.e., buildings, parking lots, roads, etc.) so that impacted runoff quality might be expected and/or treatment BMPs might be necessary, pending an evaluation of the monitoring results.

Table 4. 2020/21 Reporting Year and Monitoring Event Summary

Rain Event	Total Rainfall[1]	Event Duration[1]	24-hr Recurrence Interval	Average Rainfall Intensity[1]	Maximum 1-Hour Rainfall Intensity[1]	Antecedent Dry Period[2]	NPDES Outfalls with Sampleable Discharge	Number of Outfall 009 Watershed BMP Subarea Monitoring Samples
	(in)	(hrs)	(years)	(in/hr)	(in/hr)	(days)		
12/28-29/2020	1.62	26	<1	0.06	0.28	224	None	None
1/23-25/2021	0.32	50	<1	0.0064	0.11	26	None	None
1/28-30/2021	1.32	33	<1	0.04	0.27	3	None	3
3/10-12/2021	0.94	51	<1	0.018	0.16	40	None	11
3/15/2021	0.21	5	<1	0.042	0.08	3	None	None
Non-Rain Event Total[3]	0.17	--	--	--	--	--	--	--
Total	**4.54**	--	--	--	--	--	**0 samples**	**14 samples**

[1] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a maintained and calibrated weather station within Area I.

[2] Antecedent dry period counted as the number of days between the start of the rain event and the last 24 hr period with at least 0.1 inches rainfall

[3] On the following seven days, rainfall was measured but was not considered a rain event per the NPDES Permit definition: October 21-22, 2020 (0.02"), November 7, 2020 (0.03"), December 14, 2020 (0.02"), March 3, 2021 (0.04"), April 25, 2021 (0.01"), and May 7, 2021 (0.01").

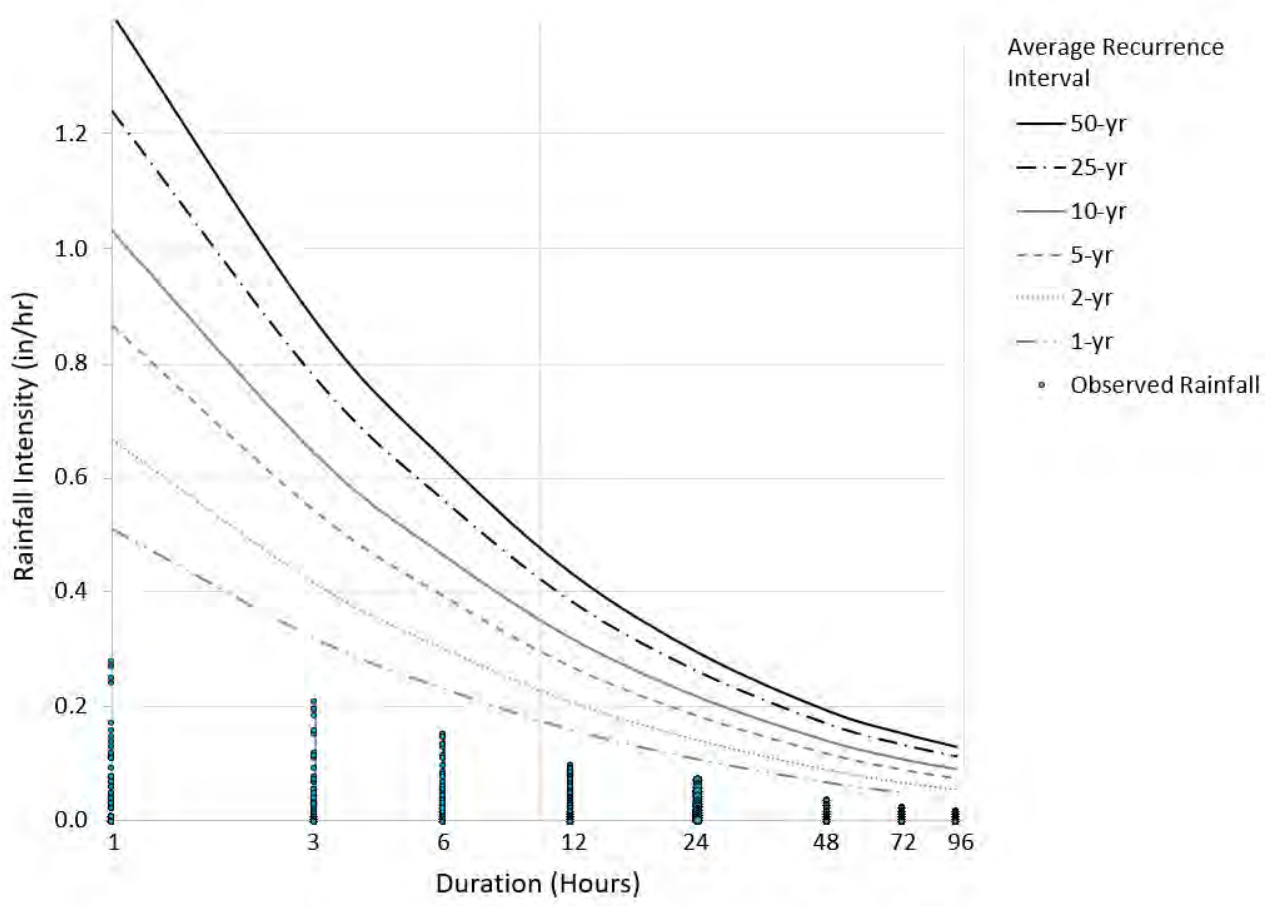


Figure 5. Observed Precipitation Intensities and Durations for 2020/21 Reporting Year, Area I Gauge, with NOAA Point Precipitation Frequency Estimates

Most site structural BMPs are designed to treat the 24-hr, 1-year recurrence interval storm (2.53 inches). Additionally, the rip rap placed in the Northern Drainage as grade control structures was sized to prevent movement during storms up to the 24-hr, 5-year event (4.34 inches). However, when back-to-back storms occur, even a storm smaller than the design storm can overwhelm the BMPs. This past season, however, the highest recorded 24-hour rainfall (1.61 inches on 12/28/2020) was below the design storm and no significant back-to-back events occurred; this helps to explain why no BMP overflow events were observed this season.

2.2 2020/21 Stormwater Sampling

During the 2020/21 rainy season, 14 BMP performance samples in the Outfall 009 watershed were collected. There was no discharge at the subarea locations in the Outfall 001 and 002 watersheds and no discharge at NPDES Outfalls. These sampling locations can be found in Appendix A and sampling results are discussed in the sections below.

2.2.1 NPDES Outfalls

SSFL Outfall discharges are monitored for water quality compliance with the 2015 NPDES Permit. This past reporting year experienced five rainfall events, all with relatively low rainfall intensities, resulting in no sampleable discharge (and thus no opportunities for Permit limit or benchmark exceedances) at any Outfalls in 2020/21. Additionally, no storms exceeded the Outfall 018 or 011 available pond capacities.

2.2.2 BMP Performance Monitoring

BMP performance monitoring is not required by the NPDES Permit. However, the Expert Panel has recommended that individual BMPs be monitored to assess their relative ability to remove stormwater COCs before they reach the Outfalls. BMP monitoring in the Outfall 009 watershed was conducted throughout the 2020/21 reporting year as outlined in the *2020/21 Rainy Season Sampling and Analysis Plan (SAP) Updates, Best Management Practice (BMP) Monitoring Program* ("2020/21 SAP") (Appendix A to this report) (HAI, 2020). This SAP is updated on an annual basis and will be updated again for the 2021/22 reporting year, as later discussed in Section 5.2.1.

This past reporting year, stormwater samples at BMP performance monitoring locations were collected in the Outfall 009 watershed. At the Panel's recommendation, sampling at the BMP performance locations was temporarily reduced to two samples per year until site activities increase as remediation is initiated. Sampling at the potential BMP subareas to identify additional distributed control locations was discontinued after the 2018/19 reporting year due to improved runoff quality at Outfall 009. No storms had a 24-hour rainfall depth that were above the design storm for the treatment controls in the Outfall 009 watershed, no bypass was observed in the Outfall 009 watershed structural BMPs. Table 7 summarizes the number of samples collected at each BMP monitoring location in the Outfall 009 watershed subareas, as well as the number of copper, lead, mercury, and dioxins results greater than the Outfall 009 Permit limits, for reference only as historical COCs, as the Permit limits and benchmarks only apply to the Outfall samples. A total of 14 samples were collected. Of these, seven were BMP influent samples, two were intermediate samples, and five were effluent samples. Of the influent samples, 29% (2 of 7), 29% (2 of 7), 0% (0 of 7), and 86% (6 of 7) of these samples had concentrations greater than the NPDES Outfall Permit limits for copper, lead, mercury, and dioxins, respectively. Focusing on the five fully treated (BMP effluent) samples, 0% (0 of 5), 0% (0 of 5), 0% (0 of 5), and 40% (2 of 5) of these samples had concentrations greater than the NPDES Permit limits for copper, lead, mercury, and dioxins, respectively.

A BMP Performance Analysis is conducted annually to evaluate the performance of existing treatment BMPs in the Outfall 009 watershed using statistical, temporal, and other data analysis approaches. The 2020/21 reporting year data have been incorporated into the BMP Performance Analysis dataset that was first established in December 2009. Out of many constituents analyzed at the performance monitoring sites, specific COCs were selected for the data analyses based on historical exceedances at Outfall 009, including total lead, total copper[10], and dioxins (TCDD TEQ no DNQ).

This year, as in previous years, the Surface Water Expert Panel has overseen and reviewed the BMP performance analysis and evaluated the results for any new BMP or monitoring recommendations. Initial analysis results were presented to the Surface Water Expert Panel in a meeting held August 18-19,

[10] Copper is not included as a pollutant of concern for the Outfall 009 watershed in the 2015 Expert Panel Work Plan. However, data for total copper are still presented in the paired line plots.

2021. The Surface Water Expert Panel received the draft BMP Performance Analysis report in September 2021 and the revised draft in October 2021. BMP and monitoring recommendations were developed based on their review of these results and incorporated into the recommendations found in Sections 5.1 and 5.2 of this report. The final report, *2020/21 BMP Performance Analysis, Santa Susana Field Laboratory* (Santa Susana Surface Water Expert Panel and Geosyntec Consultants, 2021b), is provided as Appendix D to this report. Key findings are discussed in Section 4 below.

In addition to the regular annual performance analysis, two peer-reviewed journal articles were published using the extensive BMP performance monitoring data collected at SSFL. The papers were both published in *Journal of Sustainable Water in the Built Environment* and are titled Laboratory Media Test Comparisons to Long-Term Performance of Biofilter and Media Filter Treatment-Train Stormwater Controls. Journal of Sustainable Water in the Built Environment (Pitt, et al., 2021) and Performance Changes during Long-Term Monitoring of Full-Scale Media Filter Stormwater Controls at an Industrial Site (Pitt, et al., 2022).

Table 5. Outfall 009 BMP Subarea Stormwater Monitoring Results, 2020/21 Reporting Year

Site	Type	Site Description	Number of Samples	Results Greater than OF009 Permit Limit (reference only, as limits apply to Permitted Outfall locations only)			
				Copper	Lead	Mercury	TCDD TEQ (no DNQ)
				(14 ug/L)	(5.2 ug/L)	(0.1 ug/L)	(2.8e-8 ug/L)
B1BMP0009	Influent	Upper lot media filter – road culvert influent	1	0	0	0	1
B1BMP0010	Influent	Upper lot media filter – parking lot influent	1	1	0	0	1
B1BMP0011	Effluent	Upper lot media filter – BMP effluent	1	0	0	0	1
ILBMP0004	Influent	Upstream 1 (B1436 Southern Detention Bioswale influent)	1	0	0	0	1
ILBMP0005	Effluent	Downstream (B1436 Southern Detention Bioswale effluent)	1	0	0	0	0
ILBMP0008	Influent	Upstream 2 (B1436 Southern Detention Bioswale influent)	1	1	1	0	1
ILBMP0009	Influent	Filter basket influent in the admin building area parking lot	1	0	1	0	1
ILBMP0010	Effluent	Filter basket effluent in the admin building area parking lot	1	0	0	0	1
LPBMP0002	Influent	Lower parking lot influent to cistern, before treatment	2	0	0	0	1
LPBMP0003	Intermediate	Lower parking lot sediment basin outlet, before treatment	2	0	0	0	1
LPBMP0004	Effluent	Lower parking lot biofilter outlet	2	1	0	0	0
SUBTOTALS BY SITE TYPE							
		BMP Influent	7	2	2	0	6
		BMP Intermediate	2	1	0	0	1
		BMP Effluent	5	0	0	0	2
		Background	0	0	0	0	0
TOTAL COUNT			**14**	**3**	**2**	**0**	**9**

2.2.3 Outfall 001 and Outfall 002 Subarea Monitoring

Beginning in the 2019/20 reporting year, to help investigate the cause of ongoing benchmark exceedances in the Outfall 001 and 002 watersheds, subarea samples were collected in these buffer zone watersheds to characterize runoff from both natural background and potentially impacted areas. However, due to the unusually dry year this past season, none of the six identified subarea sampling locations had sampleable flow in 2020/21. The Panel has recommended for the Southern Buffer Zone subarea sampling program to continue in the 2021/22 rainy season.

2.2.4 Demolition Subarea Monitoring

Subarea samples were collected in Outfall 003 watershed due to demolition of the Radioactive Materials Handling Facility (RMHF). Samples were collected before diverting to Silvernale to characterize runoff from the RMHF demolition area. Two samples were collected in accordance with the recommendation in the 2020 Annual Report and analyzed for metals, dioxins, radionuclides, and general water quality parameters. Results were compared against the NPDES Permit Limits for Outfall 003 and of the 67 parameters analyzed, copper, lead, zinc, and dioxins were detected above the Permit Limit in the first storm event and only zinc and was detected above the Permit Limit in the second storm event. The pH of both samples were below the defined Permit Limit range.

2.3 Northern Drainage Assessment

As identified in the *Northern Drainage Restoration, Mitigation, and Monitoring Plan* (RMMP) (Haley & Aldrich, 2011), recurring site investigations were performed annually along the Northern Drainage for a duration of five years (2011/12 to 2016/17).

Although the RMMP expired in 2017, a voluntary annual stream walk and inspection of in-channel erosion risk areas and sediment control conditions in the lower portion of the Outfall 009 drainage was conducted on June 10, 2021. No additional stabilization measures or maintenance activities are recommended at this time.

2.4 Outfall 009 Non-Industrial Sources Special Study

The 2015 Work Plan was developed in part to address periodic lead and dioxins exceedances (most recently in February 2017 and December 2018, respectively) at Outfall 009 despite the implementation of numerous BMPs in the upper watershed and to follow-up on previous findings that paved subareas had significantly higher stormwater concentrations of exceeding constituents than unpaved subareas (regardless of whether impacted soils were known to exist). The 2015 Work Plan posed the following questions as the basis for a non-industrial sources special study:

1. Where (spatially) within watershed 009 are dioxins and lead in stormwater predominantly coming from; and
2. What are the predominant sources of constituents in paved subareas -- e.g., pavement material itself (weathered or newly resurfaced), vehicles, treated wood poles, historic shooting range, and/or atmospheric deposition?

The Surface Water Expert Panel and Geosyntec developed the *Special Monitoring Studies for the 009 Watershed* ("Special Study Work Plan") (Santa Susana Surface Water Expert Panel and Geosyntec Consultants, 2015b), which proposed approaches to collect data to further investigate the causes and sources of dioxins and lead in stormwater at Outfall 009. The Expert Panel also recommended offsite

sampling and lead isotope sampling in the Northern Drainage during the 2018/19 reporting year. The Non-Industrial Sources Special Study was expanded again through recommendations in the 2018/19 Annual Report to include additional parameters and potential sources affecting stormwater quality in the Southern Buffer Zone. The frequency and samples dates of these programs are provided in Table 9. A summary report will be made available in 2022, after all monitoring activities have been completed and the results analyzed.

Table 6. Non-Industrial Sources Special Study – Monitoring Events, Planned and Completed

Activity	Event Frequency	Events Scoped	Events Completed	Completed Event Dates	
Atmospheric Deposition (2 sites)	Monthly	12	12	6/14/2016 7/14/2016 8/16/2016 9/16/2016 10/17/2016 11/15/2016	12/13/2016 3/14/2017 4/27/2017 5/31/2017 6/28/2017 7/31/2017
Pavement Solids (6 sites)	Quarterly	5	5	6/14-15/2016 7/28-29/2016 10/25-26/2017	3/13-14/2017 8/23-24/2017
Soils Near Treated Wood Poles (18 sites)	Single sampling event	1	1	5/11-12/2016	
Northern Drainage (ND) Stormwater	Storm-based	12	12	3/7/2016 (4 of 7 sites) 12/24/2016 (4 of 7) 1/9/2017 (4 of 7) 1/19/2017 (5 of 7) 2/4/2017 (6 of 7) 2/11/2017 (6 of 7)	2/17/2017 (7 of 7) 2/26/2017 (6 of 7) 3/22/2018 (5 of 6) 12/6/2018 (2 of 6) 2/18/2019 (6 of 6) 3/2/2019 (6 of 6)
Northern Drainage Sediments	Single sampling event	2	2	3/25-28/2016 (7 sites) 9/7/2017 (8 sites)	
Offsite Pavement Solids from Public Roads (3 sites)	Single sampling event	1	1	11/7/2018	
Offsite Stormwater Runoff from Public Roads (4 sites)	Single sampling event	3	3	3/2/2018 3/22/2018 1/14/2019	
Lead Isotope Study	Single sampling event	1 for solid samples 10 stormwater events	1 solid 6 stormwater	Shooting Range Soil: 8/27/2018 Background Soil: 8/28/2018 ND Sediment: 8/29-30/2018 Atmospheric Deposition: 10/2/2018 Pavement Solids: 10/2/2018 Lead Shot: 8/27/2018 Stormwater: 2/18/2019, 2/28/2019, 3/8/2019, 3/21/2019, 12/24/2019, 3/16/2020	
Core Sample of Treated Wood Poles (9 sites)	Single sampling event	1	1	10/6-7/2020	
Stormwater Runoff from Treated Wood Poles (3 pairs of upstream/ downstream sites)	Storm-based	2	0	No sampleable flow in the rainy season of 2020/21. Contingency sampling events are still being discussed for 2021/22	

Activity	Event Frequency	Events Scoped	Events Completed	Completed Event Dates
Southern Buffer Zone Soils Near Treated Wood Poles	Single sampling event	1	1	11/24/2020
Southern Buffer Zone Soils Near Metal Stakes	Single sampling event	1	1	11/23/2020
Southern Buffer Zone Gravel Road Solids	Single sampling event	1	1	11/23/2020

3 BMP Activities

The following sections summarize the construction and demolition activities conducted at SSFL, the BMP activities within each watershed (e.g., new BMPs, inspections, maintenance, etc.), and public involvement within the past year.

3.1 Demolition

DOE demolition activities of buildings in the Radioactive Materials Handling Facility (RMHF) area began in July 2020 and was completed in December 2020. Stormwater from this area was sampled as described in section 2.2.4. Demolition activities are covered by a separate Construction SWPPP which has been reviewed by the Surface Water Expert Panel.

3.2 New Activities/Maintenance

Outfall/BMP activities and maintenance conducted at SSFL during the past year (e.g., erosion, sediment control, and drainage stabilization inspections, removal of sediment and debris from Outfalls following extreme storm events, BMP repairs, etc.) are incorporated by reference through the following quarterly NPDES Discharge Monitoring Reports (DMRs):

- The Boeing Company, 2020a. *Third Quarter 2020 NPDES Discharge Monitoring Report, Compliance File CI-6027 and NPDES No. CA0001309, Santa Susana Field Laboratory, Ventura County, California.* November 15.
- The Boeing Company, 2020b. *Fourth Quarter 2020 NPDES Discharge Monitoring Report, Compliance File CI-6027 and NPDES No. CA0001309, Santa Susana Field Laboratory, Ventura County, California.* February 15.
- The Boeing Company, 2021a. *First Quarter 2021 NPDES Discharge Monitoring Report, Compliance File CI-6027 and NPDES No. CA0001309, Santa Susana Field Laboratory, Ventura County, California.* May 15.
- The Boeing Company, 2021b. *Second Quarter 2021 NPDES Discharge Monitoring Report, Compliance File CI-6027 and NPDES No. CA0001309, Santa Susana Field Laboratory, Ventura County, California.* August 15.

As recommended in the 2019/20 SSFL Site-Wide Stormwater Annual Report (Surface Water Expert Panel and Geosyntec, 202019), the following BMP maintenance, improvement, and monitoring actions were taken this past season:

- **Outfall 009 CM-9 continued to be monitored for signs of clogging:** The CM continues to perform well and has not yet exhibited signs of clogging, despite its long duration of operation and elevated accumulation of sediment (but still below critical levels).
- **Outfall 009 ELV media filter reconstruction:** The ELV system as-built plans were not available for review to determine the current design of the system, so the BMP was physically inspected. It was determined that the gravel underdrain layer should be retrofitted to better contain the filter media and prevent washout. The ELV media bed reconstruction was completed in September 2021 and is shown in Figure 9.

Figure 6. Reconstructed ELV Media Bed Showing Flow Distributing Geotextile on Top of Media

- **Outfall 009 CM-4 check dam reconstruction:** Riprap check dams were rebuilt upstream of CM-4 to capture sediment and debris before the CM and the riprap in the ponding area was replaced as shown in Figure 10.

Figure 7. Check dam and ponding area upstream of CM-4 before (left) and after (right) reconstruction

- **Maintained erosion control material stockpile as feasible:** The late-season timing of the Woolsey fire highlighted the importance of being able to implement erosion controls quickly before a storm event. A stockpile of control measures, such as wattles, are maintained and cycled through at the site so there is always a sufficient quantity of materials available if needed.

3.3 Public Involvement

Numerous stakeholder groups and members of the public have expressed interest in the stormwater issues at the SSFL at past public involvement activities and Regional Board hearings. To keep these groups and others apprised of progress, and provide an opportunity for public input, periodic public forum meetings and site tours have been held with the Surface Water Expert Panel since 2011 and throughout the duration of the 2015 Work Plan. Additionally, project status reports and submittal

documents have been posted on the Boeing project website after major project milestones and prior to public outreach meetings. Table 10 summarizes public involvement activities that have occurred since the 2010 BMP Plan (MWH et al., 2010). The most recent public meeting was hosted remotely, via Zoom, on August 19, 2021. Prior to the meeting, a survey was developed and distributed to the public to gauge topics of interest, which allowed the Surface Water Expert Panel to tailor the presentation content. The Surface Water Expert Panel presented on the 2020/21 rainfall and site monitoring activities, BMP performance, results from internal subarea stormwater monitoring, and responded to questions submitted by the public. Although site tours are typically planned as part of the public meeting, a public tour was not possible this year due to coronavirus restrictions on gatherings.

Table 7. Surface Water Expert Panel Public Involvement Activities, 2011-2021

Date	Activity
August 19, 2021	Public meeting (virtual)
August 11, 2020	Public meeting (virtual)
July 17 2019	Public meeting and SSFL tour
May 9, 2019	Presentation to LARWQCB
May 25, 2018	Public meeting and SSFL tour
August 17, 2017	DIPCON LA Conference SSFL tour
March 21, 2017	Public meeting and SSFL tour
November 19, 2014	Community Action Group meeting
March 20, 2013	Public meeting and SSFL tour
October 6, 2013	Public meeting and SSFL tour
August 25, 2011	Public meeting
January 22, 2011	Public meeting and SSFL tour

4 Key Findings

Data supporting the following key findings are provided in the analyses referenced above. The following findings significantly shape the BMP and monitoring recommendations presented in Section 5.

a. 2020/21 was an exceptionally dry year that did not produce stormwater discharges at the Outfalls.

Less frequent and intense storm activity in the 2020/21 reporting year as compared to the 2019/20 reporting year, in combination with the on-site stormwater control measures, resulted in no stormwater discharges (or Permit limit exceedances) at the Outfalls. Only 4.54 inches of rainfall fell at the site, which is well below the long-term annual average of 16.8 inches. 2020/21 was the driest year in the 55 years of rainfall records available at the site.

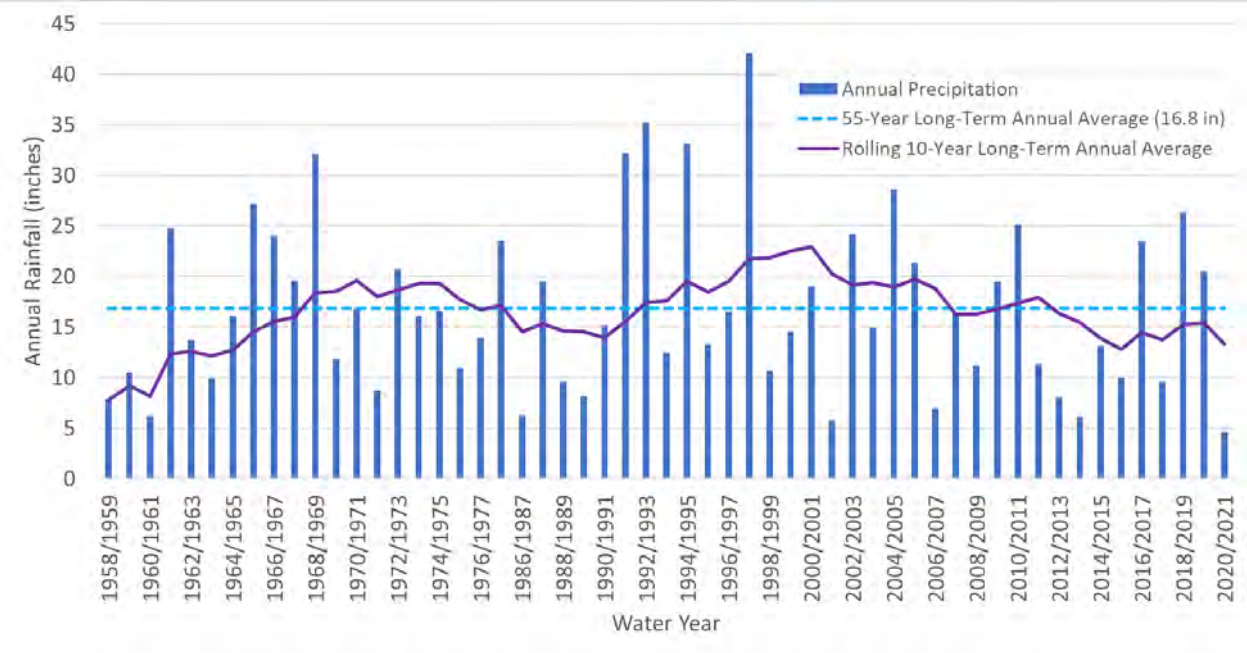


Figure 8. SSFL Long-Term Rainfall Record

b. The stormwater controls and SWTSs generally continue to be very effective across the site.

Performance monitoring of the distributed treatment controls in the 009 watershed demonstrates continued water quality improvement, which supports NPDES compliance at Outfall 009. This past reporting year, all BMP-COC combinations had the same or fewer effluent concentration results above Permit Limits compared to the influent concentrations. Historically, most grouped BMP-COC combinations also showed lower average and maximum exceedance ratios (i.e., exceeding sample concentrations divided by the Permit Limit) for effluent results compared to the influent results.

As shown in Tables 12-16, lead and dioxins reductions are observed for almost all BMP types, based on the percent change from BMP influent to effluent concentrations. The percent of influent samples greater than the Outfall Permit limit is less than or equal the percent of effluent samples greater than the Permit limits for both lead and dioxins for all BMPs, indicating an improvement in water quality between influent and effluent. For almost all BMP types the maximum and average ratios of observed concentrations to Permit limit, for results exceeding Permit limits, generally exhibit a higher ratio in influent than effluent, for both lead and dioxins. Two exceptions are the B-1 Media Filter (lead) and the Boeing Admin Area Inlet Filters (dioxins) where the maximum and average ratio of observed concentrations to the Permit limit show a higher ratio for effluent than influent samples, suggesting an increase in concentration through the inlet filter for the available data pairs. Overall, constituent loads are being reduced, both because concentrations are being reduced, and because runoff volumes are being reduced by upstream pavement and building removal and stormwater storage in BMPs.

Table 8. B-1, CM-1, CM-9, Upper Lot Media Filter, CM-3 [post 2017/2018] Influent and Effluent Concentrations Compared to the Outfall 009 Permit Limits, 2009-2021

BMP	Parameter	% of Samples Greater than Permit Limits		Maximum Exceedance Ratio (Exceeding Result: Permit Limit)		Average Exceedance Ratio (Exceeding Result: Permit Limit)	
		Influent	Effluent	Influent	Effluent	Influent	Effluent
B-1	Lead	35%	8.7%	1.8	1.7	1.3	1.5
	TCDD TEQ no DNQ	85%	68%	12,868	10	773	3.9
CM-1	Lead	31%	17%	11	7.5	3.9	3.0
	TCDD TEQ no DNQ	60%	48%	3,149	155	159	15
CM-9	Lead	41%	24%	11	6.9	4.2	2.9
	TCDD TEQ no DNQ	49%	22%	56	5.2	8.5	3.2
Upper Lot Media Filter	Lead	12%	0%	1.2	N/A[1]	1.1	N/A[1]
	TCDD TEQ no DNQ	76%	50%	11	2.7	4.8	1.8
CM-3	Lead	40%	0%	1.7	N/A[1]	1.5	N/A[1]
	TCDD TEQ no DNQ	0%	0%	N/A[1]	N/A[1]	N/A[1]	N/A[1]

[1] Not calculated because there were no exceedances of Permit limits

Table 9. Lower Lot Biofilter Influent and Effluent Summary as Compared to the Outfall 009 Permit Limits, 2013-2021

	% of Samples Greater than Permit Limits		Maximum Exceedance Ratio (Exceeding Result : Permit Limit)		Average Exceedance Ratio (Exceeding Result : Permit Limit)	
Parameter	**Influent**	**Effluent**	**Influent**	**Effluent**	**Influent**	**Effluent**
Lead	10%	3.1%	3.8	1.1	2.1	1.1
TCDD TEQ no DNQ	87%	9.4%	17	5.2	4.0	3.3

Table 10. ELV Treatment BMP Influent and Effluent Summary as compared to the Outfall 009 Permit Limits, 2013-2020

	% of Samples Greater than Permit Limits		Maximum Exceedance Ratio (Exceeding Result : Permit Limit)		Average Exceedance Ratio (Exceeding Result : Permit Limit)	
Parameter	**Influent**	**Effluent**	**Influent**	**Effluent**	**Influent**	**Effluent**
Lead	17%	0%	9.7	N/A[1]	5.9	N/A[1]
TCDD TEQ no DNQ	33%	13%	13	6.9	4.8	4.2

[1] Not calculated because there were no exceedances of Permit limits

Table 11. Detention Bioswales Influent and Effluent Summary as compared to the Outfall 009 Permit Limits, 2015-2021

	% of Samples Greater than Permit Limits		Maximum Exceedance Ratio (Exceeding Result : Permit Limit)		Average Exceedance Ratio (Exceeding Result : Permit Limit)	
Parameter	**Influent**	**Effluent**	**Influent**	**Effluent**	**Influent**	**Effluent**
Lead	38%	0%	4.5	N/A[1]	1.8	N/A[1]
TCDD TEQ no DNQ	75%	14%	737	6.7	54	3.4

[1] Not calculated because there were no exceedances of Permit limits

Table 12. Boeing Admin Area Inlet Filters Influent and Effluent Summary as compared to the Outfall 009 Permit Limits, 2018-2021

Parameter	% of Samples Greater than Permit Limits		Maximum Exceedance Ratio (Exceeding Result : Permit Limit)		Average Exceedance Ratio (Exceeding Result : Permit Limit)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent
Lead	25%	0%	1.1	N/A[1]	1.1	N/A[1]
TCDD TEQ no DNQ	100%	100%	22	76	11	26

[1] Not calculated because there were no exceedances of Permit limits

Figure 9 and Figure 10 present summaries of influent and effluent monitoring results for dioxins and lead by BMP group.

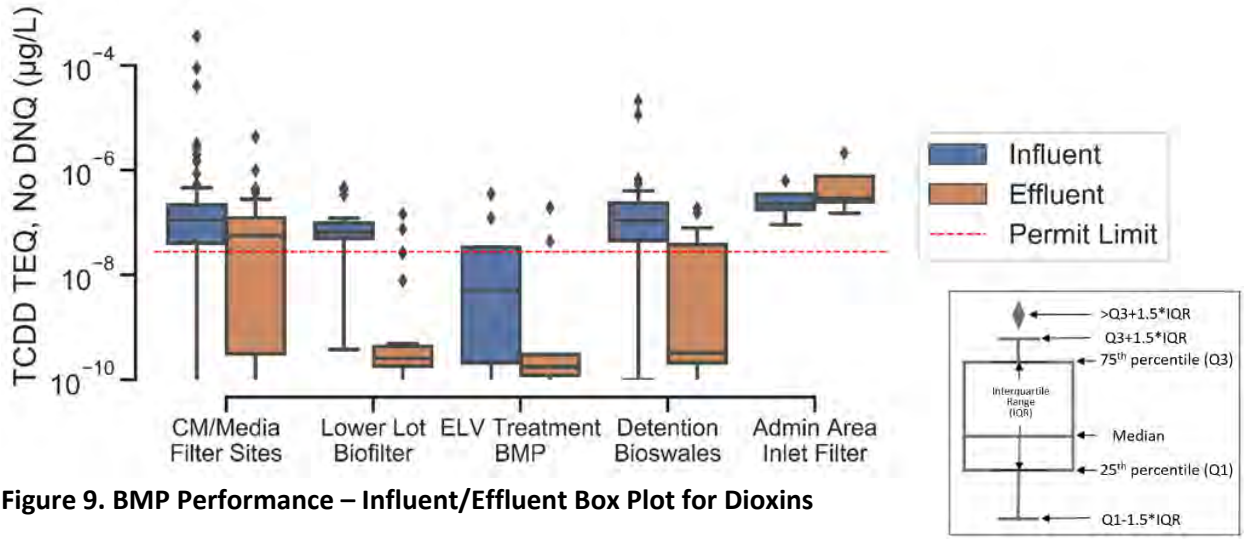


Figure 9. BMP Performance – Influent/Effluent Box Plot for Dioxins

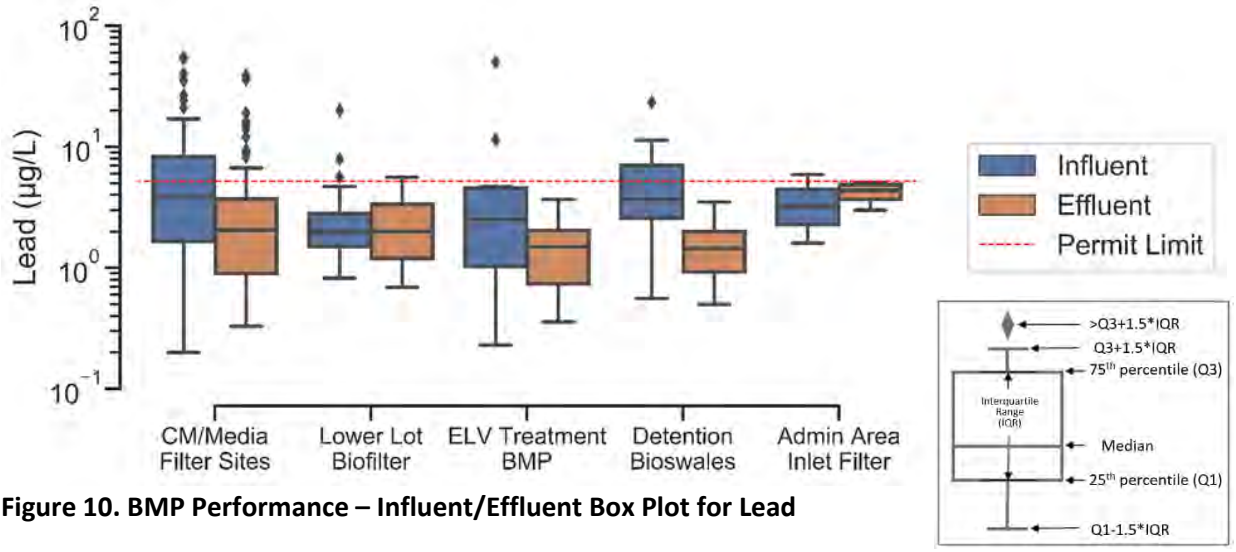


Figure 10. BMP Performance – Influent/Effluent Box Plot for Lead

c. Boeing and NASA continue to implement Surface Water Expert Panel recommendations.

As described in Sections 1.3 and 3.2, recommendations from the Surface Expert Panel continue to be implemented at the site in order to continue to improve stormwater quality. A summary of recommendations from the 2019/20 Annual Report and their status to-date are provided in Table 14.

Table 13. Summary of 2019/20 Surface Water Expert Panel BMP Recommendations

Watershed	Recommendation	Status
Sitewide	Continue to have the Expert Panel receive and review all demolition (demo) and cleanup SWPPPs	Completed
Sitewide	Continue to monitor the condition of existing erosion and sediment controls and vegetation across the site and repairing or supplementing where needed	Completed
Sitewide	Identify and evaluate the feasibility of removing unnecessary treated wood utility poles and other treated wood, and adjacent soils where staining is observed	On-going
Outfalls 001 & 002	Install non-flammable media wattles around the remaining bare treated wood utility poles in the Southern Buffer Zone	On-going - Wattles should be spaced out from poles to better capture impacted soils
Outfalls 001	Evaluate removal of pipe support stakes (potential iron source)	Completed – Stakes were removed
Outfalls 001 & 002	Evaluate subarea monitoring data in OF001 and OF002 watersheds to identify any critical subwatersheds	On-going – No samples collected in 2020/21
Outfall 009	Compare CM-3 performance before/after rebuilding	On-going - No samples collected in 2020/21
Outfall 009	Review as-built plans for ELV or physically inspect BMP to determine if a retrofit is recommended to contain filter media and prevent washout	Completed – Retrofit made
Outfall 009	Maintain check dams in Northern Drainage and remove sediment as needed	Complete – no sediment removal required this year
Outfall 009	Evaluate admin area inlet filter performance	Completed – Recommended keeping inlet filters
Outfall 018	OF018/R-2A pond spillway media filter redesign/rebuild evaluation	In progress
Outfall 018	Collect stormwater samples from DOE RMHF demo area during first two storm events of the 2020/21 rainy season and analyze for the monitoring suite required at Outfall 003, the watershed where this area is located.	Completed

d. The Expert Panel continues to find that more data are needed to confirm our understanding of sources of recent stormwater exceedances.

Extensive sampling was conducted throughout Outfall 008 and 009 to identify areas with impacted stormwater beginning in 2009. Locations were ranked to prioritize targeting subareas for treatment. From 2008-present, distributed BMPs were designed and installed to treat stormwater from highest priority areas. Additionally, 2008 Interim Source Removal Action (ISRA) removed surface soils high in NPDES exceeding parameters. ISRA excavations were completed in 2010 in the Outfall 008 watershed and 2013 in the Outfall 009 watershed.

Based upon the success of subarea sampling guiding BMP prioritization and placement in the Outfall 008 and 009 watersheds, the Surface Water Expert Panel has initiated a similar process in the Outfall 001 and 002 watersheds. Six subarea monitoring locations were identified and monitored over the 2019/20 reporting year. Due to an unusually dry year, none of the six locations had sampleable flows this year. This subarea monitoring program will be continued in order to gather more results for a robust analysis.

Additional targeted solid and stormwater source sampling is ongoing as well. The Panel will continue to make these findings available in public meetings and annual reports (described in detail in previous Annual Reports Appendix C: Exceeding Constituent Source Investigation).

e. Based on preliminary data collection along Bell Creek, dry weather flows are believed to include flows from the adjacent urban areas (e.g., irrigation overspray) along with already-documented seep/spring flows that originate near the property boundary, while septic effluent may have little or no contribution based on water quality analysis.

In response to concerns expressed by local stakeholders regarding dry weather observed flow along Bell Creek just downstream of SSFL, a dry weather sampling investigation was conducted. Boeing and the Ground Water Expert Panel (GWEP) already have a seep monitoring program, and any dry weather flows at SSFL property boundary originate entirely from seeps or springs. The purpose of the dry weather sampling was to determine if septic effluent or other anthropogenic sources were also contributing to flows along the reach, since significant algae was observed, and the adjacent neighborhood was at least partly unsewered.

On December 23, 2021, surface water was sampled downstream of the Bell Canyon neighborhood properties at the Buckskin Drive bridge during dry weather and analyzed for chemical indicators of septic effluent. Based on a single sample, chemical signatures indicated no significant septic effluent contribution, but field observations did note contributing dry weather urban flows from irrigation overspray.

5 Recommendations

5.1 BMP Recommendations

The following sections outline the proposed BMP recommendations for the Site.

5.1.1 Site-Wide Recommendations

The Expert Panel recommends:

- continuing to involve the Expert Panel on review of all demolition and cleanup SWPPPs site-wide to assess the robustness of the construction BMPs being used during these important projects;
- continuing to monitor the condition of existing erosion and sediment controls and vegetation across the site and repairing or supplementing where needed; and
- moving treated wood utility pole BMPs (wattles, biobags) further from poles to better contain pole-impacted soils.

5.1.2 Outfall 009 Watershed

There were no NPDES exceedances at Outfall 009 in the 2020/21 reporting year, so no new treatment BMPs are recommended in this watershed. Existing BMPs should continue to be observed and repaired as needed.

The Expert Panel recommends observing the newly reconstructed CM-3 to assess its performance over time.

Based on cumulative solids loading calculations, it is estimated that CM-9 has approximately one year until initial maintenance is needed. As such, the Expert Panel recommends that post-storm ponding at CM-9 be closely observed in the coming year to check for indications of clogging.

The Expert Panel recommends continuing to maintain check dams in the Northern Drainage and remove accumulated sediments as needed to preserve their function.

Although the administrative area inlet filters do not appear to be removing lead and dioxins as desired, the Expert Panel has recommended to leave them in place to help as a trash control. All stormwater entering these inlets is conveyed to the lower lot biofilter for additional treatment.

5.2 Monitoring Recommendations

The sections below outline recommendations made by the Expert Panel with respect to stormwater monitoring of potential and existing BMP subareas, continuation of as-needed inspections along the Northern Drainage, and potential additions to the non-industrial source special study.

5.2.1 Stormwater Monitoring

Informed by the data analyses performed above, the Expert Panel recommends the following changes for the 2020/21 stormwater monitoring program, as documented in the *2019/20 Sampling and Analysis Plan (SAP) Updates, Best Management Practice (BMP) Monitoring Program* (Haley & Aldrich, 2019):

- Continue to sample all Outfall 009 BMP performance sites during two events per year. This temporarily reduced sample frequency reflects the reduction in site activities within the Outfall 009 watershed anticipated for next year (e.g., limited ISRA, construction, demolition, etc.

planned). The Panel will revisit all voluntary (i.e., not required by the NPDES Permit) monitoring frequencies when SSFL site remediation activities increase.

- Continue to complete full BMP performance inspection checklists for all BMPs which includes visiting each during every storm event to observe whether there is stormwater discharging and again 72 hours after the end of the rain event to observe if any ponded water remains.
- Continue subarea monitoring in Outfall 001 and 002 watersheds during all runoff-producing storm events to evaluate sources of constituents found in stormwater at these Outfalls.
- Continue to hold off on monitoring at Northern Drainage subarea sampling locations. If a lead exceedance is measured at Outfall 009, reevaluate monitoring at these locations, or at one site downstream of the shooting range.
- Continue to also analyze for the filtered form of each metal when total metals are already being analyzed in Outfall samples as required by the Permit.
- Restart background subarea monitoring during all runoff-producing storm events to evaluate natural background contributions of constituents found in stormwater at these Outfalls.
- Start subarea monitoring in Outfall 011 watershed during all runoff-producing storm events to evaluate stormwater constituent contributions from Area 1 Burn Pit.

5.2.2 Northern Drainage

As specified in the RMMP, 2016/17 was the last year of required geomorphic monitoring. As such, near-term monitoring and maintenance should focus on NPDES compliance needs only. A continued annual assessment of sediment delivery and erosion along this important reach of drainage is recommended.

5.2.3 Non-Industrial Source Special Study

Initial monitoring activities associated with the Non-Industrial Source Special Study are now completed, as specified in Section 2.4. Additional activities recommended in the 2019/20 Annual Report are either complete, in progress, or planned for the start of the 2021/22 rainy season (Table 9).

The following activities are planned for 2021/22 based on recommendations from the Expert Panel:

- Analysis of lead isotope sampling results to determine if the former shooting range is contributing lead to Outfall 009.
- Wet weather sheet flow sampling upgradient and downgradient of pentachlorophenol (PCP) treated utility poles with and without BMPs (permeable barriers). The objective is to assess the impact of poles on runoff and the effectiveness of BMPs in reducing metals and dioxins.
- Dry weather step-out sampling of soils and paved surfaces upgradient and downgradient of treated wood utility poles. The objective is to determine the area around PCP treated utility poles that is impacted by metals and dioxins, so that BMPs can be effectively implemented.
- Sampling near newly installed fiberglass utility poles in the Southern Buffer to determine if soils remain impacted after replacement.
- Sampling of gross alpha in undeveloped subwatersheds and dioxin in subwatersheds with treated wood poles to better assess background and non-industrial sources to stormwater.

6 Milestones/Schedule

Following BMPs/treatment control implementation, effectiveness of these measures will be evaluated primarily by the results of surface water samples collected at Outfalls, supplemented by any subarea data collected as part of the 2015 Work Plan. These sampling results will continue to be reviewed annually to determine whether additional upgrades or maintenance may be warranted. The following milestones are planned for the remainder of the NPDES Permit term.

2021/22

Future Expert Panel activities will be determined based on requirements of the pending renewed NPDES Permit and Boeing's requests for Expert Panel involvement.

7 References

The Boeing Company, 2020a. Third Quarter 2020 NPDES Discharge Monitoring Report, Compliance File CI-6027 and NPDES No. CA0001309, Santa Susana Field Laboratory, Ventura County, California. November 15.

The Boeing Company, 2020b. Fourth Quarter 2020 NPDES Discharge Monitoring Report, Compliance File CI-6027 and NPDES No. CA0001309, Santa Susana Field Laboratory, Ventura County, California. February 15.

The Boeing Company, 2021a. First Quarter 2021 NPDES Discharge Monitoring Report, Compliance File CI-6027 and NPDES No. CA0001309, Santa Susana Field Laboratory, Ventura County, California. May 15.

The Boeing Company, 2021b. Second Quarter 2021 NPDES Discharge Monitoring Report, Compliance File CI-6027 and NPDES No. CA0001309, Santa Susana Field Laboratory, Ventura County, California. August 15.

Haley & Aldrich, Inc., 2011. *Northern Drainage Restoration, Mitigation and Monitoring Plan, Santa Susana Field Laboratory, Ventura County, California*. October.

Haley & Aldrich, Inc., 2015. *Best Management Practices Plan, Santa Susana Field Laboratory, 5800 Woolsey Canyon Road, Canoga Park, California*. File No. 40458-071. June.

Haley & Aldrich, Inc., 2020. *2020/21 Rainy Season Sampling and Analysis Plan (SAP) Updates, Best Management Practice (BMP) Monitoring Program.*

LARWQCB, 2015. *Transmittal of the Waste Discharge Requirements (WRDs) and National Pollutant Discharge Elimination System (NPDES) Permit for the Boeing Company, Santa Susana Field Laboratory, Canoga Park, CA*, NPDES No. CA0001309, CI NO 6027. February 23.

MWH et al., 2015. *ISRA Performance Monitoring and BMP Monitoring for the Outfalls 008 and 009 Watersheds, 2014/2015 Rainy Season*.

MWH, Santa Susana Field Laboratory Surface Water Expert Panel, Geosyntec Consultants, Haley & Aldrich, Inc., and CH2M Hill, 2010. *Best Management Practices (BMP) Plan, Outfalls 008 and 009 Watersheds, Santa Susana Field Laboratory, Ventura County, California*. October.

Pitt, R., Otto, M., Questad, A., Isaac, S., Colyar, M., Steets, B., Gearheart, R., Jones, J., Josselyn, M., Stenstrom, M.K. and Clark, S., 2021. Laboratory Media Test Comparisons to Long-Term Performance of Biofilter and Media Filter Treatment-Train Stormwater Controls. *Journal of Sustainable Water in the Built Environment*, *7*(4), p.04021015.

Pitt, R., Otto, M., Questad, A., Isaac, S., Colyar, M., Steets, B., Gearheart, R., Jones, J., Josselyn, M., Stenstrom, M.K. and Costa, P., 2022. Performance Changes during Long-Term Monitoring of Full-Scale Media Filter Stormwater Controls at an Industrial Site. *Journal of Sustainable Water in the Built Environment*, *8*(1), p.04021019.

Santa Susana Surface Water Expert Panel and Geosyntec Consultants, 2015a. *Site-Wide Stormwater Work Plan and 2014/15 Annual Report, The Boeing Company, Santa Susana Field Laboratory, Ventura County, CA*. September.

Santa Susana Surface Water Expert Panel and Geosyntec Consultants, 2015b. *Special Monitoring Studies for the 009 Watershed*. November 2. Updated January 20, 2016. Updated March 17, 2016. Updated August 10, 2016.

Appendix A: 2020/21 Reporting Year Sampling and Analysis Plan

HALEY & ALDRICH, INC.
5333 Mission Center Road
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30 November 2020
File No. 0129095-005

Mr. Peter Zorba
National Aeronautics and Space Administration
Santa Susana Field Laboratory
5800 Woolsey Canyon Road
Canoga Park, California 91304

Mr. Jeffrey Wokurka
The Boeing Company
Santa Susana Field Laboratory
5800 Woolsey Canyon Road
Canoga Park, California 91304

Subject: 2020/2021 Rainy Season Sampling and Analysis Plan (SAP) Updates,
Best Management Practice (BMP) Monitoring Program
Santa Susana Field Laboratory
Canoga Park, California

Dear Mr. Zorba and Mr. Wokurka:

This letter presents the Sampling and Analysis Plan (SAP) updates to the Best Management Practice (BMP) subarea and BMP performance monitoring programs near or within the Outfalls 001, 002, 003 and 009 watersheds at the Santa Susana Field Laboratory (SSFL) for the 2020/2021 rainy season, and serves as an addendum to the 2015/2016 and 2016/2017 rainy season SAPs (MWH Americas, Inc. [MWH], 2015; 2016) and the 2017/2018, 2018/2019, and 2019/2020 SAPs (Haley & Aldrich, 2018a; 2018b; 2019). BMP subarea monitoring is conducted at locations receiving runoff from potential source areas and other infrastructure (e.g., roads, buildings, parking areas) to evaluate the potential for contribution of constituents of concern (COCs) from the potential source areas to stormwater runoff and to identify locations for new BMPs. BMP performance monitoring is conducted at selected structural BMPs (e.g., Lower Parking Lot BMP, B1436 detention bioswales) to assess the effectiveness of the BMPs at promoting sediment settling and improving surface water quality to comply with NPDES benchmarks and permit limits at Outfalls 001, 002, 003, 008, 009, and 018.

The updates to the BMP monitoring program SAP for the 2020/2021 rainy season account for field observations of monitoring locations during the 2019/2020 rainy season and an evaluation of surface water sampling data collected to date and are described below. In addition, attached to this letter are 2020/2021 rainy season versions of the SAP tables and figures as well as standardized BMP inspection forms. The changes described in this letter were developed with input from, and in accordance with, the recommendations from the SSFL Surface Water Expert Panel (Expert Panel) and Geosyntec Consultants (Geosyntec), and were initially presented in the 2019/2020 Site-wide Stormwater Annual Report (Surface Water Expert Panel and Geosyntec Consultants, 2020).

BMP Monitoring Updates

OUTFALL 003

A temporary monitoring location will be added within the Department of Energy (DOE) Radioactive Material Handling Facility (RMHF) demolition area, at the inlet pipe from the RMHF paved area to Tank 28, to monitor demolition activities that began in July 2020.

Sampling at this location will be conducted during the first two rain events of the 2020/2021 rainy season and samples will be analyzed for parameters required by the NPDES Permit at Outfall 003, including a set of annual and routine constituents. The following constituents will be analyzed during both sampling events: TSS, Iron, Manganese, Lead, Dioxins, and Gross Alpha.

BMP SAMPLING ACTIVITIES CONTINUING FROM THE 2019/2020 SAP UPDATES

Subarea monitoring within Outfall 001 and 002 watersheds to evaluate sources of constituents found in stormwater at these outfalls will continue at the following locations for every rain event with sampleable flow: EPSW001BG01, EPSW001IE01, EPSW001PV01, EPSW002BG01, EPSW002IE01, and EPSW002IE02. Sampling is required regardless of whether Outfall 001 or 002 discharge.

Monitoring active BMP performance sites within the Outfall 009 watershed will continue to be conducted twice a year.

- During 2020, it is not essential to sample BMPs unless Outfall 009 discharges. However, if no samples are collected by the end of Fourth Quarter 2020, then BMPs will be sampled during any two rain events in 2021 with sampleable flow.
- All BMPs do not need to be sampled during the same rain event, but influent and effluent samples from a single BMP must be collected during the same event.

If a lead exceedance is measured at Outfall 009, sampling Northern Drainage subarea monitoring locations or one location downstream of the shooting range will be reevaluated.

The lower lot totalizer reading will be recorded after each rain event, as feasible.

BMP INSPECTION FORMS

The BMP inspections will be conducted during every rain event exceeding 0.75 inches of rainfall, and once after the rainy season using the BMP Inspection Forms attached to this SAP. These forms include observations, maintenance needs, and corrective actions and were revised in Fall 2020 to reflect current field conditions. As specified on each form, a standardized framed photo should be taken at the same location, facing the same direction, during each site visit.

72 hours after the end of each rain event exceeding 0.75 inches of rainfall, field crews will also inspect and record maximum ponding levels at locations listed in the Boeing 72 Hours After Rain Event Ponding Inspection Form and NASA 72 Hours After Rain Event Ponding Inspection Form. Both forms are included as Attachments to this SAP. The ponding inspection may occur at a time slightly before or after the 72 hours.

Sincerely yours,
HALEY & ALDRICH, INC.

Katherine Miller
Project Manager

Nancy E. Gardiner, CPESC, QSD, QISP
Program Manager

Enclosures:

References
Table I – BMP Monitoring Inspection Locations and Analytical Plan, 2020/2021 Rainy Season
Figure 1 – Outfall 009, BMP Monitoring Locations
Figure 2 – Outfall 009, B-1 and Lower Parking Lot Areas – Boeing
Figure 3 – Outfall 009, IEL Area – Boeing
Figure 4 – Outfall 009, AILF Area – Boeing
Figure 5 – Outfall 009, CMs South of LOX Area – NASA
Figure 6 – Outfall 009, A2LF, CM-1, and Helipad Areas – NASA
Figure 7 – Outfall 009, ELV Area – NASA
Figure 8 – Outfall 001 and 002 BMP Monitoring Locations
Figure 9 – Outfall 001, Potential BMP Subarea
Figure 10– Outfall 001, Potential BMP Subarea
Figure 11 – Outfall 002, Potential BMP Subarea
Figure 12 – Outfall 002, Potential BMP Subarea
Figure 13 – Outfall 002, Potential BMP Subarea
Figure 14 – Outfall 003 and Phase 1 Demolition Boundary at RMHF
BMP Inspection Forms – Outfalls 008 and 009 – Boeing
BMP Inspection Forms – Outfall 009 – NASA
Boeing 72 Hours After Rain Event Ponding Inspection Form
NASA 72 Hours After Rain Event Ponding Inspection Form
Sample Collection Forms

References

Haley & Aldrich, Inc., 2016. Revised Field Sampling Plan, Stormwater Runoff & Discharge Monitoring Program, Santa Susana Field Laboratory, 5800 Woolsey Canyon Road, Canoga Park, California. February 25.

MWH, 2015. 2015/2016 Rainy Season Sampling and Analysis Plan (SAP) Updates, Best Management Practice (BMP) Monitoring and ISRA Performance Monitoring Programs. November 3.

MWH, 2016. 2016/2017 Rainy Season Sampling and Analysis Plan (SAP) Updates, Best Management Practice (BMP) Monitoring and ISRA Performance Monitoring Programs. October 14.

Haley & Aldrich, Inc., 2018a. 2017/2018 Rainy Season Sampling and Analysis Plan (SAP) Updates, Best Management Practice (BMP) Monitoring and ISRA Performance Monitoring Programs. January 17.

Haley & Aldrich, Inc., 2018b. 2018/2019 Rainy Season Sampling and Analysis Plan (SAP) Updates, Best Management Practice (BMP) Monitoring and ISRA Performance Monitoring Programs. November 19.

Haley & Aldrich, Inc., 2019. 2019/2020 Rainy Season Sampling and Analysis Plan (SAP) Updates, Best Management Practice (BMP) Monitoring and ISRA Performance Monitoring Programs. November 26.

Surface Water Expert Panel and Geosyntec Consultants, 2020. *Santa Susana Field Laboratory Site-Wide Stormwater Annual Report, 2019/2020 Rainy Season*. October.

TABLES

TABLE I

BMP MONITORING INSPECTION LOCATIONS AND ANALYTICAL PLAN
2020/2021 RAINY SEASON
SANTA SUSANA FIELD LABORATORY
CANOGA PARK, CALIFORNIA

Object ID	Sampling Responsibility	Location	Areas Monitored	Purpose	Notes	Sample Frequency	Cd, Cu, Pb (Total Dissolved) (Method 200.7/200.8) Hg (Total Dissolved) (Method 245.1)	Cd, Cu, Pb (Total Recoverable) (Method 200.7/200.8) Hg (Total Recoverable) (Method 245.1)	Dioxins (Method 1613)	Total Suspended Solids (Method 2540)	Particle Size Distribution (Method ASTM D422)	Turbidity (Method 180.1)	As, Cd, Cu, Fe, Pb, Mn, Se, Zn (Total Dissolved) (Method 200.7/200.8) Hg (Total Dissolved) (Method 245.1)	As, Cd, Cu, Fe, Pb, Mn, Se, Zn (Total Recoverable) (Method 200.7/200.8) Hg (Total Recoverable) (Method 245.1)	SO4 (Method 300)	Gross Alpha (Total Dissolved) (Method 900.0)	Gross Alpha (Total Recoverable) (Method 900.0)	Outfall 003 NPDES permit-required constituents[1]
A1BMP0002	Boeing	AILF	CM-9, AILF	US South, Treatment BMP Performance Monitoring	AILF tributary drainage	Twice a year	X	X	X	X	X							
A1BMP0003	Boeing	AILF	CM-9, AILF, IEL, Area II Road	DS, Treatment BMP Performance Monitoring	CM-9 underdrain	Twice a year	X	X	X	X	X							
A2BMP0006	NASA	CM-1	CM-1	US East, Treatment BMP Performance Monitoring	CM-1 eastern tributary drainage	Twice a year	X	X	X	X	X							
A2BMP0007	NASA	CM-1	CM-1	DS, Treatment BMP Performance Monitoring	CM-1 culvert outlet	Twice a year	X	X	X	X	X							
A2BMP0012	NASA	CM-1	CM-1, Area II Road	US, Treatment BMP Performance Monitoring	Outlet pipe south side of road	Twice a year	X	X	X	X	X	X						
B1BMP0009	Boeing	B-1	B-1 Upper Parking Lot Media Filter	US North, Treatment BMP Performance Monitoring	Gunite swale conveying road runoff	Twice a year	X	X	X	X	X							
B1BMP0010	Boeing	B-1	B-1 Upper Parking Lot Media Filter	US South, Treatment BMP Performance Monitoring	Culvert outlet from upper parking lot area	Twice a year	X	X	X	X	X							
B1BMP0011	Boeing	B-1	B-1 Upper Parking Lot Media Filter	DS, Treatment BMP Performance Monitoring	Underdrains	Twice a year	X	X	X	X	X							
EVBMP0001	NASA	ELV	ELV, Helipad	ELV Treatment BMP Overflow Monitoring	Culvert inlet; runoff will only be present when rain events exceed ELV BMP design storm	Twice a year	X	X	X	X	X	X						
EVBMP0003	NASA	CM-1	CM-1, Area II Road	US West, Treatment BMP Performance Monitoring	Sheetflow along Area II Road upstream of sandbag berm	Twice a year	X	X	X	X	X							
EVBMP0007	NASA	ELV	ELV Treatment BMP	US, Treatment BMP Performance Monitoring	Sample port in BMP influent pipe prior to "T" connection	Twice a year	X	X	X	X	X							
EVBMP0008	NASA	ELV	ELV Treatment BMP	DS, Treatment BMP Performance Monitoring	Discharge from media filter tank pipe	Twice a year	X	X	X	X	X	X						
EVBMP0009	NASA	ELV	ELV Treatment BMP	Mid-Point Treatment BMP Performance Monitoring	Composite of samples from eastern and western sample ports between settling tanks and media filter	Twice a year	X	X	X	X	X	X						
ILBMP0002	Boeing	AILF	CM-9, IEL, Area II Road	US East, Treatment BMP Performance Monitoring	Culvert inlet off Area II Road	Twice a year	X	X	X	X	X							
ILBMP0004	Boeing	IEL	B1436 Southern Detention Bioswale	US, Treatment BMP Performance Monitoring	Concrete swale (western) diverting sheetflow into rock crib	Twice a year	X	X	X	X	X							
ILBMP0005	Boeing	IEL	B1436 Southern Detention Bioswale	DS, Treatment BMP Performance Monitoring	Bioswale underdrain (subsurface 12- inch drain connecting to existing culvert)	Twice a year	X*	X*	X*	X	X							
ILBMP0008	Boeing	IEL	B1436 Southern Detention Bioswale	US, Treatment BMP Performance Monitoring	Concrete swale (eastern) diverting sheetflow into rock crib	Twice a year	X	X	X	X	X							
ILBMP0009	Boeing	Administration bldgs. area	Administration buildings area filter basket	Filter basket BMP Performance Monitoring	Influent (upstream) filter basket sample	Twice a year	X	X	X	X	X							
ILBMP0010	Boeing	Administration bldgs. area	Administration buildings area filter basket	Filter basket BMP Performance Monitoring	Effluent (downstream) filter basket sample	Twice a year	X	X	X	X	X							
LPBMP0002	Boeing	Lower Parking Lot	Lower Parking Lot BMP	US, Treatment BMP Performance Monitoring	Sample port in cistern discharge pipe	Twice a year	X	X	X	X	X							
LPBMP0003	Boeing	Lower Parking Lot	Lower Parking Lot BMP	Mid-Point Treatment BMP Performance Monitoring	Sediment Basin outlet box	Twice a year	X	X	X	X	X							
LPBMP0004	Boeing	Lower Parking Lot	Lower Parking Lot BMP	DS Treatment BMP Performance Monitoring	Discharge from Biofilter effluent pipe	Twice a year	X	X	X	X	X							
LXBMP0010	Boeing	CM-3	Service Area Road BMP	US, Treatment BMP Performance Monitoring	Outlet pipe south side of road	Twice a year	X	X	X	X	X							
LXBMP0011	Boeing	CM-3	Service Area Road BMP	US, Treatment BMP Performance Monitoring	Natural drainage upstream of CM-3	Twice a year	X	X	X	X	X							
LXBMP0012	Boeing	CM-3	Service Area Road BMP	DS, Treatment BMP Performance Monitoring	Underdrains	Twice a year	X	X	X	X	X							
EPSW001BG01	Boeing	OF001 Watershed	Background (natural unimpacted areas)	Potential BMP Location	Located at the low spot along Bell Canyon Road and north of the road leading to Outfall 001.	Every Storm			X	X			X	X	X	X	X	
EPSW001IE01	Boeing	OF001 Watershed	Impacted Soils Evaluation (A1BP, CTL-V)	Potential BMP Location	At the bottom of the hill to the north of the intersection of the Southern Buffer Zone Road and Outfall 001 Road.	Every Storm			X	X			X	X	X	X	X	
EPSW001PV01	Boeing	OF001 Watershed	Background (with paved areas)	Potential BMP Location	South side of the road heading towards Outfall 001 at the intersection of Outfall 001 road and Bell Canyon Road.	Every Storm			X	X			X	X	X	X	X	
EPSW002BG01	Boeing	OF002 Watershed	Natural Background	Potential BMP Location	Located past the second water guzzler just before the steep incline into Outfall 002. Road delineator to the west of culvert.	Every Storm			X	X			X	X	X	X	X	

TABLE I

BMP MONITORING INSPECTION LOCATIONS AND ANALYTICAL PLAN

2020/2021 RAINY SEASON

SANTA SUSANA FIELD LABORATORY

CANOGA PARK, CALIFORNIA

Object ID	Sampling Responsibility	Location	Areas Monitored	Purpose	Notes	Sample Frequency	Cd, Cu, Pb (Total Dissolved) (Method 200.7/200.8) Hg (Total Dissolved) (Method 245.1)	Cd, Cu, Pb (Total Recoverable) (Method 200.7/200.8) Hg (Total Recoverable) (Method 245.1)	Dioxins (Method 1613)	Total Suspended Solids (Method 2540)	Particle Size Distribution (Method ASTM D422)	Turbidity (Method 180.1)	As, Cd, Cu, Fe, Pb, Mn, Se, Zn (Total Dissolved) (Method 200.7/200.8) Hg (Total Dissolved) (Method 245.1)	As, Cd, Cu, Fe, Pb, Mn, Se, Zn (Total Recoverable) (Method 200.7/200.8) Hg (Total Recoverable) (Method 245.1)	SO4 (Method 300)	Gross Alpha (Total Dissolved) (Method 900.0)	Gross Alpha (Total Recoverable) (Method 900.0)	Outfall 003 NPDES permit-required constituents[1]
EPSW002IE01	Boeing	OF002 Watershed	Impacted Soils Evaluation (STL-IV)	Potential BMP Location	At STLV-IV. Immediately past the gates to the south east; adjacent to the new telephone pole.	Every Storm			X	X			X	X	X	X	X	
EPSW002IE02	Boeing	OF002 Watershed	Impacted Soils Evaluation (Coca)	Potential BMP Location	Located along the Southern Buffer Zone Road at the culvert inlet on the north side of the road. Approximately 400 feet east of the turnout.	Every Storm			X	X			X	X	X	X	X	
RMHF0001	Boeing	OF003 Watershed	Phase 1 Demolition Boundary at RMHF	Demolition Monitoring	Sample port is located at the inlet pipe from the RMHF paved area that leads to Tank 28 in Area IV.	First 2 Storms			X	X			X[2]	X[2]		X	X	X

Notes:

* Collect one equipment blank per sampling day from the equipment used to sample the B1436 Detention Bioswales downstream monitoring location (under drains) and place on hold for metals and dioxins analysis; the analyses will be performed if unusual results are reported for primary samples.
The EB sample ID will be based on the ID of the primary sample collected immediately before collecting the equipment blank, and will either be ILQW0005_yyyymmdd or ILQW0007_yyyymmdd.

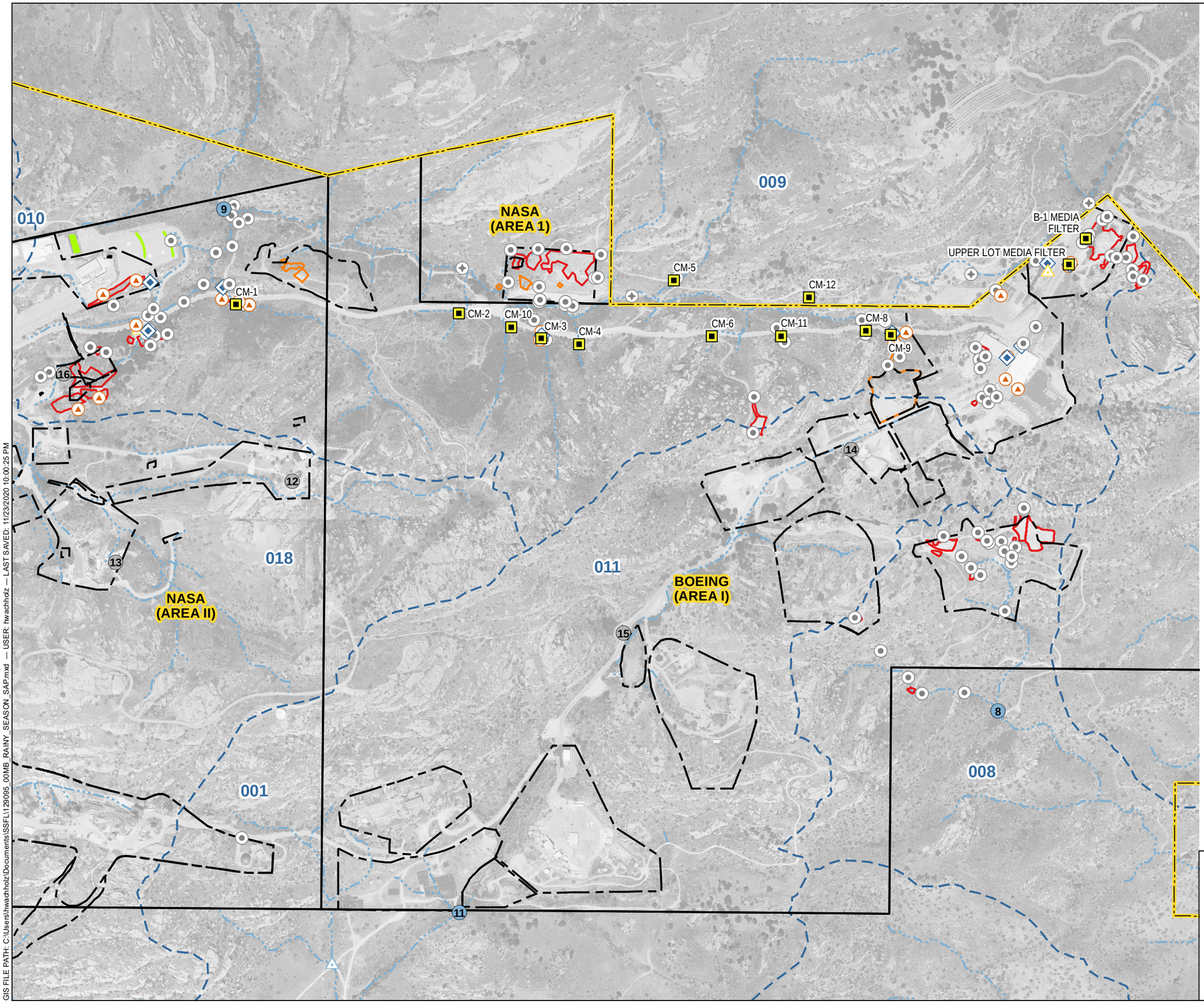
[1] Outfall 003 NPDES permit-required constituents will only be analyzed according to the frequency stated in Table E-2b of the permit during the first 2 storm events (between July 1, 2020 - June 30, 2021).
All other constituents marked for analysis at RMHF0001 will be analyzed during both sampling events regardless of the frequency stated in the permit.

[2] Only Iron, Lead, and Manganese.

Abbreviations:

CM - Culvert Modification
DS - Downstream
RMHF = Radioactive Materials Handling Facility
US - Upstream
X = Collect and Analyze

FIGURES



LEGEND

- CULVERT MODIFICATION (CM)
- UPSTREAM BMP PERFORMANCE MONITORING LOCATION
- DOWNSTREAM BMP PERFORMANCE MONITORING LOCATION
- MIDPOINT BMP PERFORMANCE MONITORING LOCATION
- PREVIOUS BMP PERFORMANCE MONITORING LOCATION
- POTENTIAL BMP PERFORMANCE MONITORING LOCATION
- ACTIVE NPDES OUTFALL
- FORMER NPDES OUTFALL
- PREVIOUS SPECIAL STUDIES AND OTHER SAMPLING LOCATIONS
- DRAINAGE
- SURFACE WATER DIVIDE
- EROSION CONTROL FABRIC/LINER
- ISRA EXCAVATION BOUNDARY
- FORMER ISRA EXCAVATION BOUNDARY
- ADMINISTRATIVE AREA BOUNDARY
- STUDY AREA
- SSFL PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. SAP = SAMPLING AND ANALYSIS PLAN
3. BMP = BEST MANAGEMENT PRACTICE
4. AERIAL IMAGERY SOURCE: CIRGIS

N

0 750 1,500
SCALE IN FEET

HALEY ALDRICH

2020/2021 RAINY SEASON MAP
BMP MONITORING PROGRAM
THE BOEING COMPANY
VENTURA COUNTY, CALIFORNIA

OUTFALL 009
BMP MONITORING LOCATIONS

NOVEMBER 2020

FIGURE 1

GIS FILE PATH: C:\Users\hwachholz\Documents\SSFL\129095_00MB_RAINY_SEASON_SAP.mxd — USER: hwachholz — LAST SAVED: 11/23/2020, 10:00:25 PM

009

EPNDSW07

B1SW0012

B1SW0002

B1SW0015

B1BMP0004

B-1 MEDIA FILTER

B1BMP0006

B1SW0014

B1BMP0001

B1SW0010

B1BMP0005

B1SW0011

B1SW0013

B1-2

B1SW0007

B1SW0009

B1-1A

B1SW0008

B1-1B

B1SW0006

B1-1C

B1SW0005

B1SW0004

B1SW0003

B1-1D

B1BMP0007

LPBMP0004

UPPER LOT MEDIA FILTER

B1BMP0009

B1BMP0011

B1BMP0010

LPBMP0003

EPNDSW06

LPBMP0001

LPBMP0002

ILBMP0006

LEGEND

- CULVERT MODIFICATION (CM)
- UPSTREAM BMP PERFORMANCE MONITORING LOCATION
- DOWNSTREAM BMP PERFORMANCE MONITORING LOCATION
- MIDPOINT BMP PERFORMANCE MONITORING LOCATION
- PREVIOUS BMP PERFORMANCE MONITORING LOCATION
- PREVIOUS SPECIAL STUDIES AND OTHER SAMPLING LOCATIONS
- 24" STORM DRAIN
- DRAINAGE
- SURFACE WATER DIVIDE
- CONVEYANCE PIPELINE
- ASPHALT CURB
- ROLLING AC BERM
- STORM DRAIN (ESTIMATED SUBSURFACE TRACE)
- STORM DRAIN INFERRED
- ASPHALT/CONCRETE REMOVAL AREA
- DETENTION BIOSWALE
- ENGINEERED NATURAL TREATMENT SYSTEM
- ROCK CRIB SWALE
- SEDIMENTAION BASIN
- ISRA EXCAVATION BOUNDARY
- ADMINISTRATIVE AREA BOUNDARY
- STUDY AREA
- SSFL PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. SAP = SAMPLING AND ANALYSIS PLAN
3. BMP = BEST MANAGEMENT PRACTICE
4. AERIAL IMAGERY SOURCE: CIRGIS

N

0 125 250

SCALE IN FEET

HALEY ALDRICH

2020/2021 RAINY SEASON MAP
BMP MONITORING PROGRAM
THE BOEING COMPANY
VENTURA COUNTY, CALIFORNIA

OUTFALL 009
B-1 AND LOWER PARKING LOT AREAS - BOEING

NOVEMBER 2020

FIGURE 2

GIS FILE PATH: C:\Users\hwachholz\Documents\SSFL\129095_00MB_RAINY_SEASON_SAP.mxd — USER: hwachholz — LAST SAVED: 11/23/2020 10:00:25 PM

009

ILSW0005

IEL-3

ILSW0006

ILSW0002

IEL-1

ILSW0001

ILBMP0006

ILBMP0007

ILBMP0005

ILBMP0009

ILBMP0010

ILBMP0004

ILBMP0008

ILSW0008

ILSW0004

IEL-2

ILSW0007

ILSW0003

IEL-2 Soil Borrow Area

LEGEND

- UPSTREAM BMP PERFORMANCE MONITORING LOCATION
- DOWNSTREAM BMP PERFORMANCE MONITORING LOCATION
- PREVIOUS BMP PERFORMANCE MONITORING LOCATION
- 24" STORM DRAIN
- SURFACE WATER DIVIDE
- ROLLING AC BERM
- ASPHALT/CONCRETE REMOVAL AREA
- DETENTION BIOSWALE
- ROCK CRIB SWALE
- ISRA EXCAVATION BOUNDARY
- STUDY AREA

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. SAP = SAMPLING AND ANALYSIS PLAN
3. BMP = BEST MANAGEMENT PRACTICE
4. AERIAL IMAGERY SOURCE: CIRGIS

N

0 75 150

SCALE IN FEET

HALEY ALDRICH

2020/2021 RAINY SEASON MAP
BMP MONITORING PROGRAM
THE BOEING COMPANY
VENTURA COUNTY, CALIFORNIA

OUTFALL 009
IEL AREA - BOEING

NOVEMBER 2020

FIGURE 3

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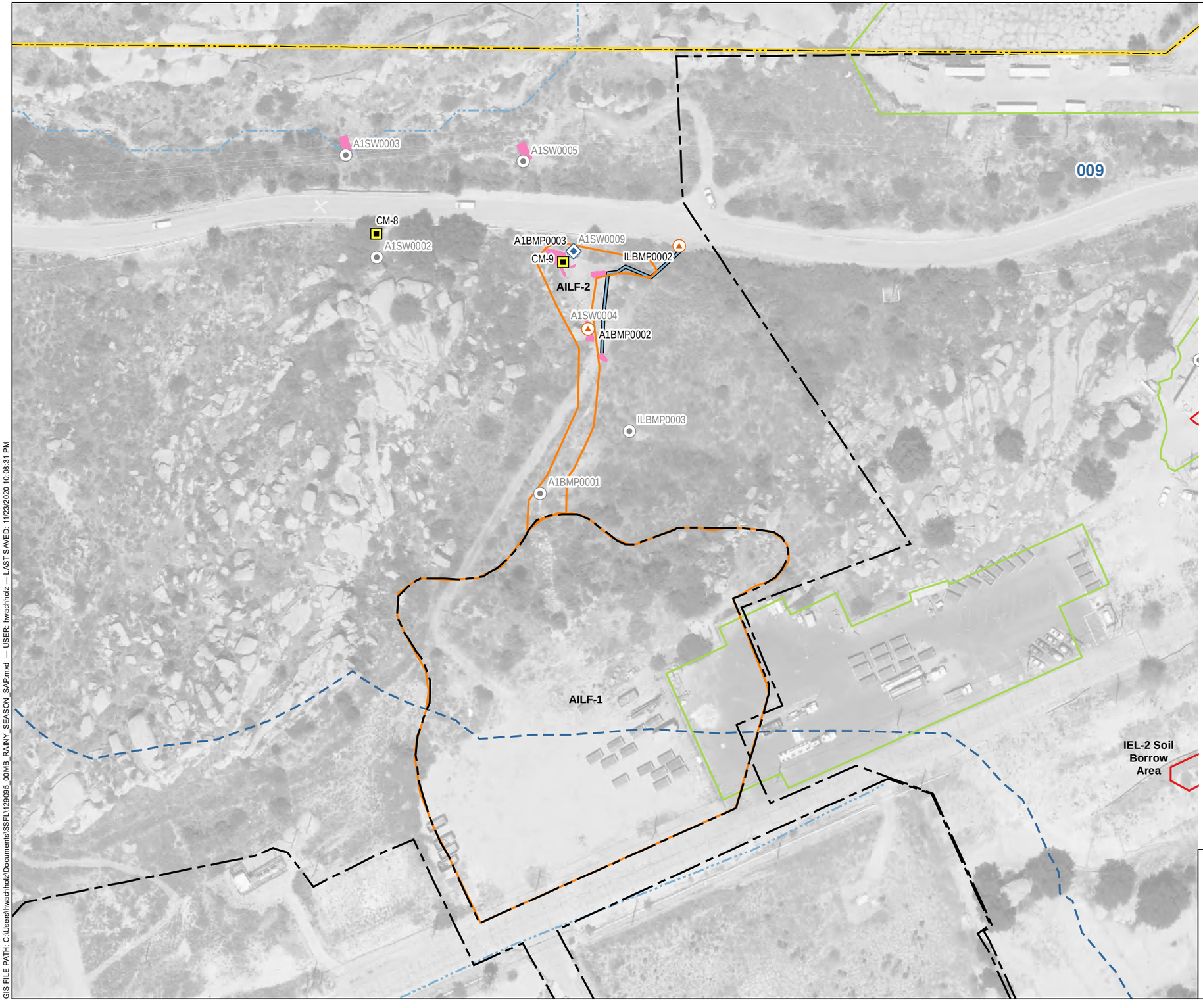

LEGEND

- CULVERT MODIFICATION (CM)
- UPSTREAM BMP PERFORMANCE MONITORING LOCATION
- DOWNSTREAM BMP PERFORMANCE MONITORING LOCATION
- PREVIOUS BMP PERFORMANCE MONITORING LOCATION
- DRAINAGE
- SURFACE WATER DIVIDE
- CONVEYANCE PIPELINE
- ASPHALT/CONCRETE REMOVAL AREA
- ROCK CRIB SWALE
- ISRA EXCAVATION BOUNDARY
- FORMER ISRA EXCAVATION BOUNDARY
- STUDY AREA
- SSFL PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. SAP = SAMPLING AND ANALYSIS PLAN
3. BMP = BEST MANAGEMENT PRACTICE
4. AERIAL IMAGERY SOURCE: CIRGIS

N

0 100 200
SCALE IN FEET

HALEY ALDRICH

2020/2021 RAINY SEASON MAP
BMP MONITORING PROGRAM
THE BOEING COMPANY
VENTURA COUNTY, CALIFORNIA

OUTFALL 009
AILF AREA - BOEING

NOVEMBER 2020

FIGURE 4

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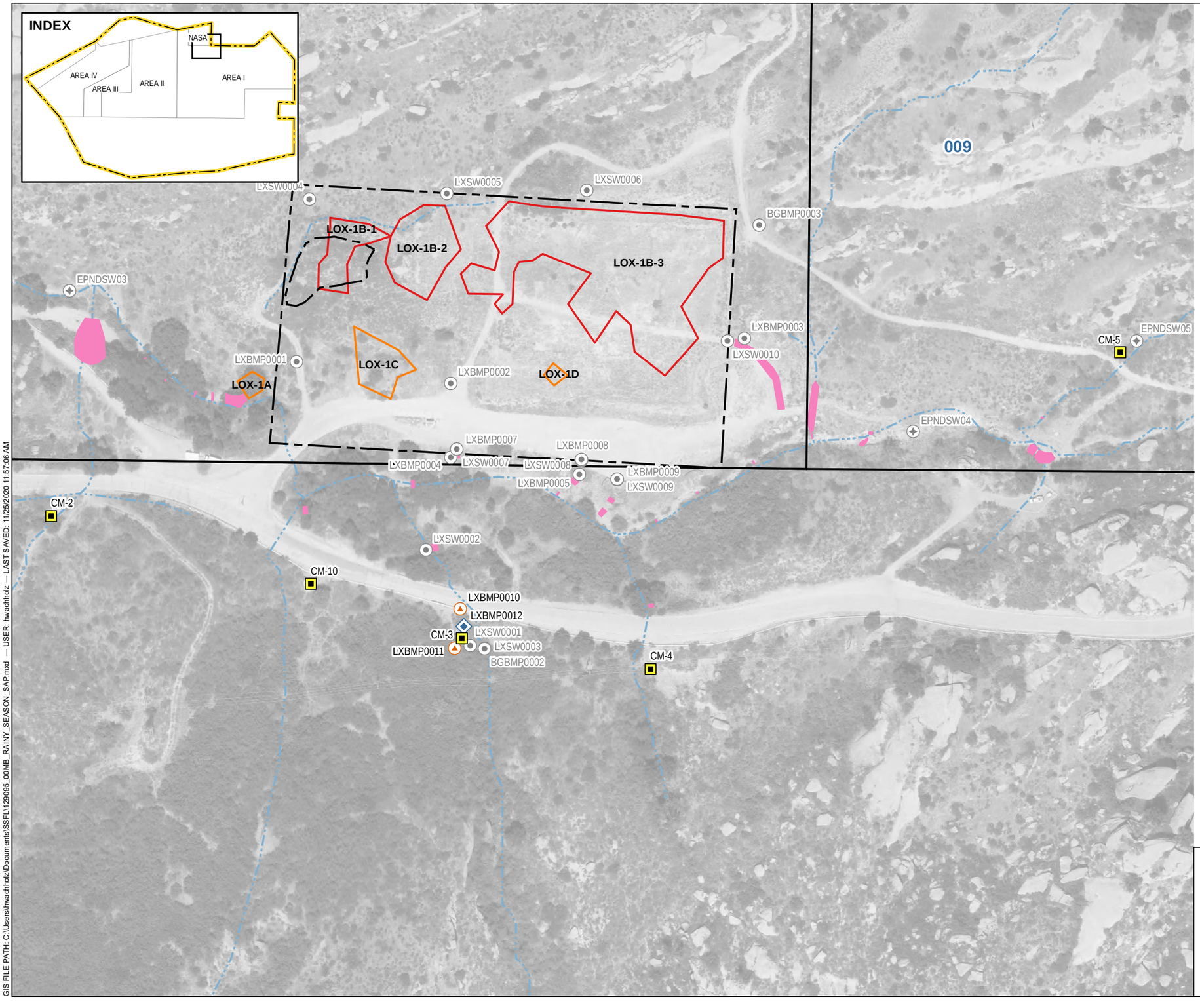

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LEGEND

- CULVERT MODIFICATION (CM)
- UPSTREAM BMP PERFORMANCE MONITORING LOCATION
- DOWNSTREAM BMP PERFORMANCE MONITORING LOCATION
- PREVIOUS BMP PERFORMANCE MONITORING LOCATION
- PREVIOUS SPECIAL STUDIES AND OTHER SAMPLING LOCATIONS
- DRAINAGE
- ROCK CRIB SWALE
- ISRA EXCAVATION BOUNDARY
- FORMER ISRA EXCAVATION BOUNDARY
- STUDY AREA
- ADMINISTRATIVE AREA BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. SAP = SAMPLING AND ANALYSIS PLAN
3. BMP = BEST MANAGEMENT PRACTICE
4. AERIAL IMAGERY SOURCE: CIRGIS

N

0 150 300
SCALE IN FEET

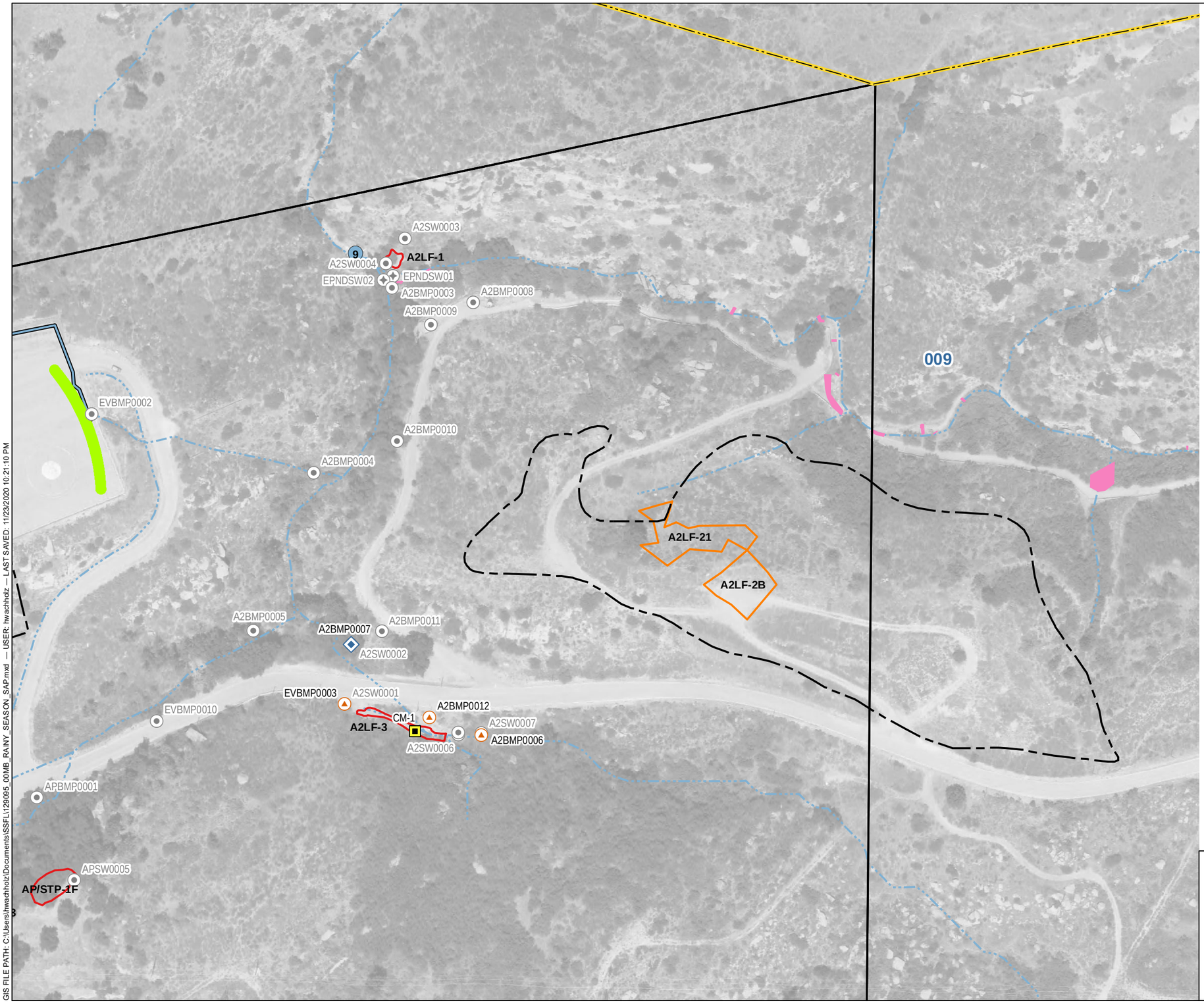
HALEY ALDRICH

2020/2021 RAINY SEASON MAP
BMP MONITORING PROGRAM
THE BOEING COMPANY
VENTURA COUNTY, CALIFORNIA

OUTFALL 009
CMs SOUTH OF LOX AREA - NASA

NOVEMBER 2020

FIGURE 5



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LEGEND

- CULVERT MODIFICATION (CM)
- UPSTREAM BMP PERFORMANCE MONITORING LOCATION
- DOWNSTREAM BMP PERFORMANCE MONITORING LOCATION
- PREVIOUS BMP PERFORMANCE MONITORING LOCATION
- POTENTIAL BMP PERFORMANCE MONITORING LOCATION
- ACTIVE NPDES OUTFALL
- PREVIOUS SPECIAL STUDIES AND OTHER SAMPLING LOCATIONS
- DRAINAGE
- CONVEYANCE PIPELINE
- ROCK CRIB SWALE
- EROSION CONTROL FABRIC/LINER
- ISRA EXCAVATION BOUNDARY
- FORMER ISRA EXCAVATION BOUNDARY
- STUDY AREA
- ADMINISTRATIVE AREA BOUNDARY
- SSFL PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. SAP = SAMPLING AND ANALYSIS PLAN
3. BMP = BEST MANAGEMENT PRACTICE
4. AERIAL IMAGERY SOURCE: CIRGIS

N

0 150 300
SCALE IN FEET

HALEY ALDRICH

2020/2021 RAINY SEASON MAP
BMP MONITORING PROGRAM
THE BOEING COMPANY
VENTURA COUNTY, CALIFORNIA

OUTFALL 009
A2LF, CM-1, AND HELIPAD AREAS - NASA

NOVEMBER 2020

FIGURE 6

ELV-1C

EVSW0002

EVBMP0004

EVBMP0010

EVBMP0001

EVBMP0005

EVBMP0006

APBMP0001

EVBMP0007

EVBMP0009

APBMP0002

APSW0013

EVBMP0008

APSW0014

APSW0006

APSW0005

AP/STP-1F

AP/STP-1E-2

AP/STP-1E-1

AP/STP-1E-3

APSW0012

009

APSW0004

LEGEND

- UPSTREAM BMP PERFORMANCE MONITORING LOCATION
- DOWNSTREAM BMP PERFORMANCE MONITORING LOCATION
- MIDPOINT BMP PERFORMANCE MONITORING LOCATION
- PREVIOUS BMP PERFORMANCE MONITORING LOCATION
- POTENTIAL BMP PERFORMANCE MONITORING LOCATION
- DRAINAGE
- CONVEYANCE PIPELINE
- ROCK CRIB SWALE
- SEDIMENTAION BASIN
- ISRA EXCAVATION BOUNDARY
- STUDY AREA

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. SAP = SAMPLING AND ANALYSIS PLAN
3. BMP = BEST MANAGEMENT PRACTICE
4. AERIAL IMAGERY SOURCE: CIRGIS

N

0 50 100

SCALE IN FEET

HALEY ALDRICH

2020/2021 RAINY SEASON MAP
BMP MONITORING PROGRAM
THE BOEING COMPANY
VENTURA COUNTY, CALIFORNIA

OUTFALL 009
ELV AREA - NASA

NOVEMBER 2020

FIGURE 7

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INDEX

NASA (AREA II)

EPSW002IE01

EPSW001IE01

EPSW002IE02

EPSW002BG01

EPSW001BG01

EPSW001PV01

12 13 15 17 18 11 2 1 19

LEGEND

- POTENTIAL BMP PERFORMANCE MONITORING LOCATION
- ACTIVE NPDES OUTFALL
- FORMER NPDES OUTFALL
- DRAINAGE
- SURFACE WATER DIVIDE
- STUDY AREA
- ADMINISTRATIVE AREA BOUNDARY
- SSFL PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. SAP = SAMPLING AND ANALYSIS PLAN
3. BMP = BEST MANAGEMENT PRACTICE
4. AERIAL IMAGERY SOURCE: CIRGIS

N

0 750 1,500
SCALE IN FEET

HALEY ALDRICH

2020/2021 RAINY SEASON MAP
BMP MONITORING PROGRAM
THE BOEING COMPANY
VENTURA COUNTY, CALIFORNIA

OUTFALL 001 AND 002 BMP MONITORING LOCATIONS

NOVEMBER 2020

FIGURE 8

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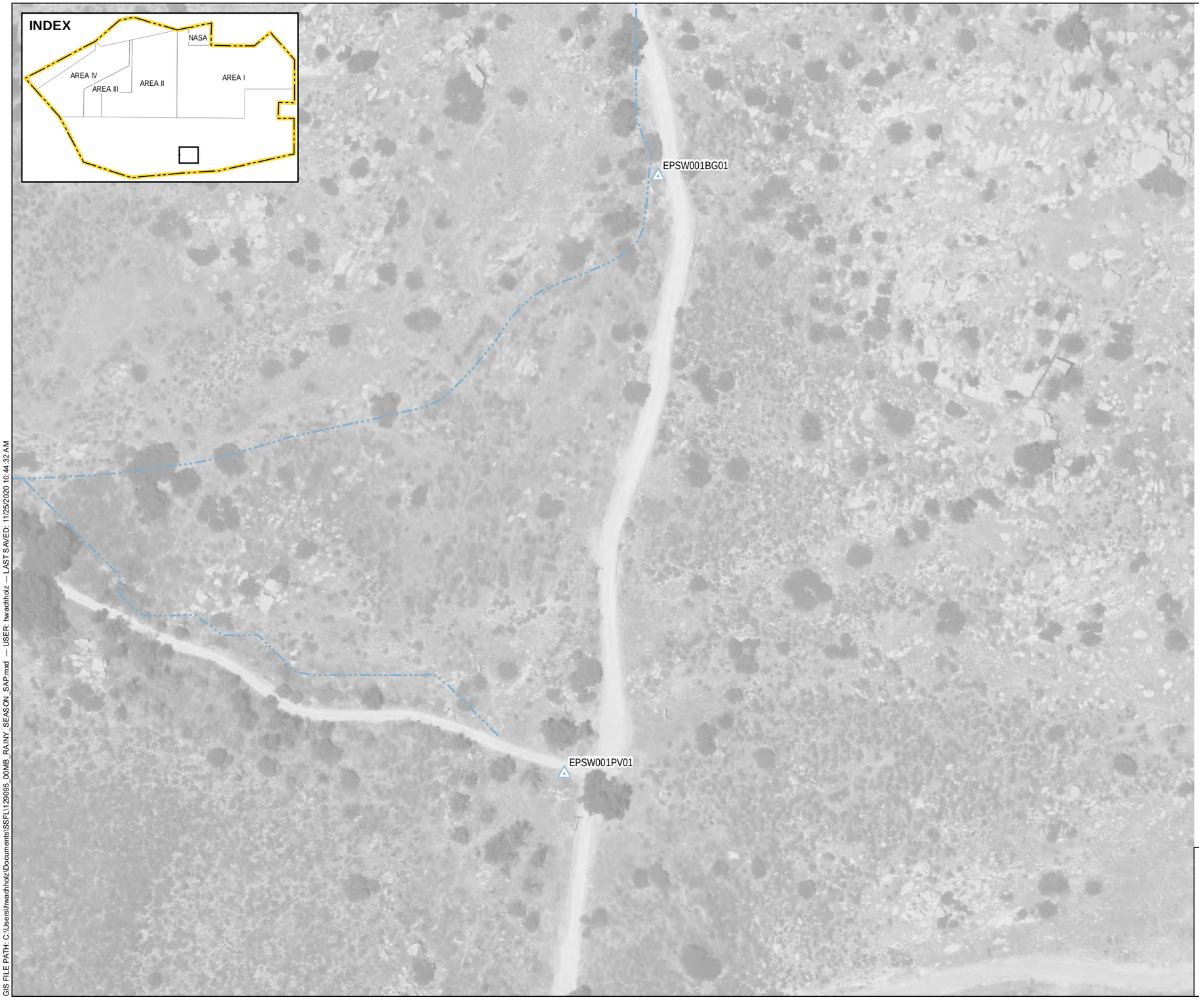

LEGEND

- POTENTIAL BMP PERFORMANCE MONITORING LOCATION
- DRAINAGE

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. SAP = SAMPLING AND ANALYSIS PLAN
3. BMP = BEST MANAGEMENT PRACTICE
4. AERIAL IMAGERY SOURCE: CIRGIS

N

0 100 200
SCALE IN FEET

HALEY ALDRICH

2020/2021 RAINY SEASON MAP
BMP MONITORING PROGRAM
THE BOEING COMPANY
VENTURA COUNTY, CALIFORNIA

OUTFALL 001
POTENTIAL BMP SUBAREA

NOVEMBER 2020

FIGURE 9

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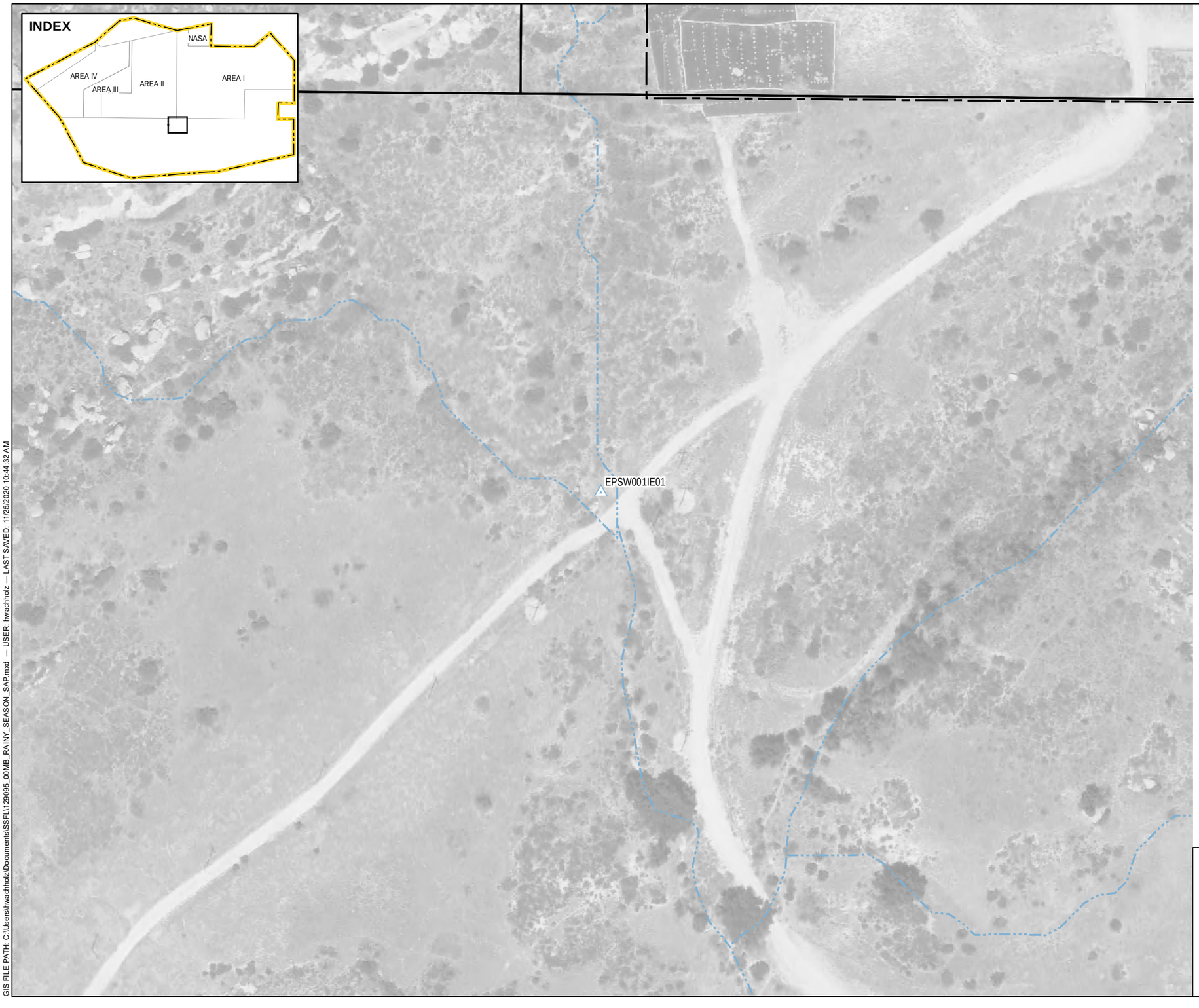

LEGEND

- POTENTIAL BMP PERFORMANCE MONITORING LOCATION
- DRAINAGE
- STUDY AREA
- ADMINISTRATIVE AREA BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. SAP = SAMPLING AND ANALYSIS PLAN
3. BMP = BEST MANAGEMENT PRACTICE
4. AERIAL IMAGERY SOURCE: CIRGIS

N

0 100 200
SCALE IN FEET

HALEY ALDRICH

2020/2021 RAINY SEASON MAP
BMP MONITORING PROGRAM
THE BOEING COMPANY
VENTURA COUNTY, CALIFORNIA

OUTFALL 001
POTENTIAL BMP SUBAREA

NOVEMBER 2020

FIGURE 10

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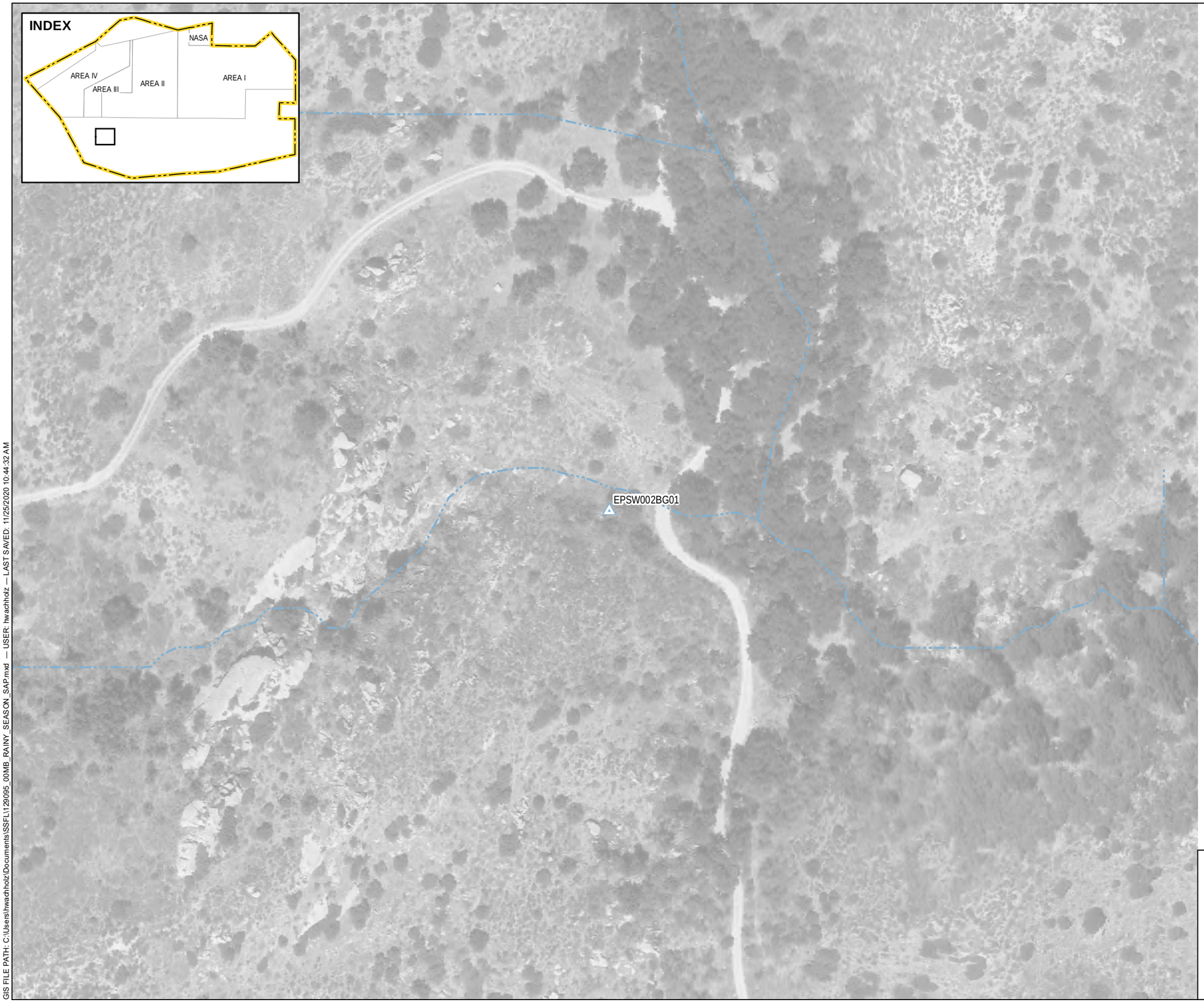

LEGEND

- POTENTIAL BMP PERFORMANCE MONITORING LOCATION
- DRAINAGE

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. SAP = SAMPLING AND ANALYSIS PLAN
3. BMP = BEST MANAGEMENT PRACTICE
4. AERIAL IMAGERY SOURCE: CIRGIS

N

0 100 200
SCALE IN FEET

HALEY ALDRICH

2020/2021 RAINY SEASON MAP
BMP MONITORING PROGRAM
THE BOEING COMPANY
VENTURA COUNTY, CALIFORNIA

OUTFALL 002
POTENTIAL BMP SUBAREA

NOVEMBER 2020

FIGURE 11

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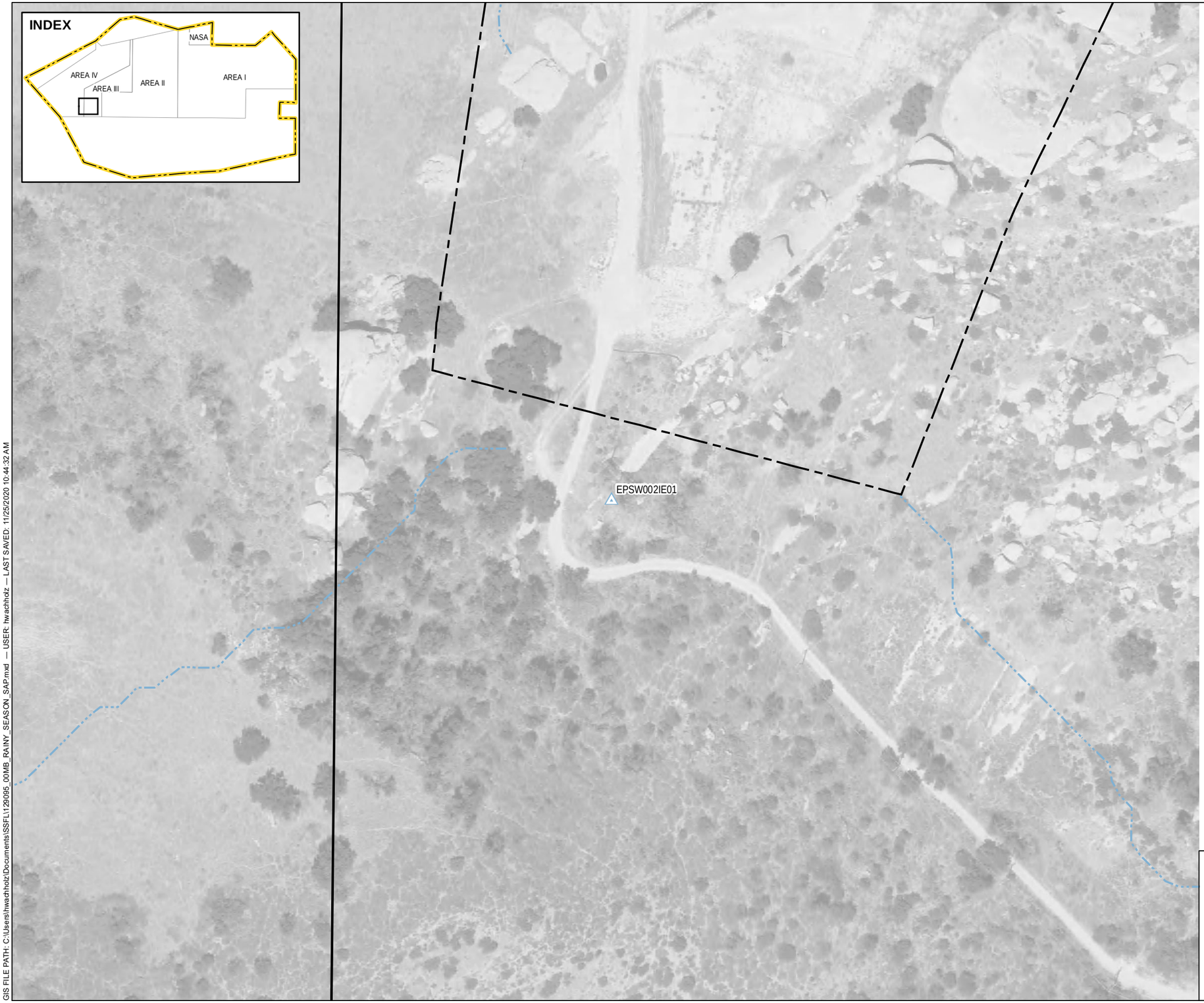

LEGEND

- POTENTIAL BMP PERFORMANCE MONITORING LOCATION
- DRAINAGE
- STUDY AREA
- ADMINISTRATIVE AREA BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. SAP = SAMPLING AND ANALYSIS PLAN
3. BMP = BEST MANAGEMENT PRACTICE
4. AERIAL IMAGERY SOURCE: CIRGIS

N

0 100 200
SCALE IN FEET

HALEY ALDRICH

2020/2021 RAINY SEASON MAP
BMP MONITORING PROGRAM
THE BOEING COMPANY
VENTURA COUNTY, CALIFORNIA

OUTFALL 002
POTENTIAL BMP SUBAREA

NOVEMBER 2020

FIGURE 12

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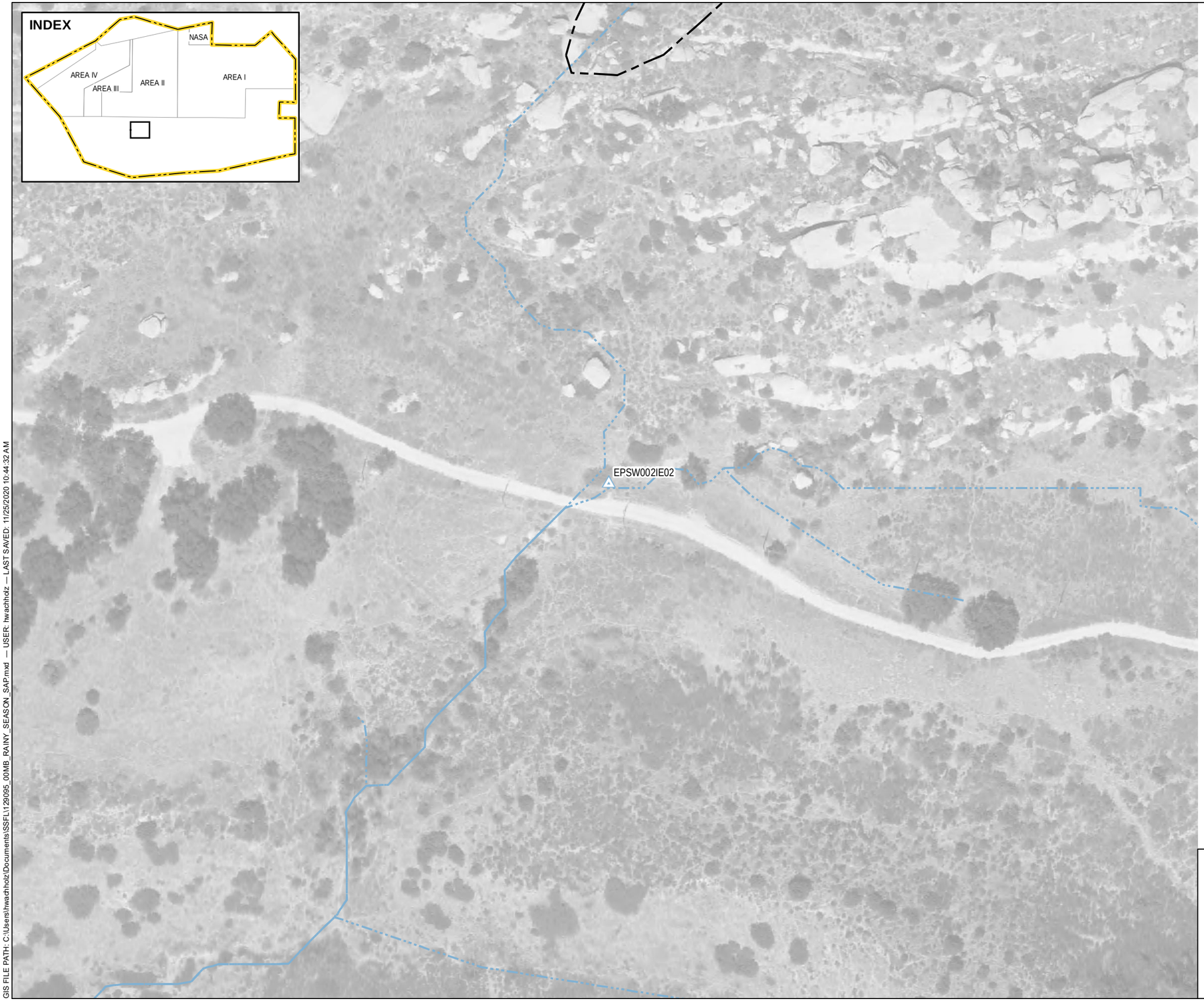

LEGEND

- POTENTIAL BMP PERFORMANCE MONITORING LOCATION
- DRAINAGE
- STUDY AREA

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. SAP = SAMPLING AND ANALYSIS PLAN
3. BMP = BEST MANAGEMENT PRACTICE
4. AERIAL IMAGERY SOURCE: CIRGIS

N

0 100 200
SCALE IN FEET

HALEY ALDRICH

2020/2021 RAINY SEASON MAP
BMP MONITORING PROGRAM
THE BOEING COMPANY
VENTURA COUNTY, CALIFORNIA

OUTFALL 002
POTENTIAL BMP SUBAREA

NOVEMBER 2020

FIGURE 13

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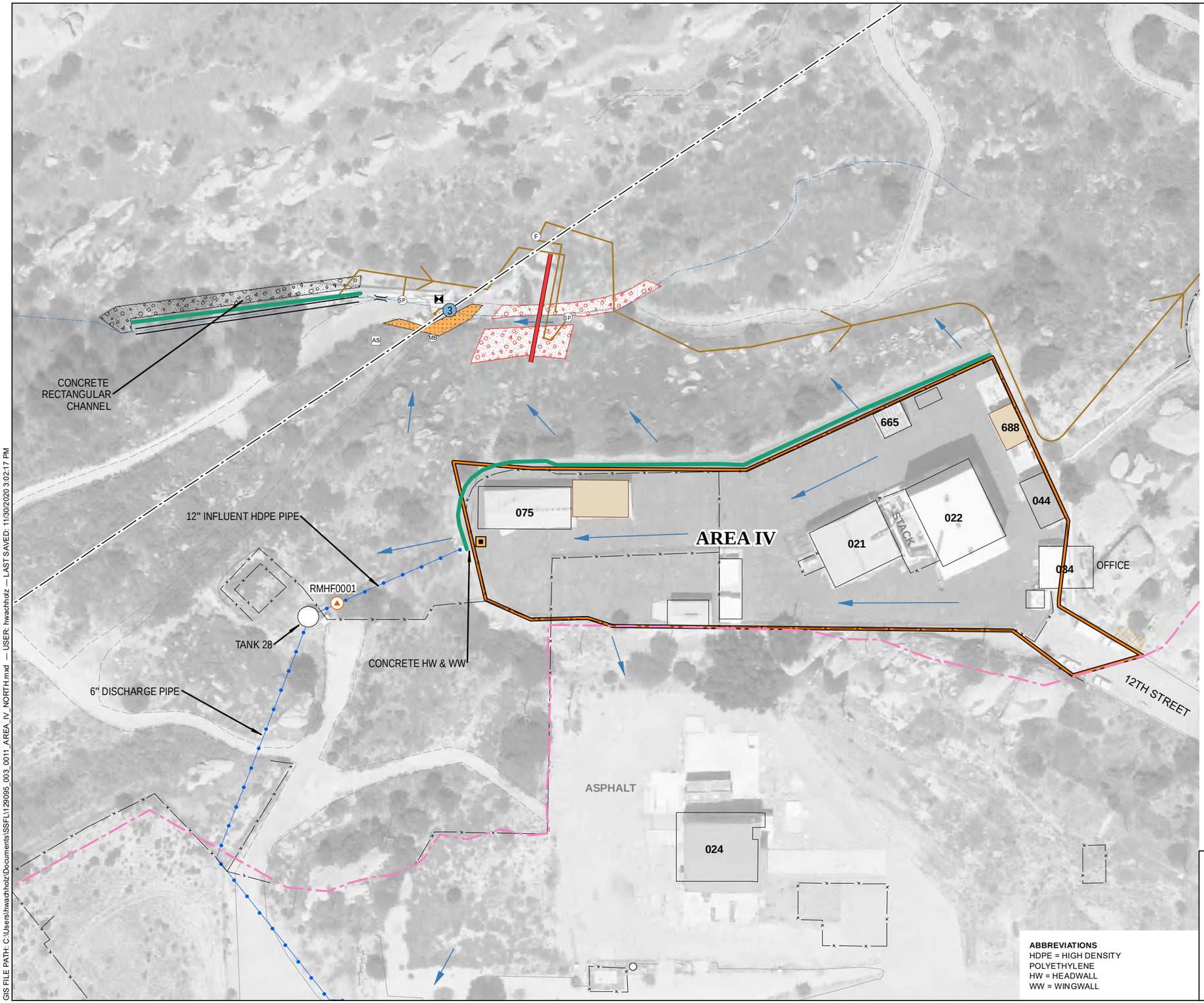

LEGEND

- SAMPLE BOX
- AUTO SAMPLER
- MEDIA BED
- FLOW METER TOTALIZER
- SUBMERSIBLE PUMP
- DRAIN
- UPSTREAM BMP PERFORMANCE MONITORING LOCATION
- ACTIVE NPDES OUTFALL
- FLUME
- P-DRNS
- CHECK DAM
- DEMOLITION BOUNDARY
- PIPELINE
- FENCE
- SURFACE WATER DIVIDE
- NATURAL DRAINAGE
- SURFACE WATER FLOW DIRECTION
- SWALE
- GRAVEL
- RIP RAP
- MEDIA FILTER
- EXISTING BUILDING/STRUCTURE
- AWNING
- ADMINISTRATIVE AREA BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ALL THE BMPs SHOWN ON THE FIGURE ARE EXISTING.
3. AERIAL IMAGERY SOURCE: CIRGIS

ABBREVIATIONS
HDPE = HIGH DENSITY POLYETHYLENE
HW = HEADWALL
WW = WINGWALL

0 80 160
SCALE IN FEET

HALEY ALDRICH

2020/2021 RAINY SEASON MAP
BMP MONITORING PROGRAM
THE BOEING COMPANY

OUTFALL 003 AND PHASE 1 DEMOLITION BOUNDARY AT RADIOACTIVE MATERIALS HANDLING FACILITY (RMHF)

NOVEMBER 2020

FIGURE 14

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Company Name

Happy Valley - Road Leading Down to Lower BMP Area

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Happy Valley - Road Leading Down to Lower BMP Area

Inspection Status: **Conducted/Not Conducted**

Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Is the road leading down to BMP area free of erosion?	No/Yes/NA with comment
Are rip rap berms free of sediment/debris?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
72 Hours After the End of the Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Is the road leading down to BMP area free of erosion?	No/Yes/NA with comment
Are rip rap berms free of sediment/debris?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment

Corrective action identified during this inspection event: No/Yes/NA with comment

General Comments:

Signature

Company Name

Happy Valley - Road Leading Down to Lower BMP Area

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo LBMP-1: Overview of HVS Lower BMP Area (from top of road east)

Insert photo here

Photo LBMP-2: Overview of HVS Lower BMP Area (from top of road west)

General Comments:

Signature

Company Name

OF008

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF008 Inspection Status: **Conducted/Not Conducted**

Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
72 Hours After the End of the Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment

Corrective action identified during this inspection event: No/Yes/NA with comments

General Comments:

Signature

Company Name

OF008

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo OF008-1: HVS Drainage and Tributary Drainage Overview (looking north)

Insert photo here

Photo OF008-2: Outfall 008 Overview

Insert photo here

Photo OF008-3: Tributary Drainage Check Dams

General Comments:

Signature

Company Name

OF009 ADMINISTRATION BUILDING AREA

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 Administration Building Area	Inspection Status:	**Conducted/Not Conducted**
Inspection Checklist Questions:		*Inspection Answers:*
During Rain Event Inspection		
Any odors, suspended materials, floating material, etc. observed?		No/Yes/NA with comment
Is any short-circuiting present around the lip of the filter basket?		No/Yes/NA with comment
72 Hours After the End of the Rain Event Inspection		
Any odors, suspended materials, floating material, etc. observed?		No/Yes/NA with comment
Is ponded water observed in filter basket?		No/Yes/NA with comment

Corrective action identified during this inspection event: No/Yes/NA with comment

General Comments:

Signature

Company Name

OF009 ADMINISTRATION BUILDING AREA

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo OF 009 Filter Basket Overview

Insert photo here

Photo 1: ILBMP0009-1: Filter Basket Influent

Insert photo here

Photo 2: ILBMP0010-1: Filter Basket Effluent

General Comments:

Signature

Company Name

OF009 Lower Parking Lot
BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 Lower Parking Lot Inspection Status: **Conducted/Not Conducted**

Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Is the area near or along the cistern drain inlet clear of unwanted sediment/debris?	No/Yes/NA with comment
Is runoff along the 24-inch drain being diverted by the low flow diversion weir to the cistern?	No/Yes/NA with comment
Is the gravel area/gravel bag berm (north of fence) in good condition?	No/Yes/NA with comment
Is the wood retaining wall in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
What is the approximate depth of water present in the low flow diversion structure?	No/Yes/NA with comment
72 Hours After the End of the Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Is the area near or along the cistern drain inlet clear of unwanted sediment/debris?	No/Yes/NA with comment
Is the gravel area/gravel bag berm (north of fence) in good condition?	No/Yes/NA with comment
Is the wood retaining wall in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment

Corrective action identified during this inspection event: No/Yes/NA with comment

General Comments:

Signature

Company Name

OF009 Lower Parking Lot
BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo LPL-1: Cistern area

Insert photo here

Photo LPL-2: Looking down into low flow diversion structure

Insert photo here

Photo LPL-3: Grated inlet and concrete curb

Insert photo here

Photo LPL-4: Wooden retaining wall

General Comments:

Signature

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo 17: LPBMP0002: Lower Lot Area, Upstream BMP; Sample Port in Cistern Discharge Pipe

Insert photo here

Photo 18: LPBMP0002: Lower Lot Area, Upstream BMP; Sample Port in Cistern Discharge Pipe

Insert photo here

Photo 19: LPBMP0003: Lower Lot Area, Mid-Point Lower Lot BMP; Sediment Basin Outlet Box

Insert photo here

Photo 20: LPBMP0003: Lower Lot Area, Mid-Point Lower Lot BMP; Sediment Basin Outlet Box

General Comments:

Signature

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo 21: LPBMP0004: Lower Lot Area, Downstream Lower Lot Treatment BMP; Discharge from Biofilter Effluent Pipe

Insert photo here

Photo 22: LPBMP0004: Lower Lot Area, Downstream Lower Lot Treatment BMP; Discharge from Biofilter Effluent Pipe

General Comments:

Signature

Company Name

OF009 Sediment Basin
BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 Sediment Basin	Inspection Status:	**Conducted/Not Conducted**
Inspection Checklist Questions:		*Inspection Answers:*
During Rain Event Inspection		
Any odors, suspended materials, floating material, etc. observed?		No/Yes/NA with comment
Are erosion/sediment controls in good condition?		No/Yes/NA with comment
Is there overflow into the lower lot?		No/Yes/NA with comment
If above is YES, please record a video.		N/A
72 Hours After the End of the Rain Event Inspection		
Any odors, suspended materials, floating material, etc. observed?		No/Yes/NA with comment
Are erosion/sediment controls in good condition?		No/Yes/NA with comment
Is the outlet box clear of unwanted sediment/debris?		No/Yes/NA with comment
Is there ponded water in the Sediment Basin?		No/Yes/NA with comment
If above is YES, note approximate depth to water from top of outlet box		No/Yes/NA with comment

Corrective action identified during this inspection event: No/Yes/NA with comment

General Notes:

Signature

Company Name

OF009 Sediment Basin
BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo SB-1: Sediment Basin Overview

Insert photo here

Photo SB-2: Inside Sediment Basin Riser Structure

General Notes:

Signature

Company Name

OF009 BIOFILTER

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 BIOFILTER Inspection Status: **Conducted/Not Conducted**

Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is there flow overtopping the riser structure?	No/Yes/NA with comment
If above is YES, does the underdrain appear to be constricted?	No/Yes/NA with comment
If above is YES, please record a video.	N/A
Is there flow in the riser structure?	No/Yes/NA with comment
72 Hours After the End of the Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Are underdrain(s) clear of unwanted sediment/debris?	No/Yes/NA with comment
Is there ponded water in the Biofilter?	No/Yes/NA with comment
If above is YES, record approximate depth from top of riser structure under comments	Depth
Are percolation holes in the concrete apron (at the sediment basin effluent pipe) clear of unwanted sediment/debris?	No/Yes/NA with comment

Corrective action identified during this inspection event: No/Yes/NA with comment

General Notes:

Signature

Company Name

OF009 BIOFILTER

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo BF-1: Sediment Basin Discharge Pipe

Insert photo here

Photo BF-2: Biofilter Overview

Insert photo here

Photo BF-3: Biofilter Discharge Pipe

Insert photo here

Photo BF-4: Biofilter Outlet Structure

General Notes:

Signature

Company Name

OF009 CM-9 AILF Area

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 CM-9 AILF Area Inspection Status:	**Conducted/Not Conducted**
Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is there flow overtopping the weir board?	No/Yes/NA with comment
If above is YES, does the underdrain appear to be constricted?	No/Yes/NA with comment
If above is YES, please record a video.	N/A
Is the upstream perforated pipeline draining properly?	No/Yes/NA with comment
Is the culvert basin clear of unwanted sediment/debris?	No/Yes/NA with comment
If above is NO, note approximate depth	Depth
Is the inlet swale along Area II Road clear of unwanted sediment/debris?	No/Yes/NA with comment
Is rip rap berm clear of unwanted sediment/debris?	No/Yes/NA with comment
Is any water observed coming out of landfill slope?	No/Yes/NA with comment
Does the CM-9 discharge pipe (north of Area II Road) show any additional signs of erosion?	No/Yes/NA with comment
72 Hours After the End of the Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Are underdrain(s) clear of unwanted sediment/debris?	No/Yes/NA with comment
Is weir board filter fabric in good condition?	No/Yes/NA with comment
Is the culvert basin clear of unwanted sediment/debris?	No/Yes/NA with comment
If above is NO, note approximate depth	Depth
Is a recent high-water mark visible on weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth
Is water ponded in front of weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth
Is the inlet swale along Area II Road clear of unwanted sediment/debris?	No/Yes/NA with comment
Is rip rap berm clear of unwanted sediment/debris?	No/Yes/NA with comment
Does the CM-9 discharge pipe (north of Area II Road) show any additional signs of erosion?	No/Yes/NA with comment

Corrective action identified during this inspection event: No/Yes/NA with comment

General Notes:

Signature

Company Name

OF009 CM-9 AILF Area

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo CM9-1: Asphalt Swale Inlet from Area 2 Road – ILBMP0002

Insert photo here

Photo CM9-2a: CM-9 Basin Overview (Upstream)

Insert photo here

Photo CM9-2b: CM-9 Basin Overview (Towards Weir Boards)

Insert photo here

Photo CM9-3a: Along Perforated Pipeline (upstream)

General Notes:

Signature

Company Name

OF009 CM-9 AILF Area

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo CM9-3b: Along Perforated Pipeline (downstream)

Insert photo here

Photo CM9-4a: Rip Rap Berm (upstream)

Insert photo here

Photo CM9-4b: Rip Rap Berm (downstream)

Insert photo here

Photo 17: A1BMP0002: CM-9 Area, Upstream (South), CM-9 BMPs

General Notes:

Signature

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo 18: A1BMP0002: CM-9 Area, Upstream (South), CM-9 BMPs

Insert photo here

Photo 19: A1BMP0003: CM-9 Area, Downstream, CM-9 BMPs; CM-9 Underdrains

Insert photo here

Photo 20: A1BMP0003: CM-9 Area, Downstream, CM-9 BMPs; CM-9 Underdrains

Insert photo here

Photo 21: ILBMP0002: CM-9 Area, Upstream (East), CM-9 BMPs; Culvert Inlet Off Area II Road

General Notes:

Signature

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo 22: ILBMP0002: CM-9 Area, Upstream (East), CM-9 BMPs; Culvert Inlet Off Area II Road

General Notes:

Signature

Company Name

OF009 B-1 Retention Basin

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 B-1 Retention Basin Inspection Status: **Conducted/Not Conducted**

Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is the retention basin clear of unwanted sediment/debris?	No/Yes/NA with comment
Is the perimeter of the basin free of erosion?	No/Yes/NA with comment
72 Hours After the End of the Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is the retention basin clear of unwanted sediment/debris?	No/Yes/NA with comment
Is the perimeter of the basin free of erosion?	No/Yes/NA with comment

Corrective action identified during this inspection event: No/Yes/NA with comment

General Notes:

Signature

Company Name

OF009 B-1 Retention Basin

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo B1RB-1: B-1 Retention Overview

Insert photo here

Photo B1RB-2: Close-up of Riser Structure in Retention Basin

General Notes:

Signature

Company Name

OF009 Upper Lot Media Filter
BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 Upper Lot Media Filter Inspection Status: **Conducted/Not Conducted**

Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is there flow overtopping the box?	No/Yes/NA with comment
If above is YES, does the underdrain appear to be constricted?	No/Yes/NA with comment
If above is YES, please record a video.	N/A
Is hillside free of erosion?	No/Yes/NA with comment
Is the asphalt/gunite swale going towards Upper Lot Media Filter clear of unwanted sediment/debris?	No/Yes/NA with comment
Note % flow from each underdrain	%
72 Hours After the End of the Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Are underdrain(s) clear of unwanted sediment/debris?	No/Yes/NA with comment
Is hillside free of erosion?	No/Yes/NA with comment
Is the asphalt/gunite swale going towards Upper Lot Media Filter clear of unwanted sediment/debris?	No/Yes/NA with comment
Is there ponded water present in media filter area?	No/Yes/NA with comment
If above is YES, record approximate depth from the top of riser structure	Depth
Is hillside free of erosion?	No/Yes/NA with comment
Is the asphalt/gunite swale going towards Upper Lot Media Filter clear of unwanted sediment/debris?	No/Yes/NA with comment

Corrective action identified during this inspection event: No/Yes/NA with comment

General Notes:

Signature

Company Name

OF009 Upper Lot Media Filter
BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo ULMF-1: Upper Lot Media Filter Overview

Insert photo here

Photo ULMF-2: Upper Lot Retention Basin Discharge Pipe (inside of the riser structure)

Insert photo here

Photo ULMF-3: ULMF Area, Gunite Swale Conveying Road Runoff

Insert photo here

Photo 10: B1BMP0009: B-1 Area, Gunite Swale Conveying Road Runoff

General Notes:

Signature

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo 11: B1BMP0009: B-1 Area, Gunite Swale Conveying Road Runoff

Insert photo here

Photo 12: B1BMP0010: B-1 Area, Culvert Outlet from Upper Parking Lot Area

Insert photo here

Photo 13: B1BMP0010: B-1 Area, Culvert Outlet from Upper Parking Lot Area

Insert photo here

Photo 14: B1BMP0011: B-1 Area, Underdrains

General Notes:

Signature

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo 15: B1BMP0011: B-1 Area, Underdrains

General Notes:

Signature

Company Name

OF009 Detention Bioswales
BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 Detention Bioswales Inspection Status: **Conducted/Not Conducted**

Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is rip rap swale clear of unwanted sediment/debris?	No/Yes/NA with comment
Are vegetated swales in good condition?	No/Yes/NA with comment
Note % flow from northern underdrain	%
Note % flow from southern underdrain	%
72 Hours After the End of the Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Are underdrain(s) clear of unwanted sediment/debris?	No/Yes/NA with comment
Is rip rap swale clear of unwanted sediment/debris?	No/Yes/NA with comment

Corrective action identified during this inspection event: No/Yes/NA with comment

General Notes:

Signature

Company Name

OF009 Detention Bioswales
BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo B1DB-1: Northern B1436 Bioswale Overview (from the north end)

Insert photo here

Photo B1DB-2: Northern B1436 Bioswale Overview (from the south end)

Insert photo here

Photo B1DB-3: Southern B1436 Bioswale Overview (from the north end)

Insert photo here

Photo B1DB-4: Southern B1436 Bioswale Overview (from the south end)

General Notes:

Signature

Company Name

OF009 Detention Bioswales
BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo B1DB-5: Western Swale Inlet to Southern B1436 Bioswale

Insert photo here

Photo B1DB-6: Eastern Swale Inlet to Southern B1436 Bioswale

Insert photo here

Photo 1: ILBMP0008: Upstream, B1436 Southern Detention Bioswale (Concrete Swale Diverting Sheet Flow into Rock Crib – East)

Insert photo here

Photo 2: ILBMP0008: Upstream, B1436 Southern Detention Bioswale (Concrete Swale Diverting Sheet Flow into Rock Crib – East)

General Notes:

Signature

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo 3: ILBMP0004: Upstream, B1436 Southern Detention Bioswale (Concrete Swale Diverting Sheet Flow into Rock Crib – West)

Insert photo here

Photo 4: ILBMP0004: Upstream, B1436 Southern Detention Bioswale (Concrete Swale Diverting Sheet Flow into Rock Crib – West)

Insert photo here

Photo 5: ILBMP0005: Downstream, B1436 Southern Detention Bioswale; 12-inch Underdrain

Insert photo here

Photo 6: ILBMP0005: Downstream, B1436 Southern Detention Bioswale; 12-inch Underdrain

General Notes:

Signature

Company Name

OF009 CM-8

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 CM-8 Inspection Status: **Conducted/Not Conducted**

Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is the culvert basin clear of unwanted sediment/debris?	No/Yes/NA with comment
If above is NO, note approximate depth	Depth
Is there flow overtopping the weir boards?	No/Yes/NA with comment
If above is YES, does the underdrain appear to be constricted?	No/Yes/NA with comment
If above is YES, please record a video.	N/A
72 Hour Storm Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Are underdrain(s) clear of unwanted sediment/debris?	No/Yes/NA with comment
Is weir board filter fabric in good condition?	No/Yes/NA with comment
Is the culvert basin clear of unwanted sediment/debris?	No/Yes/NA with comment
If above is NO, note approximate depth	Depth
Is a recent high-water mark visible on weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth
Is water ponded in front of weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth

Corrective action identified during this inspection event: No/Yes/NA with comment

General Notes:

Signature

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo CM8-1a: CM-8 Basin Overview (Upstream)

Insert photo here

Photo CM8-1b: CM-8 Basin Overview (Towards Weir Boards)

General Notes:

Signature

Company Name

OF009 CM-11
BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 CM-11 Inspection Status: **Conducted/Not Conducted**

Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is the culvert basin clear of unwanted sediment/debris?	No/Yes/NA with comment
If above is NO, note approximate depth	Depth
Is there flow overtopping the weir boards?	No/Yes/NA with comment
If above is YES, does the underdrain appear to be constricted?	No/Yes/NA with comment
If above is YES, please record a video.	N/A
72 Hours After the End of the Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Are underdrain(s) clear of unwanted sediment/debris?	No/Yes/NA with comment
Is weir board filter fabric in good condition?	No/Yes/NA with comment
Is the culvert basin clear of unwanted sediment/debris?	No/Yes/NA with comment
If above is NO, note approximate depth	Depth
Is a recent high-water mark visible on weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth
Is water ponded in front of weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth

Corrective action identified during this inspection event: No/Yes/NA with comment

General Notes:

Signature

Company Name

OF009 CM-11

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo CM11-1a: CM-11 Basin Overview (Upstream)

Insert photo here

Photo CM11-1b: CM-11 Basin Overview (Towards Weir Boards)

General Notes:

Signature

Company Name

OF009 CM-7

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 CM-7 Inspection Status: **Conducted/Not Conducted**

Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Are the upstream swales clear of unwanted sediment/debris?	No/Yes/NA with comment
72 Hours After the End of the Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Are the upstream swales clear of unwanted sediment/debris?	No/Yes/NA with comment

Corrective action identified during this inspection event: No/Yes/NA with comment

General Notes:

Signature

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo CM7-1a: CM-7 Upstream

General Notes:

Signature

Company Name

OF009 CM-6

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 CM-6 Inspection Status: **Conducted/Not Conducted**

Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is the culvert basin clear of unwanted sediment/debris?	No/Yes/NA with comment
If above is NO, note approximate depth	Depth
Is there flow overtopping the weir boards?	No/Yes/NA with comment
If above is YES, does the underdrain appear to be constricted?	No/Yes/NA with comment
If above is YES, please record a video.	N/A
72 Hours After the End of the Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Are underdrain(s) clear of unwanted sediment/debris?	No/Yes/NA with comment
Is weir board filter fabric in good condition?	No/Yes/NA with comment
Is the culvert basin clear of unwanted sediment/debris?	No/Yes/NA with comment
If above is NO, note approximate depth	Depth
Is a recent high-water mark visible on weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth
Is water ponded in front of weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth

Corrective action identified during this inspection event: No/Yes/NA with comment

General Notes:

Signature

Company Name

OF009 CM-6

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo CM6-1a: CM-6 Basin Overview (Upstream)

Insert photo here

Photo CM6-1b: CM-6 Basin Overview (Towards Weir Boards)

General Notes:

Signature

Company Name

OF009 CM-5 Sage Ranch
BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 CM-5 Sage Ranch Inspection Status: **Conducted/Not Conducted**

Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is the culvert basin clear of unwanted sediment/debris?	No/Yes/NA with comment
If above is NO, note approximate depth	Depth
Is there flow overtopping the weir boards?	No/Yes/NA with comment
If above is YES, does the underdrain appear to be constricted?	No/Yes/NA with comment
If above is YES, please record a video.	N/A
72 Hours After the End of the Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Are underdrain(s) clear of unwanted sediment/debris?	No/Yes/NA with comment
Is weir board filter fabric in good condition?	No/Yes/NA with comment
Is the culvert basin clear of unwanted sediment/debris?	No/Yes/NA with comment
If above is NO, note approximate depth	Depth
Is a recent high-water mark visible on weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth
Is water ponded in front of weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth

Corrective action identified during this inspection event: No/Yes/NA with comment

General Notes:

Signature

Company Name

OF009 CM-5 Sage Ranch
BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo CM5-1a: CM-5 Basin Overview (Upstream)

Insert photo here

Photo CM5-1b: CM-5 Basin Overview (Towards Weir Boards)

General Notes:

Signature

Company Name

OF009 CM-12 Sage Ranch

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 CM-12 Sage Ranch Inspection Status: **Conducted/Not Conducted**

Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is the culvert basin clear of unwanted sediment/debris?	No/Yes/NA with comment
If above is NO, note approximate depth	Depth
Is there flow overtopping the weir boards?	No/Yes/NA with comment
If above is YES, does the underdrain appear to be constricted?	No/Yes/NA with comment
If above is YES, please record a video.	N/A
72 Hours After the End of the Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is weir board filter fabric in good condition?	No/Yes/NA with comment
Is the culvert basin clear of unwanted sediment/debris?	No/Yes/NA with comment
If above is NO, note approximate depth	Depth
Is a recent high-water mark visible on weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth
Is water ponded in front of weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth

Corrective action identified during this inspection event: No/Yes/NA with comment

General Notes:

Signature

Company Name

OF009 CM-12 Sage Ranch
BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo CM12-1a: CM-12 Basin Overview (Upstream)

Insert photo here

Photo CM12-1b: CM-12 Basin Overview (Towards Weir Boards)

General Notes:

Signature

Company Name

OF009 CM-4

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 CM-4 Inspection Status: **Conducted/Not Conducted**

Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is the culvert basin clear of unwanted sediment/debris?	No/Yes/NA with comment
If above is NO, note approximate depth	Depth
Is there flow overtopping the weir boards?	No/Yes/NA with comment
If above is YES, does the underdrain appear to be constricted?	No/Yes/NA with comment
If above is YES, please record a video.	N/A
72 Hours After the End of the Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Are underdrain(s) clear of unwanted sediment/debris?	No/Yes/NA with comment
Is weir board filter fabric in good condition?	No/Yes/NA with comment
Is the culvert basin clear of unwanted sediment/debris?	No/Yes/NA with comment
If above is NO, note approximate depth	Depth
Is a recent high-water mark visible on weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth
Is water ponded in front of weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth

Corrective action identified during this inspection event: No/Yes/NA with comment

General Notes:

Signature

Company Name

OF009 CM-4

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo CM4-1a: CM-4 Basin Overview (Upstream)

Insert photo here

Photo CM4-1b: CM-4 Basin Overview (Towards Weir Boards)

General Notes:

Signature

Company Name

OF009 CM-3

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 CM-3 Inspection Status: **Conducted/Not Conducted**

Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is the culvert basin clear of unwanted sediment/debris?	No/Yes/NA with comment
If above is NO, note approximate depth	Depth
Is there flow overtopping the weir boards?	No/Yes/NA with comment
If above is YES, does the underdrain appear to be constricted?	No/Yes/NA with comment
If above is YES, please record a video.	N/A
Is the drop inlet on the north side of the road clogged or otherwise obstructed?	No/Yes/NA with comment
Is there erosion at the diversion pipe outlet?	No/Yes/NA with comment
72 Hours After the End of the Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Are underdrain(s) clear of unwanted sediment/debris?	No/Yes/NA with comment
Is weir board filter fabric in good condition?	No/Yes/NA with comment
Is the culvert basin clear of unwanted sediment/debris?	No/Yes/NA with comment
If above is NO, note approximate depth	Depth
Is a recent high-water mark visible on weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth
Is water ponded in front of weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth
Is the drop inlet on the north side of the road clogged or otherwise obstructed?	No/Yes/NA with comment
Is there erosion at the diversion pipe outlet?	No/Yes/NA with comment

Corrective action identified during this inspection event: No/Yes/NA with comment

General Notes:

Signature

Company Name

OF009 CM-3

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo CM3-1a: CM-3 Basin Overview (Upstream)

Insert photo here

Photo CM3-1b: CM-3 Basin Overview (Towards Weir Boards)

Insert photo here

Photo CM3-2: CM-3 Roadway Inlet

Insert photo here

Photo CM3-3: CM-3 Diversion Outlet

General Notes:

Signature

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo 25: LXBMP0010: CM-3 Area, upstream of Service Area Road BMP; Outlet on South Side of Road

Insert photo here

Photo 25: LXBMP0010: CM-3 Area, upstream of Service Area Road BMP; Outlet on South Side of Road

Insert photo here

Photo 26: LXBMP0011: CM-3 Area, Upstream of Service Area Road BMP, Natural Drainage Upstream of CM-3

Insert photo here

Photo 26: LXBMP0011: CM-3 Area, Upstream of Service Area Road BMP, Natural Drainage Upstream of CM-3

General Notes:

Signature

Company Name

OF009 CM-10
BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 CM-10 Inspection Status: **Conducted/Not Conducted**

Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is there flow overtopping the weir boards?	No/Yes/NA with comment
If above is YES, does the underdrain appear to be constricted?	No/Yes/NA with comment
If above is YES, please record a video.	N/A
Is there sediment accumulation in the culvert basin?	No/Yes/NA with comment
If above is YES, record approximate depth.	Depth
Is there erosion at the diversion pipe outlet?	No/Yes/NA with comment
72 Hours After the End of the Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is there sediment accumulation in the culvert basin?	No/Yes/NA with comment
If above is YES, record approximate depth.	Depth
Is there erosion at the diversion pipe outlet?	No/Yes/NA with comment
Is a recent high-water mark visible on weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth
Is water ponded in front of weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth
Are underdrain(s) clear of unwanted sediment/debris?	No/Yes/NA with comment
Is weir board filter fabric in good condition?	No/Yes/NA with comment

Corrective action identified during this inspection event: No/Yes/NA with comment

General Notes:

Signature

Company Name

OF009 CM-10

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo CM10-1a: CM-10 Basin Overview (Upstream)

Insert photo here

Photo CM10-1b: CM-10 Basin Overview (Towards Weir Boards)

General Notes:

Signature

Company Name

OF009 CM-2

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

OF009 CM-2 Inspection Status: **Conducted/Not Conducted**

Inspection Checklist Questions:	*Inspection Answers:*
During Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is there sediment accumulation in the culvert basin?	No/Yes/NA with comment
If above is YES, record approximate depth.	Depth
Is there flow overtopping the weir boards?	No/Yes/NA with comment
If above is YES, does the underdrain appear to be constricted?	No/Yes/NA with comment
If above is YES, please record a video.	N/A
72 Hours After the End of the Rain Event Inspection	
Any odors, suspended materials, floating material, etc. observed?	No/Yes/NA with comment
Are erosion/sediment controls in good condition?	No/Yes/NA with comment
Are upstream areas free of erosion or sediment?	No/Yes/NA with comment
Is there sediment accumulation in the culvert basin?	No/Yes/NA with comment
If above is YES, record approximate depth.	Depth
Is a recent high-water mark visible on weir boards?	No/Yes/NA with comment
If above is YES, note approximate depth from top of weir boards	Depth
Are underdrain(s) clear of unwanted sediment/debris?	
Is weir board filter fabric in good condition?	No/Yes/NA with comment

Corrective action identified during this inspection event: No/Yes/NA with comment

General Notes:

Signature

Company Name

OF009 CM-2

BMP Performance Inspection Checklist

Client	**The Boeing Company**	Inspection Date	
Project Name	**Santa Susana**	Inspector Name	
County	**Ventura County**	Inspector Company	
State	**California**	Project Manager	
Inspection Type(s)	**Stormwater Inspection**	Precip. Present	

Insert photo here

Photo CM2-1a: CM-2 Basin Overview (Upstream)

Insert photo here

Photo CM2-1b: CM-2 Basin Overview (Towards Weir Boards)

General Notes:

Signature

BMP Visual Inspection Form – OF009 NASA

Date/Time of Inspection _____

Inspector's Name/Title _____ **Signature** _____

Weather and Observations		
Precipitation present during inspection?	☐ Yes	☐ No

LOX Area BMPs

Photo #		Photo Location:	LOX Berm Overview (West End)
Photo #		Photo Location:	LOX Berm Overview (East End)
Photo #		Photo Location:	Northern Drainage Overview Where Slope Drains Discharge
Photo #		Additional Photo(s):	

During Rain Event Inspection	Yes	No	N/A	Comments/Corrective Action:
Any odors, suspended material, floating material, etc. observed?				
Are erosion/sediment controls in good condition?				
Are slope drains in good condition?				
Is the gravel bag berm in good condition?				
Are upstream areas free of erosion or sediment? If no, note location and description under comments.				

72 Hours After the End of the Rain Event Inspection				
Any odors, suspended material, floating material, etc. observed?				
Are slope drains in good condition?				
Is the gravel bag berm in good condition?				
Are upstream areas free of erosion or sediment? If no, note location and description under comments.				
Other _____				

BMP Visual Inspection Form – OF009 NASA

Sandbag Berm – Near LOX Area

Photo #		Photo Location:	
Photo #		Photo Location:	
Photo #		Photo Location:	
Photo #		Additional Photo(s):	

	Yes	No	N/A	Comments/Corrective Action:
During Rain Event Inspection				
Any odors, suspended material, floating material, etc. observed?				
Are the sandbags in good condition?				
Is area behind sandbag berm free of debris/sediment buildup?				
Are upstream areas free of erosion or sediment? If no, note location and description under comments.				
72 Hours After the End of the Rain Event Inspection				
Any odors, suspended material, floating material, etc. observed?				
Are slope drains in good condition?				
Are the sandbags in good condition?				
Is area behind sandbag berm free of debris/sediment buildup?				
Are upstream areas free of erosion or sediment? If no, note location and description under comments.				
Other				

BMP Visual Inspection Form – OF009 NASA

CM-1 Area

Photo #		Photo Location:	CM-1 Basin Overview (Upstream and Towards Weir Boards)
Photo #		Photo Location:	CM-1 Underdrains
Photo #		Photo Location:	CM-1 Discharge Pipe
Photo #		Photo Location:	Rip Rap Berm Northwest of CM-1
Photo #		Photo Location:	Stormwater Diversion to CM-1

During Rain Event Inspection	Yes	No	N/A	Comments/Corrective Action:
Any odors, suspended materials, floating material, etc. observed?				
Are erosion/sediment controls in good condition?				
Is there flow overtopping the weir boards? If yes, does the underdrain appear to be constricted? If yes, please record a video.				
Are underdrains in good condition? Note approximate % flow from each underdrain under comments.				
Is there sediment accumulation in the culvert basin? If yes, record approximate depth under comments.				
Any excessive ponding in front of sandbags at NW entrance?				
Are upstream areas free of erosion or sediment? If no, note location and description under comments.				
Is the drop inlet on the north side of the road clogged or otherwise obstructed?				
Is there erosion at the diversion pipe outlet?				

BMP Visual Inspection Form – OF009 NASA

CM-1 Area

72 Hours After the End of the Rain Event Inspection	Yes	No	N/A	Comments/Corrective Action:
Any odors, suspended materials, floating material, etc. observed?				
Are erosion/sediment controls in good condition?				
Is a recent high-water mark visible on weir boards? If yes, record depth from top of weir boards.				
Is water ponded in front of weir boards? If yes, record depth from top of weir boards.				
Is weir board filter fabric in good condition?				
Is there sediment accumulation in the culvert basin? If yes, record approximate depth under comments.				
Are upstream areas free of erosion or sediment? If no, note location and description under comments.				
Is the drop inlet on the north side of the road clogged or otherwise obstructed?				
Is there erosion at the diversion pipe outlet?				
Other _____				

BMP Visual Inspection Form – OF009 NASA

ELV Treatment BMP & ELV Channel

Photo #		Photo Location:	ELV Channel (Up- and Downstream)
Photo #		Photo Location:	ELV Settling Basin (looking towards intake pipe)
Photo #		Photo Location:	ELV Settling Basin (looking towards overflow bypass and culvert inlet)
Photo #		Photo Location:	ELV Treatment BMP Discharge Pipe
Photo #		Photo Location:	ELV Treatment BMP Tank Array Overview
Photo #		Additional Photo(s):	

During Rain Event Inspection / 72 Hours After the End of the Rain Event Inspection	Yes	No	N/A	Comments/Corrective Action:
Are erosion/sediment controls in good condition?				
Is ELV channel rip rap in good condition?				
Are fiber rolls and jute matting in good condition?				
Is influent screen free of debris (no clogging)?				
Is basin intake pipe in good condition?				
Is the settling basin in good condition?				
Is tank array and associated piping in good condition?				
Is effluent pipe in good condition?				
Are upstream areas free of erosion or sediment? If no, note location and description under comments.				
Other _____				

BMP Visual Inspection Form – OF009 NASA

Sandbag Berm – Near ELV Treatment BMP

Photo # _____ Photo Location: _____

Photo # _____ Photo Location: _____

Photo # _____ Photo Location: _____

Photo # _____ Additional Photo(s): _____

	Yes	No	N/A	Comments/Corrective Action:
During Rain Event Inspection				
Are the sandbags in good condition?				
Is area behind sandbag berm free of debris/sediment buildup?				
Are upstream areas free of erosion or sediment? If no, note location and description under comments.				
72 Hours After the End of the Rain Event Inspection				
Are the sandbags in good condition?				
Is area behind sandbag berm free of debris/sediment buildup?				
Are upstream areas free of erosion or sediment? If no, note location and description under comments.				
Is water ponded in front of sandbags? If yes, record depth from top of weir boards.				
Other _____				

BMP Visual Inspection Form – OF009 NASA

Helipad Area BMPs

Photo #		Photo Location:	Helipad Berm Overview (Eastern Berm)
Photo #		Photo Location:	Helipad Berm Overview (Western Berm)
Photo #		Photo Location:	Culvert Inlet Passing Beneath Helipad Road
Photo #		Photo Location:	
Photo #		Additional Photo(s):	

	Yes	No	N/A	Comments/Corrective Action:
During Rain Event Inspection				
Are the Helipad Berms in good condition?				
Are upstream areas free of erosion or sediment? If no, note location and description under comments.				
Is area behind Helipad Berms free of debris/sediment buildup?				
Is parking lot free of excessive debris/sediment?				
Is water overtopping the Helipad Berm? If yes, note which berm(s) are being overtopped. If yes, please record a video.				
72 Hours After the End of the Rain Event Inspection				
Are the Helipad Berms in good condition?				
Are upstream areas free of erosion or sediment? If no, note location and description under comments.				
Is area behind Helipad Berms free of debris/sediment buildup?				
Is parking lot free of excessive debris/sediment?				
Other _____				

BMP Visual Inspection Form – OF009 NASA

Additional Notes/Observations

Boeing 72 Hours After Rain Event Ponding Inspection Form

Date/Time of Inspection _____

Inspector's Name/Title _____ **Signature** _____

Culvert Modification	Ponding? Yes	Ponding? No	Depth (feet)
CM-2			
CM-3			
CM-4			
CM-5			
CM-6			
CM-7			
CM-8			
CM-9			
CM-10			
CM-11			
CM-12			
SEDIMENT BASIN			
BIOFILTER			
UPPER LOT MEDIA FILTER			
NORTHERN DETENTION BIOSWALE			
SOUTHERN DETENTION BIOSWALE			
ADMIN AREA FILTER BASKET			

OF009 Lower Lot - Cistern Inspection Checklist Questions:	**Inspection Answers:**
Amount of volume pumped from the cistern?	Volume
What was the resulting depth of the cistern?	Depth
Record the totalizer reading	Total

NASA 72 Hours After Rain Event Ponding Inspection Form

Date/Time of Inspection _____

Inspector's Name/Title _____ **Signature** _____

Culvert Modification	Ponding? Yes	Ponding? No	Depth (feet)
CM-1			
ELV			

Printed on 11/30/2020

Surface Water Monitoring Inspection and Sample Collection Form
PERFORMANCE MONITORING and BMP MONITORING PROGRAMS

Sampling Responsibility: NASA Inspector/Sampler: _____
Date: _____
Outfall/Watershed: 009

Weather: _____
Rain Event Start Date/Time: _____

	Sample Tracking Information						Sample Field Measurements				Leaf Test				Sample Observations
	ISRA Area(s) & Location	Qualitative Flow Observations*	Photo Number(s)	Object ID	Sample ID (Object ID_yyyymmdd)	Sample/Observation Time	Conductivity (mS or uS)	pH	Temperature (°C)	Turbidity (NTU)	Distance (ft)	Time (s)	Speed (ft/s)	Water Depth (in)	Notes (color, odor, sheen, foam, biological material, nearby erosion, etc.)
ELV TREATMENT BMP AND HELIPAD	Culvert inlet; runoff will only be present when rain events exceed ELV BMP design storm			EVBMP0001	EVBMP0001_										
	Sample port in BMP influent pipe prior to "T" connection			EVBMP0007	EVBMP0007_										
	Discharge from media filter tank pipe			EVBMP0008	EVBMP0008_										
	Composite of samples from eastern and western sample ports between settling tanks and media filter			EVBMP0009	EVBMP0009_										

Notes:

***Qualitative Flow Observations:**

No Flow
Low Flow: Trickle or minor amount of flow.
Moderate Flow: Water is flowing normally, no significant erosion or turbid water.
High Flow: Significant water flow/velocity, slope erosion.

NPDES Permit Limits:

Temperature < 86 °F

pH 6.5 - 8.5

ALL RECEIVING AND SAMPLE COLLECTION BOTTLES MUST BE PRE-RINSED 3 TIMES WITH SOURCE WATER, PRIOR TO COLLECTION OF THE SAMPLE.

EXCEPTION IS THE HNO3 (NITRIC) PRESERVED POLY BOTTLES - DO NOT PRE-RINSE THE HNO3 PRESERVED POLY'S

Additional Observations:

Printed on 11/30/2020

Surface Water Monitoring Inspection and Sample Collection Form
PERFORMANCE MONITORING and BMP MONITORING PROGRAMS

Sampling Responsibility: NASA
Inspector/Sampler:
Date:
Outfall/Watershed 009

Weather:
Rain Event Start Date/Time:

	Sample Tracking Information						Sample Field Measurements				Leaf Test				Sample Observations
	ISRA Area(s) & Location	Qualitative Flow Observations*	Photo Number(s)	Object ID	Sample ID (Object ID_yyyymmdd)	Sample/Observation Time	Conductivity (mS or uS)	pH	Temperature (°C)	Turbidity (NTU)	Distance (ft)	Time (s)	Speed (ft/s)	Water Depth (in)	Notes (color, odor, sheen, foam, biological material, nearby erosion, etc.)
CM-1 AND AREA II ROAD	Sheetflow along Area II Road upstream of sandbag berm			EVBMP0003	EVBMP0003_										
	CM-1 eastern tributary drainage			A2BMP0006	A2BMP0006_										
	CM-1 culvert outlet			A2BMP0007	A2BMP0007_										
	Outlet pipe south side of road			A2BMP0012	A2BMP0012_										

Notes:

Additional Observations:

***Qualitative Flow Observations:**

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Surface Water Monitoring Inspection and Sample Collection Form
PERFORMANCE MONITORING and BMP MONITORING PROGRAMS

Sampling Responsibility: Boeing
Inspector/Sampler:
Date:
Outfall/Watershed: 009

Weather:
Rain Event Start Date/Time:

	Sample Tracking Information						Sample Field Measurements				Leaf Test				Sample Observations
	ISRA Area(s) & Location	Qualitative Flow Observations*	Photo Number(s)	Object ID	Sample ID (Object ID_yyyymmdd)	Sample/Observation Time	Conductivity (mS or uS)	pH	Temperature (°C)	Turbidity (NTU)	Distance (ft)	Time (s)	Speed (ft/s)	Water Depth (in)	Notes (color, odor, sheen, foam, biological material, nearby erosion, etc.)
CM-3 AREA	Upstream of Service Area Road BMP, outlet pipe on south side of road			LXBMP0010	LXBMP0010_										
	Upstream of Service Area Road BMP, natural drainage upstream of CM-3			LXBMP0011	LXBMP0011_										
	Downstream of Service Area Road BMP, underdrains			LXBMP0012	LXBMP0012_										

Notes:

***Qualitative Flow Observations:**

No Flow
Low Flow: Trickle or minor amount of flow.
Moderate Flow: Water is flowing normally, no significant erosion or turbid water.
High Flow: Significant water flow/velocity, slope erosion.

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pH 6.5 - 8.5

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Additional Observations:

Surface Water Monitoring Inspection and Sample Collection Form
PERFORMANCE MONITORING and BMP MONITORING PROGRAMS

Sampling Responsibility: Boeing
Inspector/Sampler:
Date:
Outfall/Watershed: 009

Weather:
Rain Event Start Date/Time:

	Sample Tracking Information						Sample Field Measurements				Leaf Test				Sample Observations
	ISRA Area(s) & Location	Qualitative Flow Observations*	Photo Number(s)	Object ID	Sample ID (Object ID_yyyymmdd)	Sample/Observation Time	Conductivity (mS or uS)	pH	Temperature (°C)	Turbidity (NTU)	Distance (ft)	Time (s)	Speed (ft/s)	Water Depth (in)	Notes (color, odor, sheen, foam, biological material, nearby erosion, etc.)
B-1 AREA	Gunite swale conveying road runoff			B1BMP0009	B1BMP0009_										
	Culvert outlet from upper parking lot area			B1BMP0010	B1BMP0010_										
	Underdrains			B1BMP0011	B1BMP0011_										

Notes:

***Qualitative Flow Observations:**

No Flow
Low Flow: Trickle or minor amount of flow.
Moderate Flow: Water is flowing normally, no significant erosion or turbid water.
High Flow: Significant water flow/velocity, slope erosion.

NPDES Permit Limits:

Temperature < 86 °F

pH 6.5 - 8.5

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EXCEPTION IS THE HNO3 (NITRIC) PRESERVED POLY BOTTLES - DO NOT PRE-RINSE THE HNO3 PRESERVED POLY'S

Additional Observations:

Printed on 11/30/2020

Surface Water Monitoring Inspection and Sample Collection Form
PERFORMANCE MONITORING and BMP MONITORING PROGRAMS

Sampling Responsibility: Boeing
Inspector/Sampler:
Date:
Outfall/Watershed: 009

Weather:
Rain Event Start Date/Time:

	Sample Tracking Information						Sample Field Measurements				Leaf Test				Sample Observations
	ISRA Area(s) & Location	Qualitative Flow Observations*	Photo Number(s)	Object ID	Sample ID (Object ID_yyyymmdd)	Sample/Observation Time	Conductivity (mS or uS)	pH	Temperature (°C)	Turbidity (NTU)	Distance (ft)	Time (s)	Speed (ft/s)	Water Depth (in)	Notes (color, odor, sheen, foam, biological material, nearby erosion, etc.)
LOWER LOT AND ADMINISTRATION BUILDING AREA	Upstream Lower Lot Treatment BMP; sample port in cistern discharge pipeline			LPBMP0002	LPBMP0002_										
	Mid-Point Lower Lot BMP; Sediment Basin outlet box			LPBMP0003	LPBMP0003_										
	Downstream Lower Lot Treatment BMP; discharge from Biofilter effluent pipe			LPBMP0004	LPBMP0004_										
	Filter basket influent in the administration buildings area parking lot.			ILBMP0009	ILBMP0009_										
	Filter basket effluent in the administration buildings area parking lot.			ILBMP0010	ILBMP0010_										
CM-9 Area	Upstream (South), CM-9 BMPs			A1BMP0002	A1BMP0002_										
	Downstream, CM-9 BMPs; CM-9 underdrains			A1BMP0003	A1BMP0003_										
	Upstream (East), CM-9 BMPs; culvert inlet off Area II Road			ILBMP0002	ILBMP0002_										

Notes:

Additional Observations:

***Qualitative Flow Observations:**

No Flow
Low Flow: Trickle or minor amount of flow.
Moderate Flow: Water is flowing normally, no significant erosion or turbid water.
High Flow: Significant water flow/velocity, slope erosion.

NPDES Permit Limits:

Temperature < 86 °F

pH 6.5 - 8.5

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Surface Water Monitoring Inspection and Sample Collection Form
PERFORMANCE MONITORING and BMP MONITORING PROGRAMS

Sampling Responsibility: Boeing
Inspector/Sampler:
Date:
Outfall/Watershed: 009

Weather:
Rain Event Start Date/Time:

	Sample Tracking Information						Sample Field Measurements				Leaf Test				Sample Observations
	ISRA Area(s) & Location	Qualitative Flow Observations*	Photo Number(s)	Object ID	Sample ID (Object ID_yyyymmdd)	Sample/Observation Time	Conductivity (mS or uS)	pH	Temperature (°C)	Turbidity (NTU)	Distance (ft)	Time (s)	Speed (ft/s)	Water Depth (in)	Notes (color, odor, sheen, foam, biological material, nearby erosion, etc.)
B1436 DETENTION BIOSWALES	Upstream, B1436 southern detention bioswale (concrete swale diverting sheet flow into rock crib - west)			ILBMP0004	ILBMP0004_										
	Downstream, B1436 southern detention bioswale; 12-inch underdrain			ILBMP0005	ILBMP0005_										
	Upstream, B1436 southern detention bioswale (concrete swale diverting sheet flow into rock crib - east)			ILBMP0008	ILBMP0008_										

Notes:

Additional Observations:

***Qualitative Flow Observations:**

No Flow
Low Flow: Trickle or minor amount of flow.
Moderate Flow: Water is flowing normally, no significant erosion or turbid water.
High Flow: Significant water flow/velocity, slope erosion.

NPDES Permit Limits:

Temperature < 86 °F

pH 6.5 - 8.5

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Surface Water Monitoring Inspection and Sample Collection Form
PERFORMANCE MONITORING and BMP MONITORING PROGRAMS

Sampling Responsibility: Boeing
Inspector/Sampler:
Date:
Outfall/Watershed 001

Weather:
Rain Event Start Date/Time:

	Sample Tracking Information						Sample Field Measurements				Leaf Test				Sample Observations
	ISRA Area(s) & Location	Qualitative Flow Observations*	Photo Number(s)	Object ID	Sample ID (Object ID_yyyymmdd)	Sample/Observation Time	Conductivity (mS or uS)	pH	Temperature (°C)	Turbidity (NTU)	Distance (ft)	Time (s)	Speed (ft/s)	Water Depth (in)	Notes (color, odor, sheen, foam, biological material, nearby erosion, etc.)
OF001	Potential BMP location, Outfall 001 watershed (located at the low spot along Bell Canyon Road north of the road heading to Outfall 001).			EPSW001BG01	EPSW001BG01_										
	Potential BMP location, Outfall 001 watershed (at the bottom of the hill to the north of the intersection of the Southern Buffer Zone Road and Outfall 01			EPSW001IE01	EPSW001IE01_										
	Potential BMP location, Outfall 001 watershed (south side of the road heading towards Outfall 001 at the intersection of Outfall 001 road and Bell Canyon Road).			EPSW001PV01	EPSW001PV01_										

Notes:

Additional Observations:

***Qualitative Flow Observations:**

No Flow
Low Flow: Trickle or minor amount of flow.
Moderate Flow: Water is flowing normally, no significant erosion or turbid water.
High Flow: Significant water flow/velocity, slope erosion.

NPDES Permit Limits:

Temperature < 86 °F

pH 6.5 - 8.5

ALL RECEIVING AND SAMPLE COLLECTION BOTTLES MUST BE PRE-RINSED 3 TIMES WITH SOURCE WATER, PRIOR TO COLLECTION OF THE SAMPLE.

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Printed on 11/30/2020

Surface Water Monitoring Inspection and Sample Collection Form
PERFORMANCE MONITORING and BMP MONITORING PROGRAMS

Sampling Responsibility: Boeing
Inspector/Sampler:
Date:
Outfall/Watershed 002

Weather:
Rain Event Start Date/Time:

	Sample Tracking Information						Sample Field Measurements				Leaf Test				Sample Observations
	ISRA Area(s) & Location	Qualitative Flow Observations*	Photo Number(s)	Object ID	Sample ID (Object ID_yyyymmdd)	Sample/Observation Time	Conductivity (mS or uS)	pH	Temperature (°C)	Turbidity (NTU)	Distance (ft)	Time (s)	Speed (ft/s)	Water Depth (in)	Notes (color, odor, sheen, foam, biological material, nearby erosion, etc.)
OF002	Potential BMP location, Outfall 002 watershed (located past the second water guzzler just before the steep incline into Outfall 002. Road delineator to the west of culvert).			EPSW002BG01	EPSW002BG01_										
OF002	Potential BMP location, Outfall 002 watershed (at STLV-IV. Immediately past the gates to the south east; adjacent to the new telephone pole).			EPSW002IE01	EPSW002IE01_										
OF002	Potential BMP location, Outfall 002 watershed (located along the Southern Buffer Zone Road at the culvert inlet on the north side of the road. Approximately 400 feet east of the turnout).			EPSW002IE02	EPSW002IE02_										

Notes:

***Qualitative Flow Observations:**

No Flow
Low Flow: Trickle or minor amount of flow.
Moderate Flow: Water is flowing normally, no significant erosion or turbid water.
High Flow: Significant water flow/velocity, slope erosion.

NPDES Permit Limits:

Temperature < 86 °F

pH 6.5 - 8.5

ALL RECEIVING AND SAMPLE COLLECTION BOTTLES MUST BE PRE-RINSED 3 TIMES WITH SOURCE WATER, PRIOR TO COLLECTION OF THE SAMPLE.

EXCEPTION IS THE HNO3 (NITRIC) PRESERVED POLY BOTTLES - DO NOT PRE-RINSE THE HNO3 PRESERVED POLY'S

Additional Observations:

Printed on 11/30/2020

Surface Water Monitoring Inspection and Sample Collection Form
PERFORMANCE MONITORING and BMP MONITORING PROGRAMS

Sampling Responsibility: Boeing
Inspector/Sampler:
Date:
Outfall/Watershed 003

Weather:
Rain Event Start Date/Time:

	Sample Tracking Information						Sample Field Measurements				Leaf Test				Sample Observations
	ISRA Area(s) & Location	Qualitative Flow Observations*	Photo Number(s)	Object ID	Sample ID (Object ID_yyyymmdd)	Sample/Observation Time	Conductivity (mS or uS)	pH	Temperature (°C)	Turbidity (NTU)	Distance (ft)	Time (s)	Speed (ft/s)	Water Depth (in)	Notes (color, odor, sheen, foam, biological material, nearby erosion, etc.)
OF003				RMHF0001	RMHF0001_										

Notes:

Additional Observations:

***Qualitative Flow Observations:**

No Flow
Low Flow: Trickle or minor amount of flow.
Moderate Flow: Water is flowing normally, no significant erosion or turbid water.
High Flow: Significant water flow/velocity, slope erosion.

NPDES Permit Limits:

Temperature < 86 °F

pH 6.5 - 8.5

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Appendix B: 2020/21 BMP Program Laboratory Reports

LABORATORY REPORTS

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Boeing

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins Calscience Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-276656-1
Client Project/Site: Routine Outfall 003 RMHF GRAB

For:
Haley & Aldrich, Inc.
400 E Van Buren St.
Suite 545
Phoenix, Arizona 85004

Attn: Katherine Miller

Authorized for release by:
1/11/2021 3:26:02 PM

Christian Bondoc, Project Manager I
(949)260-3218
Christian.Bondoc@Eurofinset.com

Table of Contents

Sample Summary

Client: Haley & Aldrich, Inc.
Project/Site: Routine Outfall 003 RMHF GRAB

Job ID: 440-276656-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-276656-1	RMHF_20201228_Grab	Water	12/28/20 08:00	12/28/20 16:38	
440-276656-2	RMHF_20201228_Grab_F	Water	12/28/20 08:00	12/28/20 16:38	

Job ID: 440-276656-1

Laboratory: Eurofins Calscience Irvine

Narrative

Job Narrative
440-276656-1

Comments
No additional comments.

Receipt
The samples were received on 12/28/2020 4:38 PM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.8º C.

Dioxin
Method 1613B: EPA Method 1613B specifies a +/- 15 second retention time difference between the recovery standard in the initial calibration (ICAL) and the continuing calibration verification (CCV010621A). The 13C-1,2,3,4-TCDD and 13C-1,2,3,7,8,9-HxCDD associated with the following samples run on instrument 10D5 exceeded this criteria: RMHF_20201228_Grab (440-276656-1), (CCV 320-449084/15), (LCS 320-447136/2-A), (MB 320-447136/1-A) and (WDM 320-449084/16). This retention time shift is due to normal and reasonable column maintenance and does not affect the instrument chromatography resolution, sensitivity, or identification of target analytes. System retention times have been updated for proper analyte identification.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
Method FILTRATION: The following sample requested dissolved metals and was not filtered in the field: RMHF_20201228_Grab_F (440-276656-2). This sample was filtered and preserved upon receipt to the laboratory.

12/29/20 @ 1318 hours
2.5 mL HNO3
HNO3 Lot # 0000245675

Method 200.7 Rev 4.4: The matrix spike / matrix spike duplicate (MS/MSD) recoveries of Aluminum for preparation batch 440-635081 and analytical batch 440-635192 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected. The associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Dioxin Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample ID: RMHF_20201228_Grab
Lab Sample ID: 440-276656-1

Date Collected: 12/28/20 08:00
Matrix: Water
Date Received: 12/28/20 16:38

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.000010	0.0000016	ug/L		12/30/20 11:29	01/07/21 03:38	1
2,3,7,8-TCDF	ND		0.000010	0.0000008 0	ug/L		12/30/20 11:29	01/07/21 03:38	1
1,2,3,7,8-PeCDD	**0.0000066**	**J,DX q**	0.000051	0.0000021	ug/L		12/30/20 11:29	01/07/21 03:38	1
1,2,3,7,8-PeCDF	**0.0000019**	**J,DX q**	0.000051	0.0000014	ug/L		12/30/20 11:29	01/07/21 03:38	1
2,3,4,7,8-PeCDF	**0.0000029**	**J,DX q**	0.000051	0.0000015	ug/L		12/30/20 11:29	01/07/21 03:38	1
1,2,3,4,7,8-HxCDD	**0.000016**	**J,DX q**	0.000051	0.0000021	ug/L		12/30/20 11:29	01/07/21 03:38	1
1,2,3,6,7,8-HxCDD	**0.000027**	**J,DX**	0.000051	0.0000019	ug/L		12/30/20 11:29	01/07/21 03:38	1
1,2,3,7,8,9-HxCDD	**0.000019**	**J,DX**	0.000051	0.0000018	ug/L		12/30/20 11:29	01/07/21 03:38	1
1,2,3,4,7,8-HxCDF	ND		0.000051	0.0000020	ug/L		12/30/20 11:29	01/07/21 03:38	1
1,2,3,6,7,8-HxCDF	ND		0.000051	0.0000023	ug/L		12/30/20 11:29	01/07/21 03:38	1
1,2,3,7,8,9-HxCDF	ND		0.000051	0.0000012	ug/L		12/30/20 11:29	01/07/21 03:38	1
2,3,4,6,7,8-HxCDF	**0.0000029**	**J,DX q MB**	0.000051	0.0000014	ug/L		12/30/20 11:29	01/07/21 03:38	1
1,2,3,4,6,7,8-HpCDD	**0.00044**	**MB**	0.000051	0.0000053	ug/L		12/30/20 11:29	01/07/21 03:38	1
1,2,3,4,6,7,8-HpCDF	**0.000059**	**q MB**	0.000051	0.0000018	ug/L		12/30/20 11:29	01/07/21 03:38	1
1,2,3,4,7,8,9-HpCDF	**0.0000038**	**J,DX**	0.000051	0.0000022	ug/L		12/30/20 11:29	01/07/21 03:38	1
OCDD	**0.0056**	**MB**	0.00010	0.0000046	ug/L		12/30/20 11:29	01/07/21 03:38	1
OCDF	**0.000083**	**J,DX**	0.00010	0.0000011	ug/L		12/30/20 11:29	01/07/21 03:38	1
Total TCDD	**0.000013**	**MB**	0.000010	0.0000016	ug/L		12/30/20 11:29	01/07/21 03:38	1
Total TCDF	ND		0.000010	0.0000008 0	ug/L		12/30/20 11:29	01/07/21 03:38	1
Total PeCDD	**0.000012**	**J,DX q**	0.000051	0.0000021	ug/L		12/30/20 11:29	01/07/21 03:38	1
Total PeCDF	**0.000022**	**J,DX q**	0.000051	0.0000014	ug/L		12/30/20 11:29	01/07/21 03:38	1
Total HxCDD	**0.00018**	**q**	0.000051	0.0000019	ug/L		12/30/20 11:29	01/07/21 03:38	1
Total HxCDF	**0.000080**	**q MB**	0.000051	0.0000017	ug/L		12/30/20 11:29	01/07/21 03:38	1
Total HpCDD	**0.0013**	**MB**	0.000051	0.0000053	ug/L		12/30/20 11:29	01/07/21 03:38	1
Total HpCDF	**0.00016**	**q MB**	0.000051	0.0000020	ug/L		12/30/20 11:29	01/07/21 03:38	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*71*		*25 - 164*	*12/30/20 11:29*	*01/07/21 03:38*	*1*
13C-2,3,7,8-TCDF	*73*		*24 - 169*	*12/30/20 11:29*	*01/07/21 03:38*	*1*
13C-1,2,3,7,8-PeCDD	*69*		*25 - 181*	*12/30/20 11:29*	*01/07/21 03:38*	*1*
13C-1,2,3,7,8-PeCDF	*63*		*24 - 185*	*12/30/20 11:29*	*01/07/21 03:38*	*1*
13C-2,3,4,7,8-PeCDF	*63*		*21 - 178*	*12/30/20 11:29*	*01/07/21 03:38*	*1*
13C-1,2,3,4,7,8-HxCDD	*76*		*32 - 141*	*12/30/20 11:29*	*01/07/21 03:38*	*1*
13C-1,2,3,6,7,8-HxCDD	*74*		*28 - 130*	*12/30/20 11:29*	*01/07/21 03:38*	*1*
13C-1,2,3,4,7,8-HxCDF	*82*		*26 - 152*	*12/30/20 11:29*	*01/07/21 03:38*	*1*
13C-1,2,3,6,7,8-HxCDF	*74*		*26 - 123*	*12/30/20 11:29*	*01/07/21 03:38*	*1*
13C-1,2,3,7,8,9-HxCDF	*81*		*29 - 147*	*12/30/20 11:29*	*01/07/21 03:38*	*1*
13C-2,3,4,6,7,8-HxCDF	*80*		*28 - 136*	*12/30/20 11:29*	*01/07/21 03:38*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*93*		*23 - 140*	*12/30/20 11:29*	*01/07/21 03:38*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*87*		*28 - 143*	*12/30/20 11:29*	*01/07/21 03:38*	*1*
13C-1,2,3,4,7,8,9-HpCDF	*89*		*26 - 138*	*12/30/20 11:29*	*01/07/21 03:38*	*1*
13C-OCDD	*105*		*17 - 157*	*12/30/20 11:29*	*01/07/21 03:38*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*93*		*35 - 197*	*12/30/20 11:29*	*01/07/21 03:38*	*1*

Method: 200.7 Rev 4.4 - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nickel	**14**		10	5.0	ug/L		12/31/20 15:03	01/04/21 11:23	1

Client Sample ID: RMHF_20201228_Grab
Lab Sample ID: 440-276656-1
Date Collected: 12/28/20 08:00
Matrix: Water
Date Received: 12/28/20 16:38

Method: 200.7 Rev 4.4 - Metals (ICP) - Total Recoverable (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Zinc	1500		20	12	ug/L		12/31/20 15:03	01/04/21 11:23	1
Iron	2500		100	50	ug/L		12/31/20 15:03	01/04/21 11:23	1
Vanadium	16		10	5.0	ug/L		12/31/20 15:03	01/04/21 11:23	1
Boron	35	J,DX	50	25	ug/L		12/31/20 15:03	01/04/21 11:23	1
Aluminum	1400		100	50	ug/L		12/31/20 15:03	01/04/21 11:23	1
Manganese	210		20	15	ug/L		12/31/20 15:03	01/04/21 11:23	1

Method: 200.8 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		1.0	0.50	ug/L		12/31/20 15:09	01/04/21 09:30	1
Cadmium	1.3		1.0	0.25	ug/L		12/31/20 15:09	01/04/21 09:30	1
Copper	62		2.0	0.50	ug/L		12/31/20 15:09	01/04/21 09:30	1
Lead	18		1.0	0.50	ug/L		12/31/20 15:09	01/04/21 09:30	1
Antimony	0.75	J,DX	2.0	0.50	ug/L		12/31/20 15:09	01/04/21 09:30	1
Selenium	0.94	J,DX	2.0	0.50	ug/L		12/31/20 15:09	01/04/21 09:30	1
Thallium	ND		1.0	0.20	ug/L		12/31/20 15:09	01/04/21 09:30	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		12/31/20 10:45	12/31/20 15:27	1

Method: SM 2340B - Total Hardness (as CaCO3) by calculation - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness, as CaCO3	54		0.33	0.17	mg/L			01/05/21 02:58	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	210		6.7	3.3	mg/L			12/31/20 14:53	1

Client Sample ID: RMHF_20201228_Grab_F
Lab Sample ID: 440-276656-2
Date Collected: 12/28/20 08:00
Matrix: Water
Date Received: 12/28/20 16:38

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	95	J,DX	100	50	ug/L		01/04/21 11:56	01/04/21 17:33	1
Boron	32	J,DX	50	25	ug/L		01/04/21 11:56	01/04/21 17:33	1
Iron	260		100	50	ug/L		01/04/21 11:56	01/04/21 17:33	1
Nickel	10		10	5.0	ug/L		01/04/21 11:56	01/04/21 17:33	1
Vanadium	11		10	5.0	ug/L		01/04/21 11:56	01/04/21 17:33	1
Zinc	1200		20	12	ug/L		01/04/21 11:56	01/04/21 17:33	1
Manganese	160		20	15	ug/L		01/04/21 11:56	01/04/21 17:33	1

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		2.0	0.50	ug/L		12/30/20 08:08	12/30/20 15:19	1
Cadmium	0.72	J,DX	1.0	0.25	ug/L		12/30/20 08:08	12/30/20 15:19	1
Copper	43		2.0	0.50	ug/L		12/30/20 08:08	12/30/20 15:19	1
Lead	3.5		1.0	0.50	ug/L		12/30/20 08:08	12/30/20 15:19	1
Selenium	0.62	J,DX	2.0	0.50	ug/L		12/30/20 08:08	12/30/20 15:19	1
Silver	ND		1.0	0.50	ug/L		12/30/20 08:08	12/30/20 15:19	1

Client Sample ID: RMHF_20201228_Grab_F
Lab Sample ID: 440-276656-2
Date Collected: 12/28/20 08:00
Matrix: Water
Date Received: 12/28/20 16:38

Method: 200.8 - Metals (ICP/MS) - Dissolved (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		1.0	0.20	ug/L		12/30/20 08:08	12/30/20 15:19	1

Method: SM 2340B - Total Hardness (as CaCO3) by calculation - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness, as CaCO3	**43**		0.33	0.17	mg/L			01/06/21 02:58	1

Method Summary

Client: Haley & Aldrich, Inc.
Project/Site: Routine Outfall 003 RMHF GRAB

Job ID: 440-276656-1

Method	Method Description	Protocol	Laboratory
1613B	Dioxins and Furans (HRGC/HRMS)	EPA	TAL SAC
200.7 Rev 4.4	Metals (ICP)	EPA	TAL IRV
200.8	Metals (ICP/MS)	EPA	TAL IRV
245.1	Mercury (CVAA)	EPA	TAL IRV
SM 2340B	Total Hardness (as CaCO3) by calculation	SM	TAL IRV
SM 2540D	Solids, Total Suspended (TSS)	SM	TAL IRV
1613B	Separatory Funnel (L/L) Extraction with Soxhlet Extraction of Dioxin and Furans	EPA	TAL SAC
200.2	Preparation, Total Recoverable Metals	EPA	TAL IRV
245.1	Preparation, Mercury	EPA	TAL IRV
FILTRATION	Sample Filtration	None	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

None = None

SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

TAL IRV = Eurofins Calscience Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Lab Chronicle

Client: Haley & Aldrich, Inc.
Job ID: 440-276656-1
Project/Site: Routine Outfall 003 RMHF GRAB

Client Sample ID: RMHF_20201228_Grab
Lab Sample ID: 440-276656-1
Date Collected: 12/28/20 08:00
Matrix: Water
Date Received: 12/28/20 16:38

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			983.4 mL	20.0 uL	447136	12/30/20 11:29	NR	TAL SAC
Total/NA	Analysis	1613B		1			449084	01/07/21 03:38	SMA	TAL SAC
Total Recoverable	Prep	200.2			25 mL	25 mL	635081	12/31/20 15:03	M1G	TAL IRV
Total Recoverable	Analysis	200.7 Rev 4.4		1			635192	01/04/21 11:23	VS	TAL IRV
Total Recoverable	Prep	200.2			25 mL	25 mL	635082	12/31/20 15:09	M1G	TAL IRV
Total Recoverable	Analysis	200.8		1			635168	01/04/21 09:30	Y2WS	TAL IRV
Total/NA	Prep	245.1			20 mL	20 mL	635044	12/31/20 10:45	MA6V	TAL IRV
Total/NA	Analysis	245.1		1			635090	12/31/20 15:27	MA6V	TAL IRV
Total Recoverable	Analysis	SM 2340B		1			634523	01/05/21 02:58	P1R	TAL IRV
Total/NA	Analysis	SM 2540D		1	150 mL	1000 mL	635080	12/31/20 14:53	KMY	TAL IRV

Client Sample ID: RMHF_20201228_Grab_F
Lab Sample ID: 440-276656-2
Date Collected: 12/28/20 08:00
Matrix: Water
Date Received: 12/28/20 16:38

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			200 mL	200 mL	634790	12/29/20 13:02	M1G	TAL IRV
Dissolved	Prep	200.2			25 mL	25 mL	635191	01/04/21 11:56	M1G	TAL IRV
Dissolved	Analysis	200.7 Rev 4.4		1			635229	01/04/21 17:33	P1R	TAL IRV
Dissolved	Filtration	FILTRATION			200 mL	200 mL	634790	12/29/20 13:02	M1G	TAL IRV
Dissolved	Prep	200.2			25 mL	25 mL	634809	12/30/20 08:08	M1G	TAL IRV
Dissolved	Analysis	200.8		1			634962	12/30/20 15:19	MQP	TAL IRV
Dissolved	Analysis	SM 2340B		1			634523	01/06/21 02:58	P1R	TAL IRV

Laboratory References:

TAL IRV = Eurofins Calscience Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Lab Sample ID: MB 320-447136/1-A
Matrix: Water
Analysis Batch: 449084

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 447136

Analyte	MB Result	MB Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.000010	0.0000013	ug/L		12/30/20 11:29	01/07/21 02:08	1
2,3,7,8-TCDF	ND		0.000010	0.00000065	ug/L		12/30/20 11:29	01/07/21 02:08	1
1,2,3,7,8-PeCDD	ND		0.000050	0.0000026	ug/L		12/30/20 11:29	01/07/21 02:08	1
1,2,3,7,8-PeCDF	ND		0.000050	0.0000016	ug/L		12/30/20 11:29	01/07/21 02:08	1
2,3,4,7,8-PeCDF	ND		0.000050	0.0000018	ug/L		12/30/20 11:29	01/07/21 02:08	1
1,2,3,4,7,8-HxCDD	ND		0.000050	0.0000013	ug/L		12/30/20 11:29	01/07/21 02:08	1
1,2,3,6,7,8-HxCDD	ND		0.000050	0.0000012	ug/L		12/30/20 11:29	01/07/21 02:08	1
1,2,3,7,8,9-HxCDD	ND		0.000050	0.0000011	ug/L		12/30/20 11:29	01/07/21 02:08	1
1,2,3,4,7,8-HxCDF	ND		0.000050	0.0000016	ug/L		12/30/20 11:29	01/07/21 02:08	1
1,2,3,6,7,8-HxCDF	ND		0.000050	0.0000016	ug/L		12/30/20 11:29	01/07/21 02:08	1
1,2,3,7,8,9-HxCDF	ND		0.000050	0.00000092	ug/L		12/30/20 11:29	01/07/21 02:08	1
2,3,4,6,7,8-HxCDF	0.00000184	J,DX	0.000050	0.0000011	ug/L		12/30/20 11:29	01/07/21 02:08	1
1,2,3,4,6,7,8-HpCDD	0.00000517	J,DX	0.000050	0.0000010	ug/L		12/30/20 11:29	01/07/21 02:08	1
1,2,3,4,6,7,8-HpCDF	0.00000339	J,DX q	0.000050	0.00000075	ug/L		12/30/20 11:29	01/07/21 02:08	1
1,2,3,4,7,8,9-HpCDF	ND		0.000050	0.00000095	ug/L		12/30/20 11:29	01/07/21 02:08	1
OCDD	0.00000647	J,DX q	0.00010	0.0000012	ug/L		12/30/20 11:29	01/07/21 02:08	1
OCDF	ND		0.00010	0.0000012	ug/L		12/30/20 11:29	01/07/21 02:08	1
Total TCDD	0.0000102	q	0.000010	0.0000013	ug/L		12/30/20 11:29	01/07/21 02:08	1
Total TCDF	ND		0.000010	0.00000065	ug/L		12/30/20 11:29	01/07/21 02:08	1
Total PeCDD	ND		0.000050	0.0000026	ug/L		12/30/20 11:29	01/07/21 02:08	1
Total PeCDF	ND		0.000050	0.0000018	ug/L		12/30/20 11:29	01/07/21 02:08	1
Total HxCDD	ND		0.000050	0.0000013	ug/L		12/30/20 11:29	01/07/21 02:08	1
Total HxCDF	0.00000184	J,DX	0.000050	0.0000013	ug/L		12/30/20 11:29	01/07/21 02:08	1
Total HpCDD	0.00000871	J,DX	0.000050	0.0000010	ug/L		12/30/20 11:29	01/07/21 02:08	1
Total HpCDF	0.00000339	J,DX q	0.000050	0.00000085	ug/L		12/30/20 11:29	01/07/21 02:08	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*67*		*25 - 164*	*12/30/20 11:29*	*01/07/21 02:08*	*1*
13C-2,3,7,8-TCDF	*71*		*24 - 169*	*12/30/20 11:29*	*01/07/21 02:08*	*1*
13C-1,2,3,7,8-PeCDD	*66*		*25 - 181*	*12/30/20 11:29*	*01/07/21 02:08*	*1*
13C-1,2,3,7,8-PeCDF	*65*		*24 - 185*	*12/30/20 11:29*	*01/07/21 02:08*	*1*
13C-2,3,4,7,8-PeCDF	*65*		*21 - 178*	*12/30/20 11:29*	*01/07/21 02:08*	*1*
13C-1,2,3,4,7,8-HxCDD	*75*		*32 - 141*	*12/30/20 11:29*	*01/07/21 02:08*	*1*
13C-1,2,3,6,7,8-HxCDD	*71*		*28 - 130*	*12/30/20 11:29*	*01/07/21 02:08*	*1*
13C-1,2,3,4,7,8-HxCDF	*74*		*26 - 152*	*12/30/20 11:29*	*01/07/21 02:08*	*1*
13C-1,2,3,6,7,8-HxCDF	*77*		*26 - 123*	*12/30/20 11:29*	*01/07/21 02:08*	*1*
13C-1,2,3,7,8,9-HxCDF	*80*		*29 - 147*	*12/30/20 11:29*	*01/07/21 02:08*	*1*
13C-2,3,4,6,7,8-HxCDF	*79*		*28 - 136*	*12/30/20 11:29*	*01/07/21 02:08*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*82*		*23 - 140*	*12/30/20 11:29*	*01/07/21 02:08*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*80*		*28 - 143*	*12/30/20 11:29*	*01/07/21 02:08*	*1*
13C-1,2,3,4,7,8,9-HpCDF	*80*		*26 - 138*	*12/30/20 11:29*	*01/07/21 02:08*	*1*
13C-OCDD	*88*		*17 - 157*	*12/30/20 11:29*	*01/07/21 02:08*	*1*

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Lab Sample ID: MB 320-447136/1-A
Matrix: Water
Analysis Batch: 449084

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 447136

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	87		35 - 197	12/30/20 11:29	01/07/21 02:08	1

Lab Sample ID: LCS 320-447136/2-A
Matrix: Water
Analysis Batch: 449084

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 447136

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,3,7,8-TCDD	0.000200	0.000226		ug/L		113	67 - 158
2,3,7,8-TCDF	0.000200	0.000219		ug/L		109	75 - 158
1,2,3,7,8-PeCDD	0.00100	0.00102		ug/L		102	70 - 142
1,2,3,7,8-PeCDF	0.00100	0.00111		ug/L		111	80 - 134
2,3,4,7,8-PeCDF	0.00100	0.00111		ug/L		111	68 - 160
1,2,3,4,7,8-HxCDD	0.00100	0.00113		ug/L		113	70 - 164
1,2,3,6,7,8-HxCDD	0.00100	0.00103		ug/L		103	76 - 134
1,2,3,7,8,9-HxCDD	0.00100	0.00106		ug/L		106	64 - 162
1,2,3,4,7,8-HxCDF	0.00100	0.00105		ug/L		105	72 - 134
1,2,3,6,7,8-HxCDF	0.00100	0.00102		ug/L		102	84 - 130
1,2,3,7,8,9-HxCDF	0.00100	0.00100		ug/L		100	78 - 130
2,3,4,6,7,8-HxCDF	0.00100	0.00104	MB	ug/L		104	70 - 156
1,2,3,4,6,7,8-HpCDD	0.00100	0.000992	MB	ug/L		99	70 - 140
1,2,3,4,6,7,8-HpCDF	0.00100	0.00105	MB	ug/L		105	82 - 122
1,2,3,4,7,8,9-HpCDF	0.00100	0.00105		ug/L		105	78 - 138
OCDD	0.00200	0.00198	MB	ug/L		99	78 - 144
OCDF	0.00200	0.00187		ug/L		94	63 - 170

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C-2,3,7,8-TCDD	75		20 - 175
13C-2,3,7,8-TCDF	77		22 - 152
13C-1,2,3,7,8-PeCDD	75		21 - 227
13C-1,2,3,7,8-PeCDF	72		21 - 192
13C-2,3,4,7,8-PeCDF	72		13 - 328
13C-1,2,3,4,7,8-HxCDD	82		21 - 193
13C-1,2,3,6,7,8-HxCDD	81		25 - 163
13C-1,2,3,4,7,8-HxCDF	86		19 - 202
13C-1,2,3,6,7,8-HxCDF	85		21 - 159
13C-1,2,3,7,8,9-HxCDF	90		17 - 205
13C-2,3,4,6,7,8-HxCDF	89		22 - 176
13C-1,2,3,4,6,7,8-HpCDD	99		26 - 166
13C-1,2,3,4,6,7,8-HpCDF	95		21 - 158
13C-1,2,3,4,7,8,9-HpCDF	94		20 - 186
13C-OCDD	109		13 - 199

Surrogate	LCS %Recovery	LCS Qualifier	Limits
37Cl4-2,3,7,8-TCDD	93		31 - 191

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 440-635081/1-A
Matrix: Water
Analysis Batch: 635192

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 635081

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nickel	ND		10	5.0	ug/L		12/31/20 15:03	01/04/21 11:19	1
Zinc	ND		20	12	ug/L		12/31/20 15:03	01/04/21 11:19	1
Iron	ND		100	50	ug/L		12/31/20 15:03	01/04/21 11:19	1
Vanadium	ND		10	5.0	ug/L		12/31/20 15:03	01/04/21 11:19	1
Boron	ND		50	25	ug/L		12/31/20 15:03	01/04/21 11:19	1
Aluminum	ND		100	50	ug/L		12/31/20 15:03	01/04/21 11:19	1
Manganese	ND		20	15	ug/L		12/31/20 15:03	01/04/21 11:19	1

Lab Sample ID: LCS 440-635081/2-A
Matrix: Water
Analysis Batch: 635192

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 635081

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nickel	500	496		ug/L		99	85 - 115
Zinc	500	497		ug/L		99	85 - 115
Iron	500	498		ug/L		100	85 - 115
Vanadium	500	488		ug/L		98	85 - 115
Boron	500	485		ug/L		97	85 - 115
Aluminum	500	478		ug/L		96	85 - 115
Manganese	500	490		ug/L		98	85 - 115

Lab Sample ID: 440-276656-1 MS
Matrix: Water
Analysis Batch: 635192

Client Sample ID: RMHF_20201228_Grab
Prep Type: Total Recoverable
Prep Batch: 635081

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nickel	14		500	519		ug/L		101	70 - 130
Zinc	1500		500	2010		ug/L		105	70 - 130
Iron	2500		500	3470	BB	ug/L		189	70 - 130
Vanadium	16		500	522		ug/L		101	70 - 130
Boron	35	J,DX	500	536		ug/L		100	70 - 130
Aluminum	1400		500	2680	LM	ug/L		251	70 - 130
Manganese	210		500	711		ug/L		101	70 - 130

Lab Sample ID: 440-276656-1 MSD
Matrix: Water
Analysis Batch: 635192

Client Sample ID: RMHF_20201228_Grab
Prep Type: Total Recoverable
Prep Batch: 635081

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nickel	14		500	524		ug/L		102	70 - 130	1	20
Zinc	1500		500	2030		ug/L		108	70 - 130	1	20
Iron	2500		500	3590	BB	ug/L		213	70 - 130	3	20
Vanadium	16		500	529		ug/L		103	70 - 130	1	20
Boron	35	J,DX	500	543		ug/L		102	70 - 130	1	20
Aluminum	1400		500	2790	LM	ug/L		272	70 - 130	4	20
Manganese	210		500	722		ug/L		103	70 - 130	1	20

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: MB 440-634790/1-E
Matrix: Water
Analysis Batch: 635229

Client Sample ID: Method Blank
Prep Type: Dissolved
Prep Batch: 635191

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nickel	ND		10	5.0	ug/L		01/04/21 11:56	01/04/21 17:04	1
Zinc	ND		20	12	ug/L		01/04/21 11:56	01/04/21 17:04	1
Iron	ND		100	50	ug/L		01/04/21 11:56	01/04/21 17:04	1
Vanadium	ND		10	5.0	ug/L		01/04/21 11:56	01/04/21 17:04	1
Boron	ND		50	25	ug/L		01/04/21 11:56	01/04/21 17:04	1
Aluminum	ND		100	50	ug/L		01/04/21 11:56	01/04/21 17:04	1
Manganese	ND		20	15	ug/L		01/04/21 11:56	01/04/21 17:04	1

Lab Sample ID: LCS 440-634790/2-E
Matrix: Water
Analysis Batch: 635229

Client Sample ID: Lab Control Sample
Prep Type: Dissolved
Prep Batch: 635191

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nickel	500	484		ug/L		97	85 - 115
Zinc	500	484		ug/L		97	85 - 115
Iron	500	483		ug/L		97	85 - 115
Vanadium	500	482		ug/L		96	85 - 115
Boron	500	473		ug/L		95	85 - 115
Aluminum	500	469		ug/L		94	85 - 115
Manganese	500	483		ug/L		97	85 - 115

Lab Sample ID: 440-276596-C-2-G MS
Matrix: Water
Analysis Batch: 635229

Client Sample ID: Matrix Spike
Prep Type: Dissolved
Prep Batch: 635191

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nickel	15		500	485		ug/L		94	70 - 130
Zinc	3600		500	4000	BB	ug/L		84	70 - 130
Iron	75	J,DX	500	558		ug/L		96	70 - 130
Vanadium	7.7	J,DX	500	490		ug/L		97	70 - 130
Boron	540		500	1010		ug/L		95	70 - 130
Aluminum	ND		500	518		ug/L		104	70 - 130
Manganese	97		500	572		ug/L		95	70 - 130

Lab Sample ID: 440-276596-C-2-H MSD
Matrix: Water
Analysis Batch: 635229

Client Sample ID: Matrix Spike Duplicate
Prep Type: Dissolved
Prep Batch: 635191

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nickel	15		500	496		ug/L		96	70 - 130	2	20
Zinc	3600		500	3990	BB	ug/L		81	70 - 130	0	20
Iron	75	J,DX	500	560		ug/L		97	70 - 130	1	20
Vanadium	7.7	J,DX	500	500		ug/L		99	70 - 130	2	20
Boron	540		500	1020		ug/L		97	70 - 130	1	20
Aluminum	ND		500	533		ug/L		107	70 - 130	3	20
Manganese	97		500	583		ug/L		97	70 - 130	2	20

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 440-635082/1-A
Matrix: Water
Analysis Batch: 635168

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 635082

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		12/31/20 15:09	01/04/21 09:54	1
Copper	ND		2.0	0.50	ug/L		12/31/20 15:09	01/04/21 09:54	1
Lead	ND		1.0	0.50	ug/L		12/31/20 15:09	01/04/21 09:54	1
Antimony	ND		2.0	0.50	ug/L		12/31/20 15:09	01/04/21 09:54	1
Selenium	ND		2.0	0.50	ug/L		12/31/20 15:09	01/04/21 09:54	1
Silver	ND		1.0	0.50	ug/L		12/31/20 15:09	01/04/21 09:54	1
Thallium	ND		1.0	0.20	ug/L		12/31/20 15:09	01/04/21 09:54	1

Lab Sample ID: LCS 440-635082/2-A
Matrix: Water
Analysis Batch: 635168

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 635082

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	80.0	80.3		ug/L		100	85 - 115
Copper	80.0	80.5		ug/L		101	85 - 115
Lead	80.0	80.0		ug/L		100	85 - 115
Antimony	80.0	85.2		ug/L		106	85 - 115
Selenium	80.0	77.9		ug/L		97	85 - 115
Silver	80.0	83.2		ug/L		104	85 - 115
Thallium	80.0	79.6		ug/L		100	85 - 115

Lab Sample ID: 440-276656-1 MS
Matrix: Water
Analysis Batch: 635168

Client Sample ID: RMHF_20201228_Grab
Prep Type: Total Recoverable
Prep Batch: 635082

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Silver	ND		80.0	79.2		ug/L		99	70 - 130
Cadmium	1.3		80.0	85.5		ug/L		105	70 - 130
Copper	62		80.0	146		ug/L		105	70 - 130
Lead	18		80.0	101		ug/L		104	70 - 130
Antimony	0.75	J,DX	80.0	75.7		ug/L		94	70 - 130
Selenium	0.94	J,DX	80.0	72.8		ug/L		90	70 - 130
Thallium	ND		80.0	81.4		ug/L		102	70 - 130

Lab Sample ID: 440-276656-1 MSD
Matrix: Water
Analysis Batch: 635168

Client Sample ID: RMHF_20201228_Grab
Prep Type: Total Recoverable
Prep Batch: 635082

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Silver	ND		80.0	70.8		ug/L		88	70 - 130	11	20
Cadmium	1.3		80.0	81.0		ug/L		100	70 - 130	5	20
Copper	62		80.0	138		ug/L		95	70 - 130	5	20
Lead	18		80.0	95.0		ug/L		96	70 - 130	7	20
Antimony	0.75	J,DX	80.0	71.8		ug/L		89	70 - 130	5	20
Selenium	0.94	J,DX	80.0	69.5		ug/L		86	70 - 130	5	20
Thallium	ND		80.0	77.0		ug/L		96	70 - 130	6	20

Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 440-634790/1-B
Matrix: Water
Analysis Batch: 634962

Client Sample ID: Method Blank
Prep Type: Dissolved
Prep Batch: 634809

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		12/30/20 08:08	12/30/20 14:49	1
Copper	ND		2.0	0.50	ug/L		12/30/20 08:08	12/30/20 14:49	1
Lead	ND		1.0	0.50	ug/L		12/30/20 08:08	12/30/20 14:49	1
Antimony	ND		2.0	0.50	ug/L		12/30/20 08:08	12/30/20 14:49	1
Selenium	ND		2.0	0.50	ug/L		12/30/20 08:08	12/30/20 14:49	1
Silver	ND		1.0	0.50	ug/L		12/30/20 08:08	12/30/20 14:49	1
Thallium	ND		1.0	0.20	ug/L		12/30/20 08:08	12/30/20 14:49	1

Lab Sample ID: LCS 440-634790/2-B
Matrix: Water
Analysis Batch: 634962

Client Sample ID: Lab Control Sample
Prep Type: Dissolved
Prep Batch: 634809

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	80.0	75.1		ug/L		94	85 - 115
Copper	80.0	73.1		ug/L		91	85 - 115
Lead	80.0	74.2		ug/L		93	85 - 115
Antimony	80.0	82.0		ug/L		102	85 - 115
Selenium	80.0	74.5		ug/L		93	85 - 115
Silver	80.0	76.4		ug/L		96	85 - 115
Thallium	80.0	74.2		ug/L		93	85 - 115

Lab Sample ID: 440-276656-2 MS
Matrix: Water
Analysis Batch: 634962

Client Sample ID: RMHF_20201228_Grab_F
Prep Type: Dissolved
Prep Batch: 634809

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.72	J,DX	80.0	75.6		ug/L		94	70 - 130
Copper	43		80.0	115		ug/L		90	70 - 130
Lead	3.5		80.0	75.4		ug/L		90	70 - 130
Antimony	ND		80.0	81.9		ug/L		102	70 - 130
Selenium	0.62	J,DX	80.0	70.3		ug/L		87	70 - 130
Silver	ND		80.0	76.1		ug/L		95	70 - 130
Thallium	ND		80.0	72.4		ug/L		90	70 - 130

Lab Sample ID: 440-276656-2 MSD
Matrix: Water
Analysis Batch: 634962

Client Sample ID: RMHF_20201228_Grab_F
Prep Type: Dissolved
Prep Batch: 634809

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	0.72	J,DX	80.0	74.4		ug/L		92	70 - 130	2	20
Copper	43		80.0	113		ug/L		88	70 - 130	1	20
Lead	3.5		80.0	76.0		ug/L		91	70 - 130	1	20
Antimony	ND		80.0	79.9		ug/L		100	70 - 130	2	20
Selenium	0.62	J,DX	80.0	69.9		ug/L		87	70 - 130	1	20
Silver	ND		80.0	73.7		ug/L		92	70 - 130	3	20
Thallium	ND		80.0	72.0		ug/L		90	70 - 130	0	20

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 440-635044/1-A
Matrix: Water
Analysis Batch: 635090

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635044

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		12/31/20 10:45	12/31/20 15:18	1

Lab Sample ID: LCS 440-635044/2-A
Matrix: Water
Analysis Batch: 635090

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635044

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	4.00	4.04		ug/L		101	85 - 115

Lab Sample ID: 440-276656-1 MS
Matrix: Water
Analysis Batch: 635090

Client Sample ID: RMHF_20201228_Grab
Prep Type: Total/NA
Prep Batch: 635044

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		4.00	4.20		ug/L		105	75 - 125

Lab Sample ID: 440-276656-1 MSD
Matrix: Water
Analysis Batch: 635090

Client Sample ID: RMHF_20201228_Grab
Prep Type: Total/NA
Prep Batch: 635044

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		4.00	4.02		ug/L		100	75 - 125	4	20

Method: SM 2540D - Solids, Total Suspended (TSS)

Lab Sample ID: MB 440-635080/1
Matrix: Water
Analysis Batch: 635080

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		1.0	0.50	mg/L			12/31/20 14:53	1

Lab Sample ID: LCS 440-635080/2
Matrix: Water
Analysis Batch: 635080

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Suspended Solids	1000	943		mg/L		94	85 - 115

Lab Sample ID: 440-276697-A-1 DU
Matrix: Water
Analysis Batch: 635080

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Suspended Solids	12		12.4		mg/L		3	10

Specialty Organics

Prep Batch: 447136

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total/NA	Water	1613B	
MB 320-447136/1-A	Method Blank	Total/NA	Water	1613B	
LCS 320-447136/2-A	Lab Control Sample	Total/NA	Water	1613B	

Analysis Batch: 449084

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total/NA	Water	1613B	447136
MB 320-447136/1-A	Method Blank	Total/NA	Water	1613B	447136
LCS 320-447136/2-A	Lab Control Sample	Total/NA	Water	1613B	447136

Metals

Analysis Batch: 634523

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total Recoverable	Water	SM 2340B	
440-276656-2	RMHF_20201228_Grab_F	Dissolved	Water	SM 2340B	

Filtration Batch: 634790

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-2	RMHF_20201228_Grab_F	Dissolved	Water	FILTRATION	
MB 440-634790/1-B	Method Blank	Dissolved	Water	FILTRATION	
MB 440-634790/1-E	Method Blank	Dissolved	Water	FILTRATION	
LCS 440-634790/2-B	Lab Control Sample	Dissolved	Water	FILTRATION	
LCS 440-634790/2-E	Lab Control Sample	Dissolved	Water	FILTRATION	
440-276596-C-2-G MS	Matrix Spike	Dissolved	Water	FILTRATION	
440-276596-C-2-H MSD	Matrix Spike Duplicate	Dissolved	Water	FILTRATION	
440-276656-2 MS	RMHF_20201228_Grab_F	Dissolved	Water	FILTRATION	
440-276656-2 MSD	RMHF_20201228_Grab_F	Dissolved	Water	FILTRATION	

Prep Batch: 634809

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-2	RMHF_20201228_Grab_F	Dissolved	Water	200.2	634790
MB 440-634790/1-B	Method Blank	Dissolved	Water	200.2	634790
LCS 440-634790/2-B	Lab Control Sample	Dissolved	Water	200.2	634790
440-276656-2 MS	RMHF_20201228_Grab_F	Dissolved	Water	200.2	634790
440-276656-2 MSD	RMHF_20201228_Grab_F	Dissolved	Water	200.2	634790

Analysis Batch: 634962

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-2	RMHF_20201228_Grab_F	Dissolved	Water	200.8	634809
MB 440-634790/1-B	Method Blank	Dissolved	Water	200.8	634809
LCS 440-634790/2-B	Lab Control Sample	Dissolved	Water	200.8	634809
440-276656-2 MS	RMHF_20201228_Grab_F	Dissolved	Water	200.8	634809
440-276656-2 MSD	RMHF_20201228_Grab_F	Dissolved	Water	200.8	634809

Prep Batch: 635044

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total/NA	Water	245.1	
MB 440-635044/1-A	Method Blank	Total/NA	Water	245.1	
LCS 440-635044/2-A	Lab Control Sample	Total/NA	Water	245.1	
440-276656-1 MS	RMHF_20201228_Grab	Total/NA	Water	245.1	

Metals (Continued)

Prep Batch: 635044 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1 MSD	RMHF_20201228_Grab	Total/NA	Water	245.1	

Prep Batch: 635081

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total Recoverable	Water	200.2	
MB 440-635081/1-A	Method Blank	Total Recoverable	Water	200.2	
LCS 440-635081/2-A	Lab Control Sample	Total Recoverable	Water	200.2	
440-276656-1 MS	RMHF_20201228_Grab	Total Recoverable	Water	200.2	
440-276656-1 MSD	RMHF_20201228_Grab	Total Recoverable	Water	200.2	

Prep Batch: 635082

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total Recoverable	Water	200.2	
MB 440-635082/1-A	Method Blank	Total Recoverable	Water	200.2	
LCS 440-635082/2-A	Lab Control Sample	Total Recoverable	Water	200.2	
440-276656-1 MS	RMHF_20201228_Grab	Total Recoverable	Water	200.2	
440-276656-1 MSD	RMHF_20201228_Grab	Total Recoverable	Water	200.2	

Analysis Batch: 635090

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total/NA	Water	245.1	635044
MB 440-635044/1-A	Method Blank	Total/NA	Water	245.1	635044
LCS 440-635044/2-A	Lab Control Sample	Total/NA	Water	245.1	635044
440-276656-1 MS	RMHF_20201228_Grab	Total/NA	Water	245.1	635044
440-276656-1 MSD	RMHF_20201228_Grab	Total/NA	Water	245.1	635044

Analysis Batch: 635168

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total Recoverable	Water	200.8	635082
MB 440-635082/1-A	Method Blank	Total Recoverable	Water	200.8	635082
LCS 440-635082/2-A	Lab Control Sample	Total Recoverable	Water	200.8	635082
440-276656-1 MS	RMHF_20201228_Grab	Total Recoverable	Water	200.8	635082
440-276656-1 MSD	RMHF_20201228_Grab	Total Recoverable	Water	200.8	635082

Prep Batch: 635191

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-2	RMHF_20201228_Grab_F	Dissolved	Water	200.2	634790
MB 440-634790/1-E	Method Blank	Dissolved	Water	200.2	634790
LCS 440-634790/2-E	Lab Control Sample	Dissolved	Water	200.2	634790
440-276596-C-2-G MS	Matrix Spike	Dissolved	Water	200.2	634790
440-276596-C-2-H MSD	Matrix Spike Duplicate	Dissolved	Water	200.2	634790

Analysis Batch: 635192

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total Recoverable	Water	200.7 Rev 4.4	635081
MB 440-635081/1-A	Method Blank	Total Recoverable	Water	200.7 Rev 4.4	635081
LCS 440-635081/2-A	Lab Control Sample	Total Recoverable	Water	200.7 Rev 4.4	635081
440-276656-1 MS	RMHF_20201228_Grab	Total Recoverable	Water	200.7 Rev 4.4	635081
440-276656-1 MSD	RMHF_20201228_Grab	Total Recoverable	Water	200.7 Rev 4.4	635081

QC Association Summary

Client: Haley & Aldrich, Inc.
Project/Site: Routine Outfall 003 RMHF GRAB

Job ID: 440-276656-1

Metals

Analysis Batch: 635229

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-2	RMHF_20201228_Grab_F	Dissolved	Water	200.7 Rev 4.4	635191
MB 440-634790/1-E	Method Blank	Dissolved	Water	200.7 Rev 4.4	635191
LCS 440-634790/2-E	Lab Control Sample	Dissolved	Water	200.7 Rev 4.4	635191
440-276596-C-2-G MS	Matrix Spike	Dissolved	Water	200.7 Rev 4.4	635191
440-276596-C-2-H MSD	Matrix Spike Duplicate	Dissolved	Water	200.7 Rev 4.4	635191

General Chemistry

Analysis Batch: 635080

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total/NA	Water	SM 2540D	
MB 440-635080/1	Method Blank	Total/NA	Water	SM 2540D	
LCS 440-635080/2	Lab Control Sample	Total/NA	Water	SM 2540D	
440-276697-A-1 DU	Duplicate	Total/NA	Water	SM 2540D	

Qualifiers

Dioxin

Qualifier	Qualifier Description
J,DX	Estimated value; value < lowest standard (MQL), but >than MDL
MB	Analyte present in the method blank
q	The reported result is the estimated maximum possible concentration of this analyte, quantitated using the theoretical ion ratio. The measured ion ratio does not meet qualitative identification criteria and indicates a possible interference.

Metals

Qualifier	Qualifier Description
BB	Sample > 4X spike concentration
J,DX	Estimated value; value < lowest standard (MQL), but >than MDL
LM	MS and/or MSD above acceptance limits. See Blank Spike (LCS)

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Haley & Aldrich, Inc.
Job ID: 440-276656-1
Project/Site: Routine Outfall 003 RMHF GRAB

Laboratory: Eurofins Calscience Irvine

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
California	State	2706	06-30-21

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
SM 2340B		Water	Hardness, as CaCO3
SM 2540D		Water	Total Suspended Solids

Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	01-20-21
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	01-20-21
Arizona	State	AZ0708	08-11-21
Arkansas DEQ	State	88-0691	06-17-21
California	State	2897	01-31-22
Colorado	State	CA0004	08-31-21
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-21
Georgia	State	4040	01-30-21
Hawaii	State	<cert No.>	01-29-21
Illinois	NELAP	200060	03-17-21
Kansas	NELAP	E-10375	02-01-21
Louisiana	NELAP	01944	06-30-21
Maine	State	CA00004	04-14-22
Michigan	State	9947	08-03-23
Nevada	State	CA000442021-2	07-31-21
New Hampshire	NELAP	2997	04-18-21
New Jersey	NELAP	CA005	06-30-21
New York	NELAP	11666	04-01-21
Oregon	NELAP	4040	01-29-21
Pennsylvania	NELAP	68-01272	03-31-21
Texas	NELAP	T104704399-19-13	06-01-21
US Fish & Wildlife	US Federal Programs	58448	07-31-21
USDA	US Federal Programs	P330-18-00239	07-31-21
Utah	NELAP	CA000442019-01	02-28-21
Vermont	State	VT-4040	04-16-21
Virginia	NELAP	460278	03-14-21
Washington	State	C581	05-05-21
West Virginia (DW)	State	9930C	12-31-20 *
Wisconsin	State	998204680	08-31-21
Wyoming	State Program	8TMS-L	01-28-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins Calscience Irvine

CHAIN OF CUSTODY FORM

Page 1 of 1

Meter # MYH55481 MD

Client Name/Address	Project
Haley & Aldrich 5333 Mission Center Rd Suite 300 San Diego, CA 92108	Boeing SSFL RMHF **Routine Outfall 003 RMHF** **Outfall 003** **GRAB**
Eurofins Calscience Irvine Contact Christian Bondoc 17461 Derian Ave Suite #100 Irvine CA 92614 Tel. 949-260-3218	
TestAmerica's services under this CoC shall be performed in accordance with the T&Cs within Blanket Service Agreement# 2019-22-TestAmerica by and between Haley & Aldrich, Inc., its subsidiaries and affiliates and TestAmerica Laboratories Inc	Project Manager Katherine Miller 520 289 8606, 520.904 6944 (cell)
Sampler MATT BIRNEY	Field Manager Mark Dominick 978 234.5033, 818 599 0702 (cell)

ANALYSIS REQUIRED

Analysis columns: (1) R/A Total Recoverable Metals (E200 7) Al, B, Fe, MN, Ni, V, Zn, Hardness as CaCO3 (E200 8) Ag, Cd, Cu, Pb, Sb, Se, Tl; (2) R TCDD (and all congeners) (E1613B); (3) R/A Cl, F, SO4, NO3+NO2-N, Perchlorate (E300) [struck out]; (4) R TDS (SM2540C/E160 1) [struck out]; (5) A TSS (160 2 (SM2540D)); (6) R/A Total Dissolved Metals (E200 7) Al, B, Fe, Mn, Ni, V, Zn, Hardness as CaCO3 (E200 8): Ag, Cd, Cu, Pb, Sb, Se, Tl; (7) R Gross Alpha(E900 0), Gross Beta(E900 0), Tritium (H-3) (E906 0), Sr-90 (E905 0), Total Combined Radium 226 (E903 0 or E903 1) & Radium 228 (E904 0), Uranium (E908 0), K-40, CS-137 (E901 0 or E901 1); (8) R Chronic Toxicity - Selenastrum (EPA-821-R-02-013) [struck out]; (9) R Cyanide (SM4500 CN E / E335 2) [struck out]; (10) A Priority Pollutants Pesticides/PCBs (E608) [struck out]; (11) R Total Recoverable Metals Mercury (E245 1); (12) R Total Dissolved Metals Mercury (E245 1) [struck out]

Sample Description	Sample I D	Sampling Date/Time	Sample Matrix	Container Type	# of Cont.	Preservative	Bottle #	MS/MSD	1	2	3	4	5	6	7	8	9	10	11	12		Comments
RMHF	RMHF_20201228_Grab	12/28/2020/0800	WM	500 mL Poly	3	HNO_3	85	Yes	X										X			
			WM	1 L Glass Amber	~~2~~ 1 MD	None	110			X												
			~~WM~~	~~500 mL Poly~~	~~2~~	~~None~~	~~155~~				~~X~~											~~48 hours Holding Time NO3 & NO2~~ MD
			~~WM~~	~~500 mL Poly~~	~~1~~	~~None~~	~~155~~					~~X~~										MD
			WM	1 L Poly	1	None	165						X									
			~~WM~~	~~500 mL Poly~~	~~1~~	~~NaOH~~	~~220~~										~~X~~					MD
			WM	2 5 Gal Cube	1	None	225								X							Unfiltered and unpreserved analysis, Separate RAD onto another workorder
			WM	1 L Glass Amber	1	None	230															Analyze duplicate, not MS/MSD
			~~WM~~	~~1 Gal Cube~~	~~6~~	~~None~~	~~235~~									~~X~~						~~[illegible]~~ MD
			~~WM~~	~~1 L Glass Amber~~	~~2~~	~~None~~	~~250~~											~~X~~				MD
	RMHF_20201228_Grab_F	12/28/2020/0800	WM	1 L Poly	1	None	195							X								Filter and preserve w/in 24hrs of receipt at lab
			~~WM~~	~~Centrifuge Vial~~	~~1~~	~~None~~	~~520~~													~~X~~		~~Sample receiving DO NOT OPEN BAG. Bag to be opened in Mercury Prep using clean procedures~~ MD
	RMHF_20201228_Grab_Extra	12/28/2020/0800	WM	1 L Glass Amber	~~2~~ 1 MD	None	110			H												Hold
			~~WM~~	~~500 mL Poly~~	~~2~~	~~None~~	~~155~~				~~H~~											~~Hold~~ MD
			~~WM~~	~~1 L Glass Amber~~	~~2~~	~~None~~	~~250~~											~~H~~				~~Hold~~ MD

Comments: pH: 4.57 Temp: 42.5 °F 0800; checked By: MD/MB 12-28-2020 0830

Legend: A = Annual, R = Routine,

Relinquished By	Date/Time	Company	Received By	Date/Time
[signature]	12-28-2020/1355	H+A	William Rivera	12/28/20 1355
William Rivera	12/28/20 1638		[signature]	
			[signature]	ECI 112V 12/28/20 1638

Turn-around time (Check)
24 Hour ______ 72 Hour ______ 10 Day __X__
48 Hour ______ 5 Day ______ Normal ______

Sample Integrity (Check)
Intact ______ On Ice ______

Store samples for 6 months

Data Requirements (Check)
No Level IV ______ All Level IV __X__

0.9/0.8 #89

440-276656 Chain of Custody

Rainy Season 2019-2020
Version 2

Eurofins Calscience Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone: 949-261-1022 Fax: 949-260-3297

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Bondoc, Christian M	Carrier Tracking No(s):	COC No: 440-165300.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Christian.Bondoc@Eurofinset.com	State of Origin: California	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 440-276656-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 1/11/2021			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: DNU (TotalAccess) Boeing NPDES SSFL Outf	Project #: 44009879			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	901.1_Cs/Fill_Geo_0 K-40 and Cesium-137	A01R_U/ExtChrom_Actin Total Uranium	900.0/Evaporation Gross Alpha/Beta	903.0/PrecSep_21 Radium-226	904.0/PrecSep_0 Radium-228	905_Sr90/PrecSep_7 Strontium-90	906.0/LSC_Dist_Susp Tritium	Total Number of containers	Special Instructions/Note:
			Preservation Code:												
RMHF_20201228_Grab (440-276656-1)	12/28/20	08:00 Pacific		Water			X	X	X	X	X	X	X	2	Boeing SSFL; DO NOT FILTER; use prep date from preservation

Note: Since laboratory accreditations are subject to change, Eurofins Calscience places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Calscience laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Calscience attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Calscience.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	Teresa Ortiz	12.29.20 1700	Client		12/30/20 1000	Eta SAC
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.: Seal	Cooler Temperature(s) °C and Other Remarks: 1.0

Ver: 11/01/2020

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 440-276656-1

Login Number: 276656
List Number: 1
Creator: Skinner, Alma D

List Source: Eurofins Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	Not present
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 440-276656-1

Login Number: 276656
List Number: 2
Creator: Nuval, Mark-Anthony M

List Source: Eurofins TestAmerica, Sacramento
List Creation: 12/30/20 10:53 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	Seal present with no number.
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	1.0C
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Isotope Dilution Summary

Client: Haley & Aldrich, Inc.
Project/Site: Routine Outfall 003 RMHF GRAB

Job ID: 440-276656-1

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	TCDD (25-164)	TCDF (24-169)	PeCDD (25-181)	PeCDF (24-185)	PeCF (21-178)	HxCDD (32-141)	HxDD (28-130)	HxCDF (26-152)
440-276656-1	RMHF_20201228_Grab	71	73	69	63	63	76	74	82
MB 320-447136/1-A	Method Blank	67	71	66	65	65	75	71	74

		Percent Isotope Dilution Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	HxDF (26-123)	HxCF (29-147)	13CHxCF (28-136)	HpCDD (23-140)	HpCDF (28-143)	HpCDF2 (26-138)	OCDD (17-157)
440-276656-1	RMHF_20201228_Grab	74	81	80	93	87	89	105
MB 320-447136/1-A	Method Blank	77	80	79	82	80	80	88

Surrogate Legend

TCDD = 13C-2,3,7,8-TCDD
TCDF = 13C-2,3,7,8-TCDF
PeCDD = 13C-1,2,3,7,8-PeCDD
PeCDF = 13C-1,2,3,7,8-PeCDF
PeCF = 13C-2,3,4,7,8-PeCDF
HxCDD = 13C-1,2,3,4,7,8-HxCDD
HxDD = 13C-1,2,3,6,7,8-HxCDD
HxCDF = 13C-1,2,3,4,7,8-HxCDF
HxDF = 13C-1,2,3,6,7,8-HxCDF
HxCF = 13C-1,2,3,7,8,9-HxCDF
13CHxCF = 13C-2,3,4,6,7,8-HxCDF
HpCDD = 13C-1,2,3,4,6,7,8-HpCDD
HpCDF = 13C-1,2,3,4,6,7,8-HpCDF
HpCDF2 = 13C-1,2,3,4,7,8,9-HpCDF
OCDD = 13C-OCDD

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	TCDD (20-175)	TCDF (22-152)	PeCDD (21-227)	PeCDF (21-192)	PeCF (13-328)	HxCDD (21-193)	HxDD (25-163)	HxCDF (19-202)
LCS 320-447136/2-A	Lab Control Sample	75	77	75	72	72	82	81	86

		Percent Isotope Dilution Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	HxDF (21-159)	HxCF (17-205)	13CHxCF (22-176)	HpCDD (26-166)	HpCDF (21-158)	HpCDF2 (20-186)	OCDD (13-199)
LCS 320-447136/2-A	Lab Control Sample	85	90	89	99	95	94	109

Surrogate Legend

TCDD = 13C-2,3,7,8-TCDD
TCDF = 13C-2,3,7,8-TCDF
PeCDD = 13C-1,2,3,7,8-PeCDD
PeCDF = 13C-1,2,3,7,8-PeCDF
PeCF = 13C-2,3,4,7,8-PeCDF
HxCDD = 13C-1,2,3,4,7,8-HxCDD
HxDD = 13C-1,2,3,6,7,8-HxCDD
HxCDF = 13C-1,2,3,4,7,8-HxCDF
HxDF = 13C-1,2,3,6,7,8-HxCDF
HxCF = 13C-1,2,3,7,8,9-HxCDF
13CHxCF = 13C-2,3,4,6,7,8-HxCDF
HpCDD = 13C-1,2,3,4,6,7,8-HpCDD

Isotope Dilution Summary

Client: Haley & Aldrich, Inc.
Job ID: 440-276656-1
Project/Site: Routine Outfall 003 RMHF GRAB

HpCDF = 13C-1,2,3,4,6,7,8-HpCDF
HpCDF2 = 13C-1,2,3,4,7,8,9-HpCDF
OCDD = 13C-OCDD

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Sacramento
Sample Receiving Notes

Job:_____

Tracking # :_____

SO / PO / FO / SAT / 2-Day / Ground / UPS / CDO / Courier

GSO / OnTrac / Goldstreak / USPS / Other_____

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations. File in the job folder with the COC.

Therm. ID: L-01 Corr. Factor: (+ / -) 0 °C

Ice ___ Wet ✓ Gel ___ Other ___

Cooler Custody Seal: seal

Cooler ID: -

Temp Observed: 1.0 °C Corrected: 1.0 °C

From: Temp Blank ☐ Sample ☐

Opening/Processing The Shipment	Yes	No	NA
Cooler compromised/tampered with?	☐	☑	☐
Cooler Temperature is acceptable?	☑	☐	☐
Frozen samples show signs of thaw?	☐	☐	☑

Initials: MAN Date: 12/30/20

Unpacking/Labeling The Samples	Yes	No	NA
CoC is complete w/o discrepancies?	☑	☐	☐
Samples compromised/tampered with?	☐	☑	☐
Sample containers have legible labels?	☑	☐	☐
Sample custody seal?	☐	☐	☑
Containers are not broken or leaking?	☑	☐	☐
Sample date/times are provided?	☑	☐	☐
Appropriate containers are used?	☑	☐	☐
Sample bottles are completely filled?	☑	☐	☐
Sample preservatives verified?	☐	☐	☑
Samples w/o discrepancies?	☑	☐	☐
Zero headspace?*	☐	☐	☑
Alkalinity has no headspace?	☐	☐	☑
Perchlorate has headspace? (Methods 314, 331, 6850)	☐	☐	☑
Multiphasic samples are not present?	☑	☐	☐

Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4")

Initials: MAN Date: 12/30/20

Notes:_____

Trizma Lot #(s): _____

Login Completion	Yes	No	NA
Receipt Temperature on COC?	☑	☐	☐
Samples received within hold time?	☑	☐	☐
NCM Filed?	☐	☐	☑
Log Release checked in TALS?	☑	☐	☐

Initials: MAN Date: 12/30/20

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ANALYTICAL REPORT

Eurofins Calscience Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-276656-2
Client Project/Site: Routine Outfall 003 RMHF GRAB
Revision: 1

For:
Haley & Aldrich, Inc.
400 E Van Buren St.
Suite 545
Phoenix, Arizona 85004

Attn: Katherine Miller

Authorized for release by:
2/23/2021 3:35:50 PM

Christian Bondoc, Project Manager I
(949)260-3218
Christian.Bondoc@Eurofinset.com

Table of Contents

Sample Summary

Client: Haley & Aldrich, Inc.
Project/Site: Routine Outfall 003 RMHF GRAB

Job ID: 440-276656-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-276656-1	RMHF_20201228_Grab	Water	12/28/20 08:00	12/28/20 16:38	

Job ID: 440-276656-2

Laboratory: Eurofins Calscience Irvine

Narrative

Job Narrative
440-276656-2

Comments
No additional comments.

Revision
The report being provided is a revision of the original report sent on 1/27/2021. The report (revision 1) is being revised due to: Client requested additional tests for RAD work.

Receipt
The samples were received on 12/28/2020 4:38 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.8º C.

RAD
Methods 900.0, 9310: Gross Alpha/Beta Prep Batch 160-493900

The gross Alpha matrix spike (MS/MSD) is recovering (MS-61% MSD-61%) outside of the control limits of (70-130). Sample matrix interference is suspected because the associated gross alpha laboratory control sample (LCS) recovery is within acceptance limits. The data have been reported with this narrative.

(280-144105-A-1-B MS) and (280-144105-A-1-C MSD)

Methods 900.0, 9310: GAB prep batch 493900
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

RMHF_20201228_Grab (440-276656-1), (LCS 160-493900/2-A), (LCSB 160-493900/3-A), (MB 160-493900/1-A), (280-144105-A-1-A), (280-144105-A-1-B MS), (280-144105-A-1-D MSBT), (280-144105-A-1-E MSBTD) and (280-144105-A-1-C MSD)

Method 901.1: GAmma batch 160-493549
The MDC in the sample (20.9) was slightly above the requested limit of 20.0 pCi/L. The sample activity is well below the detection goal and achieved MDC. In addition, the sample duplicate MDC of 10.3 was below the requested limit.

RMHF_20201228_Grab (440-276656-1)

Method 901.1: Gamma Prep Batch 160-493549
Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

Inferred from	Reported to Analyte
Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231

Job ID: 440-276656-2 (Continued)

Laboratory: Eurofins Calscience Irvine (Continued)

Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

**The method blank (MB) Z-score is within limits and is located in the level IV raw data

RMHF_20201228_Grab (440-276656-1) and (440-276656-F-1-B DU)

Method 903.0: 903 prep batch 493744
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

RMHF_20201228_Grab (440-276656-1), (LCS 160-493744/1-A), (LCSD 160-493744/2-A) and (MB 160-493744/6-A)

Method 904.0: 904 prep batch 495876
The Ra228 laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recovery (LCS-155 / LCSD-158) associated with the following sample(s) is outside the upper QC limit of (60-140) indicating a potential positive bias for that analyte. This analyte was not observed above the MDC/RL in the associated samples; therefore the sample data is not adversely affected by this excursion. The data have been reported with this narrative.

(LCS 160-495876/1-A) and (LCSD 160-495876/2-A)

Method 904.0: 904 prep batch 495876
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

RMHF_20201228_Grab (440-276656-1), (LCS 160-495876/1-A), (LCSD 160-495876/2-A) and (MB 160-495876/7-A)

Method 905: 905 Prep batch 493937
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

RMHF_20201228_Grab (440-276656-1), (LCS 160-493937/1-A), (LCSD 160-493937/2-A) and (MB 160-493937/6-A)

Method 906.0: Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

RMHF_20201228_Grab (440-276656-1), (LCS 160-495065/2-A), (MB 160-495065/1-A), (160-40980-A-1-A), (160-40980-A-1-C DU) and (160-40980-A-1-B MS)

Method A-01-R: Isotopic Plutonium Prep Batch 160-798748

Job ID: 440-276656-2 (Continued)

Laboratory: Eurofins Calscience Irvine (Continued)

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.
RMHF_20201228_Grab (440-276656-1), (LCS 160-498748/2-A), (MB 160-498748/1-A), (440-278183-A-1-I) and (440-278183-A-1-J DU)

Methods A-01-R, U-02-RC: Isotopic Uranium Prep Batch 160-493932
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.
RMHF_20201228_Grab (440-276656-1), (LCS 160-493932/2-A), (MB 160-493932/1-A), (680-193399-A-1-C) and (680-193399-B-1-E DU)

Methods A-01-R, U-02-RC: Uranium batch 160- 493932
Detectors 189 was calibrated in December therefore the monthly calibration check (CCV) was not required and will not be included in the deliverable. Note: because a ccv was not analyzed, it is possible that an older CCV will pull into the deliverable. This CCV is not applicable

(LCS 160-493932/2-A)

Method A-01-R: U batch 160-493932
The sample was inadvertently counted on a detector which failed daily check for energy/centroid. However, the tracer peak and spike peaks in the actual sample count are at the expected energies, and the LCS spike recovery is within limits. The laboratory does not believe this excursion adversely affects the data

RMHF_20201228_Grab (440-276656-1)

Method ExtChrom: Plutonium Prep Batch 160-498748:

The following sample was prepared at a reduced aliquot due to discoloration: RMHF_20201228_Grab (440-276656-1).

The sample has yellow discoloration and light sediment.

Method LSC_Dist_Susp: H3 preparation batch 160-495065

The following sample was prepped using an aliquot preserved with nitric acid. Additional sodium hydroxide pellets were added ti ensure sample was basic

RMHF_20201228_Grab (440-276656-1)

Method PrecSep_0: Radium 228 Prep Batch 160-493746:
Sample 440-276656-1 was prepared at a reduced aliquot due to brown discoloration, a cloudy appearance, and heavy sediment levels:
Sample 160-70936-1 was prepared at a reduced aliquot to insure sufficient volume remains if needed for analysis:

Method PrecSep_0: Radium 228 Prep Batch 160-493746:
Insufficient sample volume was available to perform a sample duplicate for the following samples: RMHF_20201228_Grab (440-276656-1). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep_0: Radium 228 Prep batch 160-495876:
Insufficient sample volume was available to perform a sample duplicate for the following samples: RMHF_20201228_Grab (440-276656-1). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep-21: Radium 226 Prep Batch 160-493744:
Insufficient sample volume was available to perform a sample duplicate for the following samples: RMHF_20201228_Grab

Job ID: 440-276656-2 (Continued)

Laboratory: Eurofins Calscience Irvine (Continued)

(440-276656-1). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep-21: Radium 226 Prep Batch 160-493744:
Sample 440-276656-1 was prepared at a reduced aliquot due to brown discoloration, a cloudy appearance, and heavy sediment levels:
Sample 160-70936-1 was prepared at a reduced aliquot to insure sufficient volume remains if needed for analysis:

Method PrecSep-7: Strontium 90 Prep batch 160-493937:

Insufficient sample volume was available to perform a sample duplicate for the following samples: RMHF_20201228_Grab (440-276656-1). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep-7: Strontium 90 Prep batch 160-493937:

The following sample was prepared at a reduced aliquot due to the tan/orange haze and dark brown particulates: RMHF_20201228_Grab (440-276656-1). This could indicated possible matrix interference.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample ID: RMHF_20201228_Grab
Lab Sample ID: 440-276656-1

Date Collected: 12/28/20 08:00
Matrix: Water
Date Received: 12/28/20 16:38

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	**3.34**		1.39	1.44	3.00	1.73	pCi/L	01/05/21 09:10	01/08/21 14:09	1
Gross Beta	**27.6**		1.80	3.30	4.00	0.989	pCi/L	01/05/21 09:10	01/08/21 14:09	1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	2.86	U G	16.6	16.6	20.0	20.9	pCi/L	12/31/20 07:19	01/02/21 11:57	1
Potassium-40	87.4	U	105	105		163	pCi/L	12/31/20 07:19	01/02/21 11:57	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.177	U	0.177	0.178	1.00	0.275	pCi/L	01/04/21 10:35	01/26/21 05:59	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*67.0*		*40 - 110*	*01/04/21 10:35*	*01/26/21 05:59*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.579	U *	0.575	0.577	1.00	0.931	pCi/L	01/20/21 17:35	01/25/21 09:18	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*75.2*		*40 - 110*	*01/20/21 17:35*	*01/25/21 09:18*	*1*
Y Carrier	*87.5*		*40 - 110*	*01/20/21 17:35*	*01/25/21 09:18*	*1*

Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Strontium-90	0.761	U	0.664	0.667	3.00	1.06	pCi/L	01/05/21 19:02	01/13/21 16:55	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Sr Carrier	*95.6*		*40 - 110*	*01/05/21 19:02*	*01/13/21 16:55*	*1*
Y Carrier	*86.0*		*40 - 110*	*01/05/21 19:02*	*01/13/21 16:55*	*1*

Method: 906.0 - Tritium, Total (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tritium	-3.15	U	168	168	500	305	pCi/L	01/14/21 11:20	01/16/21 00:15	1

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Plutonium-238	-0.310	U	0.266	0.267	1.00	0.801	pCi/L	02/12/21 12:52	02/19/21 11:08	1

Client Sample ID: RMHF_20201228_Grab
Lab Sample ID: 440-276656-1
Date Collected: 12/28/20 08:00
Matrix: Water
Date Received: 12/28/20 16:38

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Plutonium-239/240	-0.118	U	0.0836	0.0842	1.00	0.485	pCi/L	02/12/21 12:52	02/19/21 11:08	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*48.4*		*30 - 110*	*02/12/21 12:52*	*02/19/21 11:08*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	0.209	U	0.296	0.297	1.00	0.501	pCi/L	01/05/21 17:01	01/14/21 13:29	1
Uranium-235	0.130	U	0.184	0.185	1.00	0.195	pCi/L	01/05/21 17:01	01/14/21 13:29	1
Uranium-238	**0.157**		0.181	0.181	1.00	0.157	pCi/L	01/05/21 17:01	01/14/21 13:29	1
Total Uranium	0.496	U	0.393	0.394	1.00	0.501	pCi/L	01/05/21 17:01	01/14/21 13:29	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*33.4*		*30 - 110*	*01/05/21 17:01*	*01/14/21 13:29*	*1*

Method Summary

Client: Haley & Aldrich, Inc.
Project/Site: Routine Outfall 003 RMHF GRAB

Job ID: 440-276656-2

Method	Method Description	Protocol	Laboratory
900.0	Gross Alpha and Gross Beta Radioactivity	EPA	TAL SL
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL SL
903.0	Radium-226 (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL
905	Strontium-90 (GFPC)	EPA	TAL SL
906.0	Tritium, Total (LSC)	EPA	TAL SL
A-01-R	Isotopic Plutonium and Neptunium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL SL
Evaporation	Preparation, Evaporation	None	TAL SL
ExtChrom	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL SL
Fill_Geo-0	Fill Geometry, No In-Growth	None	TAL SL
LSC_Dist_Susp	Distillation and Suspension (LSC)	None	TAL SL
PrecSep_0	Preparation, Precipitate Separation	None	TAL SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	TAL SL
PrecSep-7	Preparation, Precipitate Separation (7-Day In-Growth)	None	TAL SL

Protocol References:

DOE = U.S. Department of Energy

EPA = US Environmental Protection Agency

None = None

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Lab Chronicle

Client: Haley & Aldrich, Inc.
Job ID: 440-276656-2
Project/Site: Routine Outfall 003 RMHF GRAB

Client Sample ID: RMHF_20201228_Grab
Lab Sample ID: 440-276656-1
Date Collected: 12/28/20 08:00
Matrix: Water
Date Received: 12/28/20 16:38

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Evaporation			199.98 mL	1.0 g	493900	01/05/21 09:10	HRT	TAL SL
Total/NA	Analysis	900.0		1	1.0 mL	1.0 mL	494357	01/08/21 14:09	TMS	TAL SL
Total/NA	Prep	Fill_Geo-0			1000 mL	1.0 g	493549	12/31/20 07:19	HIO	TAL SL
Total/NA	Analysis	901.1		1			493705	01/02/21 11:57	JLP	TAL SL
Total/NA	Prep	PrecSep-21			500.32 mL	1.0 g	493744	01/04/21 10:35	AVB	TAL SL
Total/NA	Analysis	903.0		1			496647	01/26/21 05:59	FLC	TAL SL
Total/NA	Prep	PrecSep_0			499.69 mL	1.0 g	495876	01/20/21 17:35	KMP	TAL SL
Total/NA	Analysis	904.0		1			496465	01/25/21 09:18	FLC	TAL SL
Total/NA	Prep	PrecSep-7			250.02 mL	1.0 g	493937	01/05/21 19:02	JEC	TAL SL
Total/NA	Analysis	905		1			494901	01/13/21 16:55	GRW	TAL SL
Total/NA	Prep	LSC_Dist_Susp			100.2 mL	1.0 g	495065	01/14/21 11:20	LTC	TAL SL
Total/NA	Analysis	906.0		1			495498	01/16/21 00:15	JLP	TAL SL
Total/NA	Prep	ExtChrom			99.85 mL	1.0 mL	493932	01/05/21 17:01	MNH	TAL SL
Total/NA	Analysis	A-01-R		1			495120	01/14/21 13:29	TJR	TAL SL
Total/NA	Prep	ExtChrom			249.92 mL	1.0 mL	498748	02/12/21 12:52	LTC	TAL SL
Total/NA	Analysis	A-01-R		1			499372	02/19/21 11:08	TJR	TAL SL

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

Lab Sample ID: MB 160-493900/1-A
Matrix: Water
Analysis Batch: 494357

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 493900

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.0000	U	0.652	0.652	3.00	1.24	pCi/L	01/05/21 09:10	01/08/21 14:10	1
Gross Beta	-0.4897	U	0.407	0.409	4.00	0.835	pCi/L	01/05/21 09:10	01/08/21 14:10	1

Lab Sample ID: LCS 160-493900/2-A
Matrix: Water
Analysis Batch: 494357

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 493900

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Alpha	51.5	45.57		6.64	3.00	2.03	pCi/L	89	75 - 125

Lab Sample ID: LCSB 160-493900/3-A
Matrix: Water
Analysis Batch: 494357

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 493900

Analyte	Spike Added	LCSB Result	LCSB Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Beta	83.0	80.73		8.60	4.00	0.833	pCi/L	97	75 - 125

Lab Sample ID: 280-144105-A-1-B MS
Matrix: Water
Analysis Batch: 494357

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 493900

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Alpha	0.990	U	51.5	32.35	F1	5.36	3.00	2.06	pCi/L	61	70 - 130

Lab Sample ID: 280-144105-A-1-C MSD
Matrix: Water
Analysis Batch: 494357

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 493900

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Gross Alpha	0.990	U	51.5	32.16	F1	5.00	3.00	1.83	pCi/L	61	70 - 130	0.02	1

Lab Sample ID: 280-144105-A-1-D MSBT
Matrix: Water
Analysis Batch: 494357

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 493900

Analyte	Sample Result	Sample Qual	Spike Added	MSBT Result	MSBT Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Beta	1.52		83.0	80.85		8.62	4.00	0.986	pCi/L	96	70 - 130

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity (Continued)

Lab Sample ID: 280-144105-A-1-E MSBTD
Matrix: Water
Analysis Batch: 494357

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 493900

Analyte	Sample Result	Sample Qual	Spike Added	MSBTD Result	MSBTD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Gross Beta	1.52		83.0	79.75		8.51	4.00	1.12	pCi/L	94	70 - 130	0.06	1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-493549/1-A
Matrix: Water
Analysis Batch: 493707

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 493549

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	2.811	U	10.4	10.4	20.0	13.0	pCi/L	12/31/20 07:19	01/02/21 12:02	1
Potassium-40	-84.23	U	132	133		217	pCi/L	12/31/20 07:19	01/02/21 12:02	1

Lab Sample ID: LCS 160-493549/2-A
Matrix: Water
Analysis Batch: 493702

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 493549

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	136000	142200		16700		478	pCi/L	105	90 - 111
Cesium-137	43000	44000		5180	20.0	129	pCi/L	102	90 - 111
Cobalt-60	23900	24300		2860		89.5	pCi/L	102	89 - 110

Lab Sample ID: 440-276656-1 DU
Matrix: Water
Analysis Batch: 493702

Client Sample ID: RMHF_20201228_Grab
Prep Type: Total/NA
Prep Batch: 493549

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Cesium-137	2.86	U G	4.580	U	8.68	20.0	10.3	pCi/L	0.07	1
Potassium-40	87.4	U	62.77	U	149		157	pCi/L	0.1	1

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-493744/6-A
Matrix: Water
Analysis Batch: 496647

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 493744

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.01529	U	0.0419	0.0420	1.00	0.102	pCi/L	01/04/21 10:35	01/26/21 06:01	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*85.0*		*40 - 110*	*01/04/21 10:35*	*01/26/21 06:01*	*1*

Method: 903.0 - Radium-226 (GFPC) (Continued)

Lab Sample ID: LCS 160-493744/1-A
Matrix: Water
Analysis Batch: 496647

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 493744

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-226			11.3	11.04		1.18	1.00	0.154	pCi/L	97	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*77.4*		*40 - 110*

Lab Sample ID: LCSD 160-493744/2-A
Matrix: Water
Analysis Batch: 496647

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 493744

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-226			11.3	11.10		1.18	1.00	0.126	pCi/L	98	75 - 125	0.02	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Ba Carrier	*80.4*		*40 - 110*

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-495876/7-A
Matrix: Water
Analysis Batch: 496465

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 495876

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.1114	U	0.269	0.269	1.00	0.467	pCi/L	01/20/21 17:35	01/25/21 09:20	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*87.5*		*40 - 110*	*01/20/21 17:35*	*01/25/21 09:20*	*1*
Y Carrier	*88.6*		*40 - 110*	*01/20/21 17:35*	*01/25/21 09:20*	*1*

Lab Sample ID: LCS 160-495876/1-A
Matrix: Water
Analysis Batch: 496465

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 495876

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-228			9.97	15.47	*	1.75	1.00	0.581	pCi/L	155	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*87.8*		*40 - 110*
Y Carrier	*89.7*		*40 - 110*

Method: 904.0 - Radium-228 (GFPC) (Continued)

Lab Sample ID: LCSD 160-495876/2-A
Matrix: Water
Analysis Batch: 496465

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 495876

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228			9.97	15.75	*	1.77	1.00	0.554	pCi/L	158	75 - 125	0.08	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Ba Carrier	*90.8*		*40 - 110*
Y Carrier	*87.9*		*40 - 110*

Method: 905 - Strontium-90 (GFPC)

Lab Sample ID: MB 160-493937/6-A
Matrix: Water
Analysis Batch: 494901

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 493937

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Strontium-90	-0.09689	U	0.280	0.280	3.00	0.525	pCi/L	01/05/21 19:02	01/13/21 16:55	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Sr Carrier	*98.4*		*40 - 110*	*01/05/21 19:02*	*01/13/21 16:55*	*1*
Y Carrier	*83.4*		*40 - 110*	*01/05/21 19:02*	*01/13/21 16:55*	*1*

Lab Sample ID: LCS 160-493937/1-A
Matrix: Water
Analysis Batch: 494901

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 493937

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Strontium-90			8.30	7.298		0.962	3.00	0.581	pCi/L	88	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Sr Carrier	*98.1*		*40 - 110*
Y Carrier	*84.1*		*40 - 110*

Lab Sample ID: LCSD 160-493937/2-A
Matrix: Water
Analysis Batch: 494901

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 493937

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Strontium-90			8.30	6.308		0.850	3.00	0.503	pCi/L	76	75 - 125	0.55	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Sr Carrier	*102*		*40 - 110*
Y Carrier	*85.2*		*40 - 110*

Method: 906.0 - Tritium, Total (LSC)

Lab Sample ID: MB 160-495065/1-A
Matrix: Water
Analysis Batch: 495498

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 495065

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tritium	32.88	U	174	174	500	309	pCi/L	01/14/21 11:20	01/15/21 17:28	1

Lab Sample ID: LCS 160-495065/2-A
Matrix: Water
Analysis Batch: 495498

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 495065

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Tritium	2370	2342		403	500	305	pCi/L	99	75 - 114

Lab Sample ID: 160-40980-A-1-B MS
Matrix: Water
Analysis Batch: 495498

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 495065

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Tritium	24.8	U	2380	2658		435	500	311	pCi/L	111	67 - 130

Lab Sample ID: 160-40980-A-1-C DU
Matrix: Water
Analysis Batch: 495498

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 495065

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Tritium	24.8	U	94.59	U	181	500	309	pCi/L	0.20	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 160-493932/1-A
Matrix: Water
Analysis Batch: 495025

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 493932

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	-0.04001	U	0.0566	0.0567	1.00	0.173	pCi/L	01/05/21 17:01	01/13/21 10:59	1
Uranium-235	0.02490	U	0.0739	0.0739	1.00	0.157	pCi/L	01/05/21 17:01	01/13/21 10:59	1
Uranium-238	0.01597	U	0.0479	0.0479	1.00	0.107	pCi/L	01/05/21 17:01	01/13/21 10:59	1
Total Uranium	0.0008561	U	0.1047	0.1047	1.00	0.173	pCi/L	01/05/21 17:01	01/13/21 10:59	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*91.5*		*30 - 110*	*01/05/21 17:01*	*01/13/21 10:59*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-493932/2-A
Matrix: Water
Analysis Batch: 495026

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 493932

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium-234			12.7	12.87		1.50	1.00	0.342	pCi/L	101	75 - 125		
Uranium-235			0.607	0.6257		0.283	1.00	0.261	pCi/L	103			
Uranium-238			13.0	13.83		1.58	1.00	0.128	pCi/L	106	75 - 125		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Uranium-232	*64.5*		*30 - 110*

Lab Sample ID: 680-193399-B-1-E DU
Matrix: Water
Analysis Batch: 495039

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 493932

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Uranium-234	1.18			1.071		0.302	1.00	0.241	pCi/L			0.18	1
Uranium-235	0.0229	U		0.04052	U	0.0860	1.00	0.166	pCi/L			0.13	1
Uranium-238	0.504			0.7069		0.227	1.00	0.122	pCi/L			0.50	1
Total Uranium	1.71			1.818		0.387	1.00	0.241	pCi/L			0.15	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Uranium-232	*87.4*		*30 - 110*

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Lab Sample ID: MB 160-498748/1-A
Matrix: Water
Analysis Batch: 499370

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 498748

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Plutonium-238	-0.06003	U	0.106	0.107	1.00	0.256	pCi/L	02/12/21 12:52	02/19/21 11:08	1
Plutonium-239/240	-0.02146	U	0.0192	0.0193	1.00	0.122	pCi/L	02/12/21 12:52	02/19/21 11:08	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*81.0*		*30 - 110*	*02/12/21 12:52*	*02/19/21 11:08*	*1*

Lab Sample ID: LCS 160-498748/2-A
Matrix: Water
Analysis Batch: 499535

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 498748

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Plutonium-238			10.4	10.44		1.08	1.00	0.167	pCi/L	100	79 - 115		
Plutonium-239/240			10.6	10.20		1.06	1.00	0.127	pCi/L	97	85 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*96.5*		*30 - 110*

Client: Haley & Aldrich, Inc.
Job ID: 440-276656-2
Project/Site: Routine Outfall 003 RMHF GRAB

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Lab Sample ID: 440-278183-A-1-J DU
Matrix: Water
Analysis Batch: 499376

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 498748

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Plutonium-238	-0.0360	U		-0.06736	U	0.0984	1.00	0.246	pCi/L			0.15	1
Plutonium-239/240	-0.0241	U		-0.02529	U	0.0430	1.00	0.149	pCi/L			0.01	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*78.7*		*30 - 110*

QC Association Summary

Client: Haley & Aldrich, Inc.
Job ID: 440-276656-2
Project/Site: Routine Outfall 003 RMHF GRAB

Rad

Prep Batch: 493549

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total/NA	Water	Fill_Geo-0	
MB 160-493549/1-A	Method Blank	Total/NA	Water	Fill_Geo-0	
LCS 160-493549/2-A	Lab Control Sample	Total/NA	Water	Fill_Geo-0	
440-276656-1 DU	RMHF_20201228_Grab	Total/NA	Water	Fill_Geo-0	

Prep Batch: 493744

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total/NA	Water	PrecSep-21	
MB 160-493744/6-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-493744/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-493744/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 493900

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total/NA	Water	Evaporation	
MB 160-493900/1-A	Method Blank	Total/NA	Water	Evaporation	
LCS 160-493900/2-A	Lab Control Sample	Total/NA	Water	Evaporation	
LCSB 160-493900/3-A	Lab Control Sample	Total/NA	Water	Evaporation	
280-144105-A-1-B MS	Matrix Spike	Total/NA	Water	Evaporation	
280-144105-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	Evaporation	
280-144105-A-1-D MSBT	Matrix Spike	Total/NA	Water	Evaporation	
280-144105-A-1-E MSBTD	Matrix Spike Duplicate	Total/NA	Water	Evaporation	

Prep Batch: 493932

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total/NA	Water	ExtChrom	
MB 160-493932/1-A	Method Blank	Total/NA	Water	ExtChrom	
LCS 160-493932/2-A	Lab Control Sample	Total/NA	Water	ExtChrom	
680-193399-B-1-E DU	Duplicate	Total/NA	Water	ExtChrom	

Prep Batch: 493937

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total/NA	Water	PrecSep-7	
MB 160-493937/6-A	Method Blank	Total/NA	Water	PrecSep-7	
LCS 160-493937/1-A	Lab Control Sample	Total/NA	Water	PrecSep-7	
LCSD 160-493937/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-7	

Prep Batch: 495065

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total/NA	Water	LSC_Dist_Susp	
MB 160-495065/1-A	Method Blank	Total/NA	Water	LSC_Dist_Susp	
LCS 160-495065/2-A	Lab Control Sample	Total/NA	Water	LSC_Dist_Susp	
160-40980-A-1-B MS	Matrix Spike	Total/NA	Water	LSC_Dist_Susp	
160-40980-A-1-C DU	Duplicate	Total/NA	Water	LSC_Dist_Susp	

Prep Batch: 495876

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total/NA	Water	PrecSep_0	
MB 160-495876/7-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-495876/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-495876/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

QC Association Summary

Client: Haley & Aldrich, Inc.
Job ID: 440-276656-2
Project/Site: Routine Outfall 003 RMHF GRAB

Rad

Prep Batch: 498748

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-276656-1	RMHF_20201228_Grab	Total/NA	Water	ExtChrom	
MB 160-498748/1-A	Method Blank	Total/NA	Water	ExtChrom	
LCS 160-498748/2-A	Lab Control Sample	Total/NA	Water	ExtChrom	
440-278183-A-1-J DU	Duplicate	Total/NA	Water	ExtChrom	

Definitions/Glossary

Client: Haley & Aldrich, Inc.
Project/Site: Routine Outfall 003 RMHF GRAB

Job ID: 440-276656-2

Qualifiers

Rad

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
F1	MS and/or MSD recovery exceeds control limits.
G	The Sample MDC is greater than the requested RL.
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Haley & Aldrich, Inc.
Job ID: 440-276656-2
Project/Site: Routine Outfall 003 RMHF GRAB

Laboratory: Eurofins TestAmerica, St. Louis

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	20-001	05-06-22
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-21
California	Los Angeles County Sanitation Districts	10259	06-30-21
California	State	2886	06-30-21
Connecticut	State	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-21
HI - RadChem Recognition	State	n/a	06-30-21
Illinois	NELAP	004553	11-30-21
Iowa	State	373	12-01-22
Kansas	NELAP	E-10236	10-31-21
Kentucky (DW)	State	KY90125	12-31-20 *
Louisiana	NELAP	04080	06-30-21
Louisiana (DW)	State	LA011	12-31-21
Maryland	State	310	09-30-21
MI - RadChem Recognition	State	9005	06-30-21
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-21
New Jersey	NELAP	MO002	06-30-21
New York	NELAP	11616	04-01-21
North Dakota	State	R-207	06-30-21
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-21
Oregon	NELAP	4157	09-01-21
Pennsylvania	NELAP	68-00540	02-28-21
South Carolina	State	85002001	06-30-21
Texas	NELAP	T104704193-19-13	07-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	US Federal Programs	P330-17-00028	03-11-23
Utah	NELAP	MO000542019-11	07-31-21
Virginia	NELAP	10310	06-14-21
Washington	State	C592	08-30-21
West Virginia DEP	State	381	10-31-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins Calscience Irvine

CHAIN OF CUSTODY FORM

Meter # MYH55H91 MD

Client Name/Address	Project
Haley & Aldrich 5333 Mission Center Rd Suite 300 San Diego, CA 92108	Boeing SSFL RMHF **Routine Outfall 003 RMHF** **Outfall 003** **GRAB**
Eurofins Calscience Irvine Contact: Christian Bondoc 17461 Derian Ave Suite #100 Irvine CA 92614 Tel. 949-260-3218	Project Manager: Katherine Miller 520 289 8606, 520.904 6944 (cell) Field Manager: Mark Dominick 978 234.5033, 818 599 0702 (cell)

TestAmerica's services under this CoC shall be performed in accordance with the T&Cs within Blanket Service Agreement# 2019-22-TestAmerica by and between Haley & Aldrich, Inc., its subsidiaries and affiliates and TestAmerica Laboratories Inc

Sampler: MATT BRIVEY

ANALYSIS REQUIRED

Sample Description	Sample I D	Sampling Date/Time	Sample Matrix	Container Type	# of Cont.	Preservative	Bottle #	MS/MSD	Total Recoverable Metals (E200.7) Al, B, Fe, Mn, Ni, V, Zn, Hardness as CaCO3 (E200.8) Ag, Cd, Cu, Pb, Sb, Se, Tl	TCDD (and all congeners) (E16138)	Oil_E_SGT_HEM+NO3-N_Perchlorate (E1664B+E300.0)	TDS (SM2540C/E160.1)	TSS (160.2 (SM2540D))	Total Dissolved Metals (E200.7) Al, B, Fe, Mn, Ni, V, Zn, Hardness as CaCO3 (E200.8) Ag, Cd, Cu, Pb, Sb, Se, Tl	Gross Alpha(E900.0), Gross Beta(E900.0), Tritium (H-3) (E906.0), Sr-90 (E905.0), Total Combined Radium 226 (E903.0 or E903.1) & Radium 228 (E904.0), Uranium (E908.0), K-40, Cs-137 (E901.0 or E901.1)	Chronic Toxicity - Selenastrum (EPA-821-R-02-013)	Cyanide (SM4500-CN-E + E335.2)	Priority Pollutants Pesticides + PCBs (8081)	Total Recoverable Metals - Mercury (E245.1)	Total Dissolved Metals - Mercury (E245.1)	Comments
RMHF	RMHF_20201228_Grab	12/28/2020/0800	WM	500 mL Poly	3	HNO_3	85	Yes	X											X	
			WM	1 L Glass Amber	MD 2 1	None	110			X											
			~~WM~~	~~250 mL Poly~~	~~2~~	~~None~~	~~160~~				~~X~~										~~48 hours Holding Time NO3 & NO2~~
			~~WM~~	~~500 mL Poly~~	~~1~~	~~None~~	~~155~~					~~X~~									
			WM	1 L Poly	1	None	185						X								
			~~WM~~	~~500 mL Poly~~	~~1~~	~~NaOH~~	~~220~~										~~X~~				
			WM	2.5 Gal Cube	1	None	225								X						Unfiltered and unpreserved analysis. Separate RAD onto another workorder Analyze duplicate, not MS/MSD
			WM	1 L Glass Amber	1	None	230														
			~~WM~~	~~4 Gal Cube~~	~~1~~	~~None~~	~~235~~									~~X~~					
			~~WM~~	~~1 L Glass Amber~~	~~2~~	~~None~~	~~250~~											X			
	RMHF_20201228_Grab_F	12/28/2020/0800	WM	1 L Poly	1	None	195							X							Filter and preserve w/in 24hrs of receipt at lab
			~~WM~~	~~Dissolved Metals~~	~~1~~	~~None~~	~~320~~												~~X~~		Sample receiving DO NOT OPEN BAG. Bag to be opened in Mercury Prep using clean procedures
	RMHF_20201228_Grab_Extra	12/28/2020/1300	WM	1 L Glass Amber	MD 2 1	None	110			H											Hold
			~~WM~~	~~500 mL Poly~~	~~2~~	~~None~~	~~180~~				~~H~~										Hold
			~~WM~~	~~1 L Glass Amber~~	~~2~~	~~None~~	~~200~~														Hold

pH 4.57
Temp 42.5 °F
0800

Comments
checked B; MD/MB
12-29-2020 0810

Legend: A = Annual, R = Routine,

Relinquished By	Date/Time	Company	Received By	Date/Time
	12-29-2020/1355	H+A	William Rivera	12/28/20 1355
William Rivera	12/28/20	1638		
			EGD 112V	12/28/20 1638

Turn-around time (Check)
24 Hour ____ 72 Hour ____ 10 Day __X__
48 Hour ____ 5 Day ____ Normal ____

Sample Integrity (Check)
Intact ____ On Ice ____
Store samples for 6 months
Data Requirements (Check)
No Level IV ____ All Level IV __X__

0.9/0.8 #89

440-276656 Chain of Custody

Eurofins Calscience Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone: 949-261-1022 Fax: 949-260-3297

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Bondoc, Christian M	Carrier Tracking No(s):	COC No: 440-165300.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Christian.Bondoc@Eurofinset.com	State of Origin: California	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 440-276656-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 1/11/2021			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: DNU (TotalAccess) Boeing NPDES SSFL Outf	Project #: 44009879			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	901.1_Cs/FIII_Geo_0 K-40 and Cesium-137	A01R_U/ExtChrom_Actin Total Uranium	900.0/Evaporation Gross Alpha/Beta	903.0/PrecSep_21 Radium-226	904.0/PrecSep_0 Radium-228	905_Sr90/PrecSep_7 Strontium-90	906.0/LSC_Dist_Susp Tritium	Total Number of containers	Special Instructions/Note:
			Preservation Code:												
RMHF_20201228_Grab (440-276656-1)	12/28/20	08:00 Pacific		Water			X	X	X	X	X	X	X	2	Boeing SSFL; DO NOT FILTER; use prep date from preservation

Note: Since laboratory accreditations are subject to change, Eurofins Calscience places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Calscience laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Calscience attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Calscience.

Possible Hazard Identification	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
			FedEx		
Relinquished by: FedEx	Date/Time:	Company	Received by:	Date/Time: 12/30/2020 1015	Company ETA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 11/01/2020

Eurofins Calscience Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone: 949-261-1022 Fax: 949-260-3297

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Bondoc, Christian M	Carrier Tracking No(s):	COC No: 440-165299.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Christian.Bondoc@Eurofinset.com	State of Origin: California	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 440-276656-1
Address: 880 Riverside Parkway, ,	Due Date Requested: 1/11/2021			
City: West Sacramento	TAT Requested (days):			
State, Zip: CA, 95605				
Phone: 916-373-5600(Tel) 916-372-1059(Fax)	PO #:			
Email:	WO #:			
Project Name: DNU (TotalAccess) Boeing NPDES SSFL Outf	Project #: 44009879			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	1613B/1613B_Sox_Sep_P Standard List w/ Totals	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
RMHF_20201228_Grab (440-276656-1)	12/28/20	08:00 Pacific		Water			X	1	See QAS, Boeing_w/u to zero, ug/L; Use Boeing glassware.

Note: Since laboratory accreditations are subject to change, Eurofins Calscience places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Calscience laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Calscience attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Calscience.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:			
Relinquished by: Rosa Ortiz	Date/Time: 12 29 20 1700	Company ECIPU	Received by: FED EX	Date/Time:	Company
Relinquished by: FED EX	Date/Time:	Company	Received by:	Date/Time: 12/30/2020 1015	Company ETASTL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 11/01/2020

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 440-276656-2

Login Number: 276656
List Number: 1
Creator: Skinner, Alma D

List Source: Eurofins Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	Not present
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 440-276656-2

Login Number: 276656
List Number: 3
Creator: Mazariegos, Leonel A

List Source: Eurofins TestAmerica, St. Louis
List Creation: 12/30/20 02:31 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	Sample 440-276656-G-1 preserved upon arrival to lab.
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Tracer/Carrier Summary

Client: Haley & Aldrich, Inc.
Project/Site: Routine Outfall 003 RMHF GRAB

Job ID: 440-276656-2

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Ba (40-110)
440-276656-1	RMHF_20201228_Grab	67.0
LCS 160-493744/1-A	Lab Control Sample	77.4
LCSD 160-493744/2-A	Lab Control Sample Dup	80.4
MB 160-493744/6-A	Method Blank	85.0

Tracer/Carrier Legend

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
440-276656-1	RMHF_20201228_Grab	75.2	87.5
LCS 160-495876/1-A	Lab Control Sample	87.8	89.7
LCSD 160-495876/2-A	Lab Control Sample Dup	90.8	87.9
MB 160-495876/7-A	Method Blank	87.5	88.6

Tracer/Carrier Legend

Ba = Ba Carrier

Y = Y Carrier

Method: 905 - Strontium-90 (GFPC)

Matrix: Water **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Sr (40-110)	Y (40-110)
440-276656-1	RMHF_20201228_Grab	95.6	86.0
LCS 160-493937/1-A	Lab Control Sample	98.1	84.1
LCSD 160-493937/2-A	Lab Control Sample Dup	102	85.2
MB 160-493937/6-A	Method Blank	98.4	83.4

Tracer/Carrier Legend

Sr = Sr Carrier

Y = Y Carrier

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Matrix: Water **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Pu-242 (T) (30-110)
440-276656-1	RMHF_20201228_Grab	48.4
440-278183-A-1-J DU	Duplicate	78.7
LCS 160-498748/2-A	Lab Control Sample	96.5
MB 160-498748/1-A	Method Blank	81.0

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Tracer/Carrier Summary

Client: Haley & Aldrich, Inc.
Job ID: 440-276656-2
Project/Site: Routine Outfall 003 RMHF GRAB

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Water
Prep Type: Total/NA

		Percent Yield (Acceptance Limits)							
Lab Sample ID	Client Sample ID	U-232 (30-110)							
440-276656-1	RMHF_20201228_Grab	33.4							
680-193399-B-1-E DU	Duplicate	87.4							
LCS 160-493932/2-A	Lab Control Sample	64.5							
MB 160-493932/1-A	Method Blank	91.5							

Tracer/Carrier Legend

U-232 = Uranium-232

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Sacramento
Sample Receiving Notes

440-276656 Field Sheet

Job:_____

Tracking # :_____

SO / PO / FO / SAT / 2-Day / Ground / UPS / CDO / Courier

GSO / OnTrac / Goldstreak / USPS / Other_____

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations. File in the job folder with the COC.

Therm. ID: L-01 Corr. Factor: (+ / -) 0 °C

Ice ___ Wet ✓ Gel ___ Other ___

Cooler Custody Seal: seal

Cooler ID: -

Temp Observed: 1.0 °C Corrected: 1.0 °C

From: Temp Blank ☐ Sample ☐

Opening/Processing The Shipment	Yes	No	NA
Cooler compromised/tampered with?	☐	☑	☐
Cooler Temperature is acceptable?	☑	☐	☐
Frozen samples show signs of thaw?	☐	☐	☑

Initials: MAN Date: 12/30/20

Unpacking/Labeling The Samples	Yes	No	NA
CoC is complete w/o discrepancies?	☑	☐	☐
Samples compromised/tampered with?	☐	☑	☐
Sample containers have legible labels?	☑	☐	☐
Sample custody seal?	☐	☐	☑
Containers are not broken or leaking?	☑	☐	☐
Sample date/times are provided?	☑	☐	☐
Appropriate containers are used?	☑	☐	☐
Sample bottles are completely filled?	☑	☐	☐
Sample preservatives verified?	☐	☐	☑
Samples w/o discrepancies?	☑	☐	☐
Zero headspace?*	☐	☐	☑
Alkalinity has no headspace?	☐	☐	☑
Perchlorate has headspace? (Methods 314, 331, 6850)	☐	☐	☑
Multiphasic samples are not present?	☑	☐	☐

Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4")

Initials: MAN Date: 12/30/20

Notes:_____

Trizma Lot #(s): _____

Login Completion	Yes	No	NA
Receipt Temperature on COC?	☑	☐	☐
Samples received within hold time?	☑	☐	☐
NCM Filed?	☐	☐	☑
Log Release checked in TALS?	☑	☐	☐

Initials: MAN Date: 12/30/20

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ANALYTICAL REPORT

Eurofins Calscience Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-278183-1
Client Project/Site: Boeing NPDES SSFL Outfalls
Revision: 1

For:
Haley & Aldrich, Inc.
400 E Van Buren St.
Suite 545
Phoenix, Arizona 85004

Attn: Ms. Katherine Miller

Virendra R Patel

Authorized for release by:
3/19/2021 2:36:19 PM

Virendra Patel, Project Manager I
(714)895-5494
Virendra.Patel@eurofinset.com

Table of Contents

Sample Summary

Client: Haley & Aldrich, Inc.
Project/Site: Boeing NPDES SSFL Outfalls

Job ID: 440-278183-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-278183-1	RMHF_20210129_Grab	Water	01/29/21 07:45	01/29/21 16:30	

Case Narrative

Client: Haley & Aldrich, Inc.
Project/Site: Boeing NPDES SSFL Outfalls

Job ID: 440-278183-1

Job ID: 440-278183-1

Laboratory: Eurofins Calscience Irvine

Narrative

Job Narrative
440-278183-1

Comments
No additional comments.

Revision
The report being provided is a revision of the original report sent on 2/8/2021. The report (revision 1) is being revised due to: Reports revised to include EPA 200.7 (Ca/Mg) results per client request..

Receipt
The sample was received on 1/29/2021 4:30 PM. Unless otherwise noted below, the sample arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.6º C.

Reports revised to include EPA 200.7 (Ca/Mg) results per client request.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Boeing NPDES SSFL Outfalls

Job ID: 440-278183-1

Client Sample ID: RMHF_20210129_Grab

Date Collected: 01/29/21 07:45
Date Received: 01/29/21 16:30

Lab Sample ID: 440-278183-1

Matrix: Water

Method: 200.7 Rev 4.4 - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**81**	**J,DX**	100	50	ug/L		02/04/21 09:54	02/04/21 17:50	1
Boron	ND		50	25	ug/L		02/04/21 09:54	02/04/21 17:50	1
Calcium	**3.2**		0.10	0.050	mg/L		02/04/21 09:54	02/04/21 17:50	1
Iron	**130**		100	50	ug/L		02/04/21 09:54	02/04/21 17:50	1
Magnesium	**0.56**		0.020	0.010	mg/L		02/04/21 09:54	02/04/21 17:50	1
Manganese	**27**		20	15	ug/L		02/04/21 09:54	02/04/21 17:50	1
Nickel	ND		10	5.0	ug/L		02/04/21 09:54	02/04/21 17:50	1
Vanadium	ND		10	5.0	ug/L		02/04/21 09:54	02/04/21 17:50	1
Zinc	**200**		20	12	ug/L		02/04/21 09:54	02/04/21 17:50	1

Method: 200.8 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		1.0	0.50	ug/L		02/04/21 09:51	02/04/21 17:40	1
Cadmium	ND		1.0	0.25	ug/L		02/04/21 09:51	02/04/21 17:40	1
Copper	**13**		2.0	0.50	ug/L		02/04/21 09:51	02/04/21 17:40	1
Lead	**1.4**		1.0	0.50	ug/L		02/04/21 09:51	02/04/21 17:40	1
Antimony	ND		2.0	0.50	ug/L		02/04/21 09:51	02/04/21 17:40	1
Selenium	ND		2.0	0.50	ug/L		02/04/21 09:51	02/04/21 17:40	1
Thallium	ND		1.0	0.20	ug/L		02/04/21 09:51	02/04/21 17:40	1

Method: SM 2340B - Total Hardness (as CaCO3) by calculation - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness, as CaCO3	**10**		0.33	0.17	mg/L			02/04/21 18:00	1
Calcium hardness as calcium carbonate	**8.1**		0.25	0.12	mg/L			02/04/21 18:00	1
Magnesium hardness as calcium carbonate	**2.3**		0.082	0.041	mg/L			02/04/21 18:00	1

Method Summary

Client: Haley & Aldrich, Inc.
Project/Site: Boeing NPDES SSFL Outfalls

Job ID: 440-278183-1

Method	Method Description	Protocol	Laboratory
200.7 Rev 4.4	Metals (ICP)	EPA	TAL IRV
200.8	Metals (ICP/MS)	EPA	TAL IRV
SM 2340B	Total Hardness (as CaCO3) by calculation	SM	TAL IRV
200.2	Preparation, Total Recoverable Metals	EPA	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

TAL IRV = Eurofins Calscience Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Lab Chronicle

Client: Haley & Aldrich, Inc.
Project/Site: Boeing NPDES SSFL Outfalls

Job ID: 440-278183-1

Client Sample ID: RMHF_20210129_Grab
Date Collected: 01/29/21 07:45
Date Received: 01/29/21 16:30

Lab Sample ID: 440-278183-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	200.2			25 mL	25 mL	637895	02/04/21 09:54	LZY7	TAL IRV
Total Recoverable	Analysis	200.7 Rev 4.4		1			637962	02/04/21 17:50	P1R	TAL IRV
Total Recoverable	Prep	200.2			25 mL	25 mL	637894	02/04/21 09:51	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			637960	02/04/21 17:40	SQ5O	TAL IRV
Total Recoverable	Analysis	SM 2340B		1			637440	02/04/21 18:00	P1R	TAL IRV

Laboratory References:

TAL IRV = Eurofins Calscience Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 440-637895/1-A
Matrix: Water
Analysis Batch: 637962

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 637895

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	50	ug/L		02/04/21 09:54	02/04/21 17:12	1
Boron	ND		50	25	ug/L		02/04/21 09:54	02/04/21 17:12	1
Calcium	ND		0.10	0.050	mg/L		02/04/21 09:54	02/04/21 17:12	1
Iron	ND		100	50	ug/L		02/04/21 09:54	02/04/21 17:12	1
Magnesium	ND		0.020	0.010	mg/L		02/04/21 09:54	02/04/21 17:12	1
Manganese	ND		20	15	ug/L		02/04/21 09:54	02/04/21 17:12	1
Nickel	ND		10	5.0	ug/L		02/04/21 09:54	02/04/21 17:12	1
Vanadium	ND		10	5.0	ug/L		02/04/21 09:54	02/04/21 17:12	1
Zinc	ND		20	12	ug/L		02/04/21 09:54	02/04/21 17:12	1

Lab Sample ID: LCS 440-637895/2-A
Matrix: Water
Analysis Batch: 637962

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 637895

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	500	474		ug/L		95	85 - 115
Boron	500	492		ug/L		98	85 - 115
Iron	500	483		ug/L		97	85 - 115
Manganese	500	479		ug/L		96	85 - 115
Nickel	500	496		ug/L		99	85 - 115
Vanadium	500	485		ug/L		97	85 - 115
Zinc	500	501		ug/L		100	85 - 115

Lab Sample ID: 440-278304-B-1-B MS
Matrix: Water
Analysis Batch: 637962

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 637895

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	ND		500	532		ug/L		106	70 - 130
Boron	ND		500	512		ug/L		102	70 - 130
Iron	ND		500	527		ug/L		105	70 - 130
Manganese	ND		500	493		ug/L		99	70 - 130
Nickel	ND		500	503		ug/L		101	70 - 130
Vanadium	ND		500	497		ug/L		99	70 - 130
Zinc	33		500	538		ug/L		101	70 - 130

Lab Sample ID: 440-278304-B-1-C MSD
Matrix: Water
Analysis Batch: 637962

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 637895

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	ND		500	531		ug/L		106	70 - 130	0	20
Boron	ND		500	511		ug/L		102	70 - 130	0	20
Iron	ND		500	529		ug/L		106	70 - 130	0	20
Manganese	ND		500	492		ug/L		98	70 - 130	0	20
Nickel	ND		500	502		ug/L		100	70 - 130	0	20
Vanadium	ND		500	496		ug/L		99	70 - 130	0	20
Zinc	33		500	538		ug/L		101	70 - 130	0	20

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 440-637894/1-A
Matrix: Water
Analysis Batch: 637960

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 637894

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		1.0	0.50	ug/L		02/04/21 09:51	02/04/21 17:28	1
Cadmium	ND		1.0	0.25	ug/L		02/04/21 09:51	02/04/21 17:28	1
Copper	ND		2.0	0.50	ug/L		02/04/21 09:51	02/04/21 17:28	1
Lead	ND		1.0	0.50	ug/L		02/04/21 09:51	02/04/21 17:28	1
Antimony	ND		2.0	0.50	ug/L		02/04/21 09:51	02/04/21 17:28	1
Selenium	ND		2.0	0.50	ug/L		02/04/21 09:51	02/04/21 17:28	1
Thallium	ND		1.0	0.20	ug/L		02/04/21 09:51	02/04/21 17:28	1

Lab Sample ID: LCS 440-637894/2-A
Matrix: Water
Analysis Batch: 637960

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 637894

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Silver	80.0	76.0		ug/L		95	85 - 115
Cadmium	80.0	76.4		ug/L		96	85 - 115
Copper	80.0	78.4		ug/L		98	85 - 115
Lead	80.0	75.6		ug/L		94	85 - 115
Antimony	80.0	79.8		ug/L		100	85 - 115
Selenium	80.0	75.9		ug/L		95	85 - 115
Thallium	80.0	77.6		ug/L		97	85 - 115

Lab Sample ID: 440-278182-A-1-B MS
Matrix: Water
Analysis Batch: 637960

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 637894

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Silver	ND		80.0	75.1		ug/L		94	70 - 130
Cadmium	ND		80.0	76.2		ug/L		95	70 - 130
Copper	17		80.0	95.0		ug/L		98	70 - 130
Lead	10		80.0	87.1		ug/L		96	70 - 130
Antimony	ND		80.0	79.0		ug/L		99	70 - 130
Selenium	ND		80.0	73.8		ug/L		92	70 - 130
Thallium	ND		80.0	63.3		ug/L		79	70 - 130

Lab Sample ID: 440-278182-A-1-C MSD
Matrix: Water
Analysis Batch: 637960

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 637894

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Silver	ND		80.0	77.0		ug/L		96	70 - 130	3	20
Cadmium	ND		80.0	78.2		ug/L		98	70 - 130	3	20
Copper	17		80.0	97.9		ug/L		101	70 - 130	3	20
Lead	10		80.0	89.2		ug/L		98	70 - 130	2	20
Antimony	ND		80.0	81.0		ug/L		101	70 - 130	3	20
Selenium	ND		80.0	76.0		ug/L		95	70 - 130	3	20
Thallium	ND		80.0	65.3		ug/L		82	70 - 130	3	20

QC Association Summary

Client: Haley & Aldrich, Inc.
Project/Site: Boeing NPDES SSFL Outfalls

Job ID: 440-278183-1

Metals

Analysis Batch: 637440

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278183-1	RMHF_20210129_Grab	Total Recoverable	Water	SM 2340B	

Prep Batch: 637894

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278183-1	RMHF_20210129_Grab	Total Recoverable	Water	200.2	
MB 440-637894/1-A	Method Blank	Total Recoverable	Water	200.2	
LCS 440-637894/2-A	Lab Control Sample	Total Recoverable	Water	200.2	
440-278182-A-1-B MS	Matrix Spike	Total Recoverable	Water	200.2	
440-278182-A-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	200.2	

Prep Batch: 637895

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278183-1	RMHF_20210129_Grab	Total Recoverable	Water	200.2	
MB 440-637895/1-A	Method Blank	Total Recoverable	Water	200.2	
LCS 440-637895/2-A	Lab Control Sample	Total Recoverable	Water	200.2	
440-278304-B-1-B MS	Matrix Spike	Total Recoverable	Water	200.2	
440-278304-B-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	200.2	

Analysis Batch: 637960

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278183-1	RMHF_20210129_Grab	Total Recoverable	Water	200.8	637894
MB 440-637894/1-A	Method Blank	Total Recoverable	Water	200.8	637894
LCS 440-637894/2-A	Lab Control Sample	Total Recoverable	Water	200.8	637894
440-278182-A-1-B MS	Matrix Spike	Total Recoverable	Water	200.8	637894
440-278182-A-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	200.8	637894

Analysis Batch: 637962

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278183-1	RMHF_20210129_Grab	Total Recoverable	Water	200.7 Rev 4.4	637895
MB 440-637895/1-A	Method Blank	Total Recoverable	Water	200.7 Rev 4.4	637895
LCS 440-637895/2-A	Lab Control Sample	Total Recoverable	Water	200.7 Rev 4.4	637895
440-278304-B-1-B MS	Matrix Spike	Total Recoverable	Water	200.7 Rev 4.4	637895
440-278304-B-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	200.7 Rev 4.4	637895

Definitions/Glossary

Client: Haley & Aldrich, Inc.
Project/Site: Boeing NPDES SSFL Outfalls

Job ID: 440-278183-1

Qualifiers

Metals

Qualifier	Qualifier Description
J,DX	Estimated value; value < lowest standard (MQL), but >than MDL

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Haley & Aldrich, Inc.
Job ID: 440-278183-1
Project/Site: Boeing NPDES SSFL Outfalls

Laboratory: Eurofins Calscience Irvine

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
California	State	2706	02-21-21

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
SM 2340B		Water	Calcium hardness as calcium carbonate
SM 2340B		Water	Hardness, as CaCO3
SM 2340B		Water	Magnesium hardness as calcium carbonate

Eurofins Calscience Irvine

CHAIN OF CUSTODY FORM

UH4VAADK

Client Name/Address:
Haley & Aldrich
5333 Mission Center Rd Suite 300
San Diego, CA 92108

Eurofins Calscience Irvine Contact: Christian Bondoc
17461 Derian Ave Suite #100
Irvine CA 92614
Tel: 949-260-3218

TestAmerica's services under this CoC shall be performed in accordance with the T&Cs within Blanket Service Agreement# 2019-22-TestAmerica by and between Haley & Aldrich, Inc., its subsidiaries and affiliates, and TestAmerica Laboratories Inc.

Sampler:

Project:
Boeing SSFL RMHF
Annual Outfall 003 RMHF
Outfall 003
GRAB

Project Manager: Katherine Miller
520.289.8606, 520.904.6944 (cell)
Field Manager: Mark Dominick
978.234.5033, 818.599.0702 (cell)

Field Readings | Meter serial #
Field Readings: (Include units)
Time of Readings: 0745
pH 5.00 pH unit
Temp 8.89 °F
Field readings QC
Checked by: MB
Date/Time: 01/29/2021 0750

ANALYSIS REQUIRED

Analysis columns: (1) R/A Total Recoverable Metals: (E200.7): Al, B, Fe, MN, Ni, V, Zn, Hardness as CaCO3 (E200.8): Ag, Cd, Cu, Pb, Sb, Se, Tl; (2) R TCDD (and all congeners) (E1613B); (3) R/A Cl, F, SO4, NO3+NO2-N, Perchlorate (E300); (4) R TDS (SM2540C/E160.1); (5) A TSS (160.2 (SM2540D)); (6) R/A Total Dissolved Metals (E200.7): Al, B, Fe, Mn, Ni, V, Zn, Hardness as CaCO3 (E200.8): Ag, Cd, Cu, Pb, Sb, Se, Tl; (7) R Gross Alpha(E900.0), Gross Beta(E900.0), Tritium (H-3) (E906.0), Sr-90 (E905.0), Total Combined Radium 226 (E903.0 or E903.1) & Radium 228 (E904.0), Uranium (E908.0), U-238/-235/-234, K-40, CS-137 (E901.0 or E901.1), Pu-239; (8) R Chronic Toxicity Selenastrum (EPA-821-R-02-013) ABC abs; (9) R Cyanide (SM4500-CN-E / E335.2); (10) A Priority Pollutants-Pesticides+PCBs (E608); (11) R Total Recoverable Metals: Mercury (E245.1); (12) R Total Dissolved Metals: Mercury (E245.1)

Sample Description	Sample I.D.	Sampling Date/Time	Sample Matrix	Container Type	# of Cont.	Preservative	Bottle #	MS/MSD	1	2	3	4	5	6	7	8	9	10	11	12	Comments
RMHF	RMHF_20210129_Grab	01/29/2021/ 0745	WM	500 mL Poly	1 ✓	HNO3	85		X										X		
			WM	1 L Glass Amber	2	None	110			X											
			WM	500 mL Poly	3	None	135				X										48 hours Holding Time NO3 & NO2
			WM	500 mL Poly	1	None	155					X									
			WM	1 L Poly	1	None	165						X								
			WM	500 mL Poly	1	NaOH	220										X				
			WM	2.5 Gal Cube	1 ✓	None	225								X						Unfiltered and unpreserved analysis. Separate RAD onto another workorder.
			WM	1 L Glass Amber	1 ✓	None	230														Analyze duplicate, not MS/MSD.
			WM	1 Gal Cube	6	None	235														ver abs vert
			WM	1 L Glass Amber	2	None	250											X			
	RMHF_20210129_Grab_F	01/29/2021/	WM	1 L Poly	1	None	195							X							Filter and preserve w/in 24hrs of receipt at lab
			WM	borosilicate vials	1	None	320													X	Sample receiving DO NOT OPEN BAG. Bag to be opened in Mercury Prep using clean procedures.
	RMHF_20210129_Grab_Extra	01/29/2021/	WM	1 L Glass Amber	2	None	110			H											Hold
			WM	500 mL Poly	2	None	135				H										Hold
			WM	1 L Glass Amber	2	None	250											H			Hold

Laboratory - any leftover water, please analyze for TSS, Dissolved metals, and TCDD if possible

Legend: A = Annual, R = Routine,

Relinquished By	Date/Time	Company	Received By	Date/Time
[signature]	1/29/2021 1130	JHA	[signature]	EC-FIRV 1-29-21 11:30
[signature]	1/29/21 1630	EC-FIRV	[signature]	EC IRV 1/29/21 1630

Turn-around time: (Check)
24 Hour: ______ 72 Hour: ______ 10 Day: __X__
48 Hour ______ 5 Day: ______ Normal: ______

Sample Integrity: (Check)
Intact: ______ On Ice: ______
Store samples for 6 months.
Data Requirements: (Check)
No Level IV: ______ All Level IV: __X__

~~2.4/2.3~~ © 0.7/0.6 IR-89

1/29/21 a

440-278183 Chain of Custody

Rainy Season 2019-2020
Version 2

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 440-278183-1

Login Number: 278183
List Number: 1
Creator: Escalante, Maria I

List Source: Eurofins Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	Not present
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins Calscience Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-278183-2
Client Project/Site: Boeing NPDES SSFL Outfalls
Revision: 1

For:
Haley & Aldrich, Inc.
400 E Van Buren St.
Suite 545
Phoenix, Arizona 85004

Attn: Katherine Miller

Virendra R Patel

Authorized for release by:
3/2/2021 1:47:53 PM

Virendra Patel, Project Manager I
(714)895-5494
Virendra.Patel@eurofinset.com

Table of Contents

Sample Summary

Client: Haley & Aldrich, Inc.
Project/Site: Boeing NPDES SSFL Outfalls

Job ID: 440-278183-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-278183-1	RMHF_20210129_Grab	Water	01/29/21 07:45	01/29/21 16:30	

Job ID: 440-278183-2

Laboratory: Eurofins Calscience Irvine

Narrative

Job Narrative
440-278183-2

Comments
No additional comments.

Revision
The report being provided is a revision of the original report sent on 3/1/2021. The report (revision 1) is being revised due to: All methods were not approved for reportng..

Receipt
The sample was received on 1/29/2021 4:30 PM. Unless otherwise noted below, the sample arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.6º C.

RAD
Methods 900.0, 9310: 900 prep batch 497770
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

RMHF_20210129_Grab (440-278183-1), (LCS 160-497770/2-A), (LCSB 160-497770/3-A), (MB 160-497770/1-A), (570-49663-AJ-3-A), (570-49663-AJ-3-D DU), (570-49663-AJ-3-B MS) and (570-49663-AJ-3-C MSBT)

Methods 900.0, 9310:

Method 901.1: Gamma prep batch 160-497409:

The cesium-137 MDC (27.2 pCi/L) for the method blank (MB) is above the requested limit of 20 pCi/L. Cesium-137 activity was not observed in the MB above the MDC or RL. The MDC for the associated samples is less than the requested limit. The data have been reported with the MDC achieved. (MB 160-497409/1-A).

Method 901.1: Gamma prep batch 160-497409:

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

Inferred from	Reported to Analyte
Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223

Job ID: 440-278183-2 (Continued)

Laboratory: Eurofins Calscience Irvine (Continued)

Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.
RMHF_20210129_Grab (440-278183-1), (LCS 160-497409/2-A), (MB 160-497409/1-A) and (440-278183-A-1-B DU)

Method 903.0: Radium-226 prep batch 160-497782:

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. RMHF_20210129_Grab (440-278183-1), (LCS 160-497782/1-A), (MB 160-497782/18-A), (160-41146-A-8-A), (160-41146-A-8-B MS) and (160-41146-B-8-A MSD)

Method 904.0: 904 prep batch 497785
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

RMHF_20210129_Grab (440-278183-1), (LCS 160-497785/1-A), (MB 160-497785/18-A), (160-41146-A-8-C), (160-41146-A-8-D MS) and (160-41146-B-8-B MSD)

Method 905: strontium-90 prep batch 497942

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

RMHF_20210129_Grab (440-278183-1), (LCS 160-497942/1-A), (LCSD 160-497942/2-A) and (MB 160-497942/7-A)

Method 906.0: Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

RMHF_20210129_Grab (440-278183-1), (LCS 160-497965/2-A), (MB 160-497965/1-A), (570-49989-D-2-A), (570-49989-D-2-D DU) and (570-49989-D-2-E MS)

Method 906.0: Tritium prep batch 160-497965
The batch closing daily check for Aqua (analyzed 2/9) contained a warning. The initial daily check was fine (no warning) and all batch QC was within limits. Data is reported with this narrative.

Job ID: 440-278183-2 (Continued)

Laboratory: Eurofins Calscience Irvine (Continued)

RMHF_20210129_Grab (440-278183-1), (LCS 160-497965/2-A), (MB 160-497965/1-A), (570-49989-D-2-A), (570-49989-D-2-D DU) and (570-49989-D-2-E MS)

Method A-01-R: Isotopic Plutonium Prep Batch 160-798748
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.
RMHF_20210129_Grab (440-278183-1), (LCS 160-498748/2-A), (MB 160-498748/1-A) and (440-278183-A-1-J DU)

Methods A-01-R, U-02-RC: Isotopic Uranium Prep Batch 160-497766
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.
(LCS 160-497766/2-A), (MB 160-497766/1-A) and (440-278183-A-1-D DU)

Method PrecSep_0: Radium 226 Prep Batch 160-497785:
The following samples were prepared at a reduced aliquot: RMHF_20210129_Grab (440-278183-1). Sample 440-278183-1 contained a yellow discoloration and a noticeable sediment level. Samples 160-41157-1 and 160-41159-1 were reduced to insure sufficient volume remains if needed for analysis.

Method PrecSep-21: Radium 226 Prep Batch 160-497782:
The following samples were prepared at a reduced aliquot: RMHF_20210129_Grab (440-278183-1). Sample 440-278183-1 contained a yellow discoloration and a noticeable sediment level. Samples 160-41157-1 and 160-41159-1 were reduced to insure sufficient volume remains if needed for analysis.

Method PrecSep-7: Strontium 90 Prep Batch 160-497942:
Insufficient sample volume was available to perform a sample duplicate for the following samples: RMHF_20210129_Grab (440-278183-1). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep-7: Strontium 90 Prep Batch 160-497942:
The following samples were prepared at a reduced aliquot due to yellow discoloration: RMHF_20210129_Grab (440-278183-1). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) to demonstrate batch precision.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample ID: RMHF_20210129_Grab
Lab Sample ID: 440-278183-1

Date Collected: 01/29/21 07:45
Matrix: Water
Date Received: 01/29/21 16:30

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.519	U	0.874	0.876	3.00	1.50	pCi/L	02/04/21 11:47	02/08/21 14:34	1
Gross Beta	**6.25**		0.985	1.17	4.00	1.03	pCi/L	02/04/21 11:47	02/08/21 14:34	1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	3.57	U	8.23	8.24	20.0	14.2	pCi/L	02/02/21 14:13	02/03/21 07:48	1
Potassium-40	-41.8	U	169	169		178	pCi/L	02/02/21 14:13	02/03/21 07:48	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0692	U	0.0852	0.0854	1.00	0.140	pCi/L	02/04/21 13:52	02/26/21 07:42	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*79.6*		*40 - 110*	*02/04/21 13:52*	*02/26/21 07:42*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.0940	U	0.371	0.371	1.00	0.675	pCi/L	02/04/21 14:24	02/10/21 09:45	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*79.6*		*40 - 110*	*02/04/21 14:24*	*02/10/21 09:45*	*1*
Y Carrier	*90.5*		*40 - 110*	*02/04/21 14:24*	*02/10/21 09:45*	*1*

Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Strontium-90	0.243	U	0.219	0.220	3.00	0.351	pCi/L	02/05/21 14:07	02/17/21 15:27	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Sr Carrier	*86.5*		*40 - 110*	*02/05/21 14:07*	*02/17/21 15:27*	*1*
Y Carrier	*86.7*		*40 - 110*	*02/05/21 14:07*	*02/17/21 15:27*	*1*

Method: 906.0 - Tritium, Total (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tritium	-24.8	U	163	163	500	301	pCi/L	02/07/21 08:35	02/08/21 19:05	1

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Plutonium-238	-0.0360	U	0.104	0.104	1.00	0.237	pCi/L	02/12/21 12:52	02/19/21 11:08	1

Client Sample ID: RMHF_20210129_Grab
Lab Sample ID: 440-278183-1
Date Collected: 01/29/21 07:45
Matrix: Water
Date Received: 01/29/21 16:30

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Plutonium-239/240	-0.0241	U	0.0409	0.0409	1.00	0.141	pCi/L	02/12/21 12:52	02/19/21 11:08	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*87.5*		*30 - 110*	*02/12/21 12:52*	*02/19/21 11:08*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	0.0267	U	0.0653	0.0654	1.00	0.133	pCi/L	02/04/21 10:37	02/17/21 12:39	1
Uranium-235/236	-0.0332	U	0.0271	0.0272	1.00	0.166	pCi/L	02/04/21 10:37	02/17/21 12:39	1
Uranium-238	-0.00887	U	0.0416	0.0416	1.00	0.133	pCi/L	02/04/21 10:37	02/17/21 12:39	1
Total Uranium	-0.0154	U	0.08203	0.08214	1.00	0.166	pCi/L	02/04/21 10:37	02/17/21 12:39	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*93.6*		*30 - 110*	*02/04/21 10:37*	*02/17/21 12:39*	*1*

Method Summary

Client: Haley & Aldrich, Inc.
Project/Site: Boeing NPDES SSFL Outfalls

Job ID: 440-278183-2

Method	Method Description	Protocol	Laboratory
900.0	Gross Alpha and Gross Beta Radioactivity	EPA	TAL SL
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL SL
903.0	Radium-226 (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL
905	Strontium-90 (GFPC)	EPA	TAL SL
906.0	Tritium, Total (LSC)	EPA	TAL SL
A-01-R	Isotopic Plutonium and Neptunium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL SL
Evaporation	Preparation, Evaporation	None	TAL SL
ExtChrom	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL SL
Fill_Geo-0	Fill Geometry, No In-Growth	None	TAL SL
LSC_Dist_Susp	Distillation and Suspension (LSC)	None	TAL SL
PrecSep_0	Preparation, Precipitate Separation	None	TAL SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	TAL SL
PrecSep-7	Preparation, Precipitate Separation (7-Day In-Growth)	None	TAL SL

Protocol References:

DOE = U.S. Department of Energy

EPA = US Environmental Protection Agency

None = None

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Lab Chronicle

Client: Haley & Aldrich, Inc.
Job ID: 440-278183-2
Project/Site: Boeing NPDES SSFL Outfalls

Client Sample ID: RMHF_20210129_Grab
Lab Sample ID: 440-278183-1

Date Collected: 01/29/21 07:45
Matrix: Water
Date Received: 01/29/21 16:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Evaporation			200.07 mL	1.0 g	497770	02/04/21 11:47	JEC	TAL SL
Total/NA	Analysis	900.0		1			498081	02/08/21 14:34	ANW	TAL SL
Total/NA	Prep	Fill_Geo-0			1000 mL	1.0 g	497409	02/02/21 14:13	HIO	TAL SL
Total/NA	Analysis	901.1		1			497556	02/03/21 07:48	JLP	TAL SL
Total/NA	Prep	PrecSep-21			749.91 mL	1.0 g	497782	02/04/21 13:52	KMP	TAL SL
Total/NA	Analysis	903.0		1			500104	02/26/21 07:42	ANW	TAL SL
Total/NA	Prep	PrecSep_0			749.91 mL	1.0 g	497785	02/04/21 14:24	KMP	TAL SL
Total/NA	Analysis	904.0		1			498531	02/10/21 09:45	FLC	TAL SL
Total/NA	Prep	PrecSep-7			749.68 mL	1.0 g	497942	02/05/21 14:07	KMP	TAL SL
Total/NA	Analysis	905		1			499002	02/17/21 15:27	ANW	TAL SL
Total/NA	Prep	LSC_Dist_Susp			99.9 mL	1.0 g	497965	02/07/21 08:35	MAV	TAL SL
Total/NA	Analysis	906.0		1			498099	02/08/21 19:05	JLP	TAL SL
Total/NA	Prep	ExtChrom			500.59 mL	1.0 mL	497766	02/04/21 10:37	LTC	TAL SL
Total/NA	Analysis	A-01-R		1			499091	02/17/21 12:39	TJR	TAL SL
Total/NA	Prep	ExtChrom			499.72 mL	1.0 mL	498748	02/12/21 12:52	LTC	TAL SL
Total/NA	Analysis	A-01-R		1			499375	02/19/21 11:08	TJR	TAL SL

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

Lab Sample ID: MB 160-497770/1-A
Matrix: Water
Analysis Batch: 498081

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 497770

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	-0.6549	U	0.663	0.667	3.00	1.45	pCi/L	02/04/21 11:47	02/08/21 14:32	1
Gross Beta	-0.7361	U	0.487	0.493	4.00	0.991	pCi/L	02/04/21 11:47	02/08/21 14:32	1

Lab Sample ID: LCS 160-497770/2-A
Matrix: Water
Analysis Batch: 498081

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 497770

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Alpha	51.5	49.32		7.16	3.00	1.97	pCi/L	96	75 - 125

Lab Sample ID: LCSB 160-497770/3-A
Matrix: Water
Analysis Batch: 498081

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 497770

Analyte	Spike Added	LCSB Result	LCSB Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Beta	82.8	82.00		8.72	4.00	0.903	pCi/L	99	75 - 125

Lab Sample ID: 570-49663-AJ-3-B MS
Matrix: Water
Analysis Batch: 498081

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 497770

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Alpha	0.103	U	51.5	55.45		7.32	3.00	1.09	pCi/L	107	70 - 130

Lab Sample ID: 570-49663-AJ-3-C MSBT
Matrix: Water
Analysis Batch: 498088

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 497770

Analyte	Sample Result	Sample Qual	Spike Added	MSBT Result	MSBT Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Beta	-0.0211	U	82.9	79.01		8.41	4.00	0.958	pCi/L	95	70 - 130

Lab Sample ID: 570-49663-AJ-3-D DU
Matrix: Water
Analysis Batch: 498088

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 497770

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Gross Alpha	0.103	U	0.3551	U	0.672	3.00	1.18	pCi/L	0.19	1
Gross Beta	-0.0211	U	0.4294	U	0.518	4.00	0.844	pCi/L	0.45	1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-497409/1-A
Matrix: Water
Analysis Batch: 497563

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 497409

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	2.343	U G	15.3	15.3	20.0	27.2	pCi/L	02/02/21 14:13	02/03/21 07:17	1
Potassium-40	-47.85	U	162	162		245	pCi/L	02/02/21 14:13	02/03/21 07:17	1

Lab Sample ID: LCS 160-497409/2-A
Matrix: Water
Analysis Batch: 497562

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 497409

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	136000	122200		14400		622	pCi/L	90	90 - 111
Cesium-137	42900	44020		5190	20.0	165	pCi/L	103	90 - 111
Cobalt-60	23600	24380		2880		84.2	pCi/L	103	89 - 110

Lab Sample ID: 440-278183-1 DU
Matrix: Water
Analysis Batch: 497559

Client Sample ID: RMHF_20210129_Grab
Prep Type: Total/NA
Prep Batch: 497409

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Cesium-137	3.57	U	-5.673	U	6.18	20.0	17.9	pCi/L	0.64	1
Potassium-40	-41.8	U	-44.09	U	95.0		154	pCi/L	0.01	1

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-497782/18-A
Matrix: Water
Analysis Batch: 500106

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 497782

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0007354	U	0.0672	0.0672	1.00	0.132	pCi/L	02/04/21 13:52	02/26/21 07:43	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*86.5*		*40 - 110*	*02/04/21 13:52*	*02/26/21 07:43*	*1*

Lab Sample ID: LCS 160-497782/1-A
Matrix: Water
Analysis Batch: 500104

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 497782

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-226	11.3	11.17		1.15	1.00	0.124	pCi/L	98	75 - 125

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*79.0*		*40 - 110*

Method: 903.0 - Radium-226 (GFPC) (Continued)

Lab Sample ID: 160-41146-A-8-B MS
Matrix: Water
Analysis Batch: 500104

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 497782

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-226	0.150		11.3	12.18		1.24	1.00	0.0975	pCi/L	106	75 - 138		

Carrier	*MS %Yield*	*MS Qualifier*	*Limits*
Ba Carrier	*82.6*		*40 - 110*

Lab Sample ID: 160-41146-B-8-A MSD
Matrix: Water
Analysis Batch: 500104

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 497782

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-226	0.150		11.3	11.65		1.19	1.00	0.0933	pCi/L	101	75 - 138	0.22	1

Carrier	*MSD %Yield*	*MSD Qualifier*	*Limits*
Ba Carrier	*86.2*		*40 - 110*

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-497785/18-A
Matrix: Water
Analysis Batch: 498531

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 497785

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.07156	U	0.248	0.248	1.00	0.453	pCi/L	02/04/21 14:24	02/10/21 09:45	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*86.5*		*40 - 110*	*02/04/21 14:24*	*02/10/21 09:45*	*1*
Y Carrier	*91.2*		*40 - 110*	*02/04/21 14:24*	*02/10/21 09:45*	*1*

Lab Sample ID: LCS 160-497785/1-A
Matrix: Water
Analysis Batch: 498531

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 497785

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-228			7.44	7.798		0.986	1.00	0.454	pCi/L	105	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*79.0*		*40 - 110*
Y Carrier	*89.3*		*40 - 110*

Method: 904.0 - Radium-228 (GFPC) (Continued)

Lab Sample ID: 160-41146-A-8-D MS
Matrix: Water
Analysis Batch: 498531

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 497785

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-228	0.390	U	7.43	8.512		1.04	1.00	0.411	pCi/L	109	45 - 150		

Carrier	*MS %Yield*	*MS Qualifier*	*Limits*
Ba Carrier	*82.6*		*40 - 110*
Y Carrier	*87.1*		*40 - 110*

Lab Sample ID: 160-41146-B-8-B MSD
Matrix: Water
Analysis Batch: 498531

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 497785

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228	0.390	U	7.43	8.476		1.03	1.00	0.423	pCi/L	109	45 - 150	0.02	1

Carrier	*MSD %Yield*	*MSD Qualifier*	*Limits*
Ba Carrier	*86.2*		*40 - 110*
Y Carrier	*90.1*		*40 - 110*

Method: 905 - Strontium-90 (GFPC)

Lab Sample ID: MB 160-497942/7-A
Matrix: Water
Analysis Batch: 499002

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 497942

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Strontium-90	-0.05836	U	0.168	0.168	3.00	0.312	pCi/L	02/05/21 14:07	02/17/21 15:28	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Sr Carrier	*84.7*		*40 - 110*	*02/05/21 14:07*	*02/17/21 15:28*	*1*
Y Carrier	*84.5*		*40 - 110*	*02/05/21 14:07*	*02/17/21 15:28*	*1*

Lab Sample ID: LCS 160-497942/1-A
Matrix: Water
Analysis Batch: 499002

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 497942

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Strontium-90			8.28	7.682		0.821	3.00	0.275	pCi/L	93	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Sr Carrier	*86.1*		*40 - 110*
Y Carrier	*84.9*		*40 - 110*

Method: 905 - Strontium-90 (GFPC) (Continued)

Lab Sample ID: LCSD 160-497942/2-A
Matrix: Water
Analysis Batch: 499002

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 497942

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Strontium-90			8.28	8.566		0.896	3.00	0.284	pCi/L	103	75 - 125	0.52	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Sr Carrier	*84.9*		*40 - 110*
Y Carrier	*86.0*		*40 - 110*

Method: 906.0 - Tritium, Total (LSC)

Lab Sample ID: MB 160-497965/1-A
Matrix: Water
Analysis Batch: 498099

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 497965

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tritium	56.31	U	167	168	500	292	pCi/L	02/07/21 08:34	02/08/21 17:35	1

Lab Sample ID: LCS 160-497965/2-A
Matrix: Water
Analysis Batch: 498099

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 497965

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Tritium			2360	2224		379	500	305	pCi/L	94	75 - 114		

Lab Sample ID: 570-49989-D-2-E MS
Matrix: Water
Analysis Batch: 498099

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 497965

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Tritium	-111	U	2370	2553		400	500	289	pCi/L	108	67 - 130		

Lab Sample ID: 570-49989-D-2-D DU
Matrix: Water
Analysis Batch: 498099

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 497965

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Tritium	-111	U		-26.58	U	159	500	293	pCi/L			0.28	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 160-497766/1-A
Matrix: Water
Analysis Batch: 498860

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 497766

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	-0.01535	U	0.0614	0.0614	1.00	0.159	pCi/L	02/04/21 10:37	02/13/21 09:28	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: MB 160-497766/1-A
Matrix: Water
Analysis Batch: 498860

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 497766

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-235/236	-0.009553	U	0.0135	0.0135	1.00	0.107	pCi/L	02/04/21 10:37	02/13/21 09:28	1
Uranium-238	0.03065	U	0.0552	0.0553	1.00	0.102	pCi/L	02/04/21 10:37	02/13/21 09:28	1
Total Uranium	0.005739	U	0.08366	0.08373	1.00	0.159	pCi/L	02/04/21 10:37	02/13/21 09:28	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*96.0*		*30 - 110*	*02/04/21 10:37*	*02/13/21 09:28*	*1*

Lab Sample ID: LCS 160-497766/2-A
Matrix: Water
Analysis Batch: 498861

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 497766

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium-234			12.7	11.75		1.35	1.00	0.121	pCi/L	92	75 - 125		
Uranium-238			13.0	13.19		1.48	1.00	0.112	pCi/L	101	75 - 125		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Uranium-232	*93.2*		*30 - 110*

Lab Sample ID: 440-278183-1 DU
Matrix: Water
Analysis Batch: 499110

Client Sample ID: RMHF_20210129_Grab
Prep Type: Total/NA
Prep Batch: 497766

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Uranium-234	0.0267	U		0.05973	U	0.101	1.00	0.179	pCi/L			0.20	1
Uranium-235/236	-0.0332	U		0.03252	U	0.0534	1.00	0.0899	pCi/L			0.81	1
Uranium-238	-0.00887	U		-0.02235	U	0.0606	1.00	0.161	pCi/L			0.13	1
Total Uranium	-0.0154	U		0.06989	U	0.129	1.00	0.179	pCi/L			0.40	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Uranium-232	*100*		*30 - 110*

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Lab Sample ID: MB 160-498748/1-A
Matrix: Water
Analysis Batch: 499370

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 498748

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Plutonium-238	-0.06003	U	0.106	0.107	1.00	0.256	pCi/L	02/12/21 12:52	02/19/21 11:08	1
Plutonium-239/240	-0.02146	U	0.0192	0.0193	1.00	0.122	pCi/L	02/12/21 12:52	02/19/21 11:08	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*81.0*		*30 - 110*	*02/12/21 12:52*	*02/19/21 11:08*	*1*

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Lab Sample ID: LCS 160-498748/2-A
Matrix: Water
Analysis Batch: 499535

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 498748

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Plutonium-238			10.4	10.44		1.08	1.00	0.167	pCi/L	100	79 - 115		
Plutonium-239/240			10.6	10.20		1.06	1.00	0.127	pCi/L	97	85 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*96.5*		*30 - 110*

Lab Sample ID: 440-278183-1 DU
Matrix: Water
Analysis Batch: 499376

Client Sample ID: RMHF_20210129_Grab
Prep Type: Total/NA
Prep Batch: 498748

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Plutonium-238	-0.0360	U		-0.06736	U	0.0984	1.00	0.246	pCi/L			0.15	1
Plutonium-239/240	-0.0241	U		-0.02529	U	0.0430	1.00	0.149	pCi/L			0.01	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*78.7*		*30 - 110*

Rad

Prep Batch: 497409

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278183-1	RMHF_20210129_Grab	Total/NA	Water	Fill_Geo-0	
MB 160-497409/1-A	Method Blank	Total/NA	Water	Fill_Geo-0	
LCS 160-497409/2-A	Lab Control Sample	Total/NA	Water	Fill_Geo-0	
440-278183-1 DU	RMHF_20210129_Grab	Total/NA	Water	Fill_Geo-0	

Prep Batch: 497766

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278183-1	RMHF_20210129_Grab	Total/NA	Water	ExtChrom	
MB 160-497766/1-A	Method Blank	Total/NA	Water	ExtChrom	
LCS 160-497766/2-A	Lab Control Sample	Total/NA	Water	ExtChrom	
440-278183-1 DU	RMHF_20210129_Grab	Total/NA	Water	ExtChrom	

Prep Batch: 497770

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278183-1	RMHF_20210129_Grab	Total/NA	Water	Evaporation	
MB 160-497770/1-A	Method Blank	Total/NA	Water	Evaporation	
LCS 160-497770/2-A	Lab Control Sample	Total/NA	Water	Evaporation	
LCSB 160-497770/3-A	Lab Control Sample	Total/NA	Water	Evaporation	
570-49663-AJ-3-B MS	Matrix Spike	Total/NA	Water	Evaporation	
570-49663-AJ-3-C MSBT	Matrix Spike	Total/NA	Water	Evaporation	
570-49663-AJ-3-D DU	Duplicate	Total/NA	Water	Evaporation	

Prep Batch: 497782

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278183-1	RMHF_20210129_Grab	Total/NA	Water	PrecSep-21	
MB 160-497782/18-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-497782/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
160-41146-A-8-B MS	Matrix Spike	Total/NA	Water	PrecSep-21	
160-41146-B-8-A MSD	Matrix Spike Duplicate	Total/NA	Water	PrecSep-21	

Prep Batch: 497785

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278183-1	RMHF_20210129_Grab	Total/NA	Water	PrecSep_0	
MB 160-497785/18-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-497785/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
160-41146-A-8-D MS	Matrix Spike	Total/NA	Water	PrecSep_0	
160-41146-B-8-B MSD	Matrix Spike Duplicate	Total/NA	Water	PrecSep_0	

Prep Batch: 497942

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278183-1	RMHF_20210129_Grab	Total/NA	Water	PrecSep-7	
MB 160-497942/7-A	Method Blank	Total/NA	Water	PrecSep-7	
LCS 160-497942/1-A	Lab Control Sample	Total/NA	Water	PrecSep-7	
LCSD 160-497942/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-7	

Prep Batch: 497965

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278183-1	RMHF_20210129_Grab	Total/NA	Water	LSC_Dist_Susp	
MB 160-497965/1-A	Method Blank	Total/NA	Water	LSC_Dist_Susp	
LCS 160-497965/2-A	Lab Control Sample	Total/NA	Water	LSC_Dist_Susp	
570-49989-D-2-E MS	Matrix Spike	Total/NA	Water	LSC_Dist_Susp	

Rad (Continued)

Prep Batch: 497965 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-49989-D-2-D DU	Duplicate	Total/NA	Water	LSC_Dist_Susp	

Prep Batch: 498748

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278183-1	RMHF_20210129_Grab	Total/NA	Water	ExtChrom	
MB 160-498748/1-A	Method Blank	Total/NA	Water	ExtChrom	
LCS 160-498748/2-A	Lab Control Sample	Total/NA	Water	ExtChrom	
440-278183-1 DU	RMHF_20210129_Grab	Total/NA	Water	ExtChrom	

Definitions/Glossary

Client: Haley & Aldrich, Inc.
Job ID: 440-278183-2
Project/Site: Boeing NPDES SSFL Outfalls

Qualifiers

Rad

Qualifier	Qualifier Description
G	The Sample MDC is greater than the requested RL.
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Haley & Aldrich, Inc.
Job ID: 440-278183-2
Project/Site: Boeing NPDES SSFL Outfalls

Laboratory: Eurofins TestAmerica, St. Louis

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	20-001	05-06-22
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-21
California	Los Angeles County Sanitation Districts	10259	06-30-21
California	State	2886	06-30-21
Connecticut	State	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-21
HI - RadChem Recognition	State	n/a	06-30-21
Illinois	NELAP	004553	11-30-21
Iowa	State	373	12-01-22
Kansas	NELAP	E-10236	10-31-21
Kentucky (DW)	State	KY90125	01-01-22
Louisiana	NELAP	04080	06-30-21
Louisiana (DW)	State	LA011	12-31-21
Maryland	State	310	09-30-21
MI - RadChem Recognition	State	9005	06-30-21
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-21
New Jersey	NELAP	MO002	06-30-21
New York	NELAP	11616	04-01-21
North Dakota	State	R-207	06-30-21
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-21
Oregon	NELAP	4157	09-01-21
Pennsylvania	NELAP	68-00540	03-01-22
South Carolina	State	85002001	06-30-21
Texas	NELAP	T104704193-19-13	07-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	US Federal Programs	P330-17-00028	03-11-23
Utah	NELAP	MO000542019-11	07-31-21
Virginia	NELAP	10310	06-14-21
Washington	State	C592	08-30-21
West Virginia DEP	State	381	10-31-21

CHAIN OF CUSTODY FORM

WH4VAADK 1

Client Name/Address: Haley & Aldrich 5333 Mission Center Rd Suite 300 San Diego, CA 92108	Project: Boeing SSFL RMHF Annual Outfall 003 RMHF Outfall 003 GRAB
Eurofins Calscience Irvine Contact: Christian Bondoc 17461 Derian Ave Suite #100 Irvine CA 92614 Tel: 949-260-3218	Project Manager: Katherine Miller 520.289.8606, 520.904.6944 (cell) Field Manager: Mark Dominick 978.234.5033, 818.599.0702 (cell)
TestAmerica's services under this CoC shall be performed in accordance with the T&Cs within Blanket Service Agreement# 2019-22-TestAmerica by and between Haley & Aldrich, Inc., its subsidiaries and affiliates, and TestAmerica Laboratories Inc. Sampler:	

ANALYSIS REQUIRED

Sample Description	Sample .D.	Sampling Date/Time	Sample Matrix	Container Type	# of Cont.	Preservative	Bottle #	MS/MSD	Total Recoverable Metals: (E200.7): Al, B, Fe, Mn, Ni, V, Zn, Hardness as CaCO3 (E200.8): Ag, Cd, Cu, Pb, Sb, Se, Tl	TCDD (and all congeners) (E1613B)	Cl-, F-, SO4, NO3+NO2-N, Perchlorate (E300)	TDS (SM2540C/E160.1)	TSS (160.2 (SM2540D))	Total Dissolved Metals (E200.7): Al, B, Fe, Mn, Ni, V, Zn, Hardness as CaCO3 (E200.8): Ag, Cd, Cu, Pb, Sb, Se, Tl	Gross Alpha(E900.0), Gross Beta(E900.0), Tritium (H-3) (E906.0), Sr-90 (E905.0), Total Combined Radium 226 (E903.0 or E903.1) & Radium 228 (E904.0), Uranium (E908.0), U-238/ 235/ 234, K-40, Cs-137 (E901.0 or E901.1), Pu-239	Chronic Toxicity Selenastrum (EPA-821-R-02-013) SBC abs A	Cyanide (SM4500-CN-E / E335.2)	Priority Pollutants+Pesticides+PCBs (E608)	Total Recoverable Metals: Mercury (E245.1)	Total Dissolved Metals: Mercury (E245.1)	Comments
									R/A	R	R/A	R	A	R/A	R	R	R	A	R	R	
RMHF	RMHF_20210129_Grab	01/29/2021 0745	WM	500 mL Poly	1 ✓	HNO_3	85		X										X		
			WM	1 L Glass Amber	2	None	110			X											
			WM	500 mL Poly	2	None	135				X										48 hours Holding Time NO3 & NO2
			WM	500 mL Poly	1	None	455					X									
			WM	1 L Poly	1	None	165						X								
			WM	500 mL Poly	1	NaOH	220										X				
			WM	2.5 Gal Cube	1 ✓	None	225								X						Unfiltered and unpreserved analysis. Separate RAD onto another workorder. Analyze duplicate, not MS/MSD.
			WM	1 L Glass Amber	1 ✓	None	230														
			WM	1 Gal Cube	6	None	235														Wet Abs Vent
			WM	1 L Glass Amber	2	None	250												X		
	RMHF_20210129_Grab_F	01/29/2021	WM	1 L Poly	1	None	195							X							Filter and preserve w/in 24hrs of receipt at lab
			WM	borosilicate vials	1	None	320													X	Sample receiving DO NOT OPEN BAG. Bag to be opened in Mercury Prep using clean procedures.
	RMHF_20210129_Grab_Extra	01/29/2021	WM	1 L Glass Amber	2	None	110			H											Hold
			WM	500 mL Poly	2	None	135				H										Hold
			WM	1 L Glass Amber	2	None	250												H		Hold

Laboratory - any leftover water, please analyze for TSS, dissolved metals, and TCDD if possible

Field Readings | Meter serial #

Field Readings: (Include units)

Time of Readings: 0745

pH 5.00 pH unit

Temp 8.89 °F

Field readings QC

Checked by: MB

Date/Time: 01/29/2021 0750

Legend: A = Annual, R = Routine,

Relinquished By	Date/Time	Company	Received By	Date/Time
	1/29/2021 1130	JH/t	EC 112V	1-29-21 11:30
	1/29/21 1630	EC 112V	EC 112V	1/29/21 1630

Turn-around time: (Check)

24 Hour: ____ 72 Hour: ____ 10 Day: ___X___

48 Hour: ____ 5 Day: ____ Normal: ____

Sample Integrity: (Check)

Intact: ____ On Ice: ____

Store samples for 6 months.

Data Requirements: (Check)

No Level IV: ____ All Level IV: ___X___

2 4/2 3 (N) 0.7/2.6 12-89

1/29/21 a

440-278183 Chain of Custody

Eurofins Calscience Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone: 949-261-1022 Fax: 949-260-3297

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Bondoc, Christian M	Carrier Tracking No(s):	COC No: 440-165989.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Christian.Bondoc@Eurofinset.com	State of Origin: California	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 440-278183-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 2/11/2021			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: Boeing NPDES SSFL Outfalls	Project #: 44024446			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	901.1_Cs/Fill_Geo_0 K-40 and Cesium-137	A01R_U/ExtChrom_Actin Total Uranium	900.0/Evaporation Gross Alpha/Beta	903.0/PrecSep_21 Radium-226	904.0/PrecSep_0 Radium-228	905_Sr90/PrecSep_7 Strontium-90	906.0/LSC_Dist_Susp Tritium	Total Number of containers	Special Instructions/Note:
			Preservation Code:												
RMHF_20210129_Grab (440-278183-1)	1/29/21	07:45 Pacific		Water			X	X	X	X	X	X	X	2	Boeing SSFL; DO NOT FILTER; use prep date from preservation

Note: Since laboratory accreditations are subject to change, Eurofins Calscience places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Calscience laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Calscience attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Calscience.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Olga Cruelas	2/1/21 1700	EC-IRV	FED EX		
Relinquished by: FED EX	Date/Time:	Company	Received by: Mallory Olsen	Date/Time: 2/2/21 0855	Company ETA-STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 11/01/2020

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 440-278183-2

Login Number: 278183
List Number: 1
Creator: Escalante, Maria I

List Source: Eurofins Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	Not present
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 440-278183-2

Login Number: 278183
List Number: 2
Creator: Worthington, Sierra M

List Source: Eurofins TestAmerica, St. Louis
List Creation: 02/02/21 12:50 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Tracer/Carrier Summary

Client: Haley & Aldrich, Inc.
Project/Site: Boeing NPDES SSFL Outfalls

Job ID: 440-278183-2

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)
		Ba
Lab Sample ID	Client Sample ID	(40-110)
160-41146-A-8-B MS	Matrix Spike	82.6
160-41146-B-8-A MSD	Matrix Spike Duplicate	86.2
440-278183-1	RMHF_20210129_Grab	79.6
LCS 160-497782/1-A	Lab Control Sample	79.0
MB 160-497782/18-A	Method Blank	86.5

Tracer/Carrier Legend

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
		Ba	Y
Lab Sample ID	Client Sample ID	(40-110)	(40-110)
160-41146-A-8-D MS	Matrix Spike	82.6	87.1
160-41146-B-8-B MSD	Matrix Spike Duplicate	86.2	90.1
440-278183-1	RMHF_20210129_Grab	79.6	90.5
LCS 160-497785/1-A	Lab Control Sample	79.0	89.3
MB 160-497785/18-A	Method Blank	86.5	91.2

Tracer/Carrier Legend

Ba = Ba Carrier
Y = Y Carrier

Method: 905 - Strontium-90 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
		Sr	Y
Lab Sample ID	Client Sample ID	(40-110)	(40-110)
440-278183-1	RMHF_20210129_Grab	86.5	86.7
LCS 160-497942/1-A	Lab Control Sample	86.1	84.9
LCSD 160-497942/2-A	Lab Control Sample Dup	84.9	86.0
MB 160-497942/7-A	Method Blank	84.7	84.5

Tracer/Carrier Legend

Sr = Sr Carrier
Y = Y Carrier

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)
		Pu-242 (T)
Lab Sample ID	Client Sample ID	(30-110)
440-278183-1	RMHF_20210129_Grab	87.5
440-278183-1 DU	RMHF_20210129_Grab	78.7
LCS 160-498748/2-A	Lab Control Sample	96.5
MB 160-498748/1-A	Method Blank	81.0

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Tracer/Carrier Summary

Client: Haley & Aldrich, Inc.
Job ID: 440-278183-2
Project/Site: Boeing NPDES SSFL Outfalls

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Water
Prep Type: Total/NA

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	U-232 (30-110)
440-278183-1	RMHF_20210129_Grab	93.6
440-278183-1 DU	RMHF_20210129_Grab	100
LCS 160-497766/2-A	Lab Control Sample	93.2
MB 160-497766/1-A	Method Blank	96.0

Tracer/Carrier Legend

U-232 = Uranium-232

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ANALYTICAL REPORT

Eurofins Calscience Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-278183-3
Client Project/Site: Boeing NPDES SSFL Outfalls

For:
Haley & Aldrich, Inc.
400 E Van Buren St.
Suite 545
Phoenix, Arizona 85004

Attn: Katherine Miller

Virendra R Patel

Authorized for release by:
3/10/2021 5:10:10 PM

Virendra Patel, Project Manager I
(714)895-5494
Virendra.Patel@eurofinset.com

Table of Contents

Sample Summary

Client: Haley & Aldrich, Inc.
Project/Site: Boeing NPDES SSFL Outfalls

Job ID: 440-278183-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-278183-1	RMHF_20210129_Grab	Water	01/29/21 07:45	01/29/21 16:30	

Case Narrative

Client: Haley & Aldrich, Inc.
Project/Site: Boeing NPDES SSFL Outfalls

Job ID: 440-278183-3

Job ID: 440-278183-3

Laboratory: Eurofins Calscience Irvine

Narrative

Job Narrative
440-278183-3

Comments
No additional comments.

Receipt
The sample was received on 1/29/2021 4:30 PM. Unless otherwise noted below, the sample arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.6º C.

Metals
Method 245.1: The following sample was prepared outside of preparation holding time due to method requested after holding time had expired : RMHF_20210129_Grab (440-278183-1).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample Results

Client: Haley & Aldrich, Inc.
Job ID: 440-278183-3
Project/Site: Boeing NPDES SSFL Outfalls

Client Sample ID: RMHF_20210129_Grab
Lab Sample ID: 440-278183-1
Date Collected: 01/29/21 07:45
Matrix: Water
Date Received: 01/29/21 16:30

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	BU	0.20	0.10	ug/L		03/10/21 10:46	03/10/21 15:06	1

Method Summary

Client: Haley & Aldrich, Inc.
Project/Site: Boeing NPDES SSFL Outfalls

Job ID: 440-278183-3

Method	Method Description	Protocol	Laboratory
245.1	Mercury (CVAA)	EPA	TAL IRV
245.1	Preparation, Mercury	EPA	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL IRV = Eurofins Calscience Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Lab Chronicle

Client: Haley & Aldrich, Inc.
Job ID: 440-278183-3
Project/Site: Boeing NPDES SSFL Outfalls

Client Sample ID: RMHF_20210129_Grab
Lab Sample ID: 440-278183-1
Date Collected: 01/29/21 07:45
Matrix: Water
Date Received: 01/29/21 16:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	245.1			20 mL	30 mL	640903	03/10/21 10:46	MA6V	TAL IRV
Total/NA	Analysis	245.1		1			640951	03/10/21 15:06	MA6V	TAL IRV

Laboratory References:

TAL IRV = Eurofins Calscience Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 440-640903/1-A
Matrix: Water
Analysis Batch: 640951

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 640903

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/10/21 10:46	03/10/21 15:01	1

Lab Sample ID: LCS 440-640903/2-A
Matrix: Water
Analysis Batch: 640951

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 640903

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			6.00	5.64		ug/L		94	85 - 115		

Lab Sample ID: 440-278183-1 MS
Matrix: Water
Analysis Batch: 640951

Client Sample ID: RMHF_20210129_Grab
Prep Type: Total/NA
Prep Batch: 640903

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	ND	BU	6.00	6.13		ug/L		102	75 - 125		

Lab Sample ID: 440-278183-1 MSD
Matrix: Water
Analysis Batch: 640951

Client Sample ID: RMHF_20210129_Grab
Prep Type: Total/NA
Prep Batch: 640903

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND	BU	6.00	5.89		ug/L		98	75 - 125	4	20

QC Association Summary

Client: Haley & Aldrich, Inc.
Project/Site: Boeing NPDES SSFL Outfalls

Job ID: 440-278183-3

Metals

Prep Batch: 640903

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278183-1	RMHF_20210129_Grab	Total/NA	Water	245.1	
MB 440-640903/1-A	Method Blank	Total/NA	Water	245.1	
LCS 440-640903/2-A	Lab Control Sample	Total/NA	Water	245.1	
440-278183-1 MS	RMHF_20210129_Grab	Total/NA	Water	245.1	
440-278183-1 MSD	RMHF_20210129_Grab	Total/NA	Water	245.1	

Analysis Batch: 640951

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278183-1	RMHF_20210129_Grab	Total/NA	Water	245.1	640903
MB 440-640903/1-A	Method Blank	Total/NA	Water	245.1	640903
LCS 440-640903/2-A	Lab Control Sample	Total/NA	Water	245.1	640903
440-278183-1 MS	RMHF_20210129_Grab	Total/NA	Water	245.1	640903
440-278183-1 MSD	RMHF_20210129_Grab	Total/NA	Water	245.1	640903

Definitions/Glossary

Client: Haley & Aldrich, Inc.
Project/Site: Boeing NPDES SSFL Outfalls

Job ID: 440-278183-3

Qualifiers

Metals

Qualifier	Qualifier Description
BU	Analyzed out of holding time

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Haley & Aldrich, Inc.
Job ID: 440-278183-3
Project/Site: Boeing NPDES SSFL Outfalls

Laboratory: Eurofins Calscience Irvine

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2706	06-30-21

Eurofins Calscience Irvine

CHAIN OF CUSTODY FORM

UH4VAADK

Client Name/Address:	Project:
Haley & Aldrich 5333 Mission Center Rd Suite 300 San Diego, CA 92108	Boeing SSFL RMHF **Annual Outfall 003 RMHF** **Outfall 003** **GRAB**
Eurofins Calscience Irvine Contact: Christian Bondoc 17461 Derian Ave Suite #100 Irvine CA 92614 Tel: 949-260-3218	
TestAmerica's services under this CoC shall be performed in accordance with the T&Cs within Blanket Service Agreement# 2019-22-TestAmerica by and between Haley & Aldrich, Inc., its subsidiaries and affiliates, and TestAmerica Laboratories Inc.	Project Manager: Katherine Miller 520.289.8606, 520.904.6944 (cell)
Sampler:	Field Manager: Mark Dominick 978.234.5033, 818.599.0702 (cell)

Field Readings

Field Readings	Meter serial #
Field Readings: (include units)	
Time of Readings: 0745	
pH 5.00 pH unit	
Temp 8.89 °F	
Field readings QC	
Checked by: MB	
Date/Time: 01/29/2021 0750	

ANALYSIS REQUIRED

Columns: (1) R/A Total Recoverable Metals: (E200.7): Al, B, Fe, MN, Ni, V, Zn, Hardness as CaCO3 (E200.8): Ag, Cd, Cu, Pb, Sb, Se, Tl; (2) R TCDD (and all congeners) (E1613B); (3) R/A Cl-, F-, SO4, NO3+NO2-N, Perchlorate (E300); (4) R TDS (SM2540C/E160.1); (5) A TSS (160.2 (SM2540D)); (6) R/A Total Dissolved Metals (E200.7): Al, B, Fe, Mn, Ni, V, Zn, Hardness as CaCO3 (E200.8): Ag, Cd, Cu, Pb, Sb, Se, Tl; (7) R Gross Alpha(E900.0), Gross Beta(E900.0), Tritium (H-3) (E906.0), Sr-90 (E905.0), Total Combined Radium 226 (E903.0 or E903.1) & Radium 228 (E904.0), Uranium (E908.0), U-238/-235/-234, K-40, CS-137 (E901.0 or E901.1), Pu-239; (8) R Chronic Toxicity Selenastrum (EPA-821-R-02-013) NBC abs A; (9) R Cyanide (SM4500-CN-E / E335.2); (10) A Priority Pollutants-Pesticides+PCBs (E608); (11) R Total Recoverable Metals: Mercury (E245.1); (12) R Total Dissolved Metals: Mercury (E245.1)

Sample Description	Sample I.D.	Sampling Date/Time	Sample Matrix	Container Type	# of Cont.	Preservative	Bottle #	MS/MSD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	Comments
RMHF	RMHF_20210129_Grab	01/29/2021/ 0745	WM	500 mL Poly	1 ✓	HNO_3	85		X										X		
			~~WM~~	~~1 L Glass Amber~~	~~2~~	~~None~~	~~110~~			~~X~~											
			~~WM~~	~~500 mL Poly~~	~~2~~	~~None~~	~~135~~				~~X~~										48 hours Holding Time NO3 & NO2
			~~WM~~	~~500 mL Poly~~	~~1~~	~~None~~	~~155~~					~~X~~									
			~~WM~~	~~1 L Poly~~	~~1~~	~~None~~	~~185~~						~~X~~								
			~~WM~~	~~500 mL Poly~~	~~1~~	~~NaOH~~	~~220~~										~~X~~				
			WM	2.5 Gal Cube	1 ✓	None	225								X						Unfiltered and unpreserved analysis. Separate RAD onto another workorder. Analyze duplicate, not MS/MSD.
			WM	1 L Glass Amber	1 ✓	None	230														
			WM	1 Gal Cube	6	None	235														ver abs vert
			WM	1 L Glass Amber	2	None	250											X			
	RMHF_20210129_Grab_F	01/29/2021/	WM	1 L Poly	1	None	195							X							Filter and preserve w/in 24hrs of receipt at lab
			WM	borosilicate vials	1	None	320													X	Sample receiving DO NOT OPEN BAG. Bag to be opened in Mercury Prep using clean procedures.
	RMHF_20210129_Grab_Extra	01/29/2021/	WM	1 L Glass Amber	2	None	110			H											Hold
			WM	500 mL Poly	2	None	135				H										Hold
			WM	1 L Glass Amber	2	None	250											H			Hold

Laboratory - any leftover water, please analyze for TSS, Dissolved metals, and TCDD if possible

Legend: A = Annual, R = Routine.

Relinquished By	Date/Time:	Company:	Received By	Date/Time:
[signature]	1/29/2021 1130	JHA	[signature] EC-FTZV	1-29-21 11:30
Relinquished By	Date/Time:	Company:	Received By	Date/Time:
Relinquished By	Date/Time:	Company:	Received By	Date/Time:
[signature]	1-29-21 1630	EC-FTZV	[signature]	EC IRV 1/29/21 1630

Turn-around time: (Check)
24 Hour: ______ 72 Hour: ______ 10 Day: X
48 Hour: ______ 5 Day: ______ Normal: ______

Sample Integrity: (Check)
Intact: ______ On Ice: ______

Store samples for 6 months.

Data Requirements: (Check)
No Level IV: ______ All Level IV: X

~~2.4/2.3~~ © 0.7/0.6 IR-89

1/29/21 a

440-278183 Chain of Custody

Rainy Season 2019-2020
Version 2

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 440-278183-3

Login Number: 278183

List Source: Eurofins Irvine

List Number: 1

Creator: Escalante, Maria I

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	Not present
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Eurofins Calscience Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-278184-1
Client Project/Site: BMP

For:
Haley & Aldrich, Inc.
400 E Van Buren St.
Suite 545
Phoenix, Arizona 85004

Attn: Katherine Miller

Authorized for release by:
2/16/2021 9:59:31 AM

Christian Bondoc, Project Manager I
(949)260-3218
Christian.Bondoc@Eurofinset.com

Table of Contents

Sample Summary

Client: Haley & Aldrich, Inc.
Project/Site: BMP

Job ID: 440-278184-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-278184-1	LPBMP0002_20210129	Water	01/29/21 08:35	01/29/21 16:30	
440-278184-2	LPBMP0003_20210129	Water	01/29/21 08:48	01/29/21 16:30	
440-278184-3	LPBMP0004_20210129	Water	01/29/21 08:52	01/29/21 16:30	

Job ID: 440-278184-1

Laboratory: Eurofins Calscience Irvine

Narrative

Job Narrative
440-278184-1

Comments
No additional comments.

Receipt
The samples were received on 1/29/2021 4:30 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.3º C.

Dioxin
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Metals
Methods 200.2, FILTRATION: The following samples requested dissolved metals and were not filtered in the field: LPBMP0002_20210129 (440-278184-1), LPBMP0003_20210129 (440-278184-2) and LPBMP0004_20210129 (440-278184-3). These samples were filtered and preserved past the 24 hrs from receipt in the laboratory due to samples received with insufficient time to filter within the HT.

02/01/21 @ 0900 hours
2.5 mL HNO3
HNO3 Lot # 0000245675

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Dioxin Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client: Haley & Aldrich, Inc.
Project/Site: BMP

Job ID: 440-278184-1

Client Sample ID: LPBMP0002_20210129
Date Collected: 01/29/21 08:35
Date Received: 01/29/21 16:30

Lab Sample ID: 440-278184-1
Matrix: Water

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.000010	0.00000064	ug/L		02/04/21 15:49	02/09/21 02:42	1
1,2,3,7,8-PeCDD	ND		0.000052	0.00000089	ug/L		02/04/21 15:49	02/09/21 02:42	1
1,2,3,7,8-PeCDF	ND		0.000052	0.00000084	ug/L		02/04/21 15:49	02/09/21 02:42	1
2,3,4,7,8-PeCDF	ND		0.000052	0.00000092	ug/L		02/04/21 15:49	02/09/21 02:42	1
1,2,3,4,7,8-HxCDD	**0.0000029**	**J,DX MB**	0.000052	0.00000092	ug/L		02/04/21 15:49	02/09/21 02:42	1
1,2,3,6,7,8-HxCDD	**0.0000026**	**J,DX**	0.000052	0.00000092	ug/L		02/04/21 15:49	02/09/21 02:42	1
1,2,3,7,8,9-HxCDD	**0.0000027**	**J,DX**	0.000052	0.00000084	ug/L		02/04/21 15:49	02/09/21 02:42	1
1,2,3,4,7,8-HxCDF	**0.0000026**	**J,DX**	0.000052	0.00000075	ug/L		02/04/21 15:49	02/09/21 02:42	1
1,2,3,6,7,8-HxCDF	**0.0000014**	**J,DX**	0.000052	0.00000068	ug/L		02/04/21 15:49	02/09/21 02:42	1
1,2,3,7,8,9-HxCDF	**0.00000088**	**J,DX**	0.000052	0.00000060	ug/L		02/04/21 15:49	02/09/21 02:42	1
2,3,4,6,7,8-HxCDF	**0.0000020**	**J,DX**	0.000052	0.00000059	ug/L		02/04/21 15:49	02/09/21 02:42	1
1,2,3,4,6,7,8-HpCDD	**0.000018**	**J,DX MB**	0.000052	0.00000068	ug/L		02/04/21 15:49	02/09/21 02:42	1
1,2,3,4,6,7,8-HpCDF	**0.000011**	**J,DX**	0.000052	0.00000061	ug/L		02/04/21 15:49	02/09/21 02:42	1
1,2,3,4,7,8,9-HpCDF	**0.0000015**	**J,DX q**	0.000052	0.00000066	ug/L		02/04/21 15:49	02/09/21 02:42	1
OCDD	**0.00013**	**MB**	0.00010	0.0000013	ug/L		02/04/21 15:49	02/09/21 02:42	1
OCDF	**0.000013**	**J,DX MB**	0.00010	0.00000091	ug/L		02/04/21 15:49	02/09/21 02:42	1
Total TCDD	**0.0000068**	**J,DX q MB**	0.000010	0.00000064	ug/L		02/04/21 15:49	02/09/21 02:42	1
Total TCDF	**0.0000011**	**J,DX**	0.000010	0.00000040	ug/L		02/04/21 15:49	02/09/21 02:42	1
Total PeCDD	**0.0000020**	**J,DX**	0.000052	0.00000089	ug/L		02/04/21 15:49	02/09/21 02:42	1
Total PeCDF	ND		0.000052	0.00000084	ug/L		02/04/21 15:49	02/09/21 02:42	1
Total HxCDD	**0.000015**	**J,DX q MB**	0.000052	0.00000084	ug/L		02/04/21 15:49	02/09/21 02:42	1
Total HxCDF	**0.000012**	**J,DX**	0.000052	0.00000059	ug/L		02/04/21 15:49	02/09/21 02:42	1
Total HpCDD	**0.000041**	**J,DX MB**	0.000052	0.00000068	ug/L		02/04/21 15:49	02/09/21 02:42	1
Total HpCDF	**0.000018**	**J,DX q MB**	0.000052	0.00000061	ug/L		02/04/21 15:49	02/09/21 02:42	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*72*		*25 - 164*	*02/04/21 15:49*	*02/09/21 02:42*	*1*
13C-2,3,7,8-TCDF	*84*		*24 - 169*	*02/04/21 15:49*	*02/09/21 02:42*	*1*
13C-1,2,3,7,8-PeCDD	*69*		*25 - 181*	*02/04/21 15:49*	*02/09/21 02:42*	*1*
13C-1,2,3,7,8-PeCDF	*76*		*24 - 185*	*02/04/21 15:49*	*02/09/21 02:42*	*1*
13C-2,3,4,7,8-PeCDF	*75*		*21 - 178*	*02/04/21 15:49*	*02/09/21 02:42*	*1*
13C-1,2,3,4,7,8-HxCDD	*70*		*32 - 141*	*02/04/21 15:49*	*02/09/21 02:42*	*1*
13C-1,2,3,6,7,8-HxCDD	*74*		*28 - 130*	*02/04/21 15:49*	*02/09/21 02:42*	*1*

Client Sample ID: LPBMP0002_20210129

Date Collected: 01/29/21 08:35
Date Received: 01/29/21 16:30

Lab Sample ID: 440-278184-1

Matrix: Water

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-1,2,3,4,7,8-HxCDF	*83*		*26 - 152*	*02/04/21 15:49*	*02/09/21 02:42*	*1*
13C-1,2,3,6,7,8-HxCDF	*86*		*26 - 123*	*02/04/21 15:49*	*02/09/21 02:42*	*1*
13C-1,2,3,7,8,9-HxCDF	*86*		*29 - 147*	*02/04/21 15:49*	*02/09/21 02:42*	*1*
13C-2,3,4,6,7,8-HxCDF	*88*		*28 - 136*	*02/04/21 15:49*	*02/09/21 02:42*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*69*		*23 - 140*	*02/04/21 15:49*	*02/09/21 02:42*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*78*		*28 - 143*	*02/04/21 15:49*	*02/09/21 02:42*	*1*
13C-1,2,3,4,7,8,9-HpCDF	*73*		*26 - 138*	*02/04/21 15:49*	*02/09/21 02:42*	*1*
13C-OCDD	*70*		*17 - 157*	*02/04/21 15:49*	*02/09/21 02:42*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*90*		*35 - 197*	*02/04/21 15:49*	*02/09/21 02:42*	*1*

Method: 1613B - Dioxins and Furans (HRGC/HRMS) - RA

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDF	ND		0.000010	0.00000062	ug/L		02/04/21 15:49	02/12/21 14:54	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDF	*80*		*24 - 169*	*02/04/21 15:49*	*02/12/21 14:54*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*95*		*35 - 197*	*02/04/21 15:49*	*02/12/21 14:54*	*1*

Method: 200.8 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		02/08/21 09:37	02/08/21 18:39	1
Copper	**11**		2.0	0.50	ug/L		02/08/21 09:37	02/08/21 18:39	1
Lead	**1.3**		1.0	0.50	ug/L		02/08/21 09:37	02/08/21 18:39	1

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		02/01/21 09:17	02/01/21 11:18	1
Copper	**8.7**		2.0	0.50	ug/L		02/01/21 09:17	02/01/21 11:18	1
Lead	**0.57**	**J,DX**	1.0	0.50	ug/L		02/01/21 09:17	02/01/21 11:18	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		02/09/21 11:44	02/09/21 16:51	1

Method: 245.1 - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		02/09/21 11:33	02/09/21 16:42	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	**7.6**		1.0	0.50	mg/L			02/02/21 14:28	1

Method: D4464 - Particle Size Distribution of Catalytic Material (Laser light scattering)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	ND		0.01	0.01	%			02/05/21 17:46	1
Coarse Sand (0.5mm to 1mm)	ND		0.01	0.01	%			02/05/21 17:46	1
Fine Sand (0.125 to 0.25mm)	**54.85**		0.01	0.01	%			02/05/21 17:46	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			02/05/21 17:46	1

Client Sample ID: LPBMP0002_20210129

Lab Sample ID: 440-278184-1

Date Collected: 01/29/21 08:35
Matrix: Water
Date Received: 01/29/21 16:30

Method: D4464 - Particle Size Distribution of Catalytic Material (Laser light scattering) (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Medium Sand (0.25 to 0.5 mm)	**0.90**		0.01	0.01	%			02/05/21 17:46	1
Silt (0.00391 to 0.0625mm)	**4.78**		0.01	0.01	%			02/05/21 17:46	1
Total Silt and Clay (0 to 0.0626mm)	**4.78**		0.01	0.01	%			02/05/21 17:46	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			02/05/21 17:46	1
Very Fine Sand (0.0625 to 0.125 mm)	**39.47**		0.01	0.01	%			02/05/21 17:46	1

Client Sample ID: LPBMP0003_20210129

Lab Sample ID: 440-278184-2

Date Collected: 01/29/21 08:48
Matrix: Water
Date Received: 01/29/21 16:30

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.000010	0.00000063	ug/L		02/04/21 15:49	02/09/21 03:30	1
2,3,7,8-TCDF	ND		0.000010	0.00000046	ug/L		02/04/21 15:49	02/09/21 03:30	1
1,2,3,7,8-PeCDD	ND		0.000052	0.00000094	ug/L		02/04/21 15:49	02/09/21 03:30	1
1,2,3,7,8-PeCDF	ND		0.000052	0.00000087	ug/L		02/04/21 15:49	02/09/21 03:30	1
2,3,4,7,8-PeCDF	ND		0.000052	0.00000098	ug/L		02/04/21 15:49	02/09/21 03:30	1
1,2,3,4,7,8-HxCDD	**0.0000038**	**J,DX MB**	0.000052	0.00000098	ug/L		02/04/21 15:49	02/09/21 03:30	1
1,2,3,6,7,8-HxCDD	**0.0000029**	**J,DX**	0.000052	0.00000099	ug/L		02/04/21 15:49	02/09/21 03:30	1
1,2,3,7,8,9-HxCDD	**0.0000024**	**J,DX q**	0.000052	0.00000090	ug/L		02/04/21 15:49	02/09/21 03:30	1
1,2,3,4,7,8-HxCDF	**0.0000021**	**J,DX**	0.000052	0.00000081	ug/L		02/04/21 15:49	02/09/21 03:30	1
1,2,3,6,7,8-HxCDF	**0.0000016**	**J,DX**	0.000052	0.00000075	ug/L		02/04/21 15:49	02/09/21 03:30	1
1,2,3,7,8,9-HxCDF	ND		0.000052	0.00000064	ug/L		02/04/21 15:49	02/09/21 03:30	1
2,3,4,6,7,8-HxCDF	**0.0000018**	**J,DX**	0.000052	0.00000065	ug/L		02/04/21 15:49	02/09/21 03:30	1
1,2,3,4,6,7,8-HpCDD	**0.000034**	**J,DX MB**	0.000052	0.00000086	ug/L		02/04/21 15:49	02/09/21 03:30	1
1,2,3,4,6,7,8-HpCDF	**0.000018**	**J,DX**	0.000052	0.00000077	ug/L		02/04/21 15:49	02/09/21 03:30	1
1,2,3,4,7,8,9-HpCDF	ND		0.000052	0.00000089	ug/L		02/04/21 15:49	02/09/21 03:30	1
OCDD	**0.00025**	**MB**	0.00010	0.0000016	ug/L		02/04/21 15:49	02/09/21 03:30	1
OCDF	**0.000019**	**J,DX q MB**	0.00010	0.00000095	ug/L		02/04/21 15:49	02/09/21 03:30	1
Total TCDD	**0.0000083**	**J,DX q MB**	0.000010	0.00000063	ug/L		02/04/21 15:49	02/09/21 03:30	1
Total TCDF	ND		0.000010	0.00000046	ug/L		02/04/21 15:49	02/09/21 03:30	1
Total PeCDD	ND		0.000052	0.00000094	ug/L		02/04/21 15:49	02/09/21 03:30	1
Total PeCDF	ND		0.000052	0.00000087	ug/L		02/04/21 15:49	02/09/21 03:30	1

Client Sample ID: LPBMP0003_20210129

Date Collected: 01/29/21 08:48
Date Received: 01/29/21 16:30

Lab Sample ID: 440-278184-2

Matrix: Water

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
Total HxCDD	**0.000020**	**J,DX q MB**	0.000052	0.00000090	ug/L		02/04/21 15:49	02/09/21 03:30	1
Total HxCDF	**0.000015**	**J,DX**	0.000052	0.00000064	ug/L		02/04/21 15:49	02/09/21 03:30	1
Total HpCDD	**0.000077**	**MB**	0.000052	0.00000086	ug/L		02/04/21 15:49	02/09/21 03:30	1
Total HpCDF	**0.000028**	**J,DX MB**	0.000052	0.00000077	ug/L		02/04/21 15:49	02/09/21 03:30	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*66*		*25 - 164*	*02/04/21 15:49*	*02/09/21 03:30*	*1*
13C-2,3,7,8-TCDF	*77*		*24 - 169*	*02/04/21 15:49*	*02/09/21 03:30*	*1*
13C-1,2,3,7,8-PeCDD	*60*		*25 - 181*	*02/04/21 15:49*	*02/09/21 03:30*	*1*
13C-1,2,3,7,8-PeCDF	*66*		*24 - 185*	*02/04/21 15:49*	*02/09/21 03:30*	*1*
13C-2,3,4,7,8-PeCDF	*65*		*21 - 178*	*02/04/21 15:49*	*02/09/21 03:30*	*1*
13C-1,2,3,4,7,8-HxCDD	*62*		*32 - 141*	*02/04/21 15:49*	*02/09/21 03:30*	*1*
13C-1,2,3,6,7,8-HxCDD	*65*		*28 - 130*	*02/04/21 15:49*	*02/09/21 03:30*	*1*
13C-1,2,3,4,7,8-HxCDF	*73*		*26 - 152*	*02/04/21 15:49*	*02/09/21 03:30*	*1*
13C-1,2,3,6,7,8-HxCDF	*76*		*26 - 123*	*02/04/21 15:49*	*02/09/21 03:30*	*1*
13C-1,2,3,7,8,9-HxCDF	*76*		*29 - 147*	*02/04/21 15:49*	*02/09/21 03:30*	*1*
13C-2,3,4,6,7,8-HxCDF	*77*		*28 - 136*	*02/04/21 15:49*	*02/09/21 03:30*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*59*		*23 - 140*	*02/04/21 15:49*	*02/09/21 03:30*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*68*		*28 - 143*	*02/04/21 15:49*	*02/09/21 03:30*	*1*
13C-1,2,3,4,7,8,9-HpCDF	*63*		*26 - 138*	*02/04/21 15:49*	*02/09/21 03:30*	*1*
13C-OCDD	*61*		*17 - 157*	*02/04/21 15:49*	*02/09/21 03:30*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*87*		*35 - 197*	*02/04/21 15:49*	*02/09/21 03:30*	*1*

Method: 200.8 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		02/08/21 09:37	02/08/21 18:41	1
Copper	**6.4**		2.0	0.50	ug/L		02/08/21 09:37	02/08/21 18:41	1
Lead	**1.2**		1.0	0.50	ug/L		02/08/21 09:37	02/08/21 18:41	1

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		02/01/21 09:17	02/01/21 11:25	1
Copper	**5.8**		2.0	0.50	ug/L		02/01/21 09:17	02/01/21 11:25	1
Lead	ND		1.0	0.50	ug/L		02/01/21 09:17	02/01/21 11:25	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		02/09/21 11:44	02/09/21 17:02	1

Method: 245.1 - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		02/09/21 11:33	02/09/21 16:44	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	**6.6**		1.1	0.53	mg/L			02/02/21 14:28	1

Client Sample ID: LPBMP0003_20210129

Lab Sample ID: 440-278184-2

Date Collected: 01/29/21 08:48
Date Received: 01/29/21 16:30

Matrix: Water

Method: D4464 - Particle Size Distribution of Catalytic Material (Laser light scattering)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	**3.30**		0.01	0.01	%			02/05/21 17:52	1
Coarse Sand (0.5mm to 1mm)	ND		0.01	0.01	%			02/05/21 17:52	1
Fine Sand (0.125 to 0.25mm)	**53.42**		0.01	0.01	%			02/05/21 17:52	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			02/05/21 17:52	1
Medium Sand (0.25 to 0.5 mm)	ND		0.01	0.01	%			02/05/21 17:52	1
Silt (0.00391 to 0.0625mm)	**18.59**		0.01	0.01	%			02/05/21 17:52	1
Total Silt and Clay (0 to 0.0626mm)	**21.88**		0.01	0.01	%			02/05/21 17:52	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			02/05/21 17:52	1
Very Fine Sand (0.0625 to 0.125 mm)	**24.70**		0.01	0.01	%			02/05/21 17:52	1

Client Sample ID: LPBMP0004_20210129

Lab Sample ID: 440-278184-3

Date Collected: 01/29/21 08:52
Date Received: 01/29/21 16:30

Matrix: Water

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.000010	0.00000063	ug/L		02/04/21 15:49	02/09/21 04:18	1
1,2,3,7,8-PeCDD	**0.0000030**	**J,DX**	0.000052	0.00000093	ug/L		02/04/21 15:49	02/09/21 04:18	1
1,2,3,7,8-PeCDF	ND		0.000052	0.00000078	ug/L		02/04/21 15:49	02/09/21 04:18	1
2,3,4,7,8-PeCDF	ND		0.000052	0.00000086	ug/L		02/04/21 15:49	02/09/21 04:18	1
1,2,3,4,7,8-HxCDD	**0.0000054**	**J,DX MB**	0.000052	0.0000011	ug/L		02/04/21 15:49	02/09/21 04:18	1
1,2,3,6,7,8-HxCDD	**0.0000034**	**J,DX**	0.000052	0.0000011	ug/L		02/04/21 15:49	02/09/21 04:18	1
1,2,3,7,8,9-HxCDD	**0.0000044**	**J,DX**	0.000052	0.00000098	ug/L		02/04/21 15:49	02/09/21 04:18	1
1,2,3,4,7,8-HxCDF	**0.0000035**	**J,DX**	0.000052	0.00000074	ug/L		02/04/21 15:49	02/09/21 04:18	1
1,2,3,6,7,8-HxCDF	**0.0000030**	**J,DX**	0.000052	0.00000067	ug/L		02/04/21 15:49	02/09/21 04:18	1
1,2,3,7,8,9-HxCDF	**0.0000025**	**J,DX q**	0.000052	0.00000059	ug/L		02/04/21 15:49	02/09/21 04:18	1
2,3,4,6,7,8-HxCDF	**0.0000038**	**J,DX**	0.000052	0.00000061	ug/L		02/04/21 15:49	02/09/21 04:18	1
1,2,3,4,6,7,8-HpCDD	**0.000023**	**J,DX MB**	0.000052	0.00000090	ug/L		02/04/21 15:49	02/09/21 04:18	1
1,2,3,4,6,7,8-HpCDF	**0.000011**	**J,DX**	0.000052	0.00000077	ug/L		02/04/21 15:49	02/09/21 04:18	1
1,2,3,4,7,8,9-HpCDF	**0.0000030**	**J,DX q**	0.000052	0.00000088	ug/L		02/04/21 15:49	02/09/21 04:18	1
OCDD	**0.00017**	**MB**	0.00010	0.0000017	ug/L		02/04/21 15:49	02/09/21 04:18	1
OCDF	**0.000017**	**J,DX q MB**	0.00010	0.0000011	ug/L		02/04/21 15:49	02/09/21 04:18	1
Total TCDD	**0.0000094**	**J,DX MB**	0.000010	0.00000063	ug/L		02/04/21 15:49	02/09/21 04:18	1
Total TCDF	**0.0000014**	**J,DX**	0.000010	0.00000041	ug/L		02/04/21 15:49	02/09/21 04:18	1
Total PeCDD	**0.0000030**	**J,DX**	0.000052	0.00000093	ug/L		02/04/21 15:49	02/09/21 04:18	1
Total PeCDF	ND		0.000052	0.00000078	ug/L		02/04/21 15:49	02/09/21 04:18	1

Client Sample ID: LPBMP0004_20210129

Date Collected: 01/29/21 08:52
Date Received: 01/29/21 16:30

Lab Sample ID: 440-278184-3

Matrix: Water

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
Total HxCDD	**0.000018**	**J,DX q MB**	0.000052	0.00000098	ug/L		02/04/21 15:49	02/09/21 04:18	1
Total HxCDF	**0.000015**	**J,DX q**	0.000052	0.00000059	ug/L		02/04/21 15:49	02/09/21 04:18	1
Total HpCDD	**0.000048**	**J,DX MB**	0.000052	0.00000090	ug/L		02/04/21 15:49	02/09/21 04:18	1
Total HpCDF	**0.000019**	**J,DX q MB**	0.000052	0.00000077	ug/L		02/04/21 15:49	02/09/21 04:18	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*69*		*25 - 164*	*02/04/21 15:49*	*02/09/21 04:18*	*1*
13C-2,3,7,8-TCDF	*82*		*24 - 169*	*02/04/21 15:49*	*02/09/21 04:18*	*1*
13C-1,2,3,7,8-PeCDD	*63*		*25 - 181*	*02/04/21 15:49*	*02/09/21 04:18*	*1*
13C-1,2,3,7,8-PeCDF	*69*		*24 - 185*	*02/04/21 15:49*	*02/09/21 04:18*	*1*
13C-2,3,4,7,8-PeCDF	*69*		*21 - 178*	*02/04/21 15:49*	*02/09/21 04:18*	*1*
13C-1,2,3,4,7,8-HxCDD	*59*		*32 - 141*	*02/04/21 15:49*	*02/09/21 04:18*	*1*
13C-1,2,3,6,7,8-HxCDD	*62*		*28 - 130*	*02/04/21 15:49*	*02/09/21 04:18*	*1*
13C-1,2,3,4,7,8-HxCDF	*69*		*26 - 152*	*02/04/21 15:49*	*02/09/21 04:18*	*1*
13C-1,2,3,6,7,8-HxCDF	*72*		*26 - 123*	*02/04/21 15:49*	*02/09/21 04:18*	*1*
13C-1,2,3,7,8,9-HxCDF	*71*		*29 - 147*	*02/04/21 15:49*	*02/09/21 04:18*	*1*
13C-2,3,4,6,7,8-HxCDF	*74*		*28 - 136*	*02/04/21 15:49*	*02/09/21 04:18*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*56*		*23 - 140*	*02/04/21 15:49*	*02/09/21 04:18*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*64*		*28 - 143*	*02/04/21 15:49*	*02/09/21 04:18*	*1*
13C-1,2,3,4,7,8,9-HpCDF	*58*		*26 - 138*	*02/04/21 15:49*	*02/09/21 04:18*	*1*
13C-OCDD	*56*		*17 - 157*	*02/04/21 15:49*	*02/09/21 04:18*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*96*		*35 - 197*	*02/04/21 15:49*	*02/09/21 04:18*	*1*

Method: 1613B - Dioxins and Furans (HRGC/HRMS) - RA

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDF	ND		0.000010	0.00000074	ug/L		02/04/21 15:49	02/12/21 15:32	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDF	*73*		*24 - 169*	*02/04/21 15:49*	*02/12/21 15:32*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*98*		*35 - 197*	*02/04/21 15:49*	*02/12/21 15:32*	*1*

Method: 200.8 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		02/08/21 09:37	02/08/21 18:44	1
Copper	**5.2**		2.0	0.50	ug/L		02/08/21 09:37	02/08/21 18:44	1
Lead	ND		1.0	0.50	ug/L		02/08/21 09:37	02/08/21 18:44	1

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		02/01/21 09:17	02/01/21 11:27	1
Copper	**4.7**		2.0	0.50	ug/L		02/01/21 09:17	02/01/21 11:27	1
Lead	ND		1.0	0.50	ug/L		02/01/21 09:17	02/01/21 11:27	1

Client: Haley & Aldrich, Inc.
Project/Site: BMP

Job ID: 440-278184-1

Client Sample ID: LPBMP0004_20210129
Date Collected: 01/29/21 08:52
Date Received: 01/29/21 16:30

Lab Sample ID: 440-278184-3
Matrix: Water

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		02/09/21 11:44	02/09/21 17:05	1

Method: 245.1 - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		02/09/21 11:33	02/09/21 16:36	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	**3.3**		1.0	0.50	mg/L			02/02/21 14:28	1

Method: D4464 - Particle Size Distribution of Catalytic Material (Laser light scattering)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	ND		0.01	0.01	%			02/05/21 17:58	1
Coarse Sand (0.5mm to 1mm)	ND		0.01	0.01	%			02/05/21 17:58	1
Fine Sand (0.125 to 0.25mm)	ND		0.01	0.01	%			02/05/21 17:58	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			02/05/21 17:58	1
Medium Sand (0.25 to 0.5 mm)	ND		0.01	0.01	%			02/05/21 17:58	1
Silt (0.00391 to 0.0625mm)	ND		0.01	0.01	%			02/05/21 17:58	1
Total Silt and Clay (0 to 0.0626mm)	ND		0.01	0.01	%			02/05/21 17:58	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			02/05/21 17:58	1
Very Fine Sand (0.0625 to 0.125 mm)	ND		0.01	0.01	%			02/05/21 17:58	1

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

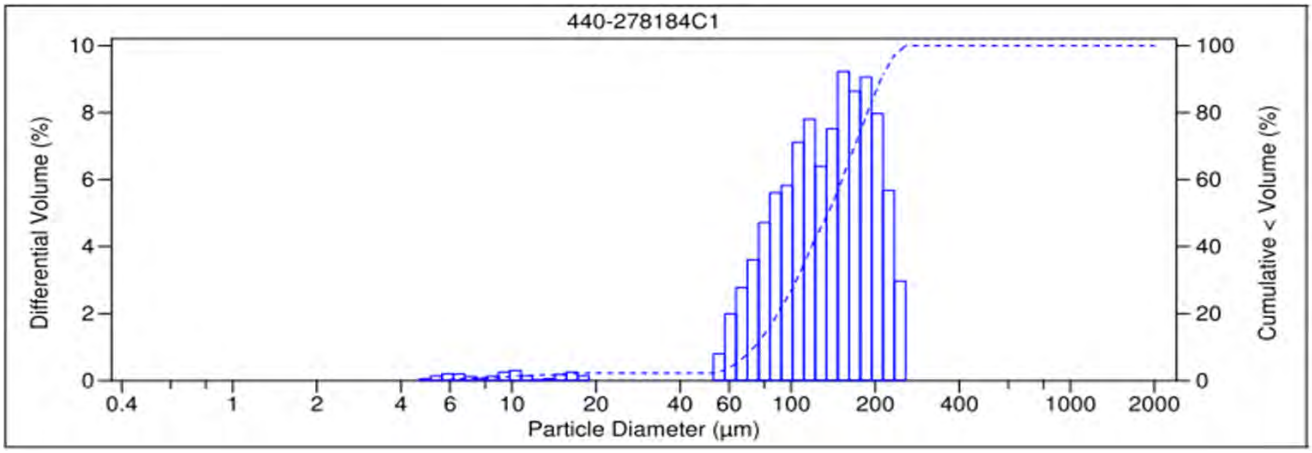
Haley & Aldrich, Inc.

Date Sampled:	01/29/21
Date Received:	01/30/21
Work Order No:	440-278184
Date Analyzed:	02/05/21
Method:	ASTM D4464M

Project:

Sample ID	Depth ft	Description	Mean Grain Size mm
LPBMP0002_20210129		Fine Sand	0.138

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.00	0.00	0.90	54.85	39.47	4.78	0.00	4.78



V 3.0

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

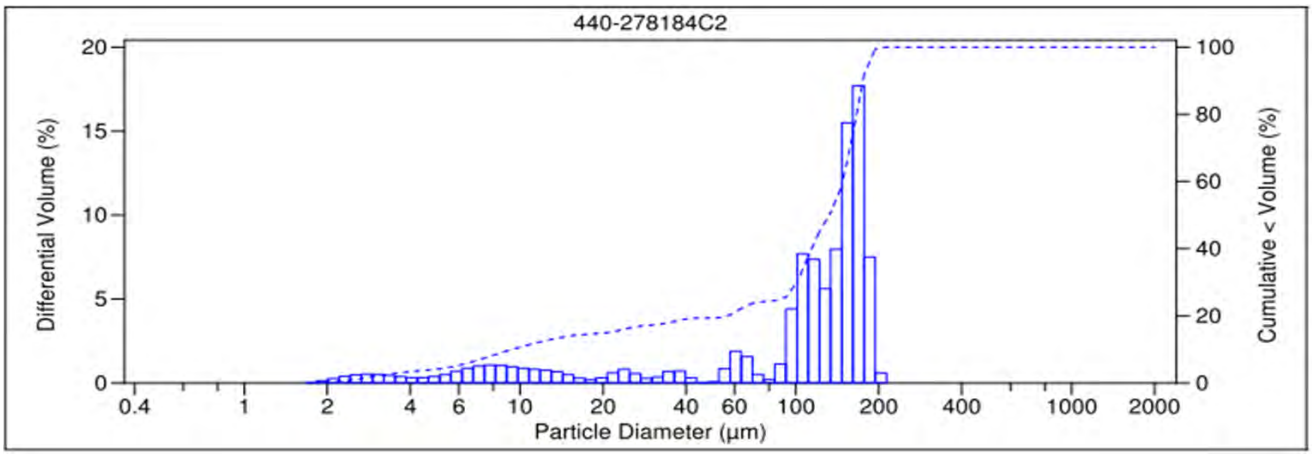
Haley & Aldrich, Inc.

Date Sampled:	01/29/21
Date Received:	01/30/21
Work Order No:	440-278184
Date Analyzed:	02/05/21
Method:	ASTM D4464M

Project:

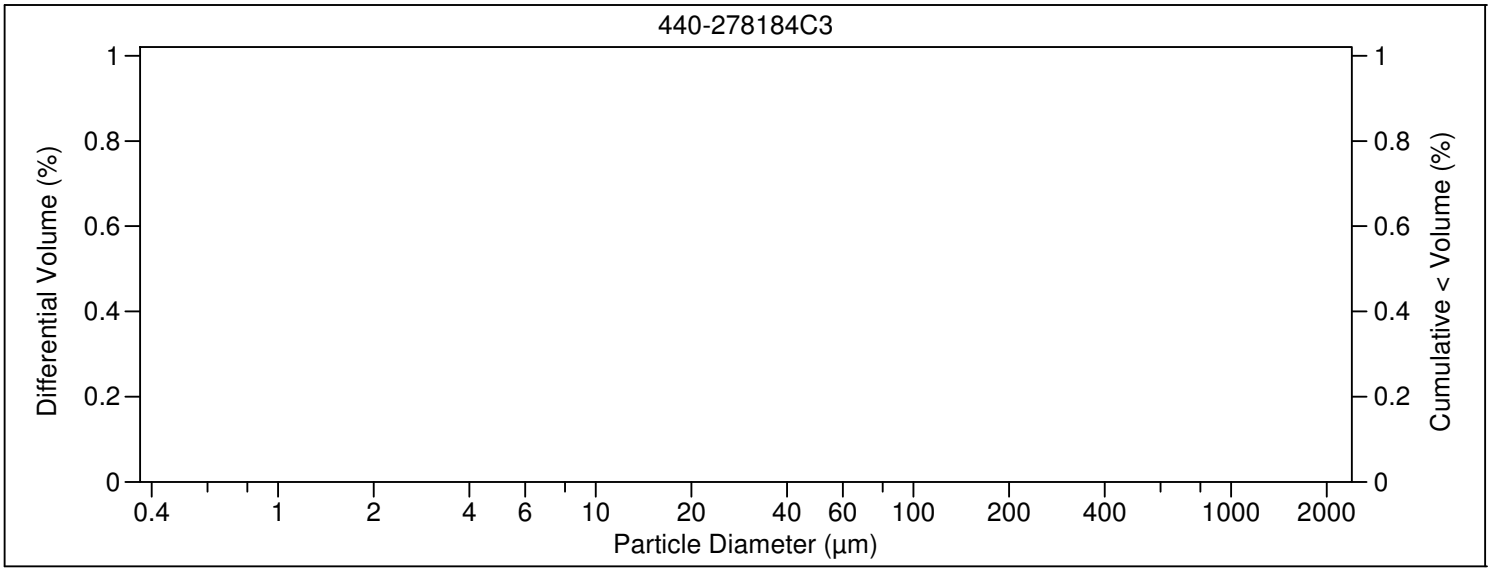
Sample ID	Depth ft	Description	Mean Grain Size mm
LPBMP0003_20210129		Very Fine Sand	0.115

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.00	0.00	0.00	53.42	24.70	18.59	3.30	21.88



V 3.0

File name:	C:\LS13320\440-278184C3_ 5 Feb 2021_17.58.14.$ls 440-278184C3_ 5 Feb 2021_17.58.14.$ls		
File ID:	440-278184C3		
Sample ID:	440-278184C3		
Operator:	C4LT		
Run number:	17		
Comment 1:	ASTM D4464M , LPSA 1		
Optical model:	Fraunhofer.rf780d		
Residual:	3.83%		
LS 13 320	Aqueous Liquid Module		
Start time:	17:57 5 Feb 2021	Run length:	60 seconds
Pump speed:	49		
Obscuration:	2%		
Fluid:	Water		
Software:	6.01	Firmware:	4.00



Volume Statistics (Arithmetic) 440-278184C3_ 5 Feb 2021_17.58.14.$ls

Calculations from 0.375 µm to 2000 µm

Volume:	0%		
Mean:	0.000 µm	S.D.:	0 µm
Median:	0.000 µm	Variance:	0 μm^2
Mean/Median ratio:	0.000	Skewness:	0
Mode:	0.000 µm	Kurtosis:	0

d_{10}: 0.000 µm d_{50}: 0.000 µm d_{90}: 0.000 µm

Folk and Ward Statistics (Phi)

Mean:	0.00	Median:	0.00	Deviation:	0.00
Skewness:	0.00	Kurtosis:	0.00		

<5%	<16%	<25%	<40%	<50%	<75%	<84%	<95%
0.000 µm	0.000 µm	0.000 µm	0.000 µm	0.000 µm	0.000 µm	0.000 µm	0.000 µm

Particle Diameter µm	440-278184C 3_ 5 Feb 2021_17.58 .14.$ls Volume %
0.04	0
0.4	0
1.95	0
3.91	0
62.5	0
125	0
250	0
500	0
1000	0
2000	

440-278184C3_ 5 Feb 2021_17.58.14.$ls

Channel Diameter (Lower) µm	Diff. Volume %	Channel Diameter (Lower) µm	Diff. Volume %	Channel Diameter (Lower) µm	Diff. Volume %
0.375	0	24.95	0	1660	0
0.412	0	27.39	0	1822	0
0.452	0	30.07	0	2000	
0.496	0	33.01	0		
0.545	0	36.24	0		
0.598	0	39.78	0		
0.657	0	43.67	0		
0.721	0	47.94	0		
0.791	0	52.63	0		
0.869	0	57.77	0		
0.954	0	63.42	0		
1.047	0	69.62	0		
1.149	0	76.43	0		
1.261	0	83.90	0		
1.385	0	92.10	0		
1.520	0	101.1	0		
1.669	0	111.0	0		
1.832	0	121.8	0		
2.011	0	133.7	0		
2.208	0	146.8	0		
2.423	0	161.2	0		
2.660	0	176.9	0		
2.920	0	194.2	0		
3.206	0	213.2	0		
3.519	0	234.1	0		
3.863	0	256.9	0		
4.241	0	282.1	0		
4.656	0	309.6	0		
5.111	0	339.9	0		
5.611	0	373.1	0		
6.159	0	409.6	0		
6.761	0	449.7	0		
7.422	0	493.6	0		
8.148	0	541.9	0		
8.944	0	594.9	0		
9.819	0	653.0	0		
10.78	0	716.9	0		
11.83	0	786.9	0		
12.99	0	863.9	0		
14.26	0	948.3	0		
15.65	0	1041	0		
17.18	0	1143	0		
18.86	0	1255	0		
20.71	0	1377	0		
22.73	0	1512	0		

Method Summary

Client: Haley & Aldrich, Inc.
Project/Site: BMP

Job ID: 440-278184-1

Method	Method Description	Protocol	Laboratory
1613B	Dioxins and Furans (HRGC/HRMS)	EPA	TAL SAC
200.8	Metals (ICP/MS)	EPA	TAL IRV
245.1	Mercury (CVAA)	EPA	TAL IRV
SM 2540D	Solids, Total Suspended (TSS)	SM	TAL IRV
D4464	Particle Size Distribution of Catalytic Material (Laser light scattering)	ASTM	ECL 1
1613B	Separatory Funnel (L/L) Extraction with Soxhlet Extraction of Dioxin and Furans	EPA	TAL SAC
200.2	Preparation, Total Recoverable Metals	EPA	TAL IRV
245.1	Preparation, Mercury	EPA	TAL IRV
FILTRATION	Sample Filtration	None	TAL IRV

Protocol References:

ASTM = ASTM International
EPA = US Environmental Protection Agency
None = None
SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494
TAL IRV = Eurofins Calscience Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022
TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Lab Chronicle

Client: Haley & Aldrich, Inc.
Project/Site: BMP

Job ID: 440-278184-1

Client Sample ID: LPBMP0002_20210129

Lab Sample ID: 440-278184-1

Date Collected: 01/29/21 08:35

Matrix: Water

Date Received: 01/29/21 16:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B	RA		956.3 mL	20 uL	458769	02/04/21 15:49	FC	TAL SAC
Total/NA	Analysis	1613B	RA	1			461724	02/12/21 14:54	SMA	TAL SAC
Total/NA	Prep	1613B			956.3 mL	20 uL	458769	02/04/21 15:49	FC	TAL SAC
Total/NA	Analysis	1613B		1			459925	02/09/21 02:42	KSS	TAL SAC
Dissolved	Filtration	FILTRATION			100 mL	100 mL	637490	02/01/21 08:57	LZY7	TAL IRV
Dissolved	Prep	200.2			25 mL	25 mL	637494	02/01/21 09:17	LZY7	TAL IRV
Dissolved	Analysis	200.8		1			637525	02/01/21 11:18	Y2WS	TAL IRV
Total Recoverable	Prep	200.2			25 mL	25 mL	638122	02/08/21 09:37	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			638176	02/08/21 18:39	SQ5O	TAL IRV
Dissolved	Filtration	FILTRATION			100 mL	100 mL	637490	02/01/21 08:57	LZY7	TAL IRV
Dissolved	Prep	245.1			20 mL	30 mL	638238	02/09/21 11:33	C0YH	TAL IRV
Dissolved	Analysis	245.1		1			638349	02/09/21 16:42	C0YH	TAL IRV
Total/NA	Prep	245.1			20 mL	30 mL	638239	02/09/21 11:44	C0YH	TAL IRV
Total/NA	Analysis	245.1		1			638349	02/09/21 16:51	C0YH	TAL IRV
Total/NA	Analysis	SM 2540D		1	1000 mL	1000 mL	637676	02/02/21 14:28	ZL7L	TAL IRV
Total/NA	Analysis	D4464		1			127713	02/05/21 17:46	C4LT	ECL 1

Client Sample ID: LPBMP0003_20210129

Lab Sample ID: 440-278184-2

Date Collected: 01/29/21 08:48

Matrix: Water

Date Received: 01/29/21 16:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			964.5 mL	20 uL	458769	02/04/21 15:49	FC	TAL SAC
Total/NA	Analysis	1613B		1			459925	02/09/21 03:30	KSS	TAL SAC
Dissolved	Filtration	FILTRATION			100 mL	100 mL	637490	02/01/21 08:57	LZY7	TAL IRV
Dissolved	Prep	200.2			25 mL	25 mL	637494	02/01/21 09:17	LZY7	TAL IRV
Dissolved	Analysis	200.8		1			637525	02/01/21 11:25	Y2WS	TAL IRV
Total Recoverable	Prep	200.2			25 mL	25 mL	638122	02/08/21 09:37	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			638176	02/08/21 18:41	SQ5O	TAL IRV
Dissolved	Filtration	FILTRATION			100 mL	100 mL	637490	02/01/21 08:57	LZY7	TAL IRV
Dissolved	Prep	245.1			20 mL	30 mL	638238	02/09/21 11:33	C0YH	TAL IRV
Dissolved	Analysis	245.1		1			638349	02/09/21 16:44	C0YH	TAL IRV
Total/NA	Prep	245.1			20 mL	30 mL	638239	02/09/21 11:44	C0YH	TAL IRV
Total/NA	Analysis	245.1		1			638349	02/09/21 17:02	C0YH	TAL IRV
Total/NA	Analysis	SM 2540D		1	950 mL	1000 mL	637676	02/02/21 14:28	ZL7L	TAL IRV
Total/NA	Analysis	D4464		1			127713	02/05/21 17:52	C4LT	ECL 1

Client Sample ID: LPBMP0004_20210129

Lab Sample ID: 440-278184-3

Date Collected: 01/29/21 08:52

Matrix: Water

Date Received: 01/29/21 16:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B	RA		962.2 mL	20 uL	458769	02/04/21 15:49	FC	TAL SAC
Total/NA	Analysis	1613B	RA	1			461724	02/12/21 15:32	SMA	TAL SAC

Lab Chronicle

Client: Haley & Aldrich, Inc.
Project/Site: BMP

Job ID: 440-278184-1

Client Sample ID: LPBMP0004_20210129

Date Collected: 01/29/21 08:52
Date Received: 01/29/21 16:30

Lab Sample ID: 440-278184-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			962.2 mL	20 uL	458769	02/04/21 15:49	FC	TAL SAC
Total/NA	Analysis	1613B		1			459925	02/09/21 04:18	KSS	TAL SAC
Dissolved	Filtration	FILTRATION			100 mL	100 mL	637490	02/01/21 08:57	LZY7	TAL IRV
Dissolved	Prep	200.2			25 mL	25 mL	637494	02/01/21 09:17	LZY7	TAL IRV
Dissolved	Analysis	200.8		1			637525	02/01/21 11:27	Y2WS	TAL IRV
Total Recoverable	Prep	200.2			25 mL	25 mL	638122	02/08/21 09:37	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			638176	02/08/21 18:44	SQ5O	TAL IRV
Dissolved	Filtration	FILTRATION			100 mL	100 mL	637490	02/01/21 08:57	LZY7	TAL IRV
Dissolved	Prep	245.1			20 mL	30 mL	638238	02/09/21 11:33	C0YH	TAL IRV
Dissolved	Analysis	245.1		1			638349	02/09/21 16:36	C0YH	TAL IRV
Total/NA	Prep	245.1			20 mL	30 mL	638239	02/09/21 11:44	C0YH	TAL IRV
Total/NA	Analysis	245.1		1			638349	02/09/21 17:05	C0YH	TAL IRV
Total/NA	Analysis	SM 2540D		1	1000 mL	1000 mL	637676	02/02/21 14:28	ZL7L	TAL IRV
Total/NA	Analysis	D4464		1			127713	02/05/21 17:58	C4LT	ECL 1

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

TAL IRV = Eurofins Calscience Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Lab Sample ID: MB 320-458769/1-A
Matrix: Water
Analysis Batch: 459925

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 458769

Analyte	MB Result	MB Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.000010	0.00000056	ug/L		02/04/21 15:49	02/09/21 01:06	1
2,3,7,8-TCDF	ND		0.000010	0.00000031	ug/L		02/04/21 15:49	02/09/21 01:06	1
1,2,3,7,8-PeCDD	ND		0.000050	0.00000073	ug/L		02/04/21 15:49	02/09/21 01:06	1
1,2,3,7,8-PeCDF	ND		0.000050	0.00000061	ug/L		02/04/21 15:49	02/09/21 01:06	1
2,3,4,7,8-PeCDF	ND		0.000050	0.00000069	ug/L		02/04/21 15:49	02/09/21 01:06	1
1,2,3,4,7,8-HxCDD	0.00000199	J,DX	0.000050	0.00000077	ug/L		02/04/21 15:49	02/09/21 01:06	1
1,2,3,6,7,8-HxCDD	ND		0.000050	0.00000079	ug/L		02/04/21 15:49	02/09/21 01:06	1
1,2,3,7,8,9-HxCDD	ND		0.000050	0.00000071	ug/L		02/04/21 15:49	02/09/21 01:06	1
1,2,3,4,7,8-HxCDF	ND		0.000050	0.00000065	ug/L		02/04/21 15:49	02/09/21 01:06	1
1,2,3,6,7,8-HxCDF	ND		0.000050	0.00000059	ug/L		02/04/21 15:49	02/09/21 01:06	1
1,2,3,7,8,9-HxCDF	ND		0.000050	0.00000051	ug/L		02/04/21 15:49	02/09/21 01:06	1
2,3,4,6,7,8-HxCDF	ND		0.000050	0.00000053	ug/L		02/04/21 15:49	02/09/21 01:06	1
1,2,3,4,6,7,8-HpCDD	0.00000426	J,DX	0.000050	0.00000048	ug/L		02/04/21 15:49	02/09/21 01:06	1
1,2,3,4,6,7,8-HpCDF	ND		0.000050	0.00000081	ug/L		02/04/21 15:49	02/09/21 01:06	1
1,2,3,4,7,8,9-HpCDF	ND		0.000050	0.00000084	ug/L		02/04/21 15:49	02/09/21 01:06	1
OCDD	0.0000142	J,DX	0.00010	0.0000012	ug/L		02/04/21 15:49	02/09/21 01:06	1
OCDF	0.00000291	J,DX	0.00010	0.00000076	ug/L		02/04/21 15:49	02/09/21 01:06	1
Total TCDD	0.00000258	J,DX	0.000010	0.00000056	ug/L		02/04/21 15:49	02/09/21 01:06	1
Total TCDF	ND		0.000010	0.00000031	ug/L		02/04/21 15:49	02/09/21 01:06	1
Total PeCDD	ND		0.000050	0.00000073	ug/L		02/04/21 15:49	02/09/21 01:06	1
Total PeCDF	ND		0.000050	0.00000061	ug/L		02/04/21 15:49	02/09/21 01:06	1
Total HxCDD	0.00000199	J,DX	0.000050	0.00000071	ug/L		02/04/21 15:49	02/09/21 01:06	1
Total HxCDF	ND		0.000050	0.00000051	ug/L		02/04/21 15:49	02/09/21 01:06	1
Total HpCDD	0.00000756	J,DX q	0.000050	0.00000048	ug/L		02/04/21 15:49	02/09/21 01:06	1
Total HpCDF	0.00000307	J,DX	0.000050	0.00000081	ug/L		02/04/21 15:49	02/09/21 01:06	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*76*		*25 - 164*	*02/04/21 15:49*	*02/09/21 01:06*	*1*
13C-2,3,7,8-TCDF	*86*		*24 - 169*	*02/04/21 15:49*	*02/09/21 01:06*	*1*
13C-1,2,3,7,8-PeCDD	*74*		*25 - 181*	*02/04/21 15:49*	*02/09/21 01:06*	*1*

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Lab Sample ID: MB 320-458769/1-A
Matrix: Water
Analysis Batch: 459925

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 458769

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-1,2,3,7,8-PeCDF	79		24 - 185	02/04/21 15:49	02/09/21 01:06	1
13C-2,3,4,7,8-PeCDF	80		21 - 178	02/04/21 15:49	02/09/21 01:06	1
13C-1,2,3,4,7,8-HxCDD	74		32 - 141	02/04/21 15:49	02/09/21 01:06	1
13C-1,2,3,6,7,8-HxCDD	76		28 - 130	02/04/21 15:49	02/09/21 01:06	1
13C-1,2,3,4,7,8-HxCDF	87		26 - 152	02/04/21 15:49	02/09/21 01:06	1
13C-1,2,3,6,7,8-HxCDF	90		26 - 123	02/04/21 15:49	02/09/21 01:06	1
13C-1,2,3,7,8,9-HxCDF	89		29 - 147	02/04/21 15:49	02/09/21 01:06	1
13C-2,3,4,6,7,8-HxCDF	91		28 - 136	02/04/21 15:49	02/09/21 01:06	1
13C-1,2,3,4,6,7,8-HpCDD	73		23 - 140	02/04/21 15:49	02/09/21 01:06	1
13C-1,2,3,4,6,7,8-HpCDF	81		28 - 143	02/04/21 15:49	02/09/21 01:06	1
13C-1,2,3,4,7,8,9-HpCDF	78		26 - 138	02/04/21 15:49	02/09/21 01:06	1
13C-OCDD	75		17 - 157	02/04/21 15:49	02/09/21 01:06	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	89		35 - 197	02/04/21 15:49	02/09/21 01:06	1

Lab Sample ID: LCS 320-458769/2-A
Matrix: Water
Analysis Batch: 459925

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 458769

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
2,3,7,8-TCDD			0.000200	0.000229		ug/L		115	67 - 158		
2,3,7,8-TCDF			0.000200	0.000240		ug/L		120	75 - 158		
1,2,3,7,8-PeCDD			0.00100	0.00116		ug/L		116	70 - 142		
1,2,3,7,8-PeCDF			0.00100	0.00122		ug/L		122	80 - 134		
2,3,4,7,8-PeCDF			0.00100	0.00125		ug/L		125	68 - 160		
1,2,3,4,7,8-HxCDD			0.00100	0.00124	MB	ug/L		124	70 - 164		
1,2,3,6,7,8-HxCDD			0.00100	0.00119		ug/L		119	76 - 134		
1,2,3,7,8,9-HxCDD			0.00100	0.00119		ug/L		119	64 - 162		
1,2,3,4,7,8-HxCDF			0.00100	0.00120		ug/L		120	72 - 134		
1,2,3,6,7,8-HxCDF			0.00100	0.00122		ug/L		122	84 - 130		
1,2,3,7,8,9-HxCDF			0.00100	0.00117		ug/L		117	78 - 130		
2,3,4,6,7,8-HxCDF			0.00100	0.00121		ug/L		121	70 - 156		
1,2,3,4,6,7,8-HpCDD			0.00100	0.00109	MB	ug/L		109	70 - 140		
1,2,3,4,6,7,8-HpCDF			0.00100	0.00115		ug/L		115	82 - 122		
1,2,3,4,7,8,9-HpCDF			0.00100	0.00115		ug/L		115	78 - 138		
OCDD			0.00200	0.00210	MB	ug/L		105	78 - 144		
OCDF			0.00200	0.00240	MB	ug/L		120	63 - 170		

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C-2,3,7,8-TCDD	76		20 - 175
13C-2,3,7,8-TCDF	88		22 - 152
13C-1,2,3,7,8-PeCDD	72		21 - 227
13C-1,2,3,7,8-PeCDF	78		21 - 192
13C-2,3,4,7,8-PeCDF	79		13 - 328
13C-1,2,3,4,7,8-HxCDD	75		21 - 193
13C-1,2,3,6,7,8-HxCDD	81		25 - 163
13C-1,2,3,4,7,8-HxCDF	90		19 - 202

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Lab Sample ID: LCS 320-458769/2-A
Matrix: Water
Analysis Batch: 459925

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 458769

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C-1,2,3,6,7,8-HxCDF	91		21 - 159
13C-1,2,3,7,8,9-HxCDF	93		17 - 205
13C-2,3,4,6,7,8-HxCDF	93		22 - 176
13C-1,2,3,4,6,7,8-HpCDD	77		26 - 166
13C-1,2,3,4,6,7,8-HpCDF	83		21 - 158
13C-1,2,3,4,7,8,9-HpCDF	81		20 - 186
13C-OCDD	77		13 - 199

Surrogate	LCS %Recovery	LCS Qualifier	Limits
37Cl4-2,3,7,8-TCDD	89		31 - 191

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 440-638122/1-A
Matrix: Water
Analysis Batch: 638176

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 638122

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		02/08/21 09:37	02/08/21 16:45	1
Copper	ND		2.0	0.50	ug/L		02/08/21 09:37	02/08/21 16:45	1
Lead	ND		1.0	0.50	ug/L		02/08/21 09:37	02/08/21 16:45	1

Lab Sample ID: LCS 440-638122/2-A
Matrix: Water
Analysis Batch: 638176

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 638122

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	80.0	76.9		ug/L		96	85 - 115
Copper	80.0	77.2		ug/L		97	85 - 115
Lead	80.0	76.4		ug/L		96	85 - 115

Lab Sample ID: 440-278162-B-1-C MS
Matrix: Water
Analysis Batch: 638176

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 638122

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	ND		80.0	75.4		ug/L		94	70 - 130
Copper	10		80.0	83.8		ug/L		92	70 - 130
Lead	2.3		80.0	76.7		ug/L		93	70 - 130

Lab Sample ID: 440-278162-B-1-D MSD
Matrix: Water
Analysis Batch: 638176

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 638122

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		80.0	76.1		ug/L		95	70 - 130	1	20
Copper	10		80.0	85.6		ug/L		94	70 - 130	2	20
Lead	2.3		80.0	76.8		ug/L		93	70 - 130	0	20

Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 440-637490/1-B
Matrix: Water
Analysis Batch: 637525

Client Sample ID: Method Blank
Prep Type: Dissolved
Prep Batch: 637494

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		02/01/21 09:17	02/01/21 11:13	1
Copper	ND		2.0	0.50	ug/L		02/01/21 09:17	02/01/21 11:13	1
Lead	ND		1.0	0.50	ug/L		02/01/21 09:17	02/01/21 11:13	1

Lab Sample ID: LCS 440-637490/2-B
Matrix: Water
Analysis Batch: 637525

Client Sample ID: Lab Control Sample
Prep Type: Dissolved
Prep Batch: 637494

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	80.0	73.4		ug/L		92	85 - 115
Copper	80.0	72.2		ug/L		90	85 - 115
Lead	80.0	71.2		ug/L		89	85 - 115

Lab Sample ID: 440-278184-1 MS
Matrix: Water
Analysis Batch: 637525

Client Sample ID: LPBMP0002_20210129
Prep Type: Dissolved
Prep Batch: 637494

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	ND		80.0	75.0		ug/L		94	70 - 130
Copper	8.7		80.0	84.2		ug/L		94	70 - 130
Lead	0.57	J,DX	80.0	72.2		ug/L		90	70 - 130

Lab Sample ID: 440-278184-1 MSD
Matrix: Water
Analysis Batch: 637525

Client Sample ID: LPBMP0002_20210129
Prep Type: Dissolved
Prep Batch: 637494

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		80.0	73.7		ug/L		92	70 - 130	2	20
Copper	8.7		80.0	83.0		ug/L		93	70 - 130	1	20
Lead	0.57	J,DX	80.0	73.4		ug/L		91	70 - 130	2	20

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 440-638239/1-A
Matrix: Water
Analysis Batch: 638349

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 638239

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		02/09/21 11:44	02/09/21 16:47	1

Lab Sample ID: LCS 440-638239/2-A
Matrix: Water
Analysis Batch: 638349

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 638239

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	6.00	5.59		ug/L		93	85 - 115

Method: 245.1 - Mercury (CVAA) (Continued)

Lab Sample ID: 440-278184-1 MS
Matrix: Water
Analysis Batch: 638349

Client Sample ID: LPBMP0002_20210129
Prep Type: Total/NA
Prep Batch: 638239

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		6.00	5.72		ug/L		95	75 - 125

Lab Sample ID: 440-278184-1 MSD
Matrix: Water
Analysis Batch: 638349

Client Sample ID: LPBMP0002_20210129
Prep Type: Total/NA
Prep Batch: 638239

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		6.00	5.49		ug/L		92	75 - 125	4	20

Lab Sample ID: MB 440-637490/1-D
Matrix: Water
Analysis Batch: 638349

Client Sample ID: Method Blank
Prep Type: Dissolved
Prep Batch: 638238

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		02/09/21 11:33	02/09/21 16:31	1

Lab Sample ID: LCS 440-637490/2-D
Matrix: Water
Analysis Batch: 638349

Client Sample ID: Lab Control Sample
Prep Type: Dissolved
Prep Batch: 638238

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	6.00	5.71		ug/L		95	85 - 115

Lab Sample ID: 440-278184-3 MS
Matrix: Water
Analysis Batch: 638349

Client Sample ID: LPBMP0004_20210129
Prep Type: Dissolved
Prep Batch: 638238

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		6.00	5.52		ug/L		92	75 - 125

Lab Sample ID: 440-278184-3 MSD
Matrix: Water
Analysis Batch: 638349

Client Sample ID: LPBMP0004_20210129
Prep Type: Dissolved
Prep Batch: 638238

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		6.00	5.60		ug/L		93	75 - 125	1	20

Method: SM 2540D - Solids, Total Suspended (TSS)

Lab Sample ID: MB 440-637676/1
Matrix: Water
Analysis Batch: 637676

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		1.0	0.50	mg/L			02/02/21 14:28	1

Method: SM 2540D - Solids, Total Suspended (TSS) (Continued)

Lab Sample ID: LCS 440-637676/2
Matrix: Water
Analysis Batch: 637676

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Suspended Solids			1000	1030		mg/L		103	85 - 115		

Lab Sample ID: 440-278181-B-1 DU
Matrix: Water
Analysis Batch: 637676

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Suspended Solids	150			147		mg/L				0.7	10

QC Association Summary

Client: Haley & Aldrich, Inc.
Project/Site: BMP

Job ID: 440-278184-1

Specialty Organics

Prep Batch: 458769

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278184-1 - RA	LPBMP0002_20210129	Total/NA	Water	1613B	
440-278184-1	LPBMP0002_20210129	Total/NA	Water	1613B	
440-278184-2	LPBMP0003_20210129	Total/NA	Water	1613B	
440-278184-3 - RA	LPBMP0004_20210129	Total/NA	Water	1613B	
440-278184-3	LPBMP0004_20210129	Total/NA	Water	1613B	
MB 320-458769/1-A	Method Blank	Total/NA	Water	1613B	
LCS 320-458769/2-A	Lab Control Sample	Total/NA	Water	1613B	

Analysis Batch: 459925

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278184-1	LPBMP0002_20210129	Total/NA	Water	1613B	458769
440-278184-2	LPBMP0003_20210129	Total/NA	Water	1613B	458769
440-278184-3	LPBMP0004_20210129	Total/NA	Water	1613B	458769
MB 320-458769/1-A	Method Blank	Total/NA	Water	1613B	458769
LCS 320-458769/2-A	Lab Control Sample	Total/NA	Water	1613B	458769

Analysis Batch: 461724

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278184-1 - RA	LPBMP0002_20210129	Total/NA	Water	1613B	458769
440-278184-3 - RA	LPBMP0004_20210129	Total/NA	Water	1613B	458769

Metals

Filtration Batch: 637490

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278184-1	LPBMP0002_20210129	Dissolved	Water	FILTRATION	
440-278184-2	LPBMP0003_20210129	Dissolved	Water	FILTRATION	
440-278184-3	LPBMP0004_20210129	Dissolved	Water	FILTRATION	
MB 440-637490/1-B	Method Blank	Dissolved	Water	FILTRATION	
MB 440-637490/1-D	Method Blank	Dissolved	Water	FILTRATION	
LCS 440-637490/2-B	Lab Control Sample	Dissolved	Water	FILTRATION	
LCS 440-637490/2-D	Lab Control Sample	Dissolved	Water	FILTRATION	
440-278184-1 MS	LPBMP0002_20210129	Dissolved	Water	FILTRATION	
440-278184-1 MSD	LPBMP0002_20210129	Dissolved	Water	FILTRATION	
440-278184-3 MS	LPBMP0004_20210129	Dissolved	Water	FILTRATION	
440-278184-3 MSD	LPBMP0004_20210129	Dissolved	Water	FILTRATION	

Prep Batch: 637494

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278184-1	LPBMP0002_20210129	Dissolved	Water	200.2	637490
440-278184-2	LPBMP0003_20210129	Dissolved	Water	200.2	637490
440-278184-3	LPBMP0004_20210129	Dissolved	Water	200.2	637490
MB 440-637490/1-B	Method Blank	Dissolved	Water	200.2	637490
LCS 440-637490/2-B	Lab Control Sample	Dissolved	Water	200.2	637490
440-278184-1 MS	LPBMP0002_20210129	Dissolved	Water	200.2	637490
440-278184-1 MSD	LPBMP0002_20210129	Dissolved	Water	200.2	637490

Analysis Batch: 637525

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278184-1	LPBMP0002_20210129	Dissolved	Water	200.8	637494
440-278184-2	LPBMP0003_20210129	Dissolved	Water	200.8	637494

Metals (Continued)

Analysis Batch: 637525 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278184-3	LPBMP0004_20210129	Dissolved	Water	200.8	637494
MB 440-637490/1-B	Method Blank	Dissolved	Water	200.8	637494
LCS 440-637490/2-B	Lab Control Sample	Dissolved	Water	200.8	637494
440-278184-1 MS	LPBMP0002_20210129	Dissolved	Water	200.8	637494
440-278184-1 MSD	LPBMP0002_20210129	Dissolved	Water	200.8	637494

Prep Batch: 638122

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278184-1	LPBMP0002_20210129	Total Recoverable	Water	200.2	
440-278184-2	LPBMP0003_20210129	Total Recoverable	Water	200.2	
440-278184-3	LPBMP0004_20210129	Total Recoverable	Water	200.2	
MB 440-638122/1-A	Method Blank	Total Recoverable	Water	200.2	
LCS 440-638122/2-A	Lab Control Sample	Total Recoverable	Water	200.2	
440-278162-B-1-C MS	Matrix Spike	Total Recoverable	Water	200.2	
440-278162-B-1-D MSD	Matrix Spike Duplicate	Total Recoverable	Water	200.2	

Analysis Batch: 638176

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278184-1	LPBMP0002_20210129	Total Recoverable	Water	200.8	638122
440-278184-2	LPBMP0003_20210129	Total Recoverable	Water	200.8	638122
440-278184-3	LPBMP0004_20210129	Total Recoverable	Water	200.8	638122
MB 440-638122/1-A	Method Blank	Total Recoverable	Water	200.8	638122
LCS 440-638122/2-A	Lab Control Sample	Total Recoverable	Water	200.8	638122
440-278162-B-1-C MS	Matrix Spike	Total Recoverable	Water	200.8	638122
440-278162-B-1-D MSD	Matrix Spike Duplicate	Total Recoverable	Water	200.8	638122

Prep Batch: 638238

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278184-1	LPBMP0002_20210129	Dissolved	Water	245.1	637490
440-278184-2	LPBMP0003_20210129	Dissolved	Water	245.1	637490
440-278184-3	LPBMP0004_20210129	Dissolved	Water	245.1	637490
MB 440-637490/1-D	Method Blank	Dissolved	Water	245.1	637490
LCS 440-637490/2-D	Lab Control Sample	Dissolved	Water	245.1	637490
440-278184-3 MS	LPBMP0004_20210129	Dissolved	Water	245.1	637490
440-278184-3 MSD	LPBMP0004_20210129	Dissolved	Water	245.1	637490

Prep Batch: 638239

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278184-1	LPBMP0002_20210129	Total/NA	Water	245.1	
440-278184-2	LPBMP0003_20210129	Total/NA	Water	245.1	
440-278184-3	LPBMP0004_20210129	Total/NA	Water	245.1	
MB 440-638239/1-A	Method Blank	Total/NA	Water	245.1	
LCS 440-638239/2-A	Lab Control Sample	Total/NA	Water	245.1	
440-278184-1 MS	LPBMP0002_20210129	Total/NA	Water	245.1	
440-278184-1 MSD	LPBMP0002_20210129	Total/NA	Water	245.1	

Analysis Batch: 638349

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278184-1	LPBMP0002_20210129	Dissolved	Water	245.1	638238
440-278184-1	LPBMP0002_20210129	Total/NA	Water	245.1	638239
440-278184-2	LPBMP0003_20210129	Dissolved	Water	245.1	638238

Metals (Continued)

Analysis Batch: 638349 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278184-2	LPBMP0003_20210129	Total/NA	Water	245.1	638239
440-278184-3	LPBMP0004_20210129	Dissolved	Water	245.1	638238
440-278184-3	LPBMP0004_20210129	Total/NA	Water	245.1	638239
MB 440-637490/1-D	Method Blank	Dissolved	Water	245.1	638238
MB 440-638239/1-A	Method Blank	Total/NA	Water	245.1	638239
LCS 440-637490/2-D	Lab Control Sample	Dissolved	Water	245.1	638238
LCS 440-638239/2-A	Lab Control Sample	Total/NA	Water	245.1	638239
440-278184-1 MS	LPBMP0002_20210129	Total/NA	Water	245.1	638239
440-278184-1 MSD	LPBMP0002_20210129	Total/NA	Water	245.1	638239
440-278184-3 MS	LPBMP0004_20210129	Dissolved	Water	245.1	638238
440-278184-3 MSD	LPBMP0004_20210129	Dissolved	Water	245.1	638238

General Chemistry

Analysis Batch: 637676

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278184-1	LPBMP0002_20210129	Total/NA	Water	SM 2540D	
440-278184-2	LPBMP0003_20210129	Total/NA	Water	SM 2540D	
440-278184-3	LPBMP0004_20210129	Total/NA	Water	SM 2540D	
MB 440-637676/1	Method Blank	Total/NA	Water	SM 2540D	
LCS 440-637676/2	Lab Control Sample	Total/NA	Water	SM 2540D	
440-278181-B-1 DU	Duplicate	Total/NA	Water	SM 2540D	

Geotechnical

Analysis Batch: 127713

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-278184-1	LPBMP0002_20210129	Total/NA	Water	D4464	
440-278184-2	LPBMP0003_20210129	Total/NA	Water	D4464	
440-278184-3	LPBMP0004_20210129	Total/NA	Water	D4464	

Definitions/Glossary

Client: Haley & Aldrich, Inc.
Project/Site: BMP

Job ID: 440-278184-1

Qualifiers

Dioxin

Qualifier	Qualifier Description
J,DX	Estimated value; value < lowest standard (MQL), but >than MDL
MB	Analyte present in the method blank
q	The reported result is the estimated maximum possible concentration of this analyte, quantitated using the theoretical ion ratio. The measured ion ratio does not meet qualitative identification criteria and indicates a possible interference.

Metals

Qualifier	Qualifier Description
J,DX	Estimated value; value < lowest standard (MQL), but >than MDL

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Haley & Aldrich, Inc.
Project/Site: BMP

Job ID: 440-278184-1

Laboratory: Eurofins Calscience Irvine

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
California	State	2706	06-30-21

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
SM 2540D		Water	Total Suspended Solids

Laboratory: Eurofins Calscience LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	Los Angeles County Sanitation Districts	10109	09-30-21
California	SCAQMD LAP	17LA0919	11-30-21
California	State	2944	09-30-21
Guam	State	20-003R	10-31-20 *
Nevada	State	CA00111	07-31-21
Oregon	NELAP	CA300001	01-30-22
USDA	US Federal Programs	P330-20-00034	02-10-23
Washington	State	C916-18	10-11-21

Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	02-20-24
ANAB	Dept. of Defense ELAP	L2468	01-20-24
ANAB	Dept. of Energy	L2468.01	01-20-21 *
ANAB	ISO/IEC 17025	L2468	01-20-21 *
Arizona	State	AZ0708	08-11-21
Arkansas DEQ	State	88-0691	06-17-21
California	State	2897	01-31-22
Colorado	State	CA0004	08-31-21
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-21
Georgia	State	4040	01-29-22
Hawaii	State	<cert No.>	01-29-22
Illinois	NELAP	200060	03-17-21
Kansas	NELAP	E-10375	02-01-21 *
Louisiana	NELAP	01944	06-30-21
Maine	State	CA00004	04-14-22
Michigan	State	9947	01-29-21 *
Nevada	State	CA000442021-2	07-31-21
New Hampshire	NELAP	2997	04-18-21
New Jersey	NELAP	CA005	06-30-21
New York	NELAP	11666	04-01-21
Ohio	State	41252	01-29-22
Oregon	NELAP	4040	01-29-22
Pennsylvania	NELAP	68-01272	03-31-21
Texas	NELAP	T104704399-19-13	06-01-21
US Fish & Wildlife	US Federal Programs	58448	07-31-21
USDA	US Federal Programs	P330-18-00239	07-31-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: Haley & Aldrich, Inc.
Project/Site: BMP

Job ID: 440-278184-1

Laboratory: Eurofins TestAmerica, Sacramento (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Utah	NELAP	CA000442019-01	02-28-21
Vermont	State	VT-4040	04-16-21
Virginia	NELAP	460278	03-14-21
Washington	State	C581	05-05-21
West Virginia (DW)	State	9930C	12-31-21
Wisconsin	State	998204680	08-31-21
Wyoming	State Program	8TMS-L	01-28-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Irvine
17461 Derian Avenue, Suite 100
Irvine, CA 92614
phone (949) 261-1022 fax (949) 260-3299

Chain of Custody Record for
Haley & Aldrich, Inc. Blanket Service Agreement #2019-22-TestAmerica

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program. ▫ DW ▫ NPDES ▫ RCRA ▫ Other:

TestAmerica Laboratories, Inc.

TestAmerica's services under this CoC shall be performed in accordance with the T&Cs within Blanket Service Agreement# 2015-18-TestAmerica by and between Haley & Aldrich, Inc. its subsidiaries and affiliates, and TestAmerica Laboratories Inc.

Client Contact	H&A Project Manager: Katherine Miller	H&A Site Contact: Matt Birney (818) 466-8782	Date: 1/29/2021	COC No:
Haley & Aldrich, Inc.	Tel/Fax: (520) 289-8606	Lab Contact: Urvashi Patel (949) 333-9055	Carrier	1 of 1 COCs
5333 Mission Center Road, Suite 300	Analysis Turnaround Time			Sampler:
San Diego, California 92108	▪ CALENDAR DAYS ▫ WORKING DAYS			For Lab Use Only:
(619) 280-9210 Phone	TAT if different from Below ______			Walk-in Client:
(619) 280-9415 FAX	▪ 2 weeks			Lab Sampling:
H&A Project Number 129095-004 SID 5.2	▫ 1 week			
Site: BMP Performance OF 001 002, and/or 009 Watershed	▫ 2 days			Job / SDG No.
H&A P O #	▫ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Method 200.8: Cd, Cu, Pb Method 245.1 Hg (Total Dissolved)	Method 200.8: Cd, Cu, Pb Method 245.1 Hg (Total Recoverable)	Dioxins (Method 1613)	Total Suspended Solids (Method 2540D)	Particle Size Distribution (Method ASTM D422)	Method 200.8: As, Cd, Cu, Fe, Pb Mn, Se, Zn Method 245.1 Hg (Total Dissolved)	Method 200.8: As, Cd, Cu, Fe, Pb Mn, Se, Zn Method 245.1 Hg (Total Recoverable)	SO4, (E300)	Gross Alpha (E900.0) (Total Dissolved)	Gross Alpha (E900.0) (Total Recoverable)	Sample Specific Notes:
								1-250mL P	1-250mL P	2-1L A	1-1L P	1-1L P	1-500mL P	1-500mL P	1-500-mL P	1-1L A	1-1L A	Field Staff Notes: Lab may substitute 250mL Poly for 500mL for metals. Only need to fill half of 500mL. Must fill TSS to the top.
LPBMP0002_20210129	1/29/21	0835	G	WM	6		N	x	x	x	x	x						Lower Parking Lot; sample port in cestern discharge pipe
LPBMP0003_20210129	1/29/21	0848	G	WM	6		N	x	x	x	x	x						Lower Parking Lot; Sediment Basin outlet box
LPBMP0004_20210129	1/29/21	0852	G	WM	6		N	x	x	x	x	x						Lower Parking Lot; discharge from Biofilter effluent pipe
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other								1	4	1	1	1	1	4	1	1	1	

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
▪ Non-Hazard ▫ Flammable ▫ Skin Irritant ▫ Poison B ▫ Unknown

Sample Disposal
▫ Return to Client ▫ Disposal by Lab ▪ Archive for 6 Months

Special Instructions/QC Requirements & Comments:
Please email data to kmiller@haleyaldrich.com and post to Total Access; Bill to Haley & Aldrich at AP@haleyaldrich.com; Report Level II Data Package and provide EDD; All dissolved metal samples are to be filtered within 24 hours of receipt, even those placed on hold.

Custody Seals Intact: ▫ Yes ▫ No	Custody Seal No. 1130		Cooler Temp. (°C): Obs'd:____ Corr'd:____ Therm ID No.____		
Relinquished by: [signature]	Company: JTAH	Date/Time: 1/29/2021	Received by: [signature]	Company: EC IRV	Date/Time: 1-29-21 1130
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by: [signature]	Company: EC IRV	Date/Time: 1-29-21 1630	Received in Laboratory by: Olga Ornelas	Company: ETA-IRV	Date/Time: 1/29/21 1630

Form No. CA-C-WI-045, Rev 1.2, dated 1/8/2016

2-4/2-3 ~~0.7/0.6~~ IR 89

1/29/21 02

440-278184 Chain of Custody

SAP COC 2019/2020 VERSION 2

2/16/2021

Eurofins Calscience Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone: 949-261-1022 Fax: 949-260-3297

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Bondoc, Christian M	Carrier Tracking No(s):	COC No: 440-165987.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Christian.Bondoc@Eurofinset.com	State of Origin: California	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 440-278184-1
Address: 880 Riverside Parkway, ,	Due Date Requested: 2/12/2021			
City: West Sacramento	TAT Requested (days):			
State, Zip: CA, 95605				
Phone: 916-373-5600(Tel) 916-372-1059(Fax)	PO #:			
Email:	WO #:			
Project Name: BMP	Project #: 44009815			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	1613B/1613B_Sox_Sep_P Standard List w/ Totals	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
LPBMP0002_20210129 (440-278184-1)	1/29/21	08:35 Pacific		Water			X	2	See QAS, Boeing_w/u to zero
LPBMP0003_20210129 (440-278184-2)	1/29/21	08:48 Pacific		Water			X	2	See QAS, Boeing_w/u to zero
LPBMP0004_20210129 (440-278184-3)	1/29/21	08:52 Pacific		Water			X	2	See QAS, Boeing_w/u to zero

Note: Since laboratory accreditations are subject to change, Eurofins Calscience places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Calscience laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Calscience attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Calscience.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:		Date:	Time:		Method of Shipment:	
Relinquished by: Olga Cuneras	Date/Time: 2/1/21 1700	Company EC-IRV	Received by:	Date/Time: 2/2/21 950	Company FedEx	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company	

Custody Seals Intact: ☒ Yes ☐ No | Custody Seal No.: Seal | Cooler Temperature(s) °C and Other Remarks: 1.9

Ver: 11/01/2020

Eurofins Calscience Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone 949-261-1022 Fax. 949-260-3297

Chain of Custody Record

eurofins Environment Testing America

Client Information (Sub Contract Lab)	Sampler	Lab PM: Bondoc, Christian M	Carrier Tracking No(s):	COC No: 440-165965 1
Client Contact: Shipping/Receiving	Phone	E-Mail: Christian Bondoc@Eurofinset.com	State of Origin: California	Page: Page 1 of 1
Company: Eurofins Calscience LLC		Accreditations Required (See note): State Program - California		Job #: 440-278184-1
Address: 7440 Lincoln Way, ,	Due Date Requested: 2/11/2021			
City: Garden Grove	TAT Requested (days):			
State, Zip: CA, 92841				
Phone: 714-895-5494(Tel) 714-894-7501(Fax)	PO #:			
Email:	WO #:			
Project Name: BMP	Project #: 44009815			
Site:	SSOW#:			

Preservation Codes.

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Analysis Requested

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	D4464/ D4464-Particle Size	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
LPBMP0002_20210129 (440-278184-1)	1/29/21	08.35 Pacific		Water			X	1	Normal TAT
LPBMP0003_20210129 (440-278184-2)	1/29/21	08.48 Pacific		Water			X	1	Normal TAT
LPBMP0004_20210129 (440-278184-3)	1/29/21	08:52 Pacific		Water			X	1	Normal TAT

Note: Since laboratory accreditations are subject to change, Eurofins Calscience places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed the samples must be shipped back to the Eurofins Calscience laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Calscience attention immediately If all requested accreditations are current to date return the signed Chain of Custody attesting to said complicance to Eurofins Calscience

Possible Hazard Identification	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested I, II, III, IV, Other (specify) Primary Deliverable Rank. 2	Special Instructions/QC Requirements.

Empty Kit Relinquished by:	Date	Time.	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		1-30-21 11:25	ECI		1-30-2021 11:25	ECI
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks: 2.9 11.3 SG

Ver: 11/01/2020

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 440-278184-1

Login Number: 278184
List Number: 1
Creator: Escalante, Maria I

List Source: Eurofins Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	Not present
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 440-278184-1

Login Number: 278184
List Number: 2
Creator: Rivera, Isaac

List Source: Eurofins Calscience
List Creation: 01/30/21 04:37 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	Not present
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	1.3
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 440-278184-1

Login Number: 278184
List Number: 3
Creator: Nelson, Kym D

List Source: Eurofins TestAmerica, Sacramento
List Creation: 02/02/21 05:06 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	Seal
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	1.9c
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Not requested on COC.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Isotope Dilution Summary

Client: Haley & Aldrich, Inc.
Project/Site: BMP

Job ID: 440-278184-1

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Matrix: Water | **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	TCDD (25-164)	TCDF (24-169)	PeCDD (25-181)	PeCDF (24-185)	PeCF (21-178)	HxCDD (32-141)	HxDD (28-130)	HxCDF (26-152)
440-278184-1	LPBMP0002_20210129	72	84	69	76	75	70	74	83
440-278184-1 - RA	LPBMP0002_20210129		80						
440-278184-2	LPBMP0003_20210129	66	77	60	66	65	62	65	73
440-278184-3	LPBMP0004_20210129	69	82	63	69	69	59	62	69
440-278184-3 - RA	LPBMP0004_20210129		73						
MB 320-458769/1-A	Method Blank	76	86	74	79	80	74	76	87

		Percent Isotope Dilution Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	HxDF (26-123)	HxCF (29-147)	13CHxCF (28-136)	HpCDD (23-140)	HpCDF (28-143)	HpCDF2 (26-138)	OCDD (17-157)
440-278184-1	LPBMP0002_20210129	86	86	88	69	78	73	70
440-278184-1 - RA	LPBMP0002_20210129							
440-278184-2	LPBMP0003_20210129	76	76	77	59	68	63	61
440-278184-3	LPBMP0004_20210129	72	71	74	56	64	58	56
440-278184-3 - RA	LPBMP0004_20210129							
MB 320-458769/1-A	Method Blank	90	89	91	73	81	78	75

Surrogate Legend

TCDD = 13C-2,3,7,8-TCDD
TCDF = 13C-2,3,7,8-TCDF
PeCDD = 13C-1,2,3,7,8-PeCDD
PeCDF = 13C-1,2,3,7,8-PeCDF
PeCF = 13C-2,3,4,7,8-PeCDF
HxCDD = 13C-1,2,3,4,7,8-HxCDD
HxDD = 13C-1,2,3,6,7,8-HxCDD
HxCDF = 13C-1,2,3,4,7,8-HxCDF
HxDF = 13C-1,2,3,6,7,8-HxCDF
HxCF = 13C-1,2,3,7,8,9-HxCDF
13CHxCF = 13C-2,3,4,6,7,8-HxCDF
HpCDD = 13C-1,2,3,4,6,7,8-HpCDD
HpCDF = 13C-1,2,3,4,6,7,8-HpCDF
HpCDF2 = 13C-1,2,3,4,7,8,9-HpCDF
OCDD = 13C-OCDD

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Matrix: Water | **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	TCDD (20-175)	TCDF (22-152)	PeCDD (21-227)	PeCDF (21-192)	PeCF (13-328)	HxCDD (21-193)	HxDD (25-163)	HxCDF (19-202)
LCS 320-458769/2-A	Lab Control Sample	76	88	72	78	79	75	81	90

		Percent Isotope Dilution Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	HxDF (21-159)	HxCF (17-205)	13CHxCF (22-176)	HpCDD (26-166)	HpCDF (21-158)	HpCDF2 (20-186)	OCDD (13-199)
LCS 320-458769/2-A	Lab Control Sample	91	93	93	77	83	81	77

Surrogate Legend

TCDD = 13C-2,3,7,8-TCDD
TCDF = 13C-2,3,7,8-TCDF
PeCDD = 13C-1,2,3,7,8-PeCDD
PeCDF = 13C-1,2,3,7,8-PeCDF

Isotope Dilution Summary

Client: Haley & Aldrich, Inc.
Project/Site: BMP

Job ID: 440-278184-1

PeCF = 13C-2,3,4,7,8-PeCDF
HxCDD = 13C-1,2,3,4,7,8-HxCDD
HxDD = 13C-1,2,3,6,7,8-HxCDD
HxCDF = 13C-1,2,3,4,7,8-HxCDF
HxDF = 13C-1,2,3,6,7,8-HxCDF
HxCF = 13C-1,2,3,7,8,9-HxCDF
13CHxCF = 13C-2,3,4,6,7,8-HxCDF
HpCDD = 13C-1,2,3,4,6,7,8-HpCDD
HpCDF = 13C-1,2,3,4,6,7,8-HpCDF
HpCDF2 = 13C-1,2,3,4,7,8,9-HpCDF
OCDD = 13C-OCDD

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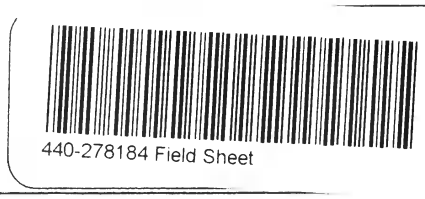
Sacramento Sample Receiving Notes



Job: _____

Tracking # : 1540 4111 6444

SO / PO / FO / SAT / 2-Day / Ground / UPS / CDO / Courier

GSO / OnTrac / Goldstreak / USPS / Other _____

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations. File in the job folder with the COC.

Therm. ID: 602 Corr. Factor: (+ / -) ✓ °C

Ice ✓ Wet ✓ Gel _____ Other _____

Cooler Custody Seal: Seal

Cooler ID: 1 of 2

Temp Observed: 1.9 °C Corrected: 1.9 °C

From: Temp Blank ☒ Sample ☐

Opening/Processing The Shipment	Yes	No	NA
Cooler compromised/tampered with?	☐	☒	☐
Cooler Temperature is acceptable?	☒	☐	☐
Frozen samples show signs of thaw?	☐	☐	☒

Initials: ST Date: 2/2/21

Unpacking/Labeling The Samples	Yes	No	NA
CoC is complete w/o discrepancies?	☐	☐	☐
Samples compromised/tampered with?	☐	☒	☐
Sample containers have legible labels?	☒	☐	☐
Sample custody seal?	☐	☐	☒
Containers are not broken or leaking?	☒	☐	☐
Sample date/times are provided?	☒	☐	☐
Appropriate containers are used?	☒	☐	☐
Sample bottles are completely filled?	☒	☐	☐
Sample preservatives verified?	☐	☐	☒
Samples w/o discrepancies?	☒	☐	☐
Zero headspace?*	☐	☐	☒
Alkalinity has no headspace?	☐	☐	☒
Perchlorate has headspace? (Methods 314, 331, 6850)	☐	☐	☒
Multiphasic samples are not present?	☒	☐	☐

*Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4")

Initials: ST Date: 2/2/21

Notes: _____

Trizma Lot #(s): _____

Login Completion	Yes	No	NA
Receipt Temperature on COC?	☒	☐	☐
Samples received within hold time?	☒	☐	☐
NCM Filed?	☐	☐	☒
Log Release checked in TALS?	☒	☐	☐

Initials: ST Date: 2/2/21

WR1-F

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ANALYTICAL REPORT

Eurofins Calscience LLC
7440 Lincoln Way
Garden Grove, CA 92841
Tel: (714)895-5494

Laboratory Job ID: 570-53559-1
Client Project/Site: BMP Performace OF 001, 002 and/or 009

For:
Haley & Aldrich, Inc.
400 E Van Buren St.
Suite 545
Phoenix, Arizona 85004

Attn: Ms. Katherine Miller

Authorized for release by:
3/25/2021 12:52:30 PM
Don Burley, Senior Project Manager
(714)895-5494
Donald.Burley@eurofinset.com

Designee for

Virendra Patel, Project Manager I
(714)895-5494
Virendra.Patel@eurofinset.com

Table of Contents

Definitions/Glossary

Client: Haley & Aldrich, Inc. Job ID: 570-53559-1
Project/Site: BMP Performace OF 001, 002 and/or 009

Qualifiers

Metals

Qualifier	Qualifier Description
J,DX	Estimated value; value < lowest standard (MQL), but >than MDL

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Haley & Aldrich, Inc. Job ID: 570-53559-1
Project/Site: BMP Performace OF 001, 002 and/or 009

Job ID: 570-53559-1

Laboratory: Eurofins Calscience LLC

Narrative

Job Narrative
570-53559-1

Comments
No additional comments.

Receipt
The samples were received on 3/11/2021 6:30 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 4 coolers at receipt time were 2.2º C, 2.4º C, 2.6º C and 2.7º C.

Receipt Exception
The number of containers for the following samples did not match the information listed on the Chain-of-Custody (COC): B1BMP0009_20210310 (570-53559-1), B1BMP0010_20210310 (570-53559-2), B1BMP0011_20210310 (570-53559-3), ILBMP0004_20210310 (570-53559-4), ILBMP0005_20210310 (570-53559-5), ILBMP0008_20210310 (570-53559-6), ILBMP0009_20210310 (570-53559-7), ILBMP0010_20210310 (570-53559-8), LPBMP0002_20210311 (570-53559-9), LPBMP0003_20210311 (570-53559-10) and LPBMP0004_20210311 (570-53559-11). Received 7 containers, while the COC lists 6 (received 2 containers for dissolved metals-250ml plastic unpreserved).

Metals
Method FILTRATION: The following samples requested dissolved metals and were not filtered in the field: B1BMP0009_20210310 (570-53559-1), B1BMP0010_20210310 (570-53559-2), B1BMP0011_20210310 (570-53559-3), ILBMP0004_20210310 (570-53559-4), ILBMP0005_20210310 (570-53559-5), ILBMP0008_20210310 (570-53559-6), ILBMP0009_20210310 (570-53559-7), ILBMP0010_20210310 (570-53559-8), LPBMP0002_20210311 (570-53559-9), LPBMP0003_20210311 (570-53559-10) and LPBMP0004_20210311 (570-53559-11). These samples were filtered and preserved upon receipt to the laboratory.

03/12/21 @ 1135 hours by ST
2.5 mL HNO3
HNO3 Lot # 0000245675

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
Method D4464: The sample duplicate precision for the following sample associated with analytical batch 570-138287 was flagged as being outside control limits due to a LIMS limitation: LPBMP0002_20210311 (570-53559-9) and (570-53559-C-9 DU). The mean grain size for the sample and sample duplicate were within RPD acceptance criteria.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Haley & Aldrich, Inc.
Project/Site: BMP Performace OF 001, 002 and/or 009

Job ID: 570-53559-1

Client Sample ID: B1BMP0009_20210310 — Lab Sample ID: 570-53559-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Copper	9.6		2.0	0.50	ug/L	1		200.8	Total Recoverable
Lead	2.5		1.0	0.50	ug/L	1		200.8	Total Recoverable
Copper	5.9		2.0	0.50	ug/L	1		200.8	Dissolved
Total Suspended Solids	30		3.3	1.7	mg/L	1		SM 2540D	Total/NA
Clay(less than 0.00391 mm)	6.36		0.01	0.01	%	1		D4464	Total/NA
Fine Sand (0.125 to 0.25mm)	22.62		0.01	0.01	%	1		D4464	Total/NA
Medium Sand (0.25 to 0.5 mm)	0.05		0.01	0.01	%	1		D4464	Total/NA
Silt (0.00391 to 0.0625mm)	53.26		0.01	0.01	%	1		D4464	Total/NA
Total Silt and Clay (0 to 0.0626mm)	59.62		0.01	0.01	%	1		D4464	Total/NA
Very Fine Sand (0.0625 to 0.125 mm)	17.71		0.01	0.01	%	1		D4464	Total/NA

Client Sample ID: B1BMP0010_20210310 — Lab Sample ID: 570-53559-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Copper	16		2.0	0.50	ug/L	1		200.8	Total Recoverable
Lead	1.1		1.0	0.50	ug/L	1		200.8	Total Recoverable
Copper	5.5		2.0	0.50	ug/L	1		200.8	Dissolved
Total Suspended Solids	12		2.0	1.0	mg/L	1		SM 2540D	Total/NA
Clay(less than 0.00391 mm)	4.40		0.01	0.01	%	1		D4464	Total/NA
Fine Sand (0.125 to 0.25mm)	27.97		0.01	0.01	%	1		D4464	Total/NA
Silt (0.00391 to 0.0625mm)	51.01		0.01	0.01	%	1		D4464	Total/NA
Total Silt and Clay (0 to 0.0626mm)	55.40		0.01	0.01	%	1		D4464	Total/NA
Very Fine Sand (0.0625 to 0.125 mm)	16.63		0.01	0.01	%	1		D4464	Total/NA

Client Sample ID: B1BMP0011_20210310 — Lab Sample ID: 570-53559-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Copper	7.0		2.0	0.50	ug/L	1		200.8	Total Recoverable
Lead	0.94	J,DX	1.0	0.50	ug/L	1		200.8	Total Recoverable
Copper	7.5		2.0	0.50	ug/L	1		200.8	Dissolved
Total Suspended Solids	6.0		1.3	0.67	mg/L	1		SM 2540D	Total/NA
Clay(less than 0.00391 mm)	1.33		0.01	0.01	%	1		D4464	Total/NA
Fine Sand (0.125 to 0.25mm)	62.38		0.01	0.01	%	1		D4464	Total/NA
Silt (0.00391 to 0.0625mm)	13.75		0.01	0.01	%	1		D4464	Total/NA
Total Silt and Clay (0 to 0.0626mm)	15.08		0.01	0.01	%	1		D4464	Total/NA
Very Fine Sand (0.0625 to 0.125 mm)	22.55		0.01	0.01	%	1		D4464	Total/NA

Client Sample ID: ILBMP0004_20210310 — Lab Sample ID: 570-53559-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cadmium	0.44	J,DX	1.0	0.25	ug/L	1		200.8	Total Recoverable
Copper	12		2.0	0.50	ug/L	1		200.8	Total Recoverable
Lead	4.5		1.0	0.50	ug/L	1		200.8	Total Recoverable
Copper	4.2		2.0	0.50	ug/L	1		200.8	Dissolved
Total Suspended Solids	100		5.0	2.5	mg/L	1		SM 2540D	Total/NA
Clay(less than 0.00391 mm)	9.79		0.01	0.01	%	1		D4464	Total/NA

This Detection Summary does not include radiochemical test results.

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Client Sample ID: ILBMP0004_20210310 (Continued) — Lab Sample ID: 570-53559-4

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Fine Sand (0.125 to 0.25mm)	21.90		0.01	0.01	%	1		D4464	Total/NA
Medium Sand (0.25 to 0.5 mm)	0.21		0.01	0.01	%	1		D4464	Total/NA
Silt (0.00391 to 0.0625mm)	56.33		0.01	0.01	%	1		D4464	Total/NA
Total Silt and Clay (0 to 0.0626mm)	66.12		0.01	0.01	%	1		D4464	Total/NA
Very Fine Sand (0.0625 to 0.125 mm)	11.78		0.01	0.01	%	1		D4464	Total/NA

Client Sample ID: ILBMP0005_20210310 — Lab Sample ID: 570-53559-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Copper	8.2		2.0	0.50	ug/L	1		200.8	Total Recoverable
Lead	1.2		1.0	0.50	ug/L	1		200.8	Total Recoverable
Copper	6.3		2.0	0.50	ug/L	1		200.8	Dissolved
Total Suspended Solids	12		1.1	0.53	mg/L	1		SM 2540D	Total/NA
Clay(less than 0.00391 mm)	3.59		0.01	0.01	%	1		D4464	Total/NA
Fine Sand (0.125 to 0.25mm)	43.71		0.01	0.01	%	1		D4464	Total/NA
Medium Sand (0.25 to 0.5 mm)	0.72		0.01	0.01	%	1		D4464	Total/NA
Silt (0.00391 to 0.0625mm)	34.10		0.01	0.01	%	1		D4464	Total/NA
Total Silt and Clay (0 to 0.0626mm)	37.70		0.01	0.01	%	1		D4464	Total/NA
Very Fine Sand (0.0625 to 0.125 mm)	17.88		0.01	0.01	%	1		D4464	Total/NA

Client Sample ID: ILBMP0008_20210310 — Lab Sample ID: 570-53559-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cadmium	1.5		1.0	0.25	ug/L	1		200.8	Total Recoverable
Copper	17		2.0	0.50	ug/L	1		200.8	Total Recoverable
Lead	12		1.0	0.50	ug/L	1		200.8	Total Recoverable
Cadmium	0.47	J,DX	1.0	0.25	ug/L	1		200.8	Dissolved
Copper	6.4		2.0	0.50	ug/L	1		200.8	Dissolved
Lead	0.83	J,DX	1.0	0.50	ug/L	1		200.8	Dissolved
Total Suspended Solids	120		10	5.0	mg/L	1		SM 2540D	Total/NA
Clay(less than 0.00391 mm)	10.40		0.01	0.01	%	1		D4464	Total/NA
Fine Sand (0.125 to 0.25mm)	24.90		0.01	0.01	%	1		D4464	Total/NA
Medium Sand (0.25 to 0.5 mm)	0.01		0.01	0.01	%	1		D4464	Total/NA
Silt (0.00391 to 0.0625mm)	46.66		0.01	0.01	%	1		D4464	Total/NA
Total Silt and Clay (0 to 0.0626mm)	57.06		0.01	0.01	%	1		D4464	Total/NA
Very Fine Sand (0.0625 to 0.125 mm)	18.03		0.01	0.01	%	1		D4464	Total/NA

Client Sample ID: ILBMP0009_20210310 — Lab Sample ID: 570-53559-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Copper	9.7		2.0	0.50	ug/L	1		200.8	Total Recoverable
Lead	5.9		1.0	0.50	ug/L	1		200.8	Total Recoverable
Copper	4.1		2.0	0.50	ug/L	1		200.8	Dissolved
Total Suspended Solids	42		3.3	1.7	mg/L	1		SM 2540D	Total/NA
Clay(less than 0.00391 mm)	14.37		0.01	0.01	%	1		D4464	Total/NA
Fine Sand (0.125 to 0.25mm)	8.49		0.01	0.01	%	1		D4464	Total/NA
Silt (0.00391 to 0.0625mm)	66.48		0.01	0.01	%	1		D4464	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: ILBMP0009_20210310 (Continued)
Lab Sample ID: 570-53559-7

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Silt and Clay (0 to 0.0626mm)	80.85		0.01	0.01	%	1		D4464	Total/NA
Very Fine Sand (0.0625 to 0.125 mm)	10.66		0.01	0.01	%	1		D4464	Total/NA

Client Sample ID: ILBMP0010_20210310
Lab Sample ID: 570-53559-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Copper	10		2.0	0.50	ug/L	1		200.8	Total Recoverable
Lead	4.8		1.0	0.50	ug/L	1		200.8	Total Recoverable
Copper	4.2		2.0	0.50	ug/L	1		200.8	Dissolved
Total Suspended Solids	28		2.5	1.3	mg/L	1		SM 2540D	Total/NA
Clay(less than 0.00391 mm)	8.83		0.01	0.01	%	1		D4464	Total/NA
Fine Sand (0.125 to 0.25mm)	28.28		0.01	0.01	%	1		D4464	Total/NA
Medium Sand (0.25 to 0.5 mm)	1.40		0.01	0.01	%	1		D4464	Total/NA
Silt (0.00391 to 0.0625mm)	52.85		0.01	0.01	%	1		D4464	Total/NA
Total Silt and Clay (0 to 0.0626mm)	61.69		0.01	0.01	%	1		D4464	Total/NA
Very Fine Sand (0.0625 to 0.125 mm)	8.64		0.01	0.01	%	1		D4464	Total/NA

Client Sample ID: LPBMP0002_20210311
Lab Sample ID: 570-53559-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Copper	10		2.0	0.50	ug/L	1		200.8	Total Recoverable
Lead	2.5		1.0	0.50	ug/L	1		200.8	Total Recoverable
Copper	7.3		2.0	0.50	ug/L	1		200.8	Dissolved
Total Suspended Solids	14		2.0	1.0	mg/L	1		SM 2540D	Total/NA
Clay(less than 0.00391 mm)	5.29		0.01	0.01	%	1		D4464	Total/NA
Fine Sand (0.125 to 0.25mm)	36.04		0.01	0.01	%	1		D4464	Total/NA
Silt (0.00391 to 0.0625mm)	27.43		0.01	0.01	%	1		D4464	Total/NA
Total Silt and Clay (0 to 0.0626mm)	32.72		0.01	0.01	%	1		D4464	Total/NA
Very Fine Sand (0.0625 to 0.125 mm)	31.23		0.01	0.01	%	1		D4464	Total/NA

Client Sample ID: LPBMP0003_20210311
Lab Sample ID: 570-53559-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Copper	9.9		2.0	0.50	ug/L	1		200.8	Total Recoverable
Lead	2.2		1.0	0.50	ug/L	1		200.8	Total Recoverable
Copper	7.3		2.0	0.50	ug/L	1		200.8	Dissolved
Total Suspended Solids	12		1.3	0.67	mg/L	1		SM 2540D	Total/NA
Clay(less than 0.00391 mm)	1.53		0.01	0.01	%	1		D4464	Total/NA
Fine Sand (0.125 to 0.25mm)	42.81		0.01	0.01	%	1		D4464	Total/NA
Silt (0.00391 to 0.0625mm)	14.84		0.01	0.01	%	1		D4464	Total/NA
Total Silt and Clay (0 to 0.0626mm)	16.37		0.01	0.01	%	1		D4464	Total/NA
Very Fine Sand (0.0625 to 0.125 mm)	40.82		0.01	0.01	%	1		D4464	Total/NA

Client Sample ID: LPBMP0004_20210311
Lab Sample ID: 570-53559-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Copper	19		2.0	0.50	ug/L	1		200.8	Total Recoverable
Copper	5.0		2.0	0.50	ug/L	1		200.8	Dissolved

This Detection Summary does not include radiochemical test results.

Client Sample ID: LPBMP0004_20210311 (Continued) **Lab Sample ID: 570-53559-11**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Solids	1.5		1.0	0.50	mg/L	1		SM 2540D	Total/NA

This Detection Summary does not include radiochemical test results.

Method: 200.8 - Metals (ICP/MS) - Total Recoverable

Client Sample ID: B1BMP0009_20210310
Date Collected: 03/10/21 11:20
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/15/21 07:35	03/15/21 20:22	1
Copper	**9.6**		2.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:22	1
Lead	**2.5**		1.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:22	1

Client Sample ID: B1BMP0010_20210310
Date Collected: 03/10/21 11:25
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/15/21 07:35	03/15/21 20:28	1
Copper	**16**		2.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:28	1
Lead	**1.1**		1.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:28	1

Client Sample ID: B1BMP0011_20210310
Date Collected: 03/10/21 11:30
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/15/21 07:35	03/15/21 20:30	1
Copper	**7.0**		2.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:30	1
Lead	**0.94**	**J,DX**	1.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:30	1

Client Sample ID: ILBMP0004_20210310
Date Collected: 03/10/21 11:05
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	**0.44**	**J,DX**	1.0	0.25	ug/L		03/15/21 07:35	03/15/21 20:32	1
Copper	**12**		2.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:32	1
Lead	**4.5**		1.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:32	1

Client Sample ID: ILBMP0005_20210310
Date Collected: 03/10/21 11:10
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/15/21 07:35	03/15/21 20:34	1
Copper	**8.2**		2.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:34	1
Lead	**1.2**		1.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:34	1

Client Sample ID: ILBMP0008_20210310
Date Collected: 03/10/21 11:00
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-6
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	**1.5**		1.0	0.25	ug/L		03/15/21 07:35	03/15/21 20:40	1
Copper	**17**		2.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:40	1
Lead	**12**		1.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:40	1

Client Sample ID: ILBMP0009_20210310
Date Collected: 03/10/21 10:50
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-7
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/15/21 07:35	03/15/21 20:42	1
Copper	**9.7**		2.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:42	1
Lead	**5.9**		1.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:42	1

Method: 200.8 - Metals (ICP/MS) - Total Recoverable

Client Sample ID: ILBMP0010_20210310 **Lab Sample ID: 570-53559-8**
Date Collected: 03/10/21 10:55 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/15/21 07:35	03/15/21 20:44	1
Copper	**10**		2.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:44	1
Lead	**4.8**		1.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:44	1

Client Sample ID: LPBMP0002_20210311 **Lab Sample ID: 570-53559-9**
Date Collected: 03/11/21 09:40 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/15/21 07:35	03/15/21 20:46	1
Copper	**10**		2.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:46	1
Lead	**2.5**		1.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:46	1

Client Sample ID: LPBMP0003_20210311 **Lab Sample ID: 570-53559-10**
Date Collected: 03/11/21 09:50 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/15/21 07:35	03/15/21 20:48	1
Copper	**9.9**		2.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:48	1
Lead	**2.2**		1.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:48	1

Client Sample ID: LPBMP0004_20210311 **Lab Sample ID: 570-53559-11**
Date Collected: 03/11/21 10:00 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/15/21 07:35	03/15/21 20:50	1
Copper	**19**		2.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:50	1
Lead	ND		1.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:50	1

Method: 200.8 - Metals (ICP/MS) - Dissolved

Client Sample ID: B1BMP0009_20210310
Date Collected: 03/10/21 11:20
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/12/21 15:22	03/12/21 16:44	1
Copper	**5.9**		2.0	0.50	ug/L		03/12/21 15:22	03/12/21 16:44	1
Lead	ND		1.0	0.50	ug/L		03/12/21 15:22	03/12/21 16:44	1

Client Sample ID: B1BMP0010_20210310
Date Collected: 03/10/21 11:25
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/12/21 15:22	03/12/21 16:51	1
Copper	**5.5**		2.0	0.50	ug/L		03/12/21 15:22	03/12/21 16:51	1
Lead	ND		1.0	0.50	ug/L		03/12/21 15:22	03/12/21 16:51	1

Client Sample ID: B1BMP0011_20210310
Date Collected: 03/10/21 11:30
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/12/21 15:22	03/12/21 16:54	1
Copper	**7.5**		2.0	0.50	ug/L		03/12/21 15:22	03/12/21 16:54	1
Lead	ND		1.0	0.50	ug/L		03/12/21 15:22	03/12/21 16:54	1

Client Sample ID: ILBMP0004_20210310
Date Collected: 03/10/21 11:05
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/12/21 15:22	03/12/21 16:56	1
Copper	**4.2**		2.0	0.50	ug/L		03/12/21 15:22	03/12/21 16:56	1
Lead	ND		1.0	0.50	ug/L		03/12/21 15:22	03/12/21 16:56	1

Client Sample ID: ILBMP0005_20210310
Date Collected: 03/10/21 11:10
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/12/21 15:22	03/12/21 16:59	1
Copper	**6.3**		2.0	0.50	ug/L		03/12/21 15:22	03/12/21 16:59	1
Lead	ND		1.0	0.50	ug/L		03/12/21 15:22	03/12/21 16:59	1

Client Sample ID: ILBMP0008_20210310
Date Collected: 03/10/21 11:00
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-6
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	**0.47**	**J,DX**	1.0	0.25	ug/L		03/12/21 15:22	03/12/21 17:01	1
Copper	**6.4**		2.0	0.50	ug/L		03/12/21 15:22	03/12/21 17:01	1
Lead	**0.83**	**J,DX**	1.0	0.50	ug/L		03/12/21 15:22	03/12/21 17:01	1

Client Sample ID: ILBMP0009_20210310
Date Collected: 03/10/21 10:50
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-7
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/12/21 15:22	03/12/21 17:08	1
Copper	**4.1**		2.0	0.50	ug/L		03/12/21 15:22	03/12/21 17:08	1
Lead	ND		1.0	0.50	ug/L		03/12/21 15:22	03/12/21 17:08	1

Client: Haley & Aldrich, Inc.
Job ID: 570-53559-1
Project/Site: BMP Performace OF 001, 002 and/or 009

Method: 200.8 - Metals (ICP/MS) - Dissolved

Client Sample ID: ILBMP0010_20210310
Date Collected: 03/10/21 10:55
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-8
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/12/21 15:22	03/12/21 17:11	1
Copper	**4.2**		2.0	0.50	ug/L		03/12/21 15:22	03/12/21 17:11	1
Lead	ND		1.0	0.50	ug/L		03/12/21 15:22	03/12/21 17:11	1

Client Sample ID: LPBMP0002_20210311
Date Collected: 03/11/21 09:40
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-9
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/12/21 15:22	03/12/21 17:13	1
Copper	**7.3**		2.0	0.50	ug/L		03/12/21 15:22	03/12/21 17:13	1
Lead	ND		1.0	0.50	ug/L		03/12/21 15:22	03/12/21 17:13	1

Client Sample ID: LPBMP0003_20210311
Date Collected: 03/11/21 09:50
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-10
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/12/21 15:22	03/12/21 17:15	1
Copper	**7.3**		2.0	0.50	ug/L		03/12/21 15:22	03/12/21 17:15	1
Lead	ND		1.0	0.50	ug/L		03/12/21 15:22	03/12/21 17:15	1

Client Sample ID: LPBMP0004_20210311
Date Collected: 03/11/21 10:00
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-11
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/12/21 15:22	03/12/21 17:18	1
Copper	**5.0**		2.0	0.50	ug/L		03/12/21 15:22	03/12/21 17:18	1
Lead	ND		1.0	0.50	ug/L		03/12/21 15:22	03/12/21 17:18	1

Method: 245.1 - Mercury (CVAA)

Client Sample ID: B1BMP0009_20210310
Date Collected: 03/10/21 11:20
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:20	03/23/21 16:59	1

Client Sample ID: B1BMP0010_20210310
Date Collected: 03/10/21 11:25
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:20	03/23/21 17:05	1

Client Sample ID: B1BMP0011_20210310
Date Collected: 03/10/21 11:30
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:20	03/23/21 17:08	1

Client Sample ID: ILBMP0004_20210310
Date Collected: 03/10/21 11:05
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:20	03/23/21 17:10	1

Client Sample ID: ILBMP0005_20210310
Date Collected: 03/10/21 11:10
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:20	03/23/21 17:16	1

Client Sample ID: ILBMP0008_20210310
Date Collected: 03/10/21 11:00
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-6
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:20	03/23/21 17:19	1

Client Sample ID: ILBMP0009_20210310
Date Collected: 03/10/21 10:50
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-7
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:20	03/23/21 17:21	1

Client Sample ID: ILBMP0010_20210310
Date Collected: 03/10/21 10:55
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-8
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:20	03/23/21 17:23	1

Client Sample ID: LPBMP0002_20210311
Date Collected: 03/11/21 09:40
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-9
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:20	03/23/21 17:25	1

Client: Haley & Aldrich, Inc.
Job ID: 570-53559-1
Project/Site: BMP Performace OF 001, 002 and/or 009

Method: 245.1 - Mercury (CVAA)

Client Sample ID: LPBMP0003_20210311
Lab Sample ID: 570-53559-10
Date Collected: 03/11/21 09:50
Matrix: Water
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:20	03/23/21 17:28	1

Client Sample ID: LPBMP0004_20210311
Lab Sample ID: 570-53559-11
Date Collected: 03/11/21 10:00
Matrix: Water
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:20	03/23/21 17:30	1

Method: 245.1 - Mercury (CVAA) - Dissolved

Client Sample ID: B1BMP0009_20210310
Date Collected: 03/10/21 11:20
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:09	03/23/21 16:28	1

Client Sample ID: B1BMP0010_20210310
Date Collected: 03/10/21 11:25
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:09	03/23/21 16:30	1

Client Sample ID: B1BMP0011_20210310
Date Collected: 03/10/21 11:30
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:09	03/23/21 16:32	1

Client Sample ID: ILBMP0004_20210310
Date Collected: 03/10/21 11:05
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:09	03/23/21 16:34	1

Client Sample ID: ILBMP0005_20210310
Date Collected: 03/10/21 11:10
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:09	03/23/21 16:36	1

Client Sample ID: ILBMP0008_20210310
Date Collected: 03/10/21 11:00
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-6
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:09	03/23/21 16:16	1

Client Sample ID: ILBMP0009_20210310
Date Collected: 03/10/21 10:50
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-7
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:09	03/23/21 16:39	1

Client Sample ID: ILBMP0010_20210310
Date Collected: 03/10/21 10:55
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-8
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:09	03/23/21 16:41	1

Client Sample ID: LPBMP0002_20210311
Date Collected: 03/11/21 09:40
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-9
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:09	03/23/21 16:43	1

Client: Haley & Aldrich, Inc.
Job ID: 570-53559-1
Project/Site: BMP Performace OF 001, 002 and/or 009

Method: 245.1 - Mercury (CVAA) - Dissolved

Client Sample ID: LPBMP0003_20210311
Lab Sample ID: 570-53559-10
Date Collected: 03/11/21 09:50
Matrix: Water
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:09	03/23/21 16:50	1

Client Sample ID: LPBMP0004_20210311
Lab Sample ID: 570-53559-11
Date Collected: 03/11/21 10:00
Matrix: Water
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:09	03/23/21 16:52	1

General Chemistry

Client Sample ID: B1BMP0009_20210310 **Lab Sample ID: 570-53559-1**
Date Collected: 03/10/21 11:20 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	30		3.3	1.7	mg/L			03/16/21 15:17	1

Client Sample ID: B1BMP0010_20210310 **Lab Sample ID: 570-53559-2**
Date Collected: 03/10/21 11:25 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	12		2.0	1.0	mg/L			03/16/21 15:17	1

Client Sample ID: B1BMP0011_20210310 **Lab Sample ID: 570-53559-3**
Date Collected: 03/10/21 11:30 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	6.0		1.3	0.67	mg/L			03/16/21 15:17	1

Client Sample ID: ILBMP0004_20210310 **Lab Sample ID: 570-53559-4**
Date Collected: 03/10/21 11:05 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	100		5.0	2.5	mg/L			03/16/21 15:17	1

Client Sample ID: ILBMP0005_20210310 **Lab Sample ID: 570-53559-5**
Date Collected: 03/10/21 11:10 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	12		1.1	0.53	mg/L			03/16/21 15:17	1

Client Sample ID: ILBMP0008_20210310 **Lab Sample ID: 570-53559-6**
Date Collected: 03/10/21 11:00 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	120		10	5.0	mg/L			03/16/21 15:17	1

Client Sample ID: ILBMP0009_20210310 **Lab Sample ID: 570-53559-7**
Date Collected: 03/10/21 10:50 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	42		3.3	1.7	mg/L			03/16/21 15:17	1

Client Sample ID: ILBMP0010_20210310 **Lab Sample ID: 570-53559-8**
Date Collected: 03/10/21 10:55 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	28		2.5	1.3	mg/L			03/16/21 15:17	1

Client Sample ID: LPBMP0002_20210311 **Lab Sample ID: 570-53559-9**
Date Collected: 03/11/21 09:40 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	14		2.0	1.0	mg/L			03/16/21 15:41	1

Client: Haley & Aldrich, Inc.
Job ID: 570-53559-1
Project/Site: BMP Performace OF 001, 002 and/or 009

General Chemistry

Client Sample ID: LPBMP0003_20210311
Lab Sample ID: 570-53559-10
Date Collected: 03/11/21 09:50
Matrix: Water
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	12		1.3	0.67	mg/L			03/16/21 15:41	1

Client Sample ID: LPBMP0004_20210311
Lab Sample ID: 570-53559-11
Date Collected: 03/11/21 10:00
Matrix: Water
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.5		1.0	0.50	mg/L			03/16/21 15:41	1

Method: D4464 - Particle Size Distribution of Catalytic Material (Laser light scattering)

Client Sample ID: B1BMP0009_20210310 **Lab Sample ID: 570-53559-1**
Date Collected: 03/10/21 11:20 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	**6.36**		0.01	0.01	%			03/23/21 14:48	1
Coarse Sand (0.5mm to 1mm)	ND		0.01	0.01	%			03/23/21 14:48	1
Fine Sand (0.125 to 0.25mm)	**22.62**		0.01	0.01	%			03/23/21 14:48	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			03/23/21 14:48	1
Medium Sand (0.25 to 0.5 mm)	**0.05**		0.01	0.01	%			03/23/21 14:48	1
Silt (0.00391 to 0.0625mm)	**53.26**		0.01	0.01	%			03/23/21 14:48	1
Total Silt and Clay (0 to 0.0626mm)	**59.62**		0.01	0.01	%			03/23/21 14:48	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			03/23/21 14:48	1
Very Fine Sand (0.0625 to 0.125 mm)	**17.71**		0.01	0.01	%			03/23/21 14:48	1

Client Sample ID: B1BMP0010_20210310 **Lab Sample ID: 570-53559-2**
Date Collected: 03/10/21 11:25 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	**4.40**		0.01	0.01	%			03/23/21 14:56	1
Coarse Sand (0.5mm to 1mm)	ND		0.01	0.01	%			03/23/21 14:56	1
Fine Sand (0.125 to 0.25mm)	**27.97**		0.01	0.01	%			03/23/21 14:56	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			03/23/21 14:56	1
Medium Sand (0.25 to 0.5 mm)	ND		0.01	0.01	%			03/23/21 14:56	1
Silt (0.00391 to 0.0625mm)	**51.01**		0.01	0.01	%			03/23/21 14:56	1
Total Silt and Clay (0 to 0.0626mm)	**55.40**		0.01	0.01	%			03/23/21 14:56	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			03/23/21 14:56	1
Very Fine Sand (0.0625 to 0.125 mm)	**16.63**		0.01	0.01	%			03/23/21 14:56	1

Client Sample ID: B1BMP0011_20210310 **Lab Sample ID: 570-53559-3**
Date Collected: 03/10/21 11:30 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	**1.33**		0.01	0.01	%			03/23/21 15:02	1
Coarse Sand (0.5mm to 1mm)	ND		0.01	0.01	%			03/23/21 15:02	1
Fine Sand (0.125 to 0.25mm)	**62.38**		0.01	0.01	%			03/23/21 15:02	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			03/23/21 15:02	1
Medium Sand (0.25 to 0.5 mm)	ND		0.01	0.01	%			03/23/21 15:02	1
Silt (0.00391 to 0.0625mm)	**13.75**		0.01	0.01	%			03/23/21 15:02	1
Total Silt and Clay (0 to 0.0626mm)	**15.08**		0.01	0.01	%			03/23/21 15:02	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			03/23/21 15:02	1
Very Fine Sand (0.0625 to 0.125 mm)	**22.55**		0.01	0.01	%			03/23/21 15:02	1

Client Sample ID: ILBMP0004_20210310 **Lab Sample ID: 570-53559-4**
Date Collected: 03/10/21 11:05 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	**9.79**		0.01	0.01	%			03/23/21 15:18	1
Coarse Sand (0.5mm to 1mm)	ND		0.01	0.01	%			03/23/21 15:18	1
Fine Sand (0.125 to 0.25mm)	**21.90**		0.01	0.01	%			03/23/21 15:18	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			03/23/21 15:18	1
Medium Sand (0.25 to 0.5 mm)	**0.21**		0.01	0.01	%			03/23/21 15:18	1
Silt (0.00391 to 0.0625mm)	**56.33**		0.01	0.01	%			03/23/21 15:18	1

Method: D4464 - Particle Size Distribution of Catalytic Material (Laser light scattering) (Continued)

Client Sample ID: ILBMP0004_20210310 **Lab Sample ID: 570-53559-4**
Date Collected: 03/10/21 11:05 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Silt and Clay (0 to 0.0626mm)	**66.12**		0.01	0.01	%			03/23/21 15:18	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			03/23/21 15:18	1
Very Fine Sand (0.0625 to 0.125 mm)	**11.78**		0.01	0.01	%			03/23/21 15:18	1

Client Sample ID: ILBMP0005_20210310 **Lab Sample ID: 570-53559-5**
Date Collected: 03/10/21 11:10 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	**3.59**		0.01	0.01	%			03/23/21 15:24	1
Coarse Sand (0.5mm to 1mm)	ND		0.01	0.01	%			03/23/21 15:24	1
Fine Sand (0.125 to 0.25mm)	**43.71**		0.01	0.01	%			03/23/21 15:24	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			03/23/21 15:24	1
Medium Sand (0.25 to 0.5 mm)	**0.72**		0.01	0.01	%			03/23/21 15:24	1
Silt (0.00391 to 0.0625mm)	**34.10**		0.01	0.01	%			03/23/21 15:24	1
Total Silt and Clay (0 to 0.0626mm)	**37.70**		0.01	0.01	%			03/23/21 15:24	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			03/23/21 15:24	1
Very Fine Sand (0.0625 to 0.125 mm)	**17.88**		0.01	0.01	%			03/23/21 15:24	1

Client Sample ID: ILBMP0008_20210310 **Lab Sample ID: 570-53559-6**
Date Collected: 03/10/21 11:00 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	**10.40**		0.01	0.01	%			03/23/21 15:31	1
Coarse Sand (0.5mm to 1mm)	ND		0.01	0.01	%			03/23/21 15:31	1
Fine Sand (0.125 to 0.25mm)	**24.90**		0.01	0.01	%			03/23/21 15:31	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			03/23/21 15:31	1
Medium Sand (0.25 to 0.5 mm)	**0.01**		0.01	0.01	%			03/23/21 15:31	1
Silt (0.00391 to 0.0625mm)	**46.66**		0.01	0.01	%			03/23/21 15:31	1
Total Silt and Clay (0 to 0.0626mm)	**57.06**		0.01	0.01	%			03/23/21 15:31	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			03/23/21 15:31	1
Very Fine Sand (0.0625 to 0.125 mm)	**18.03**		0.01	0.01	%			03/23/21 15:31	1

Client Sample ID: ILBMP0009_20210310 **Lab Sample ID: 570-53559-7**
Date Collected: 03/10/21 10:50 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	**14.37**		0.01	0.01	%			03/23/21 15:37	1
Coarse Sand (0.5mm to 1mm)	ND		0.01	0.01	%			03/23/21 15:37	1
Fine Sand (0.125 to 0.25mm)	**8.49**		0.01	0.01	%			03/23/21 15:37	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			03/23/21 15:37	1
Medium Sand (0.25 to 0.5 mm)	ND		0.01	0.01	%			03/23/21 15:37	1
Silt (0.00391 to 0.0625mm)	**66.48**		0.01	0.01	%			03/23/21 15:37	1
Total Silt and Clay (0 to 0.0626mm)	**80.85**		0.01	0.01	%			03/23/21 15:37	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			03/23/21 15:37	1
Very Fine Sand (0.0625 to 0.125 mm)	**10.66**		0.01	0.01	%			03/23/21 15:37	1

Method: D4464 - Particle Size Distribution of Catalytic Material (Laser light scattering)

Client Sample ID: ILBMP0010_20210310 **Lab Sample ID: 570-53559-8**
Date Collected: 03/10/21 10:55 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	**8.83**		0.01	0.01	%			03/23/21 15:45	1
Coarse Sand (0.5mm to 1mm)	ND		0.01	0.01	%			03/23/21 15:45	1
Fine Sand (0.125 to 0.25mm)	**28.28**		0.01	0.01	%			03/23/21 15:45	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			03/23/21 15:45	1
Medium Sand (0.25 to 0.5 mm)	**1.40**		0.01	0.01	%			03/23/21 15:45	1
Silt (0.00391 to 0.0625mm)	**52.85**		0.01	0.01	%			03/23/21 15:45	1
Total Silt and Clay (0 to 0.0626mm)	**61.69**		0.01	0.01	%			03/23/21 15:45	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			03/23/21 15:45	1
Very Fine Sand (0.0625 to 0.125 mm)	**8.64**		0.01	0.01	%			03/23/21 15:45	1

Client Sample ID: LPBMP0002_20210311 **Lab Sample ID: 570-53559-9**
Date Collected: 03/11/21 09:40 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	**5.29**		0.01	0.01	%			03/23/21 15:51	1
Coarse Sand (0.5mm to 1mm)	ND		0.01	0.01	%			03/23/21 15:51	1
Fine Sand (0.125 to 0.25mm)	**36.04**		0.01	0.01	%			03/23/21 15:51	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			03/23/21 15:51	1
Medium Sand (0.25 to 0.5 mm)	ND		0.01	0.01	%			03/23/21 15:51	1
Silt (0.00391 to 0.0625mm)	**27.43**		0.01	0.01	%			03/23/21 15:51	1
Total Silt and Clay (0 to 0.0626mm)	**32.72**		0.01	0.01	%			03/23/21 15:51	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			03/23/21 15:51	1
Very Fine Sand (0.0625 to 0.125 mm)	**31.23**		0.01	0.01	%			03/23/21 15:51	1

Client Sample ID: LPBMP0003_20210311 **Lab Sample ID: 570-53559-10**
Date Collected: 03/11/21 09:50 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	**1.53**		0.01	0.01	%			03/23/21 15:57	1
Coarse Sand (0.5mm to 1mm)	ND		0.01	0.01	%			03/23/21 15:57	1
Fine Sand (0.125 to 0.25mm)	**42.81**		0.01	0.01	%			03/23/21 15:57	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			03/23/21 15:57	1
Medium Sand (0.25 to 0.5 mm)	ND		0.01	0.01	%			03/23/21 15:57	1
Silt (0.00391 to 0.0625mm)	**14.84**		0.01	0.01	%			03/23/21 15:57	1
Total Silt and Clay (0 to 0.0626mm)	**16.37**		0.01	0.01	%			03/23/21 15:57	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			03/23/21 15:57	1
Very Fine Sand (0.0625 to 0.125 mm)	**40.82**		0.01	0.01	%			03/23/21 15:57	1

Client Sample ID: LPBMP0004_20210311 **Lab Sample ID: 570-53559-11**
Date Collected: 03/11/21 10:00 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	ND		0.01	0.01	%			03/23/21 16:37	1
Coarse Sand (0.5mm to 1mm)	ND		0.01	0.01	%			03/23/21 16:37	1
Fine Sand (0.125 to 0.25mm)	ND		0.01	0.01	%			03/23/21 16:37	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			03/23/21 16:37	1
Medium Sand (0.25 to 0.5 mm)	ND		0.01	0.01	%			03/23/21 16:37	1
Silt (0.00391 to 0.0625mm)	ND		0.01	0.01	%			03/23/21 16:37	1

Client: Haley & Aldrich, Inc.
Job ID: 570-53559-1
Project/Site: BMP Performace OF 001, 002 and/or 009

Method: D4464 - Particle Size Distribution of Catalytic Material (Laser light scattering) (Continued)

Client Sample ID: LPBMP0004_20210311
Date Collected: 03/11/21 10:00
Date Received: 03/11/21 18:30

Lab Sample ID: 570-53559-11
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Silt and Clay (0 to 0.0626mm)	ND		0.01	0.01	%			03/23/21 16:37	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			03/23/21 16:37	1
Very Fine Sand (0.0625 to 0.125 mm)	ND		0.01	0.01	%			03/23/21 16:37	1

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

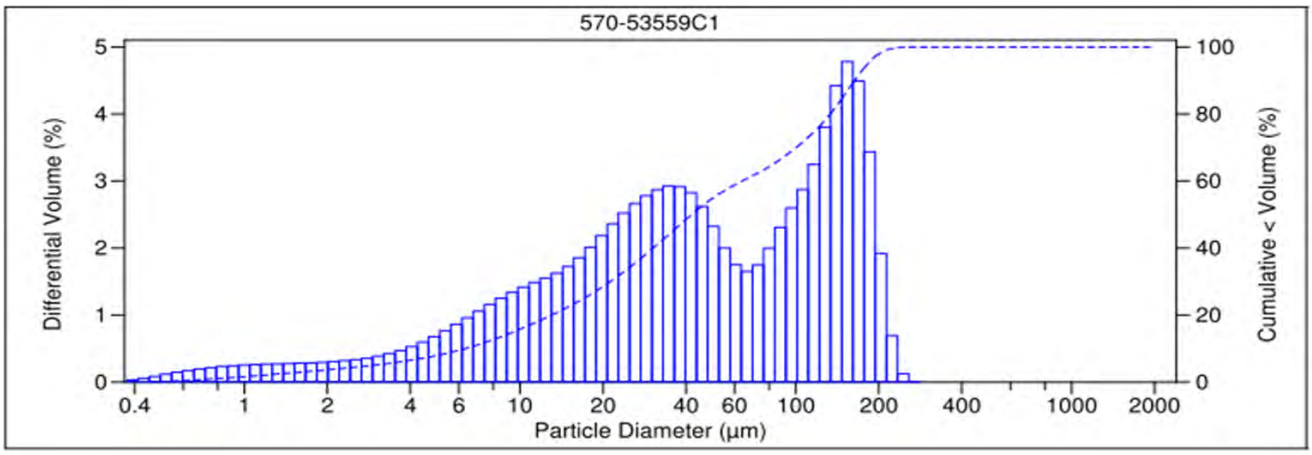
Haley & Aldrich, Inc.

Date Sampled:	03/10/21
Date Received:	03/11/21
Work Order No:	570-53559
Date Analyzed:	03/23/21
Method:	ASTM D4464M

Project:

Sample ID	Depth ft	Description	Mean Grain Size mm
B1BMP0009_20210310		Very Fine Sand	0.068

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.00	0.00	0.05	22.62	17.71	53.26	6.36	59.62



V 3.0

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

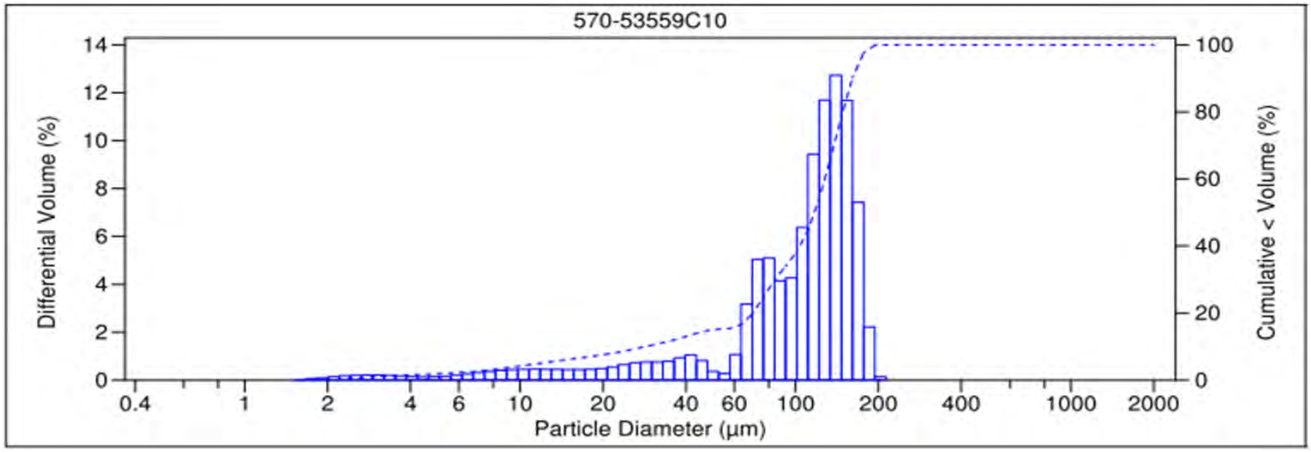
Haley & Aldrich, Inc.

Date Sampled:	03/11/21
Date Received:	03/11/21
Work Order No:	570-53559
Date Analyzed:	03/23/21
Method:	ASTM D4464M

Project:

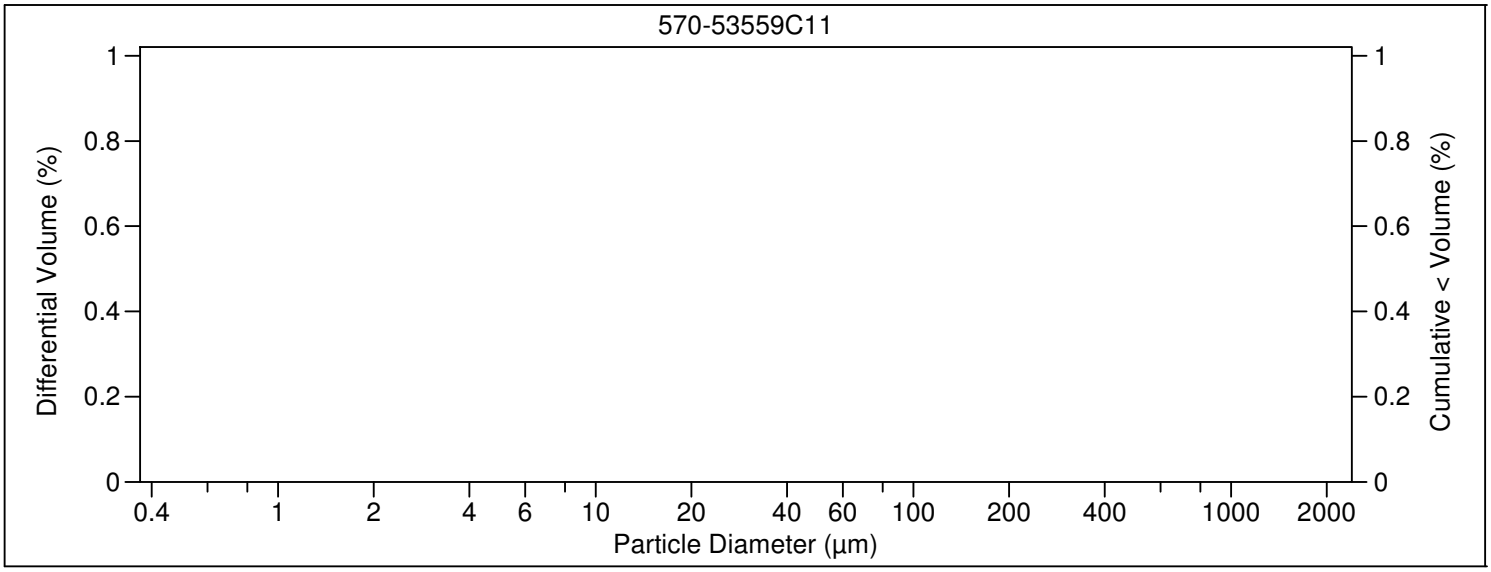
Sample ID	Depth ft	Description	Mean Grain Size mm
LPBMP0003_20210311		Very Fine Sand	0.107

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.00	0.00	0.00	42.81	40.82	14.84	1.53	16.37



V 3.0

File name:	C:\LS13320\570-53559C11_23 Mar 2021_16.37.35.$ls 570-53559C11_23 Mar 2021_16.37.35.$ls		
File ID:	570-53559C11		
Sample ID:	570-53559C11		
Operator:	C4LT		
Run number:	13		
Comment 1:	ASTM D4464M , LPSA 1		
Optical model:	Fraunhofer.rf780d		
Residual:	5.69%		
LS 13 320	Aqueous Liquid Module		
Start time:	16:36 23 Mar 2021	Run length:	60 seconds
Pump speed:	49		
Obscuration:	0%		
Fluid:	Water		
Software:	6.01	Firmware:	4.00



Volume Statistics (Arithmetic) 570-53559C11_23 Mar 2021_16.37.35.$ls

Calculations from 0.375 µm to 2000 µm

Volume:	0%		
Mean:	0.000 µm	S.D.:	0 µm
Median:	0.000 µm	Variance:	0 μm^2
Mean/Median ratio:	0.000	Skewness:	0
Mode:	0.000 µm	Kurtosis:	0

d_{10}: 0.000 µm d_{50}: 0.000 µm d_{90}: 0.000 µm

Folk and Ward Statistics (Phi)

Mean:	0.00	Median:	0.00	Deviation:	0.00
Skewness:	0.00	Kurtosis:	0.00		

<5%	<16%	<25%	<40%	<50%	<75%	<84%	<95%
0.000 µm	0.000 µm	0.000 µm	0.000 µm	0.000 µm	0.000 µm	0.000 µm	0.000 µm

Particle Diameter µm	570-53559C11_23 Mar 2021_16.37.35.$ls Volume %
0.04	0
0.4	0
1.95	0
3.91	0
62.5	0
125	0
250	0
500	0
1000	0
2000	

570-53559C11_23 Mar 2021_16.37.35.$ls

Channel Diameter (Lower) µm	Diff. Volume %	Channel Diameter (Lower) µm	Diff. Volume %	Channel Diameter (Lower) µm	Diff. Volume %
0.375	0	24.95	0	1660	0
0.412	0	27.39	0	1822	0
0.452	0	30.07	0	2000	
0.496	0	33.01	0		
0.545	0	36.24	0		
0.598	0	39.78	0		
0.657	0	43.67	0		
0.721	0	47.94	0		
0.791	0	52.63	0		
0.869	0	57.77	0		
0.954	0	63.42	0		
1.047	0	69.62	0		
1.149	0	76.43	0		
1.261	0	83.90	0		
1.385	0	92.10	0		
1.520	0	101.1	0		
1.669	0	111.0	0		
1.832	0	121.8	0		
2.011	0	133.7	0		
2.208	0	146.8	0		
2.423	0	161.2	0		
2.660	0	176.9	0		
2.920	0	194.2	0		
3.206	0	213.2	0		
3.519	0	234.1	0		
3.863	0	256.9	0		
4.241	0	282.1	0		
4.656	0	309.6	0		
5.111	0	339.9	0		
5.611	0	373.1	0		
6.159	0	409.6	0		
6.761	0	449.7	0		
7.422	0	493.6	0		
8.148	0	541.9	0		
8.944	0	594.9	0		
9.819	0	653.0	0		
10.78	0	716.9	0		
11.83	0	786.9	0		
12.99	0	863.9	0		
14.26	0	948.3	0		
15.65	0	1041	0		
17.18	0	1143	0		
18.86	0	1255	0		
20.71	0	1377	0		
22.73	0	1512	0		

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

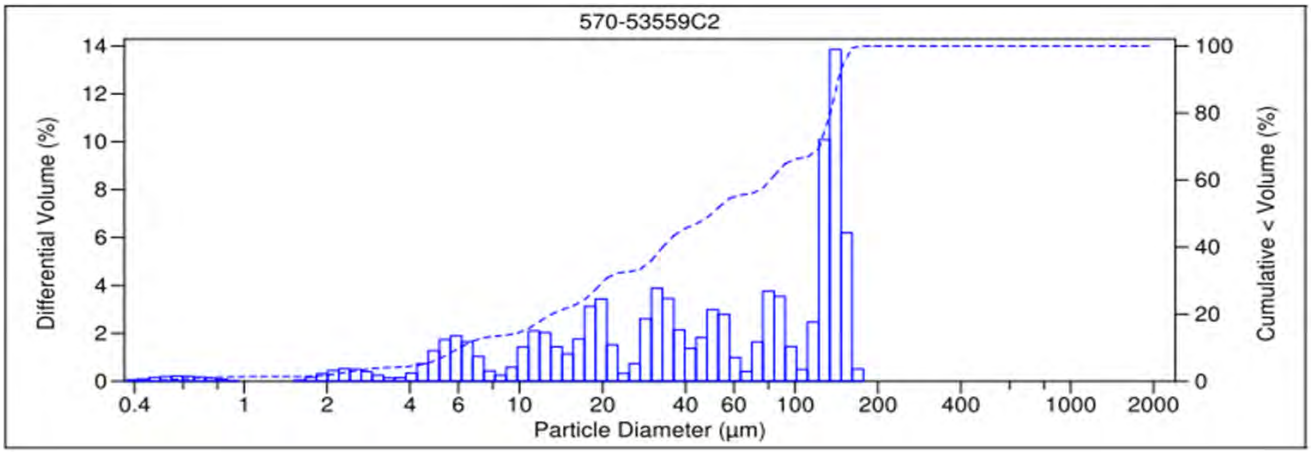
Haley & Aldrich, Inc.

Date Sampled:	03/10/21
Date Received:	03/11/21
Work Order No:	570-53559
Date Analyzed:	03/23/21
Method:	ASTM D4464M

Project:

Sample ID	Depth ft	Description	Mean Grain Size mm
B1BMP0010_20210310		Very Fine Sand	0.068

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.00	0.00	0.00	27.97	16.63	51.01	4.40	55.40



V 3.0

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

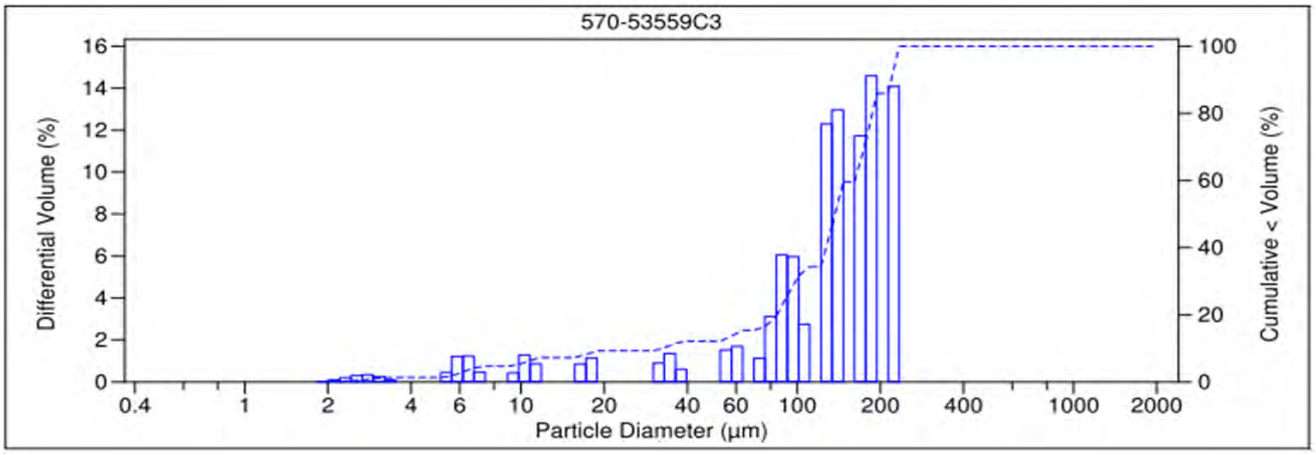
Haley & Aldrich, Inc.

Date Sampled:	03/10/21
Date Received:	03/11/21
Work Order No:	570-53559
Date Analyzed:	03/23/21
Method:	ASTM D4464M

Project:

Sample ID	Depth ft	Description	Mean Grain Size mm
B1BMP0011_20210310		Fine Sand	0.133

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.00	0.00	0.00	62.38	22.55	13.75	1.33	15.08



V 3.0

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

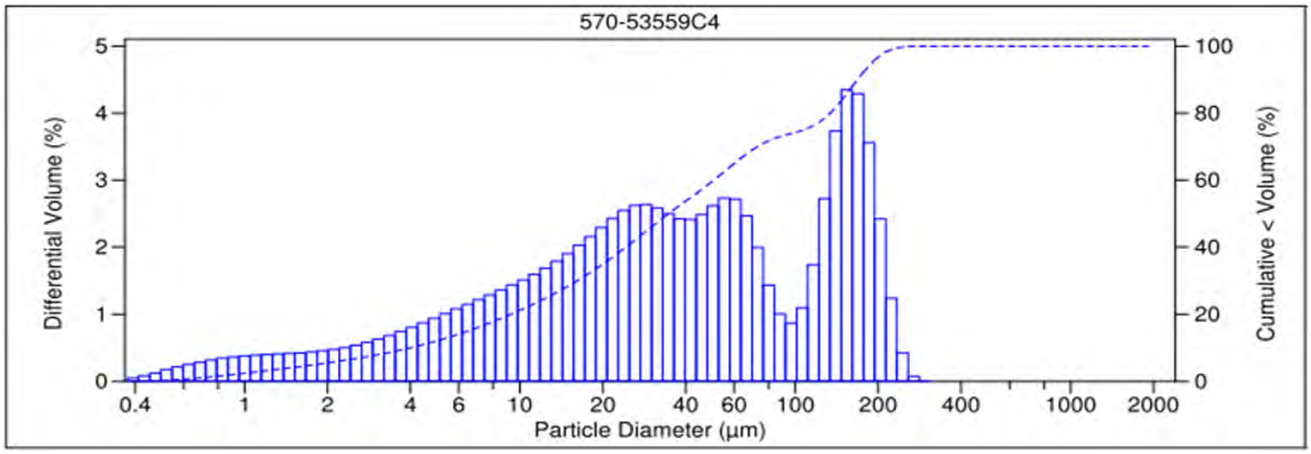
Haley & Aldrich, Inc.

Date Sampled:	03/10/21
Date Received:	03/11/21
Work Order No:	570-53559
Date Analyzed:	03/23/21
Method:	ASTM D4464M

Project:

Sample ID	Depth ft	Description	Mean Grain Size mm
ILBMP0004_20210310		Silt	0.062

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.00	0.00	0.21	21.90	11.78	56.33	9.79	66.12



V 3.0

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

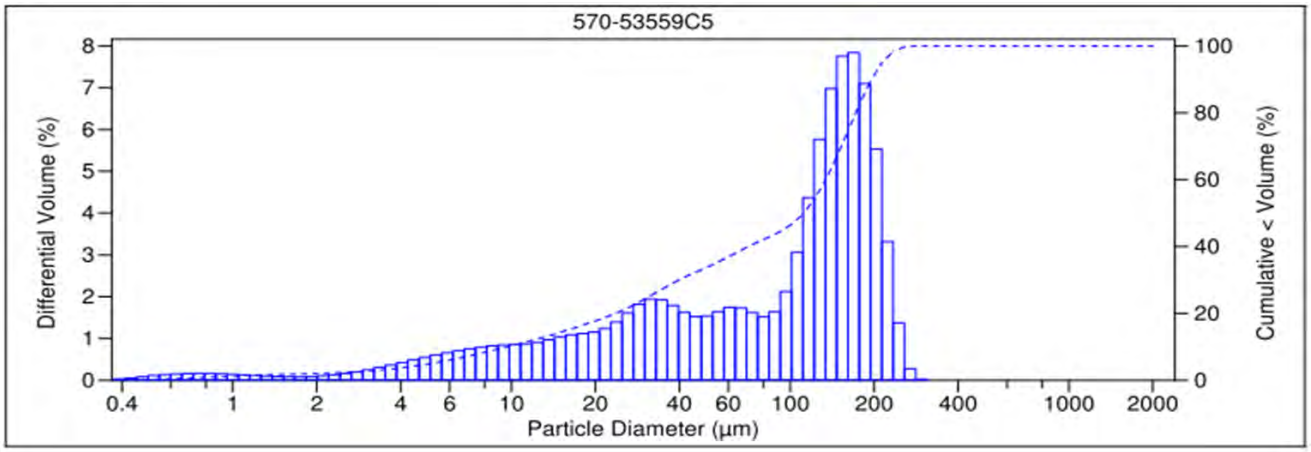
Haley & Aldrich, Inc.

Date Sampled:	03/10/21
Date Received:	03/11/21
Work Order No:	570-53559
Date Analyzed:	03/23/21
Method:	ASTM D4464M

Project:

Sample ID	Depth ft	Description	Mean Grain Size mm
ILBMP0005_20210310		Very Fine Sand	0.103

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.00	0.00	0.72	43.71	17.88	34.10	3.59	37.70



V 3.0

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

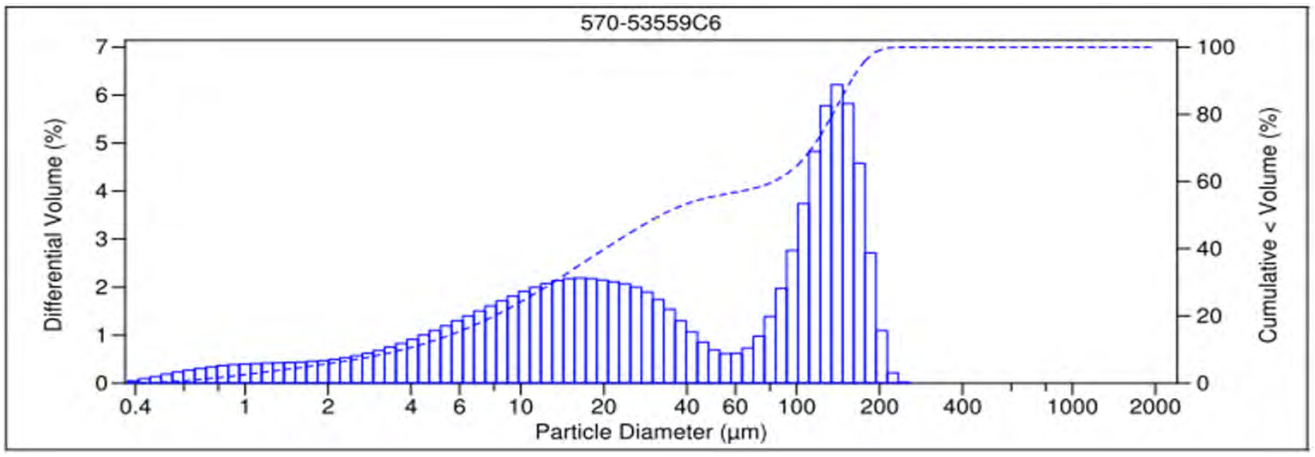
Haley & Aldrich, Inc.

Date Sampled:	03/10/21
Date Received:	03/11/21
Work Order No:	570-53559
Date Analyzed:	03/23/21
Method:	ASTM D4464M

Project:

Sample ID	Depth ft	Description	Mean Grain Size mm
ILBMP0008_20210310		Very Fine Sand	0.066

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.00	0.00	0.01	24.90	18.03	46.66	10.40	57.06



V 3.0

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

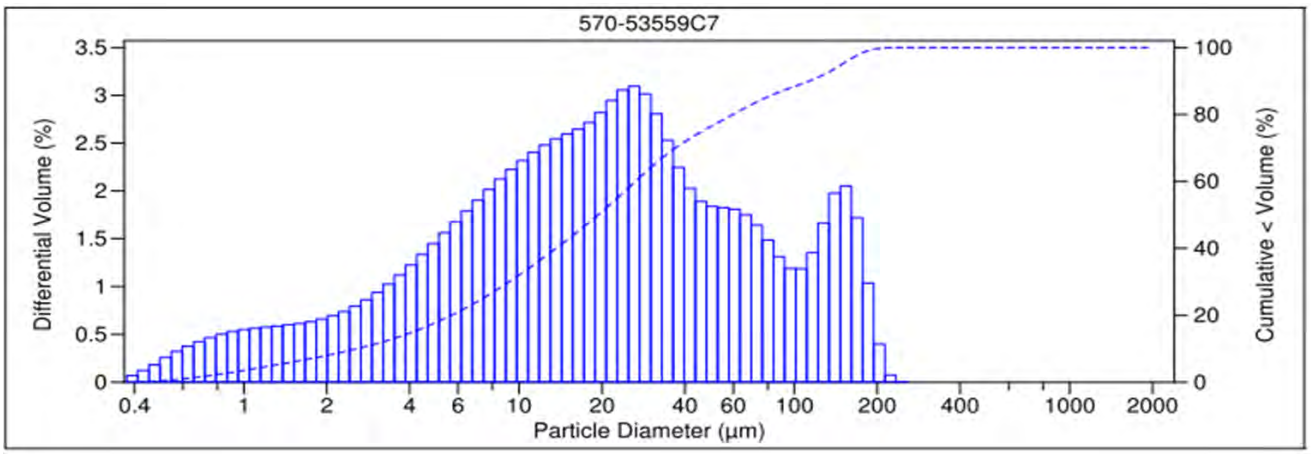
Haley & Aldrich, Inc.

Date Sampled:	03/10/21
Date Received:	03/11/21
Work Order No:	570-53559
Date Analyzed:	03/23/21
Method:	ASTM D4464M

Project:

Sample ID	Depth ft	Description	Mean Grain Size mm
ILBMP0009_20210310		Silt	0.037

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.00	0.00	0.00	8.49	10.66	66.48	14.37	80.85



V 3.0

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

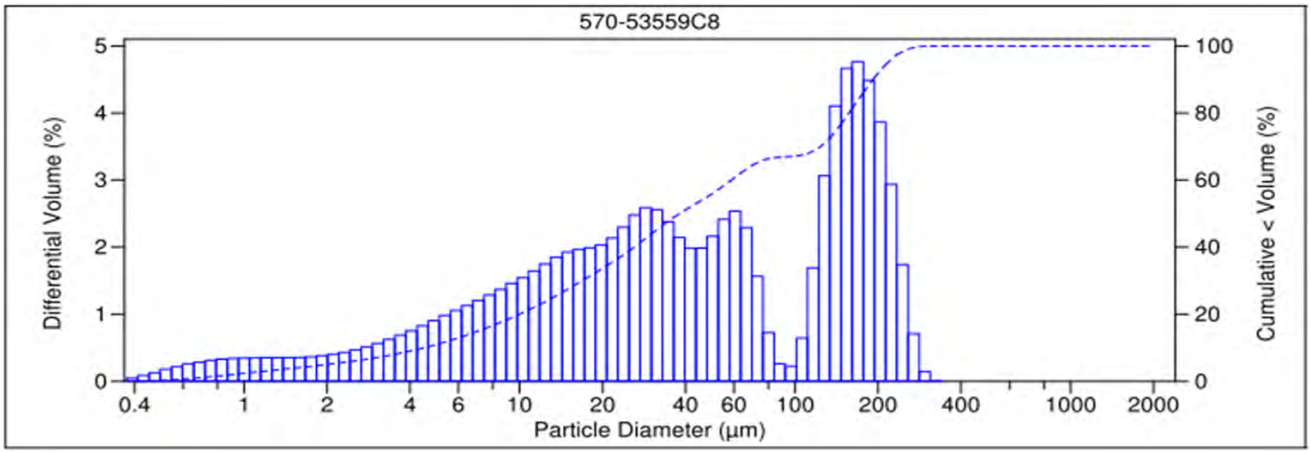
Haley & Aldrich, Inc.

Date Sampled:	03/10/21
Date Received:	03/11/21
Work Order No:	570-53559
Date Analyzed:	03/23/21
Method:	ASTM D4464M

Project:

Sample ID	Depth ft	Description	Mean Grain Size mm
ILBMP0010_20210310		Very Fine Sand	0.074

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.00	0.00	1.40	28.28	8.64	52.85	8.83	61.69



V 3.0

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

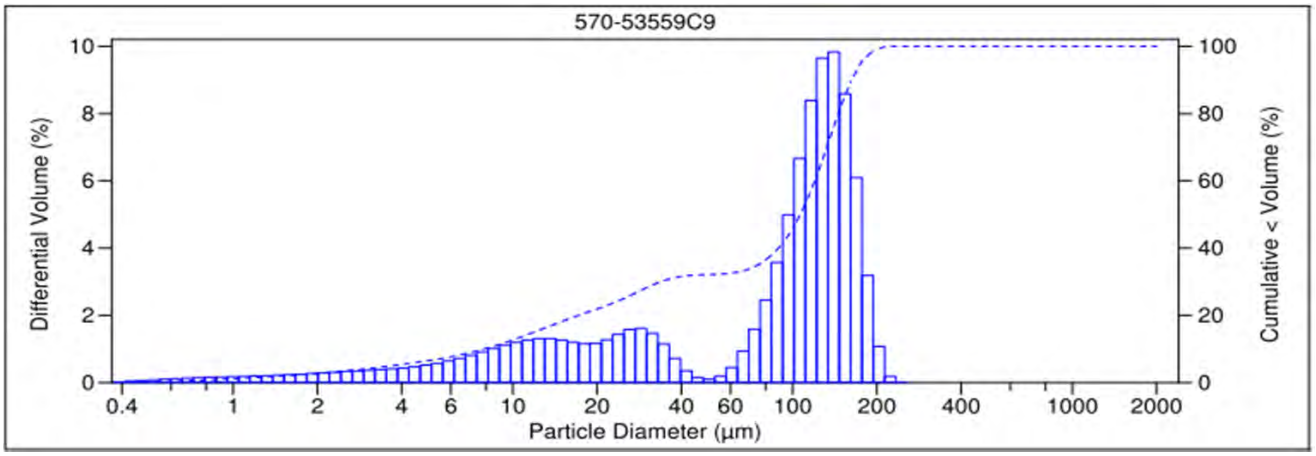
Haley & Aldrich, Inc.

Date Sampled:	03/11/21
Date Received:	03/11/21
Work Order No:	570-53559
Date Analyzed:	03/23/21
Method:	ASTM D4464M

Project:

Sample ID	Depth ft	Description	Mean Grain Size mm
LPBMP0002_20210311		Very Fine Sand	0.092

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.00	0.00	0.00	36.04	31.23	27.43	5.29	32.72



V 3.0

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 440-641185/1-A
Matrix: Water
Analysis Batch: 641364

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 641185

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/15/21 07:35	03/15/21 20:18	1
Copper	ND		2.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:18	1
Lead	ND		1.0	0.50	ug/L		03/15/21 07:35	03/15/21 20:18	1

Lab Sample ID: LCS 440-641185/2-A
Matrix: Water
Analysis Batch: 641364

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 641185

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	80.0	74.9		ug/L		94	85 - 115
Copper	80.0	76.2		ug/L		95	85 - 115
Lead	80.0	74.2		ug/L		93	85 - 115

Lab Sample ID: 570-53559-1 MS
Matrix: Water
Analysis Batch: 641364

Client Sample ID: B1BMP0009_20210310
Prep Type: Total Recoverable
Prep Batch: 641185

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	ND		80.0	75.2		ug/L		94	70 - 130
Copper	9.6		80.0	85.6		ug/L		95	70 - 130
Lead	2.5		80.0	75.5		ug/L		91	70 - 130

Lab Sample ID: 570-53559-1 MSD
Matrix: Water
Analysis Batch: 641364

Client Sample ID: B1BMP0009_20210310
Prep Type: Total Recoverable
Prep Batch: 641185

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		80.0	77.8		ug/L		97	70 - 130	3	20
Copper	9.6		80.0	88.1		ug/L		98	70 - 130	3	20
Lead	2.5		80.0	77.7		ug/L		94	70 - 130	3	20

Lab Sample ID: 570-53559-11 MS
Matrix: Water
Analysis Batch: 641364

Client Sample ID: LPBMP0004_20210311
Prep Type: Total Recoverable
Prep Batch: 641185

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	ND		80.0	75.8		ug/L		95	70 - 130
Copper	19		80.0	82.3		ug/L		80	70 - 130
Lead	ND		80.0	74.1		ug/L		93	70 - 130

Lab Sample ID: 570-53559-11 MSD
Matrix: Water
Analysis Batch: 641364

Client Sample ID: LPBMP0004_20210311
Prep Type: Total Recoverable
Prep Batch: 641185

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		80.0	76.0		ug/L		95	70 - 130	0	20
Copper	19		80.0	84.0		ug/L		82	70 - 130	2	20
Lead	ND		80.0	74.6		ug/L		93	70 - 130	1	20

Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 440-641167/1-B
Matrix: Water
Analysis Batch: 641218

Client Sample ID: Method Blank
Prep Type: Dissolved
Prep Batch: 641198

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.25	ug/L		03/12/21 15:22	03/12/21 16:40	1
Copper	ND		2.0	0.50	ug/L		03/12/21 15:22	03/12/21 16:40	1
Lead	ND		1.0	0.50	ug/L		03/12/21 15:22	03/12/21 16:40	1

Lab Sample ID: LCS 440-641167/2-B
Matrix: Water
Analysis Batch: 641218

Client Sample ID: Lab Control Sample
Prep Type: Dissolved
Prep Batch: 641198

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	80.0	72.9		ug/L		91	85 - 115
Copper	80.0	68.2		ug/L		85	85 - 115
Lead	80.0	73.8		ug/L		92	85 - 115

Lab Sample ID: 570-53559-1 MS
Matrix: Water
Analysis Batch: 641218

Client Sample ID: B1BMP0009_20210310
Prep Type: Dissolved
Prep Batch: 641198

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	ND		80.0	68.0		ug/L		85	70 - 130
Copper	5.9		80.0	73.4		ug/L		84	70 - 130
Lead	ND		80.0	70.2		ug/L		88	70 - 130

Lab Sample ID: 570-53559-1 MSD
Matrix: Water
Analysis Batch: 641218

Client Sample ID: B1BMP0009_20210310
Prep Type: Dissolved
Prep Batch: 641198

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		80.0	70.1		ug/L		88	70 - 130	3	20
Copper	5.9		80.0	74.3		ug/L		86	70 - 130	1	20
Lead	ND		80.0	71.3		ug/L		89	70 - 130	2	20

Lab Sample ID: 570-53559-11 MS
Matrix: Water
Analysis Batch: 641218

Client Sample ID: LPBMP0004_20210311
Prep Type: Dissolved
Prep Batch: 641198

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	ND		80.0	68.5		ug/L		86	70 - 130
Copper	5.0		80.0	70.3		ug/L		82	70 - 130
Lead	ND		80.0	67.9		ug/L		85	70 - 130

Lab Sample ID: 570-53559-11 MSD
Matrix: Water
Analysis Batch: 641218

Client Sample ID: LPBMP0004_20210311
Prep Type: Dissolved
Prep Batch: 641198

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		80.0	68.3		ug/L		85	70 - 130	0	20
Copper	5.0		80.0	71.5		ug/L		83	70 - 130	2	20
Lead	ND		80.0	67.2		ug/L		84	70 - 130	1	20

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 440-642060/1-A
Matrix: Water
Analysis Batch: 642145

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 642060

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:20	03/23/21 16:54	1

Lab Sample ID: LCS 440-642060/2-A
Matrix: Water
Analysis Batch: 642145

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 642060

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	6.00	6.17		ug/L		103	85 - 115

Lab Sample ID: 570-53559-1 MS
Matrix: Water
Analysis Batch: 642145

Client Sample ID: B1BMP0009_20210310
Prep Type: Total/NA
Prep Batch: 642060

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		6.00	6.02		ug/L		100	75 - 125

Lab Sample ID: 570-53559-1 MSD
Matrix: Water
Analysis Batch: 642145

Client Sample ID: B1BMP0009_20210310
Prep Type: Total/NA
Prep Batch: 642060

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		6.00	5.88		ug/L		98	75 - 125	2	20

Lab Sample ID: MB 440-641167/1-C
Matrix: Water
Analysis Batch: 642145

Client Sample ID: Method Blank
Prep Type: Dissolved
Prep Batch: 642053

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.10	ug/L		03/23/21 11:09	03/23/21 16:12	1

Lab Sample ID: LCS 440-641167/2-C
Matrix: Water
Analysis Batch: 642145

Client Sample ID: Lab Control Sample
Prep Type: Dissolved
Prep Batch: 642053

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	6.00	5.87		ug/L		98	85 - 115

Lab Sample ID: 570-53559-6 MS
Matrix: Water
Analysis Batch: 642145

Client Sample ID: ILBMP0008_20210310
Prep Type: Dissolved
Prep Batch: 642053

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		6.00	5.99		ug/L		100	75 - 125

Lab Sample ID: 570-53559-6 MSD
Matrix: Water
Analysis Batch: 642145

Client Sample ID: ILBMP0008_20210310
Prep Type: Dissolved
Prep Batch: 642053

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		6.00	5.67		ug/L		95	75 - 125	6	20

Method: SM 2540D - Solids, Total Suspended (TSS)

Lab Sample ID: MB 440-641455/1
Matrix: Water
Analysis Batch: 641455

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		1.0	0.50	mg/L			03/16/21 15:17	1

Lab Sample ID: LCS 440-641455/2
Matrix: Water
Analysis Batch: 641455

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Suspended Solids			1000	945		mg/L		95	85 - 115		

Lab Sample ID: 440-280470-A-1 DU
Matrix: Water
Analysis Batch: 641455

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Suspended Solids	87			86.5		mg/L				0.6	10

Lab Sample ID: MB 440-641466/1
Matrix: Water
Analysis Batch: 641466

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		1.0	0.50	mg/L			03/16/21 15:41	1

Lab Sample ID: LCS 440-641466/2
Matrix: Water
Analysis Batch: 641466

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Suspended Solids			1000	966		mg/L		97	85 - 115		

Lab Sample ID: 440-280513-F-2 DU
Matrix: Water
Analysis Batch: 641466

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Suspended Solids	14			13.3		mg/L				2	10

Metals

Filtration Batch: 641167

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-1	B1BMP0009_20210310	Dissolved	Water	FILTRATION	
570-53559-2	B1BMP0010_20210310	Dissolved	Water	FILTRATION	
570-53559-3	B1BMP0011_20210310	Dissolved	Water	FILTRATION	
570-53559-4	ILBMP0004_20210310	Dissolved	Water	FILTRATION	
570-53559-5	ILBMP0005_20210310	Dissolved	Water	FILTRATION	
570-53559-6	ILBMP0008_20210310	Dissolved	Water	FILTRATION	
570-53559-7	ILBMP0009_20210310	Dissolved	Water	FILTRATION	
570-53559-8	ILBMP0010_20210310	Dissolved	Water	FILTRATION	
570-53559-9	LPBMP0002_20210311	Dissolved	Water	FILTRATION	
570-53559-10	LPBMP0003_20210311	Dissolved	Water	FILTRATION	
570-53559-11	LPBMP0004_20210311	Dissolved	Water	FILTRATION	
MB 440-641167/1-B	Method Blank	Dissolved	Water	FILTRATION	
MB 440-641167/1-C	Method Blank	Dissolved	Water	FILTRATION	
LCS 440-641167/2-B	Lab Control Sample	Dissolved	Water	FILTRATION	
LCS 440-641167/2-C	Lab Control Sample	Dissolved	Water	FILTRATION	
570-53559-1 MS	B1BMP0009_20210310	Dissolved	Water	FILTRATION	
570-53559-1 MSD	B1BMP0009_20210310	Dissolved	Water	FILTRATION	
570-53559-6 MS	ILBMP0008_20210310	Dissolved	Water	FILTRATION	
570-53559-6 MSD	ILBMP0008_20210310	Dissolved	Water	FILTRATION	
570-53559-11 MS	LPBMP0004_20210311	Dissolved	Water	FILTRATION	
570-53559-11 MSD	LPBMP0004_20210311	Dissolved	Water	FILTRATION	

Prep Batch: 641185

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-1	B1BMP0009_20210310	Total Recoverable	Water	200.2	
570-53559-2	B1BMP0010_20210310	Total Recoverable	Water	200.2	
570-53559-3	B1BMP0011_20210310	Total Recoverable	Water	200.2	
570-53559-4	ILBMP0004_20210310	Total Recoverable	Water	200.2	
570-53559-5	ILBMP0005_20210310	Total Recoverable	Water	200.2	
570-53559-6	ILBMP0008_20210310	Total Recoverable	Water	200.2	
570-53559-7	ILBMP0009_20210310	Total Recoverable	Water	200.2	
570-53559-8	ILBMP0010_20210310	Total Recoverable	Water	200.2	
570-53559-9	LPBMP0002_20210311	Total Recoverable	Water	200.2	
570-53559-10	LPBMP0003_20210311	Total Recoverable	Water	200.2	
570-53559-11	LPBMP0004_20210311	Total Recoverable	Water	200.2	
MB 440-641185/1-A	Method Blank	Total Recoverable	Water	200.2	
LCS 440-641185/2-A	Lab Control Sample	Total Recoverable	Water	200.2	
570-53559-1 MS	B1BMP0009_20210310	Total Recoverable	Water	200.2	
570-53559-1 MSD	B1BMP0009_20210310	Total Recoverable	Water	200.2	
570-53559-11 MS	LPBMP0004_20210311	Total Recoverable	Water	200.2	
570-53559-11 MSD	LPBMP0004_20210311	Total Recoverable	Water	200.2	

Prep Batch: 641198

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-1	B1BMP0009_20210310	Dissolved	Water	200.2	641167
570-53559-2	B1BMP0010_20210310	Dissolved	Water	200.2	641167
570-53559-3	B1BMP0011_20210310	Dissolved	Water	200.2	641167
570-53559-4	ILBMP0004_20210310	Dissolved	Water	200.2	641167
570-53559-5	ILBMP0005_20210310	Dissolved	Water	200.2	641167
570-53559-6	ILBMP0008_20210310	Dissolved	Water	200.2	641167
570-53559-7	ILBMP0009_20210310	Dissolved	Water	200.2	641167

Metals (Continued)

Prep Batch: 641198 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-8	ILBMP0010_20210310	Dissolved	Water	200.2	641167
570-53559-9	LPBMP0002_20210311	Dissolved	Water	200.2	641167
570-53559-10	LPBMP0003_20210311	Dissolved	Water	200.2	641167
570-53559-11	LPBMP0004_20210311	Dissolved	Water	200.2	641167
MB 440-641167/1-B	Method Blank	Dissolved	Water	200.2	641167
LCS 440-641167/2-B	Lab Control Sample	Dissolved	Water	200.2	641167
570-53559-1 MS	B1BMP0009_20210310	Dissolved	Water	200.2	641167
570-53559-1 MSD	B1BMP0009_20210310	Dissolved	Water	200.2	641167
570-53559-11 MS	LPBMP0004_20210311	Dissolved	Water	200.2	641167
570-53559-11 MSD	LPBMP0004_20210311	Dissolved	Water	200.2	641167

Analysis Batch: 641218

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-1	B1BMP0009_20210310	Dissolved	Water	200.8	641198
570-53559-2	B1BMP0010_20210310	Dissolved	Water	200.8	641198
570-53559-3	B1BMP0011_20210310	Dissolved	Water	200.8	641198
570-53559-4	ILBMP0004_20210310	Dissolved	Water	200.8	641198
570-53559-5	ILBMP0005_20210310	Dissolved	Water	200.8	641198
570-53559-6	ILBMP0008_20210310	Dissolved	Water	200.8	641198
570-53559-7	ILBMP0009_20210310	Dissolved	Water	200.8	641198
570-53559-8	ILBMP0010_20210310	Dissolved	Water	200.8	641198
570-53559-9	LPBMP0002_20210311	Dissolved	Water	200.8	641198
570-53559-10	LPBMP0003_20210311	Dissolved	Water	200.8	641198
570-53559-11	LPBMP0004_20210311	Dissolved	Water	200.8	641198
MB 440-641167/1-B	Method Blank	Dissolved	Water	200.8	641198
LCS 440-641167/2-B	Lab Control Sample	Dissolved	Water	200.8	641198
570-53559-1 MS	B1BMP0009_20210310	Dissolved	Water	200.8	641198
570-53559-1 MSD	B1BMP0009_20210310	Dissolved	Water	200.8	641198
570-53559-11 MS	LPBMP0004_20210311	Dissolved	Water	200.8	641198
570-53559-11 MSD	LPBMP0004_20210311	Dissolved	Water	200.8	641198

Analysis Batch: 641364

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-1	B1BMP0009_20210310	Total Recoverable	Water	200.8	641185
570-53559-2	B1BMP0010_20210310	Total Recoverable	Water	200.8	641185
570-53559-3	B1BMP0011_20210310	Total Recoverable	Water	200.8	641185
570-53559-4	ILBMP0004_20210310	Total Recoverable	Water	200.8	641185
570-53559-5	ILBMP0005_20210310	Total Recoverable	Water	200.8	641185
570-53559-6	ILBMP0008_20210310	Total Recoverable	Water	200.8	641185
570-53559-7	ILBMP0009_20210310	Total Recoverable	Water	200.8	641185
570-53559-8	ILBMP0010_20210310	Total Recoverable	Water	200.8	641185
570-53559-9	LPBMP0002_20210311	Total Recoverable	Water	200.8	641185
570-53559-10	LPBMP0003_20210311	Total Recoverable	Water	200.8	641185
570-53559-11	LPBMP0004_20210311	Total Recoverable	Water	200.8	641185
MB 440-641185/1-A	Method Blank	Total Recoverable	Water	200.8	641185
LCS 440-641185/2-A	Lab Control Sample	Total Recoverable	Water	200.8	641185
570-53559-1 MS	B1BMP0009_20210310	Total Recoverable	Water	200.8	641185
570-53559-1 MSD	B1BMP0009_20210310	Total Recoverable	Water	200.8	641185
570-53559-11 MS	LPBMP0004_20210311	Total Recoverable	Water	200.8	641185
570-53559-11 MSD	LPBMP0004_20210311	Total Recoverable	Water	200.8	641185

Metals

Prep Batch: 642053

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-1	B1BMP0009_20210310	Dissolved	Water	245.1	641167
570-53559-2	B1BMP0010_20210310	Dissolved	Water	245.1	641167
570-53559-3	B1BMP0011_20210310	Dissolved	Water	245.1	641167
570-53559-4	ILBMP0004_20210310	Dissolved	Water	245.1	641167
570-53559-5	ILBMP0005_20210310	Dissolved	Water	245.1	641167
570-53559-6	ILBMP0008_20210310	Dissolved	Water	245.1	641167
570-53559-7	ILBMP0009_20210310	Dissolved	Water	245.1	641167
570-53559-8	ILBMP0010_20210310	Dissolved	Water	245.1	641167
570-53559-9	LPBMP0002_20210311	Dissolved	Water	245.1	641167
570-53559-10	LPBMP0003_20210311	Dissolved	Water	245.1	641167
570-53559-11	LPBMP0004_20210311	Dissolved	Water	245.1	641167
MB 440-641167/1-C	Method Blank	Dissolved	Water	245.1	641167
LCS 440-641167/2-C	Lab Control Sample	Dissolved	Water	245.1	641167
570-53559-6 MS	ILBMP0008_20210310	Dissolved	Water	245.1	641167
570-53559-6 MSD	ILBMP0008_20210310	Dissolved	Water	245.1	641167

Prep Batch: 642060

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-1	B1BMP0009_20210310	Total/NA	Water	245.1	
570-53559-2	B1BMP0010_20210310	Total/NA	Water	245.1	
570-53559-3	B1BMP0011_20210310	Total/NA	Water	245.1	
570-53559-4	ILBMP0004_20210310	Total/NA	Water	245.1	
570-53559-5	ILBMP0005_20210310	Total/NA	Water	245.1	
570-53559-6	ILBMP0008_20210310	Total/NA	Water	245.1	
570-53559-7	ILBMP0009_20210310	Total/NA	Water	245.1	
570-53559-8	ILBMP0010_20210310	Total/NA	Water	245.1	
570-53559-9	LPBMP0002_20210311	Total/NA	Water	245.1	
570-53559-10	LPBMP0003_20210311	Total/NA	Water	245.1	
570-53559-11	LPBMP0004_20210311	Total/NA	Water	245.1	
MB 440-642060/1-A	Method Blank	Total/NA	Water	245.1	
LCS 440-642060/2-A	Lab Control Sample	Total/NA	Water	245.1	
570-53559-1 MS	B1BMP0009_20210310	Total/NA	Water	245.1	
570-53559-1 MSD	B1BMP0009_20210310	Total/NA	Water	245.1	

Analysis Batch: 642145

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-1	B1BMP0009_20210310	Dissolved	Water	245.1	642053
570-53559-1	B1BMP0009_20210310	Total/NA	Water	245.1	642060
570-53559-2	B1BMP0010_20210310	Dissolved	Water	245.1	642053
570-53559-2	B1BMP0010_20210310	Total/NA	Water	245.1	642060
570-53559-3	B1BMP0011_20210310	Dissolved	Water	245.1	642053
570-53559-3	B1BMP0011_20210310	Total/NA	Water	245.1	642060
570-53559-4	ILBMP0004_20210310	Dissolved	Water	245.1	642053
570-53559-4	ILBMP0004_20210310	Total/NA	Water	245.1	642060
570-53559-5	ILBMP0005_20210310	Dissolved	Water	245.1	642053
570-53559-5	ILBMP0005_20210310	Total/NA	Water	245.1	642060
570-53559-6	ILBMP0008_20210310	Dissolved	Water	245.1	642053
570-53559-6	ILBMP0008_20210310	Total/NA	Water	245.1	642060
570-53559-7	ILBMP0009_20210310	Dissolved	Water	245.1	642053
570-53559-7	ILBMP0009_20210310	Total/NA	Water	245.1	642060
570-53559-8	ILBMP0010_20210310	Dissolved	Water	245.1	642053

Metals (Continued)

Analysis Batch: 642145 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-8	ILBMP0010_20210310	Total/NA	Water	245.1	642060
570-53559-9	LPBMP0002_20210311	Dissolved	Water	245.1	642053
570-53559-9	LPBMP0002_20210311	Total/NA	Water	245.1	642060
570-53559-10	LPBMP0003_20210311	Dissolved	Water	245.1	642053
570-53559-10	LPBMP0003_20210311	Total/NA	Water	245.1	642060
570-53559-11	LPBMP0004_20210311	Dissolved	Water	245.1	642053
570-53559-11	LPBMP0004_20210311	Total/NA	Water	245.1	642060
MB 440-641167/1-C	Method Blank	Dissolved	Water	245.1	642053
MB 440-642060/1-A	Method Blank	Total/NA	Water	245.1	642060
LCS 440-641167/2-C	Lab Control Sample	Dissolved	Water	245.1	642053
LCS 440-642060/2-A	Lab Control Sample	Total/NA	Water	245.1	642060
570-53559-1 MS	B1BMP0009_20210310	Total/NA	Water	245.1	642060
570-53559-1 MSD	B1BMP0009_20210310	Total/NA	Water	245.1	642060
570-53559-6 MS	ILBMP0008_20210310	Dissolved	Water	245.1	642053
570-53559-6 MSD	ILBMP0008_20210310	Dissolved	Water	245.1	642053

General Chemistry

Analysis Batch: 641455

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-1	B1BMP0009_20210310	Total/NA	Water	SM 2540D	
570-53559-2	B1BMP0010_20210310	Total/NA	Water	SM 2540D	
570-53559-3	B1BMP0011_20210310	Total/NA	Water	SM 2540D	
570-53559-4	ILBMP0004_20210310	Total/NA	Water	SM 2540D	
570-53559-5	ILBMP0005_20210310	Total/NA	Water	SM 2540D	
570-53559-6	ILBMP0008_20210310	Total/NA	Water	SM 2540D	
570-53559-7	ILBMP0009_20210310	Total/NA	Water	SM 2540D	
570-53559-8	ILBMP0010_20210310	Total/NA	Water	SM 2540D	
MB 440-641455/1	Method Blank	Total/NA	Water	SM 2540D	
LCS 440-641455/2	Lab Control Sample	Total/NA	Water	SM 2540D	
440-280470-A-1 DU	Duplicate	Total/NA	Water	SM 2540D	

Analysis Batch: 641466

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-9	LPBMP0002_20210311	Total/NA	Water	SM 2540D	
570-53559-10	LPBMP0003_20210311	Total/NA	Water	SM 2540D	
570-53559-11	LPBMP0004_20210311	Total/NA	Water	SM 2540D	
MB 440-641466/1	Method Blank	Total/NA	Water	SM 2540D	
LCS 440-641466/2	Lab Control Sample	Total/NA	Water	SM 2540D	
440-280513-F-2 DU	Duplicate	Total/NA	Water	SM 2540D	

Geotechnical

Analysis Batch: 138287

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-1	B1BMP0009_20210310	Total/NA	Water	D4464	
570-53559-2	B1BMP0010_20210310	Total/NA	Water	D4464	
570-53559-3	B1BMP0011_20210310	Total/NA	Water	D4464	
570-53559-4	ILBMP0004_20210310	Total/NA	Water	D4464	
570-53559-5	ILBMP0005_20210310	Total/NA	Water	D4464	
570-53559-6	ILBMP0008_20210310	Total/NA	Water	D4464	
570-53559-7	ILBMP0009_20210310	Total/NA	Water	D4464	

Geotechnical (Continued)

Analysis Batch: 138287 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-8	ILBMP0010_20210310	Total/NA	Water	D4464	
570-53559-9	LPBMP0002_20210311	Total/NA	Water	D4464	
570-53559-10	LPBMP0003_20210311	Total/NA	Water	D4464	
570-53559-11	LPBMP0004_20210311	Total/NA	Water	D4464	

Lab Chronicle

Client: Haley & Aldrich, Inc.
Job ID: 570-53559-1
Project/Site: BMP Performace OF 001, 002 and/or 009

Client Sample ID: B1BMP0009_20210310
Lab Sample ID: 570-53559-1
Date Collected: 03/10/21 11:20
Matrix: Water
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			150 mL	150 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	200.2			25 mL	25 mL	641198	03/12/21 15:22	LZY7	TAL IRV
Dissolved	Analysis	200.8		1			641218	03/12/21 16:44	SQ5O	TAL IRV
	Instrument ID: ICPMS5									
Total Recoverable	Prep	200.2			25 mL	25 mL	641185	03/15/21 07:35	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			641364	03/15/21 20:22	SQ5O	TAL IRV
	Instrument ID: ICPMS6									
Dissolved	Filtration	FILTRATION			150 mL	150 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	245.1			20 mL	30 mL	642053	03/23/21 11:09	C0YH	TAL IRV
Dissolved	Analysis	245.1		1			642145	03/23/21 16:28	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Prep	245.1			20 mL	30 mL	642060	03/23/21 11:20	C0YH	TAL IRV
Total/NA	Analysis	245.1		1			642145	03/23/21 16:59	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Analysis	SM 2540D		1	300 mL	1000 mL	641455	03/16/21 15:17	ZL7L	TAL IRV
	Instrument ID: BAL065									
Total/NA	Analysis	D4464		1			138287	03/23/21 14:48	C4LT	ECL 1
	Instrument ID: NOEQUIP									

Client Sample ID: B1BMP0010_20210310
Lab Sample ID: 570-53559-2
Date Collected: 03/10/21 11:25
Matrix: Water
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	200.2			25 mL	25 mL	641198	03/12/21 15:22	LZY7	TAL IRV
Dissolved	Analysis	200.8		1			641218	03/12/21 16:51	SQ5O	TAL IRV
	Instrument ID: ICPMS5									
Total Recoverable	Prep	200.2			25 mL	25 mL	641185	03/15/21 07:35	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			641364	03/15/21 20:28	SQ5O	TAL IRV
	Instrument ID: ICPMS6									
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	245.1			20 mL	30 mL	642053	03/23/21 11:09	C0YH	TAL IRV
Dissolved	Analysis	245.1		1			642145	03/23/21 16:30	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Prep	245.1			20 mL	30 mL	642060	03/23/21 11:20	C0YH	TAL IRV
Total/NA	Analysis	245.1		1			642145	03/23/21 17:05	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Analysis	SM 2540D		1	500 mL	1000 mL	641455	03/16/21 15:17	ZL7L	TAL IRV
	Instrument ID: BAL065									
Total/NA	Analysis	D4464		1			138287	03/23/21 14:56	C4LT	ECL 1
	Instrument ID: NOEQUIP									

Client Sample ID: B1BMP0011_20210310
Lab Sample ID: 570-53559-3

Date Collected: 03/10/21 11:30
Matrix: Water
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	200.2			25 mL	25 mL	641198	03/12/21 15:22	LZY7	TAL IRV
Dissolved	Analysis	200.8		1			641218	03/12/21 16:54	SQ5O	TAL IRV
	Instrument ID: ICPMS5									
Total Recoverable	Prep	200.2			25 mL	25 mL	641185	03/15/21 07:35	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			641364	03/15/21 20:30	SQ5O	TAL IRV
	Instrument ID: ICPMS6									
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	245.1			20 mL	30 mL	642053	03/23/21 11:09	C0YH	TAL IRV
Dissolved	Analysis	245.1		1			642145	03/23/21 16:32	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Prep	245.1			20 mL	30 mL	642060	03/23/21 11:20	C0YH	TAL IRV
Total/NA	Analysis	245.1		1			642145	03/23/21 17:08	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Analysis	SM 2540D		1	750 mL	1000 mL	641455	03/16/21 15:17	ZL7L	TAL IRV
	Instrument ID: BAL065									
Total/NA	Analysis	D4464		1			138287	03/23/21 15:02	C4LT	ECL 1
	Instrument ID: NOEQUIP									

Client Sample ID: ILBMP0004_20210310
Lab Sample ID: 570-53559-4

Date Collected: 03/10/21 11:05
Matrix: Water
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	200.2			25 mL	25 mL	641198	03/12/21 15:22	LZY7	TAL IRV
Dissolved	Analysis	200.8		1			641218	03/12/21 16:56	SQ5O	TAL IRV
	Instrument ID: ICPMS5									
Total Recoverable	Prep	200.2			25 mL	25 mL	641185	03/15/21 07:35	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			641364	03/15/21 20:32	SQ5O	TAL IRV
	Instrument ID: ICPMS6									
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	245.1			20 mL	30 mL	642053	03/23/21 11:09	C0YH	TAL IRV
Dissolved	Analysis	245.1		1			642145	03/23/21 16:34	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Prep	245.1			20 mL	30 mL	642060	03/23/21 11:20	C0YH	TAL IRV
Total/NA	Analysis	245.1		1			642145	03/23/21 17:10	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Analysis	SM 2540D		1	200 mL	1000 mL	641455	03/16/21 15:17	ZL7L	TAL IRV
	Instrument ID: BAL065									
Total/NA	Analysis	D4464		1			138287	03/23/21 15:18	C4LT	ECL 1
	Instrument ID: NOEQUIP									

Client: Haley & Aldrich, Inc.
Job ID: 570-53559-1
Project/Site: BMP Performace OF 001, 002 and/or 009

Client Sample ID: ILBMP0005_20210310
Lab Sample ID: 570-53559-5
Date Collected: 03/10/21 11:10
Matrix: Water
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	200.2			25 mL	25 mL	641198	03/12/21 15:22	LZY7	TAL IRV
Dissolved	Analysis	200.8		1			641218	03/12/21 16:59	SQ5O	TAL IRV
	Instrument ID: ICPMS5									
Total Recoverable	Prep	200.2			25 mL	25 mL	641185	03/15/21 07:35	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			641364	03/15/21 20:34	SQ5O	TAL IRV
	Instrument ID: ICPMS6									
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	245.1			20 mL	30 mL	642053	03/23/21 11:09	C0YH	TAL IRV
Dissolved	Analysis	245.1		1			642145	03/23/21 16:36	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Prep	245.1			20 mL	30 mL	642060	03/23/21 11:20	C0YH	TAL IRV
Total/NA	Analysis	245.1		1			642145	03/23/21 17:16	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Analysis	SM 2540D		1	950 mL	1000 mL	641455	03/16/21 15:17	ZL7L	TAL IRV
	Instrument ID: BAL065									
Total/NA	Analysis	D4464		1			138287	03/23/21 15:24	C4LT	ECL 1
	Instrument ID: NOEQUIP									

Client Sample ID: ILBMP0008_20210310
Lab Sample ID: 570-53559-6
Date Collected: 03/10/21 11:00
Matrix: Water
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	200.2			25 mL	25 mL	641198	03/12/21 15:22	LZY7	TAL IRV
Dissolved	Analysis	200.8		1			641218	03/12/21 17:01	SQ5O	TAL IRV
	Instrument ID: ICPMS5									
Total Recoverable	Prep	200.2			25 mL	25 mL	641185	03/15/21 07:35	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			641364	03/15/21 20:40	SQ5O	TAL IRV
	Instrument ID: ICPMS6									
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	245.1			20 mL	30 mL	642053	03/23/21 11:09	C0YH	TAL IRV
Dissolved	Analysis	245.1		1			642145	03/23/21 16:16	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Prep	245.1			20 mL	30 mL	642060	03/23/21 11:20	C0YH	TAL IRV
Total/NA	Analysis	245.1		1			642145	03/23/21 17:19	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Analysis	SM 2540D		1	100 mL	1000 mL	641455	03/16/21 15:17	ZL7L	TAL IRV
	Instrument ID: BAL065									
Total/NA	Analysis	D4464		1			138287	03/23/21 15:31	C4LT	ECL 1
	Instrument ID: NOEQUIP									

Client: Haley & Aldrich, Inc.
Job ID: 570-53559-1
Project/Site: BMP Performace OF 001, 002 and/or 009

Client Sample ID: ILBMP0009_20210310
Lab Sample ID: 570-53559-7
Date Collected: 03/10/21 10:50
Matrix: Water
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	200.2			25 mL	25 mL	641198	03/12/21 15:22	LZY7	TAL IRV
Dissolved	Analysis	200.8		1			641218	03/12/21 17:08	SQ5O	TAL IRV
	Instrument ID: ICPMS5									
Total Recoverable	Prep	200.2			25 mL	25 mL	641185	03/15/21 07:35	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			641364	03/15/21 20:42	SQ5O	TAL IRV
	Instrument ID: ICPMS6									
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	245.1			20 mL	30 mL	642053	03/23/21 11:09	C0YH	TAL IRV
Dissolved	Analysis	245.1		1			642145	03/23/21 16:39	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Prep	245.1			20 mL	30 mL	642060	03/23/21 11:20	C0YH	TAL IRV
Total/NA	Analysis	245.1		1			642145	03/23/21 17:21	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Analysis	SM 2540D		1	300 mL	1000 mL	641455	03/16/21 15:17	ZL7L	TAL IRV
	Instrument ID: BAL065									
Total/NA	Analysis	D4464		1			138287	03/23/21 15:37	C4LT	ECL 1
	Instrument ID: NOEQUIP									

Client Sample ID: ILBMP0010_20210310
Lab Sample ID: 570-53559-8
Date Collected: 03/10/21 10:55
Matrix: Water
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	200.2			25 mL	25 mL	641198	03/12/21 15:22	LZY7	TAL IRV
Dissolved	Analysis	200.8		1			641218	03/12/21 17:11	SQ5O	TAL IRV
	Instrument ID: ICPMS5									
Total Recoverable	Prep	200.2			25 mL	25 mL	641185	03/15/21 07:35	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			641364	03/15/21 20:44	SQ5O	TAL IRV
	Instrument ID: ICPMS6									
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	245.1			20 mL	30 mL	642053	03/23/21 11:09	C0YH	TAL IRV
Dissolved	Analysis	245.1		1			642145	03/23/21 16:41	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Prep	245.1			20 mL	30 mL	642060	03/23/21 11:20	C0YH	TAL IRV
Total/NA	Analysis	245.1		1			642145	03/23/21 17:23	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Analysis	SM 2540D		1	400 mL	1000 mL	641455	03/16/21 15:17	ZL7L	TAL IRV
	Instrument ID: BAL065									
Total/NA	Analysis	D4464		1			138287	03/23/21 15:45	C4LT	ECL 1
	Instrument ID: NOEQUIP									

Client Sample ID: LPBMP0002_20210311
Lab Sample ID: 570-53559-9

Date Collected: 03/11/21 09:40
Matrix: Water
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	200.2			25 mL	25 mL	641198	03/12/21 15:22	LZY7	TAL IRV
Dissolved	Analysis	200.8		1			641218	03/12/21 17:13	SQ5O	TAL IRV
	Instrument ID: ICPMS5									
Total Recoverable	Prep	200.2			25 mL	25 mL	641185	03/15/21 07:35	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			641364	03/15/21 20:46	SQ5O	TAL IRV
	Instrument ID: ICPMS6									
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	245.1			20 mL	30 mL	642053	03/23/21 11:09	C0YH	TAL IRV
Dissolved	Analysis	245.1		1			642145	03/23/21 16:43	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Prep	245.1			20 mL	30 mL	642060	03/23/21 11:20	C0YH	TAL IRV
Total/NA	Analysis	245.1		1			642145	03/23/21 17:25	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Analysis	SM 2540D		1	500 mL	1000 mL	641466	03/16/21 15:41	ZL7L	TAL IRV
	Instrument ID: BAL065									
Total/NA	Analysis	D4464		1			138287	03/23/21 15:51	C4LT	ECL 1
	Instrument ID: NOEQUIP									

Client Sample ID: LPBMP0003_20210311
Lab Sample ID: 570-53559-10

Date Collected: 03/11/21 09:50
Matrix: Water
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	200.2			25 mL	25 mL	641198	03/12/21 15:22	LZY7	TAL IRV
Dissolved	Analysis	200.8		1			641218	03/12/21 17:15	SQ5O	TAL IRV
	Instrument ID: ICPMS5									
Total Recoverable	Prep	200.2			25 mL	25 mL	641185	03/15/21 07:35	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			641364	03/15/21 20:48	SQ5O	TAL IRV
	Instrument ID: ICPMS6									
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	245.1			20 mL	30 mL	642053	03/23/21 11:09	C0YH	TAL IRV
Dissolved	Analysis	245.1		1			642145	03/23/21 16:50	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Prep	245.1			20 mL	30 mL	642060	03/23/21 11:20	C0YH	TAL IRV
Total/NA	Analysis	245.1		1			642145	03/23/21 17:28	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Analysis	SM 2540D		1	750 mL	1000 mL	641466	03/16/21 15:41	ZL7L	TAL IRV
	Instrument ID: BAL065									
Total/NA	Analysis	D4464		1			138287	03/23/21 15:57	C4LT	ECL 1
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Haley & Aldrich, Inc.
Job ID: 570-53559-1
Project/Site: BMP Performace OF 001, 002 and/or 009

Client Sample ID: LPBMP0004_20210311
Lab Sample ID: 570-53559-11
Date Collected: 03/11/21 10:00
Matrix: Water
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	200.2			25 mL	25 mL	641198	03/12/21 15:22	LZY7	TAL IRV
Dissolved	Analysis	200.8		1			641218	03/12/21 17:18	SQ5O	TAL IRV
	Instrument ID: ICPMS5									
Total Recoverable	Prep	200.2			25 mL	25 mL	641185	03/15/21 07:35	LZY7	TAL IRV
Total Recoverable	Analysis	200.8		1			641364	03/15/21 20:50	SQ5O	TAL IRV
	Instrument ID: ICPMS6									
Dissolved	Filtration	FILTRATION			100 mL	100 mL	641167	03/12/21 11:31	LZY7	TAL IRV
Dissolved	Prep	245.1			20 mL	30 mL	642053	03/23/21 11:09	C0YH	TAL IRV
Dissolved	Analysis	245.1		1			642145	03/23/21 16:52	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Prep	245.1			20 mL	30 mL	642060	03/23/21 11:20	C0YH	TAL IRV
Total/NA	Analysis	245.1		1			642145	03/23/21 17:30	C0YH	TAL IRV
	Instrument ID: CV-HG5									
Total/NA	Analysis	SM 2540D		1	1000 mL	1000 mL	641466	03/16/21 15:41	ZL7L	TAL IRV
	Instrument ID: BAL065									
Total/NA	Analysis	D4464		1			138287	03/23/21 16:37	C4LT	ECL 1
	Instrument ID: NOEQUIP									

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

TAL IRV = Eurofins Calscience Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Accreditation/Certification Summary

Client: Haley & Aldrich, Inc.
Job ID: 570-53559-1
Project/Site: BMP Performace OF 001, 002 and/or 009

Laboratory: Eurofins Calscience LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	Los Angeles County Sanitation Districts	10109	09-30-21
California	SCAQMD LAP	17LA0919	11-30-21
California	State	2944	09-30-21
Guam	State	20-003R	10-31-20 *
Nevada	State	CA00111	07-31-21
Oregon	NELAP	CA300001	01-30-22
USDA	US Federal Programs	P330-20-00034	02-10-23
Washington	State	C916-18	10-11-21

Laboratory: Eurofins Calscience Irvine

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2706	06-30-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Haley & Aldrich, Inc.
Job ID: 570-53559-1
Project/Site: BMP Performace OF 001, 002 and/or 009

Method	Method Description	Protocol	Laboratory
200.8	Metals (ICP/MS)	EPA	TAL IRV
245.1	Mercury (CVAA)	EPA	TAL IRV
SM 2540D	Solids, Total Suspended (TSS)	SM	TAL IRV
D4464	Particle Size Distribution of Catalytic Material (Laser light scattering)	ASTM	ECL 1
200.2	Preparation, Total Recoverable Metals	EPA	TAL IRV
245.1	Preparation, Mercury	EPA	TAL IRV
FILTRATION	Sample Filtration	None	TAL IRV

Protocol References:

ASTM = ASTM International
EPA = US Environmental Protection Agency
None = None
SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494
TAL IRV = Eurofins Calscience Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Sample Summary

Client: Haley & Aldrich, Inc.
Project/Site: BMP Performace OF 001, 002 and/or 009

Job ID: 570-53559-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
570-53559-1	B1BMP0009_20210310	Water	03/10/21 11:20	03/11/21 18:30	
570-53559-2	B1BMP0010_20210310	Water	03/10/21 11:25	03/11/21 18:30	
570-53559-3	B1BMP0011_20210310	Water	03/10/21 11:30	03/11/21 18:30	
570-53559-4	ILBMP0004_20210310	Water	03/10/21 11:05	03/11/21 18:30	
570-53559-5	ILBMP0005_20210310	Water	03/10/21 11:10	03/11/21 18:30	
570-53559-6	ILBMP0008_20210310	Water	03/10/21 11:00	03/11/21 18:30	
570-53559-7	ILBMP0009_20210310	Water	03/10/21 10:50	03/11/21 18:30	
570-53559-8	ILBMP0010_20210310	Water	03/10/21 10:55	03/11/21 18:30	
570-53559-9	LPBMP0002_20210311	Water	03/11/21 09:40	03/11/21 18:30	
570-53559-10	LPBMP0003_20210311	Water	03/11/21 09:50	03/11/21 18:30	
570-53559-11	LPBMP0004_20210311	Water	03/11/21 10:00	03/11/21 18:30	

Irvine
17461 Derian Avenue, Suite 100
Irvine, CA 92614
phone (949) 261-1022 fax (949) 260-3299

Chain of Custody Record for
Haley & Aldrich, Inc. Blanket Service Agreement #2019-22-TestAmerica

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Loc: 570
53559

TestAmerica Laboratories, Inc.

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other

TestAmerica's services under this CoC shall be performed in accordance with the T&Cs within Blanket Service Agreement# 2015-18-TestAmerica by and between Haley & Aldrich, Inc., its subsidiaries and affiliates, and TestAmerica Laboratories Inc.

Client Contact	H&A Project Manager: Katherine Miller	H&A Site Contact: Matt Birney (818) 466-8782	Date: 03/10/2021	COC No:
Haley & Aldrich, Inc.	Tel/Fax: (520) 289-8606	Lab Contact: Urvashi Patel (949) 333-9055	Carrier:	1 of 1 COCs
5333 Mission Center Road, Suite 300	Analysis Turnaround Time			Sampler: M Birney
San Diego, California 92108	☑ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(619) 280-9210 Phone	TAT if different from Below _____			Walk-in Client:
(619) 280-9415 FAX	☑ 2 weeks			Lab Sampling:
H&A Project Number 129095-004 SID 5.2	☐ 1 week			
Site: BMP Performance OF 001, 002, and/or 009 Watershed	☐ 2 days			Job / SDG No.
H&A P O #	☐ 1 day			

Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Method 200.8: Cd, Cu, Pb Method 245.1: Hg (Total Dissolved)	Method 200.8: Cd, Cu, Pb Method 245.1: Hg (Total Recoverable)	Dioxins (Method 1613)	Total Suspended Solids (Method 2540D)	Particle Size Distribution (Method ASTM D422)	Method 200.8: As, Cd, Cu, Fe, Pb Mn, Se, Zn Method 245.1: Hg (Total Dissolved)	Method 200.8: As, Cd, Cu, Fe, Pb Mn, Se, Zn Method 245.1: Hg (Total Recoverable)	SO4, (E300)	Gross Alpha (E900.0) (Total Dissolved)	Gross Alpha (E900.0) (Total Recoverable)	Sample Specific Notes:
									1-250mL P	1-250mL P	2-1L A	1-1L P	1-1L P	1-500mL P	1-500mL P	1-500-mL P	1-1L A	1-1L A	Field Staff Notes: Lab may substitute 250mL Poly for 500mL for metals. Only need to fill half of 500mL. Must fill TSS to the top.
B1BMP0009_20210310	1	3/10/2021	1120	G	WM	6		N	x	x	x	x	x						B-1 Upper Parking Lot; Media Filter· Gunite swale conveying road runoff
B1BMP0010_20210310	2	3/10/2021	1125	G	WM	6		N	x	x	x	x	x						B-1 Upper Parking Lot; Media Filter· Culvert outlet from upper parking lot area
B1BMP0011_20210310	3	3/10/2021	1130	G	WM	6		N	x	x	x	x	x						B-1 Upper Parking Lot; Underdrains
ILBMP0004_20210310	4	3/10/2021	1105	G	WM	6		N	x	x	x	x	x						Upstream, B1436 southern detention bioswale; concrete swale diverting sheet flow into rock crib-west
ILBMP0005_20210310	5	3/10/2021	1110	G	WM	6		N	x	x	x	x	x						Downstream, B1436 southern detention bioswale; 12-inch underdrain
ILBMP0008_20210310	6	3/10/2021	1100	G	WM	6		N	x	x	x	x	x						Upstream, B1436 southern detention bioswale; concrete swale diverting sheet flow into rock crib - east
ILBMP0009_20210310	7	3/10/2021	1050	G	WM	6		N	x	x	x	x	x						Influent, filter basket, administration building area
ILBMP0010_20210310	8	3/10/2021	1055	G	WM	6		N	x	x	x	x	x						Effluent, filter basket, administration building area
LPBMP0002_20210311	9	3/11/2021	0940	G	WM	6		N	x	x	x	x	x						Lower Parking Lot; sample port in cestern discharge pipe
LPBMP0003_20210311	10	3/11/2021	0950	G	WM	6		N	x	x	x	x	x						Lower Parking Lot; Sediment Basin outlet box
LPBMP0004_20210311	11	3/11/2021	1000	G	WM	6		N	x	x	x	x	x						Lower Parking Lot; discharge from Biofilter effluent pipe
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other									1	4	1	1	1	1	4	1	1	1	

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return to Client ☐ Disposal by Lab ☑ Archive for 6 Months

Special Instructions/QC Requirements & Comments:
Please email data to kmiller@haleyaldrich.com and post to Total Access; Bill to Haley & Aldrich at AP@haleyaldrich.com; Report Level II Data Package and provide EDD; All dissolved metal samples are to be filtered within 24 hours of receipt, even those placed on hold.

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No. | Cooler Temp. (°C). Obs'd._____ Corr'd._____ Therm ID No._____

	Company	Date/Time		Company	Date/Time
Relinquished by:	JHA	3/11/21	Received by:	EGS	03/11/21 16:30
Relinquished by:	EGS 18:45	3/11/21	Received by: EGI	EGI	03/11/21 18:45
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-045, Rev. 1.2, dated 1/8/2016

570-53559 Chain of Custody

Eurofins Calscience LLC
7440 Lincoln Way
Garden Grove CA 92841
Phone: 714-895-5494 Fax: 714-894-7501

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Patel, Virendra	Carrier Tracking No(s):	COC No: 570-87390 1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Virendra.Patel@eurofinset.com	State of Origin: California	Page: Page 1 of 2
Company: Eurofins Calscience LLC		Accreditations Required (See note): State Program California		Job #: 570-53559-1
Address: 17461 Derian Ave, Suite 100	Due Date Requested: 3/19/2021			
City: Irvine	TAT Requested (days):			
State, Zip: CA, 92614-5817				
Phone: 949-261 1022(Tel) 949-260-3297(Fax)	PO #:			
Email:	WO #:			
Project Name: BMP Performace OF 001 002 and/or 009	Project #: 44009815			
Site:	SSOW#:			

Analysis Requested

Preservation Codes

A HCL M Hexane
B NaOH N None
C Zn Acetate O AsNaO2
D Nitric Acid P Na2O4S
E NaHSO4 Q Na2SO3
F MeOH R Na2S2O3
G Amchlor S H2SO4
H Ascorbic Acid T TSP Dodecahydrate
Ice U Acetone
J DI Water V MCAA
K EDTA W pH 4-5
L EDA Z other (specify)

Other:

Sample Identification Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water S=solid, O=waste/oil BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	2540D/ Solids, Total Suspended (TSS)	200.8/200.2 Cd,Cu,Pb	200.8/FILTRATION Diss Cd,Cu,Pb	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
B1BMP009_20210310 (570-53559-1)	3/10/21	11.20 Pacific		Water			X	X	X	4	Filter within 24 hours
B1BMP010_20210310 (570-53559-2)	3/10/21	11.25 Pacific		Water			X	X	X	4	Filter within 24 hours
B1BMP011_20210310 (570-53559-3)	3/10/21	11 30 Pacific		Water			X	X	X	4	Filter within 24 hours
ILBMP0004_20210310 (570-53559-4)	3/10/21	11 05 Pacific		Water			X	X	X	4	Filter within 24 hours
ILBMP0005_20210310 (570-53559-5)	3/10/21	11 10 Pacific		Water			X	X	X	4	Filter within 24 hours
ILBMP0008_20210310 (570-53559-6)	3/10/21	11 00 Pacific		Water			X	X	X	4	Filter within 24 hours
ILBMP0009_20210310 (570-53559-7)	3/10/21	10:50 Pacific		Water			X	X	X	4	Filter within 24 hours
ILBMP0010_20210310 (570-53559-8)	3/10/21	10:55 Pacific		Water			X	X	X	4	Filter within 24 hours
LPBMP0002_20210311 (570-53559-9)	3/11/21	09.40 Pacific		Water			X	X	X	4	Filter within 24 hours

Note: Since laboratory accreditations are subject to change, Eurofins Calscience places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Calscience laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Calscience attention immediately If all requested accreditations are current to date return the signed Chain of Custody attesting to said complicance to Eurofins Calscience.

Possible Hazard Identification *Unconfirmed*	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*** ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested I II III IV Other (specify) Primary Deliverable Rank. 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 3/12/21 0914	Company: GL	Received by:	Date/Time: 3-12-21 9 14	Company: EC ITW
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:
Relinquished by:	Date/Time: 3-12-21 10.15	Company: EC ITW	Received by: Olga Oinelas	Date/Time: 3/12/21 1015	Company: EC INV

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks: IR-89 08/05 04/01

Ver: 11/01/2020

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

Chain of Custody Record

eurofins

Client Information (Sub Contract Lab)	Sampler	Lab PM: Patel Virendra	Carrier Tracking No(s):	COC No: 570-87390 2
Client Contact: Shipping/Receiving	Phone:	E-Mail: Virendra.Patel@eurofinset com	State of Origin: California	Page: Page 2 of 2
Company: Eurofins Calscience LLC		Accreditations Required (See note): State Program California		Job #: 570-53559-1
Address: 17461 Derian Ave, Suite 100,	Due Date Requested: 3/19/2021			
City: Irvine	TAT Requested (days):			
State, Zip: CA, 92614-5817				
Phone: 949-261 1022(Tel) 949-260-3297(Fax)	PO #:			
Email:	WO #:			
Project Name: BMP Performace OF 001 002 and/or 009	Project #: 44009815			
Site:	SSOW#:			

Analysis Requested

Preservation Codes

A	HCL	M	Hexane
B	NaOH	N	None
C	Zn Acetate	O	AsNaO2
D	Nitric Acid	P	Na2O4S
E	NaHSO4	Q	Na2SO3
F	MeOH	R	Na2S2O3
G	Amchlor	S	H2SO4
H	Ascorbic Acid	T	TSP Dodecahydrate
I	Ice	U	Acetone
J	DI Water	V	MCAA
K	EDTA	W	pH 4-5
L	EDA	Z	other (specify)

Other:

Sample Identification Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	2540D/ Solids, Total Suspended (TSS)	200.8/200.2 Cd,Cu,Pb	200.8/FILTRATION Diss Cd,Cu,Pb	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
LPBMP0003_20210311 (570-53559-10)	3/11/21	09:50 Pacific		Water			X	X	X	4	Filter within 24 hours
LPBMP0004_20210311 (570-53559-11)	3/11/21	10:00 Pacific		Water			X	X	X	4	Filter within 24 hours

Note: Since laboratory accreditations are subject to change, Eurofins Calscience places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Calscience laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Calscience attention immediately If all requested accreditations are current to date return the signed Chain of Custody attesting to said complicance to Eurofins Calscience

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested I, II III IV Other (specify) Primary Deliverable Rank. 2	Special Instructions/QC Requirements.

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		3/12/21 0914	EC		3 12 21 9.14	EC TJ
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time: 3-12-21 10:15	Company EC TJV	Received by: Olga Cinelos	Date/Time: 3/12/21 1015	Company EC IRV

Custody Seals Intact: Δ Yes Δ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks:

Ver: 11/01/2020

3/25/2021

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 570-53559-1

Login Number: 53559
List Number: 1
Creator: Cruise, Noel

List Source: Eurofins Calscience

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	IDs on containers do not match the COC. Logged in per COC.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 570-53559-1

Login Number: 53559
List Number: 2
Creator: Ornelas, Olga

List Source: Eurofins Irvine
List Creation: 03/12/21 11:17 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Eurofins Calscience LLC
7440 Lincoln Way
Garden Grove, CA 92841
Tel: (714)895-5494

Laboratory Job ID: 570-53559-2
Client Project/Site: BMP Performance OF 001, 002 and/or 009

For:
Haley & Aldrich, Inc.
400 E Van Buren St.
Suite 545
Phoenix, Arizona 85004

Attn: Ms. Katherine Miller

Virendra R Patel

Authorized for release by:
4/6/2021 12:59:26 PM

Virendra Patel, Project Manager I
(714)895-5494
Virendra.Patel@eurofinset.com

Table of Contents

Definitions/Glossary

Client: Haley & Aldrich, Inc. Job ID: 570-53559-2
Project/Site: BMP Performance OF 001, 002 and/or 009

Qualifiers

Dioxin

Qualifier	Qualifier Description
J,DX	Estimated value; value < lowest standard (MQL), but >than MDL
MB	Analyte present in the method blank
q	The reported result is the estimated maximum possible concentration of this analyte, quantitated using the theoretical ion ratio. The measured ion ratio does not meet qualitative identification criteria and indicates a possible interference.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 570-53559-2

Laboratory: Eurofins Calscience LLC

Narrative

Job Narrative
570-53559-2

Comments
No additional comments.

Receipt
The samples were received on 3/11/2021 6:30 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 4 coolers at receipt time were 2.2º C, 2.4º C, 2.6º C and 2.7º C.

Receipt Exceptions

The number of containers for the following samples did not match the information listed on the Chain-of-Custody (COC): B1BMP0009_20210310 (570-53559-1), B1BMP0010_20210310 (570-53559-2), B1BMP0011_20210310 (570-53559-3), ILBMP0004_20210310 (570-53559-4), ILBMP0005_20210310 (570-53559-5), ILBMP0008_20210310 (570-53559-6), ILBMP0009_20210310 (570-53559-7), ILBMP0010_20210310 (570-53559-8), LPBMP0002_20210311 (570-53559-9), LPBMP0003_20210311 (570-53559-10) and LPBMP0004_20210311 (570-53559-11). Received 7 containers, while the COC lists 6 (received 2 containers for dissolved metals-250ml plastic unpreserved).

Dioxin
Method 1613B: The following samples have one or more analytes with a concentration less than the corresponding estimated detection limit (EDL): B1BMP0009_20210310 (570-53559-1), B1BMP0010_20210310 (570-53559-2), B1BMP0011_20210310 (570-53559-3), ILBMP0004_20210310 (570-53559-4), ILBMP0005_20210310 (570-53559-5), ILBMP0008_20210310 (570-53559-6), LPBMP0002_20210311 (570-53559-9) and LPBMP0003_20210311 (570-53559-10). The associated peaks elute at the correct retention time for both characteristic ions and have a signal to noise ratio greater than the method required 2.5:1; therefore, per client request, the detections have been reported.

Method 1613B: EPA Method 1613B specifies a +/- 15 second retention time difference between the recovery standard in the initial calibration (ICAL) and the continuing calibration verification (CCV). The 13C-1,2,3,4-TCDD associated with the following samples run on instrument 11D2 exceeded this criteria: B1BMP0009_20210310 (570-53559-1), B1BMP0010_20210310 (570-53559-2), (CCV 320-477003/2) and (MB 320-472939/1-A). This retention time shift is due to normal and reasonable column maintenance and does not affect the instrument chromatography resolution, sensitivity, or identification of target analytes. System retention times have been updated for proper analyte identification.

Method 1613B: EPA Method 1613B specifies a +/- 15 second retention time difference between the recovery standard in the initial calibration (ICAL) and the continuing calibration verification (CCV). The 13C-1,2,3,4-TCDD associated with the following samples run on instrument 11D2 exceeded this criteria: B1BMP0011_20210310 (570-53559-3), ILBMP0004_20210310 (570-53559-4), ILBMP0005_20210310 (570-53559-5), ILBMP0008_20210310 (570-53559-6), ILBMP0009_20210310 (570-53559-7), ILBMP0010_20210310 (570-53559-8), LPBMP0003_20210311 (570-53559-10), LPBMP0004_20210311 (570-53559-11) and (CCV 320-477005/2). This retention time shift is due to normal and reasonable column maintenance and does not affect the instrument chromatography resolution, sensitivity, or identification of target analytes. System retention times have been updated for proper analyte identification.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Dioxin Prep
Method 1613B: Elevated reporting limits are provided for the following samples due to insufficient sample provided for preparation: B1BMP0009_20210310 (570-53559-1), B1BMP0010_20210310 (570-53559-2), ILBMP0004_20210310 (570-53559-4), ILBMP0005_20210310 (570-53559-5), ILBMP0008_20210310 (570-53559-6), ILBMP0009_20210310 (570-53559-7), ILBMP0010_20210310 (570-53559-8), LPBMP0002_20210311 (570-53559-9), LPBMP0003_20210311 (570-53559-10) and LPBMP0004_20210311 (570-53559-11). Nominal volume required by method is 1 liter.

preparation batch 320-472939
method: 1613B_Sox_Sep_P
matrix: water

Job ID: 570-53559-2 (Continued)

Laboratory: Eurofins Calscience LLC (Continued)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Haley & Aldrich, Inc.
Project/Site: BMP Performance OF 001, 002 and/or 009

Job ID: 570-53559-2

Client Sample ID: B1BMP0009_20210310 — Lab Sample ID: 570-53559-1

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
1,2,3,7,8-PeCDD	0.0000034	J,DX q	0.000057	0.00000096	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDD	0.0000087	J,DX MB	0.000057	0.00000090	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDD	0.0000093	J,DX q	0.000057	0.00000091	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDD	0.000010	J,DX	0.000057	0.00000084	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDF	0.0000035	J,DX q MB	0.000057	0.0000011	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDF	0.0000021	J,DX q MB	0.000057	0.0000010	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDF	0.00000070	J,DX q MB	0.000057	0.00000067	ug/L	1		1613B	Total/NA
2,3,4,6,7,8-HxCDF	0.0000019	J,DX MB	0.000057	0.00000072	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDD	0.00028	MB	0.000057	0.0000034	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDF	0.000076	MB	0.000057	0.0000012	ug/L	1		1613B	Total/NA
1,2,3,4,7,8,9-HpCDF	0.0000040	J,DX q	0.000057	0.0000015	ug/L	1		1613B	Total/NA
OCDD	0.0033	MB	0.00011	0.0000024	ug/L	1		1613B	Total/NA
OCDF	0.00022	MB	0.00011	0.0000013	ug/L	1		1613B	Total/NA
Total TCDD	0.000012	q MB	0.000011	0.00000094	ug/L	1		1613B	Total/NA
Total TCDF	0.0000014	J,DX MB	0.000011	0.00000052	ug/L	1		1613B	Total/NA
Total PeCDD	0.0000066	J,DX q MB	0.000057	0.00000096	ug/L	1		1613B	Total/NA
Total PeCDF	0.0000062	J,DX q	0.000057	0.00000072	ug/L	1		1613B	Total/NA
Total HxCDD	0.000080	q MB	0.000057	0.00000084	ug/L	1		1613B	Total/NA
Total HxCDF	0.000081	q MB	0.000057	0.00000067	ug/L	1		1613B	Total/NA
Total HpCDD	0.00094	MB	0.000057	0.0000034	ug/L	1		1613B	Total/NA
Total HpCDF	0.00024	q MB	0.000057	0.0000012	ug/L	1		1613B	Total/NA

Client Sample ID: B1BMP0010_20210310 — Lab Sample ID: 570-53559-2

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
1,2,3,7,8-PeCDD	0.0000019	J,DX q	0.000054	0.00000094	ug/L	1		1613B	Total/NA
1,2,3,7,8-PeCDF	0.00000064	J,DX q	0.000054	0.00000057	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDD	0.0000061	J,DX MB	0.000054	0.00000098	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDD	0.0000067	J,DX	0.000054	0.0000010	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDD	0.0000061	J,DX q	0.000054	0.00000093	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDF	0.0000016	J,DX MB	0.000054	0.0000010	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDF	0.0000013	J,DX q MB	0.000054	0.00000095	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDF	0.00000086	J,DX MB	0.000054	0.00000062	ug/L	1		1613B	Total/NA
2,3,4,6,7,8-HxCDF	0.0000015	J,DX q MB	0.000054	0.00000068	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDD	0.00019	MB	0.000054	0.0000021	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDF	0.000033	J,DX MB	0.000054	0.00000074	ug/L	1		1613B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Calscience LLC

Client Sample ID: B1BMP0010_20210310 (Continued)
Lab Sample ID: 570-53559-2

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
1,2,3,4,7,8,9-HpCDF	0.0000015	J,DX q	0.000054	0.00000095	ug/L	1		1613B	Total/NA
OCDD	0.0016	MB	0.00011	0.0000017	ug/L	1		1613B	Total/NA
OCDF	0.000061	J,DX MB	0.00011	0.00000090	ug/L	1		1613B	Total/NA
Total TCDD	0.000011	q MB	0.000011	0.00000079	ug/L	1		1613B	Total/NA
Total TCDF	0.00000079	J,DX q MB	0.000011	0.00000038	ug/L	1		1613B	Total/NA
Total PeCDD	0.0000085	J,DX q MB	0.000054	0.00000094	ug/L	1		1613B	Total/NA
Total PeCDF	0.0000019	J,DX q	0.000054	0.00000057	ug/L	1		1613B	Total/NA
Total HxCDD	0.000055	q MB	0.000054	0.00000093	ug/L	1		1613B	Total/NA
Total HxCDF	0.000033	J,DX q MB	0.000054	0.00000062	ug/L	1		1613B	Total/NA
Total HpCDD	0.00047	MB	0.000054	0.0000021	ug/L	1		1613B	Total/NA
Total HpCDF	0.000090	q MB	0.000054	0.00000074	ug/L	1		1613B	Total/NA

Client Sample ID: B1BMP0011_20210310
Lab Sample ID: 570-53559-3

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
1,2,3,7,8-PeCDD	0.0000045	J,DX	0.000051	0.00000057	ug/L	1		1613B	Total/NA
1,2,3,7,8-PeCDF	0.0000022	J,DX	0.000051	0.00000045	ug/L	1		1613B	Total/NA
2,3,4,7,8-PeCDF	0.0000027	J,DX q	0.000051	0.00000048	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDD	0.0000086	J,DX MB	0.000051	0.00000053	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDD	0.0000078	J,DX	0.000051	0.00000054	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDD	0.0000084	J,DX	0.000051	0.00000050	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDF	0.0000062	J,DX MB	0.000051	0.00000065	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDF	0.0000050	J,DX MB	0.000051	0.00000060	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDF	0.0000045	J,DX MB	0.000051	0.00000037	ug/L	1		1613B	Total/NA
2,3,4,6,7,8-HxCDF	0.0000061	J,DX MB	0.000051	0.00000042	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDD	0.00011	MB	0.000051	0.0000013	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDF	0.000034	J,DX MB	0.000051	0.00000054	ug/L	1		1613B	Total/NA
1,2,3,4,7,8,9-HpCDF	0.0000084	J,DX	0.000051	0.00000068	ug/L	1		1613B	Total/NA
OCDD	0.0010	MB	0.00010	0.0000011	ug/L	1		1613B	Total/NA
OCDF	0.000088	J,DX MB	0.00010	0.00000065	ug/L	1		1613B	Total/NA
Total TCDD	0.000011	MB	0.000010	0.00000071	ug/L	1		1613B	Total/NA
Total TCDF	0.00000033	J,DX q MB	0.000010	0.00000029	ug/L	1		1613B	Total/NA
Total PeCDD	0.0000080	J,DX q MB	0.000051	0.00000057	ug/L	1		1613B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: B1BMP0011_20210310 (Continued)
Lab Sample ID: 570-53559-3

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
Total PeCDF	0.0000050	J,DX q	0.000051	0.0000004 5	ug/L	1		1613B	Total/NA
Total HxCDD	0.000043	J,DX q MB	0.000051	0.0000005 0	ug/L	1		1613B	Total/NA
Total HxCDF	0.000042	J,DX q MB	0.000051	0.0000003 7	ug/L	1		1613B	Total/NA
Total HpCDD	0.00029	MB	0.000051	0.0000013	ug/L	1		1613B	Total/NA
Total HpCDF	0.000089	MB	0.000051	0.0000005 4	ug/L	1		1613B	Total/NA

Client Sample ID: ILBMP0004_20210310
Lab Sample ID: 570-53559-4

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
2,3,7,8-TCDD	0.0000016	J,DX q	0.000011	0.0000007 2	ug/L	1		1613B	Total/NA
1,2,3,7,8-PeCDD	0.000012	J,DX	0.000053	0.0000010	ug/L	1		1613B	Total/NA
1,2,3,7,8-PeCDF	0.0000013	J,DX	0.000053	0.0000006 2	ug/L	1		1613B	Total/NA
2,3,4,7,8-PeCDF	0.0000019	J,DX	0.000053	0.0000006 6	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDD	0.000020	J,DX MB	0.000053	0.0000013	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDD	0.000030	J,DX	0.000053	0.0000013	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDD	0.000038	J,DX	0.000053	0.0000012	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDF	0.0000061	J,DX q MB	0.000053	0.0000012	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDF	0.0000031	J,DX MB	0.000053	0.0000011	ug/L	1		1613B	Total/NA
2,3,4,6,7,8-HxCDF	0.0000040	J,DX MB	0.000053	0.0000007 9	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDD	0.00060	MB	0.000053	0.0000056	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDF	0.000057	MB	0.000053	0.0000008 1	ug/L	1		1613B	Total/NA
1,2,3,4,7,8,9-HpCDF	0.0000026	J,DX	0.000053	0.0000011	ug/L	1		1613B	Total/NA
OCDD	0.0089	MB	0.00011	0.0000046	ug/L	1		1613B	Total/NA
OCDF	0.00016	MB	0.00011	0.0000006 0	ug/L	1		1613B	Total/NA
Total TCDD	0.000017	q MB	0.000011	0.0000007 2	ug/L	1		1613B	Total/NA
Total TCDF	0.0000083	J,DX q MB	0.000011	0.0000003 9	ug/L	1		1613B	Total/NA
Total PeCDD	0.000030	J,DX q MB	0.000053	0.0000010	ug/L	1		1613B	Total/NA
Total PeCDF	0.000024	J,DX q	0.000053	0.0000006 2	ug/L	1		1613B	Total/NA
Total HxCDD	0.00021	MB	0.000053	0.0000012	ug/L	1		1613B	Total/NA
Total HxCDF	0.000064	q MB	0.000053	0.0000006 9	ug/L	1		1613B	Total/NA
Total HpCDD	0.0015	MB	0.000053	0.0000056	ug/L	1		1613B	Total/NA
Total HpCDF	0.00013	MB	0.000053	0.0000008 1	ug/L	1		1613B	Total/NA

Client Sample ID: ILBMP0005_20210310
Lab Sample ID: 570-53559-5

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
1,2,3,7,8-PeCDD	0.0000011	J,DX	0.000053	0.0000006 4	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDD	0.0000027	J,DX MB	0.000053	0.0000004 6	ug/L	1		1613B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Haley & Aldrich, Inc.
Project/Site: BMP Performance OF 001, 002 and/or 009

Job ID: 570-53559-2

Client Sample ID: ILBMP0005_20210310 (Continued)

Lab Sample ID: 570-53559-5

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
1,2,3,6,7,8-HxCDD	0.0000028	J,DX q	0.000053	0.00000047	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDD	0.0000025	J,DX	0.000053	0.00000043	ug/L	1		1613B	Total/NA
2,3,4,6,7,8-HxCDF	0.00000074	J,DX q MB	0.000053	0.00000038	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDD	0.000033	J,DX MB	0.000053	0.00000070	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDF	0.0000043	J,DX q MB	0.000053	0.00000040	ug/L	1		1613B	Total/NA
OCDD	0.00013	MB	0.00011	0.00000065	ug/L	1		1613B	Total/NA
OCDF	0.0000057	J,DX MB	0.00011	0.00000051	ug/L	1		1613B	Total/NA
Total TCDD	0.000012	q MB	0.000011	0.00000068	ug/L	1		1613B	Total/NA
Total TCDF	0.00000079	J,DX MB	0.000011	0.00000029	ug/L	1		1613B	Total/NA
Total PeCDD	0.0000030	J,DX q MB	0.000053	0.00000064	ug/L	1		1613B	Total/NA
Total PeCDF	0.00000071	J,DX q	0.000053	0.00000047	ug/L	1		1613B	Total/NA
Total HxCDD	0.000020	J,DX q MB	0.000053	0.00000043	ug/L	1		1613B	Total/NA
Total HxCDF	0.0000062	J,DX q MB	0.000053	0.00000034	ug/L	1		1613B	Total/NA
Total HpCDD	0.000060	MB	0.000053	0.00000070	ug/L	1		1613B	Total/NA
Total HpCDF	0.0000072	J,DX q MB	0.000053	0.00000040	ug/L	1		1613B	Total/NA

Client Sample ID: ILBMP0008_20210310

Lab Sample ID: 570-53559-6

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
1,2,3,7,8-PeCDD	0.0000041	J,DX	0.000053	0.00000080	ug/L	1		1613B	Total/NA
1,2,3,7,8-PeCDF	0.00000087	J,DX q	0.000053	0.00000067	ug/L	1		1613B	Total/NA
2,3,4,7,8-PeCDF	0.0000013	J,DX q	0.000053	0.00000073	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDD	0.0000088	J,DX MB	0.000053	0.00000010	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDD	0.000013	J,DX	0.000053	0.00000010	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDD	0.000014	J,DX	0.000053	0.00000095	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDF	0.000011	J,DX MB	0.000053	0.00000010	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDF	0.0000099	J,DX MB	0.000053	0.00000094	ug/L	1		1613B	Total/NA
2,3,4,6,7,8-HxCDF	0.0000069	J,DX MB	0.000053	0.00000066	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDD	0.00035	MB	0.000053	0.0000034	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDF	0.00021	MB	0.000053	0.0000018	ug/L	1		1613B	Total/NA
1,2,3,4,7,8,9-HpCDF	0.0000073	J,DX	0.000053	0.0000022	ug/L	1		1613B	Total/NA
OCDD	0.0037	MB	0.00011	0.0000028	ug/L	1		1613B	Total/NA
OCDF	0.00032	MB	0.00011	0.00000093	ug/L	1		1613B	Total/NA
Total TCDD	0.000014	MB	0.000011	0.00000072	ug/L	1		1613B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: ILBMP0008_20210310 (Continued)
Lab Sample ID: 570-53559-6

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
Total TCDF	0.0000075	J,DX q MB	0.000011	0.00000040	ug/L	1		1613B	Total/NA
Total PeCDD	0.000018	J,DX q MB	0.000053	0.00000080	ug/L	1		1613B	Total/NA
Total PeCDF	0.000033	J,DX q	0.000053	0.00000067	ug/L	1		1613B	Total/NA
Total HxCDD	0.00012	MB	0.000053	0.00000095	ug/L	1		1613B	Total/NA
Total HxCDF	0.00017	MB	0.000053	0.00000061	ug/L	1		1613B	Total/NA
Total HpCDD	0.00092	MB	0.000053	0.0000034	ug/L	1		1613B	Total/NA
Total HpCDF	0.00036	MB	0.000053	0.0000018	ug/L	1		1613B	Total/NA

Client Sample ID: ILBMP0009_20210310
Lab Sample ID: 570-53559-7

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
2,3,7,8-TCDD	0.0000022	J,DX q	0.000012	0.00000054	ug/L	1		1613B	Total/NA
1,2,3,7,8-PeCDD	0.000011	J,DX	0.000059	0.00000076	ug/L	1		1613B	Total/NA
1,2,3,7,8-PeCDF	0.0000019	J,DX	0.000059	0.00000056	ug/L	1		1613B	Total/NA
2,3,4,7,8-PeCDF	0.0000023	J,DX	0.000059	0.00000063	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDD	0.000022	J,DX MB	0.000059	0.00000088	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDD	0.000044	J,DX	0.000059	0.00000090	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDD	0.000040	J,DX	0.000059	0.00000083	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDF	0.0000075	J,DX MB	0.000059	0.0000014	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDF	0.0000065	J,DX MB	0.000059	0.0000012	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDF	0.0000011	J,DX MB	0.000059	0.00000075	ug/L	1		1613B	Total/NA
2,3,4,6,7,8-HxCDF	0.0000056	J,DX MB	0.000059	0.00000086	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDD	0.0012	MB	0.000059	0.0000091	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDF	0.00016	MB	0.000059	0.0000017	ug/L	1		1613B	Total/NA
1,2,3,4,7,8,9-HpCDF	0.0000049	J,DX q	0.000059	0.0000022	ug/L	1		1613B	Total/NA
OCDD	0.012	MB	0.00012	0.0000053	ug/L	1		1613B	Total/NA
OCDF	0.00029	MB	0.00012	0.00000069	ug/L	1		1613B	Total/NA
Total TCDD	0.000018	q MB	0.000012	0.00000054	ug/L	1		1613B	Total/NA
Total TCDF	0.0000072	J,DX MB	0.000012	0.00000042	ug/L	1		1613B	Total/NA
Total PeCDD	0.000033	J,DX q MB	0.000059	0.00000076	ug/L	1		1613B	Total/NA
Total PeCDF	0.000040	J,DX q	0.000059	0.00000056	ug/L	1		1613B	Total/NA
Total HxCDD	0.00029	q MB	0.000059	0.00000083	ug/L	1		1613B	Total/NA
Total HxCDF	0.00017	q MB	0.000059	0.00000075	ug/L	1		1613B	Total/NA
Total HpCDD	0.0028	MB	0.000059	0.0000091	ug/L	1		1613B	Total/NA
Total HpCDF	0.00034	q MB	0.000059	0.0000017	ug/L	1		1613B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Haley & Aldrich, Inc.
Project/Site: BMP Performance OF 001, 002 and/or 009

Job ID: 570-53559-2

Client Sample ID: ILBMP0010_20210310 — Lab Sample ID: 570-53559-8

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
2,3,7,8-TCDD	0.0000014	J,DX q	0.000011	0.00000042	ug/L	1		1613B	Total/NA
1,2,3,7,8-PeCDD	0.0000087	J,DX	0.000053	0.00000072	ug/L	1		1613B	Total/NA
1,2,3,7,8-PeCDF	0.0000032	J,DX	0.000053	0.00000051	ug/L	1		1613B	Total/NA
2,3,4,7,8-PeCDF	0.0000031	J,DX	0.000053	0.00000055	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDD	0.000013	J,DX MB	0.000053	0.00000064	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDD	0.000023	J,DX	0.000053	0.00000067	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDD	0.000023	J,DX	0.000053	0.00000061	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDF	0.0000072	J,DX MB	0.000053	0.0000010	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDF	0.0000063	J,DX MB	0.000053	0.00000091	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDF	0.0000027	J,DX MB	0.000053	0.00000057	ug/L	1		1613B	Total/NA
2,3,4,6,7,8-HxCDF	0.0000064	J,DX MB	0.000053	0.00000062	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDD	0.00053	MB	0.000053	0.0000044	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDF	0.000095	MB	0.000053	0.0000015	ug/L	1		1613B	Total/NA
1,2,3,4,7,8,9-HpCDF	0.0000053	J,DX q	0.000053	0.0000019	ug/L	1		1613B	Total/NA
OCDD	0.0058	MB	0.00011	0.0000031	ug/L	1		1613B	Total/NA
OCDF	0.00018	MB	0.00011	0.00000076	ug/L	1		1613B	Total/NA
Total TCDD	0.000011	q MB	0.000011	0.00000042	ug/L	1		1613B	Total/NA
Total TCDF	0.0000030	J,DX q MB	0.000011	0.00000028	ug/L	1		1613B	Total/NA
Total PeCDD	0.000018	J,DX q MB	0.000053	0.00000072	ug/L	1		1613B	Total/NA
Total PeCDF	0.000021	J,DX	0.000053	0.00000051	ug/L	1		1613B	Total/NA
Total HxCDD	0.00015	q MB	0.000053	0.00000061	ug/L	1		1613B	Total/NA
Total HxCDF	0.00010	q MB	0.000053	0.00000057	ug/L	1		1613B	Total/NA
Total HpCDD	0.0013	MB	0.000053	0.0000044	ug/L	1		1613B	Total/NA
Total HpCDF	0.00019	q MB	0.000053	0.0000015	ug/L	1		1613B	Total/NA

Client Sample ID: LPBMP0002_20210311 — Lab Sample ID: 570-53559-9

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
1,2,3,7,8-PeCDD	0.0000016	J,DX q	0.000054	0.00000055	ug/L	1		1613B	Total/NA
1,2,3,7,8-PeCDF	0.00000049	J,DX q	0.000054	0.00000040	ug/L	1		1613B	Total/NA
2,3,4,7,8-PeCDF	0.00000072	J,DX	0.000054	0.00000043	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDD	0.0000051	J,DX q MB	0.000054	0.00000054	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDD	0.0000061	J,DX q	0.000054	0.00000056	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDD	0.0000073	J,DX	0.000054	0.00000051	ug/L	1		1613B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Calscience LLC

Detection Summary

Client: Haley & Aldrich, Inc.
Project/Site: BMP Performance OF 001, 002 and/or 009

Job ID: 570-53559-2

Client Sample ID: LPBMP0002_20210311 (Continued)

Lab Sample ID: 570-53559-9

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
1,2,3,4,7,8-HxCDF	0.0000018	J,DX MB	0.000054	0.00000063	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDF	0.0000018	J,DX MB	0.000054	0.00000059	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDF	0.00000051	J,DX q MB	0.000054	0.00000037	ug/L	1		1613B	Total/NA
2,3,4,6,7,8-HxCDF	0.0000020	J,DX MB	0.000054	0.00000041	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDD	0.00017	MB	0.000054	0.0000015	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDF	0.000032	J,DX MB	0.000054	0.0000010	ug/L	1		1613B	Total/NA
OCDD	0.0013	MB	0.00011	0.0000013	ug/L	1		1613B	Total/NA
OCDF	0.000049	J,DX MB	0.00011	0.00000046	ug/L	1		1613B	Total/NA
Total TCDD	0.0000059	J,DX MB	0.000011	0.00000040	ug/L	1		1613B	Total/NA
Total PeCDD	0.0000063	J,DX q MB	0.000054	0.00000055	ug/L	1		1613B	Total/NA
Total PeCDF	0.0000070	J,DX q	0.000054	0.00000040	ug/L	1		1613B	Total/NA
Total HxCDD	0.000055	q MB	0.000054	0.00000051	ug/L	1		1613B	Total/NA
Total HxCDF	0.000034	J,DX q MB	0.000054	0.00000037	ug/L	1		1613B	Total/NA
Total HpCDD	0.00034	MB	0.000054	0.0000015	ug/L	1		1613B	Total/NA
Total HpCDF	0.000059	MB	0.000054	0.0000010	ug/L	1		1613B	Total/NA

Client Sample ID: LPBMP0003_20210311

Lab Sample ID: 570-53559-10

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
1,2,3,7,8-PeCDD	0.0000029	J,DX	0.000053	0.00000085	ug/L	1		1613B	Total/NA
2,3,4,7,8-PeCDF	0.0000011	J,DX	0.000053	0.00000063	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDD	0.0000054	J,DX MB	0.000053	0.00000065	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDD	0.0000071	J,DX	0.000053	0.00000065	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDD	0.0000075	J,DX	0.000053	0.00000060	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDF	0.00000095	J,DX MB	0.000053	0.00000084	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDF	0.0000020	J,DX MB	0.000053	0.00000074	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDF	0.0000014	J,DX MB	0.000053	0.00000046	ug/L	1		1613B	Total/NA
2,3,4,6,7,8-HxCDF	0.0000024	J,DX MB	0.000053	0.00000052	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDD	0.00014	MB	0.000053	0.0000013	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDF	0.000032	J,DX MB	0.000053	0.0000013	ug/L	1		1613B	Total/NA
1,2,3,4,7,8,9-HpCDF	0.0000026	J,DX q	0.000053	0.0000016	ug/L	1		1613B	Total/NA
OCDD	0.0012	MB	0.00011	0.0000015	ug/L	1		1613B	Total/NA
OCDF	0.000047	J,DX MB	0.00011	0.00000066	ug/L	1		1613B	Total/NA
Total TCDD	0.0000078	J,DX q MB	0.000011	0.00000045	ug/L	1		1613B	Total/NA
Total TCDF	0.00000072	J,DX MB	0.000011	0.00000027	ug/L	1		1613B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: LPBMP0003_20210311 (Continued)
Lab Sample ID: 570-53559-10

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
Total PeCDD	0.0000059	J,DX q MB	0.000053	0.00000085	ug/L	1		1613B	Total/NA
Total PeCDF	0.0000070	J,DX q	0.000053	0.00000055	ug/L	1		1613B	Total/NA
Total HxCDD	0.000048	J,DX q MB	0.000053	0.00000060	ug/L	1		1613B	Total/NA
Total HxCDF	0.000031	J,DX q MB	0.000053	0.00000046	ug/L	1		1613B	Total/NA
Total HpCDD	0.00029	MB	0.000053	0.0000013	ug/L	1		1613B	Total/NA
Total HpCDF	0.000057	q MB	0.000053	0.0000013	ug/L	1		1613B	Total/NA

Client Sample ID: LPBMP0004_20210311
Lab Sample ID: 570-53559-11

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
2,3,7,8-TCDD	0.0000013	J,DX q	0.000011	0.00000042	ug/L	1		1613B	Total/NA
1,2,3,7,8-PeCDD	0.0000044	J,DX	0.000054	0.00000063	ug/L	1		1613B	Total/NA
1,2,3,7,8-PeCDF	0.0000038	J,DX	0.000054	0.00000044	ug/L	1		1613B	Total/NA
2,3,4,7,8-PeCDF	0.0000041	J,DX	0.000054	0.00000048	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDD	0.0000058	J,DX q MB	0.000054	0.00000047	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDD	0.0000058	J,DX	0.000054	0.00000047	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDD	0.0000059	J,DX	0.000054	0.00000044	ug/L	1		1613B	Total/NA
1,2,3,4,7,8-HxCDF	0.0000046	J,DX MB	0.000054	0.00000058	ug/L	1		1613B	Total/NA
1,2,3,6,7,8-HxCDF	0.0000042	J,DX q MB	0.000054	0.00000050	ug/L	1		1613B	Total/NA
1,2,3,7,8,9-HxCDF	0.0000045	J,DX MB	0.000054	0.00000032	ug/L	1		1613B	Total/NA
2,3,4,6,7,8-HxCDF	0.0000046	J,DX q MB	0.000054	0.00000037	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDD	0.000029	J,DX MB	0.000054	0.00000058	ug/L	1		1613B	Total/NA
1,2,3,4,6,7,8-HpCDF	0.0000090	J,DX MB	0.000054	0.00000063	ug/L	1		1613B	Total/NA
1,2,3,4,7,8,9-HpCDF	0.0000045	J,DX q	0.000054	0.00000078	ug/L	1		1613B	Total/NA
OCDD	0.00020	MB	0.00011	0.00000075	ug/L	1		1613B	Total/NA
OCDF	0.000022	J,DX MB	0.00011	0.00000062	ug/L	1		1613B	Total/NA
Total TCDD	0.0000078	J,DX q MB	0.000011	0.00000042	ug/L	1		1613B	Total/NA
Total TCDF	0.0000010	J,DX q MB	0.000011	0.00000020	ug/L	1		1613B	Total/NA
Total PeCDD	0.0000078	J,DX q MB	0.000054	0.00000063	ug/L	1		1613B	Total/NA
Total PeCDF	0.0000079	J,DX	0.000054	0.00000044	ug/L	1		1613B	Total/NA
Total HxCDD	0.000025	J,DX q MB	0.000054	0.00000044	ug/L	1		1613B	Total/NA
Total HxCDF	0.000019	J,DX q MB	0.000054	0.00000032	ug/L	1		1613B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: LPBMP0004_20210311 (Continued)
Lab Sample ID: 570-53559-11

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
Total HpCDD	0.000057	MB	0.000054	0.00000058	ug/L	1		1613B	Total/NA
Total HpCDF	0.000017	J,DX q MB	0.000054	0.00000063	ug/L	1		1613B	Total/NA

This Detection Summary does not include radiochemical test results.

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Client Sample ID: B1BMP0009_20210310
Date Collected: 03/10/21 11:20
Date Received: 03/11/21 18:30

Lab Sample ID: 570-53559-1
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.000011	0.00000094	ug/L		03/23/21 05:15	03/25/21 01:08	1
1,2,3,7,8-PeCDD	**0.0000034**	**J,DX q**	0.000057	0.00000096	ug/L		03/23/21 05:15	03/25/21 01:08	1
1,2,3,7,8-PeCDF	ND		0.000057	0.00000072	ug/L		03/23/21 05:15	03/25/21 01:08	1
2,3,4,7,8-PeCDF	ND		0.000057	0.00000077	ug/L		03/23/21 05:15	03/25/21 01:08	1
1,2,3,4,7,8-HxCDD	**0.0000087**	**J,DX MB**	0.000057	0.00000090	ug/L		03/23/21 05:15	03/25/21 01:08	1
1,2,3,6,7,8-HxCDD	**0.0000093**	**J,DX q**	0.000057	0.00000091	ug/L		03/23/21 05:15	03/25/21 01:08	1
1,2,3,7,8,9-HxCDD	**0.000010**	**J,DX**	0.000057	0.00000084	ug/L		03/23/21 05:15	03/25/21 01:08	1
1,2,3,4,7,8-HxCDF	**0.0000035**	**J,DX q MB**	0.000057	0.0000011	ug/L		03/23/21 05:15	03/25/21 01:08	1
1,2,3,6,7,8-HxCDF	**0.0000021**	**J,DX q MB**	0.000057	0.0000010	ug/L		03/23/21 05:15	03/25/21 01:08	1
1,2,3,7,8,9-HxCDF	**0.00000070**	**J,DX q MB**	0.000057	0.00000067	ug/L		03/23/21 05:15	03/25/21 01:08	1
2,3,4,6,7,8-HxCDF	**0.0000019**	**J,DX MB**	0.000057	0.00000072	ug/L		03/23/21 05:15	03/25/21 01:08	1
1,2,3,4,6,7,8-HpCDD	**0.00028**	**MB**	0.000057	0.0000034	ug/L		03/23/21 05:15	03/25/21 01:08	1
1,2,3,4,6,7,8-HpCDF	**0.000076**	**MB**	0.000057	0.0000012	ug/L		03/23/21 05:15	03/25/21 01:08	1
1,2,3,4,7,8,9-HpCDF	**0.0000040**	**J,DX q**	0.000057	0.0000015	ug/L		03/23/21 05:15	03/25/21 01:08	1
OCDD	**0.0033**	**MB**	0.00011	0.0000024	ug/L		03/23/21 05:15	03/25/21 01:08	1
OCDF	**0.00022**	**MB**	0.00011	0.0000013	ug/L		03/23/21 05:15	03/25/21 01:08	1
Total TCDD	**0.000012**	**q MB**	0.000011	0.00000094	ug/L		03/23/21 05:15	03/25/21 01:08	1
Total TCDF	**0.0000014**	**J,DX MB**	0.000011	0.00000052	ug/L		03/23/21 05:15	03/25/21 01:08	1
Total PeCDD	**0.0000066**	**J,DX q MB**	0.000057	0.00000096	ug/L		03/23/21 05:15	03/25/21 01:08	1
Total PeCDF	**0.0000062**	**J,DX q**	0.000057	0.00000072	ug/L		03/23/21 05:15	03/25/21 01:08	1
Total HxCDD	**0.000080**	**q MB**	0.000057	0.00000084	ug/L		03/23/21 05:15	03/25/21 01:08	1
Total HxCDF	**0.000081**	**q MB**	0.000057	0.00000067	ug/L		03/23/21 05:15	03/25/21 01:08	1
Total HpCDD	**0.00094**	**MB**	0.000057	0.0000034	ug/L		03/23/21 05:15	03/25/21 01:08	1
Total HpCDF	**0.00024**	**q MB**	0.000057	0.0000012	ug/L		03/23/21 05:15	03/25/21 01:08	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*62*		*25 - 164*	*03/23/21 05:15*	*03/25/21 01:08*	*1*
13C-2,3,7,8-TCDF	*67*		*24 - 169*	*03/23/21 05:15*	*03/25/21 01:08*	*1*
13C-1,2,3,7,8-PeCDD	*56*		*25 - 181*	*03/23/21 05:15*	*03/25/21 01:08*	*1*
13C-1,2,3,7,8-PeCDF	*62*		*24 - 185*	*03/23/21 05:15*	*03/25/21 01:08*	*1*
13C-2,3,4,7,8-PeCDF	*62*		*21 - 178*	*03/23/21 05:15*	*03/25/21 01:08*	*1*
13C-1,2,3,4,7,8-HxCDD	*58*		*32 - 141*	*03/23/21 05:15*	*03/25/21 01:08*	*1*
13C-1,2,3,6,7,8-HxCDD	*59*		*28 - 130*	*03/23/21 05:15*	*03/25/21 01:08*	*1*
13C-1,2,3,4,7,8-HxCDF	*61*		*26 - 152*	*03/23/21 05:15*	*03/25/21 01:08*	*1*
13C-1,2,3,6,7,8-HxCDF	*63*		*26 - 123*	*03/23/21 05:15*	*03/25/21 01:08*	*1*
13C-1,2,3,7,8,9-HxCDF	*59*		*29 - 147*	*03/23/21 05:15*	*03/25/21 01:08*	*1*
13C-2,3,4,6,7,8-HxCDF	*61*		*28 - 136*	*03/23/21 05:15*	*03/25/21 01:08*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*54*		*23 - 140*	*03/23/21 05:15*	*03/25/21 01:08*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*61*		*28 - 143*	*03/23/21 05:15*	*03/25/21 01:08*	*1*

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Client Sample ID: B1BMP0009_20210310
Date Collected: 03/10/21 11:20
Date Received: 03/11/21 18:30

Lab Sample ID: 570-53559-1
Matrix: Water

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-1,2,3,4,7,8,9-HpCDF	*61*		*26 - 138*	*03/23/21 05:15*	*03/25/21 01:08*	*1*
13C-OCDD	*45*		*17 - 157*	*03/23/21 05:15*	*03/25/21 01:08*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*118*		*35 - 197*	*03/23/21 05:15*	*03/25/21 01:08*	*1*

Client Sample ID: B1BMP0010_20210310
Date Collected: 03/10/21 11:25
Date Received: 03/11/21 18:30

Lab Sample ID: 570-53559-2
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.000011	0.00000079	ug/L		03/23/21 05:15	03/25/21 01:53	1
1,2,3,7,8-PeCDD	**0.0000019**	**J,DX q**	0.000054	0.00000094	ug/L		03/23/21 05:15	03/25/21 01:53	1
1,2,3,7,8-PeCDF	**0.00000064**	**J,DX q**	0.000054	0.00000057	ug/L		03/23/21 05:15	03/25/21 01:53	1
2,3,4,7,8-PeCDF	ND		0.000054	0.00000064	ug/L		03/23/21 05:15	03/25/21 01:53	1
1,2,3,4,7,8-HxCDD	**0.0000061**	**J,DX MB**	0.000054	0.00000098	ug/L		03/23/21 05:15	03/25/21 01:53	1
1,2,3,6,7,8-HxCDD	**0.0000067**	**J,DX**	0.000054	0.0000010	ug/L		03/23/21 05:15	03/25/21 01:53	1
1,2,3,7,8,9-HxCDD	**0.0000061**	**J,DX q**	0.000054	0.00000093	ug/L		03/23/21 05:15	03/25/21 01:53	1
1,2,3,4,7,8-HxCDF	**0.0000016**	**J,DX MB**	0.000054	0.0000010	ug/L		03/23/21 05:15	03/25/21 01:53	1
1,2,3,6,7,8-HxCDF	**0.0000013**	**J,DX q MB**	0.000054	0.00000095	ug/L		03/23/21 05:15	03/25/21 01:53	1
1,2,3,7,8,9-HxCDF	**0.00000086**	**J,DX MB**	0.000054	0.00000062	ug/L		03/23/21 05:15	03/25/21 01:53	1
2,3,4,6,7,8-HxCDF	**0.0000015**	**J,DX q MB**	0.000054	0.00000068	ug/L		03/23/21 05:15	03/25/21 01:53	1
1,2,3,4,6,7,8-HpCDD	**0.00019**	**MB**	0.000054	0.0000021	ug/L		03/23/21 05:15	03/25/21 01:53	1
1,2,3,4,6,7,8-HpCDF	**0.000033**	**J,DX MB**	0.000054	0.00000074	ug/L		03/23/21 05:15	03/25/21 01:53	1
1,2,3,4,7,8,9-HpCDF	**0.0000015**	**J,DX q**	0.000054	0.00000095	ug/L		03/23/21 05:15	03/25/21 01:53	1
OCDD	**0.0016**	**MB**	0.00011	0.0000017	ug/L		03/23/21 05:15	03/25/21 01:53	1
OCDF	**0.000061**	**J,DX MB**	0.00011	0.00000090	ug/L		03/23/21 05:15	03/25/21 01:53	1
Total TCDD	**0.000011**	**q MB**	0.000011	0.00000079	ug/L		03/23/21 05:15	03/25/21 01:53	1
Total TCDF	**0.00000079**	**J,DX q MB**	0.000011	0.00000038	ug/L		03/23/21 05:15	03/25/21 01:53	1
Total PeCDD	**0.0000085**	**J,DX q MB**	0.000054	0.00000094	ug/L		03/23/21 05:15	03/25/21 01:53	1
Total PeCDF	**0.0000019**	**J,DX q**	0.000054	0.00000057	ug/L		03/23/21 05:15	03/25/21 01:53	1
Total HxCDD	**0.000055**	**q MB**	0.000054	0.00000093	ug/L		03/23/21 05:15	03/25/21 01:53	1
Total HxCDF	**0.000033**	**J,DX q MB**	0.000054	0.00000062	ug/L		03/23/21 05:15	03/25/21 01:53	1
Total HpCDD	**0.00047**	**MB**	0.000054	0.0000021	ug/L		03/23/21 05:15	03/25/21 01:53	1
Total HpCDF	**0.000090**	**q MB**	0.000054	0.00000074	ug/L		03/23/21 05:15	03/25/21 01:53	1

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-2,3,7,8-TCDD	65		25 - 164	03/23/21 05:15	03/25/21 01:53	1
13C-2,3,7,8-TCDF	73		24 - 169	03/23/21 05:15	03/25/21 01:53	1
13C-1,2,3,7,8-PeCDD	58		25 - 181	03/23/21 05:15	03/25/21 01:53	1
13C-1,2,3,7,8-PeCDF	65		24 - 185	03/23/21 05:15	03/25/21 01:53	1
13C-2,3,4,7,8-PeCDF	66		21 - 178	03/23/21 05:15	03/25/21 01:53	1
13C-1,2,3,4,7,8-HxCDD	60		32 - 141	03/23/21 05:15	03/25/21 01:53	1
13C-1,2,3,6,7,8-HxCDD	60		28 - 130	03/23/21 05:15	03/25/21 01:53	1
13C-1,2,3,4,7,8-HxCDF	66		26 - 152	03/23/21 05:15	03/25/21 01:53	1
13C-1,2,3,6,7,8-HxCDF	64		26 - 123	03/23/21 05:15	03/25/21 01:53	1
13C-1,2,3,7,8,9-HxCDF	62		29 - 147	03/23/21 05:15	03/25/21 01:53	1
13C-2,3,4,6,7,8-HxCDF	64		28 - 136	03/23/21 05:15	03/25/21 01:53	1
13C-1,2,3,4,6,7,8-HpCDD	57		23 - 140	03/23/21 05:15	03/25/21 01:53	1
13C-1,2,3,4,6,7,8-HpCDF	63		28 - 143	03/23/21 05:15	03/25/21 01:53	1
13C-1,2,3,4,7,8,9-HpCDF	63		26 - 138	03/23/21 05:15	03/25/21 01:53	1
13C-OCDD	44		17 - 157	03/23/21 05:15	03/25/21 01:53	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	114		35 - 197	03/23/21 05:15	03/25/21 01:53	1

Client Sample ID: B1BMP0011_20210310 **Lab Sample ID: 570-53559-3**
Date Collected: 03/10/21 11:30 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.000010	0.00000071	ug/L		03/23/21 05:15	03/25/21 02:38	1
1,2,3,7,8-PeCDD	**0.0000045**	**J,DX**	0.000051	0.00000057	ug/L		03/23/21 05:15	03/25/21 02:38	1
1,2,3,7,8-PeCDF	**0.0000022**	**J,DX**	0.000051	0.00000045	ug/L		03/23/21 05:15	03/25/21 02:38	1
2,3,4,7,8-PeCDF	**0.0000027**	**J,DX q**	0.000051	0.00000048	ug/L		03/23/21 05:15	03/25/21 02:38	1
1,2,3,4,7,8-HxCDD	**0.0000086**	**J,DX MB**	0.000051	0.00000053	ug/L		03/23/21 05:15	03/25/21 02:38	1
1,2,3,6,7,8-HxCDD	**0.0000078**	**J,DX**	0.000051	0.00000054	ug/L		03/23/21 05:15	03/25/21 02:38	1
1,2,3,7,8,9-HxCDD	**0.0000084**	**J,DX**	0.000051	0.00000050	ug/L		03/23/21 05:15	03/25/21 02:38	1
1,2,3,4,7,8-HxCDF	**0.0000062**	**J,DX MB**	0.000051	0.00000065	ug/L		03/23/21 05:15	03/25/21 02:38	1
1,2,3,6,7,8-HxCDF	**0.0000050**	**J,DX MB**	0.000051	0.00000060	ug/L		03/23/21 05:15	03/25/21 02:38	1
1,2,3,7,8,9-HxCDF	**0.0000045**	**J,DX MB**	0.000051	0.00000037	ug/L		03/23/21 05:15	03/25/21 02:38	1
2,3,4,6,7,8-HxCDF	**0.0000061**	**J,DX MB**	0.000051	0.00000042	ug/L		03/23/21 05:15	03/25/21 02:38	1
1,2,3,4,6,7,8-HpCDD	**0.00011**	**MB**	0.000051	0.0000013	ug/L		03/23/21 05:15	03/25/21 02:38	1
1,2,3,4,6,7,8-HpCDF	**0.000034**	**J,DX MB**	0.000051	0.00000054	ug/L		03/23/21 05:15	03/25/21 02:38	1
1,2,3,4,7,8,9-HpCDF	**0.0000084**	**J,DX**	0.000051	0.00000068	ug/L		03/23/21 05:15	03/25/21 02:38	1
OCDD	**0.0010**	**MB**	0.00010	0.0000011	ug/L		03/23/21 05:15	03/25/21 02:38	1
OCDF	**0.000088**	**J,DX MB**	0.00010	0.00000065	ug/L		03/23/21 05:15	03/25/21 02:38	1
Total TCDD	**0.000011**	**MB**	0.000010	0.00000071	ug/L		03/23/21 05:15	03/25/21 02:38	1
Total TCDF	**0.00000033**	**J,DX q MB**	0.000010	0.00000029	ug/L		03/23/21 05:15	03/25/21 02:38	1

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Client Sample ID: B1BMP0011_20210310
Date Collected: 03/10/21 11:30
Date Received: 03/11/21 18:30

Lab Sample ID: 570-53559-3
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
Total PeCDD	0.0000080	J,DX q MB	0.000051	0.00000057	ug/L		03/23/21 05:15	03/25/21 02:38	1
Total PeCDF	0.0000050	J,DX q	0.000051	0.00000045	ug/L		03/23/21 05:15	03/25/21 02:38	1
Total HxCDD	0.000043	J,DX q MB	0.000051	0.00000050	ug/L		03/23/21 05:15	03/25/21 02:38	1
Total HxCDF	0.000042	J,DX q MB	0.000051	0.00000037	ug/L		03/23/21 05:15	03/25/21 02:38	1
Total HpCDD	0.00029	MB	0.000051	0.0000013	ug/L		03/23/21 05:15	03/25/21 02:38	1
Total HpCDF	0.000089	MB	0.000051	0.00000054	ug/L		03/23/21 05:15	03/25/21 02:38	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*75*		*25 - 164*	*03/23/21 05:15*	*03/25/21 02:38*	*1*
13C-2,3,7,8-TCDF	*85*		*24 - 169*	*03/23/21 05:15*	*03/25/21 02:38*	*1*
13C-1,2,3,7,8-PeCDD	*70*		*25 - 181*	*03/23/21 05:15*	*03/25/21 02:38*	*1*
13C-1,2,3,7,8-PeCDF	*77*		*24 - 185*	*03/23/21 05:15*	*03/25/21 02:38*	*1*
13C-2,3,4,7,8-PeCDF	*78*		*21 - 178*	*03/23/21 05:15*	*03/25/21 02:38*	*1*
13C-1,2,3,4,7,8-HxCDD	*73*		*32 - 141*	*03/23/21 05:15*	*03/25/21 02:38*	*1*
13C-1,2,3,6,7,8-HxCDD	*70*		*28 - 130*	*03/23/21 05:15*	*03/25/21 02:38*	*1*
13C-1,2,3,4,7,8-HxCDF	*77*		*26 - 152*	*03/23/21 05:15*	*03/25/21 02:38*	*1*
13C-1,2,3,6,7,8-HxCDF	*76*		*26 - 123*	*03/23/21 05:15*	*03/25/21 02:38*	*1*
13C-1,2,3,7,8,9-HxCDF	*75*		*29 - 147*	*03/23/21 05:15*	*03/25/21 02:38*	*1*
13C-2,3,4,6,7,8-HxCDF	*77*		*28 - 136*	*03/23/21 05:15*	*03/25/21 02:38*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*68*		*23 - 140*	*03/23/21 05:15*	*03/25/21 02:38*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*76*		*28 - 143*	*03/23/21 05:15*	*03/25/21 02:38*	*1*
13C-1,2,3,4,7,8,9-HpCDF	*76*		*26 - 138*	*03/23/21 05:15*	*03/25/21 02:38*	*1*
13C-OCDD	*56*		*17 - 157*	*03/23/21 05:15*	*03/25/21 02:38*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*116*		*35 - 197*	*03/23/21 05:15*	*03/25/21 02:38*	*1*

Client Sample ID: ILBMP0004_20210310
Date Collected: 03/10/21 11:05
Date Received: 03/11/21 18:30

Lab Sample ID: 570-53559-4
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	0.0000016	J,DX q	0.000011	0.00000072	ug/L		03/23/21 05:15	03/25/21 03:23	1
1,2,3,7,8-PeCDD	0.000012	J,DX	0.000053	0.0000010	ug/L		03/23/21 05:15	03/25/21 03:23	1
1,2,3,7,8-PeCDF	0.0000013	J,DX	0.000053	0.00000062	ug/L		03/23/21 05:15	03/25/21 03:23	1
2,3,4,7,8-PeCDF	0.0000019	J,DX	0.000053	0.00000066	ug/L		03/23/21 05:15	03/25/21 03:23	1
1,2,3,4,7,8-HxCDD	0.000020	J,DX MB	0.000053	0.0000013	ug/L		03/23/21 05:15	03/25/21 03:23	1
1,2,3,6,7,8-HxCDD	0.000030	J,DX	0.000053	0.0000013	ug/L		03/23/21 05:15	03/25/21 03:23	1
1,2,3,7,8,9-HxCDD	0.000038	J,DX	0.000053	0.0000012	ug/L		03/23/21 05:15	03/25/21 03:23	1
1,2,3,4,7,8-HxCDF	0.0000061	J,DX q MB	0.000053	0.0000012	ug/L		03/23/21 05:15	03/25/21 03:23	1
1,2,3,6,7,8-HxCDF	0.0000031	J,DX MB	0.000053	0.0000011	ug/L		03/23/21 05:15	03/25/21 03:23	1
1,2,3,7,8,9-HxCDF	ND		0.000053	0.00000069	ug/L		03/23/21 05:15	03/25/21 03:23	1
2,3,4,6,7,8-HxCDF	0.0000040	J,DX MB	0.000053	0.00000079	ug/L		03/23/21 05:15	03/25/21 03:23	1
1,2,3,4,6,7,8-HpCDD	0.00060	MB	0.000053	0.0000056	ug/L		03/23/21 05:15	03/25/21 03:23	1

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Client Sample ID: ILBMP0004_20210310
Date Collected: 03/10/21 11:05
Date Received: 03/11/21 18:30

Lab Sample ID: 570-53559-4
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,3,4,6,7,8-HpCDF	**0.000057**	**MB**	0.000053	0.00000081	ug/L		03/23/21 05:15	03/25/21 03:23	1
1,2,3,4,7,8,9-HpCDF	**0.0000026**	**J,DX**	0.000053	0.0000011	ug/L		03/23/21 05:15	03/25/21 03:23	1
OCDD	**0.0089**	**MB**	0.00011	0.0000046	ug/L		03/23/21 05:15	03/25/21 03:23	1
OCDF	**0.00016**	**MB**	0.00011	0.00000060	ug/L		03/23/21 05:15	03/25/21 03:23	1
Total TCDD	**0.000017**	**q MB**	0.000011	0.00000072	ug/L		03/23/21 05:15	03/25/21 03:23	1
Total TCDF	**0.0000083**	**J,DX q MB**	0.000011	0.00000039	ug/L		03/23/21 05:15	03/25/21 03:23	1
Total PeCDD	**0.000030**	**J,DX q MB**	0.000053	0.0000010	ug/L		03/23/21 05:15	03/25/21 03:23	1
Total PeCDF	**0.000024**	**J,DX q**	0.000053	0.00000062	ug/L		03/23/21 05:15	03/25/21 03:23	1
Total HxCDD	**0.00021**	**MB**	0.000053	0.0000012	ug/L		03/23/21 05:15	03/25/21 03:23	1
Total HxCDF	**0.000064**	**q MB**	0.000053	0.00000069	ug/L		03/23/21 05:15	03/25/21 03:23	1
Total HpCDD	**0.0015**	**MB**	0.000053	0.0000056	ug/L		03/23/21 05:15	03/25/21 03:23	1
Total HpCDF	**0.00013**	**MB**	0.000053	0.00000081	ug/L		03/23/21 05:15	03/25/21 03:23	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*68*		*25 - 164*	*03/23/21 05:15*	*03/25/21 03:23*	*1*
13C-2,3,7,8-TCDF	*73*		*24 - 169*	*03/23/21 05:15*	*03/25/21 03:23*	*1*
13C-1,2,3,7,8-PeCDD	*61*		*25 - 181*	*03/23/21 05:15*	*03/25/21 03:23*	*1*
13C-1,2,3,7,8-PeCDF	*69*		*24 - 185*	*03/23/21 05:15*	*03/25/21 03:23*	*1*
13C-2,3,4,7,8-PeCDF	*70*		*21 - 178*	*03/23/21 05:15*	*03/25/21 03:23*	*1*
13C-1,2,3,4,7,8-HxCDD	*66*		*32 - 141*	*03/23/21 05:15*	*03/25/21 03:23*	*1*
13C-1,2,3,6,7,8-HxCDD	*63*		*28 - 130*	*03/23/21 05:15*	*03/25/21 03:23*	*1*
13C-1,2,3,4,7,8-HxCDF	*70*		*26 - 152*	*03/23/21 05:15*	*03/25/21 03:23*	*1*
13C-1,2,3,6,7,8-HxCDF	*70*		*26 - 123*	*03/23/21 05:15*	*03/25/21 03:23*	*1*
13C-1,2,3,7,8,9-HxCDF	*68*		*29 - 147*	*03/23/21 05:15*	*03/25/21 03:23*	*1*
13C-2,3,4,6,7,8-HxCDF	*69*		*28 - 136*	*03/23/21 05:15*	*03/25/21 03:23*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*63*		*23 - 140*	*03/23/21 05:15*	*03/25/21 03:23*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*70*		*28 - 143*	*03/23/21 05:15*	*03/25/21 03:23*	*1*
13C-1,2,3,4,7,8,9-HpCDF	*71*		*26 - 138*	*03/23/21 05:15*	*03/25/21 03:23*	*1*
13C-OCDD	*54*		*17 - 157*	*03/23/21 05:15*	*03/25/21 03:23*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*113*		*35 - 197*	*03/23/21 05:15*	*03/25/21 03:23*	*1*

Client Sample ID: ILBMP0005_20210310
Date Collected: 03/10/21 11:10
Date Received: 03/11/21 18:30

Lab Sample ID: 570-53559-5
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.000011	0.00000068	ug/L		03/23/21 05:15	03/25/21 04:08	1
1,2,3,7,8-PeCDD	**0.0000011**	**J,DX**	0.000053	0.00000064	ug/L		03/23/21 05:15	03/25/21 04:08	1
1,2,3,7,8-PeCDF	ND		0.000053	0.00000047	ug/L		03/23/21 05:15	03/25/21 04:08	1
2,3,4,7,8-PeCDF	ND		0.000053	0.00000051	ug/L		03/23/21 05:15	03/25/21 04:08	1
1,2,3,4,7,8-HxCDD	**0.0000027**	**J,DX MB**	0.000053	0.00000046	ug/L		03/23/21 05:15	03/25/21 04:08	1

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Client Sample ID: ILBMP0005_20210310
Date Collected: 03/10/21 11:10
Date Received: 03/11/21 18:30

Lab Sample ID: 570-53559-5
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,3,6,7,8-HxCDD	**0.0000028**	**J,DX q**	0.000053	0.00000047	ug/L		03/23/21 05:15	03/25/21 04:08	1
1,2,3,7,8,9-HxCDD	**0.0000025**	**J,DX**	0.000053	0.00000043	ug/L		03/23/21 05:15	03/25/21 04:08	1
1,2,3,4,7,8-HxCDF	ND		0.000053	0.00000058	ug/L		03/23/21 05:15	03/25/21 04:08	1
1,2,3,6,7,8-HxCDF	ND		0.000053	0.00000053	ug/L		03/23/21 05:15	03/25/21 04:08	1
1,2,3,7,8,9-HxCDF	ND		0.000053	0.00000034	ug/L		03/23/21 05:15	03/25/21 04:08	1
2,3,4,6,7,8-HxCDF	**0.00000074**	**J,DX q MB**	0.000053	0.00000038	ug/L		03/23/21 05:15	03/25/21 04:08	1
1,2,3,4,6,7,8-HpCDD	**0.000033**	**J,DX MB**	0.000053	0.00000070	ug/L		03/23/21 05:15	03/25/21 04:08	1
1,2,3,4,6,7,8-HpCDF	**0.0000043**	**J,DX q MB**	0.000053	0.00000040	ug/L		03/23/21 05:15	03/25/21 04:08	1
1,2,3,4,7,8,9-HpCDF	ND		0.000053	0.00000051	ug/L		03/23/21 05:15	03/25/21 04:08	1
OCDD	**0.00013**	**MB**	0.00011	0.00000065	ug/L		03/23/21 05:15	03/25/21 04:08	1
OCDF	**0.0000057**	**J,DX MB**	0.00011	0.00000051	ug/L		03/23/21 05:15	03/25/21 04:08	1
Total TCDD	**0.000012**	**q MB**	0.000011	0.00000068	ug/L		03/23/21 05:15	03/25/21 04:08	1
Total TCDF	**0.00000079**	**J,DX MB**	0.000011	0.00000029	ug/L		03/23/21 05:15	03/25/21 04:08	1
Total PeCDD	**0.0000030**	**J,DX q MB**	0.000053	0.00000064	ug/L		03/23/21 05:15	03/25/21 04:08	1
Total PeCDF	**0.00000071**	**J,DX q**	0.000053	0.00000047	ug/L		03/23/21 05:15	03/25/21 04:08	1
Total HxCDD	**0.000020**	**J,DX q MB**	0.000053	0.00000043	ug/L		03/23/21 05:15	03/25/21 04:08	1
Total HxCDF	**0.0000062**	**J,DX q MB**	0.000053	0.00000034	ug/L		03/23/21 05:15	03/25/21 04:08	1
Total HpCDD	**0.000060**	**MB**	0.000053	0.00000070	ug/L		03/23/21 05:15	03/25/21 04:08	1
Total HpCDF	**0.0000072**	**J,DX q MB**	0.000053	0.00000040	ug/L		03/23/21 05:15	03/25/21 04:08	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*65*		*25 - 164*	*03/23/21 05:15*	*03/25/21 04:08*	*1*
13C-2,3,7,8-TCDF	*71*		*24 - 169*	*03/23/21 05:15*	*03/25/21 04:08*	*1*
13C-1,2,3,7,8-PeCDD	*63*		*25 - 181*	*03/23/21 05:15*	*03/25/21 04:08*	*1*
13C-1,2,3,7,8-PeCDF	*68*		*24 - 185*	*03/23/21 05:15*	*03/25/21 04:08*	*1*
13C-2,3,4,7,8-PeCDF	*70*		*21 - 178*	*03/23/21 05:15*	*03/25/21 04:08*	*1*
13C-1,2,3,4,7,8-HxCDD	*63*		*32 - 141*	*03/23/21 05:15*	*03/25/21 04:08*	*1*
13C-1,2,3,6,7,8-HxCDD	*63*		*28 - 130*	*03/23/21 05:15*	*03/25/21 04:08*	*1*
13C-1,2,3,4,7,8-HxCDF	*69*		*26 - 152*	*03/23/21 05:15*	*03/25/21 04:08*	*1*
13C-1,2,3,6,7,8-HxCDF	*69*		*26 - 123*	*03/23/21 05:15*	*03/25/21 04:08*	*1*
13C-1,2,3,7,8,9-HxCDF	*66*		*29 - 147*	*03/23/21 05:15*	*03/25/21 04:08*	*1*
13C-2,3,4,6,7,8-HxCDF	*68*		*28 - 136*	*03/23/21 05:15*	*03/25/21 04:08*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*61*		*23 - 140*	*03/23/21 05:15*	*03/25/21 04:08*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*67*		*28 - 143*	*03/23/21 05:15*	*03/25/21 04:08*	*1*
13C-1,2,3,4,7,8,9-HpCDF	*68*		*26 - 138*	*03/23/21 05:15*	*03/25/21 04:08*	*1*
13C-OCDD	*50*		*17 - 157*	*03/23/21 05:15*	*03/25/21 04:08*	*1*

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	*120*		*35 - 197*	*03/23/21 05:15*	*03/25/21 04:08*	*1*

Client Sample ID: ILBMP0008_20210310
Date Collected: 03/10/21 11:00
Date Received: 03/11/21 18:30

Lab Sample ID: 570-53559-6
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.000011	0.00000072	ug/L		03/23/21 05:15	03/25/21 04:53	1
1,2,3,7,8-PeCDD	**0.0000041**	**J,DX**	0.000053	0.00000080	ug/L		03/23/21 05:15	03/25/21 04:53	1
1,2,3,7,8-PeCDF	**0.00000087**	**J,DX q**	0.000053	0.00000067	ug/L		03/23/21 05:15	03/25/21 04:53	1
2,3,4,7,8-PeCDF	**0.0000013**	**J,DX q**	0.000053	0.00000073	ug/L		03/23/21 05:15	03/25/21 04:53	1
1,2,3,4,7,8-HxCDD	**0.0000088**	**J,DX MB**	0.000053	0.0000010	ug/L		03/23/21 05:15	03/25/21 04:53	1
1,2,3,6,7,8-HxCDD	**0.000013**	**J,DX**	0.000053	0.0000010	ug/L		03/23/21 05:15	03/25/21 04:53	1
1,2,3,7,8,9-HxCDD	**0.000014**	**J,DX**	0.000053	0.00000095	ug/L		03/23/21 05:15	03/25/21 04:53	1
1,2,3,4,7,8-HxCDF	**0.000011**	**J,DX MB**	0.000053	0.0000010	ug/L		03/23/21 05:15	03/25/21 04:53	1
1,2,3,6,7,8-HxCDF	**0.0000099**	**J,DX MB**	0.000053	0.00000094	ug/L		03/23/21 05:15	03/25/21 04:53	1
1,2,3,7,8,9-HxCDF	ND		0.000053	0.00000061	ug/L		03/23/21 05:15	03/25/21 04:53	1
2,3,4,6,7,8-HxCDF	**0.0000069**	**J,DX MB**	0.000053	0.00000066	ug/L		03/23/21 05:15	03/25/21 04:53	1
1,2,3,4,6,7,8-HpCDD	**0.00035**	**MB**	0.000053	0.0000034	ug/L		03/23/21 05:15	03/25/21 04:53	1
1,2,3,4,6,7,8-HpCDF	**0.00021**	**MB**	0.000053	0.0000018	ug/L		03/23/21 05:15	03/25/21 04:53	1
1,2,3,4,7,8,9-HpCDF	**0.0000073**	**J,DX**	0.000053	0.0000022	ug/L		03/23/21 05:15	03/25/21 04:53	1
OCDD	**0.0037**	**MB**	0.00011	0.0000028	ug/L		03/23/21 05:15	03/25/21 04:53	1
OCDF	**0.00032**	**MB**	0.00011	0.00000093	ug/L		03/23/21 05:15	03/25/21 04:53	1
Total TCDD	**0.000014**	**MB**	0.000011	0.00000072	ug/L		03/23/21 05:15	03/25/21 04:53	1
Total TCDF	**0.0000075**	**J,DX q MB**	0.000011	0.00000040	ug/L		03/23/21 05:15	03/25/21 04:53	1
Total PeCDD	**0.000018**	**J,DX q MB**	0.000053	0.00000080	ug/L		03/23/21 05:15	03/25/21 04:53	1
Total PeCDF	**0.000033**	**J,DX q**	0.000053	0.00000067	ug/L		03/23/21 05:15	03/25/21 04:53	1
Total HxCDD	**0.00012**	**MB**	0.000053	0.00000095	ug/L		03/23/21 05:15	03/25/21 04:53	1
Total HxCDF	**0.00017**	**MB**	0.000053	0.00000061	ug/L		03/23/21 05:15	03/25/21 04:53	1
Total HpCDD	**0.00092**	**MB**	0.000053	0.0000034	ug/L		03/23/21 05:15	03/25/21 04:53	1
Total HpCDF	**0.00036**	**MB**	0.000053	0.0000018	ug/L		03/23/21 05:15	03/25/21 04:53	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-2,3,7,8-TCDD	*62*		*25 - 164*	*03/23/21 05:15*	*03/25/21 04:53*	*1*
13C-2,3,7,8-TCDF	*69*		*24 - 169*	*03/23/21 05:15*	*03/25/21 04:53*	*1*
13C-1,2,3,7,8-PeCDD	*57*		*25 - 181*	*03/23/21 05:15*	*03/25/21 04:53*	*1*
13C-1,2,3,7,8-PeCDF	*64*		*24 - 185*	*03/23/21 05:15*	*03/25/21 04:53*	*1*
13C-2,3,4,7,8-PeCDF	*65*		*21 - 178*	*03/23/21 05:15*	*03/25/21 04:53*	*1*
13C-1,2,3,4,7,8-HxCDD	*58*		*32 - 141*	*03/23/21 05:15*	*03/25/21 04:53*	*1*
13C-1,2,3,6,7,8-HxCDD	*58*		*28 - 130*	*03/23/21 05:15*	*03/25/21 04:53*	*1*
13C-1,2,3,4,7,8-HxCDF	*63*		*26 - 152*	*03/23/21 05:15*	*03/25/21 04:53*	*1*
13C-1,2,3,6,7,8-HxCDF	*64*		*26 - 123*	*03/23/21 05:15*	*03/25/21 04:53*	*1*
13C-1,2,3,7,8,9-HxCDF	*61*		*29 - 147*	*03/23/21 05:15*	*03/25/21 04:53*	*1*

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Client Sample ID: ILBMP0008_20210310
Lab Sample ID: 570-53559-6
Date Collected: 03/10/21 11:00
Matrix: Water
Date Received: 03/11/21 18:30

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-2,3,4,6,7,8-HxCDF	63		28 - 136	03/23/21 05:15	03/25/21 04:53	1
13C-1,2,3,4,6,7,8-HpCDD	55		23 - 140	03/23/21 05:15	03/25/21 04:53	1
13C-1,2,3,4,6,7,8-HpCDF	62		28 - 143	03/23/21 05:15	03/25/21 04:53	1
13C-1,2,3,4,7,8,9-HpCDF	63		26 - 138	03/23/21 05:15	03/25/21 04:53	1
13C-OCDD	46		17 - 157	03/23/21 05:15	03/25/21 04:53	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	118		35 - 197	03/23/21 05:15	03/25/21 04:53	1

Client Sample ID: ILBMP0009_20210310
Lab Sample ID: 570-53559-7
Date Collected: 03/10/21 10:50
Matrix: Water
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	0.0000022	J,DX q	0.000012	0.00000054	ug/L		03/23/21 05:15	03/25/21 09:08	1
1,2,3,7,8-PeCDD	0.000011	J,DX	0.000059	0.00000076	ug/L		03/23/21 05:15	03/25/21 09:08	1
1,2,3,7,8-PeCDF	0.0000019	J,DX	0.000059	0.00000056	ug/L		03/23/21 05:15	03/25/21 09:08	1
2,3,4,7,8-PeCDF	0.0000023	J,DX	0.000059	0.00000063	ug/L		03/23/21 05:15	03/25/21 09:08	1
1,2,3,4,7,8-HxCDD	0.000022	J,DX MB	0.000059	0.00000088	ug/L		03/23/21 05:15	03/25/21 09:08	1
1,2,3,6,7,8-HxCDD	0.000044	J,DX	0.000059	0.00000090	ug/L		03/23/21 05:15	03/25/21 09:08	1
1,2,3,7,8,9-HxCDD	0.000040	J,DX	0.000059	0.00000083	ug/L		03/23/21 05:15	03/25/21 09:08	1
1,2,3,4,7,8-HxCDF	0.0000075	J,DX MB	0.000059	0.0000014	ug/L		03/23/21 05:15	03/25/21 09:08	1
1,2,3,6,7,8-HxCDF	0.0000065	J,DX MB	0.000059	0.0000012	ug/L		03/23/21 05:15	03/25/21 09:08	1
1,2,3,7,8,9-HxCDF	0.0000011	J,DX MB	0.000059	0.00000075	ug/L		03/23/21 05:15	03/25/21 09:08	1
2,3,4,6,7,8-HxCDF	0.0000056	J,DX MB	0.000059	0.00000086	ug/L		03/23/21 05:15	03/25/21 09:08	1
1,2,3,4,6,7,8-HpCDD	0.0012	MB	0.000059	0.0000091	ug/L		03/23/21 05:15	03/25/21 09:08	1
1,2,3,4,6,7,8-HpCDF	0.00016	MB	0.000059	0.0000017	ug/L		03/23/21 05:15	03/25/21 09:08	1
1,2,3,4,7,8,9-HpCDF	0.0000049	J,DX q	0.000059	0.0000022	ug/L		03/23/21 05:15	03/25/21 09:08	1
OCDD	0.012	MB	0.00012	0.0000053	ug/L		03/23/21 05:15	03/25/21 09:08	1
OCDF	0.00029	MB	0.00012	0.00000069	ug/L		03/23/21 05:15	03/25/21 09:08	1
Total TCDD	0.000018	q MB	0.000012	0.00000054	ug/L		03/23/21 05:15	03/25/21 09:08	1
Total TCDF	0.0000072	J,DX MB	0.000012	0.00000042	ug/L		03/23/21 05:15	03/25/21 09:08	1
Total PeCDD	0.000033	J,DX q MB	0.000059	0.00000076	ug/L		03/23/21 05:15	03/25/21 09:08	1
Total PeCDF	0.000040	J,DX q	0.000059	0.00000056	ug/L		03/23/21 05:15	03/25/21 09:08	1
Total HxCDD	0.00029	q MB	0.000059	0.00000083	ug/L		03/23/21 05:15	03/25/21 09:08	1
Total HxCDF	0.00017	q MB	0.000059	0.00000075	ug/L		03/23/21 05:15	03/25/21 09:08	1
Total HpCDD	0.0028	MB	0.000059	0.0000091	ug/L		03/23/21 05:15	03/25/21 09:08	1
Total HpCDF	0.00034	q MB	0.000059	0.0000017	ug/L		03/23/21 05:15	03/25/21 09:08	1

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-2,3,7,8-TCDD	70		25 - 164	03/23/21 05:15	03/25/21 09:08	1
13C-2,3,7,8-TCDF	75		24 - 169	03/23/21 05:15	03/25/21 09:08	1
13C-1,2,3,7,8-PeCDD	64		25 - 181	03/23/21 05:15	03/25/21 09:08	1
13C-1,2,3,7,8-PeCDF	71		24 - 185	03/23/21 05:15	03/25/21 09:08	1
13C-2,3,4,7,8-PeCDF	72		21 - 178	03/23/21 05:15	03/25/21 09:08	1
13C-1,2,3,4,7,8-HxCDD	67		32 - 141	03/23/21 05:15	03/25/21 09:08	1
13C-1,2,3,6,7,8-HxCDD	68		28 - 130	03/23/21 05:15	03/25/21 09:08	1
13C-1,2,3,4,7,8-HxCDF	74		26 - 152	03/23/21 05:15	03/25/21 09:08	1
13C-1,2,3,6,7,8-HxCDF	72		26 - 123	03/23/21 05:15	03/25/21 09:08	1
13C-1,2,3,7,8,9-HxCDF	71		29 - 147	03/23/21 05:15	03/25/21 09:08	1
13C-2,3,4,6,7,8-HxCDF	72		28 - 136	03/23/21 05:15	03/25/21 09:08	1
13C-1,2,3,4,6,7,8-HpCDD	65		23 - 140	03/23/21 05:15	03/25/21 09:08	1
13C-1,2,3,4,6,7,8-HpCDF	72		28 - 143	03/23/21 05:15	03/25/21 09:08	1
13C-1,2,3,4,7,8,9-HpCDF	72		26 - 138	03/23/21 05:15	03/25/21 09:08	1
13C-OCDD	54		17 - 157	03/23/21 05:15	03/25/21 09:08	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	114		35 - 197	03/23/21 05:15	03/25/21 09:08	1

Client Sample ID: ILBMP0010_20210310 **Lab Sample ID: 570-53559-8**
Date Collected: 03/10/21 10:55 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	0.0000014	J,DX q	0.000011	0.00000042	ug/L		03/23/21 05:15	03/25/21 09:53	1
1,2,3,7,8-PeCDD	0.0000087	J,DX	0.000053	0.00000072	ug/L		03/23/21 05:15	03/25/21 09:53	1
1,2,3,7,8-PeCDF	0.0000032	J,DX	0.000053	0.00000051	ug/L		03/23/21 05:15	03/25/21 09:53	1
2,3,4,7,8-PeCDF	0.0000031	J,DX	0.000053	0.00000055	ug/L		03/23/21 05:15	03/25/21 09:53	1
1,2,3,4,7,8-HxCDD	0.000013	J,DX MB	0.000053	0.00000064	ug/L		03/23/21 05:15	03/25/21 09:53	1
1,2,3,6,7,8-HxCDD	0.000023	J,DX	0.000053	0.00000067	ug/L		03/23/21 05:15	03/25/21 09:53	1
1,2,3,7,8,9-HxCDD	0.000023	J,DX	0.000053	0.00000061	ug/L		03/23/21 05:15	03/25/21 09:53	1
1,2,3,4,7,8-HxCDF	0.0000072	J,DX MB	0.000053	0.0000010	ug/L		03/23/21 05:15	03/25/21 09:53	1
1,2,3,6,7,8-HxCDF	0.0000063	J,DX MB	0.000053	0.00000091	ug/L		03/23/21 05:15	03/25/21 09:53	1
1,2,3,7,8,9-HxCDF	0.0000027	J,DX MB	0.000053	0.00000057	ug/L		03/23/21 05:15	03/25/21 09:53	1
2,3,4,6,7,8-HxCDF	0.0000064	J,DX MB	0.000053	0.00000062	ug/L		03/23/21 05:15	03/25/21 09:53	1
1,2,3,4,6,7,8-HpCDD	0.00053	MB	0.000053	0.0000044	ug/L		03/23/21 05:15	03/25/21 09:53	1
1,2,3,4,6,7,8-HpCDF	0.000095	MB	0.000053	0.0000015	ug/L		03/23/21 05:15	03/25/21 09:53	1
1,2,3,4,7,8,9-HpCDF	0.0000053	J,DX q	0.000053	0.0000019	ug/L		03/23/21 05:15	03/25/21 09:53	1
OCDD	0.0058	MB	0.00011	0.0000031	ug/L		03/23/21 05:15	03/25/21 09:53	1
OCDF	0.00018	MB	0.00011	0.00000076	ug/L		03/23/21 05:15	03/25/21 09:53	1
Total TCDD	0.000011	q MB	0.000011	0.00000042	ug/L		03/23/21 05:15	03/25/21 09:53	1
Total TCDF	0.0000030	J,DX q MB	0.000011	0.00000028	ug/L		03/23/21 05:15	03/25/21 09:53	1
Total PeCDD	0.000018	J,DX q MB	0.000053	0.00000072	ug/L		03/23/21 05:15	03/25/21 09:53	1

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Client Sample ID: ILBMP0010_20210310 **Lab Sample ID: 570-53559-8**
Date Collected: 03/10/21 10:55 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
Total PeCDF	**0.000021**	**J,DX**	0.000053	0.00000051	ug/L		03/23/21 05:15	03/25/21 09:53	1
Total HxCDD	**0.00015**	**q MB**	0.000053	0.00000061	ug/L		03/23/21 05:15	03/25/21 09:53	1
Total HxCDF	**0.00010**	**q MB**	0.000053	0.00000057	ug/L		03/23/21 05:15	03/25/21 09:53	1
Total HpCDD	**0.0013**	**MB**	0.000053	0.0000044	ug/L		03/23/21 05:15	03/25/21 09:53	1
Total HpCDF	**0.00019**	**q MB**	0.000053	0.0000015	ug/L		03/23/21 05:15	03/25/21 09:53	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*69*		*25 - 164*	*03/23/21 05:15*	*03/25/21 09:53*	*1*
13C-2,3,7,8-TCDF	*76*		*24 - 169*	*03/23/21 05:15*	*03/25/21 09:53*	*1*
13C-1,2,3,7,8-PeCDD	*63*		*25 - 181*	*03/23/21 05:15*	*03/25/21 09:53*	*1*
13C-1,2,3,7,8-PeCDF	*70*		*24 - 185*	*03/23/21 05:15*	*03/25/21 09:53*	*1*
13C-2,3,4,7,8-PeCDF	*71*		*21 - 178*	*03/23/21 05:15*	*03/25/21 09:53*	*1*
13C-1,2,3,4,7,8-HxCDD	*65*		*32 - 141*	*03/23/21 05:15*	*03/25/21 09:53*	*1*
13C-1,2,3,6,7,8-HxCDD	*64*		*28 - 130*	*03/23/21 05:15*	*03/25/21 09:53*	*1*
13C-1,2,3,4,7,8-HxCDF	*67*		*26 - 152*	*03/23/21 05:15*	*03/25/21 09:53*	*1*
13C-1,2,3,6,7,8-HxCDF	*68*		*26 - 123*	*03/23/21 05:15*	*03/25/21 09:53*	*1*
13C-1,2,3,7,8,9-HxCDF	*66*		*29 - 147*	*03/23/21 05:15*	*03/25/21 09:53*	*1*
13C-2,3,4,6,7,8-HxCDF	*69*		*28 - 136*	*03/23/21 05:15*	*03/25/21 09:53*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*62*		*23 - 140*	*03/23/21 05:15*	*03/25/21 09:53*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*68*		*28 - 143*	*03/23/21 05:15*	*03/25/21 09:53*	*1*
13C-1,2,3,4,7,8,9-HpCDF	*69*		*26 - 138*	*03/23/21 05:15*	*03/25/21 09:53*	*1*
13C-OCDD	*50*		*17 - 157*	*03/23/21 05:15*	*03/25/21 09:53*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*116*		*35 - 197*	*03/23/21 05:15*	*03/25/21 09:53*	*1*

Client Sample ID: LPBMP0002_20210311 **Lab Sample ID: 570-53559-9**
Date Collected: 03/11/21 09:40 **Matrix: Water**
Date Received: 03/11/21 18:30

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.000011	0.00000040	ug/L		03/23/21 05:15	03/25/21 10:38	1
2,3,7,8-TCDF	ND		0.000011	0.00000029	ug/L		03/23/21 05:15	03/25/21 10:38	1
1,2,3,7,8-PeCDD	**0.0000016**	**J,DX q**	0.000054	0.00000055	ug/L		03/23/21 05:15	03/25/21 10:38	1
1,2,3,7,8-PeCDF	**0.00000049**	**J,DX q**	0.000054	0.00000040	ug/L		03/23/21 05:15	03/25/21 10:38	1
2,3,4,7,8-PeCDF	**0.00000072**	**J,DX**	0.000054	0.00000043	ug/L		03/23/21 05:15	03/25/21 10:38	1
1,2,3,4,7,8-HxCDD	**0.0000051**	**J,DX q MB**	0.000054	0.00000054	ug/L		03/23/21 05:15	03/25/21 10:38	1
1,2,3,6,7,8-HxCDD	**0.0000061**	**J,DX q**	0.000054	0.00000056	ug/L		03/23/21 05:15	03/25/21 10:38	1
1,2,3,7,8,9-HxCDD	**0.0000073**	**J,DX**	0.000054	0.00000051	ug/L		03/23/21 05:15	03/25/21 10:38	1
1,2,3,4,7,8-HxCDF	**0.0000018**	**J,DX MB**	0.000054	0.00000063	ug/L		03/23/21 05:15	03/25/21 10:38	1
1,2,3,6,7,8-HxCDF	**0.0000018**	**J,DX MB**	0.000054	0.00000059	ug/L		03/23/21 05:15	03/25/21 10:38	1

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Client Sample ID: LPBMP0002_20210311
Date Collected: 03/11/21 09:40
Date Received: 03/11/21 18:30

Lab Sample ID: 570-53559-9
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,3,7,8,9-HxCDF	**0.00000051**	**J,DX q MB**	0.000054	0.00000037	ug/L		03/23/21 05:15	03/25/21 10:38	1
2,3,4,6,7,8-HxCDF	**0.0000020**	**J,DX MB**	0.000054	0.00000041	ug/L		03/23/21 05:15	03/25/21 10:38	1
1,2,3,4,6,7,8-HpCDD	**0.00017**	**MB**	0.000054	0.0000015	ug/L		03/23/21 05:15	03/25/21 10:38	1
1,2,3,4,6,7,8-HpCDF	**0.000032**	**J,DX MB**	0.000054	0.0000010	ug/L		03/23/21 05:15	03/25/21 10:38	1
1,2,3,4,7,8,9-HpCDF	ND		0.000054	0.0000013	ug/L		03/23/21 05:15	03/25/21 10:38	1
OCDD	**0.0013**	**MB**	0.00011	0.0000013	ug/L		03/23/21 05:15	03/25/21 10:38	1
OCDF	**0.000049**	**J,DX MB**	0.00011	0.00000046	ug/L		03/23/21 05:15	03/25/21 10:38	1
Total TCDD	**0.0000059**	**J,DX MB**	0.000011	0.00000040	ug/L		03/23/21 05:15	03/25/21 10:38	1
Total TCDF	ND		0.000011	0.00000029	ug/L		03/23/21 05:15	03/25/21 10:38	1
Total PeCDD	**0.0000063**	**J,DX q MB**	0.000054	0.00000055	ug/L		03/23/21 05:15	03/25/21 10:38	1
Total PeCDF	**0.0000070**	**J,DX q**	0.000054	0.00000040	ug/L		03/23/21 05:15	03/25/21 10:38	1
Total HxCDD	**0.000055**	**q MB**	0.000054	0.00000051	ug/L		03/23/21 05:15	03/25/21 10:38	1
Total HxCDF	**0.000034**	**J,DX q MB**	0.000054	0.00000037	ug/L		03/23/21 05:15	03/25/21 10:38	1
Total HpCDD	**0.00034**	**MB**	0.000054	0.0000015	ug/L		03/23/21 05:15	03/25/21 10:38	1
Total HpCDF	**0.000059**	**MB**	0.000054	0.0000010	ug/L		03/23/21 05:15	03/25/21 10:38	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*70*		*25 - 164*	*03/23/21 05:15*	*03/25/21 10:38*	*1*
13C-2,3,7,8-TCDF	*78*		*24 - 169*	*03/23/21 05:15*	*03/25/21 10:38*	*1*
13C-1,2,3,7,8-PeCDD	*65*		*25 - 181*	*03/23/21 05:15*	*03/25/21 10:38*	*1*
13C-1,2,3,7,8-PeCDF	*73*		*24 - 185*	*03/23/21 05:15*	*03/25/21 10:38*	*1*
13C-2,3,4,7,8-PeCDF	*74*		*21 - 178*	*03/23/21 05:15*	*03/25/21 10:38*	*1*
13C-1,2,3,4,7,8-HxCDD	*69*		*32 - 141*	*03/23/21 05:15*	*03/25/21 10:38*	*1*
13C-1,2,3,6,7,8-HxCDD	*66*		*28 - 130*	*03/23/21 05:15*	*03/25/21 10:38*	*1*
13C-1,2,3,4,7,8-HxCDF	*74*		*26 - 152*	*03/23/21 05:15*	*03/25/21 10:38*	*1*
13C-1,2,3,6,7,8-HxCDF	*73*		*26 - 123*	*03/23/21 05:15*	*03/25/21 10:38*	*1*
13C-1,2,3,7,8,9-HxCDF	*71*		*29 - 147*	*03/23/21 05:15*	*03/25/21 10:38*	*1*
13C-2,3,4,6,7,8-HxCDF	*73*		*28 - 136*	*03/23/21 05:15*	*03/25/21 10:38*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*65*		*23 - 140*	*03/23/21 05:15*	*03/25/21 10:38*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*71*		*28 - 143*	*03/23/21 05:15*	*03/25/21 10:38*	*1*
13C-1,2,3,4,7,8,9-HpCDF	*73*		*26 - 138*	*03/23/21 05:15*	*03/25/21 10:38*	*1*
13C-OCDD	*54*		*17 - 157*	*03/23/21 05:15*	*03/25/21 10:38*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*119*		*35 - 197*	*03/23/21 05:15*	*03/25/21 10:38*	*1*

Client Sample ID: LPBMP0003_20210311
Date Collected: 03/11/21 09:50
Date Received: 03/11/21 18:30

Lab Sample ID: 570-53559-10
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.000011	0.00000045	ug/L		03/23/21 05:15	03/25/21 11:23	1
1,2,3,7,8-PeCDD	**0.0000029**	**J,DX**	0.000053	0.00000085	ug/L		03/23/21 05:15	03/25/21 11:23	1

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Client Sample ID: LPBMP0003_20210311
Date Collected: 03/11/21 09:50
Date Received: 03/11/21 18:30

Lab Sample ID: 570-53559-10
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,3,7,8-PeCDF	ND		0.000053	0.00000055	ug/L		03/23/21 05:15	03/25/21 11:23	1
2,3,4,7,8-PeCDF	**0.0000011**	**J,DX**	0.000053	0.00000063	ug/L		03/23/21 05:15	03/25/21 11:23	1
1,2,3,4,7,8-HxCDD	**0.0000054**	**J,DX MB**	0.000053	0.00000065	ug/L		03/23/21 05:15	03/25/21 11:23	1
1,2,3,6,7,8-HxCDD	**0.0000071**	**J,DX**	0.000053	0.00000065	ug/L		03/23/21 05:15	03/25/21 11:23	1
1,2,3,7,8,9-HxCDD	**0.0000075**	**J,DX**	0.000053	0.00000060	ug/L		03/23/21 05:15	03/25/21 11:23	1
1,2,3,4,7,8-HxCDF	**0.00000095**	**J,DX MB**	0.000053	0.00000084	ug/L		03/23/21 05:15	03/25/21 11:23	1
1,2,3,6,7,8-HxCDF	**0.0000020**	**J,DX MB**	0.000053	0.00000074	ug/L		03/23/21 05:15	03/25/21 11:23	1
1,2,3,7,8,9-HxCDF	**0.0000014**	**J,DX MB**	0.000053	0.00000046	ug/L		03/23/21 05:15	03/25/21 11:23	1
2,3,4,6,7,8-HxCDF	**0.0000024**	**J,DX MB**	0.000053	0.00000052	ug/L		03/23/21 05:15	03/25/21 11:23	1
1,2,3,4,6,7,8-HpCDD	**0.00014**	**MB**	0.000053	0.0000013	ug/L		03/23/21 05:15	03/25/21 11:23	1
1,2,3,4,6,7,8-HpCDF	**0.000032**	**J,DX MB**	0.000053	0.0000013	ug/L		03/23/21 05:15	03/25/21 11:23	1
1,2,3,4,7,8,9-HpCDF	**0.0000026**	**J,DX q**	0.000053	0.0000016	ug/L		03/23/21 05:15	03/25/21 11:23	1
OCDD	**0.0012**	**MB**	0.00011	0.0000015	ug/L		03/23/21 05:15	03/25/21 11:23	1
OCDF	**0.000047**	**J,DX MB**	0.00011	0.00000066	ug/L		03/23/21 05:15	03/25/21 11:23	1
Total TCDD	**0.0000078**	**J,DX q MB**	0.000011	0.00000045	ug/L		03/23/21 05:15	03/25/21 11:23	1
Total TCDF	**0.00000072**	**J,DX MB**	0.000011	0.00000027	ug/L		03/23/21 05:15	03/25/21 11:23	1
Total PeCDD	**0.0000059**	**J,DX q MB**	0.000053	0.00000085	ug/L		03/23/21 05:15	03/25/21 11:23	1
Total PeCDF	**0.0000070**	**J,DX q**	0.000053	0.00000055	ug/L		03/23/21 05:15	03/25/21 11:23	1
Total HxCDD	**0.000048**	**J,DX q MB**	0.000053	0.00000060	ug/L		03/23/21 05:15	03/25/21 11:23	1
Total HxCDF	**0.000031**	**J,DX q MB**	0.000053	0.00000046	ug/L		03/23/21 05:15	03/25/21 11:23	1
Total HpCDD	**0.00029**	**MB**	0.000053	0.0000013	ug/L		03/23/21 05:15	03/25/21 11:23	1
Total HpCDF	**0.000057**	**q MB**	0.000053	0.0000013	ug/L		03/23/21 05:15	03/25/21 11:23	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*59*		*25 - 164*	*03/23/21 05:15*	*03/25/21 11:23*	*1*
13C-2,3,7,8-TCDF	*64*		*24 - 169*	*03/23/21 05:15*	*03/25/21 11:23*	*1*
13C-1,2,3,7,8-PeCDD	*53*		*25 - 181*	*03/23/21 05:15*	*03/25/21 11:23*	*1*
13C-1,2,3,7,8-PeCDF	*59*		*24 - 185*	*03/23/21 05:15*	*03/25/21 11:23*	*1*
13C-2,3,4,7,8-PeCDF	*59*		*21 - 178*	*03/23/21 05:15*	*03/25/21 11:23*	*1*
13C-1,2,3,4,7,8-HxCDD	*55*		*32 - 141*	*03/23/21 05:15*	*03/25/21 11:23*	*1*
13C-1,2,3,6,7,8-HxCDD	*53*		*28 - 130*	*03/23/21 05:15*	*03/25/21 11:23*	*1*
13C-1,2,3,4,7,8-HxCDF	*58*		*26 - 152*	*03/23/21 05:15*	*03/25/21 11:23*	*1*
13C-1,2,3,6,7,8-HxCDF	*58*		*26 - 123*	*03/23/21 05:15*	*03/25/21 11:23*	*1*
13C-1,2,3,7,8,9-HxCDF	*57*		*29 - 147*	*03/23/21 05:15*	*03/25/21 11:23*	*1*
13C-2,3,4,6,7,8-HxCDF	*58*		*28 - 136*	*03/23/21 05:15*	*03/25/21 11:23*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*51*		*23 - 140*	*03/23/21 05:15*	*03/25/21 11:23*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*57*		*28 - 143*	*03/23/21 05:15*	*03/25/21 11:23*	*1*
13C-1,2,3,4,7,8,9-HpCDF	*57*		*26 - 138*	*03/23/21 05:15*	*03/25/21 11:23*	*1*

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Client Sample ID: LPBMP0003_20210311
Date Collected: 03/11/21 09:50
Date Received: 03/11/21 18:30

Lab Sample ID: 570-53559-10
Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-OCDD	39		17 - 157	03/23/21 05:15	03/25/21 11:23	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	118		35 - 197	03/23/21 05:15	03/25/21 11:23	1

Client Sample ID: LPBMP0004_20210311
Date Collected: 03/11/21 10:00
Date Received: 03/11/21 18:30

Lab Sample ID: 570-53559-11
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	0.0000013	J,DX q	0.000011	0.00000042	ug/L		03/23/21 05:15	03/25/21 12:08	1
1,2,3,7,8-PeCDD	0.0000044	J,DX	0.000054	0.00000063	ug/L		03/23/21 05:15	03/25/21 12:08	1
1,2,3,7,8-PeCDF	0.0000038	J,DX	0.000054	0.00000044	ug/L		03/23/21 05:15	03/25/21 12:08	1
2,3,4,7,8-PeCDF	0.0000041	J,DX	0.000054	0.00000048	ug/L		03/23/21 05:15	03/25/21 12:08	1
1,2,3,4,7,8-HxCDD	0.0000058	J,DX q MB	0.000054	0.00000047	ug/L		03/23/21 05:15	03/25/21 12:08	1
1,2,3,6,7,8-HxCDD	0.0000058	J,DX	0.000054	0.00000047	ug/L		03/23/21 05:15	03/25/21 12:08	1
1,2,3,7,8,9-HxCDD	0.0000059	J,DX	0.000054	0.00000044	ug/L		03/23/21 05:15	03/25/21 12:08	1
1,2,3,4,7,8-HxCDF	0.0000046	J,DX MB	0.000054	0.00000058	ug/L		03/23/21 05:15	03/25/21 12:08	1
1,2,3,6,7,8-HxCDF	0.0000042	J,DX q MB	0.000054	0.00000050	ug/L		03/23/21 05:15	03/25/21 12:08	1
1,2,3,7,8,9-HxCDF	0.0000045	J,DX MB	0.000054	0.00000032	ug/L		03/23/21 05:15	03/25/21 12:08	1
2,3,4,6,7,8-HxCDF	0.0000046	J,DX q MB	0.000054	0.00000037	ug/L		03/23/21 05:15	03/25/21 12:08	1
1,2,3,4,6,7,8-HpCDD	0.000029	J,DX MB	0.000054	0.00000058	ug/L		03/23/21 05:15	03/25/21 12:08	1
1,2,3,4,6,7,8-HpCDF	0.0000090	J,DX MB	0.000054	0.00000063	ug/L		03/23/21 05:15	03/25/21 12:08	1
1,2,3,4,7,8,9-HpCDF	0.0000045	J,DX q	0.000054	0.00000078	ug/L		03/23/21 05:15	03/25/21 12:08	1
OCDD	0.00020	MB	0.00011	0.00000075	ug/L		03/23/21 05:15	03/25/21 12:08	1
OCDF	0.000022	J,DX MB	0.00011	0.00000062	ug/L		03/23/21 05:15	03/25/21 12:08	1
Total TCDD	0.0000078	J,DX q MB	0.000011	0.00000042	ug/L		03/23/21 05:15	03/25/21 12:08	1
Total TCDF	0.0000010	J,DX q MB	0.000011	0.00000020	ug/L		03/23/21 05:15	03/25/21 12:08	1
Total PeCDD	0.0000078	J,DX q MB	0.000054	0.00000063	ug/L		03/23/21 05:15	03/25/21 12:08	1
Total PeCDF	0.0000079	J,DX	0.000054	0.00000044	ug/L		03/23/21 05:15	03/25/21 12:08	1
Total HxCDD	0.000025	J,DX q MB	0.000054	0.00000044	ug/L		03/23/21 05:15	03/25/21 12:08	1
Total HxCDF	0.000019	J,DX q MB	0.000054	0.00000032	ug/L		03/23/21 05:15	03/25/21 12:08	1
Total HpCDD	0.000057	MB	0.000054	0.00000058	ug/L		03/23/21 05:15	03/25/21 12:08	1

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Client Sample ID: LPBMP0004_20210311
Date Collected: 03/11/21 10:00
Date Received: 03/11/21 18:30

Lab Sample ID: 570-53559-11
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
Total HpCDF	0.000017	J,DX q MB	0.000054	0.00000063	ug/L		03/23/21 05:15	03/25/21 12:08	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*69*		*25 - 164*	*03/23/21 05:15*	*03/25/21 12:08*	*1*
13C-2,3,7,8-TCDF	*76*		*24 - 169*	*03/23/21 05:15*	*03/25/21 12:08*	*1*
13C-1,2,3,7,8-PeCDD	*61*		*25 - 181*	*03/23/21 05:15*	*03/25/21 12:08*	*1*
13C-1,2,3,7,8-PeCDF	*70*		*24 - 185*	*03/23/21 05:15*	*03/25/21 12:08*	*1*
13C-2,3,4,7,8-PeCDF	*70*		*21 - 178*	*03/23/21 05:15*	*03/25/21 12:08*	*1*
13C-1,2,3,4,7,8-HxCDD	*65*		*32 - 141*	*03/23/21 05:15*	*03/25/21 12:08*	*1*
13C-1,2,3,6,7,8-HxCDD	*62*		*28 - 130*	*03/23/21 05:15*	*03/25/21 12:08*	*1*
13C-1,2,3,4,7,8-HxCDF	*68*		*26 - 152*	*03/23/21 05:15*	*03/25/21 12:08*	*1*
13C-1,2,3,6,7,8-HxCDF	*68*		*26 - 123*	*03/23/21 05:15*	*03/25/21 12:08*	*1*
13C-1,2,3,7,8,9-HxCDF	*66*		*29 - 147*	*03/23/21 05:15*	*03/25/21 12:08*	*1*
13C-2,3,4,6,7,8-HxCDF	*67*		*28 - 136*	*03/23/21 05:15*	*03/25/21 12:08*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*58*		*23 - 140*	*03/23/21 05:15*	*03/25/21 12:08*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*64*		*28 - 143*	*03/23/21 05:15*	*03/25/21 12:08*	*1*
13C-1,2,3,4,7,8,9-HpCDF	*65*		*26 - 138*	*03/23/21 05:15*	*03/25/21 12:08*	*1*
13C-OCDD	*43*		*17 - 157*	*03/23/21 05:15*	*03/25/21 12:08*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*118*		*35 - 197*	*03/23/21 05:15*	*03/25/21 12:08*	*1*

Method: 1613B - Dioxins and Furans (HRGC/HRMS) - RA

Client Sample ID: B1BMP0009_20210310
Date Collected: 03/10/21 11:20
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-1
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDF	ND		0.000011	0.0000027	ug/L		03/23/21 05:15	04/05/21 12:40	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDF	*67*		*24 - 169*	*03/23/21 05:15*	*04/05/21 12:40*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*124*		*35 - 197*	*03/23/21 05:15*	*04/05/21 12:40*	*1*

Client Sample ID: B1BMP0010_20210310
Date Collected: 03/10/21 11:25
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-2
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDF	ND		0.000011	0.0000022	ug/L		03/23/21 05:15	04/05/21 13:19	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDF	*69*		*24 - 169*	*03/23/21 05:15*	*04/05/21 13:19*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*101*		*35 - 197*	*03/23/21 05:15*	*04/05/21 13:19*	*1*

Client Sample ID: B1BMP0011_20210310
Date Collected: 03/10/21 11:30
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-3
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDF	ND		0.000010	0.0000014	ug/L		03/23/21 05:15	04/05/21 21:15	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDF	*90*		*24 - 169*	*03/23/21 05:15*	*04/05/21 21:15*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*114*		*35 - 197*	*03/23/21 05:15*	*04/05/21 21:15*	*1*

Client Sample ID: ILBMP0004_20210310
Date Collected: 03/10/21 11:05
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-4
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDF	ND		0.000011	0.0000022	ug/L		03/23/21 05:15	04/05/21 21:53	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDF	*75*		*24 - 169*	*03/23/21 05:15*	*04/05/21 21:53*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*109*		*35 - 197*	*03/23/21 05:15*	*04/05/21 21:53*	*1*

Client Sample ID: ILBMP0005_20210310
Date Collected: 03/10/21 11:10
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-5
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDF	ND		0.000011	0.0000025	ug/L		03/23/21 05:15	04/05/21 22:32	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDF	*73*		*24 - 169*	*03/23/21 05:15*	*04/05/21 22:32*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*115*		*35 - 197*	*03/23/21 05:15*	*04/05/21 22:32*	*1*

Method: 1613B - Dioxins and Furans (HRGC/HRMS) - RA

Client Sample ID: ILBMP0008_20210310
Date Collected: 03/10/21 11:00
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-6
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDF	ND		0.000011	0.0000032	ug/L		03/23/21 05:15	04/05/21 23:10	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDF	*66*		*24 - 169*	*03/23/21 05:15*	*04/05/21 23:10*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*110*		*35 - 197*	*03/23/21 05:15*	*04/05/21 23:10*	*1*

Client Sample ID: ILBMP0009_20210310
Date Collected: 03/10/21 10:50
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-7
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDF	ND		0.000012	0.0000025	ug/L		03/23/21 05:15	04/05/21 23:48	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDF	*78*		*24 - 169*	*03/23/21 05:15*	*04/05/21 23:48*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*118*		*35 - 197*	*03/23/21 05:15*	*04/05/21 23:48*	*1*

Client Sample ID: ILBMP0010_20210310
Date Collected: 03/10/21 10:55
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-8
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDF	ND		0.000011	0.0000023	ug/L		03/23/21 05:15	04/06/21 00:27	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDF	*76*		*24 - 169*	*03/23/21 05:15*	*04/06/21 00:27*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*113*		*35 - 197*	*03/23/21 05:15*	*04/06/21 00:27*	*1*

Client Sample ID: LPBMP0003_20210311
Date Collected: 03/11/21 09:50
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-10
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDF	ND		0.000011	0.0000031	ug/L		03/23/21 05:15	04/06/21 01:05	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDF	*63*		*24 - 169*	*03/23/21 05:15*	*04/06/21 01:05*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*117*		*35 - 197*	*03/23/21 05:15*	*04/06/21 01:05*	*1*

Client Sample ID: LPBMP0004_20210311
Date Collected: 03/11/21 10:00
Date Received: 03/11/21 18:30
Lab Sample ID: 570-53559-11
Matrix: Water

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDF	ND		0.000011	0.0000026	ug/L		03/23/21 05:15	04/06/21 01:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDF	*79*		*24 - 169*	*03/23/21 05:15*	*04/06/21 01:44*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
37Cl4-2,3,7,8-TCDD	*117*		*35 - 197*	*03/23/21 05:15*	*04/06/21 01:44*	*1*

Surrogate Summary

Client: Haley & Aldrich, Inc.
Job ID: 570-53559-2
Project/Site: BMP Performance OF 001, 002 and/or 009

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Matrix: Water
Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	37TCDD (35-197)						
570-53559-1	B1BMP0009_20210310	118						
570-53559-1 - RA	B1BMP0009_20210310	124						
570-53559-2	B1BMP0010_20210310	114						
570-53559-2 - RA	B1BMP0010_20210310	101						
570-53559-3	B1BMP0011_20210310	116						
570-53559-3 - RA	B1BMP0011_20210310	114						
570-53559-4	ILBMP0004_20210310	113						
570-53559-4 - RA	ILBMP0004_20210310	109						
570-53559-5	ILBMP0005_20210310	120						
570-53559-5 - RA	ILBMP0005_20210310	115						
570-53559-6	ILBMP0008_20210310	118						
570-53559-6 - RA	ILBMP0008_20210310	110						
570-53559-7	ILBMP0009_20210310	114						
570-53559-7 - RA	ILBMP0009_20210310	118						
570-53559-8	ILBMP0010_20210310	116						
570-53559-8 - RA	ILBMP0010_20210310	113						
570-53559-9	LPBMP0002_20210311	119						
570-53559-10	LPBMP0003_20210311	118						
570-53559-10 - RA	LPBMP0003_20210311	117						
570-53559-11	LPBMP0004_20210311	118						
570-53559-11 - RA	LPBMP0004_20210311	117						
MB 320-472939/1-A	Method Blank	115						
MB 320-472939/1-A - RA	Method Blank	115						

Surrogate Legend

37TCDD = 37Cl4-2,3,7,8-TCDD

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Matrix: Water
Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	37TCDD (31-191)						
LCS 320-472939/2-A	Lab Control Sample	118						
LCSD 320-472939/3-A	Lab Control Sample Dup	119						

Surrogate Legend

37TCDD = 37Cl4-2,3,7,8-TCDD

Isotope Dilution Summary

Client: Haley & Aldrich, Inc.
Project/Site: BMP Performance OF 001, 002 and/or 009

Job ID: 570-53559-2

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	TCDD (25-164)	TCDF (24-169)	PeCDD (25-181)	PeCDF (24-185)	PeCF (21-178)	HxCDD (32-141)	HxDD (28-130)	HxCDF (26-152)
570-53559-1	B1BMP0009_20210310	62	67	56	62	62	58	59	61
570-53559-1 - RA	B1BMP0009_20210310		67						
570-53559-2	B1BMP0010_20210310	65	73	58	65	66	60	60	66
570-53559-2 - RA	B1BMP0010_20210310		69						
570-53559-3	B1BMP0011_20210310	75	85	70	77	78	73	70	77
570-53559-3 - RA	B1BMP0011_20210310		90						
570-53559-4	ILBMP0004_20210310	68	73	61	69	70	66	63	70
570-53559-4 - RA	ILBMP0004_20210310		75						
570-53559-5	ILBMP0005_20210310	65	71	63	68	70	63	63	69
570-53559-5 - RA	ILBMP0005_20210310		73						
570-53559-6	ILBMP0008_20210310	62	69	57	64	65	58	58	63
570-53559-6 - RA	ILBMP0008_20210310		66						
570-53559-7	ILBMP0009_20210310	70	75	64	71	72	67	68	74
570-53559-7 - RA	ILBMP0009_20210310		78						
570-53559-8	ILBMP0010_20210310	69	76	63	70	71	65	64	67
570-53559-8 - RA	ILBMP0010_20210310		76						
570-53559-9	LPBMP0002_20210311	70	78	65	73	74	69	66	74
570-53559-10	LPBMP0003_20210311	59	64	53	59	59	55	53	58
570-53559-10 - RA	LPBMP0003_20210311		63						
570-53559-11	LPBMP0004_20210311	69	76	61	70	70	65	62	68
570-53559-11 - RA	LPBMP0004_20210311		79						
MB 320-472939/1-A	Method Blank	60	69	56	62	65	55	55	60
MB 320-472939/1-A - RA	Method Blank		70						

		Percent Isotope Dilution Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	HxDF (26-123)	HxCF (29-147)	13CHxCF (28-136)	HpCDD (23-140)	HpCDF (28-143)	HpCDF2 (26-138)	OCDD (17-157)
570-53559-1	B1BMP0009_20210310	63	59	61	54	61	61	45
570-53559-1 - RA	B1BMP0009_20210310							
570-53559-2	B1BMP0010_20210310	64	62	64	57	63	63	44
570-53559-2 - RA	B1BMP0010_20210310							
570-53559-3	B1BMP0011_20210310	76	75	77	68	76	76	56
570-53559-3 - RA	B1BMP0011_20210310							
570-53559-4	ILBMP0004_20210310	70	68	69	63	70	71	54
570-53559-4 - RA	ILBMP0004_20210310							
570-53559-5	ILBMP0005_20210310	69	66	68	61	67	68	50
570-53559-5 - RA	ILBMP0005_20210310							
570-53559-6	ILBMP0008_20210310	64	61	63	55	62	63	46
570-53559-6 - RA	ILBMP0008_20210310							
570-53559-7	ILBMP0009_20210310	72	71	72	65	72	72	54
570-53559-7 - RA	ILBMP0009_20210310							
570-53559-8	ILBMP0010_20210310	68	66	69	62	68	69	50
570-53559-8 - RA	ILBMP0010_20210310							
570-53559-9	LPBMP0002_20210311	73	71	73	65	71	73	54
570-53559-10	LPBMP0003_20210311	58	57	58	51	57	57	39
570-53559-10 - RA	LPBMP0003_20210311							
570-53559-11	LPBMP0004_20210311	68	66	67	58	64	65	43
570-53559-11 - RA	LPBMP0004_20210311							
MB 320-472939/1-A	Method Blank	60	58	61	50	58	55	37
MB 320-472939/1-A - RA	Method Blank							

Isotope Dilution Summary

Client: Haley & Aldrich, Inc.
Job ID: 570-53559-2
Project/Site: BMP Performance OF 001, 002 and/or 009

Surrogate Legend

TCDD = 13C-2,3,7,8-TCDD
TCDF = 13C-2,3,7,8-TCDF
PeCDD = 13C-1,2,3,7,8-PeCDD
PeCDF = 13C-1,2,3,7,8-PeCDF
PeCF = 13C-2,3,4,7,8-PeCDF
HxCDD = 13C-1,2,3,4,7,8-HxCDD
HxDD = 13C-1,2,3,6,7,8-HxCDD
HxCDF = 13C-1,2,3,4,7,8-HxCDF
HxDF = 13C-1,2,3,6,7,8-HxCDF
HxCF = 13C-1,2,3,7,8,9-HxCDF
13CHxCF = 13C-2,3,4,6,7,8-HxCDF
HpCDD = 13C-1,2,3,4,6,7,8-HpCDD
HpCDF = 13C-1,2,3,4,6,7,8-HpCDF
HpCDF2 = 13C-1,2,3,4,7,8,9-HpCDF
OCDD = 13C-OCDD

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		TCDD	TCDF	PeCDD	PeCDF	PeCF	HxCDD	HxDD	HxCDF
Lab Sample ID	Client Sample ID	(20-175)	(22-152)	(21-227)	(21-192)	(13-328)	(21-193)	(25-163)	(19-202)
LCS 320-472939/2-A	Lab Control Sample	73	80	68	74	77	64	60	69
LCSD 320-472939/3-A	Lab Control Sample Dup	73	78	68	74	77	69	69	75

		Percent Isotope Dilution Recovery (Acceptance Limits)						
		HxDF	HxCF	13CHxCF	HpCDD	HpCDF	HpCDF2	OCDD
Lab Sample ID	Client Sample ID	(21-159)	(17-205)	(22-176)	(26-166)	(21-158)	(20-186)	(13-199)
LCS 320-472939/2-A	Lab Control Sample	68	66	70	56	64	63	44
LCSD 320-472939/3-A	Lab Control Sample Dup	74	72	75	63	71	72	49

Surrogate Legend

TCDD = 13C-2,3,7,8-TCDD
TCDF = 13C-2,3,7,8-TCDF
PeCDD = 13C-1,2,3,7,8-PeCDD
PeCDF = 13C-1,2,3,7,8-PeCDF
PeCF = 13C-2,3,4,7,8-PeCDF
HxCDD = 13C-1,2,3,4,7,8-HxCDD
HxDD = 13C-1,2,3,6,7,8-HxCDD
HxCDF = 13C-1,2,3,4,7,8-HxCDF
HxDF = 13C-1,2,3,6,7,8-HxCDF
HxCF = 13C-1,2,3,7,8,9-HxCDF
13CHxCF = 13C-2,3,4,6,7,8-HxCDF
HpCDD = 13C-1,2,3,4,6,7,8-HpCDD
HpCDF = 13C-1,2,3,4,6,7,8-HpCDF
HpCDF2 = 13C-1,2,3,4,7,8,9-HpCDF
OCDD = 13C-OCDD

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

Lab Sample ID: MB 320-472939/1-A
Matrix: Water
Analysis Batch: 473727

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 472939

Analyte	MB Result	MB Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.000010	0.00000064	ug/L		03/23/21 05:15	03/24/21 22:06	1
1,2,3,7,8-PeCDD	ND		0.000050	0.00000067	ug/L		03/23/21 05:15	03/24/21 22:06	1
1,2,3,7,8-PeCDF	ND		0.000050	0.00000059	ug/L		03/23/21 05:15	03/24/21 22:06	1
2,3,4,7,8-PeCDF	ND		0.000050	0.00000061	ug/L		03/23/21 05:15	03/24/21 22:06	1
1,2,3,4,7,8-HxCDD	0.00000151	J,DX q	0.000050	0.00000058	ug/L		03/23/21 05:15	03/24/21 22:06	1
1,2,3,6,7,8-HxCDD	ND		0.000050	0.00000058	ug/L		03/23/21 05:15	03/24/21 22:06	1
1,2,3,7,8,9-HxCDD	ND		0.000050	0.00000054	ug/L		03/23/21 05:15	03/24/21 22:06	1
1,2,3,4,7,8-HxCDF	0.00000178	J,DX	0.000050	0.00000058	ug/L		03/23/21 05:15	03/24/21 22:06	1
1,2,3,6,7,8-HxCDF	0.000000872	J,DX q	0.000050	0.00000053	ug/L		03/23/21 05:15	03/24/21 22:06	1
1,2,3,7,8,9-HxCDF	0.000000659	J,DX q	0.000050	0.00000034	ug/L		03/23/21 05:15	03/24/21 22:06	1
2,3,4,6,7,8-HxCDF	0.00000188	J,DX	0.000050	0.00000036	ug/L		03/23/21 05:15	03/24/21 22:06	1
1,2,3,4,6,7,8-HpCDD	0.00000368	J,DX	0.000050	0.00000049	ug/L		03/23/21 05:15	03/24/21 22:06	1
1,2,3,4,6,7,8-HpCDF	0.00000262	J,DX	0.000050	0.00000043	ug/L		03/23/21 05:15	03/24/21 22:06	1
1,2,3,4,7,8,9-HpCDF	ND		0.000050	0.00000060	ug/L		03/23/21 05:15	03/24/21 22:06	1
OCDD	0.0000185	J,DX	0.00010	0.00000077	ug/L		03/23/21 05:15	03/24/21 22:06	1
OCDF	0.00000305	J,DX q	0.00010	0.00000074	ug/L		03/23/21 05:15	03/24/21 22:06	1
Total TCDD	0.0000156	q	0.000010	0.00000064	ug/L		03/23/21 05:15	03/24/21 22:06	1
Total TCDF	0.000000985	J,DX q	0.000010	0.00000033	ug/L		03/23/21 05:15	03/24/21 22:06	1
Total PeCDD	0.00000454	J,DX q	0.000050	0.00000067	ug/L		03/23/21 05:15	03/24/21 22:06	1
Total PeCDF	ND		0.000050	0.00000059	ug/L		03/23/21 05:15	03/24/21 22:06	1
Total HxCDD	0.00000559	J,DX q	0.000050	0.00000054	ug/L		03/23/21 05:15	03/24/21 22:06	1
Total HxCDF	0.00000638	J,DX q	0.000050	0.00000034	ug/L		03/23/21 05:15	03/24/21 22:06	1
Total HpCDD	0.00000707	J,DX	0.000050	0.00000049	ug/L		03/23/21 05:15	03/24/21 22:06	1
Total HpCDF	0.00000262	J,DX	0.000050	0.00000043	ug/L		03/23/21 05:15	03/24/21 22:06	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*60*		*25 - 164*	*03/23/21 05:15*	*03/24/21 22:06*	*1*
13C-2,3,7,8-TCDF	*69*		*24 - 169*	*03/23/21 05:15*	*03/24/21 22:06*	*1*
13C-1,2,3,7,8-PeCDD	*56*		*25 - 181*	*03/23/21 05:15*	*03/24/21 22:06*	*1*
13C-1,2,3,7,8-PeCDF	*62*		*24 - 185*	*03/23/21 05:15*	*03/24/21 22:06*	*1*

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Lab Sample ID: MB 320-472939/1-A
Matrix: Water
Analysis Batch: 473727

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 472939

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-2,3,4,7,8-PeCDF	65		21 - 178	03/23/21 05:15	03/24/21 22:06	1
13C-1,2,3,4,7,8-HxCDD	55		32 - 141	03/23/21 05:15	03/24/21 22:06	1
13C-1,2,3,6,7,8-HxCDD	55		28 - 130	03/23/21 05:15	03/24/21 22:06	1
13C-1,2,3,4,7,8-HxCDF	60		26 - 152	03/23/21 05:15	03/24/21 22:06	1
13C-1,2,3,6,7,8-HxCDF	60		26 - 123	03/23/21 05:15	03/24/21 22:06	1
13C-1,2,3,7,8,9-HxCDF	58		29 - 147	03/23/21 05:15	03/24/21 22:06	1
13C-2,3,4,6,7,8-HxCDF	61		28 - 136	03/23/21 05:15	03/24/21 22:06	1
13C-1,2,3,4,6,7,8-HpCDD	50		23 - 140	03/23/21 05:15	03/24/21 22:06	1
13C-1,2,3,4,6,7,8-HpCDF	58		28 - 143	03/23/21 05:15	03/24/21 22:06	1
13C-1,2,3,4,7,8,9-HpCDF	55		26 - 138	03/23/21 05:15	03/24/21 22:06	1
13C-OCDD	37		17 - 157	03/23/21 05:15	03/24/21 22:06	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD	115		35 - 197	03/23/21 05:15	03/24/21 22:06	1

Lab Sample ID: LCS 320-472939/2-A
Matrix: Water
Analysis Batch: 473727

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 472939

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,3,7,8-TCDD	0.000200	0.000235		ug/L		117	67 - 158
2,3,7,8-TCDF	0.000200	0.000216	MB	ug/L		108	75 - 158
1,2,3,7,8-PeCDD	0.00100	0.00118		ug/L		118	70 - 142
1,2,3,7,8-PeCDF	0.00100	0.00113		ug/L		113	80 - 134
2,3,4,7,8-PeCDF	0.00100	0.00109		ug/L		109	68 - 160
1,2,3,4,7,8-HxCDD	0.00100	0.00120	MB	ug/L		120	70 - 164
1,2,3,6,7,8-HxCDD	0.00100	0.00126		ug/L		126	76 - 134
1,2,3,7,8,9-HxCDD	0.00100	0.00128		ug/L		128	64 - 162
1,2,3,4,7,8-HxCDF	0.00100	0.00115	MB	ug/L		115	72 - 134
1,2,3,6,7,8-HxCDF	0.00100	0.00119	MB	ug/L		119	84 - 130
1,2,3,7,8,9-HxCDF	0.00100	0.00121	MB	ug/L		121	78 - 130
2,3,4,6,7,8-HxCDF	0.00100	0.00116	MB	ug/L		116	70 - 156
1,2,3,4,6,7,8-HpCDD	0.00100	0.00127	MB	ug/L		127	70 - 140
1,2,3,4,6,7,8-HpCDF	0.00100	0.00121	MB	ug/L		121	82 - 122
1,2,3,4,7,8,9-HpCDF	0.00100	0.00119		ug/L		119	78 - 138
OCDD	0.00200	0.00249	MB	ug/L		124	78 - 144
OCDF	0.00200	0.00285	MB	ug/L		142	63 - 170

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C-2,3,7,8-TCDD	73		20 - 175
13C-2,3,7,8-TCDF	80		22 - 152
13C-1,2,3,7,8-PeCDD	68		21 - 227
13C-1,2,3,7,8-PeCDF	74		21 - 192
13C-2,3,4,7,8-PeCDF	77		13 - 328
13C-1,2,3,4,7,8-HxCDD	64		21 - 193
13C-1,2,3,6,7,8-HxCDD	60		25 - 163
13C-1,2,3,4,7,8-HxCDF	69		19 - 202
13C-1,2,3,6,7,8-HxCDF	68		21 - 159

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Lab Sample ID: LCS 320-472939/2-A
Matrix: Water
Analysis Batch: 473727

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 472939

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C-1,2,3,7,8,9-HxCDF	66		17 - 205
13C-2,3,4,6,7,8-HxCDF	70		22 - 176
13C-1,2,3,4,6,7,8-HpCDD	56		26 - 166
13C-1,2,3,4,6,7,8-HpCDF	64		21 - 158
13C-1,2,3,4,7,8,9-HpCDF	63		20 - 186
13C-OCDD	44		13 - 199

Surrogate	LCS %Recovery	LCS Qualifier	Limits
37Cl4-2,3,7,8-TCDD	118		31 - 191

Lab Sample ID: LCSD 320-472939/3-A
Matrix: Water
Analysis Batch: 473727

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 472939

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2,3,7,8-TCDD			0.000200	0.000225		ug/L		112	67 - 158	4	50
2,3,7,8-TCDF			0.000200	0.000210	MB	ug/L		105	75 - 158	3	50
1,2,3,7,8-PeCDD			0.00100	0.00116		ug/L		116	70 - 142	2	50
1,2,3,7,8-PeCDF			0.00100	0.00111		ug/L		111	80 - 134	2	50
2,3,4,7,8-PeCDF			0.00100	0.00109		ug/L		109	68 - 160	1	50
1,2,3,4,7,8-HxCDD			0.00100	0.00117	MB	ug/L		117	70 - 164	3	50
1,2,3,6,7,8-HxCDD			0.00100	0.00113		ug/L		113	76 - 134	11	50
1,2,3,7,8,9-HxCDD			0.00100	0.00117		ug/L		117	64 - 162	9	50
1,2,3,4,7,8-HxCDF			0.00100	0.00110	MB	ug/L		110	72 - 134	5	50
1,2,3,6,7,8-HxCDF			0.00100	0.00113	MB	ug/L		113	84 - 130	5	50
1,2,3,7,8,9-HxCDF			0.00100	0.00114	MB	ug/L		114	78 - 130	6	50
2,3,4,6,7,8-HxCDF			0.00100	0.00113	MB	ug/L		113	70 - 156	3	50
1,2,3,4,6,7,8-HpCDD			0.00100	0.00120	MB	ug/L		120	70 - 140	6	50
1,2,3,4,6,7,8-HpCDF			0.00100	0.00114	MB	ug/L		114	82 - 122	5	50
1,2,3,4,7,8,9-HpCDF			0.00100	0.00111		ug/L		111	78 - 138	7	50
OCDD			0.00200	0.00237	MB	ug/L		118	78 - 144	5	50
OCDF			0.00200	0.00272	MB	ug/L		136	63 - 170	5	50

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
13C-2,3,7,8-TCDD	73		20 - 175
13C-2,3,7,8-TCDF	78		22 - 152
13C-1,2,3,7,8-PeCDD	68		21 - 227
13C-1,2,3,7,8-PeCDF	74		21 - 192
13C-2,3,4,7,8-PeCDF	77		13 - 328
13C-1,2,3,4,7,8-HxCDD	69		21 - 193
13C-1,2,3,6,7,8-HxCDD	69		25 - 163
13C-1,2,3,4,7,8-HxCDF	75		19 - 202
13C-1,2,3,6,7,8-HxCDF	74		21 - 159
13C-1,2,3,7,8,9-HxCDF	72		17 - 205
13C-2,3,4,6,7,8-HxCDF	75		22 - 176
13C-1,2,3,4,6,7,8-HpCDD	63		26 - 166
13C-1,2,3,4,6,7,8-HpCDF	71		21 - 158
13C-1,2,3,4,7,8,9-HpCDF	72		20 - 186

Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

Lab Sample ID: LCSD 320-472939/3-A
Matrix: Water
Analysis Batch: 473727

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 472939

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
13C-OCDD	49		13 - 199

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
37Cl4-2,3,7,8-TCDD	119		31 - 191

Method: 1613B - Dioxins and Furans (HRGC/HRMS) - RA

Lab Sample ID: MB 320-472939/1-A
Matrix: Water
Analysis Batch: 477003

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 472939

Analyte	MB Result	MB Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDF - RA	ND		0.000010	0.0000022	ug/L		03/23/21 05:15	04/05/21 11:24	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-2,3,7,8-TCDF - RA	70		24 - 169	03/23/21 05:15	04/05/21 11:24	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
37Cl4-2,3,7,8-TCDD - RA	115		35 - 197	03/23/21 05:15	04/05/21 11:24	1

Specialty Organics

Prep Batch: 472939

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-1	B1BMP0009_20210310	Total/NA	Water	1613B	
570-53559-1 - RA	B1BMP0009_20210310	Total/NA	Water	1613B	
570-53559-2	B1BMP0010_20210310	Total/NA	Water	1613B	
570-53559-2 - RA	B1BMP0010_20210310	Total/NA	Water	1613B	
570-53559-3	B1BMP0011_20210310	Total/NA	Water	1613B	
570-53559-3 - RA	B1BMP0011_20210310	Total/NA	Water	1613B	
570-53559-4	ILBMP0004_20210310	Total/NA	Water	1613B	
570-53559-4 - RA	ILBMP0004_20210310	Total/NA	Water	1613B	
570-53559-5	ILBMP0005_20210310	Total/NA	Water	1613B	
570-53559-5 - RA	ILBMP0005_20210310	Total/NA	Water	1613B	
570-53559-6	ILBMP0008_20210310	Total/NA	Water	1613B	
570-53559-6 - RA	ILBMP0008_20210310	Total/NA	Water	1613B	
570-53559-7	ILBMP0009_20210310	Total/NA	Water	1613B	
570-53559-7 - RA	ILBMP0009_20210310	Total/NA	Water	1613B	
570-53559-8	ILBMP0010_20210310	Total/NA	Water	1613B	
570-53559-8 - RA	ILBMP0010_20210310	Total/NA	Water	1613B	
570-53559-9	LPBMP0002_20210311	Total/NA	Water	1613B	
570-53559-10	LPBMP0003_20210311	Total/NA	Water	1613B	
570-53559-10 - RA	LPBMP0003_20210311	Total/NA	Water	1613B	
570-53559-11	LPBMP0004_20210311	Total/NA	Water	1613B	
570-53559-11 - RA	LPBMP0004_20210311	Total/NA	Water	1613B	
MB 320-472939/1-A	Method Blank	Total/NA	Water	1613B	
MB 320-472939/1-A - RA	Method Blank	Total/NA	Water	1613B	
LCS 320-472939/2-A	Lab Control Sample	Total/NA	Water	1613B	
LCSD 320-472939/3-A	Lab Control Sample Dup	Total/NA	Water	1613B	

Analysis Batch: 473727

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-1	B1BMP0009_20210310	Total/NA	Water	1613B	472939
570-53559-2	B1BMP0010_20210310	Total/NA	Water	1613B	472939
570-53559-3	B1BMP0011_20210310	Total/NA	Water	1613B	472939
570-53559-4	ILBMP0004_20210310	Total/NA	Water	1613B	472939
570-53559-5	ILBMP0005_20210310	Total/NA	Water	1613B	472939
570-53559-6	ILBMP0008_20210310	Total/NA	Water	1613B	472939
MB 320-472939/1-A	Method Blank	Total/NA	Water	1613B	472939
LCS 320-472939/2-A	Lab Control Sample	Total/NA	Water	1613B	472939
LCSD 320-472939/3-A	Lab Control Sample Dup	Total/NA	Water	1613B	472939

Analysis Batch: 473729

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-7	ILBMP0009_20210310	Total/NA	Water	1613B	472939
570-53559-8	ILBMP0010_20210310	Total/NA	Water	1613B	472939
570-53559-9	LPBMP0002_20210311	Total/NA	Water	1613B	472939
570-53559-10	LPBMP0003_20210311	Total/NA	Water	1613B	472939
570-53559-11	LPBMP0004_20210311	Total/NA	Water	1613B	472939

Analysis Batch: 477003

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-1 - RA	B1BMP0009_20210310	Total/NA	Water	1613B	472939
570-53559-2 - RA	B1BMP0010_20210310	Total/NA	Water	1613B	472939
MB 320-472939/1-A - RA	Method Blank	Total/NA	Water	1613B	472939

Specialty Organics

Analysis Batch: 477005

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-53559-3 - RA	B1BMP0011_20210310	Total/NA	Water	1613B	472939
570-53559-4 - RA	ILBMP0004_20210310	Total/NA	Water	1613B	472939
570-53559-5 - RA	ILBMP0005_20210310	Total/NA	Water	1613B	472939
570-53559-6 - RA	ILBMP0008_20210310	Total/NA	Water	1613B	472939
570-53559-7 - RA	ILBMP0009_20210310	Total/NA	Water	1613B	472939
570-53559-8 - RA	ILBMP0010_20210310	Total/NA	Water	1613B	472939
570-53559-10 - RA	LPBMP0003_20210311	Total/NA	Water	1613B	472939
570-53559-11 - RA	LPBMP0004_20210311	Total/NA	Water	1613B	472939

Lab Chronicle

Client: Haley & Aldrich, Inc. Job ID: 570-53559-2
Project/Site: BMP Performance OF 001, 002 and/or 009

Client Sample ID: B1BMP0009_20210310 Lab Sample ID: 570-53559-1
Date Collected: 03/10/21 11:20 **Matrix: Water**
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			881.6 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B		1			473727	03/25/21 01:08	SMA	TAL SAC
	Instrument ID: 10D5									
Total/NA	Prep	1613B	RA		881.6 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B	RA	1			477003	04/05/21 12:40	ALM	TAL SAC
	Instrument ID: 11D2									

Client Sample ID: B1BMP0010_20210310 Lab Sample ID: 570-53559-2
Date Collected: 03/10/21 11:25 **Matrix: Water**
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			920.7 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B		1			473727	03/25/21 01:53	SMA	TAL SAC
	Instrument ID: 10D5									
Total/NA	Prep	1613B	RA		920.7 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B	RA	1			477003	04/05/21 13:19	ALM	TAL SAC
	Instrument ID: 11D2									

Client Sample ID: B1BMP0011_20210310 Lab Sample ID: 570-53559-3
Date Collected: 03/10/21 11:30 **Matrix: Water**
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			979.6 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B		1			473727	03/25/21 02:38	SMA	TAL SAC
	Instrument ID: 10D5									
Total/NA	Prep	1613B	RA		979.6 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B	RA	1			477005	04/05/21 21:15	KSS	TAL SAC
	Instrument ID: 11D2									

Client Sample ID: ILBMP0004_20210310 Lab Sample ID: 570-53559-4
Date Collected: 03/10/21 11:05 **Matrix: Water**
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			944.1 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B		1			473727	03/25/21 03:23	SMA	TAL SAC
	Instrument ID: 10D5									
Total/NA	Prep	1613B	RA		944.1 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B	RA	1			477005	04/05/21 21:53	KSS	TAL SAC
	Instrument ID: 11D2									

Lab Chronicle

Client: Haley & Aldrich, Inc. Job ID: 570-53559-2
Project/Site: BMP Performance OF 001, 002 and/or 009

Client Sample ID: ILBMP0005_20210310 — Lab Sample ID: 570-53559-5
Date Collected: 03/10/21 11:10 — **Matrix: Water**
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			944.8 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B		1			473727	03/25/21 04:08	SMA	TAL SAC
	Instrument ID: 10D5									
Total/NA	Prep	1613B	RA		944.8 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B	RA	1			477005	04/05/21 22:32	KSS	TAL SAC
	Instrument ID: 11D2									

Client Sample ID: ILBMP0008_20210310 — Lab Sample ID: 570-53559-6
Date Collected: 03/10/21 11:00 — **Matrix: Water**
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			946.5 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B		1			473727	03/25/21 04:53	SMA	TAL SAC
	Instrument ID: 10D5									
Total/NA	Prep	1613B	RA		946.5 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B	RA	1			477005	04/05/21 23:10	KSS	TAL SAC
	Instrument ID: 11D2									

Client Sample ID: ILBMP0009_20210310 — Lab Sample ID: 570-53559-7
Date Collected: 03/10/21 10:50 — **Matrix: Water**
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			846.1 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B		1			473729	03/25/21 09:08	SMA	TAL SAC
	Instrument ID: 10D5									
Total/NA	Prep	1613B	RA		846.1 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B	RA	1			477005	04/05/21 23:48	KSS	TAL SAC
	Instrument ID: 11D2									

Client Sample ID: ILBMP0010_20210310 — Lab Sample ID: 570-53559-8
Date Collected: 03/10/21 10:55 — **Matrix: Water**
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			941 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B		1			473729	03/25/21 09:53	SMA	TAL SAC
	Instrument ID: 10D5									
Total/NA	Prep	1613B	RA		941 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B	RA	1			477005	04/06/21 00:27	KSS	TAL SAC
	Instrument ID: 11D2									

Lab Chronicle

Client: Haley & Aldrich, Inc.
Job ID: 570-53559-2
Project/Site: BMP Performance OF 001, 002 and/or 009

Client Sample ID: LPBMP0002_20210311
Lab Sample ID: 570-53559-9
Date Collected: 03/11/21 09:40
Matrix: Water
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			930.3 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B		1			473729	03/25/21 10:38	SMA	TAL SAC
	Instrument ID: 10D5									

Client Sample ID: LPBMP0003_20210311
Lab Sample ID: 570-53559-10
Date Collected: 03/11/21 09:50
Matrix: Water
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			949 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B		1			473729	03/25/21 11:23	SMA	TAL SAC
	Instrument ID: 10D5									
Total/NA	Prep	1613B	RA		949 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B	RA	1			477005	04/06/21 01:05	KSS	TAL SAC
	Instrument ID: 11D2									

Client Sample ID: LPBMP0004_20210311
Lab Sample ID: 570-53559-11
Date Collected: 03/11/21 10:00
Matrix: Water
Date Received: 03/11/21 18:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1613B			920.6 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B		1			473729	03/25/21 12:08	SMA	TAL SAC
	Instrument ID: 10D5									
Total/NA	Prep	1613B	RA		920.6 mL	20 uL	472939	03/23/21 05:15	FC	TAL SAC
Total/NA	Analysis	1613B	RA	1			477005	04/06/21 01:44	KSS	TAL SAC
	Instrument ID: 11D2									

Laboratory References:
TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: Haley & Aldrich, Inc. Job ID: 570-53559-2
Project/Site: BMP Performance OF 001, 002 and/or 009

Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	02-20-24
ANAB	Dept. of Defense ELAP	L2468	01-20-24
ANAB	Dept. of Energy	L2468.01	01-20-24
ANAB	ISO/IEC 17025	L2468	01-20-24
Arizona	State	AZ0708	08-11-21
Arkansas DEQ	State	88-0691	06-17-21
California	State	2897	01-31-22
Colorado	State	CA0004	08-31-21
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-21
Georgia	State	4040	01-29-22
Hawaii	State	<cert No.>	01-29-22
Illinois	NELAP	200060	03-18-22
Kansas	NELAP	E-10375	10-31-21
Louisiana	NELAP	01944	06-30-21
Maine	State	CA00004	04-14-22
Michigan	State	9947	01-29-22
Nevada	State	CA000442021-2	07-31-21
New Hampshire	NELAP	2997	04-18-21
New Jersey	NELAP	CA005	06-30-21
New York	NELAP	11666	04-01-22
Ohio	State	41252	01-29-22
Oregon	NELAP	4040	01-30-23
Texas	NELAP	T104704399-19-13	06-01-21
US Fish & Wildlife	US Federal Programs	58448	07-31-21
USDA	US Federal Programs	P330-18-00239	07-31-21
Utah	NELAP	CA000442021-12	02-28-21 *
Vermont	State	VT-4040	04-16-21
Virginia	NELAP	460278	03-14-22
Washington	State	C581	05-05-21
West Virginia (DW)	State	9930C	12-31-21
Wisconsin	State	998204680	08-31-21
Wyoming	State Program	8TMS-L	01-28-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Haley & Aldrich, Inc.
Job ID: 570-53559-2
Project/Site: BMP Performance OF 001, 002 and/or 009

Method	Method Description	Protocol	Laboratory
1613B	Dioxins and Furans (HRGC/HRMS)	EPA	TAL SAC
1613B	Separatory Funnel (L/L) Extraction with Soxhlet Extraction of Dioxin and Furans	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: Haley & Aldrich, Inc.
Job ID: 570-53559-2
Project/Site: BMP Performance OF 001, 002 and/or 009

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
570-53559-1	B1BMP0009_20210310	Water	03/10/21 11:20	03/11/21 18:30	
570-53559-2	B1BMP0010_20210310	Water	03/10/21 11:25	03/11/21 18:30	
570-53559-3	B1BMP0011_20210310	Water	03/10/21 11:30	03/11/21 18:30	
570-53559-4	ILBMP0004_20210310	Water	03/10/21 11:05	03/11/21 18:30	
570-53559-5	ILBMP0005_20210310	Water	03/10/21 11:10	03/11/21 18:30	
570-53559-6	ILBMP0008_20210310	Water	03/10/21 11:00	03/11/21 18:30	
570-53559-7	ILBMP0009_20210310	Water	03/10/21 10:50	03/11/21 18:30	
570-53559-8	ILBMP0010_20210310	Water	03/10/21 10:55	03/11/21 18:30	
570-53559-9	LPBMP0002_20210311	Water	03/11/21 09:40	03/11/21 18:30	
570-53559-10	LPBMP0003_20210311	Water	03/11/21 09:50	03/11/21 18:30	
570-53559-11	LPBMP0004_20210311	Water	03/11/21 10:00	03/11/21 18:30	

Irvine
17461 Derian Avenue, Suite 100
Irvine, CA 92614
phone (949) 261-1022 fax (949) 260-3299

Chain of Custody Record for
Haley & Aldrich, Inc. Blanket Service Agreement #2019-22-TestAmerica

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Loc: 570
53559

TestAmerica Laboratories, Inc.

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other

TestAmerica's services under this CoC shall be performed in accordance with the T&Cs within Blanket Service Agreement# 2015-18-TestAmerica by and between Haley & Aldrich, Inc., its subsidiaries and affiliates, and TestAmerica Laboratories Inc.

Client Contact	H&A Project Manager: Katherine Miller	H&A Site Contact: Matt Birney (818) 466-8782	Date: 03/11/2021	COC No:
Haley & Aldrich, Inc.	Tel/Fax: (520) 289-8606	Lab Contact: Urvashi Patel (949) 333-9055	Carrier:	1 of 1 COCs
5333 Mission Center Road, Suite 300	Analysis Turnaround Time			Sampler: M Birney
San Diego, California 92108	☑ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(619) 280-9210 Phone	TAT if different from Below _____			Walk-in Client:
(619) 280-9415 FAX	☑ 2 weeks			Lab Sampling:
H&A Project Number 129095-004 SID 5.2	☐ 1 week			
Site: BMP Performance OF 001, 002, and/or 009 Watershed	☐ 2 days			Job / SDG No.
H&A P O #	☐ 1 day			

Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Method 200.8: Cd, Cu, Pb Method 245.1: Hg (Total Dissolved)	Method 200.8: Cd, Cu, Pb Method 245.1: Hg (Total Recoverable)	Dioxins (Method 1613)	Total Suspended Solids (Method 2540D)	Particle Size Distribution (Method ASTM D422)	Method 200.8: As, Cd, Cu, Fe, Pb Mn, Se, Zn Method 245.1: Hg (Total Dissolved)	Method 200.8: As, Cd, Cu, Fe, Pb Mn, Se, Zn Method 245.1: Hg (Total Recoverable)	SO4, (E300)	Gross Alpha (E900.0) (Total Dissolved)	Gross Alpha (E900.0) (Total Recoverable)	Sample Specific Notes:
									1-250mL P	1-250mL P	2-1L A	1-1L P	1-1L P	1-500mL P	1-500mL P	1-500-mL P	1-1L A	1-1L A	Field Staff Notes: Lab may substitute 250mL Poly for 500mL for metals. Only need to fill half of 500mL. Must fill TSS to the top.
B1BMP0009_20210310	1	3/10/2021	1120	G	WM	6		N	x	x	x	x	x						B-1 Upper Parking Lot; Media Filter· Gunite swale conveying road runoff
B1BMP0010_20210310	2	3/10/2021	1125	G	WM	6		N	x	x	x	x	x						B-1 Upper Parking Lot; Media Filter· Culvert outlet from upper parking lot area
B1BMP0011_20210310	3	3/10/2021	1130	G	WM	6		N	x	x	x	x	x						B-1 Upper Parking Lot; Underdrains
ILBMP0004_20210310	4	3/10/2021	1105	G	WM	6		N	x	x	x	x	x						Upstream, B1436 southern detention bioswale; concrete swale diverting sheet flow into rock crib-west
ILBMP0005_20210310	5	3/10/2021	1110	G	WM	6		N	x	x	x	x	x						Downstream, B1436 southern detention bioswale; 12-inch underdrain
ILBMP0008_20210310	6	3/10/2021	1100	G	WM	6		N	x	x	x	x	x						Upstream, B1436 southern detention bioswale; concrete swale diverting sheet flow into rock crib - east
ILBMP0009_20210310	7	3/10/2021	1050	G	WM	6		N	x	x	x	x	x						Influent, filter basket, administration building area
ILBMP0010_20210310	8	3/10/2021	1055	G	WM	6		N	x	x	x	x	x						Effluent, filter basket, administration building area
LPBMP0002_20210311	9	3/11/2021	0940	G	WM	6		N	x	x	x	x	x						Lower Parking Lot; sample port in cestern discharge pipe
LPBMP0003_20210311	10	3/11/2021	0950	G	WM	6		N	x	x	x	x	x						Lower Parking Lot; Sediment Basin outlet box
LPBMP0004_20210311	11	3/11/2021	1000	G	WM	6		N	x	x	x	x	x						Lower Parking Lot; discharge from Biofilter effluent pipe
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other									1	4	1	1	1	1	4	1	1	1	

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return to Client ☐ Disposal by Lab ☑ Archive for 6 Months

Special Instructions/QC Requirements & Comments:
Please email data to kmiller@haleyaldrich.com and post to Total Access; Bill to Haley & Aldrich at AP@haleyaldrich.com; Report Level II Data Package and provide EDD; All dissolved metal samples are to be filtered within 24 hours of receipt, even those placed on hold.

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No. | Cooler Temp. (°C). Obs'd._____ Corr'd._____ Therm ID No._____

Relinquished by:	Company: JHA	Date/Time: 3/11/21 16:30	Received by:	Company: EGS	Date/Time: 03/11/21 16:30
Relinquished by:	Company: EGS 18:45	Date/Time: 3/11/21	Received by: ECI	Company: ECI	Date/Time: 03/11/21 18:45
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-045, Rev. 1.2, dated 1/8/2016

570-53559 Chain of Custody

Eurofins Calscience LLC
7440 Lincoln Way
Garden Grove, CA 92841
Phone: 714-895-5494 Fax: 714-894-7501

Chain of Custody Record

eurofins Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Patel, Virendra	Carrier Tracking No(s):	COC No: 570-87542.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Virendra.Patel@eurofinset.com	State of Origin: California	Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 570-53559-2
Address: 880 Riverside Parkway, ,	Due Date Requested: 3/29/2021			
City: West Sacramento	TAT Requested (days):			
State, Zip: CA, 95605				
Phone: 916-373-5600(Tel) 916-372-1059(Fax)	PO #:			
Email:	WO #:			
Project Name: BMP Performace OF 001, 002 and/or 009	Project #: 44009815			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	1613B/1613B_Sox_Sep_P Standard List w/ Totals	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
B1BMP009_20210310 (570-53559-1)	3/10/21	11:20 Pacific		Water			X	2	See QAS, Boeing_w/u to zero
B1BMP010_20210310 (570-53559-2)	3/10/21	11:25 Pacific		Water			X	2	See QAS, Boeing_w/u to zero
B1BMP011_20210310 (570-53559-3)	3/10/21	11:30 Pacific		Water			X	2	See QAS, Boeing_w/u to zero
ILBMP0004_20210310 (570-53559-4)	3/10/21	11:05 Pacific		Water			X	2	See QAS, Boeing_w/u to zero
ILBMP0005_20210310 (570-53559-5)	3/10/21	11:10 Pacific		Water			X	2	See QAS, Boeing_w/u to zero
ILBMP0008_20210310 (570-53559-6)	3/10/21	11:00 Pacific		Water			X	2	See QAS, Boeing_w/u to zero
ILBMP0009_20210310 (570-53559-7)	3/10/21	10:50 Pacific		Water			X	2	See QAS, Boeing_w/u to zero
ILBMP0010_20210310 (570-53559-8)	3/10/21	10:55 Pacific		Water			X	2	See QAS, Boeing_w/u to zero
LPBMP0002_20210311 (570-53559-9)	3/11/21	09:40 Pacific		Water			X	2	See QAS, Boeing_w/u to zero

Note: Since laboratory accreditations are subject to change, Eurofins Calscience places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Calscience laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Calscience attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Calscience.

Possible Hazard Identification	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:				
Relinquished by:	Date/Time: 3/12/21 1445	Company EEI	Received by:	Date/Time: 3/13/21 905	Company Eurofins		
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company		
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company		

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: Seals | Cooler Temperature(s) °C and Other Remarks: 1.0, 1.0, 0.5, 1.1, 1.4

Ver: 11/01/2020

Eurofins Calscience LLC
7440 Lincoln Way
Garden Grove, CA 92841
Phone: 714-895-5494 Fax: 714-894-7501

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Patel, Virendra	Carrier Tracking No(s):	COC No: 570-87542.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: Virendra.Patel@eurofinset.com	State of Origin: California	Page: Page 2 of 2
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 570-53559-2
Address: 880 Riverside Parkway,	Due Date Requested: 3/29/2021			
City: West Sacramento	TAT Requested (days):			
State, Zip: CA, 95605				
Phone: 916-373-5600(Tel) 916-372-1059(Fax)	PO #:			
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Project Name: BMP Performace OF 001, 002 and/or 009	Project #: 44009815			
Site:	SSOW#:			

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K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	1613B/1613B_Sox_Sep_P Standard List w/ Totals	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
LPBMP0003_20210311 (570-53559-10)	3/11/21	09:50 Pacific		Water			X	2	See QAS, Boeing_w/u to zero
LPBMP0004_20210311 (570-53559-11)	3/11/21	10:00 Pacific		Water			X	2	See QAS, Boeing_w/u to zero

Note: Since laboratory accreditations are subject to change, Eurofins Calscience places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Calscience laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Calscience attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Calscience.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		3/12/21 1445	ECI		3/13/21 905	
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 1.0, 1.0, 0.8, 1.1, 1.4

Ver: 11/01/2020

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 570-53559-2

Login Number: 53559
List Number: 1
Creator: Cruise, Noel

List Source: Eurofins Calscience

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	IDs on containers do not match the COC. Logged in per COC.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 570-53559-2

Login Number: 53559
List Number: 3
Creator: Cahill, Nicholas P

List Source: Eurofins TestAmerica, Sacramento
List Creation: 03/13/21 04:41 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	Seal
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	1.0, 1.0, 0.8, 1.1, 1.4
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Appendix C: Exceeding Constituent Source Investigation

No exceeding constituent source investigation was done in 2020/21 due to no stormwater discharges and therefore no exceedances at the NPDES Outfalls in 2020/21.

Appendix D: 2020/21 BMP Performance Analysis

Prepared for

The Boeing Company
Santa Susana Site
5800 Woolsey Canyon Road
Canoga Park, California, 91304-1148

Appendix D: Best Management Practice (BMP) Performance Analysis

2020/2021 Reporting Year

Prepared by

The Surface Water Expert Panel

and

Geosyntec consultants

engineers | scientists | innovators

924 Anacapa Street, Suite 4A,
Santa Barbara, CA, 93101

CWR0654
October 2021

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Acronyms

ANOVA	Analysis of Variance
BMP	Best Management Practice
CA	California
CM	Culvert Modification
COC	Constituent of Concern
COV	Coefficient of Variation
DNQ	Detected not Quantified
ELV	Expendable Launch Vehicle
ENTS	Engineered Natural Treatment Systems
GIS	Geographic Information System
HDPE	High Density Polyethylene
ISRA	Interim Source Removal Action
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
mg/L	milligram per liter
NASA	National Aeronautics and Space Administration
ND	Non-Detect
NPDES	National Pollutant Discharge Elimination System
POR	Period of Record
SSFL	Santa Susana Field Laboratory
SWMM	Storm Water Management Model
TCDD	Tetrachlorodibenzo-*p*-dioxin
TEQ	Toxic Equivalence
TSS	Total Suspended Solids

1. Introduction

The purpose of this memorandum is to evaluate the performance of existing stormwater treatment Best Management Practices (BMPs) in the Outfall 009 watershed of the Boeing Santa Susana Field Laboratory (Site). The BMPs have been installed at the direction of the Surface Water Expert Panel and have been in operation since 2009. The purpose of these BMPs is to reduce pollutants from stormwater prior to discharge at Outfall 009 to comply with the NPDES permit standards as issued to Boeing by the Los Angeles Regional Water Quality Control Board.

This is an update to the BMP performance analysis that is conducted annually, consistent with the *Site-Wide Stormwater Work Plan and 2014/15 Annual Report* ("2015 Work Plan") (Santa Susana Surface Water Expert Panel and Geosyntec Consultants, 2015). This memorandum incorporates 2020/2021 reporting year data into a dataset that initially began in December 2009. The National Pollutant Discharge Elimination System (NPDES) constituents of concern (COCs) addressed in this analysis include total suspended solids (TSS), total lead, total copper[1], and dioxins (TCDD TEQ, DNQ excluded, BAFs included). Data were collected to assess effectiveness of the culvert modification (CM) installations[2], upper lot media filter, lower parking lot sedimentation basin and biofilter (lower lot biofilter), ELV treatment BMP[3], and B1436 detention bioswales[4] (detention bioswales), and Boeing administrative area inlet filters (Boeing admin area inlet filters). This memorandum focuses on the performance of the BMPs listed above, which are located in Watershed 009. Although this memorandum currently only addresses BMPs in Watershed 009, Table 1 shows Permit Limits at all outfalls specified in the NPDES Permit for the aforementioned COCs, as context for goals for other potential BMPs constructed in other watersheds, if needed in the future.

Table 1. COC NPDES Permit Limits by Outfall

Outfall	NPDES Permit Limit			
	TSS (mg/L)[1]	Total Lead (µg/L)	Total Copper (µg/L)	Dioxins (µg/L)
001	45	5.2	14	2.80×10^{-8}
002	45	5.2	14	2.80×10^{-8}
003	-	5.2	13	2.80×10^{-8}
004	-	5.2	13	2.80×10^{-8}
005	-	5.2	13	2.80×10^{-8}
006	-	5.2	13	2.80×10^{-8}
007	-	5.2	13	2.80×10^{-8}
008	-	5.2	14	2.80×10^{-8}

[1] Copper is not included as a pollutant of concern for the Outfall 009 watershed in the 2015 Work Plan. However, data for total copper are retained for the paired line plots.

[2] CM refers to a culvert modification BMP where detention and stormwater filtration occurs prior to entering culverts beneath roadways.

[3] ELV refers to an area previously used by NASA to test the lunar lander engines.

[4] Includes both the northern and southern detention bioswales. However, only the southern detention bioswale was sampled in 2017/2018 through 2020/2021.

Outfall	NPDES Permit Limit			
	TSS (mg/L)[1]	Total Lead (µg/L)	Total Copper (µg/L)	Dioxins (µg/L)
009	-	5.2	13	2.80×10^{-8}
010	-	5.2	13	2.80×10^{-8}
011[2]	45	5.2	14	2.80×10^{-8}
018[2]	45	5.2	14	2.80×10^{-8}
019	45	5.2	14	2.80×10^{-8}
020	45	5.2	14	2.80×10^{-8}

[1] TSS limit only applies to dry weather samples. There is no wet weather NPDES Permit Limit for TSS.
[2] Benchmark

Following the 2016/2017 reporting year, it was decided that BMP performance sampling would be reduced because many building demolitions have been completed and revegetated in the Outfall 009 watershed. In addition, BMP facilities have been in place for many years and performing well based on previous samplings. Starting in 2017/2018, sampling was only planned for two storm events per year at the upper lot media filter, southern detention bioswale, lower lot biofilter, Boeing admin area inlet filters, CM-1 (influent-west and effluent), and the ELV Treatment BMP.

During 2020/2021, there was significantly lower than average total precipitation as compared to other reporting years. Long-term average annual rainfall at SSFL from 1958/1959 through 2020/2021 is 16.8 inches[5], compared to 4.54 inches recorded in 2020/2021[6]. Four rain events[7] occurred in the 2020/2021 reporting year, with two of these storms being sampled at one or more BMP monitoring sites[8]. This is compared with between four and 14 total rain events per year in prior reporting years 2009/2010 through 2019/2020.

Table 2 summarizes rainfall events in which BMP performance data were collected for the 2009/2010 through 2020/2021 reporting years ("non-qualifying rain events" represent precipitation totals from rainfall not considered a rain event). As indicated by the gray cells, not all BMPs had influent and effluent flows during each rain event due to limited flows into or out of the BMP.

[5] Data from the Simi Hills – Rocketdyne Lab gauge (Ventura County Watershed Protection District site 249) was used to determine annual rainfall from 1958/1959 through 2000/2001. However, rainfall data were not available at this gauge from 1977/1978 through 1984/1985. Data from the Area 4 gauge (which was moved to Area 1 on January 1, 2013) were used to determine annual rainfall from 2001/2002 through 2020/2021. This results in a period of record (POR) of 55 years.

[6] A water year is typically defined as October 1 through September 30. However, due to the reporting timeline for the Annual Report, reporting years have been defined as June 1 through May 31.

[7] A "rain event" is defined as greater than 0.1 inches of rainfall in a 24-hour period and preceded by at least 72 hours of dry weather.

[8] Monitoring occurs when rain events result in observable flow and the maximum number of sampled events planned for the particular BMP has not been reached.

Table 2. Sample Collection Event Rainfall Data Summary
(gray cells indicate dates that did not have complete data pairs sampled at treatment devices)

Date(s)	Average Intensity (in/hr)	Max Intensity (in/hr)	Event Total (in)	Event Duration (hrs)	Cumulative Rainfall for Qualifying Events (in)	Number of BMP Subarea Monitoring Samples[1]
10/13/2009 - 10/14/2009	0.05	0.24	2.48	35	2.48	-[1]
12/7/2009 - 12/13/2009	0.02	0.25	3.43	57	5.91	-[1]
1/17/2010 – 1/22/2010	0.05	0.52	6.88	123	12.79	-[1]
2/5/2010 – 2/6/2010	0.04	0.20	1.84	43	14.63	-[1]
2/9/2010	0.01	0.17	0.20	3	14.83	-[1]
2/19/2010	0.01	0.05	0.14	8	14.97	-[1]
2/24/2010	0.01	0.03	0.12	12	15.09	-[1]
2/27/2010	0.06	0.34	1.52	17	16.61	-[1]
3/6/2010	0.02	0.13	0.38	11	16.99	-[1]
4/4/2010 - 4/5/2010	0.03	0.23	0.86	13	17.85	-[1]
4/11/2010 - 4/12/2010	0.03	0.22	0.65	11	18.50	-[1]
Non-qualifying rain event total[2]			*0.89*			
Total for 2009/2010 reporting year			**19.39**			-[1]
10/5/2010 - 10/6/2010	0.049	0.18	0.93	20	0.93	-[1]
10/16/2010 - 10/25/2010	0.003	0.22	0.69	216	1.62	-[1]
11/17/2010 - 11/21/2010	0.011	0.23	0.97	89	2.59	-[1]
12/5/2010	0.018	0.09	0.41	10	3.0	-[1]
12/17/2010 – 12/22/2010	0.054	0.37	7.22	131	10.22	-[1]
12/25/2010 - 12/26/2010	0.030	0.22	0.57	9	10.79	-[1]
12/29/2010	0.043	0.10	0.43	7	11.22	-[1]
1/2/2011 - 1/3/2011	0.014	0.12	0.38	17	11.60	-[1]
2/15/2011 – 2/20/2011	0.019	0.45	2.33	121	13.93	-[1]
2/25/2011 - 2/26/2011	0.030	0.22	1.50	20	15.43	-[1]
3/2/2011 - 3/3/2011	0.007	0.03	0.13	8	15.56	-[1]
3/6/2011 - 3/7/2011	0.006	0.02	0.12	10	15.68	-[1]
3/18/2011 - 3/27/2011	0.030	--	6.00	197	21.68	-[1]
5/15/2011 - 5/18/2011	0.009	0.08	0.67	76	22.35	-[1]
Non-qualifying rain event total[2]			*1.04*			
Total for 2010/2011 reporting year			**23.39**			**67**
10/5/2011	0.090	0.18	0.90	9	0.90	-[1]
11/4/2011 - 11/6/2011	0.041	0.23	0.58	59	1.48	-[1]
11/11/2011 - 11/12/2011	0.035	0.26	0.76	22	2.24	-[1]
11/19/2011 - 11/21/2011	0.031	0.29	0.78	35	3.02	-[1]
12/12/2011 - 12/17/2011	0.006	0.21	0.80	137	3.82	-[1]
1/21/2012 – 1/23/2012	0.017	0.15	1.06	62	4.88	-[1]
2/27/2012	--	--	0.00	--	4.88	-[1]
3/16/2012 - 3/18/2012	0.052	0.31	1.51	29	6.39	-[1]
3/25/2012 – 3/26/2012	0.079	0.51	2.12	21	8.51	-[1]

Date(s)	Average Intensity (in/hr)	Max Intensity (in/hr)	Event Total (in)	Event Duration (hrs)	Cumulative Rainfall for Qualifying Events (in)	Number of BMP Subarea Monitoring Samples[1]
4/10/2012 – 4/13/2012	0.034	0.36	2.37	64	10.88	-[1]
4/23/2012 - 4/26/2012	0.003	0.09	0.26	80	11.14	-[1]
Non-qualifying rain event total[2]			*0.19*			
Total for 2011/2012 reporting year			**11.33**			**88**
11/14/2012 – 11/18/2012	0.010	0.36	0.99	99	0.99	-[1]
11/28/2012 – 12/4/2012	0.011	0.12	1.49	139	2.48	-[1]
12/12/2012 – 12/18/2012	0.005	0.07	0.68	129	3.16	-[1]
12/22/2012 – 12/26/2012	0.013	0.18	1.13	87	4.29	-[1]
1/23/2013 – 1/27/2013	0.020	0.18	1.78	89	6.07	-[1]
2/8/2013 – 2/9/2013	0.008	0.07	0.12	15	6.19	-[1]
2/19/2013	0.025	0.09	0.25	10	6.44	-[1]
3/7/2013 – 3/8/2013	0.041	0.23	0.87	7	7.31	-[1]
5/5/2013 - 5/6/2013	0.040	0.16	0.48	7	7.79	-[1]
Non-qualifying rain event total[2]			*0.31*			
Total for 2012/2013 reporting year			**8.10**			**29**
11/20/2013 – 11/21/2013	0.013	0.12	0.47	17	0.47	-[1]
12/7/2013	0.070	0.09	0.28	4	0.75	-[1]
2/6/2014 – 2/7/2014	0.015	0.15	0.28	16	1.03	-[1]
2/26/2014 – 3/2/2014	0.052	0.47	4.62	89	5.65	-[1]
4/1/2014 – 4/2/2014	0.008	0.14	0.22	28	5.87	-[1]
Non-qualifying rain event total[2]			*0.20*			
Total for 2013/2014 reporting year			**6.07**			**27**
10/31/2014 – 11/1/2014	0.045	0.33	0.36	8	0.36	-[1]
11/30/2014 – 12/4/2014	0.033	0.40	3.20	97	3.56	-[1]
12/11/2014 – 12/12/2014	N/A[3]	N/A[3]	2.62	N/A[3]	6.18	-[1]
12/15/2014 – 12/17/2014	0.025	0.33	0.91	36	7.09	-[1]
1/10/2015 – 1/11/2015	0.071	0.23	1.56	22	8.65	-[1]
1/26/2015 – 1/27/2015	0.015	0.06	0.25	17	8.90	-[1]
2/22/2015 – 2/23/2015	0.008	0.06	0.21	26	9.11	-[1]
3/1/2015 – 3/3/2015	0.024	0.22	1.44	60	10.55	-[1]
5/14/2015 – 5/15/2015	0.017	0.30	0.41	24	10.96	-[1]
Non-qualifying rain event total[2]			*0.26*			
Total for 2014/2015 reporting year			**11.22**			**17**
7/18/2015 – 7/19/2015	0.027	0.32	0.83	31	0.83	0
9/14/2015 – 9/15/2015	0.050	0.39	1.10	22	1.93	8
10/5/2015 – 10/6/2015	0.025	0.32	0.45	18	2.38	0
12/13/2015	0.055	0.06	0.11	2	2.49	0
12/19/2015 – 12/22/2015	0.008	0.08	0.52	65	3.01	6

Date(s)	Average Intensity (in/hr)	Max Intensity (in/hr)	Event Total (in)	Event Duration (hrs)	Cumulative Rainfall for Qualifying Events (in)	Number of BMP Subarea Monitoring Samples[1]
1/5/2016 – 1/10/2016	0.030	0.60	3.87	129	6.88	29
1/18/2016 – 1/20/2016	0.005	0.02	0.20	40	7.08	0
1/31/2016	0.108	0.27	0.86	8	7.94	0
2/17/2016 – 2/18/2016	0.027	0.10	0.57	21	8.51	17
3/5/2016 – 3/7/2016	0.029	0.29	1.57	54	10.08	4
3/11/2016	0.088	0.34	0.44	5	10.52	15
4/7/2016 – 4/9/2016	0.010	0.10	0.52	52	11.04	16
5/6/2016	0.128	0.22	0.77	6	11.81	0
Non-qualifying rain event total[2]			*0.16*			
Total for 2015/2016 reporting year			**11.97**			**113**
10/16/2016 – 10/17/2016[4]	0.008	0.05	0.22	28	0.22	0
10/28/2016 – 10/31/2016	0.006	0.16	0.41	68	0.63	5
11/20/2016 – 11/21/2016	0.024	0.18	0.53	22	1.16	3
11/26/2016	0.055	0.15	0.22	4	1.38	8
12/15/2016 – 12/16/2016	0.093	0.20	1.58	17	2.96	12
12/21/2016 – 12/24/2016	0.030	0.31	1.99	66	4.95	6
12/30/2016 – 12/31/2016	0.011	0.11	0.45	41	5.40	14
1/4/2017 – 1/13/2017	0.013	0.26	2.74	211	8.14	33
1/18/2017 – 1/23/2017	0.050	0.69	5.70	114	13.84	25
2/2/2017 – 2/11/2017	0.013	0.17	2.84	218	16.68	23
2/16/2017 – 2/21/2017	0.049	0.71	5.81	119	22.49	21
2/26/2017	0.022	0.05	0.20	9	22.69	0
3/21/2017 – 3/22/2017	0.028	0.07	0.36	13	23.05	0
4/7/2017 – 4/8/2017	0.024	0.08	0.17	7	23.22	0
Non-qualifying rain event total[2]			0.13			
Total for 2016/2017 reporting year			**23.35**			**150**
1/8/2018 – 1/9/2018	0.068	0.37	2.78	41	2.78	11
2/26/2018 – 3/3/2018	0.015	0.15	1.66	109	4.44	10
3/10/2018 – 3/16/2018	0.012	0.30	1.92	155	6.36	0
3/21/2018 – 3/23/2018	0.059	0.45	2.94	50	9.30	15
Non-qualifying rain event total[2]			0.45			
Total for 2017/2018 reporting year			**9.75**			**36**
10/12/2018 – 10/13/2018	0.037	0.13	0.48	13	0.48	0
11/21/2018 – 11/22/2018	0.092	0.26	0.55	6	1.03	0
11/28/2018 – 11/29/2018	0.045	0.30	1.17	26	2.20	14
12/5/2018 – 12/6/2018	0.068	0.44	2.51	37	4.71	16
1/5/2019 – 1/8/2019	0.030	0.31	1.69	57	6.40	12
1/12/2019 – 1/17/2019	0.043	0.34	5.68	133	12.08	8
1/31/2019 – 2/5/2019	0.053	0.56	6.27	119	18.35	8

Date(s)	Average Intensity (in/hr)	Max Intensity (in/hr)	Event Total (in)	Event Duration (hrs)	Cumulative Rainfall for Qualifying Events (in)	Number of BMP Subarea Monitoring Samples[1]
2/9/2019 – 2/16/2019	0.018	0.39	3.12	172	21.47	8
2/27/2019 – 3/8/2019	0.016	0.25	3.21	195	24.68	11
3/20/2019 – 3/21/2019	0.0048	0.03	0.11	23	24.79	0
5/10/2019 – 5/11/2019	0.0045	0.04	0.13	29	24.92	0
5/16/2019 – 5/19/2019	0.014	0.21	1.17	82	25.96	9
Non-qualifying rain event total[2]			0.20			
Total for 2018/2019 reporting year			**26.29**			**86**
11/20/2019	0.185	0.33	0.37	2	0.37	5
11/27/2019 – 11/30/2019	0.023	0.28	2.10	90	2.47	14
12/4/2019 – 12/8/2019	0.018	0.31	2.01	109	4.48	5
12/22/2019 – 12/26/2019	0.044	0.49	3.88	89	8.36	10
1/16/2020 – 1/17/2020	0.064	0.31	0.70	11	9.06	0
2/22/2020	0.037	0.10	0.11	3	9.17	0
3/10/2020 – 3/23/2020	0.022	0.40	7.08	319	16.25	9
4/5/2020 – 4/13/2020	0.021	0.29	3.81	187	20.06	4
5/18/2020	0.031	0.07	0.22	7	20.28	0
Non-qualifying rain event total[2]			0.26			
Total for 2019/2020 reporting year			**20.54**			**47**
12/28/2020 – 12/29/2020	0.060	0.28	1.62	27	1.62	0
1/23/2021 – 1/25/2021	0.0064	0.11	0.32	50	1.94	0
1/28/2021 – 1/30/2021	0.040	0.27	1.32	33	3.26	3
3/10/2021 – 3/12/2021	0.018	0.16	0.94	51	4.20	11
3/15/2021	0.042	0.080	0.21	5	4.41	0
Non-qualifying rain event total[2]			0.13		4.54	0
Total for 2020/2021 reporting year			**4.54**			**14**

[1] Includes total samples (influent, effluent, BMP subarea, background, etc.). Annual totals only are shown for early reporting years (as available), consistent with what was reported in past annual reports.

[2] Rainfall was measured, but not considered a rain event per the NPDES definition.

[3] Area I weather station malfunctioned during rain event, rainfall totals from Station 436 used but hourly rainfall not available.

[4] Rainfall from Station 436 was used for hour 3:00 on 10/16/2016 when the Area I station was off-line.

2. Overview

2.1 BMPs

Influent and effluent results for each stormwater BMP for the same storm event were compared to assess concentration reductions through the system. Although split samples were periodically collected and used for QA/QC purposes, only the primary samples were used in these analyses. For each of the **six CM sites** discussed herein[9], the number of paired samples per BMP ranges from 3 to 37 pairs for TSS, 0 to 37 pairs for dioxins[10], 0 to 37 pairs for lead[11], and 0 to 33 pairs for copper[12] for 2011/2012 through 2019/2020. No new CM paired samples were collected during this reporting year due to lack of sampleable flow, and it should be noted that sampling at the B-1 media filter ceased after the 2015/2016 reporting year due to sufficient data having been collected to quantify performance. However, periodic visual checks are made at all control locations to indicate any maintenance problems. The road runoff diversion to CM-1 was constructed during 2017/2018, and sampling to characterize road runoff influent to CM-1 began in 2018/2019. The road runoff inlet to CM-3 was completed on May 5, 2017. No effluent samples were collected during the one post-construction event during 2016/2017, no samples were collected in 2017/2018, and no effluent samples were collected during the one sampled event in 2018/2019. Paired influent and effluent data were collected for the first time in 2019/2020 (for three events). For two of these events, the influent sample included undeveloped area influent to CM-3. For one of these events, road runoff influent was sampled, in addition to undeveloped area influent to CM-3 (results from both locations were flow-weighted [based on drainage area size and estimated imperviousness] to determine the influent concentration).

Performance data for the **lower lot biofilter** (construction of which was completed in 2013) were collected from three locations within the system (influent, effluent, and a mid-point sample at the sedimentation basin outlet before the media filter inlet) during two storm events in the 2020/2021 sampling year. As a result, there are 30 total sample pairs associated with this location to date, including one 2013/2014 biofilter effluent sample reflecting a blend of filtered underdrain flows and overflows that bypassed the filter media.

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[9] Includes CM-1, CM-3, CM-8, CM-9, CM-11, and B-1. CM-3 pre-2016/2017 was excluded from this analysis due to post-storm dry weather flows observed at the outlet between February 2010 and March 2011 when no flows were observed entering the culvert, suggesting subsurface inflows were contributing to effluent samples, thus limiting the meaningfulness of an influent-effluent comparison. However, the road runoff inlet to CM-3 was completed on May 5, 2017. Therefore, CM-3 data starting in 2016/2017 are included in this memorandum. This includes single influent results for CM-3 road runoff from one event in 2016/2017 and one event in 2018/2019, in addition to paired influent and effluent data for three events in 2019/2020 (influent data also includes undeveloped area influent to CM-3).

[10] There are no data pairs for dioxins at CM-8. Excluding CM-8, the lowest number of data pairs is three (CM-3).

[11] There are no data pairs for lead at CM-11. Excluding CM-11, the lowest number of data pairs is three (CM-3).

[12] There are no data pairs for copper at CM-8 and CM-11. Excluding CM-8 and CM-11, the lowest number of data pairs is three (CM-3).

Performance data for the **ELV treatment BMP** (implemented during the 2013/2014 reporting year) includes paired data from 12 events through 2019/2020[13]. Due to lack of flow at the ELV treatment BMP, no samples were collected during the 2020/2021 reporting year. These data are shown in the paired line plots and statistical analyses in the following sections, though it should be noted that it is possible that the media bed for this system may have been flushing fines during the first sampling event in 2013/2014 since this was the first rain event it experienced. During this event, the ELV treatment BMP was also heavily loaded by sediments eroded from the denuded ELV channel prior to implementation of erosion control improvements. Recent data have also shown evidence of solids export through the underdrain, based on the dioxins particulate strength decreasing through the media layer. As a result, the drainage layers and filter media were rebuilt in summer 2021.

The **B1436[14] detention bioswales** (construction of which was completed in December 2014), were sampled for the first time during the 2015/2016 reporting year[15]. The detention bioswales are intended to capture and slowly release flow to the downstream lower lot biofilter, thus attenuating peak flowrates and distributing them over a longer period of time allowing more opportunity for the biofilter to treat these flows. Using the site-wide Stormwater Management Model (SWMM), the time period after completion of the detention bioswales (11/1/14) until 4/1/19 was simulated with and without the bioswales to estimate the increased biofilter runoff capture efficiency (i.e., the volume of treated water divided by the total runoff draining to the biofilter) due to implementation of the bioswales upstream. The model shows that installing the bioswales has increased the biofilter runoff capture efficiency from 59% to 73% (a 24% increase). When only considering the runoff from the lower parking lot (a priority treatment area), the runoff capture efficiency from this area has increased from 80% to 88% (an 10% increase).

Treatment occurs in the bioswales, although the primary purpose was to slow the influent runoff to the lower lot biofilter and reduce flows that bypasses the lower lot biofilter during large storm events. Samples were collected at three locations at the southern detention bioswale, which includes two influent locations (results from both locations were flow-weighted [based on drainage area size and estimated imperviousness] to determine the influent concentrations) and the effluent. Paired influent and effluent performance data were collected during 21 events at the southern detention bioswale prior to the current reporting year, and one sample pair was collected during 2020/2021, for a total of 22 sampled events through 2020/2021. Samples were also collected at both the influent and effluent locations of the northern detention bioswale during eight events during the 2015/2016 and 2016/2017 reporting years. Sampling was discontinued at the northern detention bioswale after the 2016/2017

[13] The ELV treatment BMP has paired data from 12 events to date for TSS, dioxins, and lead. There are 11 data pairs for copper. Due to a power outage during the Woolsey wildfire, the ELV treatment BMP was not operational during 2018/2019 and therefore additional performance samples were not collected during the 2018/2019 reporting year. A generator has since been added at this location as the primary power source.

[14] B1456 refers to a former building at this location that was demolished by Boeing as part of its effort to remove man-made structures at SSFL.

[15] The effluent of the northern detention bioswale (ILBMP0007) was sampled in the 2014/2015 reporting year (May 2015). However, a paired influent sample was not collected during this event.

reporting year, as it was determined that sufficient data were collected at that location and the performance data for the detention bioswales are represented in the southern section.

Eight samples were collected from the **upper lot media filter** (construction of which was completed on May 16, 2017) during the 2016/2017 reporting year, but only at the influent location. Paired samples were collected for the first time at the upper lot media filter during 2017/2018 (for two events), and paired samples were collected during four events during the 2018/2019 reporting year[16], two events during the 2019/2020 reporting year, and one event during the 2020/2021 reporting year.

The **Boeing admin area inlet filters** (filter basket with targeted media mix) were installed in 2017. The Boeing admin area inlet filters were sampled for the first time during the 2018/2019 reporting year (an influent and effluent sample were collected during one event). The filter lip was sealed in April 2019 to prevent bypass, but the samples from the 2018/2019 reporting year were collected before the lip was sealed. Paired samples were collected at the Boeing admin area inlet filters during two events during 2019/2020 and one event during 2020/2021.

Table 3 shows a summary of the BMPs discussed herein, including various BMP characteristics/components and which implemented BMPs include the various components.

Table 3. BMP Summary

BMP Characteristic	BMP						
	CM Sites	B1 Media Filter	Upper Lot Media Filter	Lower Lot Biofilter	ELV Treatment BMP	Detention Bioswales	Boeing Admin Area Inlet Filters
Media filtration-based[1]	x	x	x	x	x		x
Subsurface storage-based						x	
Pretreatment incorporated		x		x	x		
Outlet controls				x	x	x	
Vegetation				x		x	
Vertical flow regime		x	x	x	x	x	x
Horizontal flow regime	x	x					

[1] Using the SSFL sand, zeolite, and granulated activated carbon (GAC) media mixture.

2.2 Sampling

Influent grab samples are collected from flowing surface water upstream of the maximum extent of ponding at each CM as observed before that date[17]. All sampled CMs include a media filter and a HDPE lining through existing galvanized corrugated metal culvert pipes (zinc is not a COC at SSFL) with the

[16] The upper lot media filter was also sampled during an additional event in 2018/2019, but only an effluent sample was collected (no paired influent sample).

[17] When the extent of ponding increased at the CM-1 and CM-3 culvert basins on December 22, 2010 during a heavy rainfall, the influent sample locations were moved upstream a sufficient distance to remain above the maximum ponded water footprint.

exception of B-1, which is a media bed with no slip-lined element. Effluent grab samples at CM-1, CM-9, CM-3, and B-1 are collected from the underdrain outlet (beginning in October 2011, rather than the culvert outlet). CM effluent grab samples were collected at the culvert outlets on the downstream side of the road prior to October 2011 (which included all samples at CM-8 and CM-11), where the culvert pipes discharge to the Northern Drainage. Flows from the culvert outlets may represent treated runoff (via sedimentation and media filtration) and partially treated runoff (flowing through or over the weir boards); this is noted on the plots. At CM-3, the slip-lined HDPE pipes were inserted from both the influent and effluent sides and could not be sealed at the point where they meet, and subsurface flows through the road embankment are known to have entered the pipe during rain events from February 2010 through March 2011 because water was observed discharging from the HDPE pipe outlet when no water was flowing into the inlet. Therefore, CM-3 performance cannot be reliably assessed due to this bypassing of the media filter and sampling at this site was discontinued after the 2010/2011 reporting year. However, sampling was initiated during 2018/2019 after completion of the road runoff inlet and new slip-lining, as previously described. Sampling to characterize road runoff influent to CM-1 began in 2018/2019.

At the lower lot biofilter, influent samples are collected in the cistern discharge pipeline, the mid-point samples are collected at the sediment basin outlet box, and effluent samples are collected from the discharge of the biofilter effluent pipe. The Boeing admin area inlet filters influent and effluent samples are collected from the filter basket influent and effluent, respectively. Influent samples for the southern detention bioswale are collected from both the east and west portions of the concrete swale diverting sheetflow into the rock crib, and effluent samples are collected from the underdrain. Influent samples for the northern detention bioswale were collected from the curb cut along the east side of the bioswale, and effluent samples were collected from the bioswale underdrain. For the ELV treatment BMP, influent samples are collected from the influent pipe, mid-point samples are a composite of samples from the eastern and western sample ports between the settling tanks and media filter, and the effluent samples are collected from the effluent pipe from the middle tank.

2.3 Drainage Areas

Several CM/media filter locations (CM-1, CM-9, CM-3, the B-1 media filter, and the upper lot media filter) and the southern detention bioswale have multiple influent drainage areas:

- CM-1 receives runoff from an eastern tributary comprised of runoff from a largely undeveloped hillside and part of Building 212 (now demolished), a western tributary comprising paved road and ELV hillside runoff (ELV hillside runoff is only reflected in samples collected prior to November 2013), and another area mainly comprised of road runoff;
- CM-9 receives runoff from the Area I Landfill (A1LF) and former Building 1324 parking lot (demolished Summer/Fall 2011), as well as the paved road to the east (Area II road);
- B-1 receives runoff from the north, comprised of paved road runoff, and the south, comprised of the upper B-1 ISRA areas, the sedimentation basin, and paved road runoff.
- The southern detention bioswale receives runoff discharged from the rock crib swale and the paved area adjacent to the detention bioswales (contractor laydown area).

- The upper lot media filter receives runoff from the south/southeast of the road, which is predominately comprised of the hillside, and the southwest (via the culvert), which consists of both the parking lot and hillside.
- CM-3 receives runoff from the hillside south of the road (including a clean soil borrow area at the top of the watershed), in addition to a small portion of the road runoff (after the road runoff inlet was completed in May 2017).

Influent locations used in the paired analyses were evaluated on a case-by-case basis, with similar sample dates taking precedence (between influent and effluent); in instances when two or three influent samples were available for the same effluent-sampling storm event, an impervious area-weighted average (used as an estimate of proportioned flowrate from each influent stream) was used to represent a single composite influent value.

Background monitoring sites at CM-3, CM-8, and CM-11[18] receive runoff from drainage areas that do not include any known historic industrial activities, although the CM-3 drainage area does include a clean soil borrow area at the top of the watershed. Therefore, influent sample results at these three CM locations (not including CM-3 road runoff) are of relatively good quality and considered reflective of "background" stormwater concentrations, making it difficult to achieve additional COC reductions through these CMs. These "background" CM locations were therefore statistically evaluated separately from the other CM locations. Sampling at these background CM locations was discontinued following the 2010/2011 reporting year, with the exception of the road runoff inlet to CM-3, which was completed in May 2017 and sampling was initiated again during the 2016/2017 reporting year.

The BMPs discussed in this memo and their respective drainage areas are shown in Table 4. The approximate percent impervious cover and portion of the drainage area burned during the Woolsey Fire is also shown in Table 4, for each BMP. While these areas are discussed specifically with respect to performance monitoring data, there are other areas of the SSFL site which are also addressed by BMPs, including CMs, asphalt removal, erosion control, and treatment control BMPs.

[18] For all previous annual reports, the eastern tributary to CM-1 was considered to reflect background concentrations. Upon review of newly acquired information, it was recently determined that the CM-1 eastern tributary should not be considered representative of background concentrations, and this annual report (and subsequent annual reports) reflect that.

Table 4. BMP Sites and Drainage Areas

BMP	Drainage Area (acres)	Approximate Impervious Cover (%)	Approximate Portion of Drainage Area Burned by Woolsey Fire (%)
CM-1	52.8 (pre-ELV improvements) 45.4 (post-ELV improvements)	6.5 10	87
CM-3	16.6 0.25 (road runoff)	6 100	89 0
CM-8	2.6	36	11
CM-9	10.2	48	0
CM-11	5.7	26	31
B-1 Media Filter	8.6	53	0
ELV Treatment BMP	15.6 (Helipad plug in place) 6.6 (Helipad plug removed)	26 37	0
Lower Lot Biofilter	29.9[1]	53	38[2]
Northern Detention Bioswale	2.6	50	31
Southern Detention Bioswale	14.2		60
Upper Lot Media Filter	5.1	35	2
Boeing Admin Area Inlet Filters	0.86	82	0

[1] A portion of the 24-inch stormdrain drainage area is diverted to the lower lot biofilter for treatment. As a result, the percent of runoff volume captured and treated from the smaller (approximately 11.7 acre) lower lot drainage area is greater than the percent of long-term runoff volume captured and treated from the larger (approximately 18.2 acre) 24-inch stormdrain drainage area. The average impervious cover of the smaller lower lot drainage area of 11.7 acres is 60%.

[2] Represents the portion of the smaller lower lot drainage area (11.7 acres) that was burned.

Regarding COCs entering the BMPs following the Woolsey fire, elevated influent concentrations post-fire were observed for all four analytes (lead, TSS, copper, and dioxins) at CM-1[19]. CM-9 also exhibited higher influent concentration following the Woolsey fire, even though the drainage area was not burned, but the increases in influent concentrations were less than with CM-1[20]. Elevated concentrations were also observed post-fire for dioxins only at the ELV treatment BMP and TSS only at the upper lot media filter[21]. Significant changes in influent concentrations were not observed pre vs. post fire at the southern detention bioswale, CM-3, or the lower lot biofilter, all of which had significant portions of the drainage area burned. Effects related to the Woolsey fire were discussed in more detail in the 2018/2019 annual report.

[19] Influent concentrations pre vs. post fire at CM-1 are 24 vs. 40 mg/L for TSS, 2.9E-08 vs. 1.3E-05 µg/L for dioxins, 1.8 vs. 3.7 µg/L for lead, and 2.9 vs. 3.9 µg/L for copper.

[20] Influent concentrations pre vs. post fire at CM-9 are 27 vs. 44 mg/L for TSS, 6.4E-08 vs. 7.9E-08 µg/L for dioxins, 7.3 vs. 11.7 µg/L for lead, and 6.6 vs. 8.8 µg/L for copper.

[21] Influent concentrations pre vs. post fire at the ELV treatment BMP are 1.0E-08 vs. 1.8E-07 µg/L for dioxins. Influent concentrations pre vs. post fire at the upper lot media filter are 15 vs. 30 mg/L for TSS.

3. Multiple BMP Box Plots

Multiple BMP box plots for TSS, dioxins, and lead for all BMPs presented herein are shown in Figure 2, Figure 3, and Figure 4, respectively. These plots illustrate basic statistics of influent and effluent performance data, relative to each of the CM/media filter sites (B-1, upper lot media filter, CM-3 [post 2017/2018], CM-9, and CM-1 non-background sites), the lower lot biofilter, ELV treatment BMP, the detention bioswales, and the Boeing admin area inlet filters. As shown in Figure 1, the box plots reflect the median, 25th percentile, 75th percentile, 1.5 quartile values, in addition to less common values outside of the 1.5 quartiles, if applicable (shown as diamonds). These plots reflect paired data results only (the same data used in the statistical analyses, influent vs. effluent correlation charts, and probability plots). These plots are intended to illustrate the range of influent and effluent concentrations at each BMP and also show how influent and effluent concentrations compare (i.e., overall lower, higher, or equal effluent concentrations compared to the influent concentrations). If very unequal sample numbers were included in these plots, the comparison between influent and effluent concentrations would be misleading, such as if there were a much larger number of influent or effluent sample results compared to the other.

The amount of overlap of the boxes indicates visual differences in the influent and effluent concentrations. Influent and effluent datasets that are widely separated (such as dioxins at the lower lot biofilter) indicate more robust controls. Influent and effluent datasets that have substantial overlaps[22] (such as TSS also at the lower lot biofilter) indicate similar influent and effluent concentrations. The Admin area inlet filter only has four data pairs available. Available data are shown in the box plot for this filter; however, it is not possible to make conclusions on their performance until additional data become available.

For TSS, the detention bioswales was the only BMP to show no overlap between the interquartile ranges (IQR) of the influent and effluent concentrations. Although an overall decrease was noted for the CM/media filter sites and the lower lot biofilter, the differences in the box plots are still significant due to the large number of observations available. The ELV treatment BMP also shows large overlaps between the influent and effluent boxes, with an overall significant increase in TSS concentration observed.

For dioxins, the lower lot biofilter and detention bioswales did not show any overlap in the IQR of the influent and effluent boxes, with a decrease in concentrations from the influent to effluent. The CM/media filter sites and ELV treatment BMP both show an overall decrease in concentrations from the influent to effluent locations, but with more overlap in the influent and effluent boxes.

For lead, the CM/media filter sites, ELV treatment BMP, and the detention bioswales all show an overall decrease in concentration from the influent to effluent, but with overlap in the boxes for the CM/media filter sites and ELV treatment BMP, and no overlap in the IQRs for the detention bioswales. The lower lot

[22] For small to intermediate data sets, if the median value of one set was larger than the 75th percentile value of the other set, or smaller than the 25th percentile value of the other set, it is expected that the sets are statistically different. For large datasets, less overlap between the two datasets may be present and they may still be statistically different. However, wider separation generally results in more robust performance.

biofilter showed similar concentrations of lead in the influent and effluent, as also indicated by the large overlap in the boxes.

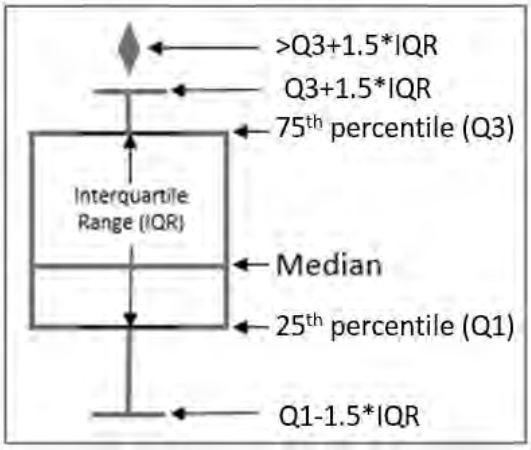

Figure 1. Box Plot Legend (example, not to scale)

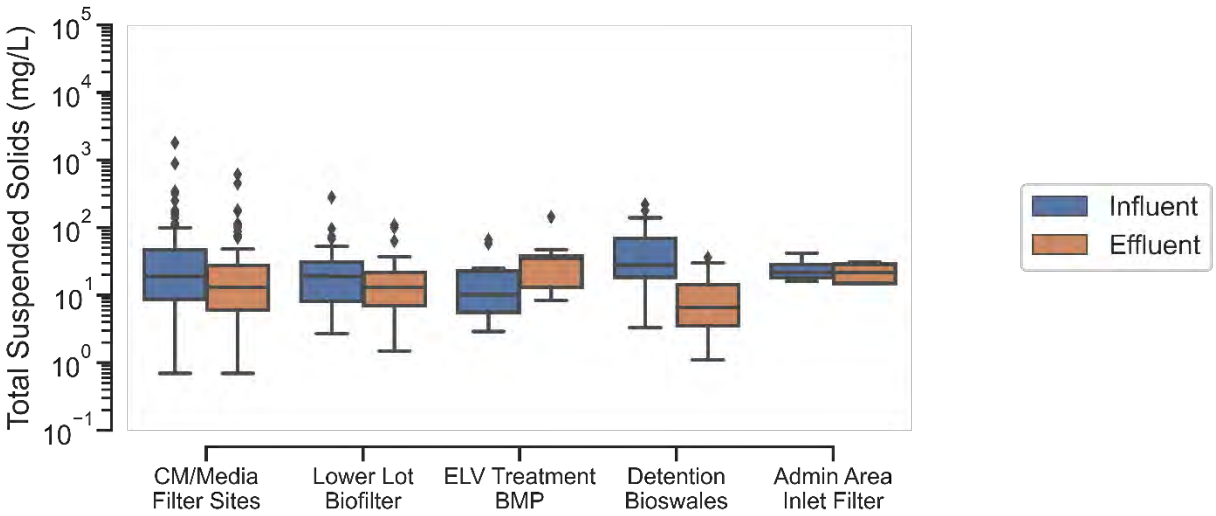

Figure 2. Multiple BMP Box Plot for TSS

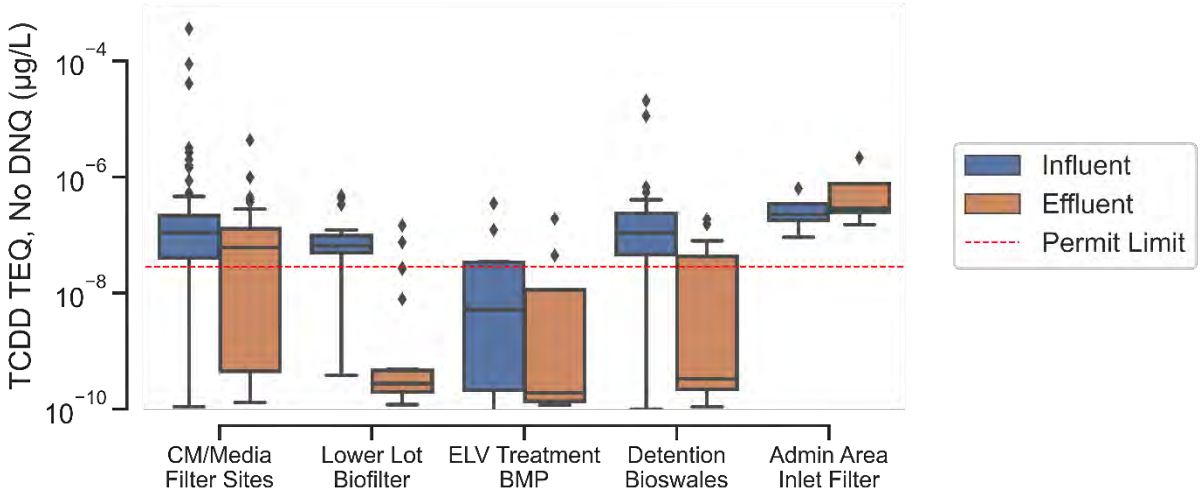

Figure 3. Multiple BMP Box Plot for Dioxins

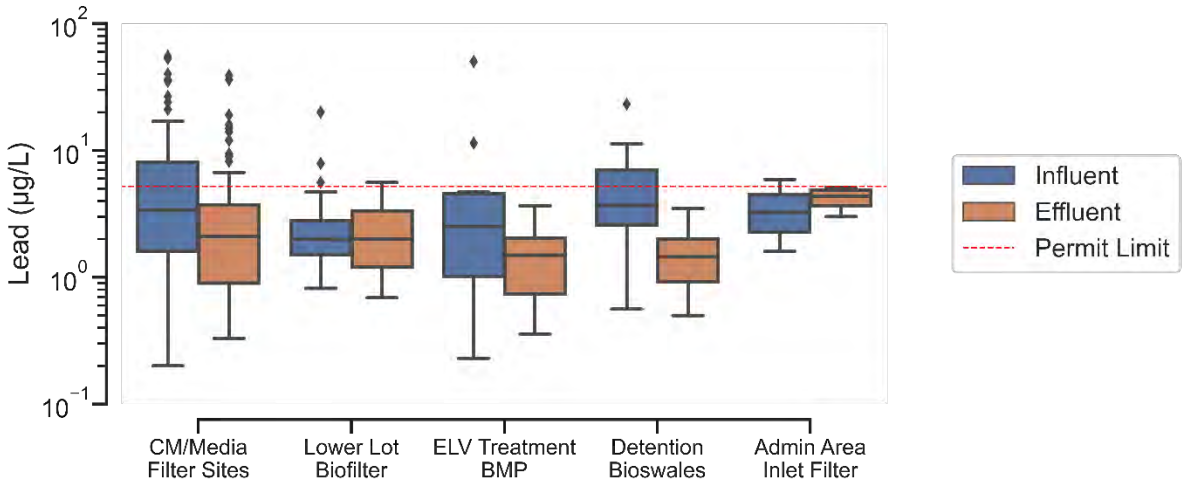

Figure 4. Multiple BMP Box Plot for Lead

4. Statistical Analysis

Statistical summaries of the Site cumulative paired data over the 2009-2021 sampling period using the non-parametric one-tailed sign test are shown for the paired datasets in Table 5 through Table 13. This test is used to evaluate statistical differences between paired data points, or in this case, between influent and effluent stormwater samples. The null hypothesis is that the number of data pairs showing an increase from influent to effluent concentrations equals the number of data pairs showing a decrease in concentration from the influent to effluent samples. If the p-value is less than 0.05, the null hypothesis is rejected with a 95 percent level of confidence. Rejection of the null hypothesis results in a statistically significant difference in the number of data pairs that show an increase in concentration from the influent to effluent and data pairs with a decrease in concentration from influent to effluent. If the p-value is greater than 0.05, there are insufficient numbers of paired data sets to indicate a significant difference. For this analysis, data pairs that were taken during observed bypass/overflow events were removed (specific locations, events, and rainfall characteristics were listed previously in Section 3).

4.1 Culvert Modification/Media Filter Areas

At the monitored CMs and media filters (B-1, CM-1, CM-3, CM-8, CM-9, CM-11, and the upper lot media filter), the total number of combined influent and effluent data pairs ranged from 101 (for dioxins) to 118 (for TSS)[23]. Table 5 and Table 6 summarize the paired data statistics for these locations. CM-8 and CM-11 paired statistics are presented separately from the other locations because they serve as a background evaluation (Table 6). The influent flows to these sites come largely from background sites. Therefore, significant reduction of the COC concentrations (which are generally very low) in those flows by CMs is unlikely (although fairly significant reduction of the average and median concentrations for lead was observed). No paired data were collected from these background sites in the 2020/2021 reporting year. Data from the CM-3 background site (pre-2016/2017) were excluded since post-storm dry weather flows were observed at the outlet between February 2010 and March 2011 when no flows were observed entering the culvert, suggesting subsurface inflows were contributing to effluent samples. Therefore, this CM cannot be reliably assessed based on the effluent sample results (pre-2016/2017). Samples collected for road runoff to CM-3 during 2019/2020 are included in the statistical analyses[24].

At the B-1 media filter site, media washout was observed during initial sampling dates in the 2011/2012 reporting year. Since this was a malfunction that was subsequently corrected, results from these sample dates were removed from the analysis. The CM-1 effluent sample collected on 2/28/2014 represented a blend of underdrain flow and seepage through the upstream weir boards. A leaking seal was noted at

[23] Because copper is not included as a pollutant of concern in the Expert Panel Work Plan for watershed 009, which was submitted to the Regional Board in September 2015, results for copper are not included herein.

[24] Samples for road runoff to CM-3 from 2016/2017 and 2018/2019 are not included in the statistical analyses because an influent/effluent data pair was not collected. No samples were collected in 2017/2018. Severe sedimentation was observed at CM-3 during 2018/2019, which hindered sample collection until cleaned. Performance at CM-3 was also likely hindered due to the sedimentation.

CM-1 on 3/3/2017. It is unclear if this condition was also present during the 2/17/2017 sample that resulted in an exceedance of Permit Limits for dioxins. These results were included in the analysis.

Table 5 shows the number of influent samples with higher concentrations than their paired effluent samples, which shows an improvement in water quality from the influent to effluent of the CM/media filter. In the non-background CMs, the majority of sample pairs had higher influent concentrations than their paired effluent (66%, 63%, and 72% of total pairs of observations had influent samples with larger concentrations than effluent samples for TSS, dioxins, and lead, respectively). In addition, the number of data pairs with influent concentrations greater than the effluent concentrations were found to be statistically significant (p-value ≤ 0.05) for TSS, lead, and dioxins.

Table 5. CM-1, CM-9, CM-3, B-1, and Upper Lot Media Filter Combined Non-Background Statistical Analysis

	TSS (mg/L)		Dioxin (µg/L)		Lead (µg/L)	
	Influent	**Effluent**	**Influent**	**Effluent**	**Influent**	**Effluent**
Minimum	0.70	0.53	1.0E-12	1.0E-12	0.09	0.09
Maximum	1,800	610	3.6E-04	9.8E-07	55	39
Average	64	28	5.6E-06	6.3E-08	6.2	3.1
Median	17	11	5.8E-08	1.4E-09	2.8	1.6
Standard Deviation	205	68	3.9E-05	1.3E-07	10	5.1
Coefficient of Variation (COV)	3.2	2.4	7.0	2.0	1.6	1.6
Total pairs of observations	97		90		97	
Number of influent samples having larger concentrations than effluent samples	64		57		70	
Number of effluent samples having larger concentrations than influent samples	29		16		22	
Number of samples having equal influent and effluent concentrations	4		17		5	
p-value by paired nonparametric sign test[1]	<0.001 (statistically significant removal)		<0.001 (statistically significant removal)		<0.001 (statistically significant removal)	

[1] One-tail sign test used to evaluate data. P values of ≤ 0.05 are considered statistically significant.

There were a statistically significant (p-value ≤ 0.05) number of paired samples where the influent concentration was greater than the paired effluent concentration (compared to paired data where the effluent concentration was greater than the paired influent concentration) for TSS and lead at background sites, as shown in Table 6. It should be noted that no data were collected from these sites in the most recent reporting year. In addition, as noted earlier, the influent concentrations at these sites are very low (only one of the dioxins samples at these sites, either influent or effluent, were above Permit Limits), so further reductions would be difficult to achieve.

Table 6. CM-8 and CM-11 Combined Background Statistical Analysis[1]

	TSS (mg/L)		Dioxin (µg/L)		Lead (µg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent
Minimum	1.0	1.0	1.0E-12	1.0E-12	0.20	0.20
Maximum	82	33	1.5E-10	3.5E-10	11	7.0
Average	13	7.6	2.7E-11	6.9E-11	3.2	1.6
Median	3.0	2.0	1.0E-12	1.0E-12	0.58	0.29
Standard Deviation	20.8	9.6	5.8E-11	1.3E-10	4.5	2.2
Coefficient of Variation (COV)	1.6	1.3	2.1	1.9	1.4	1.4
Total pairs of observations	21		11		10	
Number of influent samples having larger concentrations than effluent samples	13		1		7	
Number of effluent samples having larger concentrations than influent samples	3		3		1	
Number of samples having equal influent and effluent concentrations	5		7		2	
p-value by paired nonparametric sign test[2]	<0.001 (statistically significant removal)		0.31[3] (insufficient amount of data to show a significant difference)		0.011 (statistically significant removal)	

[1] As noted earlier in this memorandum, the CM-3 performance (pre-2016/2017) cannot be reliably assessed based on the effluent sample results. For this reason, the CM-3 paired data were excluded from the statistical analysis presented in this table.

[2] One-tail sign test used to evaluate data. P values of ≤ 0.05 are considered statistically significant.

[3] Due to the high number of samples having equal influent and effluent concentrations (due to non-detects), the total number of data pairs was assumed to be four for purposes of calculating the p-value.

4.2 Lower Lot Biofilter Treatment Train

To date, samples were collected from the lower lot biofilter during 32 rain events that occurred after the construction was completed and fully functional, with samples collected at all three locations within the biofilter treatment train (influent, post-sedimentation basin, and post-biofilter) during 29 events from 2012/2013 through 2020/2021, two locations (influent and post-biofilter) for a single rain event in the 2013/2014 reporting year[25], and two locations (post-sedimentation basin and post-biofilter) for two events in 2018/2019. The post-biofilter samples collected in early 2014 represents a blend of filtered underdrain water and overflow. During one event in the 2014/2015 reporting year, unusually turbid water was observed in the biofilter; this may have been due to sediment-laden run-on from the Building 1436 demolition area. Table 7, Table 8, and Table 9 summarize the paired sampling data for the biofilter.

Figure 5. A photo of the biofilter on 3/13/2018

[25] A sample was not taken at the biofilter inlet (post-sedimentation basin) during the 2013/2014 sampling year due to the sample location being submerged and inaccessible.

For TSS, the majority of data pairs had higher influent concentrations than their paired effluent concentrations for all steps of the treatment train (influent runoff to the sedimentation basin outlet, the sedimentation basin outlet to the biofilter outlet, and influent to biofilter outlet), as shown in Table 7, Table 8, and Table 9, respectively.

The majority of data pairs also showed a decrease in dioxins concentration through all steps of the treatment train for all years. Across the system (influent runoff to the biofilter outlet), only one sample pair had effluent dioxins concentrations with higher concentrations than their paired influent sample.

For lead, the majority of samples from the influent runoff to the sedimentation basin outlet and across the system (influent runoff to biofilter outlet) exhibited a decrease in lead concentration, as shown in Table 7 and Table 9, respectively. However, for the sedimentation basin outlet to the biofilter outlet (Table 8), the majority of sample pairs showed higher effluent lead concentrations than their paired influent concentration.

Considering the entire system (influent runoff to the biofilter outlet), dioxin was the only COC to show a statistically significant (p-value ≤ 0.05) number of paired samples that decreased in concentration from the influent runoff to the biofilter outlet. There were insufficient data to show statistically significant reduction for TSS and lead.

Table 7. Lower Lot Biofilter Performance Data – Influent Runoff to Sedimentation Basin Outlet

	TSS (mg/L)		Dioxin (µg/L)		Lead (µg/L)	
	Influent	**Effluent**	**Influent**	**Effluent**	**Influent**	**Effluent**
Minimum	2.7	2.5	1.0E-12	1.0E-12	0.8	0.7
Maximum	280	110	4.7E-07	2.8E-07	20	6.6
Average	33	23	8.7E-08	6.6E-08	2.9	2.1
Median	18	12	5.8E-08	4.7E-08	2.0	1.7
Standard Deviation	53	27	9.5E-08	6.9E-08	3.6	1.5
Coefficient of Variation (COV)	1.6	1.16	1.1	1.06	1.2	0.73
Total pairs of observations	29		29		29	
Number of influent samples having larger concentrations than effluent samples	19		20		21	
Number of effluent samples having larger concentrations than influent samples	10		8		6	
Number of samples having equal influent and effluent concentrations	0		1		2	
p-value by paired nonparametric sign test[1]	0.068 (insufficient amount of data to show a significant difference)		0.012 (statistically significant removal)		0.0012 (statistically significant removal)	

[1] One-tail sign test used to evaluate data. P values of ≤ 0.05 are considered statistically significant.

Table 8. Lower Lot Biofilter Performance Data – Sedimentation Basin Outlet to Biofilter Outlet

	TSS (mg/L)		Dioxin (µg/L)		Lead (µg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent
Minimum	2.5	1.5	1.0E-12	1.0E-12	0.7	0.5
Maximum	110	110	2.8E-07	1.5E-07	6.6	5.6
Average	23	20	6.5E-08	8.8E-09	2.1	2.1
Median	12	13	4.7E-08	2.0E-10	1.7	1.6
Standard Deviation	26	26	6.7E-08	2.8E-08	1.5	1.4
Coefficient of Variation (COV)	1.2	1.27	1.04	3.2	0.71	0.68
Total pairs of observations	31		31		31	
Number of influent samples having larger concentrations than effluent samples	18		27		15	
Number of effluent samples having larger concentrations than influent samples	11		2		16	
Number of samples having equal influent and effluent concentrations	2		2		0	
p-value by paired nonparametric sign test[1]	0.075 (insufficient amount of data to show a significant difference)		<0.001 (statistically significant removal)		0.50 (insufficient amount of data to show a significant difference)	

[1] One-tail sign test used to evaluate data. P values of ≤ 0.05 are considered statistically significant.

Table 9. Overall Lower Lot Biofilter Performance Data – Influent Runoff to Biofilter Outlet

	TSS (mg/L)		Dioxin (µg/L)		Lead (µg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent
Minimum	2.7	1.5	1.0E-12	1.0E-12	0.8	0.5
Maximum	280	110	4.7E-07	1.5E-07	20	5.6
Average	33	21	9.8E-08	9.5E-09	3.0	2.2
Median	19	13	6.2E-08	2.1E-10	2.0	1.8
Standard Deviation	52	26	1.1E-07	3.0E-08	3.6	1.5
Coefficient of Variation (COV)	1.6	1.22	1.2	3.1	1.2	0.67
Total pairs of observations	30		30		30	
Number of influent samples having larger concentrations than effluent samples	18		28		16	
Number of effluent samples having larger concentrations than influent samples	12		1		12	
Number of samples having equal influent and effluent concentrations	0		1		2	
p-value by paired nonparametric sign test[1]	0.18 (insufficient amount of data to show a significant difference)		<0.001 (statistically significant removal)		0.18 (insufficient amount of data to show a significant difference)	

[1] One-tail sign test used to evaluate data. P values of ≤ 0.05 are considered statistically significant.

4.3 ELV Treatment BMP

To date, samples have been collected from the ELV treatment BMP during 15 events from 2013/2014 through 2019/2020. Samples were not collected during the 2020/2021 reporting year due to lack of flow. Sampling was not conducted during the 2018/2019 reporting year due to a power outage at the ELV treatment BMP associated with the Woolsey fire, which destroyed the electrical infrastructure. To prevent future power outages at the ELV treatment location, a generator was added to the ELV system as the main power source, since electrical lines were not replaced in this area to reduce the risk of future fires. Samples were collected at three locations within the ELV treatment train (influent, sedimentation tank outlet, and media tank effluent) during 11 of these events. Samples were only collected at two locations (influent and effluent) during one event, the effluent location only for one event, and the effluent and mid-point location during two events.

Extenuating circumstances relevant to this site during the February/March 2014 storm event included high flows from Helipad Road to the ELV treatment system (resulting in excess inflows to the sump), inadequate erosion controls along the earthen ELV channel (resulting in excess sediment in the sump [approximately one foot of deposited sediment in the sump and less than an inch in the sedimentation tanks]), and a power outage (resulting in the sump pump not operating during part of the storm). The February/March 2014 ELV treatment BMP effluent data are still considered representative for the analysis herein, although it is recognized that because this monitoring event was the first at the ELV, washout of fines from the media bed may have been occurring. The system has been improved to avoid these issues.

Table 10, Table 11, and Table 12 summarize the paired data for this location. The majority of data pairs from the influent to the sedimentation tank effluent showed a decrease in TSS concentrations. However, there were more effluent samples with higher TSS concentrations than their paired influent samples from the sedimentation tank effluent to the media tank effluent and from the influent to the media tank effluent. For one of the two cases where a net increase in TSS occurred during the 2013/2014 reporting year, the ELV treatment BMP was heavily loaded by sediments eroded from the denuded ELV channel prior to implementation of recent erosion control improvements.

For each step of the treatment train, the majority of sample pairs had influent dioxin concentrations higher than their paired effluent concentrations. For lead, the majority of sample pairs showed decreasing lead concentrations from the influent to the sedimentation tank effluent and influent to the media tank effluent. However, there were more sample pairs with higher media tank effluent lead concentrations when compared to their paired sedimentation basin tank effluent concentrations.

Across the system from the influent to the media tank effluent, the number of influent samples with higher concentrations than their paired effluent samples was statistically significant (p-value ≤ 0.05) for dioxins and lead, while TSS showed a statistically significant number of effluent samples with higher TSS concentrations than their paired influent concentrations, based on the number of samples.

Table 10. ELV Treatment BMP Performance Data – Influent to Sedimentation Tank Effluent

	TSS (mg/L)		Dioxin (µg/L)		Lead (µg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent
Minimum	2.9	1.0	1.0E-12	1.0E-12	0.2	0.2
Maximum	66	47	3.5E-07	3.6E-07	50	3.5
Average	19	11	4.1E-08	3.3E-08	7.3	1.4
Median	7	7	5.1E-10	2.5E-10	2.0	1.1
Standard Deviation	22	14	1.0E-07	1.1E-07	14.6	1.05
Coefficient of Variation (COV)	1.18	1.24	2.49	3.29	2.00	0.72
Total pairs of observations	11		11		11	
Number of influent samples having larger concentrations than effluent samples	9		8		8	
Number of effluent samples having larger concentrations than influent samples	2		2		3	
Number of samples having equal influent and effluent concentrations	0		1		0	
p-value by paired nonparametric sign test[1]	0.030 (statistically significant removal)		0.030 (statistically significant removal)		0.11 (insufficient amount of data to show a significant difference)	

[1] One-tail sign test used to evaluate data. P values of ≤ 0.05 are considered statistically significant.

Table 11. ELV Treatment BMP Performance Data – Sedimentation Tank Effluent to Media Tank Effluent

	TSS (mg/L)		Dioxin (µg/L)		Lead (µg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent
Minimum	0.8	8	1.0E-12	1.0E-12	0.2	0.4
Maximum	47	144	3.6E-07	1.9E-07	3.5	3.7
Average	9	36	2.8E-08	1.5E-08	1.3	1.4
Median	4	35	2.4E-10	1.2E-10	0.9	1.2
Standard Deviation	13	37	1.0E-07	5.3E-08	1.01	0.97
Coefficient of Variation (COV)	1.36	1.01	3.58	3.58	0.77	0.67
Total pairs of observations	13		13		13	
Number of influent samples having larger concentrations than effluent samples	0		9		4	
Number of effluent samples having larger concentrations than influent samples	13		0		9	
Number of samples having equal influent and effluent concentrations	0		4		0	
p-value by paired nonparametric sign test[1]	<0.001[2] (statistically significant increase)		<0.001 (statistically significant removal)		0.13 (insufficient amount of data to show a significant difference)	

[1] One-tail sign test used to evaluate data. P values of ≤ 0.05 are considered statistically significant.

[2] The number of effluent samples with higher TSS concentrations than their paired influent samples is statistically significant (statistically significant increase in concentration from sedimentation tank effluent to media tank effluent).

Table 12. ELV Treatment BMP Performance Data – Influent to Media Tank Effluent

	TSS (mg/L)		Dioxin (µg/L)		Lead (µg/L)	
	Influent	**Effluent**	**Influent**	**Effluent**	**Influent**	**Effluent**
Minimum	2.9	8	1.0E-12	1.0E-12	0.2	0.4
Maximum	66	144	3.5E-07	1.9E-07	50	3.7
Average	19	36	4.8E-08	2.0E-08	7.0	1.6
Median	10	35	5.3E-09	1.3E-10	2.5	1.5
Standard Deviation	21	37	1.0E-07	5.6E-08	13.9	0.98
Coefficient of Variation (COV)	1.11	1.01	2.1	2.8	1.99	0.62
Total pairs of observations	12		12		12	
Number of influent samples having larger concentrations than effluent samples	1		10		9	
Number of effluent samples having larger concentrations than influent samples	10		1		2	
Number of samples having equal influent and effluent concentrations	1		1		1	
p-value by paired nonparametric sign test[1]	0.003[2] (statistically significant increase)		0.003 (statistically significant removal)		0.019 (statistically significant removal)	

[1] One-tail sign test used to evaluate data. P values of ≤ 0.05 are considered statistically significant.

[2] The number of effluent samples with higher TSS concentrations than their paired influent samples is statistically significant (statistically significant increase in concentration from influent to media tank effluent).

4.4 Detention Bioswales

Influent and effluent sample pairs were collected from the detention bioswales for the first time during the 2015/2016 reporting year[26]. Samples were collected at three locations representing the southern detention bioswale: two influent locations (the rock crib swale outlet and runoff from the adjacent contractor laydown area) and the effluent location. Results from the two influent locations were flow-weighted to determine a representative influent concentration. The southern detention bioswale was sampled during 26 rain events during the 2015/2016 through 2020/2021 reporting years. However, the effluent was not sampled for two of these events, the influent was not sampled for another two events, and only a single influent sample was collected for two events (so the influent sample was not flow-weighted and only represented runoff from the adjacent contractor laydown area). Therefore, a total of 22 data pairs representing the southern detention bioswale performance have been collected.

The northern detention bioswale was sampled during 18 rain events between 2014/2015 and 2016/2017. However, only the effluent location was sampled for 10 of these events, resulting in eight total sample pairs. Sampling at the northern detention bioswale was discontinued after 2016/2017.

Table 13 summarizes the paired data for this location. Performance data represents both the northern and southern detention bioswales combined. For TSS, dioxins, and lead, the majority of data pairs had influent concentrations that were higher than their paired effluent concentrations. The number of

[26] The effluent location for the northern detention bioswale (ILBMP0007) was sampled during the 2014/2015 reporting year. However, the influent location (ILBMP0006) was not sampled until 2015/2016.

influent samples with higher concentrations than their paired effluent samples were found to be statistically significant (p-value ≤ 0.05) for all three COCs.

The southern and northern detention bioswales were analyzed together in order to assess BMPs of a similar design. However, as shown in the paired line plots, the southern detention bioswale had a greater proportion of sample pairs that showed a decrease in concentration from the influent to effluent, for all three COCs, compared to the northern detention bioswale. However, the influent concentrations at the southern bioswale were typically greater than for the northern bioswale; therefore more likely to show a decrease in concentration.

Table 13. Southern and Northern Detention Bioswale Combined Performance Data

	TSS (mg/L)		Dioxin (µg/L)		Lead (µg/L)	
	Influent	**Effluent**	**Influent**	**Effluent**	**Influent**	**Effluent**
Minimum	0.5	1.1	1.0E-12	1.0E-12	0.50	0.50
Maximum	220	36	2.1E-05	1.9E-07	23	3.5
Average	49	10	1.2E-06	1.9E-08	4.8	1.5
Median	28	7	8.3E-08	2.1E-10	3.2	1.4
Standard Deviation	54	9.4	4.2E-06	4.6E-08	4.7	0.85
Coefficient of Variation (COV)	1.11	0.90	3.5	2.4	0.96	0.57
Total pairs of observations	30		30		30	
Number of influent samples having larger concentrations than effluent samples	24		26		23	
Number of effluent samples having larger concentrations than influent samples	6		1		6	
Number of samples having equal influent and effluent concentrations	0		3		1	
p-value by paired nonparametric sign test[1]	<0.001 (statistically significant removal)		<0.001 (statistically significant removal)		<0.001 (statistically significant removal)	

[1] One-tail sign test used to evaluate data. P values of ≤ 0.05 are considered statistically significant.

4.5 Boeing Admin Area Inlet Filters

The Boeing admin area inlet filters were installed in 2017 and were sampled for the first time during the 2018/2019 reporting year (paired samples were collected during one event, prior to the filter lip being sealed to prevent bypass). Paired samples were collected during two events during 2019/2020 and one event during 2020/2021. Therefore, four total sample pairs have been collected at the Boeing admin area inlet filters. Although observations regarding performance are included below, it is important to note that only four data pairs are available, and additional data are needed to evaluate performance of the Boeing admin area inlet filters.

Table 14 summarizes the paired data for this Boeing admin area inlet filters. For TSS, the majority of data pairs had influent concentrations that were higher than their paired effluent concentrations. For dioxins, more data pairs had effluent concentrations that were higher than their paired influent concentrations. There were an equal number of data pairs with effluent concentrations that were higher than their paired influent concentrations as data pairs with influent concentrations that were higher than their paired effluent concentrations.

None of the COCs showed a statistically significant (p-value ≤ 0.05) number of paired samples that decreased in concentration from the influent runoff to the biofilter outlet, based on the number of few samples available.

Table 14. Boeing Admin Area Inlet Filter Performance Data

	TSS (mg/L)		Dioxin (µg/L)		Lead (µg/L)	
	Influent	**Effluent**	**Influent**	**Effluent**	**Influent**	**Effluent**
Minimum	16	15	9.2E-08	1.5E-07	1.6	3.0
Maximum	42	31	6.3E-07	2.1E-06	5.9	5.1
Average	25	22	2.9E-07	7.2E-07	3.5	4.2
Median	22	22	2.3E-07	2.9E-07	3.3	4.4
Standard Deviation	12	8.5	2.3E-07	9.5E-07	1.9	0.95
Coefficient of Variation (COV)	0.46	0.38	0.8	1.3	0.54	0.23
Total pairs of observations	4		4		4	
Number of influent samples having larger concentrations than effluent samples	3		1		2	
Number of effluent samples having larger concentrations than influent samples	1		3		2	
Number of samples having equal influent and effluent concentrations	0		0		0	
p-value by paired nonparametric sign test[1]	0.31 (insufficient amount of data to show a significant difference)		0.31 (insufficient amount of data to show a significant difference)		0.50 (insufficient amount of data to show a significant difference)	

[1] One-tail sign test used to evaluate data. P values of ≤ 0.05 are considered statistically significant.

4.6 Statistical Analysis Summary

A summary of the statistical analyses performed on the paired data presented in this section is shown in Table 15. Based on the number of sample pairs available, a statistically significant difference indicated a decrease in concentrations from the influent to effluent locations for CM/media filter sites (excluding background sites CM-8 and CM-11) and the detention bioswales, for all three COCs. CM-8 and CM-11 background sites showed statistically significant reductions for TSS and lead, and dioxins did not exhibit a statistically significant reduction based on the data available. The lower lot biofilter (influent runoff to biofilter outlet) showed statistically significance reductions only for dioxins (while TSS and lead were not statistically significant based on the number of sample pairs available). The ELV treatment BMP (influent to media tank effluent) showed statistically significant differences for the number of influent samples with higher concentrations than their paired effluent for lead and dioxins. However, TSS at the ELV treatment BMP showed a statistically significant difference indicating higher concentrations than their paired influent samples (showing a net increase across the system). The Boeing admin area inlet filters did not have any COCs that showed a statistically significant difference for the number of influent samples with higher concentrations than their paired effluent. However, only four sample pairs are currently available.

Table 15. Summary of Performance Data, 2009-2020

Location	TSS			Dioxins			Lead		
	Number of Sample Pairs	p-value[1]	Statistically significant decrease observed?	Number of Sample Pairs	p-value[1]	Statistically significant decrease observed?	Number of Sample Pairs	p-value[1]	Statistically significant decrease observed?
CM/media filter non-background (CM-1, CM-9, CM-3, B-1, and Upper Lot Media Filter)	97	<0.001	**Yes**	90	<0.001	**Yes**	97	<0.001	**Yes**
CM-8 and CM-11	21	<0.001	**Yes**	11	0.31	No	10	0.011	**Yes**
Lower Lot Biofilter (Influent Runoff to Biofilter Outlet)	30	0.18	No	30	<0.001	**Yes**	30	0.18	No[2]
ELV Treatment BMP (Influent to Media Tank Effluent)	12	0.003	No[3]	12	0.003	**Yes**	12	0.019	**Yes**
Detention Bioswales	30	<0.001	**Yes**	30	<0.001	**Yes**	30	<0.001	**Yes**
Boeing Admin Area Inlet Filters	4	0.31	No	4	0.31	No	4	0.51	No

[1] One-tail sign test used to evaluate data. P values of ≤ 0.05 are considered statistically significant.

[2] Can likely be attributed to the much lower influent concentrations to the lower lot biofilter in recent years (to be discussed further).

[3] The number of effluent samples with higher TSS concentrations than their paired influent samples is statistically significant (instead of the number of influent samples with higher concentrations than their paired effluent).

5. Comparison to Permit Limits

The BMPs were constructed with the SSFL to reduce COCs prior to stormwater reaching Outfall 009, which is the compliance point for the NPDES permit for the watershed draining to this location. Permit Limits do not apply to the effluent from these BMPs and they were not designed to serve that purpose. However, in this section, as a basis for evaluating effectiveness of the BMPS, we do compare the number of results greater than the Outfall 009 Permit Limits for each of the influent and effluent samples at the CMs/media filters (B-1, CM-1, CM-9, upper lot media filter, and CM-3, excluding the background CMs), the lower lot biofilter, the ELV Treatment BMP, the detention bioswales, and the Boeing admin area inlet filters is shown in Table 16, Table 17, Table 18, Table 19, and Table 20, respectively. The analyses included in Table 16 through Table 20 include all data samples analyzed, not just paired samples. Because this analysis includes samples that do not have associated paired data, the number of influent sample results compared to Permit Limits may be different than the number of effluent samples compared to limits. Only influent and effluent locations for the BMPs are included in this analysis; intermediate locations are not included (e.g., sedimentation basin effluent at the ELV Treatment BMP).

It should be noted that there is no limit for TSS at Outfall 009; it is used to evaluate particulate strength or as a proxy for other constituents.

For all of the non-background CM/media filter sites analyzed, influent concentrations were more often higher than the Outfall 009 Permit Limits as compared to effluent concentrations for both lead and dioxins, as shown in Table 16. The maximum and average ratios of observed concentrations to Permit Limit, for results exceeding Permit Limits, generally show a higher ratio for influent than effluent, for both lead and dioxins, with the exception of lead at B-1 (for the average exceedance ratio). This trend of effluent ratios lower than the influent ratios suggests lead and dioxins reductions through the CMs/media filters. These results enhance the weight of evidence that the BMPs are performing effectively and reducing concentrations, especially when not enough samples are available for all of the statistical tests.

It should be noted that dioxin results for B-1 are skewed by one exceptionally high influent result of $3.6x10^{-4}$ µg/L on 12/2/2014. If that result is removed, then the maximum influent ratio drops to 94 and the average becomes 17. CM-1 is skewed by one dioxin effluent result of $4.3x10^{-6}$ µg/L on 3/17/2012, where the maximum effluent ratio decreases to 35 and the average drops to 7.3 if that result is removed.

Table 16. Influent and Effluent Summary as compared to the Outfall 009 Permit Limits (B-1, CM-1, CM-9, Upper Lot Media Filter, CM-3 [post 2017/2018]), 2009-2021

BMP	Parameter	% of Samples Greater than Permit Limits		Maximum Exceedance Ratio (Exceeding Result : Permit Limit)		Average Exceedance Ratio (Exceeding Result : Permit Limit)	
		Influent	Effluent	Influent	Effluent	Influent	Effluent
B-1	Lead	35%	8.7%	1.8	1.7	1.3	1.5
	TCDD TEQ no DNQ	85%	68%	12,868	10	773	3.9
CM-1	Lead	31%	17%	11	7.5	3.9	3.0
	TCDD TEQ no DNQ	60%	48%	3,149	155	159	15
CM-9	Lead	41%	24%	11	6.9	4.2	2.9
	TCDD TEQ no DNQ	49%	22%	56	5.2	8.5	3.2
Upper Lot Media Filter	Lead	12%	0%	1.2	N/A[1]	1.1	N/A[1]
	TCDD TEQ no DNQ	76%	50%	11	2.7	4.8	1.8
CM-3	Lead	40%	0%	1.7	N/A[1]	1.5	N/A[1]
	TCDD TEQ no DNQ	0%	0%	N/A[1]	N/A[1]	N/A[1]	N/A[1]

[1] Not calculated because there were no exceedances of Permit Limits

The number of results exceeding the Permit Limits for the influent and effluent samples at the lower lot biofilter are summarized in Table 17. Influent concentrations were more often higher than the Outfall 009 Permit Limits as compared to effluent concentrations for lead (three influent vs. one effluent, out of 30 and 32 samples, respectively) and dioxins (26 influent vs. three effluent, out of 30 and 32 samples, respectively). Observation of the maximum and average ratios of observed concentrations to the Permit Limit show that a higher ratio is calculated for influent than effluent samples for lead and dioxins, suggesting reduction in both pollutants through the lower lot biofilter. One exceedance may have been due to a power outage resulting in manual pumping from the cistern to the sediment basin, which could have overloaded the biofilter. A portable generator is now on hand for the biofilter cistern pump as a backup power supply.

Table 17. Influent and Effluent Summary as Compared to the Outfall 009 Permit Limits (Lower Lot Biofilter), 2013-2021

	% of Samples Greater than Permit Limits		Maximum Exceedance Ratio (Exceeding Result : Permit Limit)		Average Exceedance Ratio (Exceeding Result : Permit Limit)	
Parameter	Influent	Effluent	Influent	Effluent	Influent	Effluent
Lead	10%	3.1%	3.8	1.1	2.1	1.1
TCDD TEQ no DNQ	87%	9.4%	17	5.2	4.0	3.3

Similar trends are observed for the ELV treatment BMP, as shown in Table 18. There were a greater number of influent sample concentrations exceeding the Outfall 009 Permit Limits compared to effluent concentrations for lead and dioxins. Only two influent concentrations (out of 12 samples) of lead exceeded the Permit Limit (no effluent samples exceeded), while there were four influent concentrations (out of 12 samples) of dioxins that exceeded the Permit Limit and only two effluent concentrations (out of 15 samples) that exceeded the permit lLimit for dioxins. As observed with the CM

sites and lower lot biofilter, higher maximum and average ratios of observed concentrations to Permit Limits were calculated for influent samples compared to effluent samples. This trend also suggests reduction in lead and dioxins through the ELV treatment BMP.

Table 18. Influent and Effluent Summary as compared to the Outfall 009 Permit Limits (ELV Treatment BMP), 2013-2020

	% of Samples Greater than Permit Limits		Maximum Exceedance Ratio (Exceeding Result : Permit Limit)		Average Exceedance Ratio (Exceeding Result : Permit Limit)	
Parameter	**Influent**	**Effluent**	**Influent**	**Effluent**	**Influent**	**Effluent**
Lead	17%	0%	9.7	N/A[1]	5.9	N/A[1]
TCDD TEQ no DNQ	33%	13%	13	6.9	4.8	4.2

[1] Not calculated because there were no exceedances of Permit Limits

The number of results exceeding the Permit Limits for the influent and effluent samples at the detention bioswales are shown in Table 19. Influent concentrations were more often higher than the Outfall 009 Permit Limits as compared to effluent concentrations for both lead and dioxins. 12 influent concentrations (out of 32 samples) of lead exceeded the Permit Limit, while no effluent concentrations (out of 42 samples) exceeded the Permit Limit for lead. 24 influent concentrations (out of 32 samples) of dioxins exceeded the Permit Limit, and six effluent concentrations (out of 42 samples) exceeded the Permit Limit for dioxins. The maximum and average influent exceedance ratios for dioxins are greater than the effluent ratios, suggesting that dioxins are generally reduced through the detention bioswales.

Table 19. Influent and Effluent Summary as compared to the Outfall 009 Permit Limits (Detention Bioswales), 2015-2021

	% of Samples Greater than Permit Limits		Maximum Exceedance Ratio (Exceeding Result : Permit Limit)		Average Exceedance Ratio (Exceeding Result : Permit Limit)	
Parameter	**Influent**	**Effluent**	**Influent**	**Effluent**	**Influent**	**Effluent**
Lead	38%	0%	4.5	N/A[1]	1.8	N/A[1]
TCDD TEQ no DNQ	75%	14%	737	6.7	54	3.4

[1] Not calculated because there were no exceedances of Permit Limits

The number of results exceeding the Permit Limits for the influent and effluent samples at the Boeing admin area inlet filters are summarized in Table 20. Only four data pairs (influent and effluent samples) are available. For lead, one out of four influent samples were above the permit Limit, and all of the effluent sample results were below the Outfall 009 Permit Limits. For dioxins, all of the influent and effluent sample were above the Permit Limit. The maximum and average ratio of observed concentrations to the Permit Limit for dioxins show a higher ratio for effluent than influent samples, suggesting an increase in concentration through the inlet filter for the available data pairs. Again, the few data available at this location prevents any statistical evaluations.

Table 20. Influent and Effluent Summary as compared to the Outfall 009 Permit Limits (Boeing Admin Area Inlet Filters) 2018-2021

Parameter	% of Samples Greater than Permit Limits		Maximum Exceedance Ratio (Exceeding Result : Permit Limit)		Average Exceedance Ratio (Exceeding Result : Permit Limit)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent
Lead	25%	0%	1.1	N/A[1]	1.1	N/A[1]
TCDD TEQ no DNQ	100%	100%	22	76	11	26

[1] Not calculated because there were no exceedances of Permit Limits

6. Runoff Volume Discharge Analysis

In addition to water quality performance, the lower lot biofilter is also designed to reduce the frequency of smaller storms discharging untreated runoff to the Northern Drainage and thereby discharging via Outfall 009 by retaining the storm runoff and allowing evapotranspiration to take place. It was estimated in 2017 that the average volume pumped to the biofilter has increased from 52,000 gallons per inch of rainfall to 82,000 gallons per inch of rainfall since the detention bioswales were constructed. Similarly, the estimated percent of total runoff volume treated by the lower lot biofilter (from both the 24-inch drain and the lower lot drainage areas) increased from 22% to 44% on average since the detention bioswales were constructed.

To evaluate how many storms have been prevented from discharging to the Northern Drainage this year, a binned presence/absence of discharge plot was developed as shown in Figure 6. All storms sampled since the lower lot biofilter was constructed are included (3/8/2013 to present). The storm events with discharge to the Northern Drainage (i.e., bypass of the low flow diversion weir or treated effluent from the biofilter) were identified and counted. The total number of storm events compared to the number of events where discharge occurred were then binned based on storm depth in one-inch increments. Additionally, this plot shows the percent of discharging events (i.e., number of events with discharge divided by the number of total events for that storm depth bin). As is shown in Figure 6, **the lower lot biofilter successfully prevented just over half of all storms less than or equal to one inch from discharging to the Northern Drainage**, but had decreasing effects for larger rains. Although the BMP will reduce runoff volumes, it is not anticipated to prevent discharge to the Northern Drainage for storms greater than 2 inches.

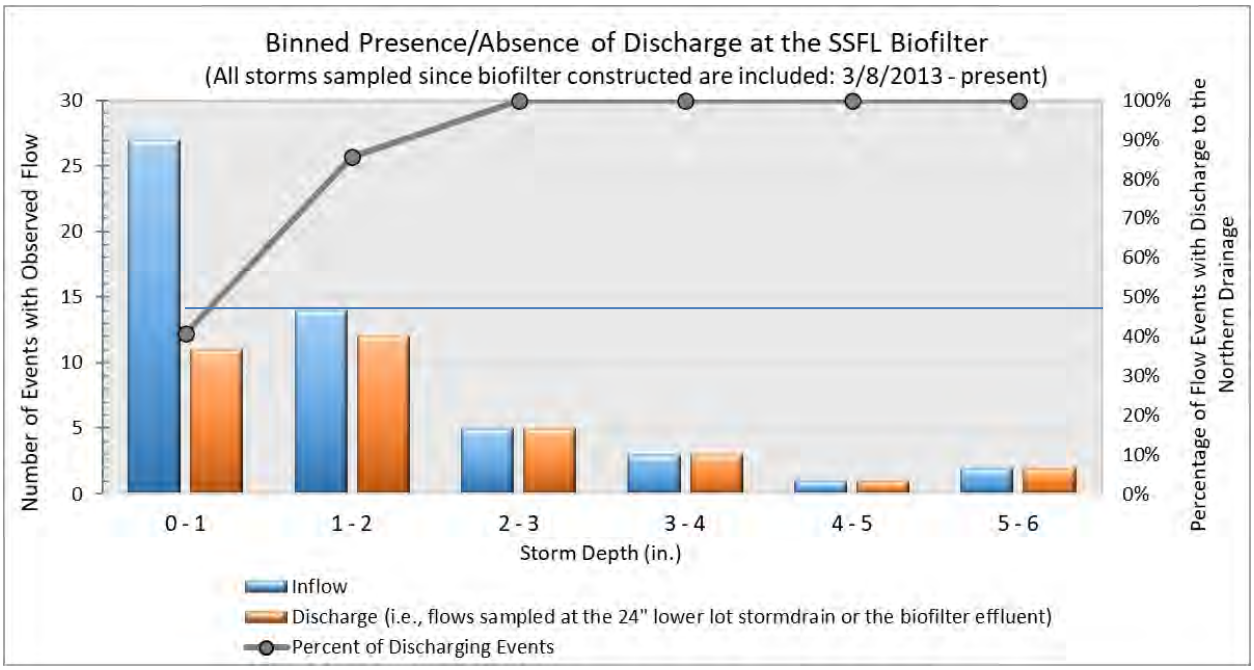

Figure 6. Binned Presence/Absence of Discharge at the SSFL Lower Lot Biofilter

7. Sampling Event Analysis

The Expert Panel evaluated the need for additional sampling at the BMPs in the context of the recent slow-down in site activities particularly in the Outfall 009 watershed. Following the 2016/2017 reporting year, it was decided that until site activities increase, samples would only be collected twice per year at the following BMPs: upper lot media filter, southern detention bioswale, lower lot biofilter, CM-1 (influent-west and effluent), Boeing admin area inlet filters, and the ELV Treatment BMP. The CM-1 influent-east (background) location will continue to be sampled during every storm, in order to collect more background data and because it was recently reconstructed with new media and the upstream ponding volume was increased. No further changes are proposed at this time.

8. Cumulative TSS Loading Analysis

An analysis was performed to calculate the cumulative TSS loading to each BMP thus far, based on historical storm event depths and the measured concentrations of TSS. These values were compared to the estimated sediment load that would result in highly reduced flows through the media which would cause larger volumes of bypassed flows, based on the lab column media performance study by Pitt and Clark (2010).

The estimated TSS loading to each BMP containing media and with sufficient data (ELV Treatment BMP, lower lot biofilter, B-1 media filter, CM-1, CM-9, and the upper lot media filter) was estimated for each storm event where a sample was collected (at either the influent or effluent location[27]). Sampling was reduced at the lower lot biofilter, the ELV Treatment BMP, upper lot media filter, and CM-9 following the 2017/2018 reporting year. Therefore, historical sampling efforts and rainfall patterns were used to approximately predict the storm events that resulted in BMP discharge for storm events that were not sampled, following reduced sampling activities[28]. TSS concentrations were estimated at these BMPs, if it was predicted that the BMP discharged but samples were not collected[29]. The same methodology was followed for the B-1 media filter, where sample ceased following the 2015/2016 reporting year. The estimated cumulative TSS loading was determined using the following steps:

- The average annual percent capture and treatment (i.e., the percentage of incoming runoff that does not bypass the BMP) was determined using USEPA's Storm Water Management Model (SWMM) for each BMP.
- The runoff coefficient for each BMP's drainage area was determined using SWMM, simulated over the average annual year scenario.
- The total area of each BMP's drainage area was determined using available Geographic Information System (GIS) shapefiles.

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[27] In the event that an effluent sample was collected and an influent sample was **not** collected during the same storm event, or vice-versa, the TSS concentration(s) were estimated (to be discussed) to represent the loading of TSS during this specific event.

[28] A logistic regression model was developed to predict if BMPs discharge during storm events (where samples were not collected, due to reduced sampling activities). Average storm intensity (in/hr), maximum storm intensity (in/hr), total rainfall depth (in), and antecedent dry period (days) were used as input variables. Model fitting was performed separately for CM-1, CM-9, ELV treatment BMP, B1 media filter, and Lower Lot Biofilter. The number of observations per test and train dataset ranged between 21 and 49, varying based on the year that the BMP became fully operational and when reduced sampling activities started. There is no model for the Upper Lot Media Filter because only data from reduced sampling years was available for this BMP. The classification accuracy (the ratio of the number of correct predictions to the total number of predictions) was 0.86, 0.93, 1.00, 0.82, and 0.75 for CM-1, CM-9, ELV treatment BMP, B1 media filter, and Lower Lot Biofilter models, respectively.

[29] If TSS loadings were estimated for storm events that were not sampled for a given BMP, the average of all TSS samples from the three rainy seasons preceding and following at that BMP was used to represent the influent and effluent concentrations of TSS during this specific event.

- The runoff volume treated by each BMP during each individual storm event was calculated as follows:
    - Storm event volume treated = BMP drainage area x Storm event rainfall depth x Runoff coefficient of the BMP drainage area x Average annual percent capture
- The storm event TSS loading contributed to each BMP during each individual storm event was then calculated as follows:
    - Storm event TSS loading = Storm event volume treated x Event-dependent TSS concentration retained (influent sample concentration – effluent sample concentration)
- The cumulative TSS loading since implementation of the BMP was calculated by summing the storm event TSS loading results from all storms occurring since the BMP was constructed.
- The media area of each BMP was estimated from plans[30], and the cumulative TSS loading per unit area of media was calculated for each BMP.

For BMPs with pretreatment (ELV Treatment BMP and lower lot biofilter), the "influent" sample used was the sample collected at the effluent of the sedimentation basin or the influent to the media. The cumulative TSS loading per media unit area to each BMP was compared to the estimated sediment load to the media until initial maintenance is needed (about 50 kg/m^2) (Pitt and Clark, 2010). The percentage of cumulative sediment loading until highly reduced treatment flows for each BMP is shown in Table 21.

The estimated number of years until media replacement is needed was calculated for each BMP, assuming an average rainfall amount during the reporting year for all subsequent years, and is also shown in Table 21. This was estimated using a similar procedure outlined above based on an average rainfall year. The long-term average annual rainfall of 16.8 inches was used as the storm event depth and the average influent and effluent TSS concentrations from all sampled events were used as the TSS influent and effluent sample results, respectively. The estimated TSS loading to each BMP (per media area) during an average rainfall year and the number of average years until media replacement is needed is shown in Table 21. It should be noted that varying annual rainfall, in addition to smaller or larger storm events, will result in varying TSS loading and this serves as a rough estimate of when replacement may be expected.

Additional analyses and standing water depth and flow bypass observations were made during the 2016/2017, 2017/2018, 2018/2019, 2019/2020, and 2020/2021 reporting years related to BMP clogging and maintenance.

An analysis of flow monitoring data obtained in 2017 show that CM-9 and CM-1 began with an estimated range of hydraulic conductivities that is close to or exceeds the "average flow rate before initial clogging" of 33 inches per hour from the Media Report (Pitt and Clark, 2010). Over time, these conductivities will be substantially reduced to well below this value suggesting that maintenance may be

[30] For CM-1 and CM-9, it was assumed that the front half of the media mound received flow, especially during small storm events. However, ponding can occur above the media filter, especially during large storm events, and infiltrate over a larger surface area. Therefore, the media area estimate is conservative for CM-1 and CM-9.

needed to remove sediment deposited over the rainy season. Since the media mounds of the CMs are covered with backfill and gravel, it is possible that these surface materials are clogged with sediment and the actual media itself may not be the limiting factor. Therefore, the 2017 analysis shows that media may actually be clogged more than results in Table 21 indicate. Conclusions of this analysis resulted in recommendations to either replace the media or design and construct a new engineered treatment system to better handle larger fractions of the annual flows. This was done at CM-1 in 2018. Since CM-1 was reconstructed and the media was replaced in August 2018, the analysis shown in Table 21 starts in 2018/2019 for CM-1.

Maintenance observations of the BMPs performed during the 2018/2019 reporting year showed that ponding occurred during several storm events (a few inches deep in front of the weir boards) at CM-9. There were no observations of ponding during the 2019/2020 or 2020/2021 reporting years.

This analysis did not evaluate the other CMs this year. However, based on a comparison of their pervious drainage areas compared to CM-1 and CM-9, it is estimated that **CM-3 may need maintenance soon** (potentially after the next rainy season), but CM-8 and CM-11 will not require maintenance in the near future.

It is acknowledged that there are large variations in TSS loading rates, in addition to the percentage of sediment loading to the media until maintenance is needed, among the BMPs. This is a partially a function of controls being installed in the Outfall 009 watershed wherever feasible, such as relatively small CMs installed in locations where the drainage areas are large and thus the loading rates are high.

Table 21. Percent of Cumulative Sediment Loading until Clogging

BMP	Wet Seasons in Operation	Cumulative TSS load (kg)	Cumulative TSS load per media area (kg/m^2)	% of "sediment load to the media until maintenance is needed"	TSS load per media area in average rainfall year (kg/m^2)	Number of average years until media replacement is expected
ELV Treatment BMP	8	1.0	0.050	0.1%	0	100+
Lower Lot Biofilter	8	390	1.8	3.6%	0.64	70
B-1	10	120	6.4	13%	1.8	23
Upper Lot Media Filter	5	79	3.1	6.3%	1.3	35
CM-1[1]	3	39	6.6	13%	2.6	16
CM-9	12	170	29	59%	3.8	5

[1] Restarted in 2018/2019 after BMP reconstruction and media replacement. Prior to reconstruction (which occurred prior to the 2018/2019 rainy season, in August 2018), CM-1 was estimated to have approximately 400 kg of cumulative TSS loading (which represents approximately 136% of the estimated sediment load until maintenance is needed). CM-1 had been in operation nine rainy seasons before reconstruction occurred. As shown in the table, CM-1 is anticipated to need maintenance again in 16 years, which would result in a lifespan of 19 years.

9. Paired Line Plots

The log-scale line plots presented in this section illustrate the changes in measured concentrations between influent and effluent sample pairs at each treatment BMP. Paired data were obtained from CM/media filter locations B-1, CM-1, CM-3, CM-8, CM-9, CM-11, and the upper lot media filter, the ELV treatment BMP, the lower lot biofilter, the detention bioswales, and the Boeing admin area inlet filters. Data are presented by COC in Figure 7 through Figure 61, where paired data measured during the same event are represented by two points (influent and effluent) connected by a line, and single sample results (where either an influent or effluent sample were not collected for a single event) are shown by single points without any connected line. Points and lines are shaded based on the sampling year during which they were collected, where black lines and points represent data from the most recent 2020/2021 reporting year and data from all previous reporting years are shown in gray. In addition, different symbology is used for different influent and effluent sample collection locations, as defined on each graph. Additionally, non-detect results are displayed as the detection limit. The detection limit may vary slightly from year to year, but the typical detection limit is also shown as a black dotted line. The statistical analyses of the datasets are presented in Section 4.

In addition to evaluating BMP performance, the monitoring data have also been used in the site selection evaluations for consideration for enhancements to selected CMs for improved performance in areas where the effluent remains problematic. This was the case at CM-9 based on historical results, and upgradient improvements were added in 2013. Other examples of improvements include asphalt removal in the upper drainage area and filter fabric installation over the weir boards. For sites that were subject to such improvements impacting the quantity or quality of contributing runoff, separate graphs are shown for sample results that occurred before and after the improvements were made. At the B-1 media filter site, media washout was observed during initial sampling dates in the 2011/2012 reporting year. Results collected during this period were removed from the analysis. Additionally, preliminary samples were collected from the lower lot biofilter in 2012/2013 before the system was fully functional. These results were also removed from the complete analysis.

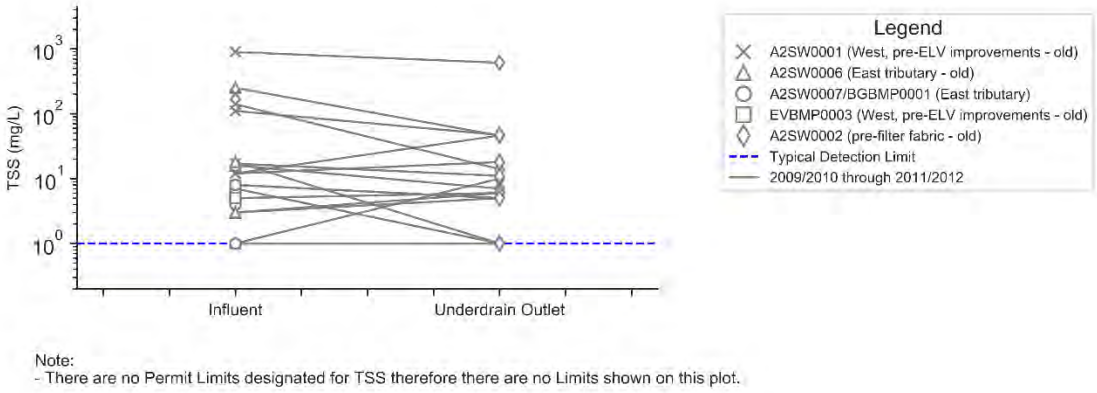
Monitoring data were first collected at the ELV treatment BMP during the 2013/2014 reporting year; since that was the first rain event that the system experienced. The monitoring data reflect media fines being washed from the system. In addition, during the February/March 2014 storm event, a plug in the storm drain under Helipad Road resulted in high flows from the Helipad Road being routed to the ELV sump and treatment system. Additionally, inadequate erosion controls along the earthen ELV channel resulted in sediment filling the sump, and a power outage resulted in the sump pump turning off. The influent-effluent pollutant concentration reduction performance of the ELV Treatment BMP is not expected to be affected by these conditions; however, the fraction of runoff volume captured from the ELV drainage area during each storm is expected to be reduced due to these factors. Although no overflow events as described previously were observed during the 2014/2015 reporting year, this plug was not removed for any storm events. Samples were not collected at the ELV treatment BMP during the 2018/2019 reporting year due to a long-term power failure associated with the Woolsey Fire, which destroyed the electrical infrastructure. To prevent future power outages at the ELV treatment location, a generator was added to the ELV system as the main power source, since electrical lines were not replaced in this area following the Woolsey Fire. A portable generator is also on hand for the biofilter cistern pump as a backup power supply.

With regards to the line plots, the BMP effectiveness during events having influent concentrations above the outfall Permit Limit is used as the performance criterion since any below the Permit Limit are already of acceptable quality and are generally considered to be at levels unlikely to be further reduced using typical stormwater controls. The data were also reviewed to document any concentration increases due to media failure or washout. As with most stormwater quality controls, the water quality percentage improvements are the most substantial when the influent concentrations are high. This is because it is difficult to further reduce low concentrations, due to equilibrium concentrations with the media, media washout, resuspension of silts, etc.

These charts are included for general visual assessment purposes only; the statistical tests in previous sections are used to make quantitative evaluations of BMP performance. It should be noted that the samples collected at the stormwater controls are all grab samples. Stormwater quality can be highly variable during storms and grab samples may represent collection times that vary throughout the storm event hydrograph. Therefore, relatively large numbers of samples for many storms are needed to represent the varying overall conditions with reasonable statistical confidence and power. The line and probability plots illustrate the influent and effluent variable concentrations.

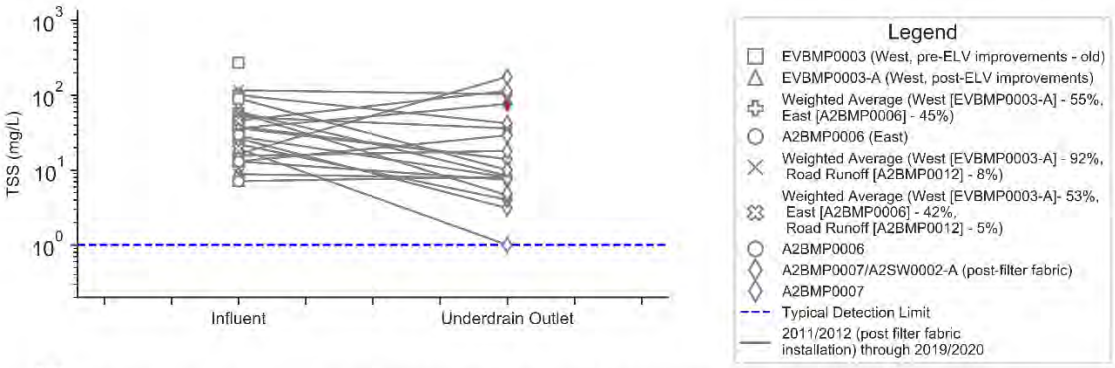
Six CM effluent samples were collected during overflow/bypass conditions (over all reporting years) based on available field notes. These conditions are noted on the plots with red markers. No other sampling dates were noted as having overflows in the available field notes. In addition, observations of weir board overflows were collected starting in the 2011/2012 reporting year. It is unknown which prior samples, if any, were collected during overflow conditions. Sampling notes, which now more carefully track this information, have not noted any samples collected under overflow/bypass conditions since the 2011/2012 observations.

9.1 TSS Paired Line Plots



Note:
- There are no Permit Limits designated for TSS therefore there are no Limits shown on this plot.

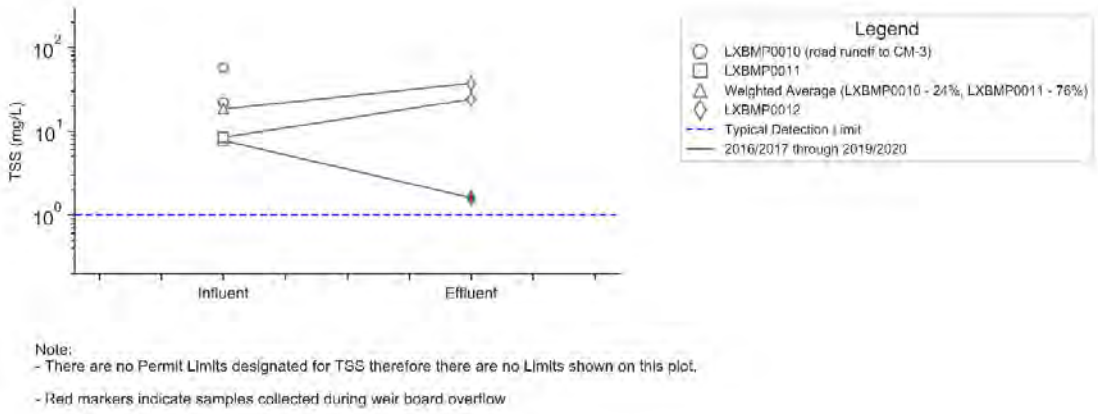
Figure 7. TSS at CM-1, pre filter fabric installation (filter fabric installed on 1/20/2012)



Note:
- There are no Permit Limits designated for TSS therefore there are no Limits shown on this plot.

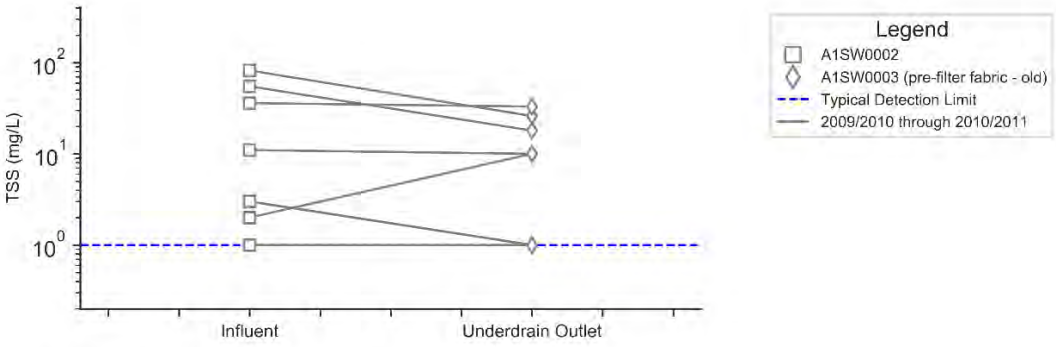
- Red markers indicate samples collected during weir board overflow

Figure 8. TSS at CM-1, post filter fabric installation (filter fabric installed on 1/20/2012)



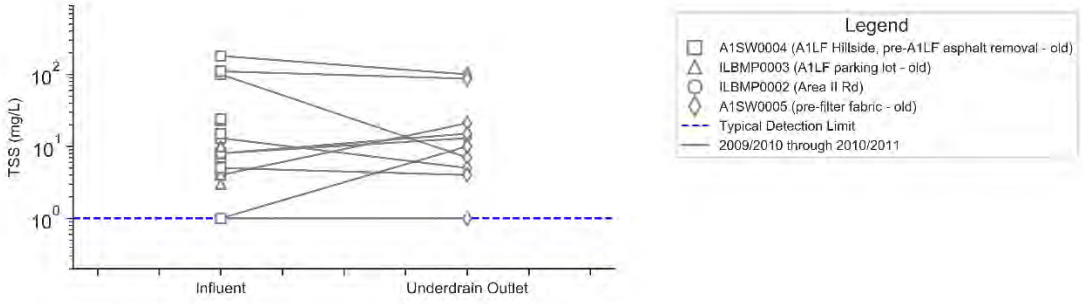
Note:
- There are no Permit Limits designated for TSS therefore there are no Limits shown on this plot.
- Red markers indicate samples collected during weir board overflow

Figure 9. TSS at CM-3[31]



Note:
- There are no Permit Limits designated for TSS therefore there are no Limits shown on this plot.

Figure 10. TSS at CM-8



Note:
- There are no Permit Limits designated for TSS therefore there are no Limits shown on this plot.

Figure 11. TSS at CM-9, pre improvements (removal of A1LF asphalt [9/1/2011] and addition of CM weir board filter fabric [1/20/2012])

[31] CM-3 was reconstructed midway through the 2019/2020 reporting year. The sampling event with weir board overflow (as shown by the red marker) occurred before CM reconstruction, and the two sampling events with increases in TSS concentration occurred following CM reconstruction and occurred when the influent TSS concentrations were very low.

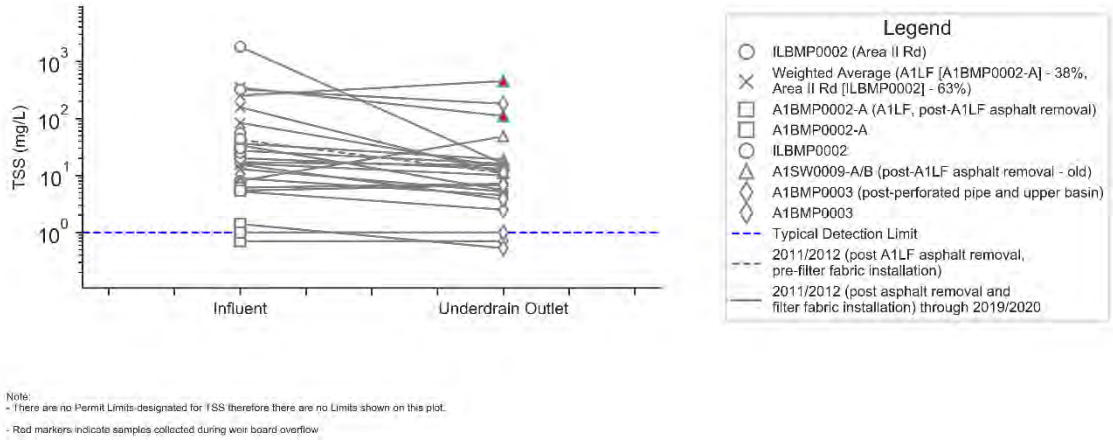


Figure 12. TSS at CM-9, post improvements (removal of A1LF asphalt [9/1/2011] and addition of CM weir board filter fabric [1/20/2012])

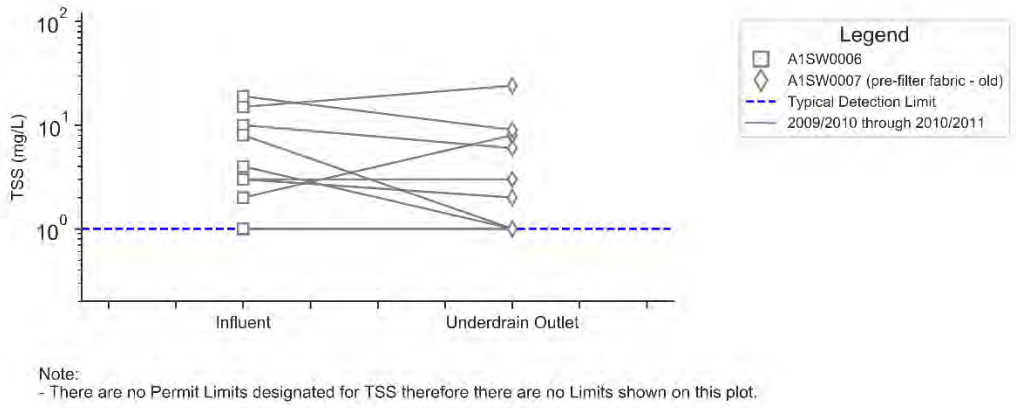


Figure 13. TSS at CM-11

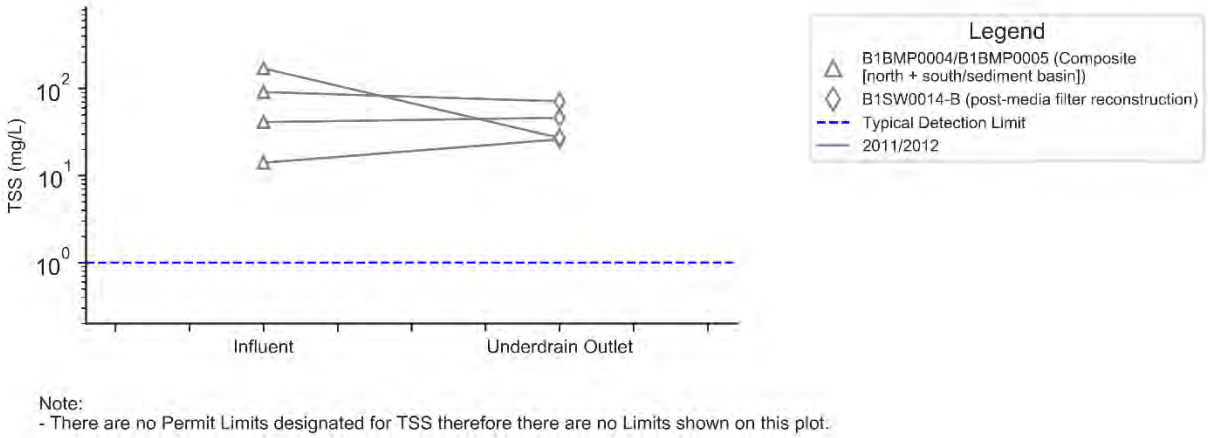
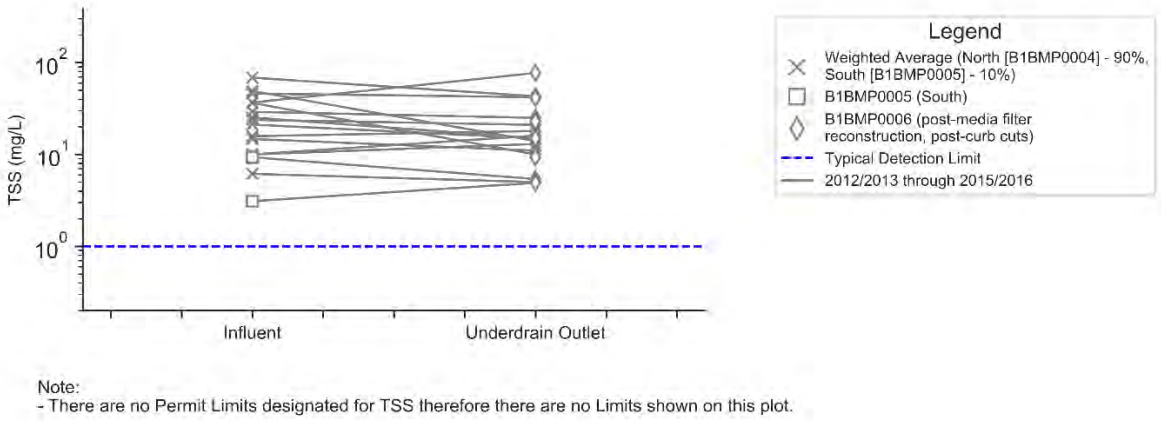
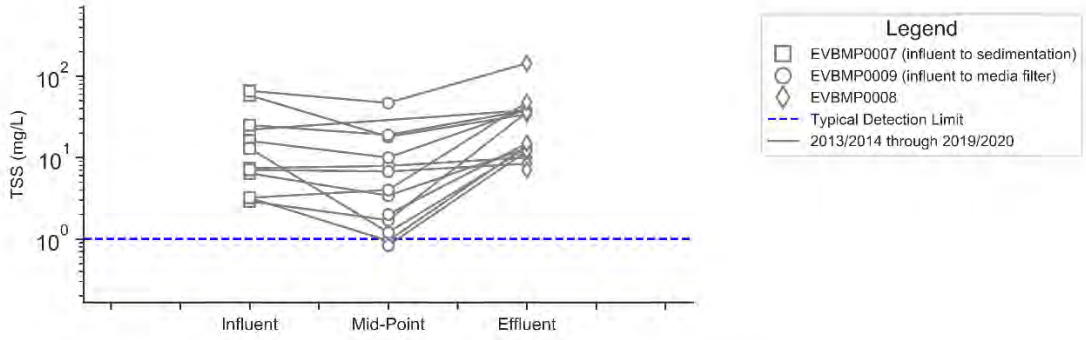


Figure 14. TSS at B-1 Media Filter (CM), pre curb cuts (curb cuts installed on 11/2/2012)



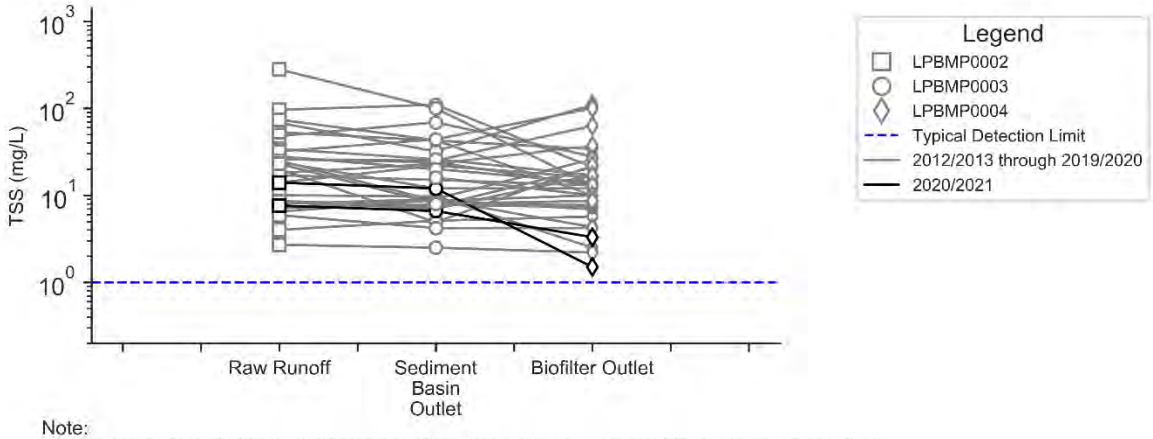
Note:
- There are no Permit Limits designated for TSS therefore there are no Limits shown on this plot.

Figure 15. TSS at B-1 Media Filter (CM), post curb cuts (curb cuts installed on 11/2/2012)



Note:
- There are no Permit Limits designated for TSS therefore there are no Limits shown on this plot.

Figure 16. TSS at ELV Treatment BMP



Note:
- There are no Permit Limits designated for TSS therefore there are no Limits shown on this plot.

Figure 17. TSS at Lower Lot Biofilter[32]

[32] A sample was not taken at the biofilter inlet (post-sedimentation basin) during the 2013/2014 sampling year due to the sample location being submerged and inaccessible. The biofilter outlet sample from the 2013/2014 reporting year reflects a mix of filtered underdrain flow and unfiltered overflow.

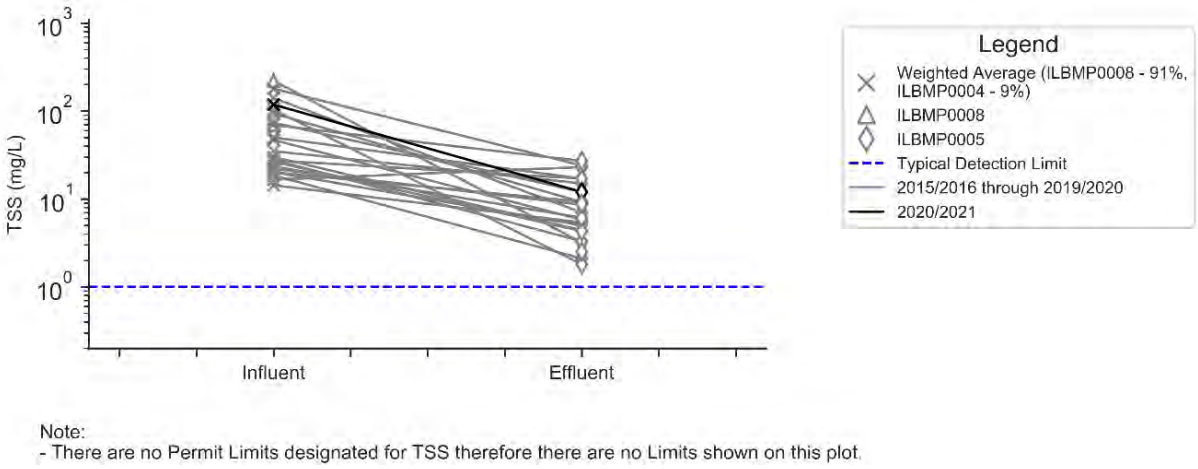


Figure 18. TSS at Southern Detention Bioswale

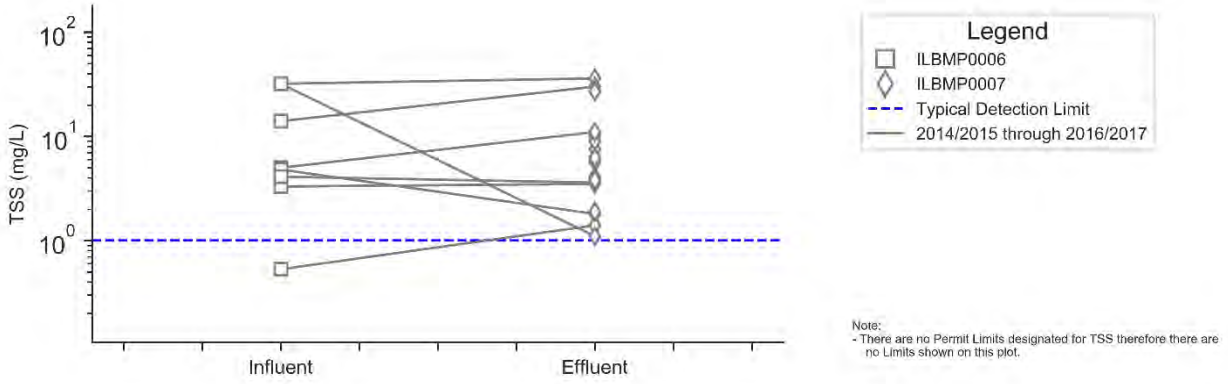


Figure 19. TSS at Northern Detention Bioswale

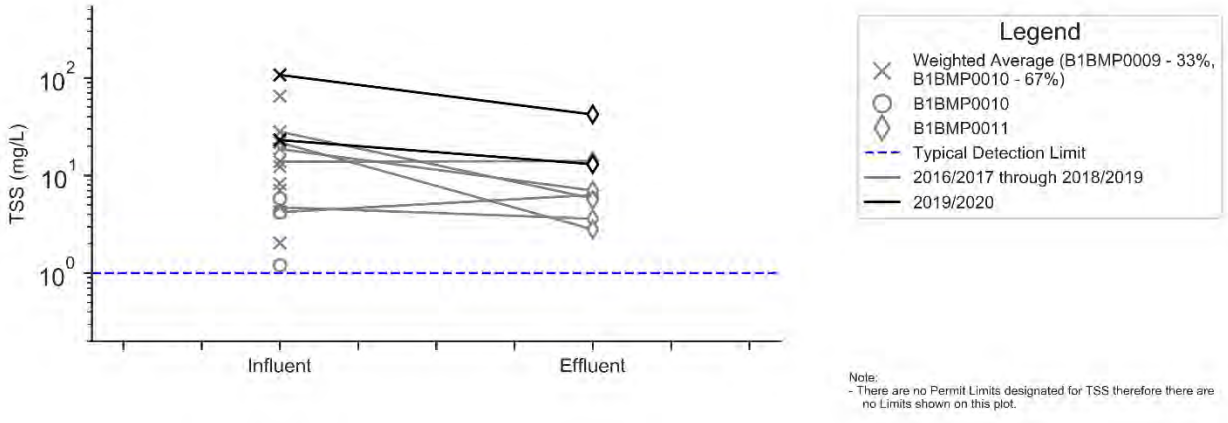


Figure 20. TSS at Upper Lot Media Filter

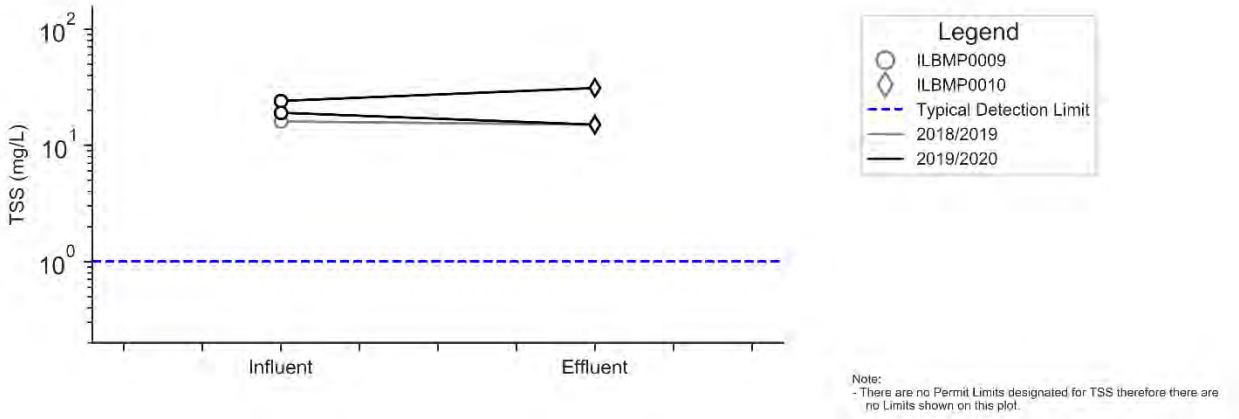


Figure 21. TSS at Boeing Admin Area Inlet Filters

9.2 Dioxins Paired Line Plots

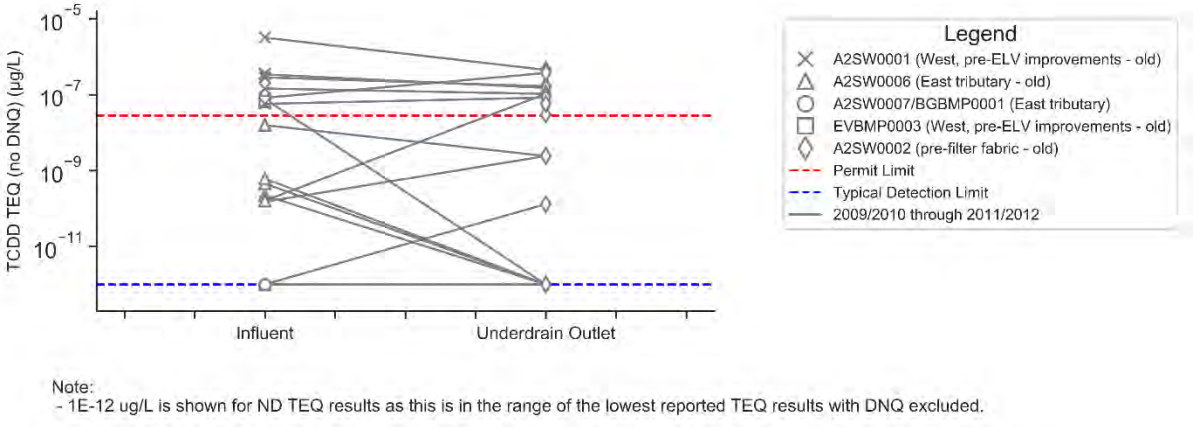
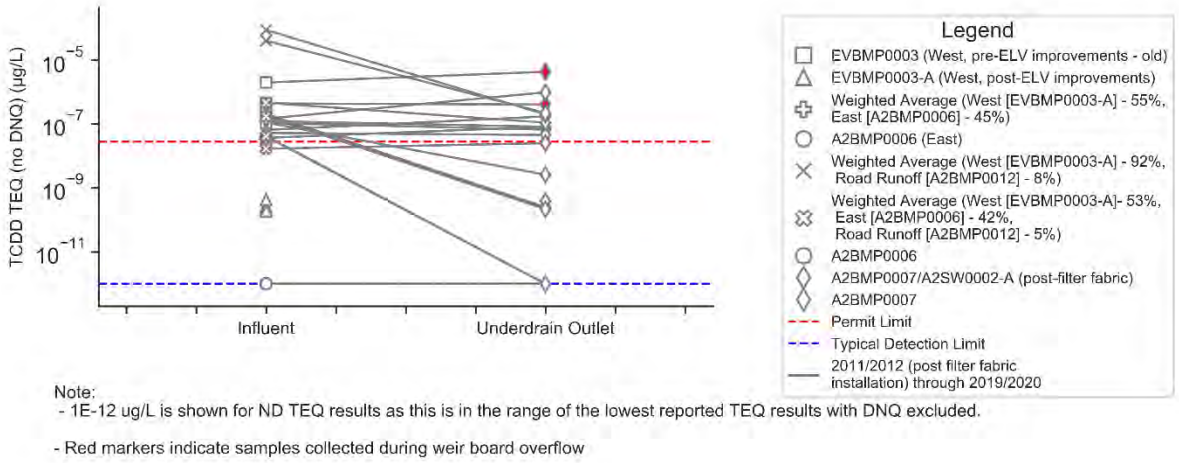


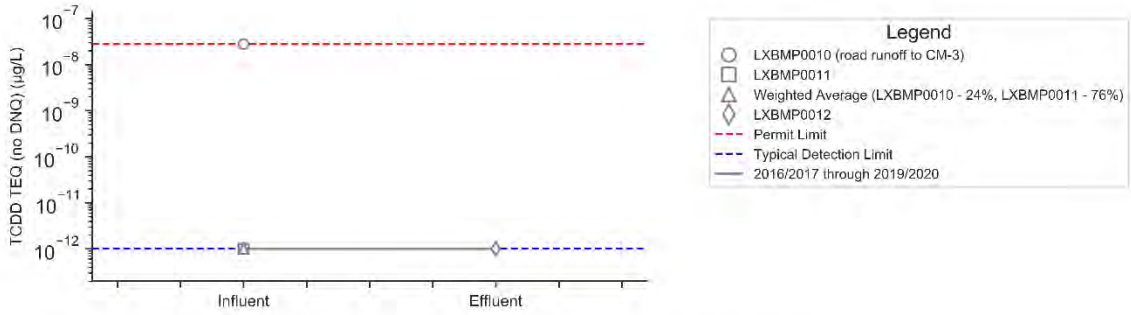
Figure 22. Dioxins at CM-1, pre filter fabric installation (filter fabric installed on 1/20/2012)



Note:
- 1E-12 ug/L is shown for ND TEQ results as this is in the range of the lowest reported TEQ results with DNQ excluded.

- Red markers indicate samples collected during weir board overflow

Figure 23. Dioxins at CM-1[33], post filter fabric installation (filter fabric installed on 1/20/2012)

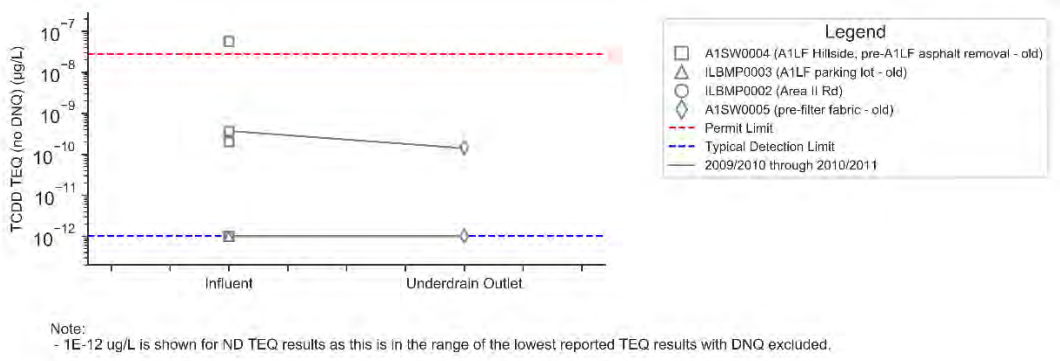


Note:
- 1E-12 ug/L is shown for ND TEQ results as this is in the range of the lowest reported TEQ results with DNQ excluded.

- Red markers indicate samples collected during weir board overflow

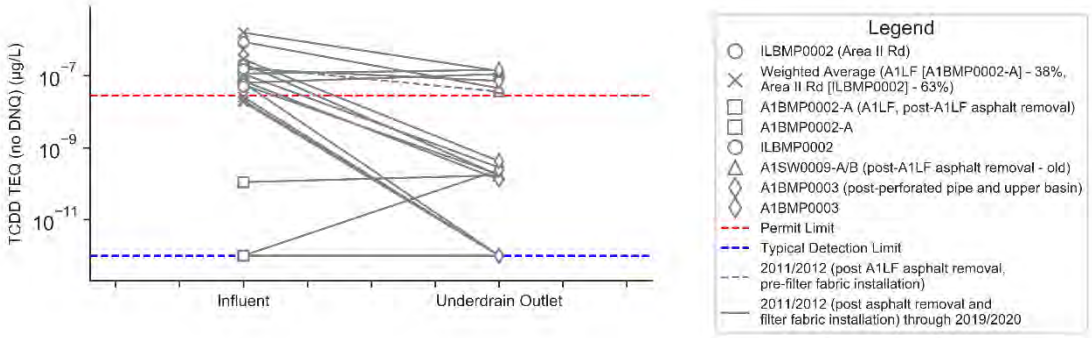
Figure 24. Dioxins at CM-3

[33] A leaking seal was noted at CM-1 on 3/3/2017. It is unclear if this condition was present during the 2/17/2017 sample that resulted in an exceedance of Permit Limits for dioxins. Additionally, unusually high influent concentrations were observed during some sampled events in recent reporting years. The road runoff diversion to CM-1 was constructed during 2017/2018, and sampling to characterize road runoff influent to CM-1 began in 2018/2019. Sampled events (during 2018/2019 and 2019/2020) where the road runoff location was sampled had higher influent dioxins concentrations. Therefore, the higher influent concentrations are likely due to road runoff contributions (which include several treated wood utility poles).



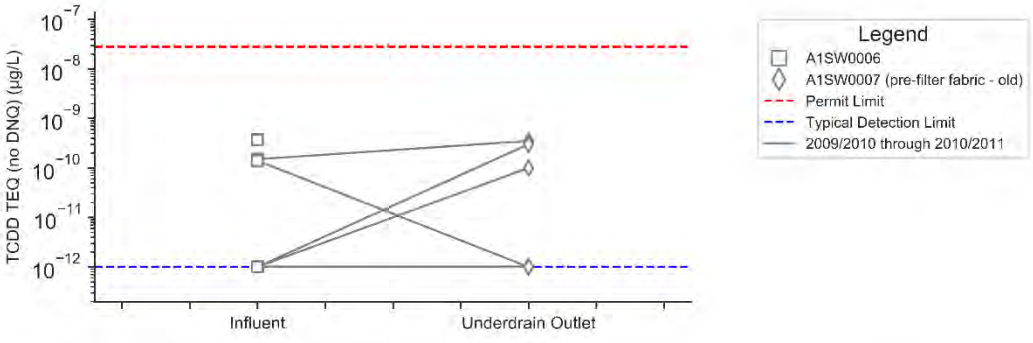
Note:
- 1E-12 ug/L is shown for ND TEQ results as this is in the range of the lowest reported TEQ results with DNQ excluded.

Figure 25. Dioxins at CM-9, pre improvements (removal of A1LF asphalt [9/1/2011] and addition of CM weir board filter fabric [1/20/2012])



Note:
- 1E-12 ug/L is shown for ND TEQ results as this is in the range of the lowest reported TEQ results with DNQ excluded.
- Red markers indicate samples collected during weir board overflow

Figure 26. Dioxins at CM-9, post improvements (removal of A1LF asphalt [9/1/2011] and addition of CM weir board filter fabric [1/20/2012])



Note:
- 1E-12 ug/L is shown for ND TEQ results as this is in the range of the lowest reported TEQ results with DNQ excluded.

Figure 27. Dioxins at CM-11

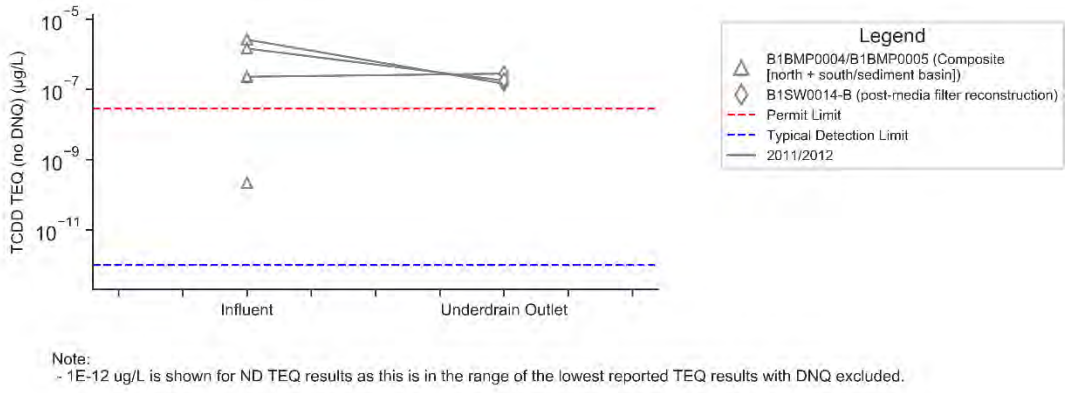


Figure 28. Dioxins at B-1 Media Filter (CM), pre curb cuts (curb cuts installed on 11/2/2012)

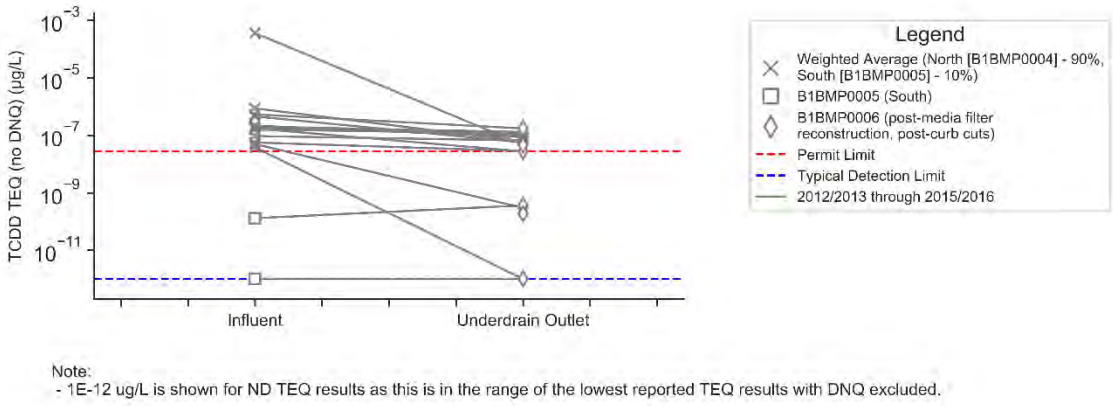


Figure 29. Dioxins at B-1 Media Filter (CM), post curb cuts (curb cuts installed on 11/2/2012)

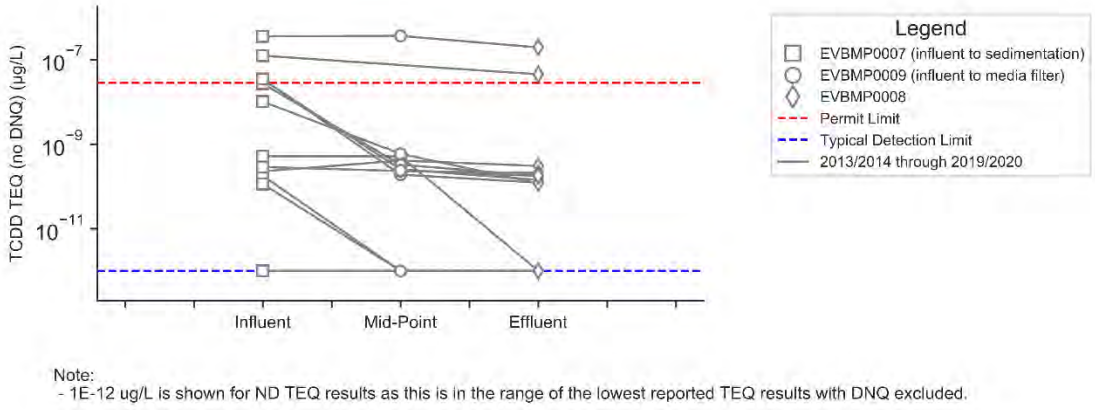
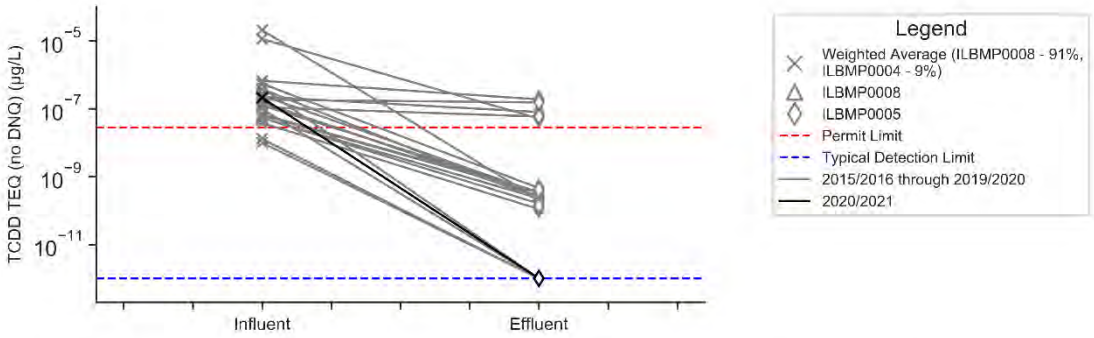


Figure 30. Dioxins at ELV Treatment BMP

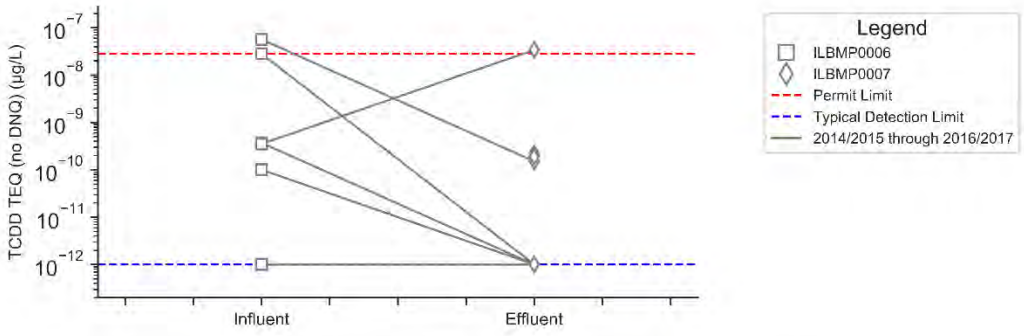
Note:
- 1E-12 ug/L is shown for ND TEQ results as this is in the range of the lowest reported TEQ results with DNQ excluded.

Figure 31. Dioxins at Lower Lot Biofilter[34]



Note:
- 1E-12 ug/L is shown for ND TEQ results as this is in the range of the lowest reported TEQ results with DNQ excluded.

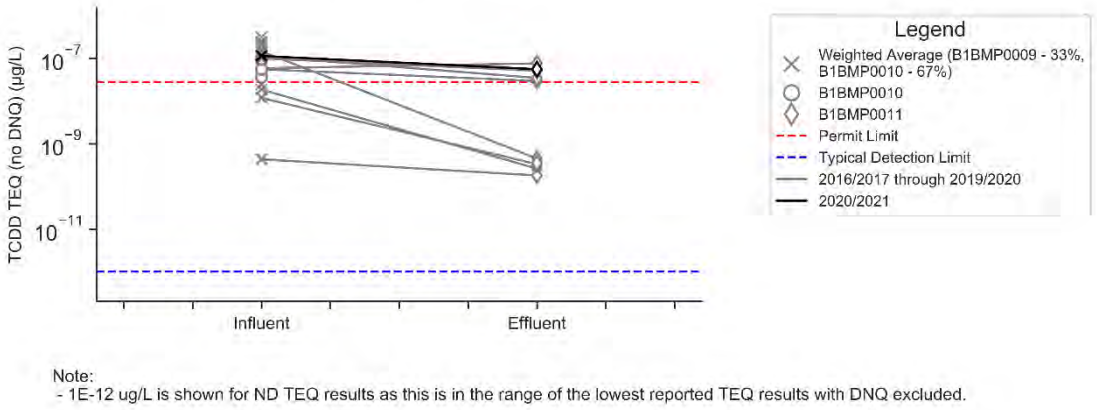
Figure 32. Dioxins at Southern Detention Bioswale



Note:
- 1E-12 ug/L is shown for ND TEQ results as this is in the range of the lowest reported TEQ results with DNQ excluded.

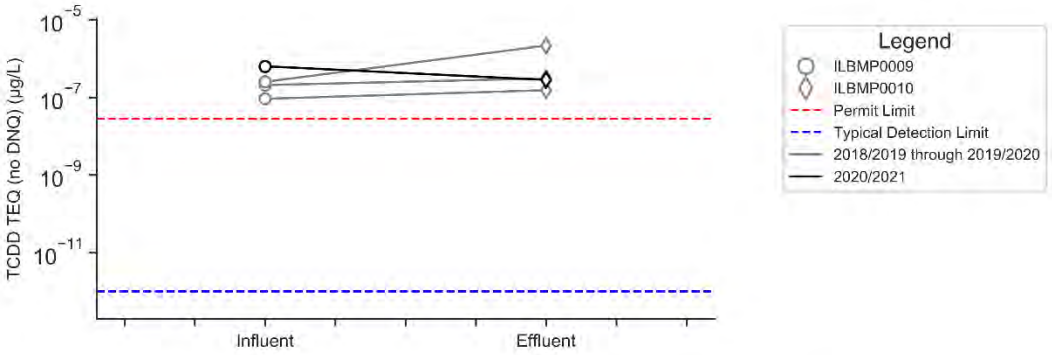
Figure 33. Dioxins at Northern Detention Bioswale

[34] Effluent result from the 1/8/18 - 1/9/18 event is not consistent with past performance observed from the biofilter, therefore the performance and effluent concentrations will be evaluated during subsequent monitoring events to make sure the biofilter is performing as designed. Additionally, the effluent result from 12/6/2018 may have been due to a power outage resulting in manual pumping from the cistern to the sediment basin, which could have overloaded the biofilter.



Note:
- 1E-12 ug/L is shown for ND TEQ results as this is in the range of the lowest reported TEQ results with DNQ excluded.

Figure 34. Dioxins at Upper Lot Media Filter



Note:
- 1E-12 ug/L is shown for ND TEQ results as this is in the range of the lowest reported TEQ results with DNQ excluded.

Figure 35. Dioxins at Boeing Admin Area Inlet Filters

9.3 Lead Paired Line Plots

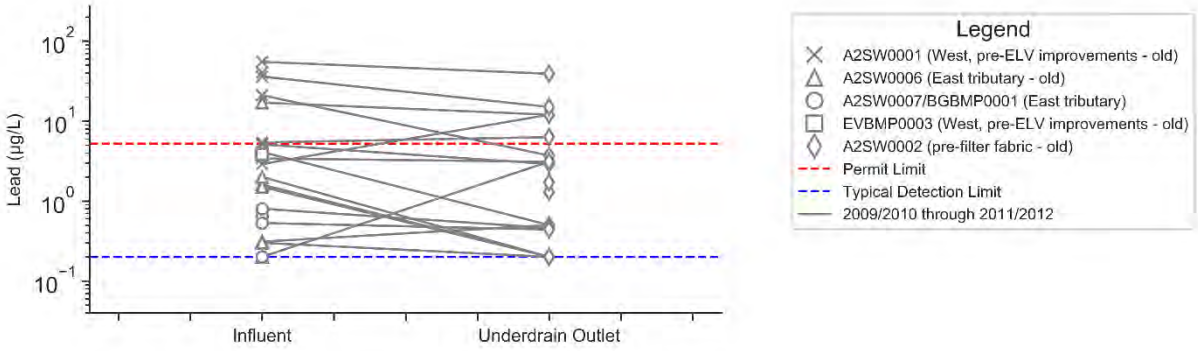


Figure 36. Lead at CM-1, pre filter fabric installation (filter fabric installed on 1/20/2012)

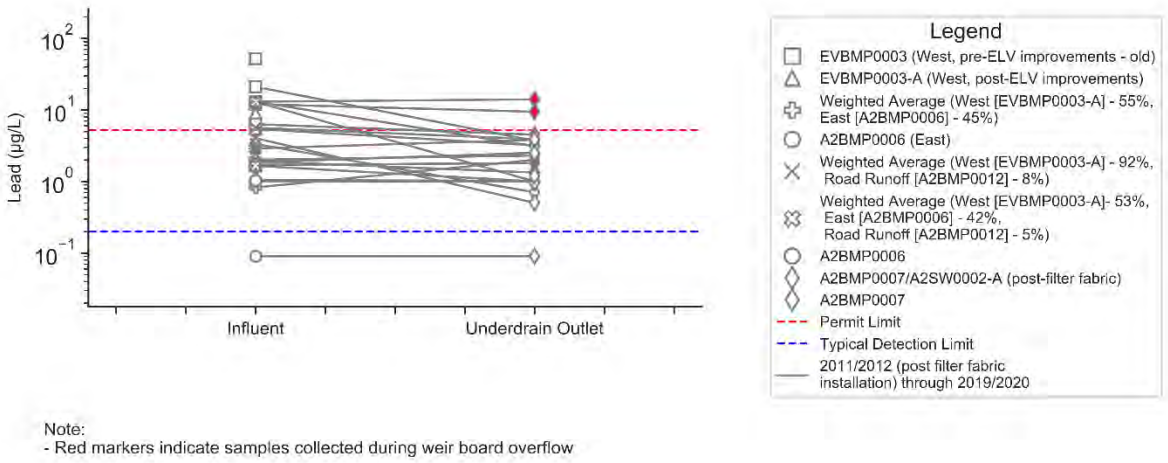


Figure 37. Lead at CM-1, post filter fabric installation (filter fabric installed on 1/20/2012)

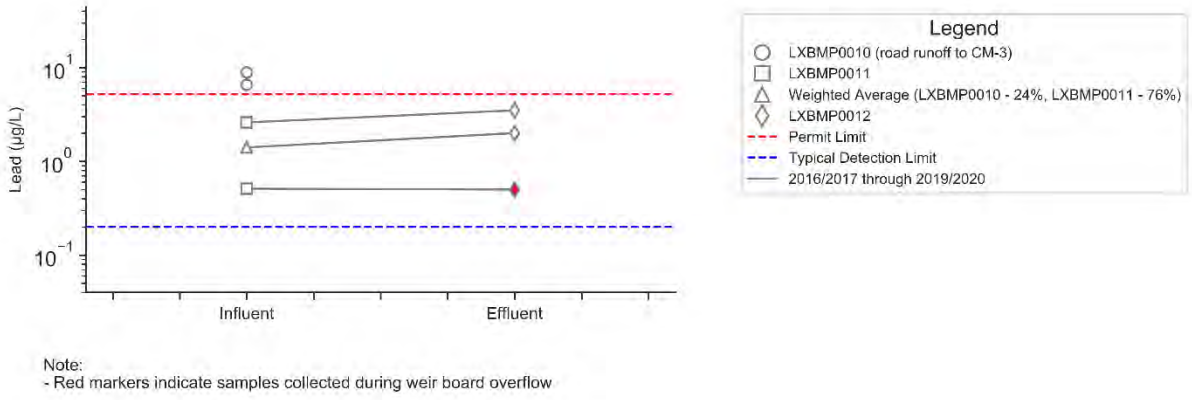


Figure 38. Lead at CM-3

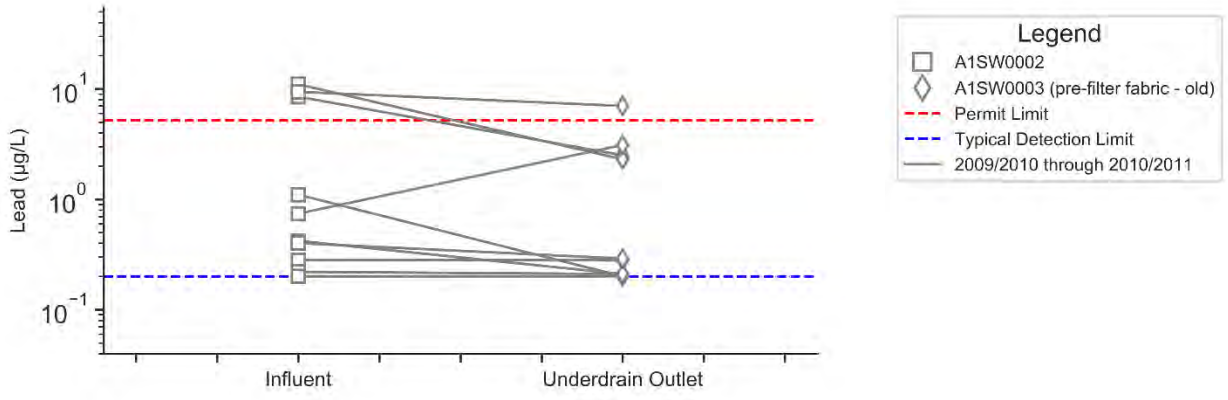


Figure 39. Lead at CM-8

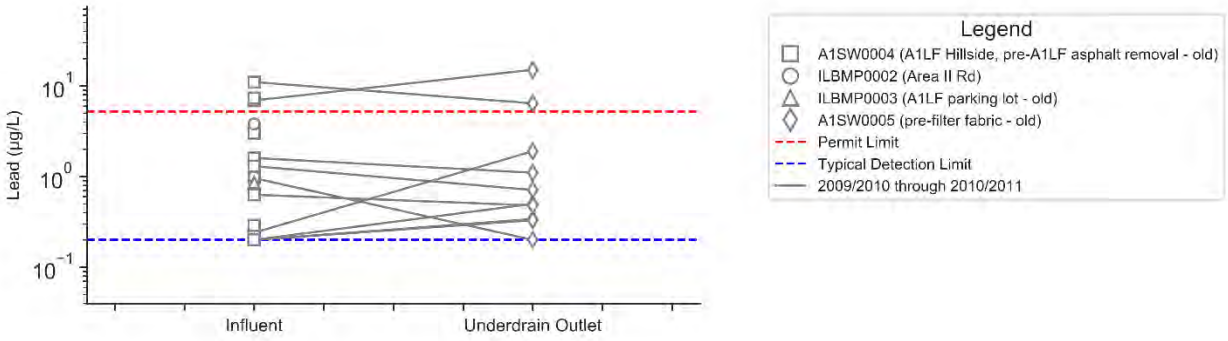


Figure 40. Lead at CM-9, pre improvements (removal of A1LF asphalt [9/1/2011] and addition of CM weir board filter fabric [1/20/2012])

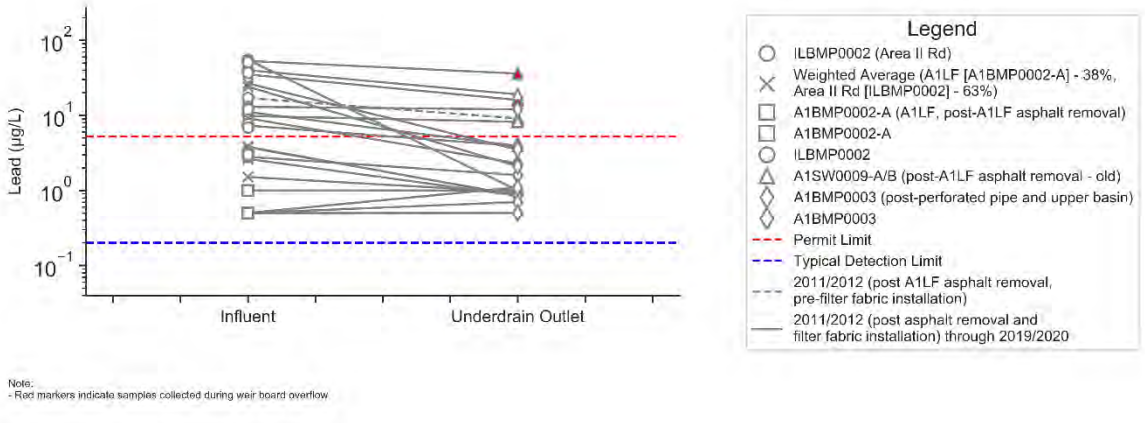


Figure 41. Lead at CM-9, post improvements (removal of A1LF asphalt [9/1/2011] and addition of CM weir board filter fabric [1/20/2012])

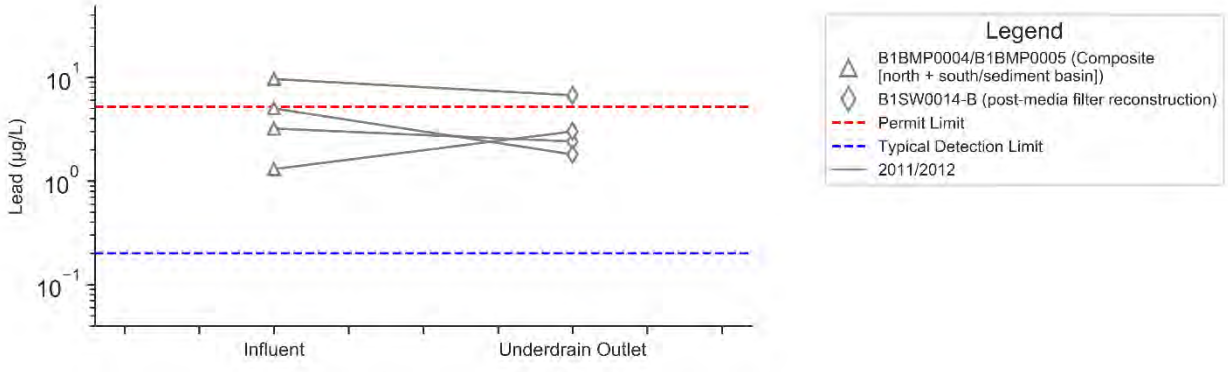


Figure 42. Lead at B-1 Media Filter (CM), pre curb cuts (curb cuts installed on 11/2/2012)

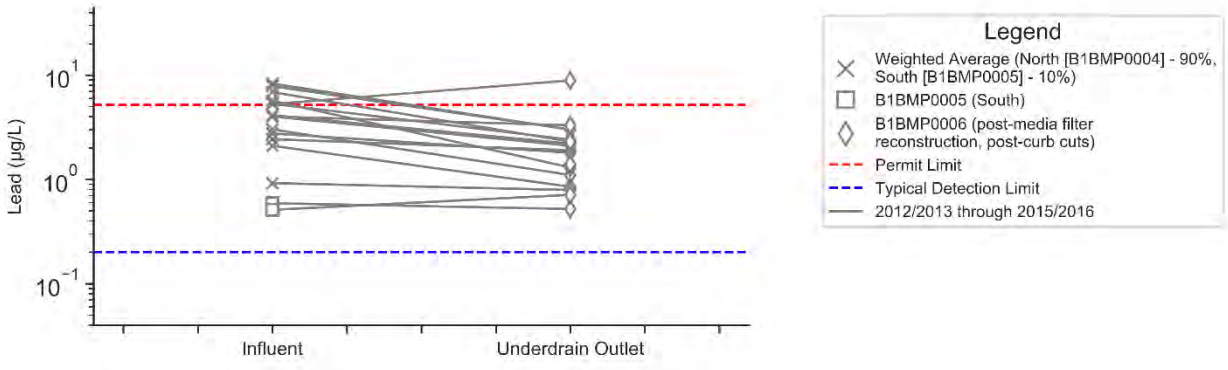


Figure 43. Lead at B-1 Media Filter (CM), post curb cuts (curb cuts installed on 11/2/2012)

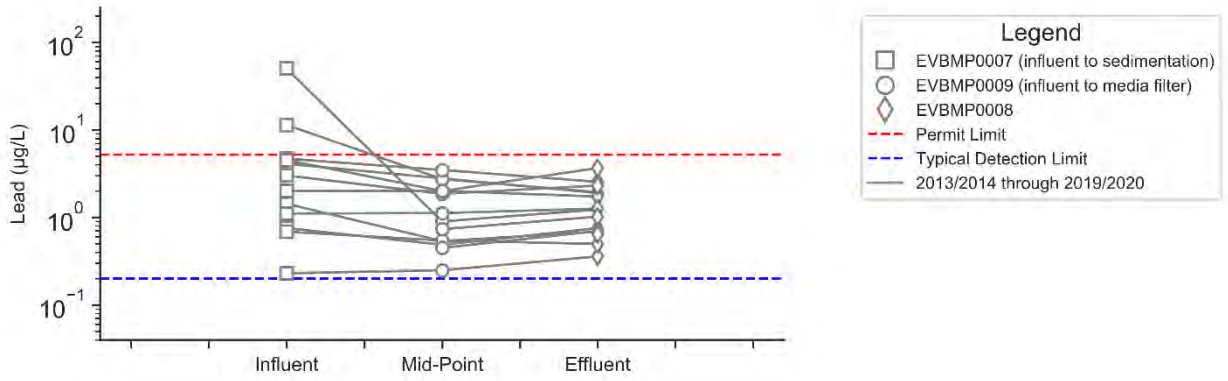


Figure 44. Lead at ELV Treatment BMP

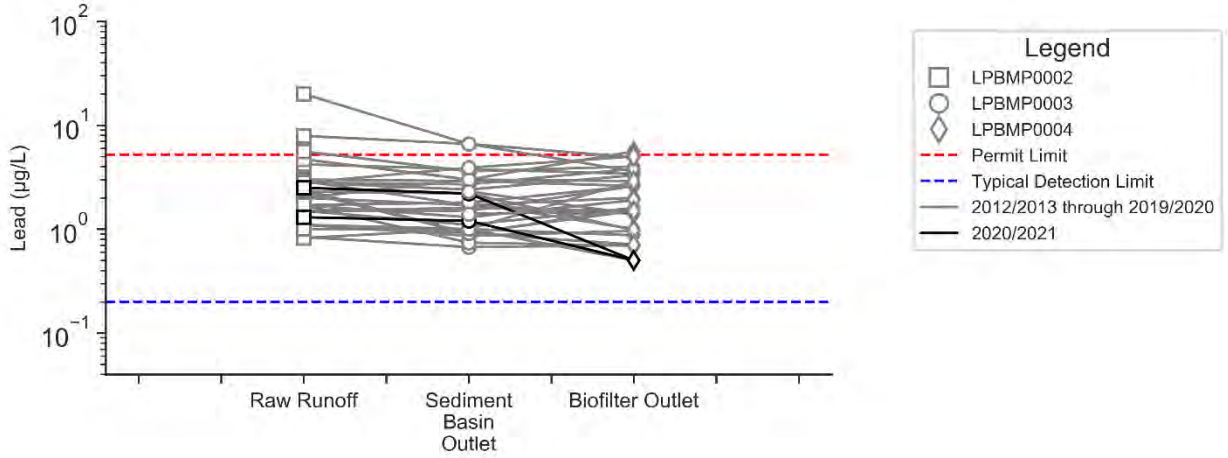


Figure 45. Lead at Lower Lot Biofilter

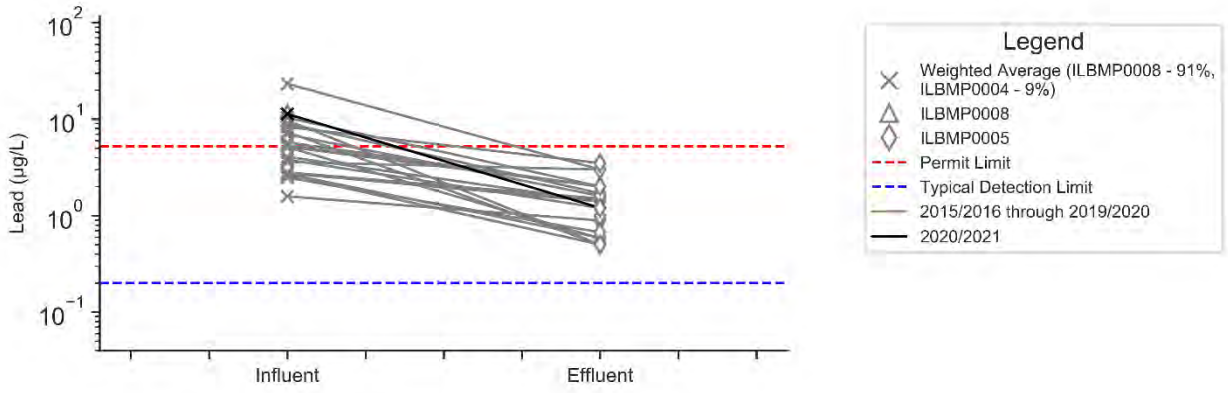


Figure 46. Lead at Southern Detention Bioswale

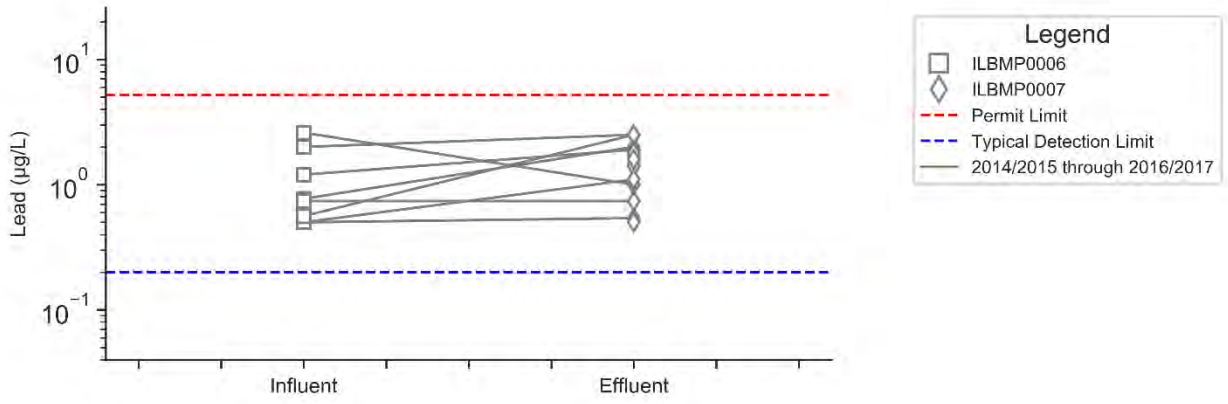


Figure 47. Lead at Northern Detention Bioswale

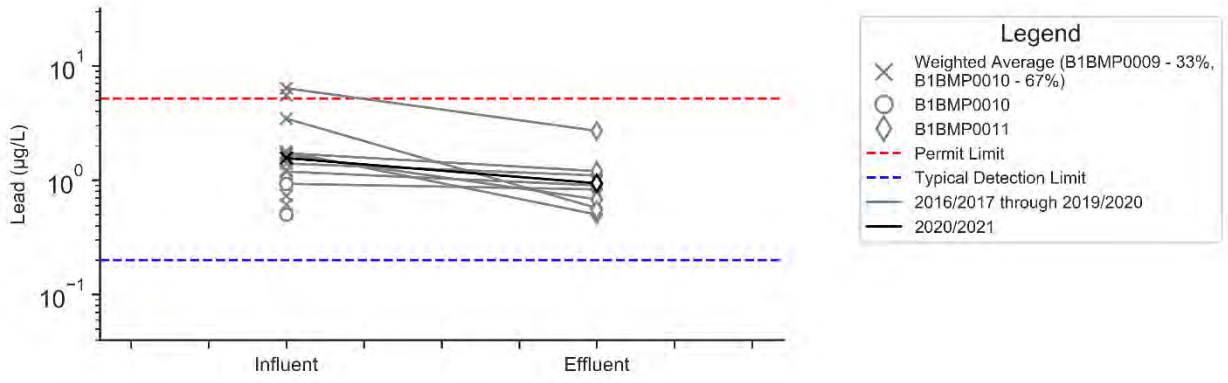


Figure 48. Lead at Upper Lot Media Filter

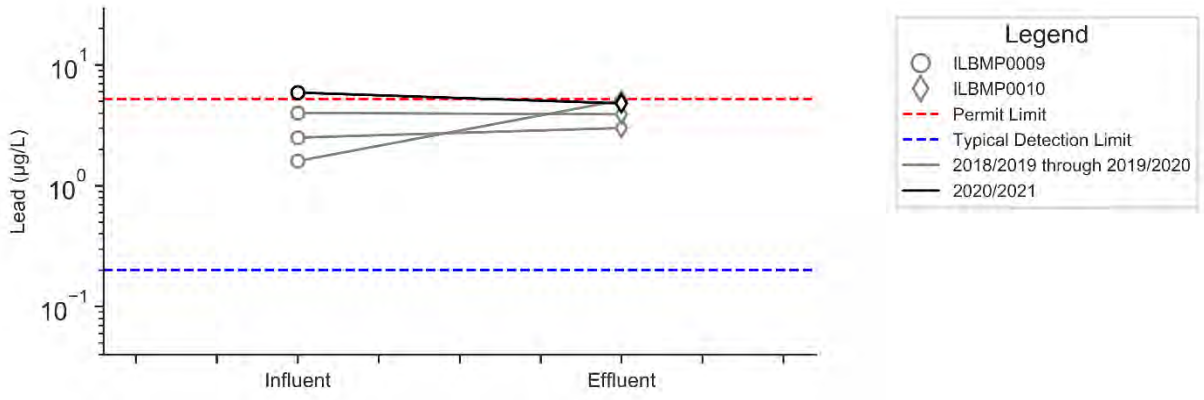


Figure 49. Lead at Boeing Admin Area Inlet Filters

9.4 Copper Paired Line Plots

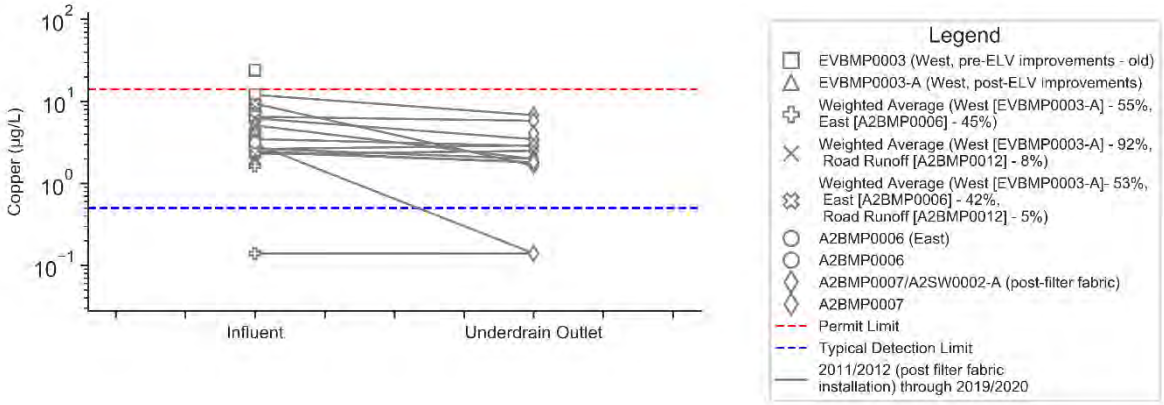


Figure 50. Copper at CM-1, post filter fabric installation (filter fabric installed on 1/20/2012)

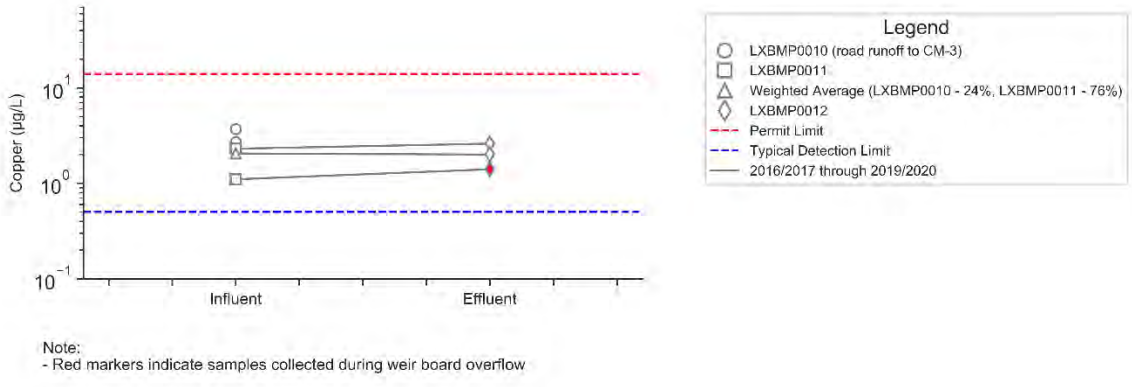


Figure 51. Copper at CM-3

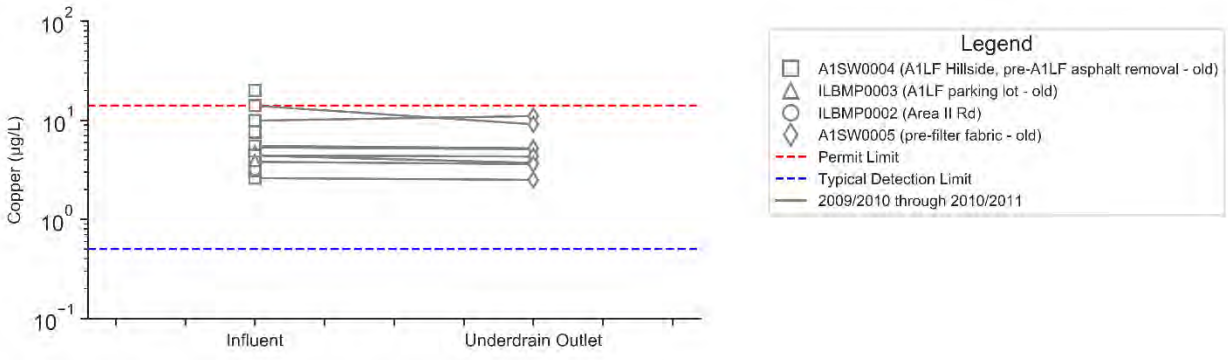


Figure 52. Copper at CM-9, pre improvements (removal of A1LF asphalt and addition of CM weir board filter fabric)

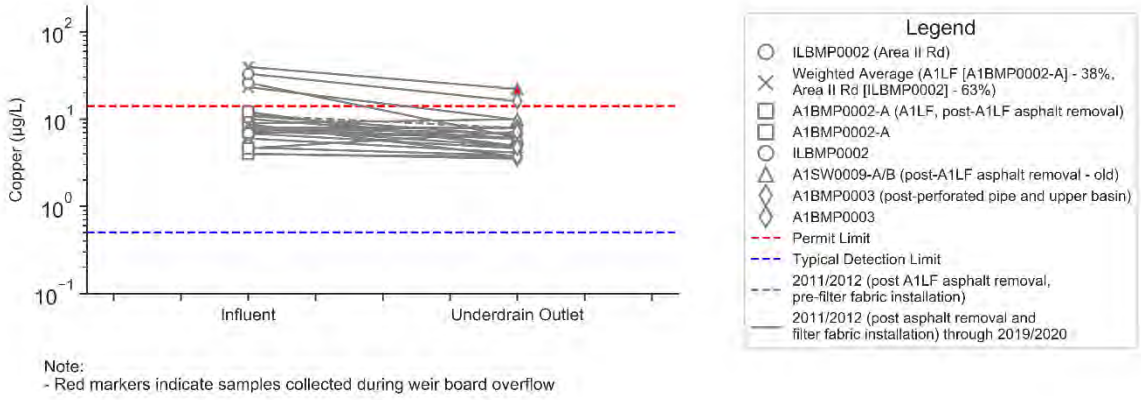


Figure 53. Copper at CM-9, post improvements (removal of A1LF asphalt [9/1/2011] and addition of CM weir board filter fabric [1/20/2012])

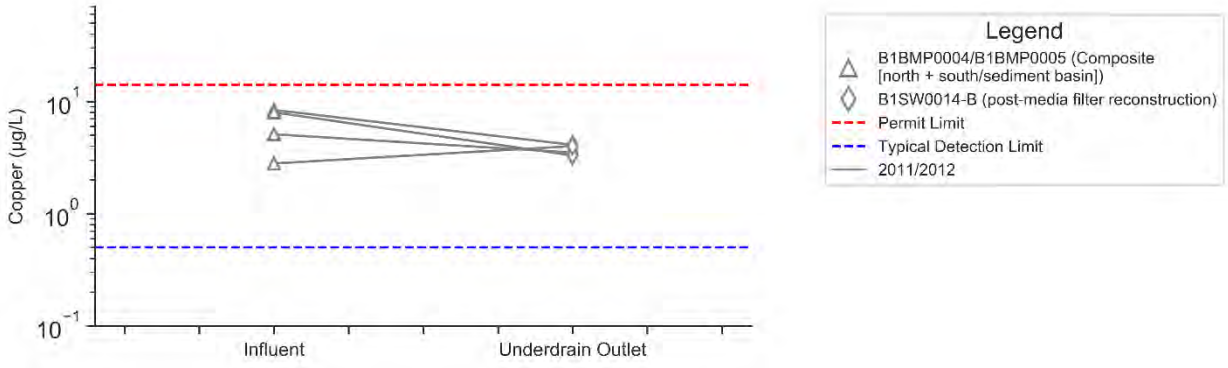


Figure 54. Copper at B-1 Media Filter (CM), pre curb cuts (curb cuts installed on 11/2/2012)

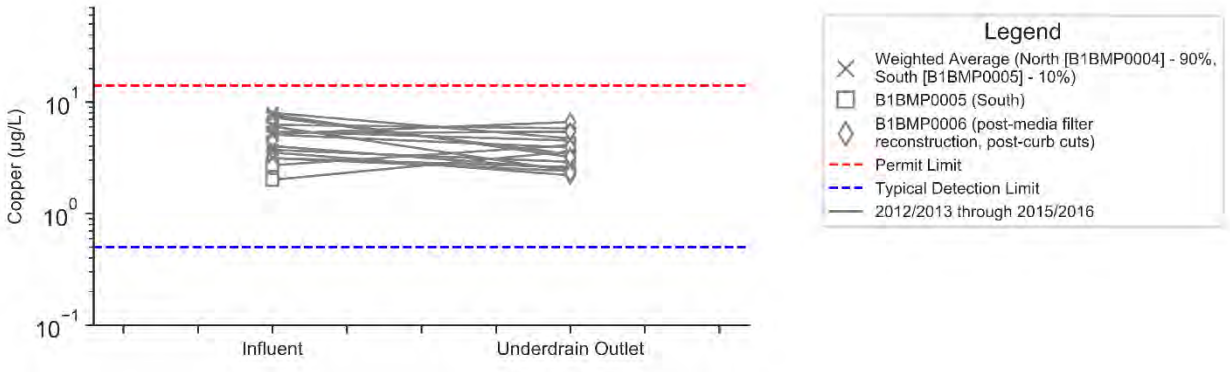


Figure 55. Copper at B-1 Media Filter (CM), post curb cuts (curb cuts installed on 11/2/2012)

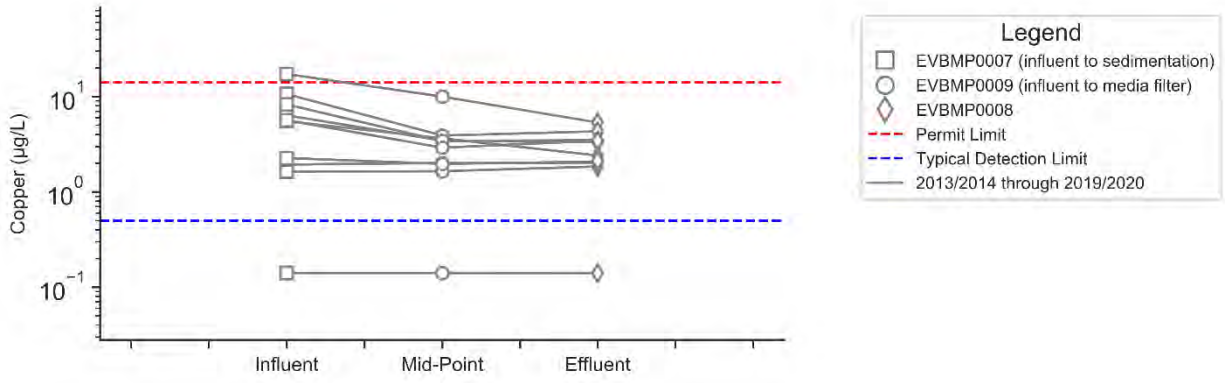


Figure 56. Copper at ELV Treatment BMP

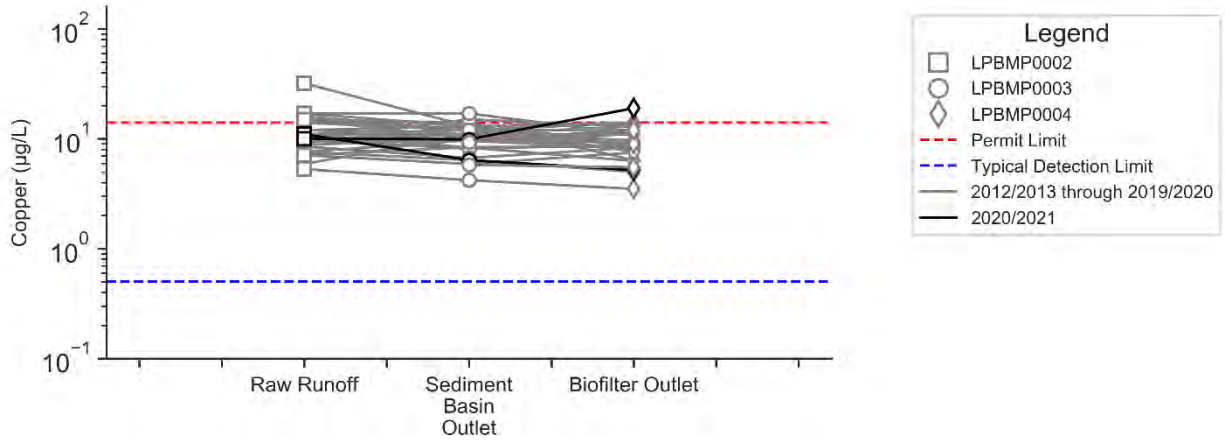


Figure 57. Copper at Lower Lot Biofilter

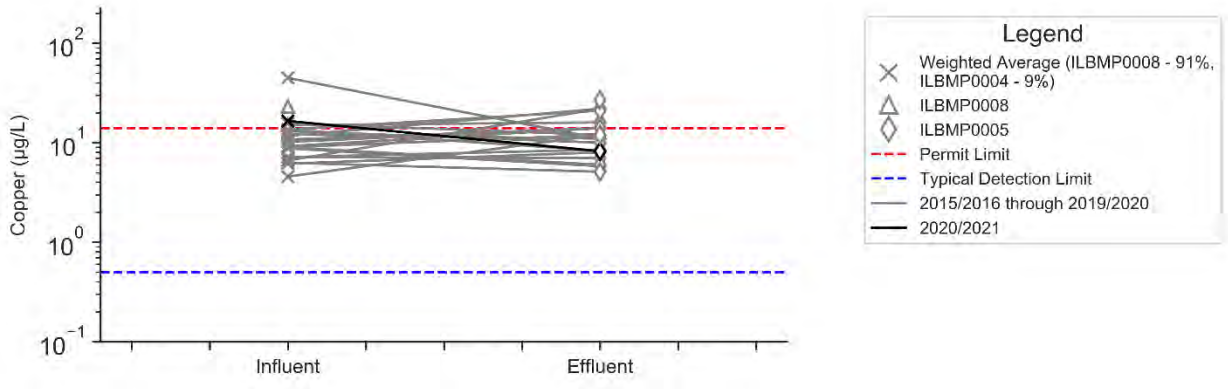


Figure 58. Copper at Southern Detention Bioswale[35]

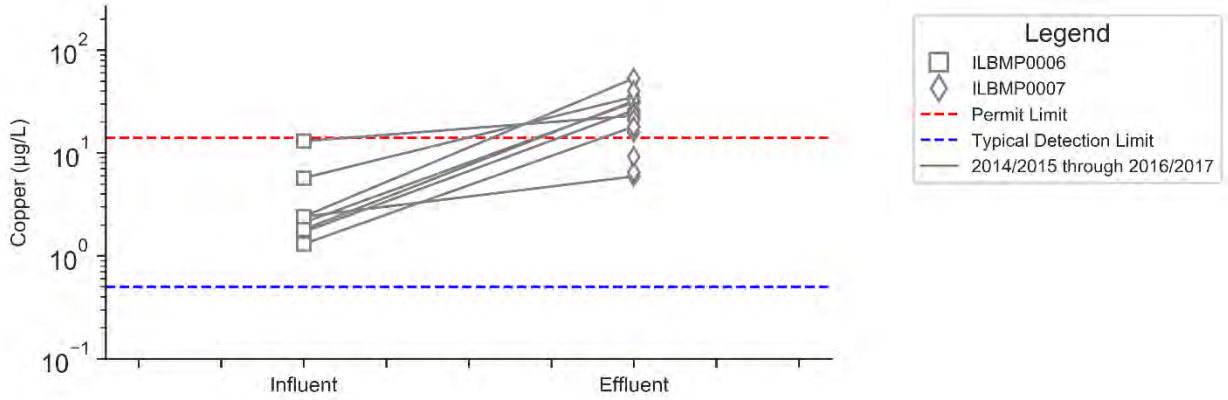


Figure 59. Copper at Northern Detention Bioswale[15]

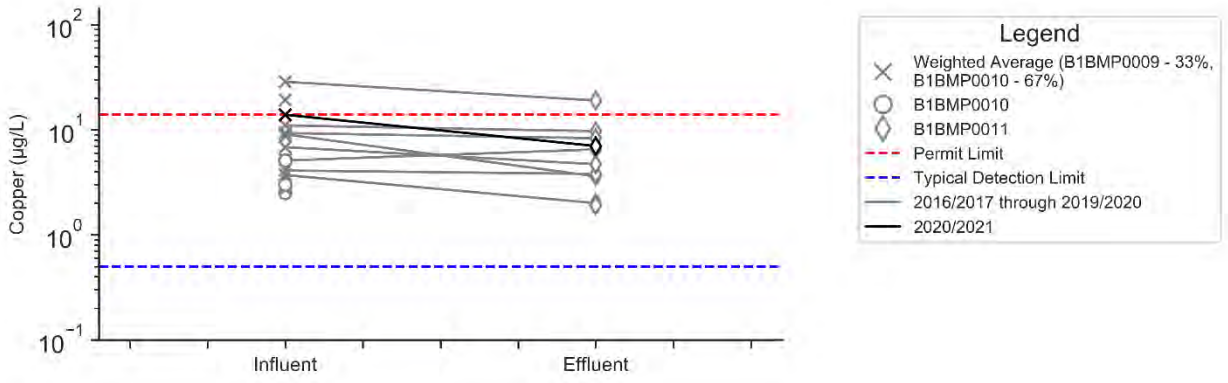


Figure 60. Copper at Upper Lot Media Filter

[35] The Permit Limit does not apply to this location. No exceedances in Permit Limits for copper occurred at watershed 009 locations during the 2015/2016 reporting year.

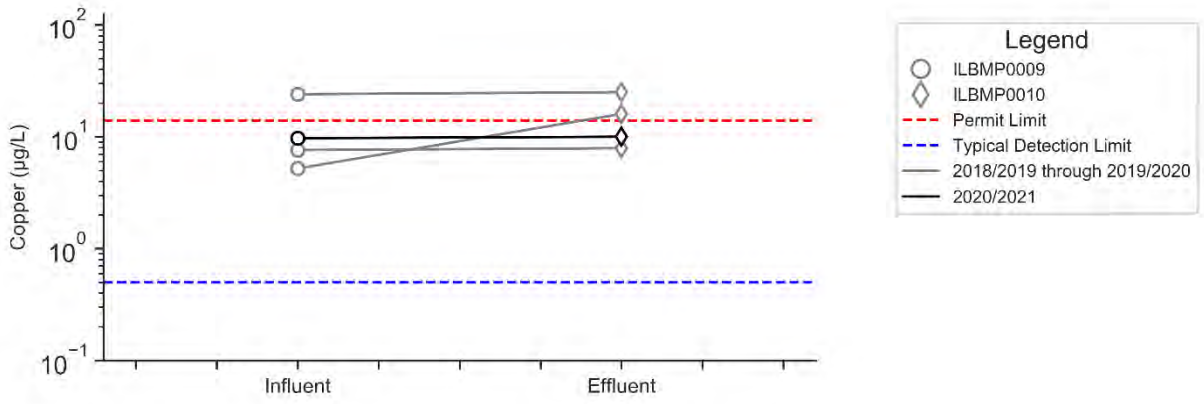


Figure 61. Copper at Boeing Admin Area Inlet Filters

10. Influent v. Effluent Correlation Charts

Figure 63 through Figure 65 compare influent to effluent concentrations for the paired data presented above for CM/media filter sites (B-1, upper lot media filter, CM-3 [post 2017/2018], CM-9, and CM-1; CM-8, and CM-11 background sites are excluded). Correlation charts for the lower lot biofilter are shown in Figure 66 through Figure 68, Figure 69 through Figure 71 for the ELV treatment BMP, Figure 72 through Figure 74 for the detention bioswales, and Figure 75 through Figure 77 for the Boeing admin area inlet filters. The plots reflect the same data pairs used to represent the influent and effluent locations in the statistical analyses in the previous section. For example, the lower lot biofilter plots reflect influent runoff samples for the influent and sedimentation basin outlet samples for the effluent, while the detention bioswales plots show the influent location as the flow-weighted average of the rock crib swale outlet and runoff from the adjacent contractor laydown area. Similar to the paired line plots, points are shaded based on the sampling year during which they were collected, where black points represent data from the most recent 2020/2021 reporting year and data from all previous reporting years are shown as gray.

A least-squares regression was used to fit a line to log-transformed data ($\log(y) = m*\log(x) + b$). The resulting equation, including the slope of the lines, m, is shown in the least-squares regression equation in the upper left corner of the graph. In addition, the p-value is also shown to indicate the significance of the reported slope term. The null hypothesis is that the slope (m) is equal to 0. If the p-value is less than 0.05, the null hypothesis is rejected, which shows that the slope is non-zero and is statistically significant at the 95% confidence level. 1 minus the significant slope term also indicates the overall percentage reduction in concentrations (when multiplied by 100x). The p-value to indicate the significance of the reported y-intercept (also represented in the least-square regression equation) is also shown. If there is a significant y-intercept, the reduction varies for different influent concentrations; if the intercept is not significant, the reduction is the same irrespective of the influent concentrations.

A 1:1 line was also added to each plot. **Data above the 1:1 line indicate an effluent increase in concentrations, while data below the 1:1 line indicate an effluent decrease in concentrations (or positive BMP performance). Additionally, the location where the 1:1 line intersects the best-fit line represents the irreducible concentration for each constituent (e.g. ~ 7 mg/L for TSS at CM sites).** An example influent vs. effluent correlation plot, illustrating these concepts, is shown in Figure 62. Pairs where one or both results were not detected were included on these graphs with different symbols.

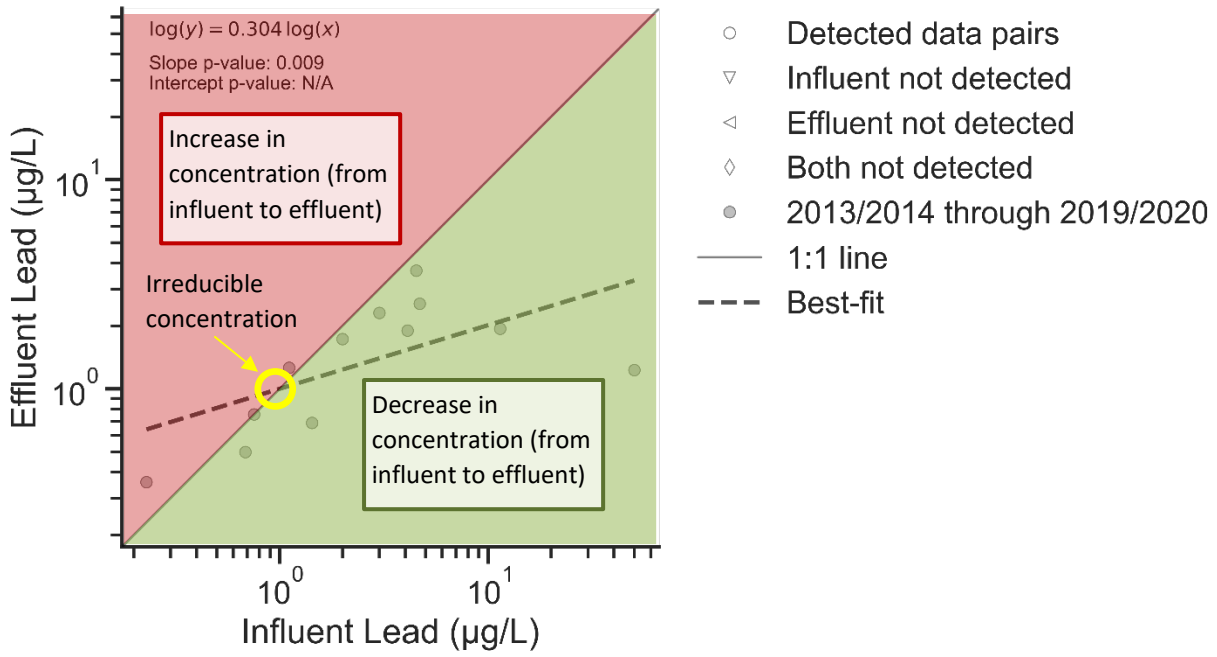


Figure 62. Example Influent vs. Effluent Correlation Plot

If the regression equations and associated ANOVA analyses indicate non-significant equation intercepts (p-value >0.05), the regressions were re-calculated with the intercept equal to zero, and this result is shown on the plots below (with the intercept p-value shown as N/A). This indicates that in general, the performance of the controls did not change by influent concentration (the percent reduction was constant). In some other cases, both the slope and intercept terms were not significant, and the regression is therefore also not significant. In this case, the effluent concentrations are not related to the influent concentrations, and the regression equation and p-values are not shown on the plots below.

10.1 CM/Media Filter Influent v. Effluent Correlation Charts

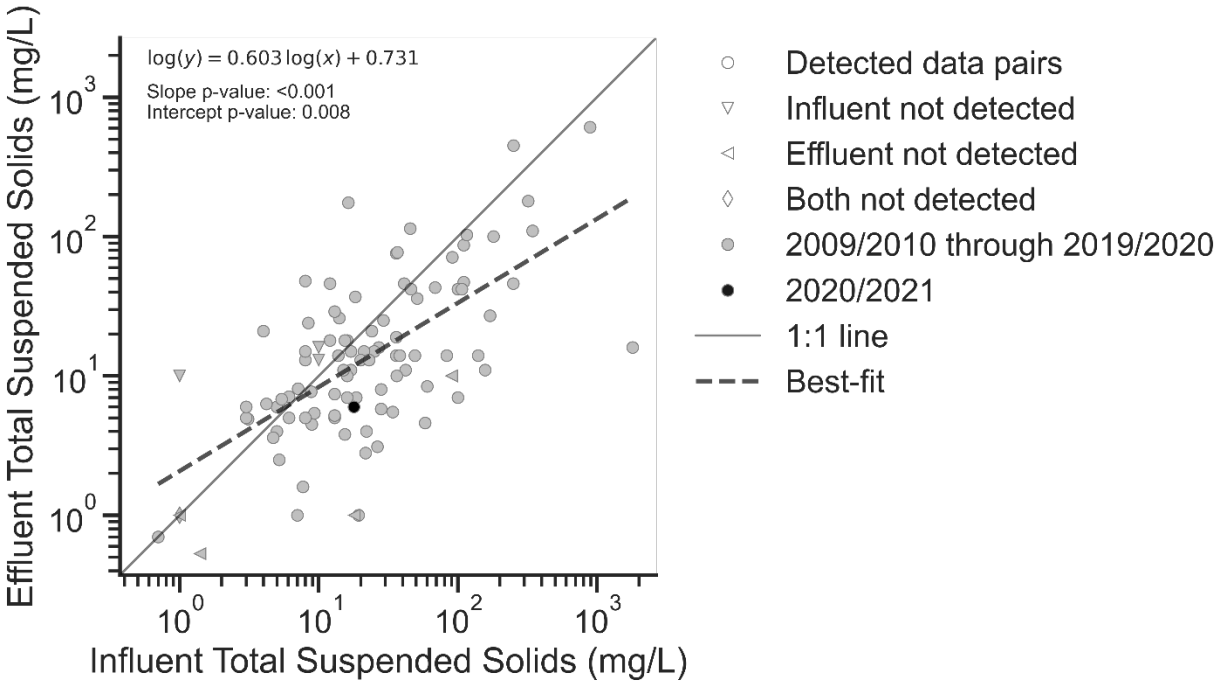


Figure 63. Paired TSS Concentrations at CM/Media Filter Sites

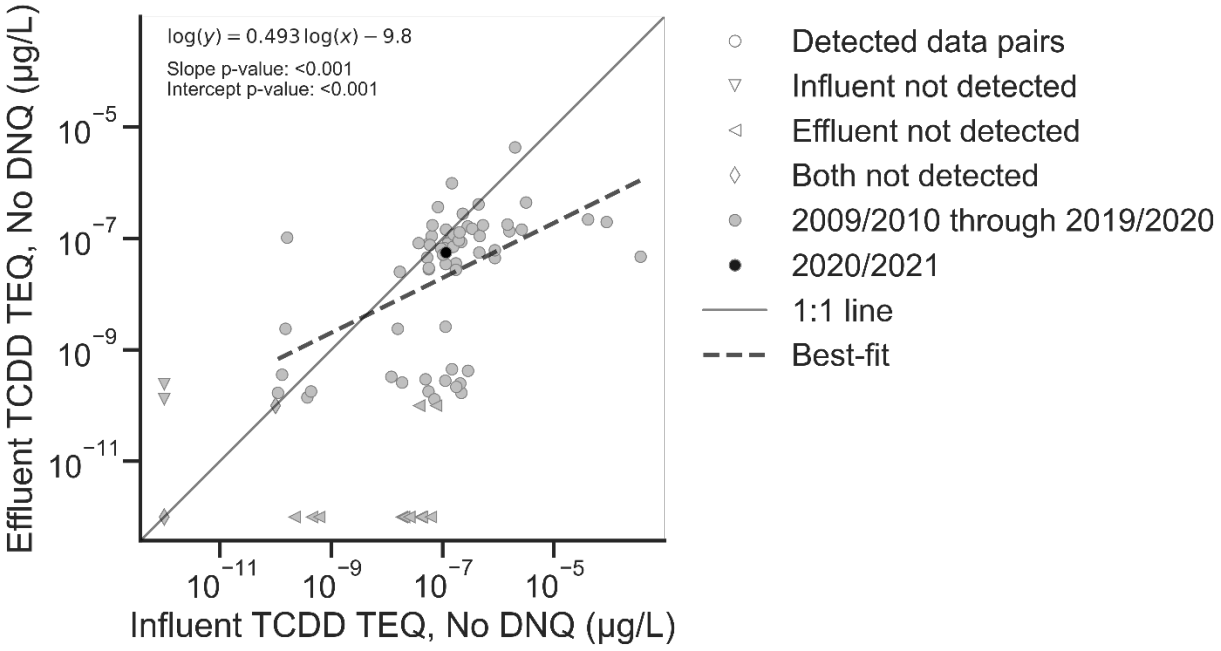


Figure 64. Paired Dioxins Concentrations at CM/Media Filter Sites

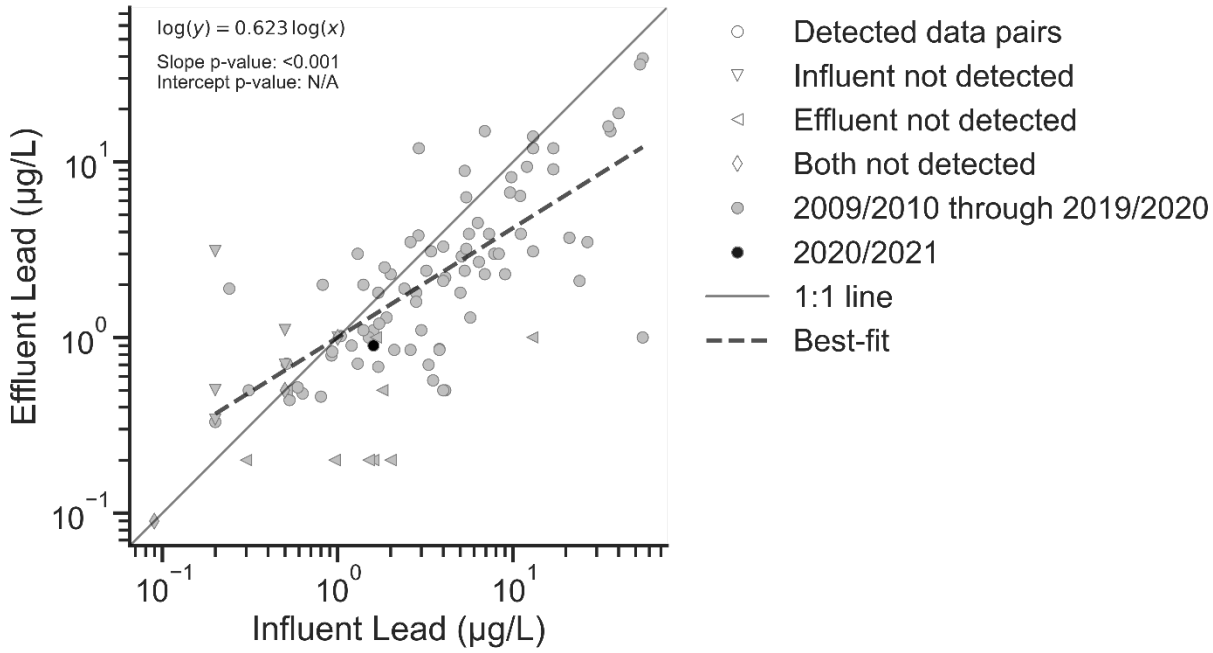


Figure 65. Paired Lead Concentrations at CM/Media Filter Sites

10.2 Lower Lot Biofilter Influent v. Effluent Correlation Charts

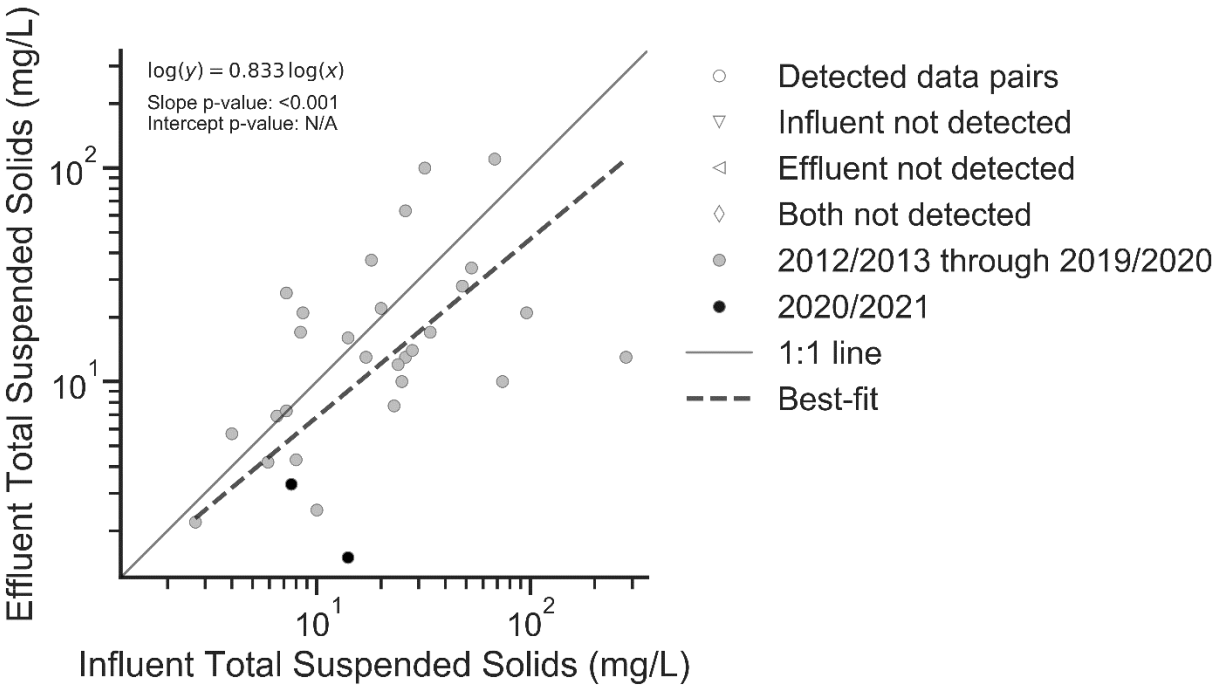


Figure 66. Paired TSS Concentrations at Lower Lot Biofilter

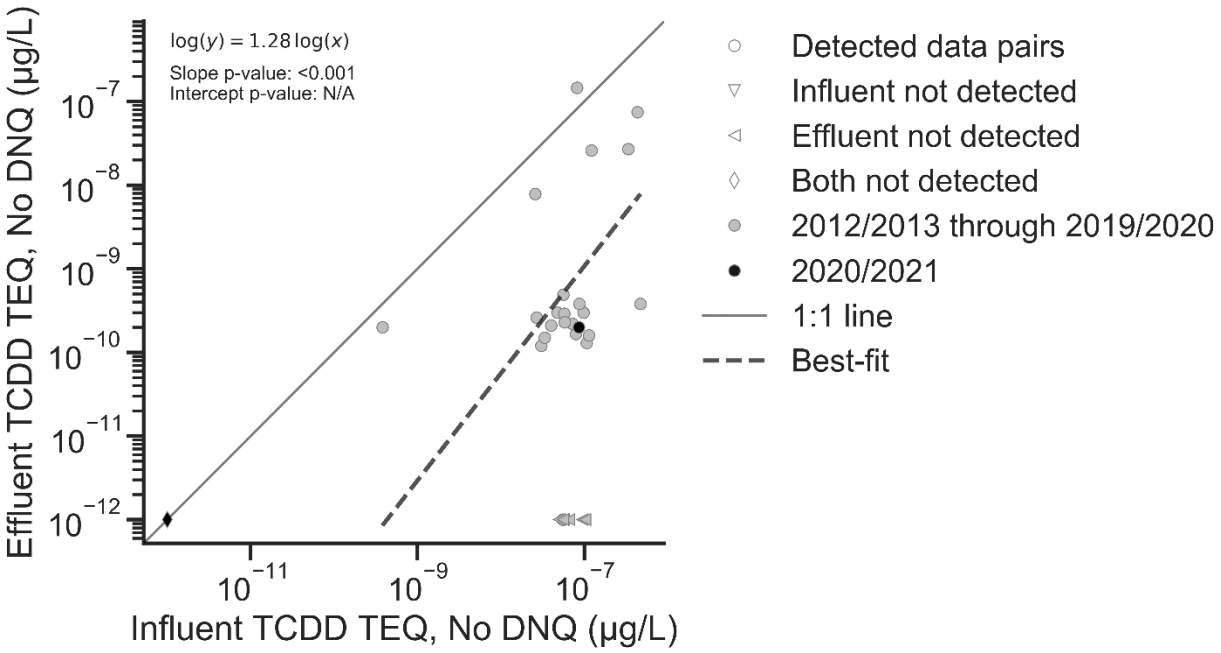


Figure 67. Paired Dioxins Concentrations at Lower Lot Biofilter

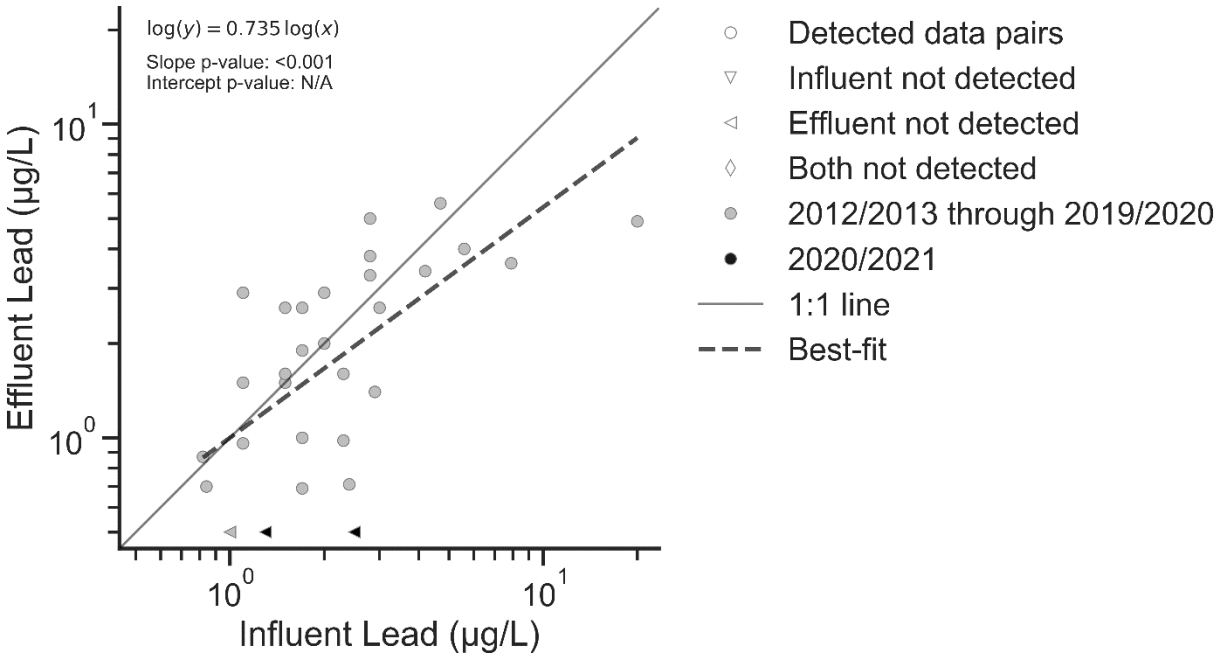


Figure 68. Paired Lead Concentrations at Lower Lot Biofilter

10.3 ELV Treatment BMP Influent v. Effluent Correlation Charts

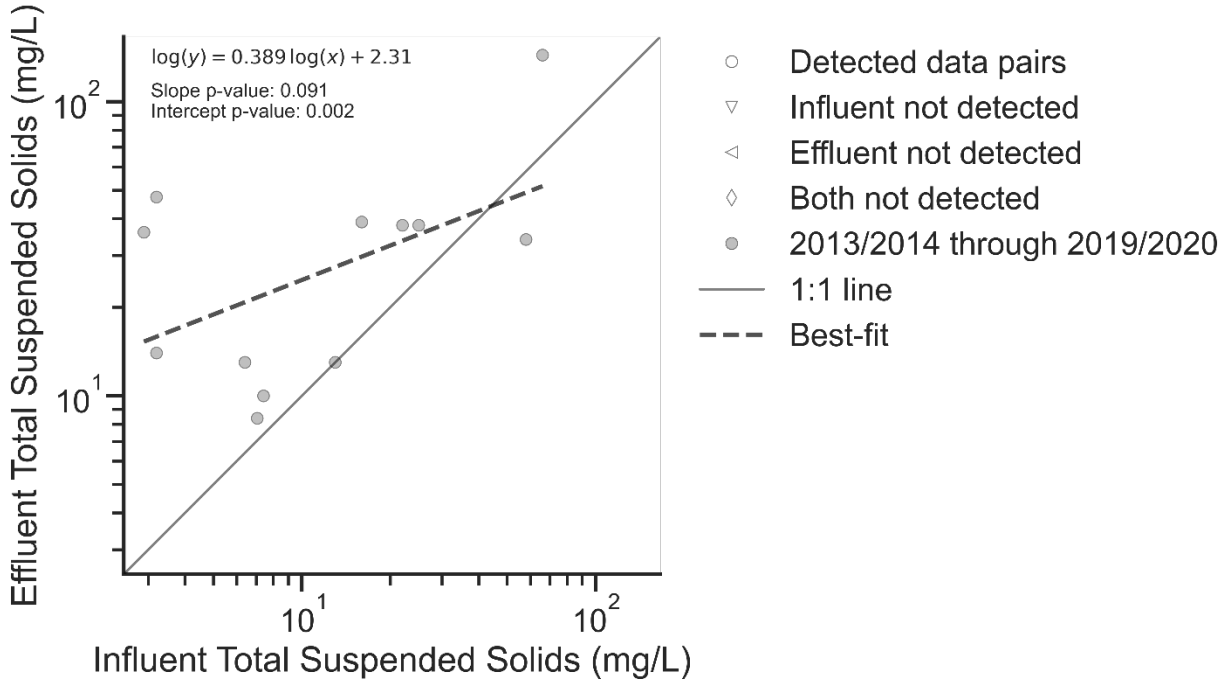


Figure 69. Paired TSS Concentrations at ELV Treatment BMP

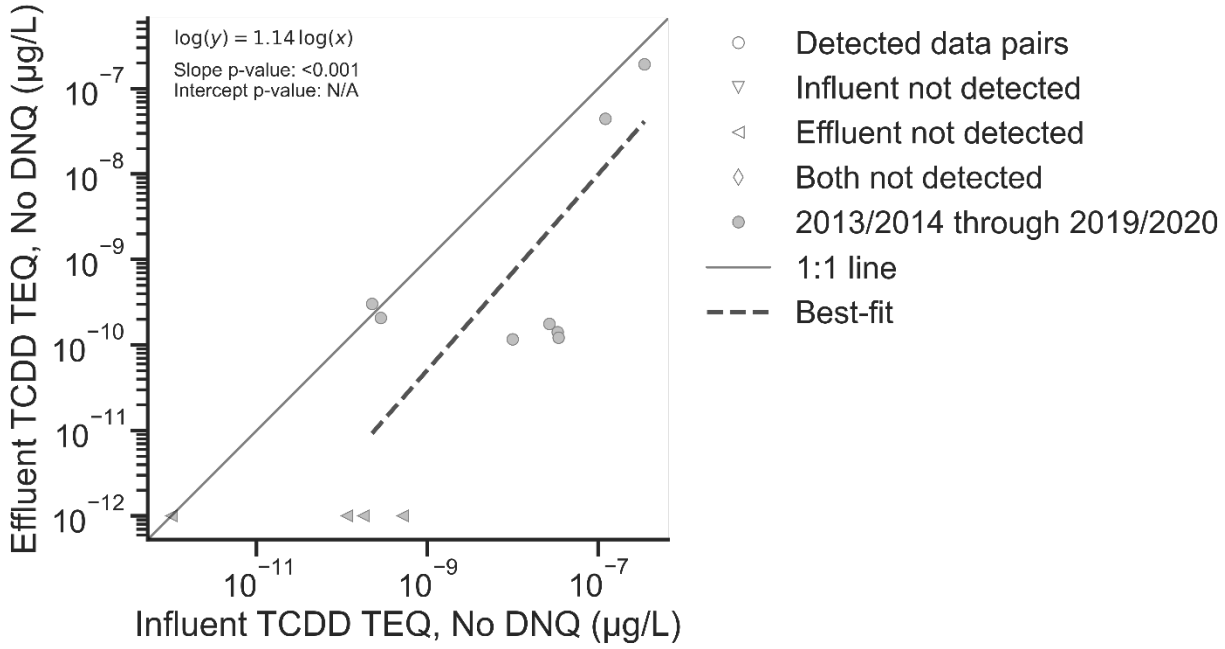


Figure 70. Paired Dioxins Concentrations at ELV Treatment BMP

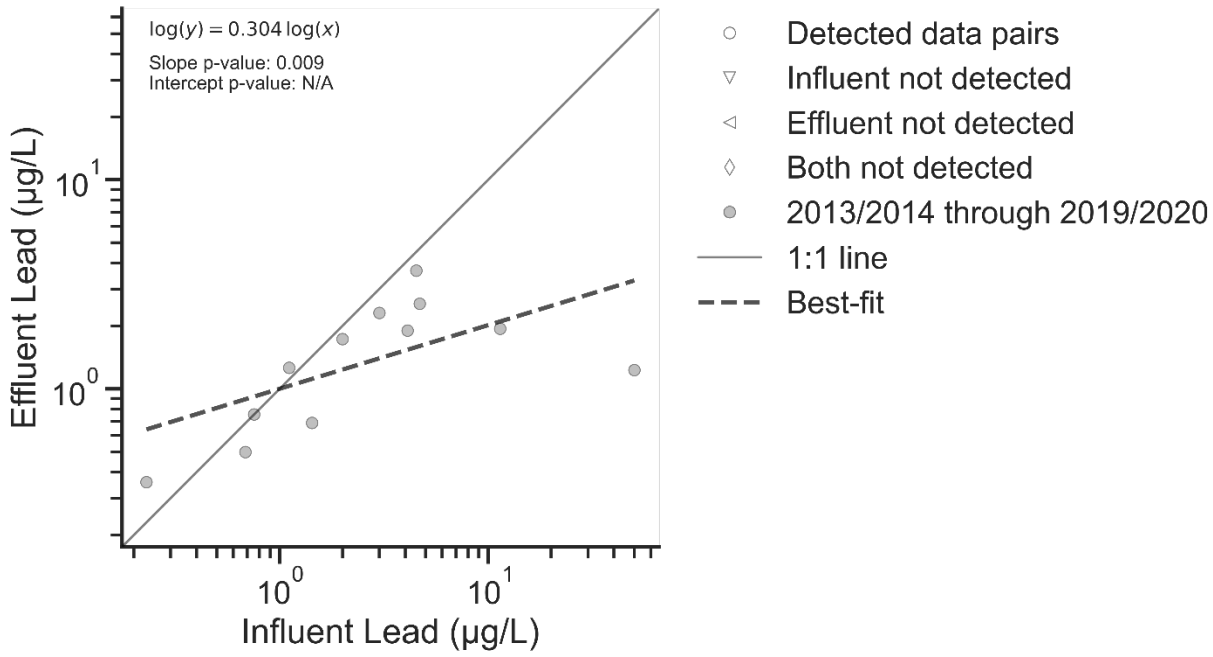


Figure 71. Paired Lead Concentrations at ELV Treatment BMP

10.4 Detention Bioswales Influent v. Effluent Correlation Charts

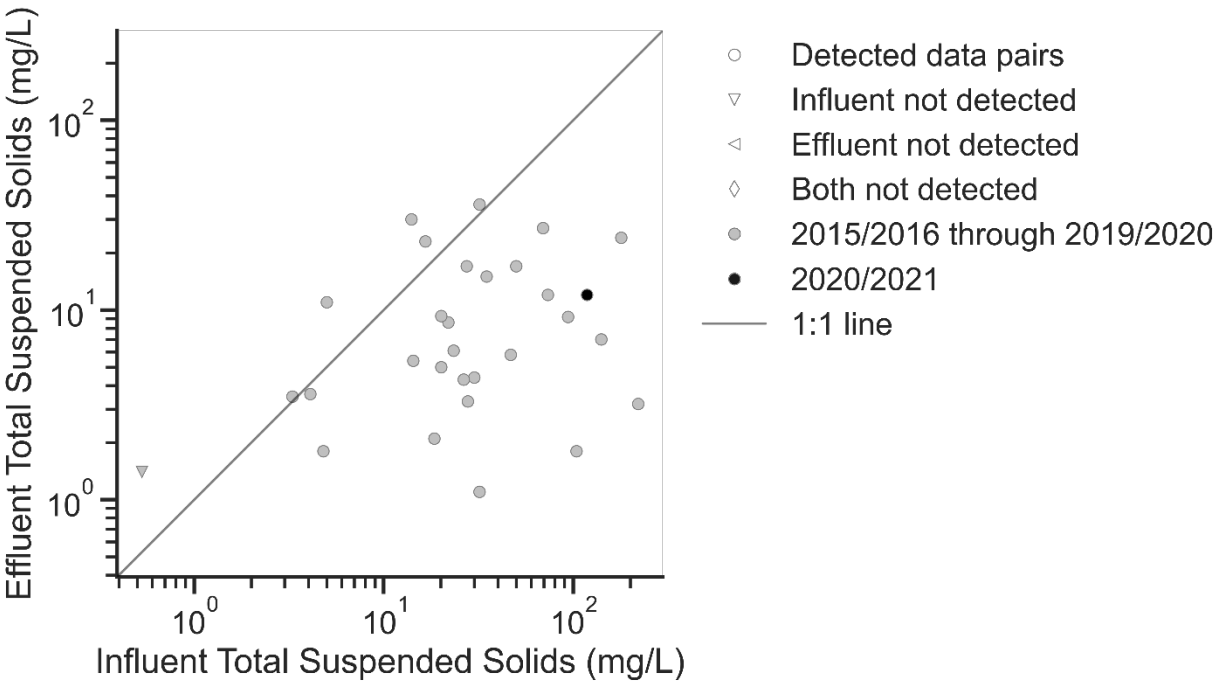


Figure 72. Paired TSS Concentrations at Detention Bioswales

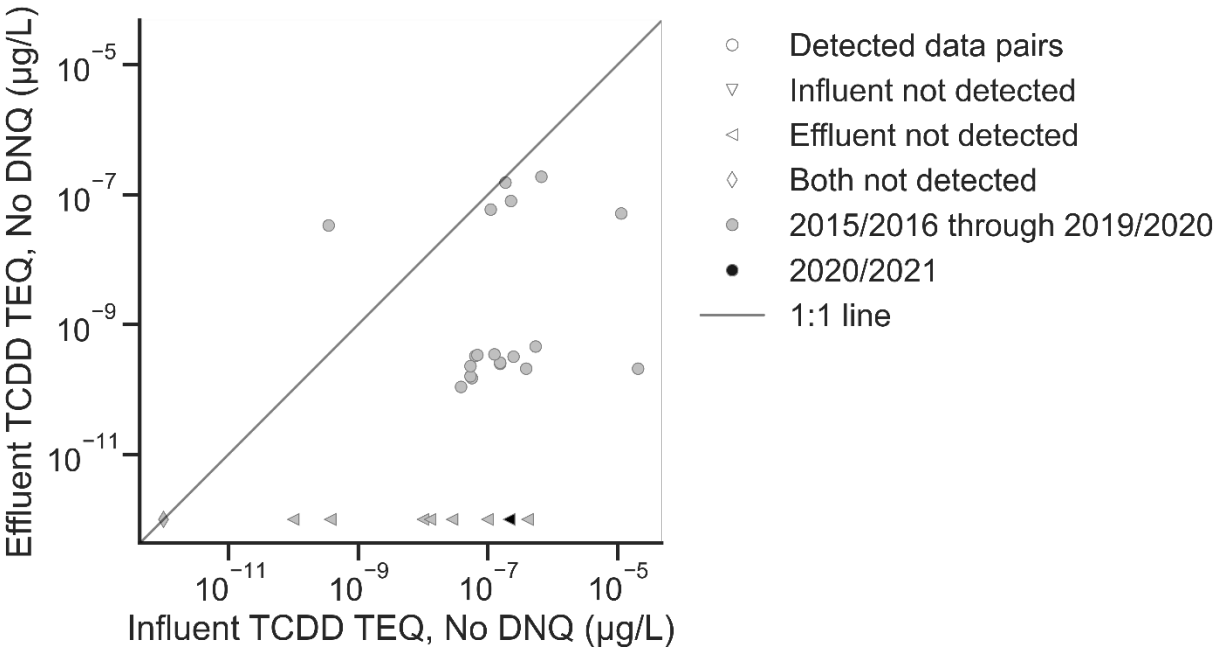


Figure 73. Paired Dioxins Concentrations at Detention Bioswales

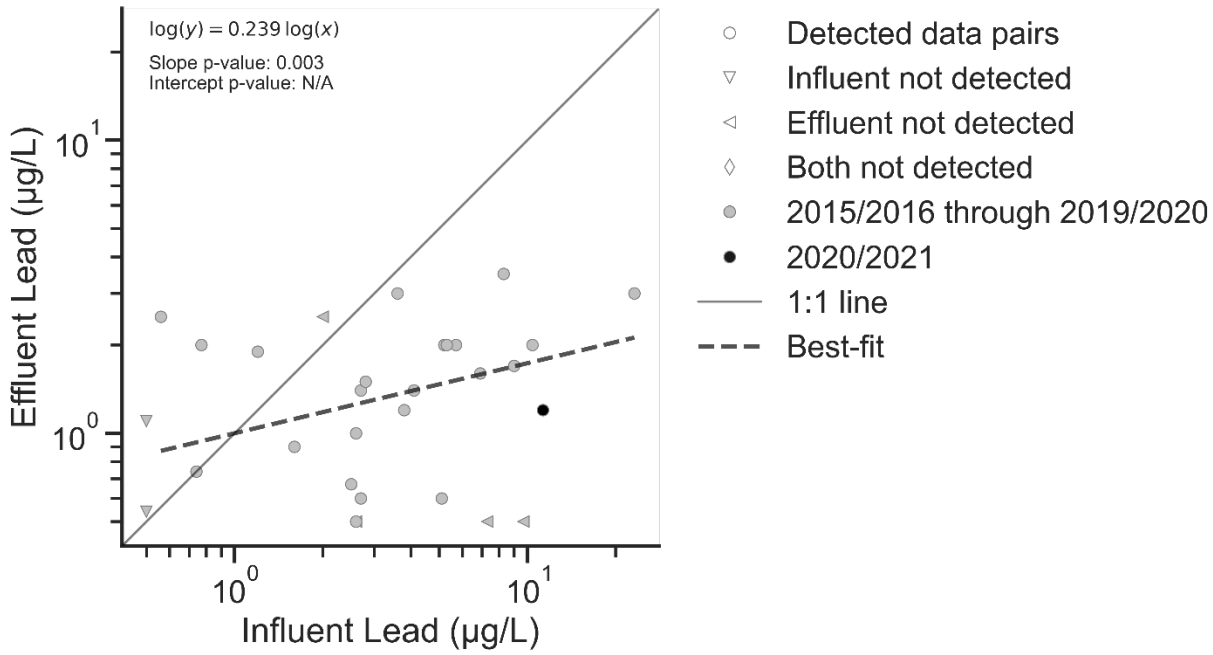


Figure 74. Paired Lead Concentrations at Detention Bioswales

10.5 Boeing Admin Area Inlet Filters Influent v. Effluent Correlation Charts

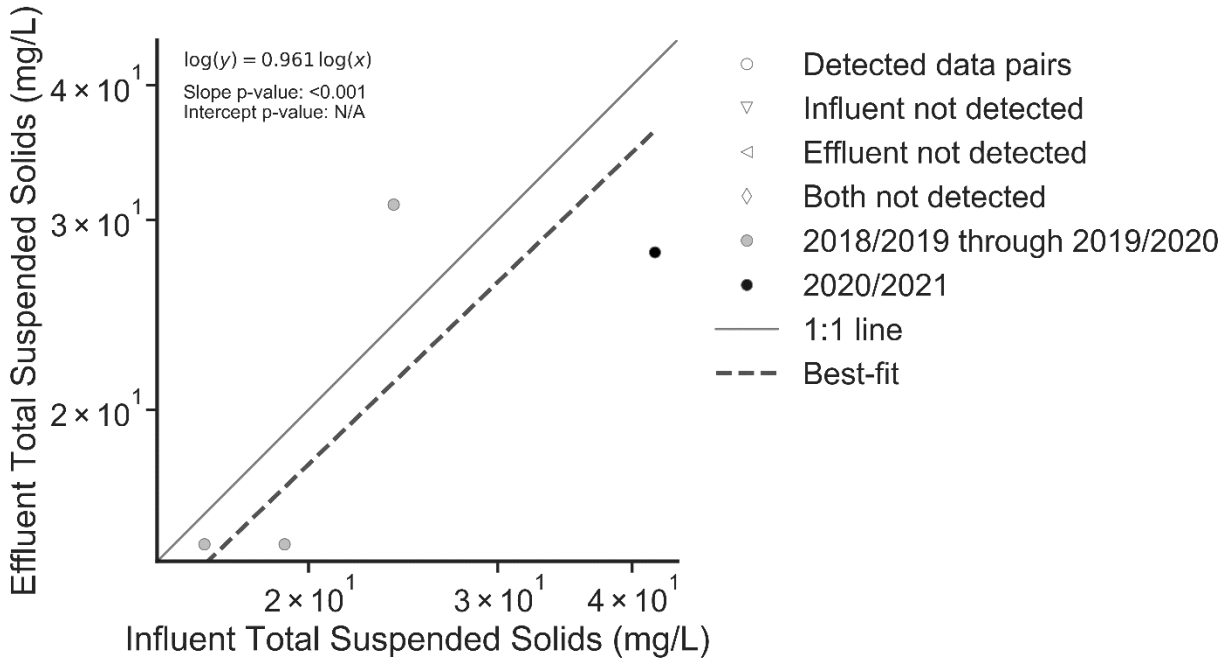


Figure 75. Paired TSS Concentrations at Boeing Admin Area Inlet Filters

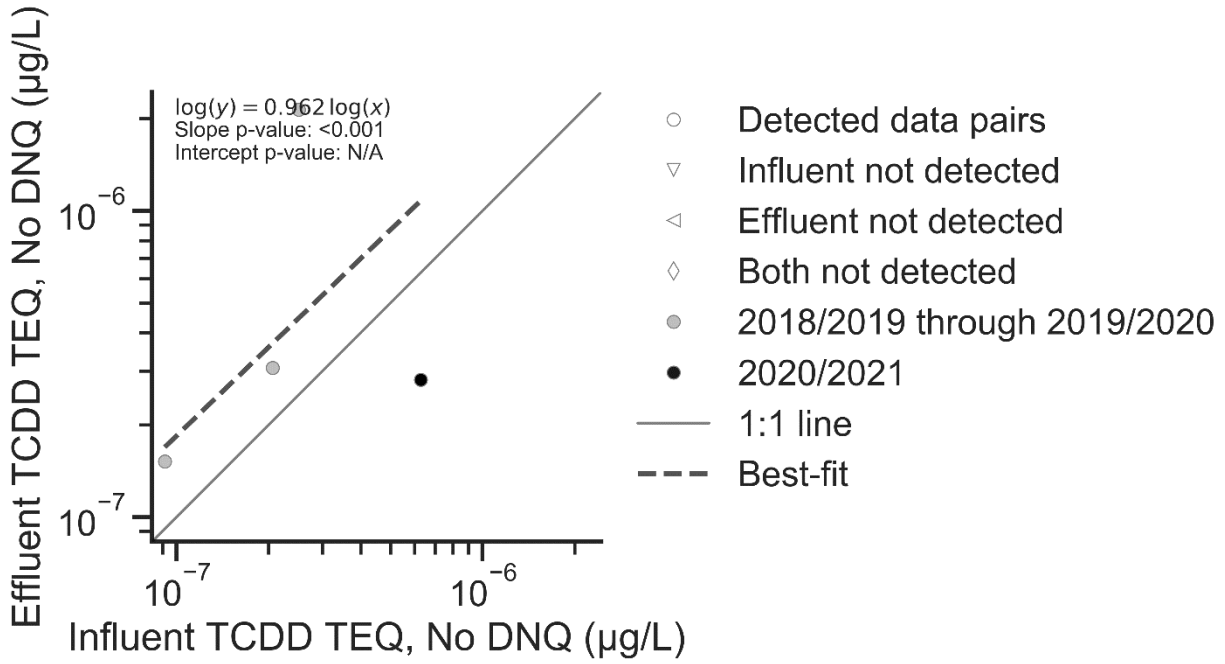


Figure 76. Paired Dioxins Concentrations at Boeing Admin Area Inlet Filters

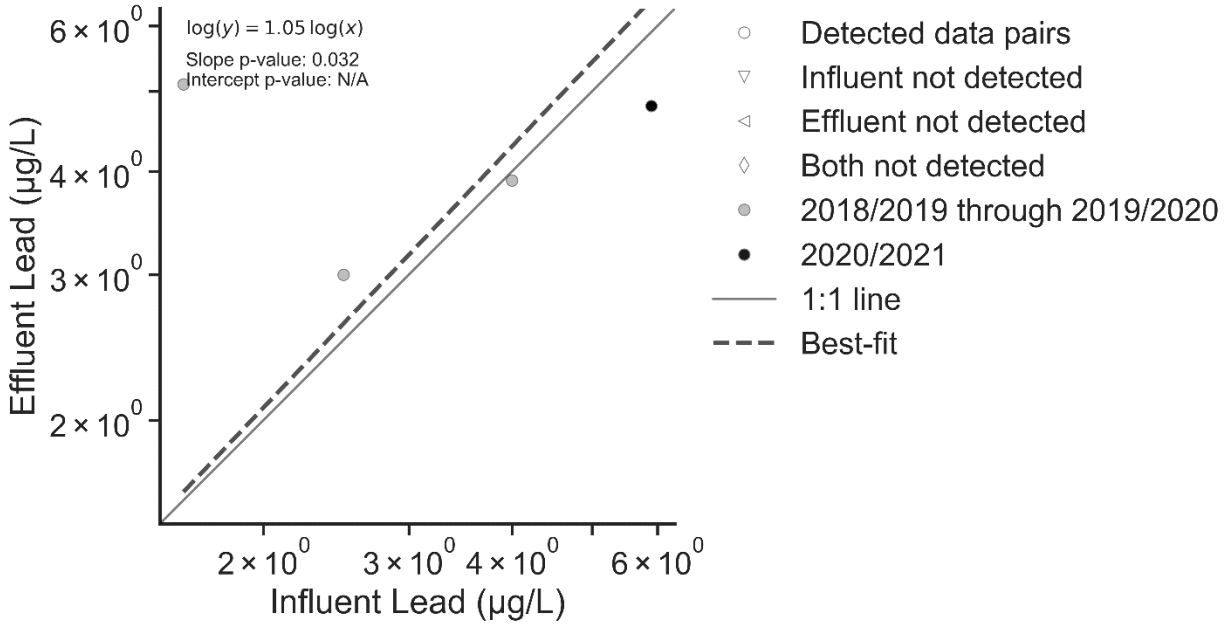


Figure 77. Paired Lead Concentrations at Boeing Admin Area Inlet Filters

11. Probability Plots

Probability plots for CM/media filter sites (B-1, upper lot media filter, CM-3 [post 2017/2018], CM-9, and CM-1, which excludes CM-8, and CM-11, due to the substantial flows that they receive from background areas) are shown in Figure 78 through Figure 80. Probability plots for the lower lot biofilter are shown in Figure 81 through Figure 83, and plots for the ELV treatment BMP are displayed in Figure 84 through Figure 86. Probability plots for the detention bioswales are displayed in Figure 87 through Figure 89, and plots for the Boeing admin area inlet filters are shown in Figure 90 through Figure 92. These log-normal probability plots are prepared by ranking the available log-transformed data and calculating their probability of occurrence. These probability values (shown on the vertical axis) are plotted against their concurrent concentrations. While determining the plotting positions, non-detect (ND) data were assigned to the lowest positions, effectively truncating the probability plots at the fraction of non-detected samples. Therefore, only detected result positions are plotted, which leads to the correct probability of occurrence for the observed data, while values less than the detection limit show their unknown specific occurrences. These figures illustrate trends for influent concentrations as compared to effluent concentrations and vice versa and serve as a useful tool for predicting effluent concentrations at a given percentile.

These figures also contain some basic statistics describing the data shown on the graphs. For each influent and effluent dataset, the number of ND results is shown. The p-value resulting from an Anderson-Darling test for lognormal distributions is also shown. The Anderson-Darling test assesses if the data follows an examined distribution (p-values <0.05 indicate that the actual distribution is significantly different from log-normal distributions for these plots). The null hypothesis here is that the data comes from a lognormal distribution. If the p-value is less than 0.05, the null hypothesis is rejected, and it is concluded that the data are not lognormal distributed. The 95th percentile confidence intervals are also shown on the plots for both influent and effluent sample results. If all of the influent or effluent data points are located within the confidence interval and the p-value is greater than 0.05, one can be 95% confident that the lognormal distribution appears to fit the data fairly well, and the fitted line may be used to estimate concentrations at various percentiles.

Where influent data (blue circles) consistently fall above the effluent points (green squares), consistent water quality improvement is occurring at these areas. The vertical distance between the datasets (noting it is a log scale) also indicates the magnitude of the concentration change at these BMP types. Similar to previous plots, points are shaded based on the sampling year during which they were collected. Points that are shaded with blue or green represent data from the most recent 2020/2021 reporting year, while data from all previous reporting years are shown with blue or green outlined shapes but no fill.

The relative difference in the amount of scatter observed in these plots indicates that BMP effectiveness may vary depending on the location and constituent. These plots indicate the influent concentrations above which the BMPs are most effective (low concentrations are expected to represent concentrations unlikely to be significantly reduced by the BMP). The slope of the probability distribution also indicates the variability of the data. As an example, if the effluent slope is flatter than the influent slope, the control is reducing the variability of the effluent concentrations.

11.1 CM/Media Filter Probability Plots

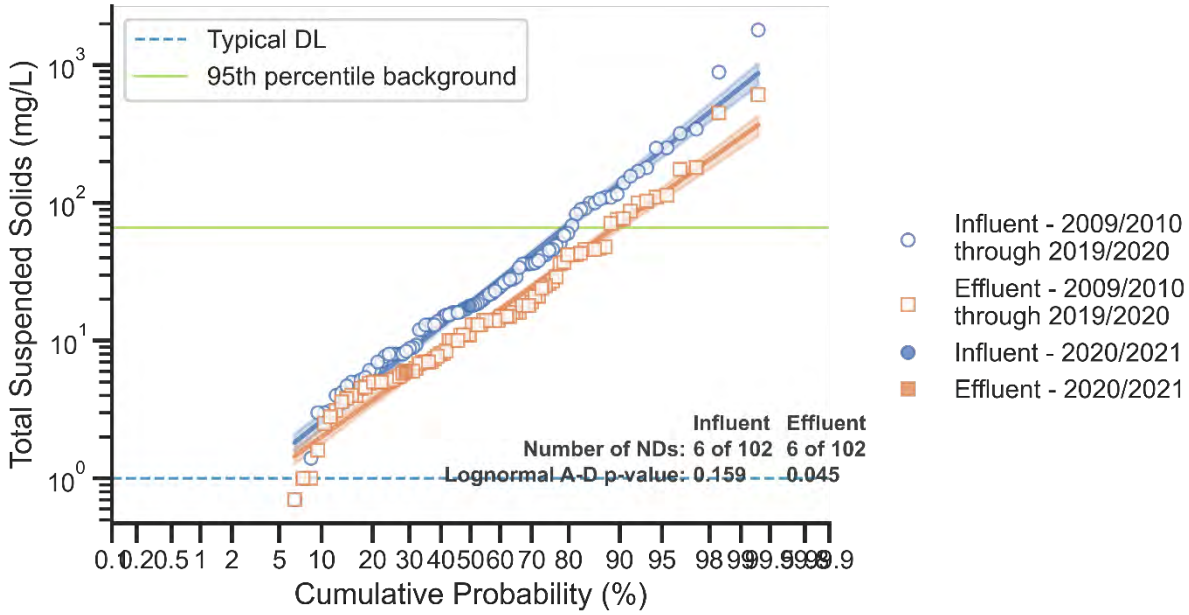


Figure 78. Log-normal Probability Plot of TSS at CM/Media Filter Locations

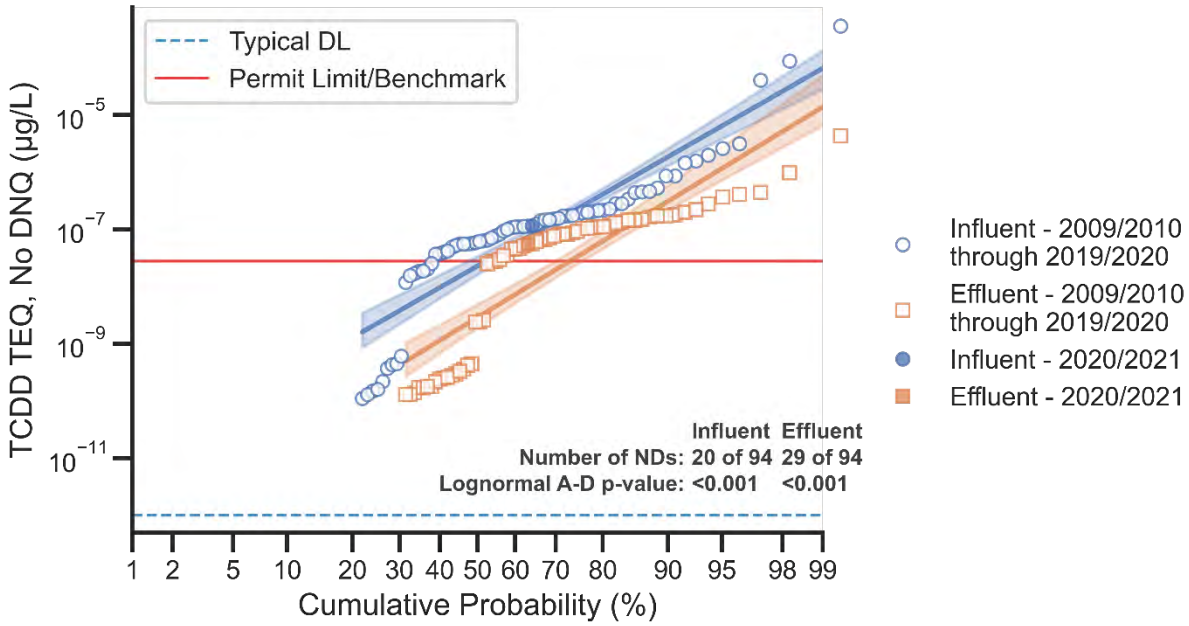


Figure 79. Log-normal Probability Plot of Dioxins at CM/Media Filter Locations

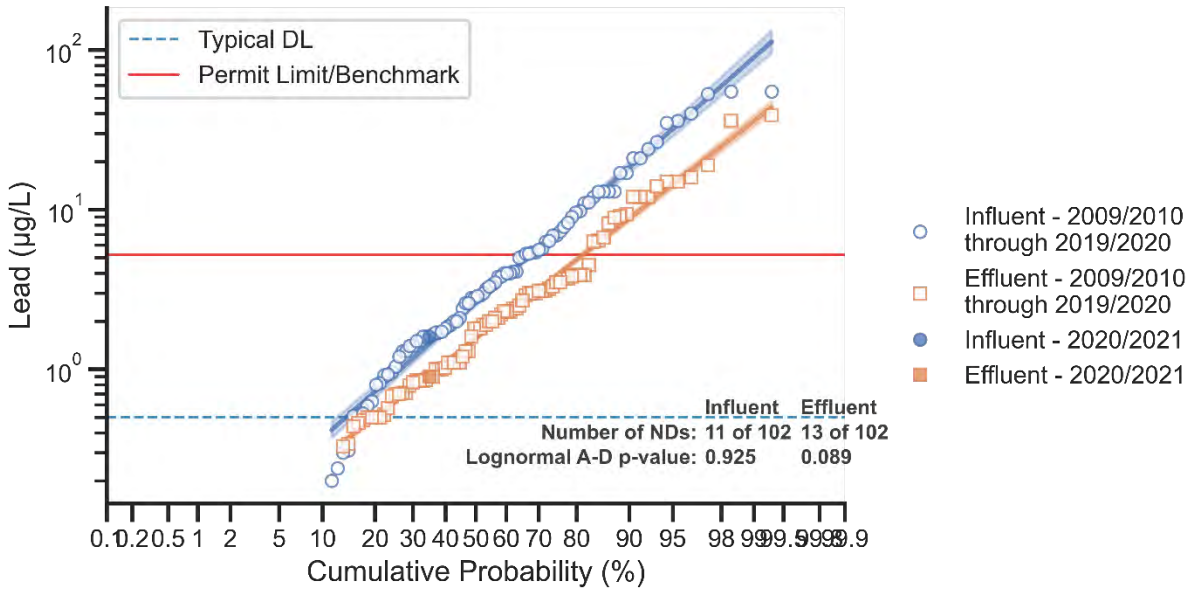


Figure 80. Log-normal Probability Plot of Lead at CM/Media Filter Locations

11.2 Lower Lot Biofilter Probability Plots

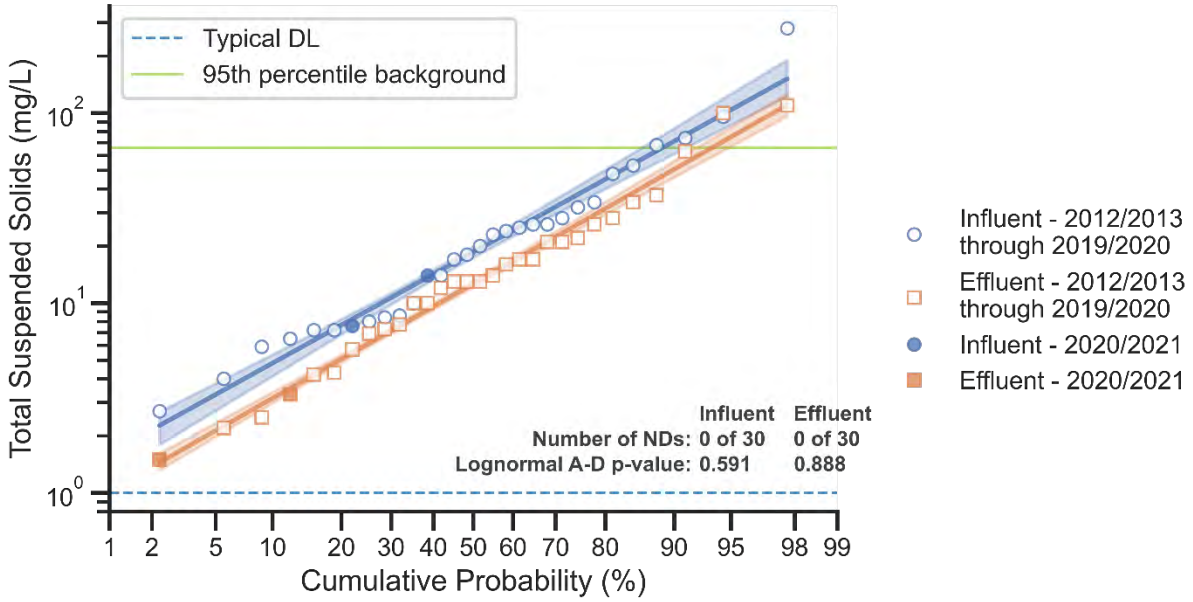


Figure 81. Log-normal Probability Plot of TSS at Lower Lot Biofilter

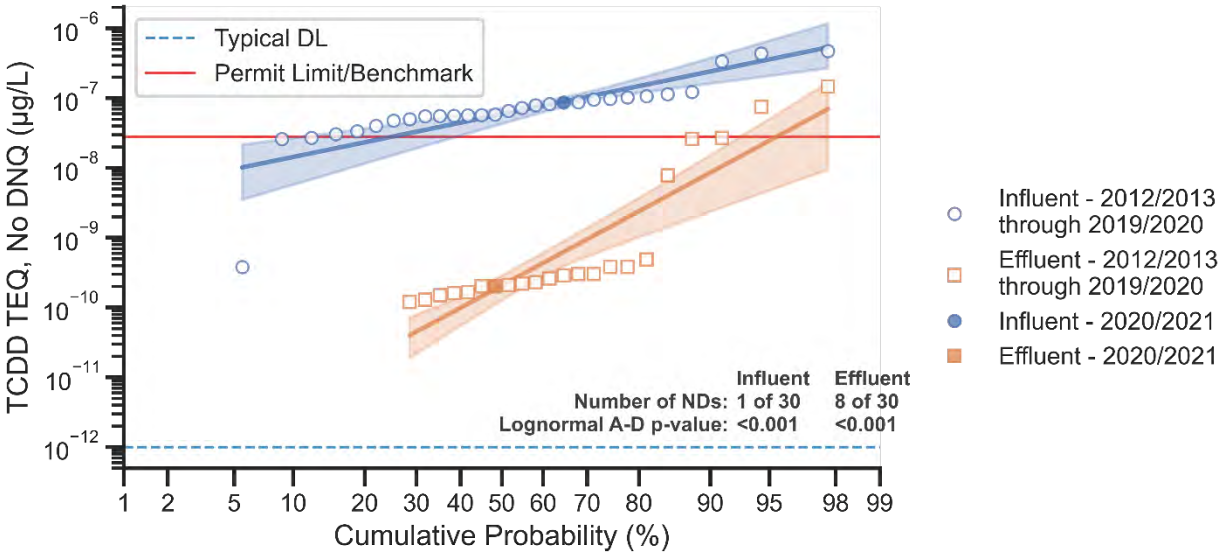


Figure 82. Log-normal Probability Plot of Dioxins at Lower Lot Biofilter

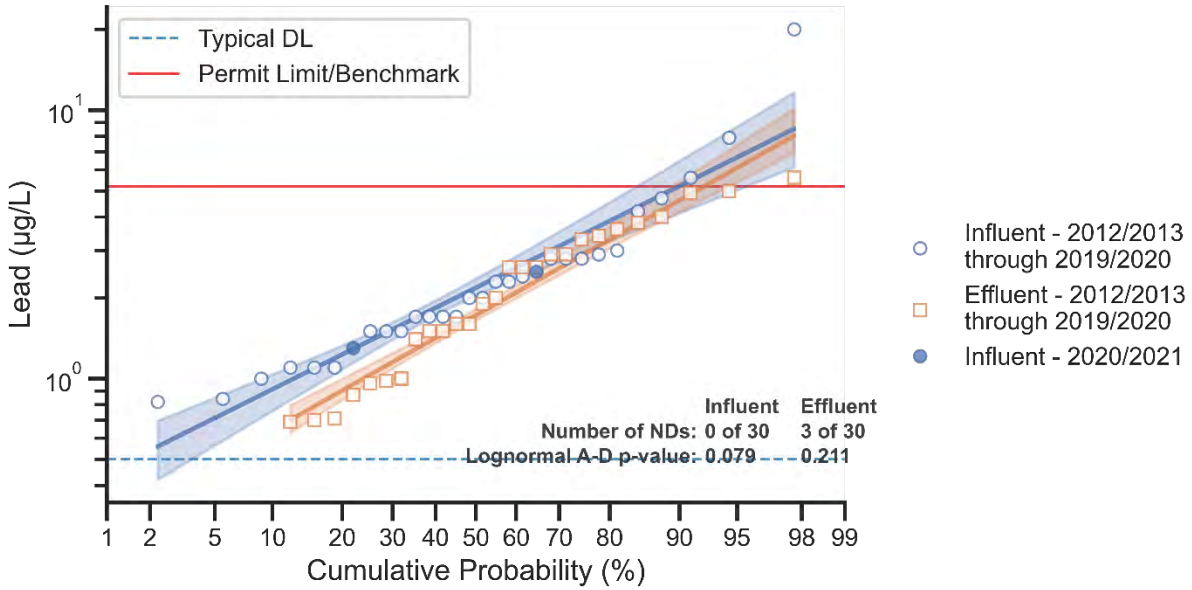


Figure 83. Log-normal Probability Plot of Lead at Lower Lot Biofilter

11.3 ELV Treatment BMP Probability Plots

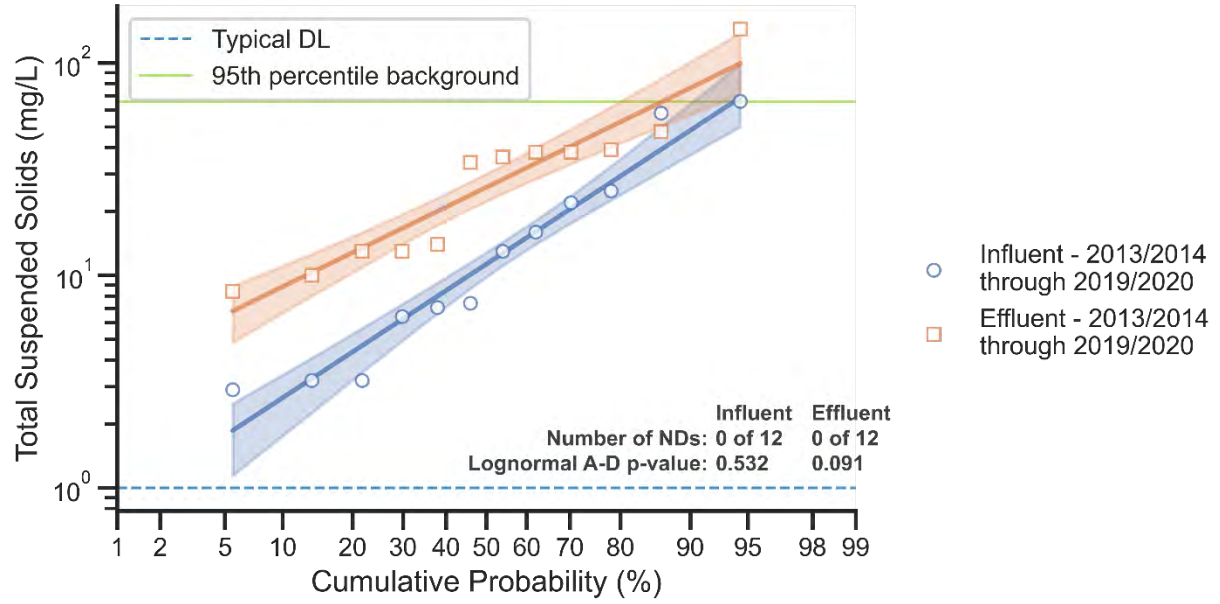


Figure 84. Log-normal Probability Plot of TSS at ELV Treatment BMP

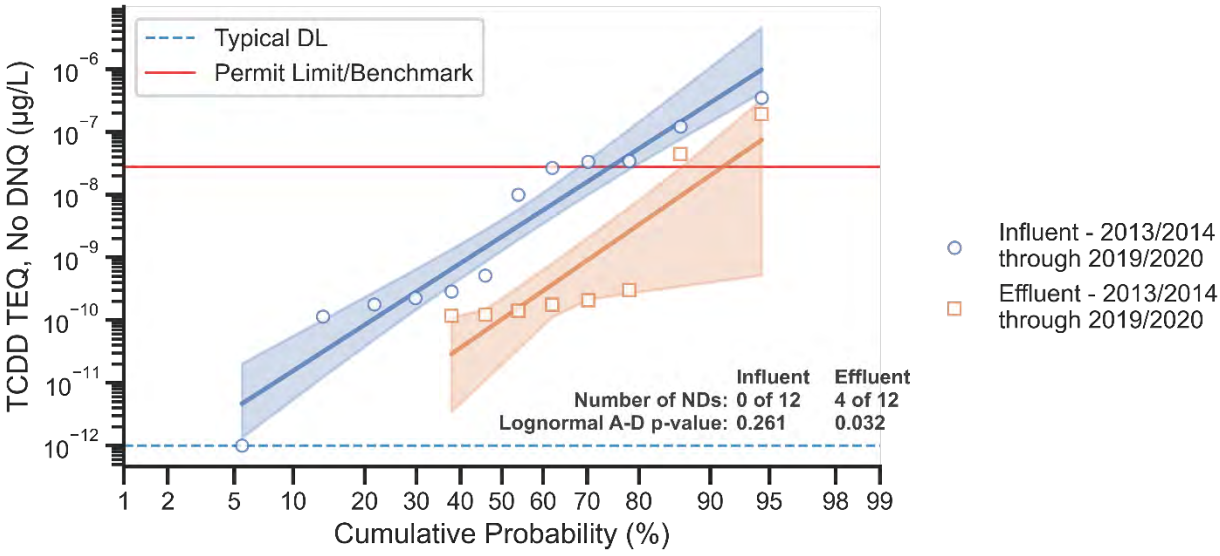


Figure 85. Log-normal Probability Plot of Dioxins at ELV Treatment BMP

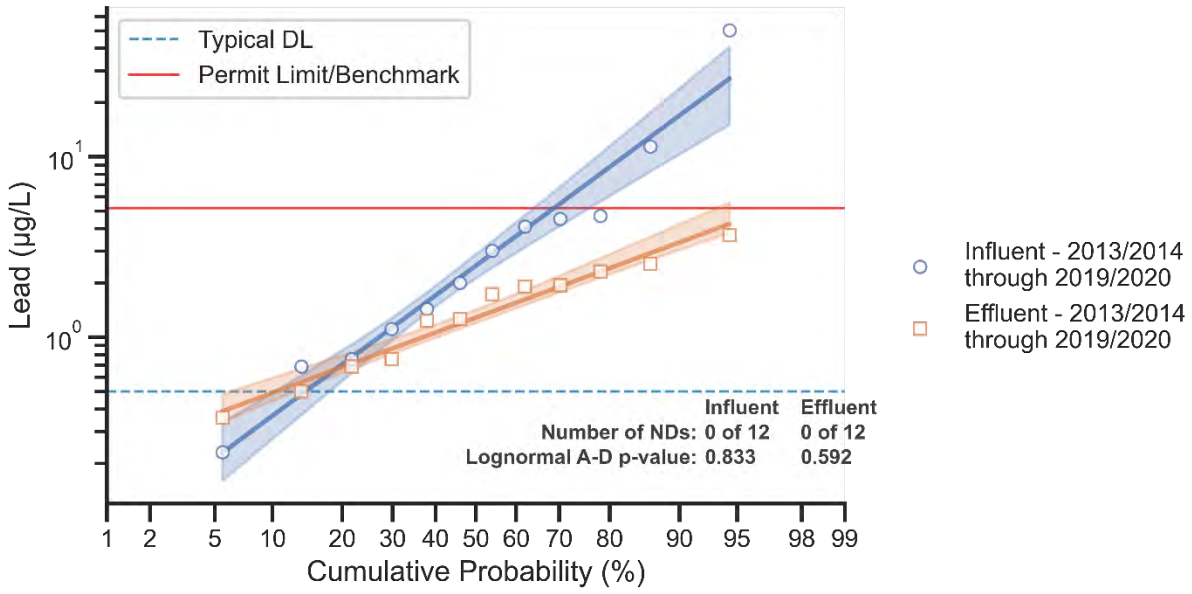


Figure 86. Log-normal Probability Plot of Lead at ELV Treatment BMP

11.4 Detention Bioswales Probability Plots

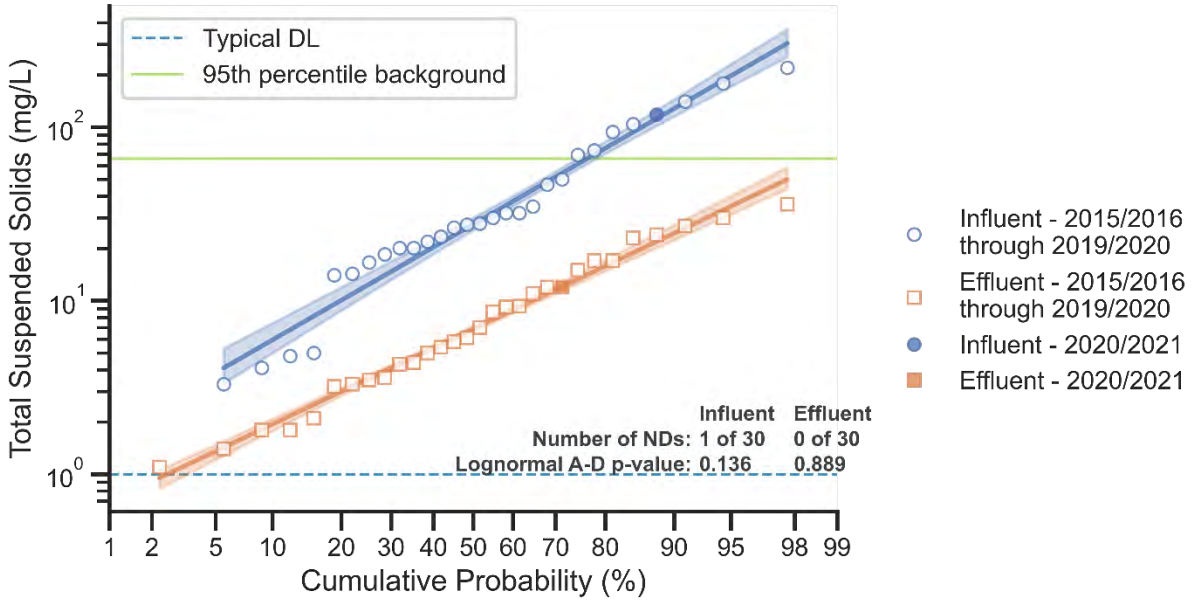


Figure 87. Log-normal Probability Plot of TSS at Detention Bioswales

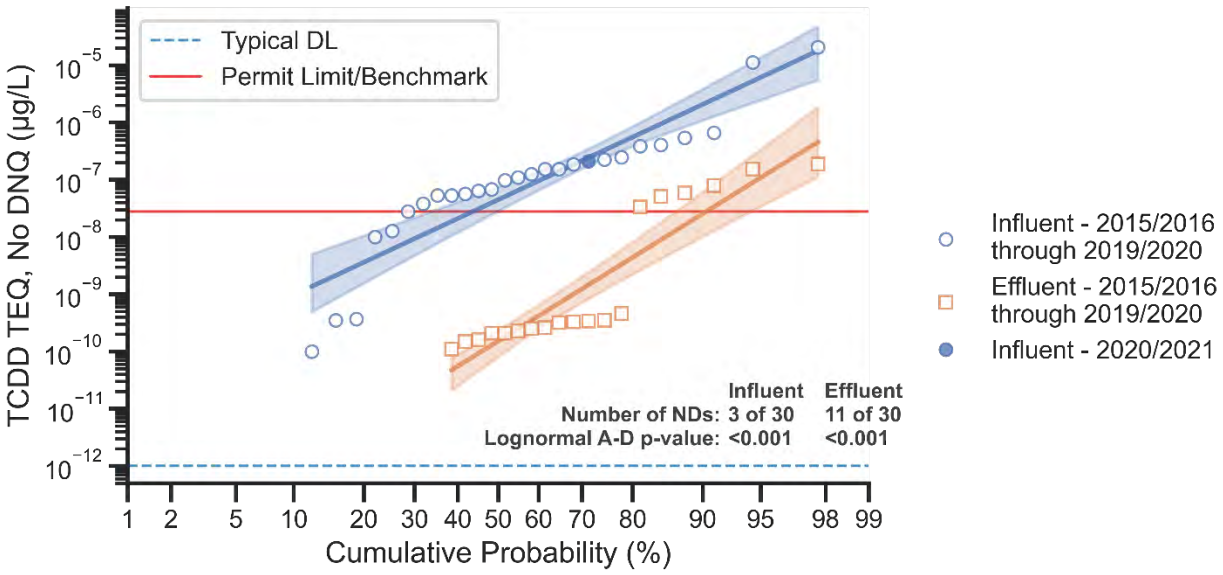


Figure 88. Log-normal Probability Plot of Dioxins at Detention Bioswales

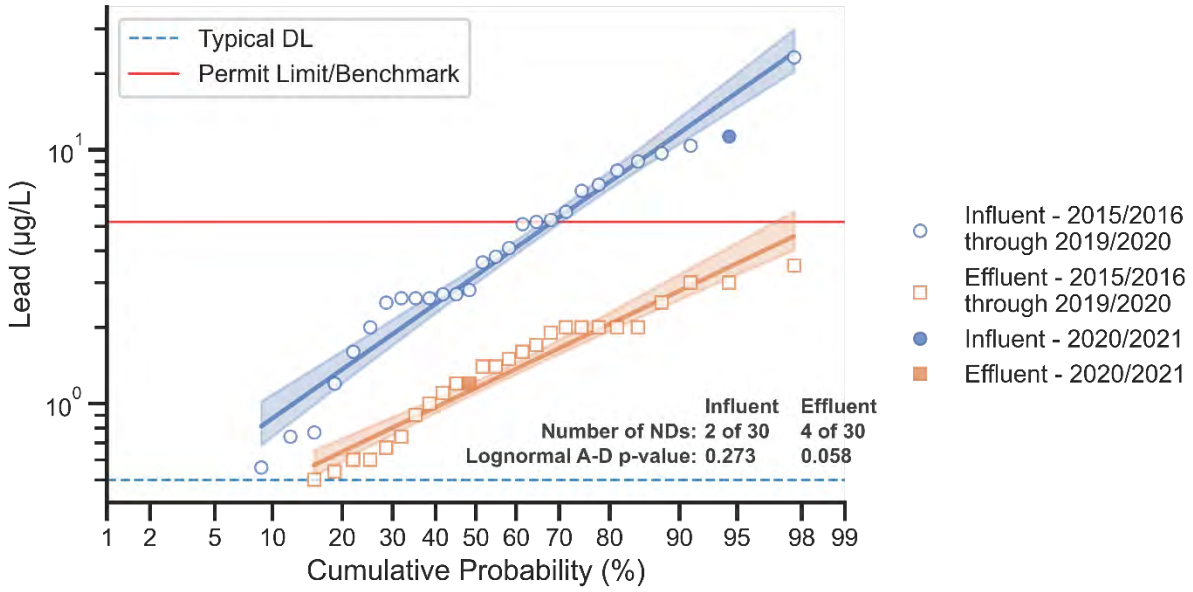


Figure 89. Log-normal Probability Plot of Lead at Detention Bioswales

11.5 Boeing Admin Area Inlet Filters Probability Plots

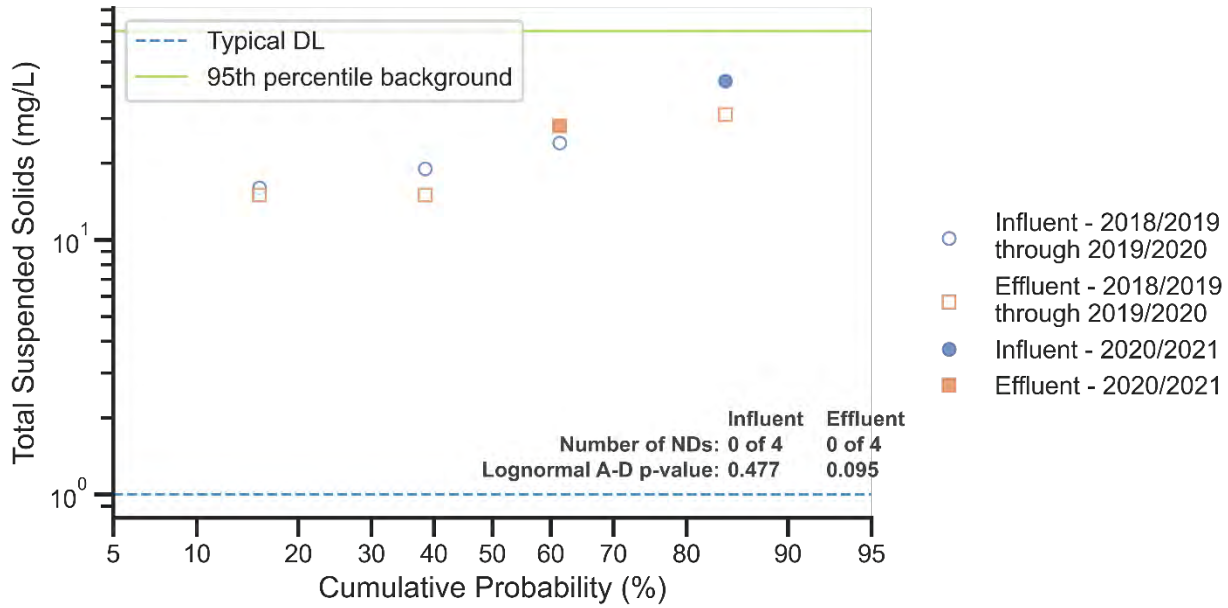


Figure 90. Log-normal Probability Plot of TSS at the Boeing Admin Area Inlet Filters

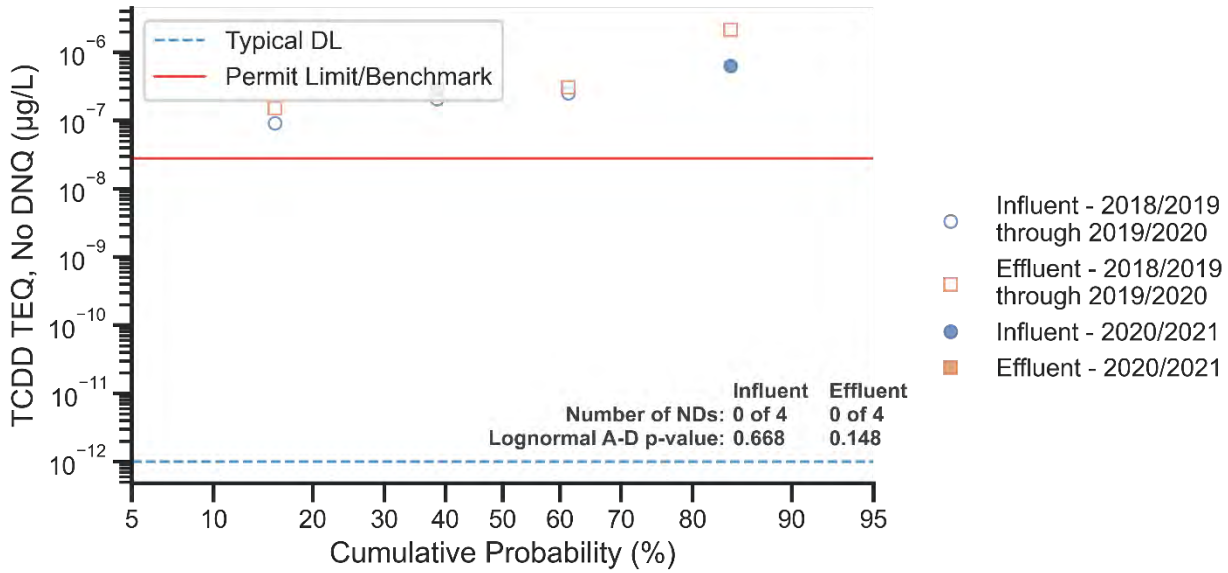


Figure 91. Log-normal Probability Plot of Dioxins at the Boeing Admin Area Inlet Filters

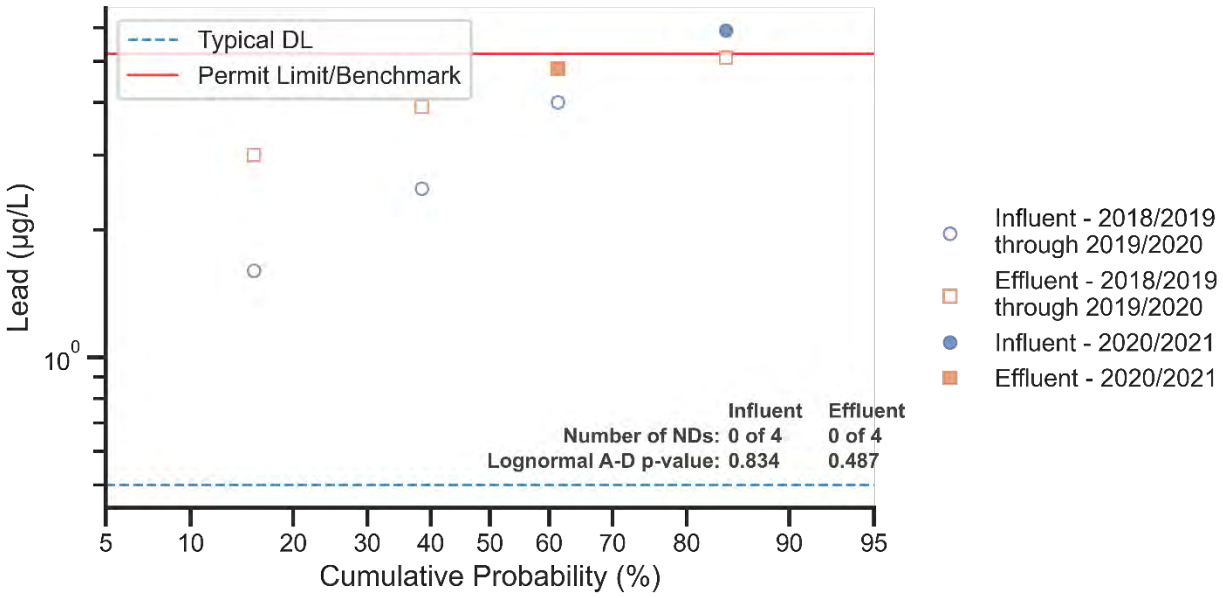


Figure 92. Log-normal Probability Plot of Lead at the Boeing Admin Area Inlet Filters

12. Discussion and Observations

The following general observations were made based on an evaluation of the aforementioned data summary charts and tables.

1. **Are the CMs/media filters continuing to reduce the concentrations of lead, dioxin, and TSS between the untreated influent and the treated effluent?**

   Yes. The CMs were originally installed as provisional (pending further evaluation) stormwater controls that could be installed in areas where existing culverts carried the stormwater below the roads. As a result, they handle a wide range of flows during a typical rain year and experience relatively short treatment residence times and the weirs overflow during average to large size storms. However, the performance monitoring results indicate that statistically significant pollutant concentration reductions are occurring for TSS, dioxins, and lead at the non-background CMs/media filters (i.e., CM-1, CM-9, B-1, and upper lot media filter) as a result of their sedimentation and media treatment unit processes. Effluent concentrations of TSS and lead were also lower than corresponding influent samples for the CM background locations (i.e., CM-8 and CM-11), with statistically significant pollutant removal observed for TSS and lead. This trend was not observed for dioxins at the CM background locations. However, a significant portion of the rain events (63%) had both influent and effluent sample results that were not detected. Monitoring results show that the CMs are reducing the concentrations of TSS, dioxins, and lead between the influent and effluent at both the non-background and background CMs (with the exception of dioxins at the background CMs).

2. **Are the detention bioswales, Lower Lot Biofilter, and ELV Treatment BMPs continuing to reduce the concentrations of lead, dioxin, and TSS between the untreated influent and the treated effluent?**

   Generally. Cumulative performance monitoring data (as summarized by the statistical analysis tables, correlation charts, and probability plots) indicate that detention bioswales effluent concentrations were lower than corresponding influent samples for all COCs evaluated. Statistically significant pollutant removals were observed for all three COCs. Effluent concentrations were generally lower (compared to influent runoff) at the lower lot biofilter for dioxins, with statistically significant pollutant removal observed. In contrast, for lead and TSS, there were only slightly more data pairs with higher effluent results compared to data pairs with higher influent results for the biofilter (see additional discussion on question #4 of this section).

   Data from the ELV Treatment BMP showed that the majority of sample pairs had lower effluent concentrations for dioxins and lead than corresponding influent samples, with statistical significance shown for both dioxins and lead. However, the majority of data pairs had higher effluent TSS concentrations than influent concentrations (with statistical significance). The ELV Treatment BMP was rebuilt recently to decrease the potential of media washout causing increased TSS in the effluent.

   In addition, the number of results exceeding the Permit Limits for both the influent and effluent samples show an improvement in water quality between the untreated influent and the treated effluent, as described in the subsequent observation below.

3. **Are the treatment controls continuing to aid in compliance with NPDES Permit Limits at Outfall 009?**

   Yes. Collectively, the treatment controls have resulted in water quality improvement and NPDES compliance at Outfall 009, where lead and dioxin compliance challenges persist. All COC-BMP combinations had fewer effluent concentration results above Permit Limits compared to the influent concentrations (with the exception of the Boeing admin area inlet filters for dioxins, which only had four influent and effluent data pairs available, and all influent and effluent results exceeded permit Limits). It is important to note that the discharge from the inlet filters flows to the lower lot biofilter for subsequent treatment. Most COC-BMP combinations also showed lower average and maximum exceedance ratios (i.e., exceeding sample concentrations divided by the Permit Limit) for effluent results compared to the influent results[36]. These observations show that the treatment controls are improving storm water quality prior to reaching Outfall 009. For example, average influent exceedance ratios for CM-9 were 4.2 and 8.5 for lead and dioxins, respectively, while the average effluent exceedance ratios were reduced to 2.9 and 3.2 for lead and dioxins, respectively, during this same time period. This not only demonstrates that the treatment controls are reducing NPDES COC concentrations in stormwater upstream of Outfall 009, but that the treatment control drainage areas (which include paved roads) are pollutant generating source areas that, without treatment, would have worsened water quality at the downstream NPDES compliance location.

4. **Is there a reason why some recent monitoring data at the lower lot biofilter have shown net increases in pollutant concentrations across the system compared to prior years?**

   Yes. As previously noted, dioxin reductions across the system have been consistent, as 28 out of 30 sample pairs decreased in dioxin concentrations from the influent runoff to the biofilter outlet (and one sample pair that did not result in a decrease in dioxins concentrations was from 2020/2021, when both the influent and effluent samples were non-detect). However, 18 of the 30 paired samples had higher influent concentrations than their paired effluent concentrations for TSS, and 16 of the 30 samples had larger influent concentrations for lead. It should first be noted that there are no applicable permit Limits for TSS for Outfall 009, only one effluent sample has exceeded permit Limits for lead (sample collected on 12/2/2014), and three effluent samples have exceeded permit Limits for dioxins. However, this pattern of net increases in lead concentrations (and in part, TSS concentrations) across the system can likely be attributed to the significantly lower influent concentrations to the lower lot biofilter in recent years. The B1436 detention bioswales, which were constructed in December 2014, slow and treat a portion of the drainage area which would have previously flowed to the lower lot biofilter. Significant pretreatment is being achieved by the detention bioswales, even though their primary purpose is to delay the influent runoff to the lower lot biofilter and reduce the portion of the total flow that bypasses the BMP during large storm events. As previously noted, the average volume pumped to the biofilter has increased since the detention bioswales were constructed. Similarly, the estimated percent of total runoff volume treated by the lower lot biofilter (from both the

[36] The only exceptions include the average exceedance ratio for lead at B-1 and dioxins for the Boeing Admin Area inlet filters (both average and maximum exceedance ratio).

24-inch drain and the lower lot drainage areas) has increased since the detention bioswales were constructed. The average influent TSS concentration to the Lower Lot biofilter for samples collected before or during December 2014 was 109 mg/L, and the average for samples collected after December 2014 was 18 mg/L. This trend of significantly lower TSS influent concentrations following construction of the detention bioswales was also observed for lead, where the average influent lead concentration before and after construction of the detention bioswales was 8.0 µg/L and 2.0 µg/L, respectively. The average effluent concentrations of both TSS and lead were lower in post-detention bioswale samples when compared to pre-detention bioswale samples (i.e., 41 mg/L vs. 17 mg/L for TSS and 4.0 µg/L vs. 1.8 µg/L for lead). The number of sample pairs with higher effluent concentrations than their paired influent concentrations for TSS and lead can be explained by the significant reduction in average influent concentrations to the Lower Lot biofilter since construction of the detention bioswales. It is usually not possible to reduce low TSS influent concentrations compared to high TSS influent concentrations, especially with pre-treatment that has already removed the larger particles, leaving only small particles that are difficult to remove due to sedimentation and filtering in the media. Additionally, scour or leaching of previous captured material may also be contributing to this observation.

5. **Is the lower lot biofilter continuing to prevent stormwater runoff from discharging to the Northern Drainage?**

   Yes. Monitoring data at the lower lot biofilter were examined to determine its ability to prevent smaller storms from discharging to the Northern Drainage. The lower lot biofilter successfully prevented just over half of all storms less than or equal to one inch originating in the lower lot tributary area from discharging to the Northern Drainage, which flows to Outfall 009.

6. **Has an adequate number of samples been collected such that sampling can be potentially discontinued at some locations?**

   Yes. Following the 2016/2017 reporting year, the Expert Panel evaluated the need for continued sampling at the BMPs. It was decided that in the context of reduced site activities (e.g., reduced construction, demolition, etc.) anticipated for the 2017/2018 and later reporting years in the Outfall 009 watershed, samples would only be collected twice per year at the following BMPs: upper lot media filter, southern detention bioswale, lower lot biofilter, CM-1 (influent-west and effluent), and the ELV Treatment BMP. Two background locations are planned to continue to be sampled during every storm, in order to collect more background data. The Panel has committed to revisiting the monitoring frequency when Outfall 009 watershed site activities increase. It should be noted that long-term monitoring is needed to examine when media clogging occurs (so maintenance can be performed when needed).

7. **Is significant maintenance currently required for any of the BMPs?**

   No. Replacement of media at CM-9 is recommended soon, due to the observed ponding during the 2018/2019 and 2020/2021 reporting years and estimated sediment loading until maintenance is needed. Additionally, it is estimated that CM-3 may need maintenance in the near future. Recent data have shown evidence of solids export through the underdrain of the ELV treatment BMP, based on the dioxins particulate strength decreasing through the media layer. The drainage layers and filter media in the ELV Treatment BMP were rebuilt in summer

2021, and the ELV treatment BMP will continue to be investigated to better understand the recent performance. The cumulative TSS loadings to the ELV Treatment BMP, lower lot biofilter, B-1 media filter, upper lot media filter, CM-1, and CM-9 were investigated and compared to the estimated value of cumulative sediment loading to the media before maintenance is needed (Pitt and Clark, 2010). The ELV Treatment BMP, lower lot biofilter, and upper lot media filter were only 0.1%, 3.6%, and 6.3%, respectively, towards requiring maintenance, and it was estimated that maintenance due to sediment clogging would not be needed for at least 30 years, assuming average rainfall years. This long maintenance interval is due to significant pretreatment of the stormwater before the media treatment at those locations. Cumulative solids loadings at B-1 were estimated to be 13% towards lab-based thresholds of media clogging, and initial maintenance is expected to be needed in approximately 23 years. However, calculations showed that CM-1 reached the cumulative sediment loading where maintenance was needed (136%) during the 2017/2018 reporting year based on lab measurements of cumulative solids loading until media clogging. Some bypass/overflow potentially associated with media clogging at CM-1 was also observed during the 2016/2017 reporting year. Due to the estimated sediment loading and ponding observations, CM-1 was reconstructed, and the media replaced in August 2018. CM-1 was estimated to be 13% towards lab-based thresholds of media clogging (post reconstruction), and initial maintenance is expected to be needed in approximately 16 years. Cumulative solids loadings at CM-9 were estimated to be 59% towards media clogging, and initial maintenance is expected to be needed in approximately five years, assuming average rainfall years. Ponding was observed at CM-9 during several storm events during the 2018/2019 reporting year. However, ponding was not observed (at any of the CMs) during the 2019/2020 or 2020/2021 reporting years, after 72 hours following storm events. Although the cumulative TSS loading analysis did not evaluate the other CMs, based on a comparison of their pervious drainage areas compared to CM-1 and CM-9, it is estimated that CM-3 may need maintenance in the near future. It should be noted that each BMP was observed (72 hours post storm event) during three storm events during 2019/2020. The Expert Panel recommends that observations of clogging, overflow, and underdrain flows should continue to be taken at BMPs -- stage recorders may also be used -- during storms when performance samples are collected (to confirm that underdrains are functioning properly and bypass through weir boards is not occurring) as well as following storms (to confirm that extended ponding is not occurring) so that this consideration is tracked and timely maintenance can be performed when needed.

8. **Is pollutant removal performance deteriorating at any BMPs?**

No. Based on long-term monitoring results of all BMPs, effluent concentrations tracked the influent concentrations, with no significant differences with time. Changes in influent concentrations due to altered site conditions had the strongest impact on effluent trends, however all effluent concentrations remained low (Pitt et al 2021 and Pitt et al 2022) Based on these observations, it is not likely that chemical breakthrough occurred at any of the media treatment systems at SSFL.

13. References

Pitt, R. E. and Clark, S.E., 2010. *Evaluation of Biofiltration Media for Engineered Natural Treatment Systems.* May.

Pitt, R., Otto, M., Questad, A., Isaac, S., Colyar, M., Steets, B., Gearheart, R., Jones, J., Josselyn, M., Stenstrom, M.K. Clark, S., and Wokurka, J., 2021. Laboratory Media Test Comparisons to Long-Term Performance of Biofilter and Media Filter Treatment-Train Stormwater Controls. *Journal of Sustainable Water in the Built Environment*, *7*(4), Nov 2021. p.04021015. https://ascelibrary.org/doi/abs/10.1061/JSWBAY.0000956

Pitt, R., Otto, M., Questad, A., Isaac, S., Colyar, M., Steets, B., Gearheart, R., Jones, J., Josselyn, M., Stenstrom, M.K. and Wokurka, J. 2022. Performance Changes during Long-Term Monitoring of Full-Scale Media Filter Stormwater Controls at an Industrial Site. *Journal of Sustainable Water in the Built Environment*, 8(1), Feb 2022. https://doi.org/10.1061/JSWBAY.0000965

Santa Susana Surface Water Expert Panel and Geosyntec Consultants, 2015. *Site-Wide Stormwater Work Plan and 2014/15 Annual Report* ("2015 Work Plan").