Project-Specific Construction ENVIRONMENTAL HAZARD MANAGEMENT PLAN (C-EHMP)

For

Nanue Bridge
Ninole, Hamakua, Hawaii County, HI
TMK (3) 3-2-001:008 and (3) 3-3-001:001

Reviewers note: This C-EHMP has been developed by the project design team and HDOT to serve as a template for the prospective contractor. The C-EHMP will be part of the bid documents for the award and implementation of the Remedial Alternative Memorandum that identified the preferred remedial alternative to address lead contamination.

There are several areas of this C-EHMP that cannot be completed before identifying the contractor via the bid process (e.g., Table 4-1 and Appendices A through C).

August 2024

Signatures

This document is not finalized until it is signed. A signed copy will be present on-site at all times.

I certify that as property owner, I am responsible for ensuring all parties who work or reside at my site are aware of the contamination at my property, and the associated hazards, and that the information in this document is true and accurate to the best of my knowledge. I am responsible for ensuring compliance with all land use controls as well as advance notifications to the Hawaii Department of Health (HDOH) of anticipated land use changes or groundbreaking activity at my property.

Property Owner or Representative of Property Owner

I certify that I am a qualified environmental professional, capable of ensuring compliance with the requirements of this Construction Environmental Hazard Management Plan (C-EHMP). It is my duty on this project to understand the requirements of this document and be on site during ground-breaking activities. I will communicate hazards, management protocols, and other C-EHMP requirements to construction professionals at the site. I will document such activities, and communicate with HDOH, as needed.

Qualified Environmental Professional

As Construction Manager, I am responsible for understanding the requirements of this C-EHMP, effectively communicating the requirements and hazards to my crews and subcontractors and providing the required training and personal protective equipment to site workers. I will work with the Qualified Environmental Professional to ensure compliance with this C-EHMP during work at this property.

Construction Manager

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Acronyms

bgs	below ground surface
BMP	Best management practices
C-EHMP	Construction Environmental Hazard Management Plan
COC	chemical of concern
COPC	Chemical of potential concern
DU	Decision Unit
EAL	Environmental Action Level
EHE	Environmental Hazard Evaluation
EHMP	Environmental Hazard Management Plan
EPA	Environmental Protection Agency
ESCP	Erosion and Sediment Control Plan
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response Standard
HDOH	Hawaii Department of Health
HEER	Hazard Evaluation and Emergency Response
HIOSH	Hawaii Department of Labor and Industrial Relations, Occupational Safety and Health
HRS	Hawaii Revised Statutes
KPC	Kealamahi Pacific Consultants LLC
LCP	Lead-containing paint
LEL	Lower explosive limit
LEPC	Local Emergency Planning Committee
mg/kg	milligram per kilogram
mg/L	milligrams per liter
NRC	National Response Center
PPE	Personal protective equipment
QEP	Qualified environmental professional
RCRA	Resource Conservation and Recovery Act
ROW	Right of Way
sq. ft.	square feet
SWPPP	Stormwater Pollution Prevention Plan
TBD	To Be Determined
TCLP	Toxicity Characteristic Leach Procedure
TGM	Technical Guidance Document
TMK	Tax Map Key
USCG	United States Coast Guard

1 Introduction

This Project-Specific Construction Environmental Hazard Management Plan (C-EHMP) provides guidance to environmental consultants, owners, operators, tenants, and construction/utility workers, who are proposing construction-related and ground-disturbing activities in order make repairs to Nanue Bridge. These guidelines will be used by all who may be hired to assist in any of the repair-related activities at the bridge to keep site workers and the environment protected from contaminants of concern (COCs) located beneath the bridge.

The site is not accessible or used by the public. As the site is a Right of Way (ROW) to perform maintenance on the bridge superstructure, site users traveling on the Nanue Bridge do not contact the soil.

The goal of this C-EHMP is to keep contamination on site and prevent COCs from leaving the site without proper management. Not adhering to this plan may have serious consequences including, but not limited to, stopping construction and being liable for any damage or harm caused by onsite contamination.

This C-EHMP addresses site activities that the contractor plans to perform for the Hawaii Department of Transportation (HDOT) under the Nanue Bridge during planned maintenance and repairs. The bridge is approximately 16 miles north of Hilo on the Hamakua Coast in Hawaii County. The tax map keys are (TMK) (3) 3-2-001 Parcel 008, and (3) 3-2-001:001. The site is only used as a ROW and there is no public access.

The objective of this project is to repair and maintain the steel members of the Nanue Bridge superstructure. This C-EHMP is needed as lead-impacted soils on the site exceed construction trench worker Hawaii Department of Health (HDOH) Environmental Action Levels (EALs) and workers will need appropriate personal protective equipment (PPE) while conducting bridge repairs. The nature of the exposure is primarily limited to contact with the soil while accessing the area below the bridge to change out members of the bridge. Heavy excavation and footing replacement are not anticipated.

This C-EHMP has been prepared to identify the location of the known COC, the concentrations of the COC, the proper worker safety considerations, and the handling and management of the COC-impacted soil.

2 Background

The C-EHMP applies to the property shown in Figure 1. The property is also identified by the following.

Address	Nanue Bridge, Hawaii Belt Rd (Route 19) Hawaii County, HI
TMK #	(TMK) (3) 3-2-001 Parcel 008, and (3) 3-2-001:001
Latitude/Longitude	19.927035°, -155.156125°

Site Conditions

Distance to Nearest Surface Water Body	Project is adjacent to Nanue Stream
Approximate Depth to Groundwater	0 to 286 ft below ground surface. Expected groundwater elevation varies based on elevation.
Is the Property Above or Below UIC Line	Above – but not a source due to proximity of shoreline
Is the first-encountered groundwater classified as a potential source of drinking water in the Mink & Lau Aquifer Identification and Classification Report?	Yes. Hakalau Aquifer in the East Mauna Kea Section.
Current Property Use Type (Residential, Commercial, Zoning, etc.)	Right of Way for repairs to bridge.
Proposed/Future Property Use Type (Residential, Commercial, Mixed-Use Zoning, etc.)	Right of Way
Typical Soil Profile from Surface to Groundwater (Include Depth Range, Lithology)	Hilo Rock outcrop, with slopes of 35 to 100 percent. These are typical of gulches in lava flows and consist of hydrous silty clay loam over basalt.
Utilities Serving Site (e.g., Storm Drains, Electrical, Gas, Water, Sewer [specify- C&C, Cesspool, Septic, Other])	None.

2.1 Existing Environmental Conditions

The Nanue Bridge project site is located in Ninole, Hawaii County, Hawaii, approximately 16 miles north of Hilo and approximately 500 ft west of the Pacific Ocean. It is the right of way for the Nanue Bridge on Hawaii Belt Road (Route 19). The Tax Map Key (TMK) parcels are (3) 3-2-001 Parcel 008 and (3) 3-2-001:001 and it is owned and managed by the HDOT (Figure 1). The northern ROW is approximately 27,500 square feet (sq. ft.) (0.6 acres) and the southern ROW is approximately 33,300 sq. ft. (0.76 acres).

The site is a steep gulch with a 78% grade and vertical drops between bridge footings. There is no road or identifiable site access except for two sloped ladders set along the hill nearest the bridge deck. On the southwest side, a swale funnels water from the highway to the stream and has been scouring out the lower bank on the southern side. The area is heavily overgrown and is not used by the public.

The bridge is the tallest one in Hawaii (286 ft) and was originally constructed in 1911/1912 for the Hilo Railroad Company to access the sugar plantations along the coast (Historic Hawaii 2014). Multiple supporting steel beams are original to the bridge and marked with the Carnegie Steel (US Steel) Logo that was in use from the late 1890s throughout the 1910s (Historic Bridges 2024).

Steel Girder Detail at Nanue Bridge

The former sugarcane camp town of Hinohina was located southwest of the bridge (1910s – 1960s), but today only the cemetery remains, west of the bridge (Hakalau Home 2023). Roadside rubbish from the upper elevation was found in the swale along the southwest bank of Nanue Bridge. Nanue Bridge survived the 1946 tsunami. The railroad was rebuilt in 1953 as a highway and lead paint was applied to the steel girders at that time (Honolulu Advertiser 1953). In 1997, the lead-based paint was abated from the bridge in conjunction with abatement at other Hamakua Coast bridges (EnviroQuest 2023).

2.2 Evaluation of Contaminants of Potential Concern in Site Media

Lead based paint was used for decades on the Nanue Bridge and other bridges along the Hamakua Coast and lead in the soil beneath these bridges has previously been identified as a COC (e.g., Hakalau, Kolekole, and Umauma). The bridge components were first constructed in the early 20th century and lead-based paint was applied throughout the century until removal in 1997. Maintenance of the bridges for the major portion of the last century included the removal of corrosion and lead-based paint.

Since there had been no previous evaluation of COPCs at Nanue Bridge, a soil investigation was conducted in March 2024 and later a paint chip investigation was conducted in August 2024 to evaluate the nature and magnitude of lead and other suspected COCs present at the site and where and may be encountered during planned bridge repairs.

2.2.1 Bridge Coating Sampling and Analysis

The bridge is currently painted gray with no visible color or application difference. Five paint chip samples were collected from the steel superstructure in two areas that correlated to the DUs names established during the soil investigation that had occurred prior to sampling the paint on the beams. Paint from two general areas on the southern embankment (DU 9 and DU10) at footings/cross beams and from eastern, middle, and western supports and trusses. Five paint chip samples were also collected from DU2 and DU3 on the northern embankment (Figure 2, Appendix C).

The paint sampling investigation was conducted to determine if lead-based or lead-containing paint is still present on the girders. This was important in understanding potential exposure risks to the workers conducting upcoming bridge repairs where they may be cutting away individual steel members and replacing them with new material.

Lead paint analysis in August 2024 identified the current gray paint as LCP. LCP is paint where the lead detected in the sample is greater than the laboratory analytical detection limit but less than 0.5% lead by weight. All of the samples were classified as LCP under this scenario (Table 2-1).

The bridge underwent lead paint remediation in 1997. During sampling of the paint with a chisel, only gray paint was observed. It is known that in the 1950s red and black lead-based paint had been applied to the bridge. This was visible as drops on exposed rock, but not on the bridge.

Paint samples were collected to bare metal. The paint film samples were analyzed by NIOSH Method 7082m *Lead by Flame* Atomic Absorption Spectrophotometry. Based on the laboratory analytical results, none of the 10 samples exceeded the EPA guidelines for lead-based paint. All the samples were identified as lead-containing paint.

Table 2-1: Lead Paint Chip Samples Nanue Bridge

Sample No.	Sample Location/Description	Result (wt. %)	LBP[1] (Y/N)	LCP[2] (Y/N)
NAN_Pb_DU2a	N. Embankment, DU2, eastern support girder	0.14	N	Y
NAN_Pb_DU2b	N. Embankment, DU2, middle	0.041	N	Y
NAN_Pb_DU2c	N. Embankment, DU2, western support	0.021	N	Y
NAN_Pb_DU3a	N. Embankment, DU3, middle	0.0087	N	Y
NAN_Pb_DU3b	N. Embankment, DU3, western beam	0.066	N	Y
NAN_Pb_DU9	S. Embankment, DU9, southeastern footing	0.019	N	Y
NAN_Pb_DU10a	S. Embankment, DU10, southeastern footing	0.094	N	Y
NAN_Pb_DU10a2	S. Embankment, DU10, southwestern footing	0.047	N	Y
NAN_Pb_DU10b	S. Embankment, DU10, northeastern footing	0.055	N	Y
NAN_Pb_DU10b2	S. Embankment, DU10, northwestern footing	0.031	N	Y

LBP = >0.5% lead by weight
LCP = >laboratory detection limit but <0.5%

Every DU in the HDOT ROW exceeded the HDOH Tier 1 EAL for unrestricted land use (200 mg/kg) for lead (Table 2-2, Appendix A1). All but one DU (DU1 at 6 to 9 inches bgs) exceeded the construction/trench worker safety of 800 mg/kg of total lead. Almost all of the DUs exceeded gross contamination of 1000 mg/kg. The southern embankment HDOT ROW (DU10 at 3 to 6 inches bgs) contained the highest lead concentration sample results (9700 mg/kg).

2.2.2 Soil Sampling and Analysis

COPCs that were investigated in 2024 included RCRA8 metals and PCBs. PCB analysis was requested by the HDOH Hazard Evaluation and Emergency Response (HEER) office, who were concerned that it may have been used in the bridge expansion joints. PCBs were determined to not be a COC (Appendix A).

Multi-increment soil samples were collected from five decision units (DUs) along the southern embankment and three DUs from the northern embankment at three depth profiles – 0 to 3 inches, 3 to 6 inches, and 6 to 9 inches below ground surface (bgs). Fifty increments were collected per sample (EQI 2024). Steep slopes and bare rock limited the number of DUs along the northern side as there was not adequate soil to sample. DUs covered approximately 30% of the northern embankment and 60% of the southern embankment. They were primarily located below the bridge deck to reflect the proposed work and repair area.

Samples were analyzed for Resource Conservation and Recovery Act (RCRA8) metals and PCBs as recommended by HDOH (See Appendix A1 and Appendix A2 for complete results).

Areas with concentrations exceeding the EALs are depicted in Figures 3a, 3b, and 3c.

RCRA 8 Methods

Arsenic	EPA* 6020B
Barium	EPA 6020B
Cadmium	EPA 6020B
Chromium	EPA 6020B
Lead	EPA 6020B
Mercury	EPA 7471A
Selenium	EPA 6020B
Silver	EPA 6020B

* *United States Environmental Protection Agency*

Polychlorinated Biphenyls (PCBs)

PCB-1016	EPA 8082A/3546
PCB-1221	EPA 8082A/3546
PCB-1232	EPA 8082A/3546
PCB-1242	EPA 8082A/3546
PCB-1248	EPA 8082A/3546
PCB-1254	EPA 8082A/3546
PCB-1260	EPA 8082A/3546

2.2.3 Results - Identified as Media Containing COC

<u>Lead in Soil:</u>

COC	Concentration Range	EAL[2]
Lead	577 mg/kg – 9700 mg/kg[1]	200 mg/kg – Unrestricted 800 mg/kg – Construction/ Industrial

[1]Adjusted Results in accordance with HDOH Technical Guidance Manual (TGM), Section 4.2.8 Evaluation of Data Representativeness
[2] EAL for Unrestricted Use and Commercial/Industrial Use > 150m from surface water; above drinking water
mg/kg=milligram per kilogram
EAL=Environmental Action Level
COC=Chemical of Concern

Table 2-2: Nanue Bridge Lead Soil Sample Results 2024

Yellow	Lead results above HDOH Tier 1 EAL Unrestricted Land Use (200 mg/kg), but below Construction/Trench Worker Scenario (800 mg/kg) (HDOH 2012)
Red	Lead results above HDOH Tier 1 EAL above Construction/Trench Worker Scenario (800 mg/kg), but below gross contamination (1,000 mg/kg)
Dark red	Lead results above gross contamination (1,000 mg/kg)

DU ID	Depth (in)	Lead Results (mg/kg)	Sq. Ft	CY	Description
DU1	0-3	1133	1722	16	Northern Embankment highest elevation
	3-6	930	1722	16	
	6-9	577	1722	16	
DU2	0-3	1200	1985	18.4	Northern Embankment Mid elevation
	3-6	1000	1985	18.4	
	6-9	1400	1985	18.4	
DU3	0-3	1200	4413	41	Northern Embankment Lowest DU on north, very steep.
	3-6	1200	4413	41	
	6-9	1500	4413	41	
DU8	0-3	4300	2161	20	Southern Embankment Highest elevation
	3-6	3100	2161	20	
	6-9	2900	2161	20	
DU9	0-3	6400	2843	26	Southern Embankment Second Highest elevation
	3-6	6200	2843	26	
	6-9	6000	2843	26	
DU10	0-3	8500	3848	37	Southern Embankment Steep slope, heavily vegetated
	3-6	9700	3848	37	
	6-9	8100	3848	37	
DU11	0-3	4300	3498	32	Southern Embankment Steepest slope
	3-6	6400	3498	32	
	6-9	6000	3498	32	
DU12	0-3	6300	7185	67	Southern Embankment Lowest elevation – at stream. Relatively flat
	3-6	7900	7185	67	
	6-9	6500	7185	67	

**DU1 results are the mean of the primary sample, duplicate, and triplicate.*

2.2.4 *Lead Mobility and Toxicity Evaluation:*

<u>Lead Synthetic Precipitation Leaching Procedure (SPLP):</u>
To assess the potential environmental/groundwater leaching pathway, the Synthetic Precipitation Leaching Procedure (SPLP) analysis was conducted on a soil sample collected from DU1 at 0 to 3 inches bgs, DU3 at 6 to 9 inches bgs, DU8 at 0 to 3 inches bgs, DU10 at 3 to 6 inches bgs, DU11 at 3 to 6 inches bgs and DU12 at 3 to 6 inches bgs. Total lead results varied from 1133 mg/kg at DU1 to the highest total lead result of 9700 mg/kg at DU10. The SPLP value varied from 0.08 mg/L to 8 mg/L respectively (Appendix B1). The limit of quantification is 0.030 mg/L.

The SPLP assists in the determination of the mobility of both organic and inorganic analytes present in liquids, solids, and wastes. The results of the SPLP test are used to determine the Desorption Partitioning Coefficient (Kd), which is important to understanding how mobile the lead in the soil is and whether it poses a potential risk to ecological receptors in the vicinity of the stream (e.g., vertebrate and invertebrate organisms). EPA Method 1312 SPLP West extraction procedure was used on the Nanue soil samples identified in Appendix B1. West refers to the pH of the extraction fluid that is made by adding 60/40 weight percent of sulfuric and nitric acids to reagent water until the pH is 5.00 +/- 0.05 used to determine the leachability of a site that is west of the Mississippi River. This method's pH is higher than the EPA methods extraction fluid for sites east of the Mississippi River (4.20 +/- 0.05) (b 2023).

The result of the SPLP was inputted in the Batch Test Leaching Model (HDOH, 2007 revised 2011), and used to determine the relative mobility of lead in the soil. Batch tests involve placing a small amount of the soil in buffered, de-ionized water, agitating the mixture for a set period and measuring the fraction of the contaminant that desorbs from the soil and goes into solution. The ratio of the mass of a contaminant that remains sorbed to the mass that goes into solution, adjusted to the test method, is referred to the contaminant's "desorption coefficient" or "Kd" value (HDOH 2007 revised 2011).

If the calculated desorption coefficient is greater than 20 (Kd>20), the contaminant is considered not significantly mobile and is unlikely to pose a leaching hazard to groundwater. If it is less than 20, then an estimated concentration in groundwater should be calculated and compared to the HDOH Tier 1 EAL. The Kd value uses micrograms/L and when calculated by this model for the soil samples Kd coefficient varied from 1193 to 14,143, all significantly greater than a Kd value of 20 (Appendix B-1).

This result demonstrates that the lead present in the soil is strongly bound to the soil and is considered immobile (soil is weathered volcanic alluvial sediments including gravel, sand, and clay). Thus, there is a low likelihood that the lead concentrations in the soil pose a risk to ecological receptors (e.g., aquatic organisms) as a result of lead leaching from the soil into rainwater and sediments or impacting the groundwater below the site.

Lead Toxicity Characteristic Leaching Procedure (TCLP):
A subset of the DU ISM samples collected below Nanue Bridger were analyzed by TCLP to determine if the soil could be disposed of at a landfill. The Environmental Protection Agency (EPA) regulatory limit for lead is 5 milligrams per liter (mg/L). TCLP soil samples were chosen based on previous analysis at Hakalau Bridge where total lead results above 5000 mg/kg failed TCLP (Kealamahi Pacific Consultants [KPC] 2022).

At Nanue, TCLP results for lead varied from 0.6 mg/L to 23 mg/L. Three of the samples at DU10, DU11, and DU12 failed TCLP. Total lead results from these DU samples varied from 6400 to 9700 mg/kg. Soil from these samples would be classified as hazardous waste. It is likely that additional DUs would also fail TCLP if tested (Appendix B2)

2.2.5 Arsenic in Soil

Arsenic was detected at concentrations at or slightly above the HDOH Tier 1 EAL for unrestricted land use (24 mg/kg) in three of the DUs (DU1, DU8, and DU9). These DUs were all close to bridge deck and the most protected from rainfall. The highest concentration was 32 mg/kg in DU8 at 6 to 9 mg/kg (Table 2-3, Figure 4).

The other DUs did not have any sample results above 24 mg/kg (Table 2-3; Appendix A1 and A2). All results were below the construction/trench worker EAL of 95 mg/kg and are not identified as a site-specific COC for the C-EHMP as the site is not and will not be accessible to public. As the total arsenic levels were relatively low and below construction/trench worker EALs, bioaccessible arsenic analysis was not conducted.

Table 2-3: Nanue Bridge Arsenic Soil Sample Results 2024

(green)	Arsenic results below HDOH Tier 1 EAL Unrestricted Land Use (24 mg/kg)
(light tan)	Arsenic results at the Unrestricted Land Use (24 mg/kg).
(yellow)	Arsenic results above HDOH Tier 1 EAL Unrestricted Land Use (24 mg/kg), but below Construction/Trench Worker Scenario (95 mg/kg)

DU ID	Depth (in)	Arsenic Results (mg/kg)	Sq. Ft	CY	Description
DU1	0-3	26	1722	16	Northern Embankment highest elevation
	3-6	23	1722	16	
	6-9	17	1722	16	
DU8	0-3	20	2161	20	Southern Embankment Highest elevation
	3-6	20	2161	20	
	6-9	32	2161	20	
DU9	0-3	24	2843	26	Southern Embankment Second Highest elevation
	3-6	25	2843	26	
	6-9	24	2843	26	

No other RCRA8 metals were detected in any of the surface soil samples at concentrations above the HDOH Unrestricted Land Use EALs (Appendix A1).

2.2.6 PCBs in Soil

In their approval letter for the Nanue Bridge Sampling and Analysis Plan, HDOH had requested that EnviroQuest analyze some of the samples for PCBs, particularly in samples with the highest lead hits. PCBs have a shorter hold time (14 days from the sampling date) and due to transportation and sample analysis time, it was not possible to have all the total lead results in time to meet the hold time. Therefore, DUs with the highest lead levels were estimated.

In DU10 and DU11 orange paint flakes (anticipated to be lead-based or lead containing) were visible at the site in the 3-6 inches interval. These DUs were chosen for PCB analysis. The upper 0–3-inch layer at DU10 was also analyzed for PCBs to verify if the orange paint flakes correlated with higher lead levels.

The PCB congener PCB-1254 was present in all three samples D at concentrations ranging from 0.037 mg/kg to 0.20 mg/kg, which is well below the HDOH Tier 1 EAL for unrestricted land use. PCBs were not identified as COC at the site (Appendix A1).

2.2.7 Chemicals of Concern and Construction Materials

Construction materials will be steel members that will be fabricated to match existing members that have been identified as beyond their design safety tolerances. Activities will include removing a number of the existing members and replacing them with new steel members. If a coating is used it will not be a lead-based paint.

Question	Yes	No
Are storm drains (including interceptors) or will storm drains be present at the site?		X
Will any portion of a storm drain (including interceptors) be present at an elevation that is potentially in contaminated groundwater?		X
Will any portion of a utility corridor be present at an elevation that is potentially in contaminated groundwater?		X
Will a portion of any other utility or subsurface structure (other than foundations) extend potentially into contaminated groundwater?		X
Are any potentially flammable or explosive COCs present at the site (e.g., methane, total petroleum hydrocarbons as gasoline, etc.)?		X
Will any electrical lines/utility corridors be subsurface?		X
Are any COCs in vapors present at or above 10 % of the LEL?		X
Will any elevator shafts or escalator pits, potentially extend into contaminated groundwater?		X

* LEL=Lower explosive limit
COC=Chemical of Concern

Construction Materials Assessment

Construction Material in Contact with Contaminated Media	COC, Concentration and Media	Proposed Material to be used	Material Safe with COC	
			Yes*	No
Tools, Replacement metal members, and PPE	Lead in surface and near surface soil.	Metal, Concrete, and Fill	X	
	Lead-containing paint	Metal	X	

* Documentation that material is safe to use, and will remain functional, in the presence of the identified contamination should be included as an attachment to the C-EHMP.
COC=Chemical of Concern

3 Summary of Potential Environmental Hazards

Table 3-1: Environmental Hazards

COC	Media			Hazard					Potential Receptors				
	Soil	Water	Vapor	Direct Exposure	Leaching	Gross Contamination	Ecotoxicity	Vapor Intrusion	Construction Workers	Site Visitors	Site Occupants	General Public	Future Site Users
Lead	X			X		X			X				

COC=Chemical of Concern

A detailed description of the effects of lead exposure is provided below.

Lead is persistent in the environment and accumulates in soil and sediments through deposition. Once absorbed into the body, lead may be stored in mineralizing tissue (e.g., teeth, bones, etc.) for long periods. The stored lead may be released again into the bloodstream, especially in times of calcium stress (e.g., pregnancy, lactation, osteoporosis, etc.) or calcium deficiency.

Depending on the level of exposure, lead can adversely affect the nervous system, kidney function, immune system, reproduction and developmental systems, and the cardiovascular system. Lead exposure also affects the oxygen-carrying capacity of the blood and can have cardiovascular effects (e.g., high blood pressure, heart disease, etc.) in adults. Lead impacts on children include neurological effects, however, no children are or will be present at the site.

Ecosystems near point sources of lead demonstrate a wide range of adverse effects including losses in biodiversity, changes in community composition, decreased growth and reproductive rates in plants and animals, and neurological effects in vertebrates.

The following are identified as potential receptors:

- On-site construction workers – including personnel involved in repair or construction during planned and future site activities; and
- On-site landscapers/site workers – personnel who may maintain and remove trees and shrubs from the bridge and surrounding right of way.
- Ecological Receptors – including native and non-native birds, and mammals that may nest, loaf, hunt, or transit across the site (AECOS 2019).

Direct exposure to lead-impacted soil is a potential exposure pathway to receptors at the site via the following pathways:

- Direct Contact: Incidental ingestion or dermal contact with soil;
- Air: Inhalation of fugitive dust;
- Surface Runoff and Sediment Exposure: Contaminants carried by water or revealed by erosion; and
- Groundwater Exposure: Not identified as a direct exposure due to site conditions. SPLP analysis (Appendix B1), confirmed that the lead is strongly bound to the soil and considered immobile. There is a low likelihood that the lead concentrations are leaching from the soil into rainwater or impacting the groundwater below the site.

Table 3-2: Chronic and Acute Direct Exposure Hazards

COC	Direct Exposure Hazard				Acute Exposure	Chronic Exposure
	Ingestion	Inhalation	Absorption	Injection		
Lead	X	X			• Pain • Muscle weakness • Numbness • Abdominal Pain • Nausea • Vomiting • Diarrhea • Constipation	• Abdominal Pain • Constipation • Depressed • Distracted • Forgetful • Irritable • Nausea/Sick People with prolonged exposure to lead may also be at risk for high blood pressure, heart disease, kidney disease, and reduced fertility.

COC=Chemical of Concern

The Remedial Action Contractor will be responsible for updating this C-EHMP or preparing a C-EHMP Addendum describing their specific means and methods to perform the scope of work, including a Site-Specific Health and Safety Plan (HASP).

No work involving the C-EHMP, or C-EHMP Addendum shall be performed until the updated C-EHMP, or C-EHMP Addendum is approved by the HDOH HEER Office.

Environmental Hazard Maps

A detailed Environmental Hazard Map is included as Figure 5 in the Figures Section of this C-EHMP. At the site, the known COCs are found below the Nanue Bridge deck and are presumed to exist in the ROW and un-tested areas around the bridge footings.

The Environmental Hazard Map delineates the location of known or presumed contamination at the Site and what type of hazard the contamination presents. All known and suspected contaminated media will be properly handled and disposed of in accordance with the guidance in this C-EHMP. Mishandling of contaminated media could result in spreading the contamination to uncontaminated areas of the Site or to off-site locations, which could result in fines and other penalties.

4 Notification Requirements

The effective environmental management of any project requires a coordinated effort from all individuals involved. The following sections outline the responsibilities of key personnel involved in the project.

4.1 Key Project Personnel

The project owner (owner/developer) is expected to maintain a list of project contacts throughout the construction phase of the project.

The key project personnel are as follows. An updated key project personnel list needs to be maintained throughout the project and submitted to HDOH in writing whenever a change in key project personnel occurs.

Table 4-1: Key Project Personnel

Role	Company	Name	Phone #	e-mail
Construction Project Manager	To Be Determined (TBD)			
Construction Foreman	TBD			
Onsite Qualified Environmental Professional	EnviroQuest	Scott Moncrief	(808) 286-0222	scottmoncrief808@gmail.com
Qualified Environmental Professional (Project Manager)	EnviroQuest	David Leigh	(808) 486-5881	dleigh@enviroquestinc.com
Owner	HDOT	Edwin Sniffen	(808) 587-2150	edwin.h.sniffen@hawaii.gov
Operator	HDOT	Kevin Kasamoto	(808) 692-7563	Kevin.kasamoto@hawaii.gov
Developer	NA			
National Pollutant Discharge Elimination System (NPDES) Permit Contact	HDOH Clean Water Branch	Darryl Lum	(808) 586-4309	darryl.lum@doh.hawaii.gov
HDOH HEER Office Project Manager	HDOH HEER	Laura Young	(808) 586-4249	Laura.young@doh.hawaii.gov

In addition, if site conditions or planned building configurations change following submittal and acceptance of this C-EHMP by the HDOH HEER Office, then the following agencies will be notified at least 90 days prior to conducting ground-disturbing activities or as soon as the change has been identified. Please note that if HDOH is notified of a change in site conditions or planned building configuration less than 90 days prior to ground-disturbing activities, there could be delays in construction if additional assessment work needs to be conducted. The initial notification of construction activities and any changes can be submitted through the HDOH e-permitting portal using the website link below.

Agency	Phone	Link/Website
HDOH HEER Office	(808) 586-4249	https://eha-cloud.doh.hawaii.gov/epermit/app/#/formversion/ed9ca916-7863-459b-b5dd-e66f881381d5

5 Requirements for Onsite Environmental Oversight

On-site monitoring is a key component of ensuring that the procedures documented in this C-EHMP are implemented properly and function as intended (e.g. appropriate installation and location of erosion and sediment control measures, cleanliness of equipment, suitability of secondary containment for fuel storage and equipment, screening of potential contaminated material, and stockpile segregation, etc.). A qualified environmental professional (QEP) will be retained as the environmental monitor to provide guidance on implementing the recommended measures and to develop additional mitigation measures if the need arises. The onsite QEP will have completed Hazardous Waste Operations and Emergency Response (HAZWOPER) 40-hour training with a current 8-hour refresher.

Monitoring events will be conducted at an appropriate frequency based on specific work tasks/procedures and the potential for adverse impacts to occur. An appropriate schedule (frequency and duration of site visits) will be established between the QEP and all involved regulatory agencies regarding when the QEP is onsite. The steepness of the slope may require the use of belaying equipment to inspect the site.

In general, the QEP will be familiar with the day-to-day conduct of project activities and be on-site during activities with the potential to impact human health or the environment, when contaminated media will be disturbed, when mitigation measures are implemented, or as determined in discussion with the regulatory agencies.

Monitoring will be conducted with greater frequency during periods of inclement weather (e.g., heavy precipitation, and strong winds) and during critical components/tasks of the project, such as working in contaminated groundwater. The steepness of the slope and the heavy rains that occur at the site will require additional Best Management Practices (BMP) inspections and potentially more BMP replacements than projects in flatter, drier locations.

The QEP will be onsite whenever potentially contaminated soil or groundwater may be disturbed and when hazardous vapors may be present. If demolition activities include abatement of lead-based paint or asbestos, abatement activities will be completed in accordance with all State and Federal laws and regulations prior to demolition. This is necessary to ensure the protection of construction workers, the general public, and the environment. Key monitoring stages may include, but are not necessarily limited to:

- Performing work in the Nanue Bridge ROW
- Potential soil movement activities associated with bridge repairs (e.g., hand tool excavation).
- Installation of erosion and sediment control measures.
- Decontamination of vehicles and equipment.
- Soil sampling.

The primary responsibility of the QEP is to ensure that the environmental and human health protection measures are implemented and adhered to and that any movement or disturbance of contaminated material (on-site as offsite removal and storage is not approved) meets the C-EHMP requirements and is properly documented.

Typical responsibilities of the QEP include those identified below:

- Preventing exposure to lead-impacted soil by communicating the requirements of the C-EHMP to project members during pre-job and tailgate meetings.
- Remain onsite as per the schedule established between parties prior to project start. The QEP will remain on-call during non-critical work periods to respond to emerging environmental issues.
- Review the contractor’s work procedures to ensure functionality and compliance with the C-EHMP and applicable regulations, standards, and BMP.
- Provide advice in preparing for work activities in a manner that mitigates adverse environmental or health effects.
- Exercise the authority to modify and/or halt any construction activity at any time if deemed necessary for the protection of human health and the environment.
- Advise project members if project activities have caused or are likely to cause an environmental incident and make recommendations for corrective action.
- Monitor compliance with the C-EHMP and relevant permit conditions.
- Liaise directly with project members and provide technical advice for the purpose of resolving situations that may impact human health and the environment as they arise.
- Maintain complete records of activities related to the implementation of the C-EHMP. This includes any measurements taken (e.g. pH, turbidity, temperature, conductivity, photoionization detector [PID] screening, air monitoring, equipment calibration, manifests, truck receipts, truck counting spreadsheets, etc.), photographs, and incident reports.
- Complete and submit environmental monitoring reports to the HDOH HEER and report any unanticipated adverse effects on the environment. Such reports will include the nature of the effect, its cause, mitigation and/or remediation implemented, and whether a work stoppage was ordered, as well as photographs, analyses, and measurements, if applicable.
- Report unanticipated encounters with contamination at the site in accordance with Hawaii Revised Statutes (HRS) 128D. Reportable releases include contamination not already identified at the site, as well as tanks, drums, and/or abandoned pipelines that are not identified in advance and are encountered during excavation.

Additional details regarding the QEP monitoring schedule shall be included in the Contractor’s updated C-EHMP or C-EHMP Addendum.

Table 5-1: Project Activities When QEP Must Be Present

Activity	Planned at Site?		QEP Will Be Present?		Monitoring Equipment to be Used by QEP
	Yes	No	Yes	No	
Environmental Sampling	X		X		Sampling Supplies
Geotechnical Sampling	X		X		Sampling Supplies
Silt Fence Installation	X		X		Logbook and camera
Demolition: Not planned		X	X		None
Grading	X		X		Gilian Pumps (personal cassettes) General Air Monitoring
Excavation – hand tools only.	X		X		Gilian Pumps (personal cassettes) General Air Monitoring
Dewatering: Not Planned		X		X	None, not planned
Soil Stockpiling (Potential)			X		None
Soil Import		X	X		None, not planned
Work Below High-Water Mark		X		X	None, not planned
Engineering Control Installation and Testing	X		X		Logbook
Installation of Erosion/ Sediment Controls	X		X		Logbook
Prior to/During Rainstorm Events	X		X		Logbook

Table 5-2: Frequency of QEP Monitoring Activities

QEP Monitoring Activities	Monitoring Required Site?		Frequency		Monitoring Equipment to be Used by QEP
	Yes	No	Daily	Weekly	
Discharge of Sediment to Stream (should be prevented through BMPs)		X		NA	Horiba U-10 Multiprobe Meter
PID		X		NA	Not applicable for Lead as a COC
pH, Turbidity, Temperature, conductivity.		X		NA	Horiba U-10 Multiprobe Meter
Air Monitoring	X		X		Gilian Pumps (personal cassettes) General Air Monitoring.
Ensuring decontamination zones are established and used	X		X		Logbook, camera
Checking for Proper Manifests (if needed)	X		X		Documents/logbooks/invoices
Counting Trucks Leaving Site		X		NA	None
Collecting Photographs	X		X		Cameras
Documenting Incidents	X		X		Logbooks
Daily Monitoring/Production Reports	X		X		Logbooks, notes

Note: QEP monitoring will be downgraded from daily monitoring and switched to every two weeks (or two times per month)

6 Construction Activities

Lead-impacted soil has been documented at Nanue Bridge during the 2024 site investigations. This C-EHMP is specific to the maintenance and repairs at Nanue Bridge. It is anticipated that steel girders and beams will be removed, replaced, or modified to repair the bridge. The footings will remain in position.

Per the Remedial Action Memorandum (EQI 2024), the remedial action objectives for Nanue Bridge as identified by the site owners and as recommended by the state guidance was listed as Alternative 7a in the RAA. This alternative calls for a construction and site-specific EHMP that outlines the locations of lead-impacted soil so that current and future workers can plan appropriate responses and PPE for site work. It is the responsibility of the contractor to implement the remedial alternative to plan the process as efficiently as possible to prevent contaminated soil from leaving the site.

This EHMP will be updated periodically and the effectiveness of this alternative will be reviewed every 5 years. This alternative will have two additional updates over the next 30 years to accommodate bridge maintenance changes.

The Remedial Action Contractor will be responsible for updating this C-EHMP or preparing a C-EHMP Addendum describing their specific means and methods that will provide site-specific information about what type of construction activities will be conducted in detail and provide construction plans or drawings on where these activities take place. The following will also be provided by the Remedial Action Contractor:

- NPDES Permit
- Remedial Design approach
- Stormwater Pollution Prevention Plan (SWPPP)
- Site-Specific Health and Safety Plan
- Erosion and Sediment Control Plan (ESCP)
- Activity Hazard Analysis
- Spill Prevention and Response Plan
- Best Management Practices for Erosion and Stormwater Control

An archaeological consultation and monitoring are not anticipated as only limited excavation using hand tools in previously disturbed areas around the footing is planned.. However, if site conditions change this will be implemented.

As soil will be left onsite, a site-specific EHMP will be necessary. Once the repairs are completed, the primary maintenance at Nanue Bridge is vertical tree trimming from the bridge deck, limiting workers from direct contact with soils on-site.

The specific equipment and Contractor means and methods will be provided by the Contractor’s Remedial Design.

7 Soil Management Plan

The purpose of this section is to ensure that lead-contaminated soil is properly handled and managed. The management of potentially contaminated soil will be overseen by an onsite QEP.

7.1 Soil Management

Soil disturbance is anticipated to be minimal and primarily restricted to vegetation clearing and establishing site access. Soil will be left on-site and not removed.

If excavation is needed at the Site it will be continuously monitored and documented by a QEP. Where known or suspected contaminated soil is encountered during excavation, the appropriate response actions will be taken that conform with HDOH and Environmental Protection Agency (EPA) guidance, laws, and regulations. This includes proactive planning to ensure that workers have the appropriate level of PPE, and that contaminated soil is managed properly when excavated. Tasks associated with properly managing contaminated soil include the following:

- Contaminated soil is assumed to exist within the ROW, therefore a QEP will provide field oversight to ensure:
    - that known or suspected contaminated soil is segregated from clean soil if clean fill is needed for repairs to the bridge.
    - that known or suspected contaminated soil is properly stored and covered with plastic sheeting or otherwise segregated if excavation is needed.
    - that the contaminated soil is managed properly during and following excavation,
    - and that health and safety guidance related to the potential exposure of workers to COCs is provided.
- Workers who may come into contact with contaminated soil will wear the appropriate level of PPE.
- Workers who may come into contact with contaminated soil will have required training (at a minimum, 40-hour HAZWOPER certification and current 8-hour annual refresher training).
- Workers who may be exposed to lead-contaminated soil shall be trained in accordance with the State of Hawaii Department of Labor and Industrial Relations, Occupational Safety and Health (HIOSH) Lead Construction Standard (Hawaii Administrative Rules (HAR) 12-148.1).
- If newly encountered soil contamination is discovered at a previously unknown source or location, the HDOH HEER Office will be immediately notified of its discovery by reporting it as a new release.

7.1.1 Field Identification of Contaminated Soil

Lead cannot be identified in the field through visual and olfactory observations; therefore, the contaminated soil will be managed in a manner protective of site workers, the public, and the environment. Areas of known or suspected contaminated soil are depicted in Figure 2. Additional testing when needed will be performed (e.g., air monitoring, waste disposal, and potentially confirmation sampling).

During the excavation of known contaminated soil, the QEP will perform the following activities:

- Monitor the location of excavation activities to ensure that soil depicted on hazard maps is properly managed as contaminated, even when there is no field evidence of contamination.

- Visually screen soils for staining, debris, soil waste, discoloration, or other evidence of contamination as the soils are removed from the excavation.

7.1.2 Dust and Erosion Control

Dust and erosion controls at the Site will be continuously monitored and documented by a QEP. Prior to excavation activities, the Contractor and the QEP will evaluate and establish erosion control and dust control measures. The erosion control and dust control measures will prevent impacted soils from migrating away from the excavation area. Typically, BMPs are employed to control erosion and prevent the spread of contamination via runoff or wind. Erosion control is particularly important as the slope at the site is steep and prone to erosion already (See photo).

Slope on DU9

Dust control measures will ensure compliance with ambient air quality standards established in the Hawaii Administrative Rules (HAR) 11-59 and will comply with air pollution control requirements specified in HAR 11-60.1. During excavation and handling of impacted soil, the following dust control measures will be implemented to minimize dust generation:

- Dust/silt fences: BMPs associated with erosion control measures will include the installation of silt fencing in the vicinity of the excavation and along the site perimeter. Dust barriers will be used where extensive excavation is anticipated.

- Equipment decontamination: BMPs to control the transport of contaminated soil from the site and within the site will be used to limit the tracking of soil away from the excavation area. Decontamination areas will be set up adjacent to excavation areas where contaminated media will be disturbed, adjacent to stockpile areas, and where vehicles and equipment leave the site. Decontamination protocols are described in Section 14.0.
- Wetting/misting: BMPs associated with dust control measures will include the use of water to be sprayed on the soil during excavation activities. During excavation, water will be sprayed on the surface of the soil to prevent dust from being generated. However, the amount of water used for dust control will be minimized so as to not create run-off away from the excavation.

7.1.3 Excavation

Contaminated soil will be kept on-site and cannot be transported or stored off-site as the soil may be classified as hazardous waste based on TCLP.

The site is inaccessible to heavy equipment. Any project activities involving excavation would have to be performed using hand tools. It is possible that some of the areas near the concrete piers would need to be exposed to allow surveyors to collect new elevation data. This soil covering the piers was previously disturbed during the construction of the bridge and has reaccumulated base of the piers in some areas. If this activity is required to be performed it is estimated that less than two to four 5-gallon buckets of soil would be excavated from the corners of the footings to complete the survey of the footings. This soil would then be replaced back in its original location after the survey.

There are no plans to excavate depths where groundwater might be encountered. Therefore, dewatering is not anticipated. Any stormwater that accumulates will be allowed to re-infiltrate.

7.2 Soil Reuse

Soil that is disturbed will remain on-site per the recommendations of RAA. It will be reused and managed in place. All soil on site is considered to be lead-impacted soil in excess of the HDOH Tier 1 EALs for unrestricted land use and at or in excess of construction/trench worker EALs for lead. Off-site disposal is not planned for soil on-site. If vegetation is removed from the site, soil should be knocked free from the roots and the green waste removed. Generally, trimmed green waste is left on-site to compost. Additional sampling is not anticipated as all soil will remain on-site and handled as lead impacted.

7.2.1 Record Keeping

If soil is imported to the site, then the QEP will collect and maintain tracking logs, invoices, and volume records and provide them to the HEER Office for review and approval. Documentation that the imported material is clean will be provided by the soil generator and a soil agreement will be signed between the generator and the site owner.

8 Groundwater Management Plan

Estimated Depth to Groundwater at Site:	286 to 3 feet bgs		
Proposed Maximum Excavation Depth:	Not planned		
Estimated Direction of Groundwater Flow:	East		
Will Contaminated Groundwater be Encountered During this Project?	Yes	No	Unknown
		X	
Will Groundwater from this Site be Dewatered into the Sanitary Sewer System?		X	
Will Groundwater from this Site be Dewatered into the Storm Sewer System?		X	
Does the Contractor have a Dewatering Permit Issued by the County and/or HDOH Clean Water Branch?		X	
Is Free Product Known or Suspected to be Present at the Site?		X	

8.1 Groundwater Management

The current remedial action plan does not anticipate impacting groundwater at this site; therefore, a groundwater management plan is not needed for this C-EHMP. SPLP testing at the site found that the lead present in the soil is strongly bound to the soil and is considered immobile (soil is weathered volcanic alluvial sediments including gravel, sand, and clay). Thus, there is a low likelihood that the lead concentrations in the soil pose a risk to ecological receptors (e.g., aquatic organisms) as a result of lead leaching from the soil into rainwater and sediments or impacting the groundwater below the site (EQI 2024).

If plans change or new information indicates that groundwater will be impacted, then this C-EHMP will be revised and re-submitted to the HEER Office for review and approval at least 90 days prior to conducting groundwater disturbing activities or as soon as the change has been identified.

9 Free Product Management Plan

Free product has not been identified as a COC at the site. Apart from DU12, the site is well above the potential groundwater line. A free product management plan is not needed. If free product is identified during site work, then this C-EHMP will be revised and re-submitted to the HEER Office for review and approval at least 90 days prior to conducting soil/groundwater disturbing activities or as soon as the change has been identified.

Question	Yes	No	Unknown
Is free product known or suspected to be present at the site?		X	
Is the groundwater at the site tidally influenced?			X
Is groundwater at the site confined?		X	
Will excavation activities at the site potentially encounter contaminated groundwater and free product?		X	

10 Storm Water Management Plan

Proactive actions will be taken to prevent stormwater from coming into contact with contaminated soil at the site. The actions listed below will minimize the potential for contaminating stormwater. The Remedial Action Contractor will have a NPDES permit and a SWPPP/ECSP developed for the removal action project. It is not anticipated that soil excavation and stockpiling will be needed to prepare and install the following BMPs.

- Place soil on plastic sheeting in a lined, bermed area or supersack to prevent stormwater from contacting contaminated soil causing rapid runoff downslope. eroding rapidly downslope. Cover and secure plastic sheeting to prevent.
- While not anticipated, open excavations will be backfilled as soon as practicable to prevent stormwater and direct precipitation from entering the excavation. When possible, open excavations will be bermed to prevent stormwater run-off from entering the excavation.
- Regularly monitor the weather throughout the day for signs of approaching storms and/or heavy rains.

11 Vapor Management Plan

None of the COCs identified or suspected to be present at the site contain significant volatile constituents that are anticipated to create a soil vapor hazard at the site during construction. Therefore, a vapor management plan is not needed for this C-EHMP. If new information indicates that hazardous soil vapors may be present, then this C-EHMP will be revised and re-submitted to the HEER Office for review and approval at least 90 days prior to conducting soil/groundwater disturbing activities or as soon as the change has been identified.

12 Spill or Release Response

Releases, should they occur, will be reported in accordance with HRS 128D and HAR 11-451. In addition to contractor releases, a release may include pre-existing contamination encountered during construction activities. If new contamination is discovered that is different from any known previously reported releases, the release will be reported as described in the abovementioned regulations.

12.1 Release Response

If a release occurs, the following actions will be taken:

- Determine the identity of what was spilled, the source of the spill, the volume of the spill, the severity of the spill, and if immediate emergency response actions are necessary.
- Stop work if contaminant releases are extremely large and cannot be contained. If an imminent threat to human health or the environment exists, or if human or environmental receptors are impacted (e.g., human receptors falling ill or suffering sudden illness), notify the Hawaii County Fire Department by calling 911.
- If the spill is of a volatile, flammable, or combustible liquid or vapor, possible ignition sources will be eliminated, and workers will be directed to remain upwind. In addition, monitor for explosive vapors using a lower explosive limit (LEL) meter.
- Stop work if an unusually large release or contaminated area is encountered unexpectedly or if there is any release of chemicals or hazards not covered by the plan.
- Stop work and take immediate emergency response actions if a worker or member of the general public is injured.
- Eliminate the source of the spill to the extent practicable (e.g., shutting off a valve, righting an overturned container), if it is safe to do so. Do not attempt to stop a release from an active fuel pipeline.
- Protect sensitive ecological receptors threatened by the spill.

12.2 Release Reporting

In the event of a release of a hazardous substance that causes an imminent threat to human health or the environment, the first call will be 911.

All releases will be reported to the HEER Office (808-586-4249 or 808-247-2191 after work hours) and the Local Emergency Planning Committee (LEPC) at (808) 936-8181. Both agencies will be contacted by telephone or in-person immediately following a release. Note, there is no penalty for reporting a release unnecessarily, but there are large penalties for not reporting a release.

If petroleum is observed on surface water, then notify the U.S. Coast Guard (USCG) through the National Response Center (NRC) at (800) 424-8802. Please note, petroleum observed in groundwater is not reportable to the NRC. For oil and hazardous substance spills that threaten or occur in navigable waters, the USCG is the lead agency.

The on-site personnel responsible for ensuring that the appropriate release notifications are conducted are listed below. Please note that in the case of an emergency or imminent threat to the environment, any on-site personnel can contact 911.

Personnel Responsible for Release Notifications

Name	Company	Title	Phone Number
QEP	EnviroQuest	Project Manager	(808) 286-0222

13 Worker Protection

A Site-Specific HASP will be prepared for the site in accordance with the appropriate occupational health and safety regulations. These regulations and requirements include but are not limited to the use of the appropriate level of PPE and appropriate personal hygiene steps associated with the identified COCs at the site. The Contractor's Site-Specific Health and Safety Plan (HASP) shall be included in the updated C-EHMP or C-EHMP Addendum once a contractor is selected for the construction tasks.

Administrative Controls for Protecting Workers from COC Hazards (further detailed in the Site-Specific HASP) include:

- 40-hour HAZWOPER training and current 8-hour refresher are required for all workers who may come into contact with contaminated media.
- HIOSH Lead Construction Standard training for workers who may be occupationally exposed to lead (HAR 12-148.1).
- A discussion of COC hazards that may be encountered will be discussed during daily tailgate safety meetings.
- A QEP will be present when contaminated media will be moved or disturbed.

Engineering Controls for Protecting Workers from COC Hazards (further detailed in the Site-Specific HASP) include:

- The appropriate level of PPE will be selected based on the potential hazards and COCs associated with the individual construction tasks by the winning contractor (TBD). The level of PPE may be upgraded or downgraded depending on the tasks being conducted and the level of contact with the soil. At a minimum, Modified Level D PPE consisting of Tyvek suits, chemical-resistant boots, and nitrile gloves is to be required for workers directly exposed to contaminated soils within the trenches and excavations.
- Conduct air monitoring to properly select respiratory protection and assure the safety of the workers.
- Stanchions (delineators) and hazard tape will be used to delineate exclusion areas where COCs are present and access is restricted.

14 Decontamination

Prior to excavation activities, the Contractor and the QEP will designate areas for decontamination activities. The QEP will also evaluate and establish decontamination procedures for personnel, tools, equipment, and vehicles, prior to construction. Decontamination procedures for personnel and BMPs to limit direct exposure to COCs will also be discussed in the Site-Specific HASP.

14.1 Decontamination of Tools and Personnel

Appropriate personal hygiene practices will be adhered to at all times when handling contaminated soil. Washing facilities will be made available on the jobsite to allow workers to wash their hands and avoid cross-contamination before eating, drinking, smoking, and/or heading home for the day.

After contact with the impacted soil, proper decontamination procedures will be conducted including the removal, segregation, and disposal of PPE. Any used PPE will be placed in plastic garbage bags, double-bagged, and deposited in the site dumpster, or a municipal landfill.

Hand-held and manual tools in direct contact with impacted soil will be decontaminated to remove any contaminated soil or water prior to handling unimpacted materials that are assumed to be uncontaminated and before they are removed from the work area. The decontamination of tools will include the following:

- At the excavation location, physically remove soil adhering to the surface of the equipment using appropriate hand tools. Soil removed during this step will be placed back into the impacted area, excavation, or the appropriate stockpile following removal.
- It is possible that dewatering may be needed at the lowest elevation DUs. Rinse off contaminated groundwater at the excavation location, allowing rinse water to drain back into the excavation or be collected in a container for proper disposal.
- While the tools are located at the excavation, water will be used to wash the surfaces of the tools that were exposed to lead-impacted soil. The water used to wash the exposed surfaces will be directed back to the impacted area or excavation and allowed to infiltrate.

During equipment decontamination, proper PPE will be employed to minimize exposure to COCs. Proper PPE will include Modified Level D PPE with nitrile gloves, rubber boots, waterproof Tyvek, and an appropriate face shield to protect against splash back during decontamination. Air monitoring will be conducted to determine if or what type of respirators are needed for site clearing and bridge repair work. See the Contractor Site Specific HASP that will be provided by the selected contractor.

The QEP will designate Decontamination Areas for the donning and doffing of disposable PPE and the cleaning of materials.

14.2 Decontamination of Vehicles and Equipment

Vehicles and heavy equipment cannot access this project site and soil tracking is not anticipated. The cutting, removal and installation tools will be lowered from the bridge using a small crane or winch system to the workers below.

Lead-impacted soil could transfer from the tools or the existing steel members as they are cut and removed. This limits the quantity and volume of potential contamination.

- Steel members will be removed and packed into lined roll-offs for shipping and disposal at Schnitzer Steel on Oahu. No lead paint remediation will take place on the site or in Hawaii County.
- Physically remove soil adhering to the surface of the steel members or equipment prior to leaving the site. Soil removed during this step will be placed back into the impacted area.
- The equipment decontamination procedures are intended to describe methods for reducing and controlling the spread of site COCs to unimpacted materials and to off-site locations.

During equipment decontamination, proper PPE will be employed to minimize exposure to COCs. Proper PPE may include Modified Level D PPE with nitrile gloves, rubber boots, waterproof Tyvek, and trash bags/bins.

15 Recordkeeping and Reporting Requirements

Detailed records of all environmental activities conducted during construction will be kept. These records may include air monitoring results, dewatering activities, and any other environmental activities conducted in association with construction activities.

Lead-contaminated soil will be left on site and an Environmental Hazard Evaluation (EHE) EHMP will be prepared to manage the contamination in the long term. EHEs and EHMPs update will be submitted to the HDOH for review and approval following the completion of construction activities detailed in this C-EHMP.

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FIGURES

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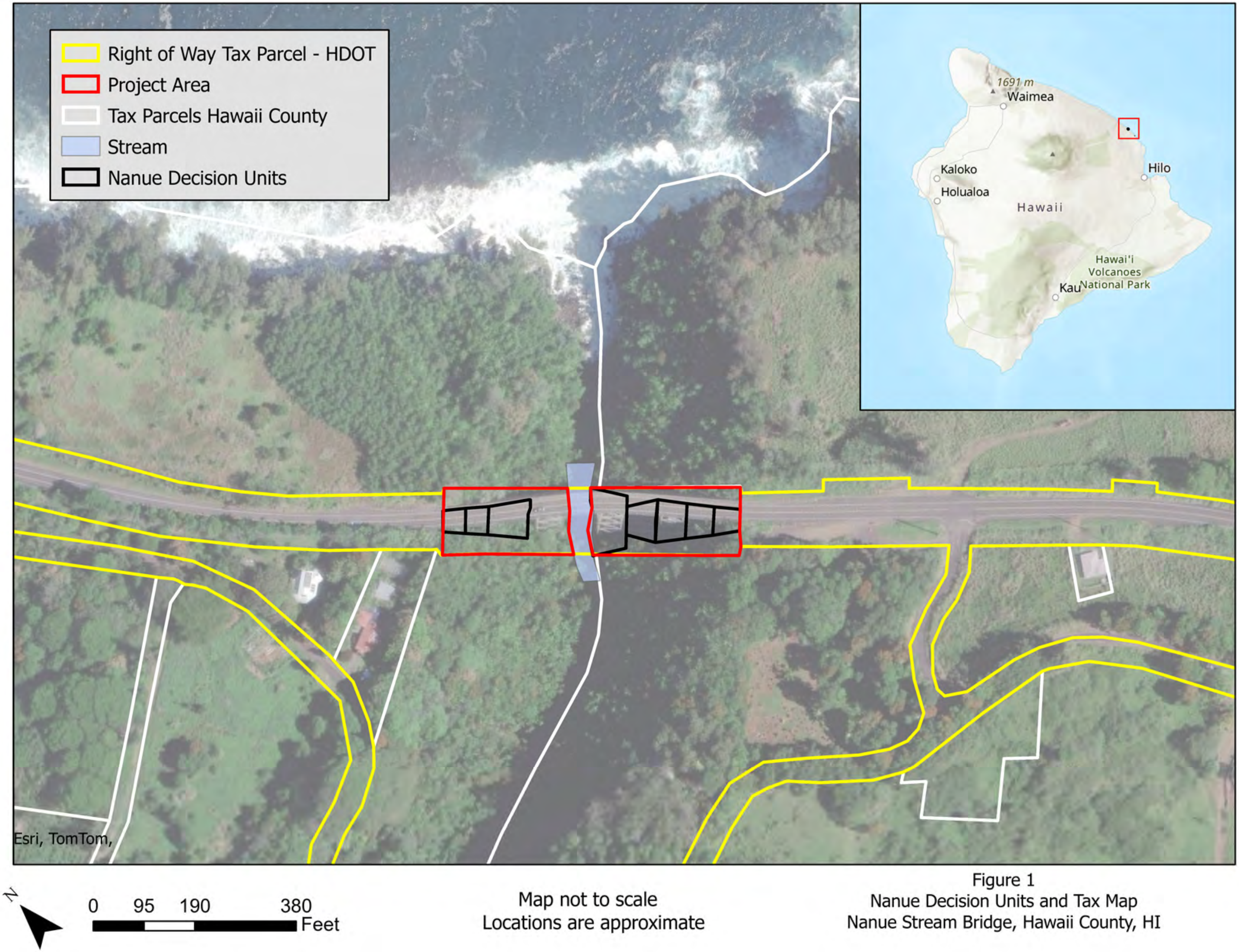
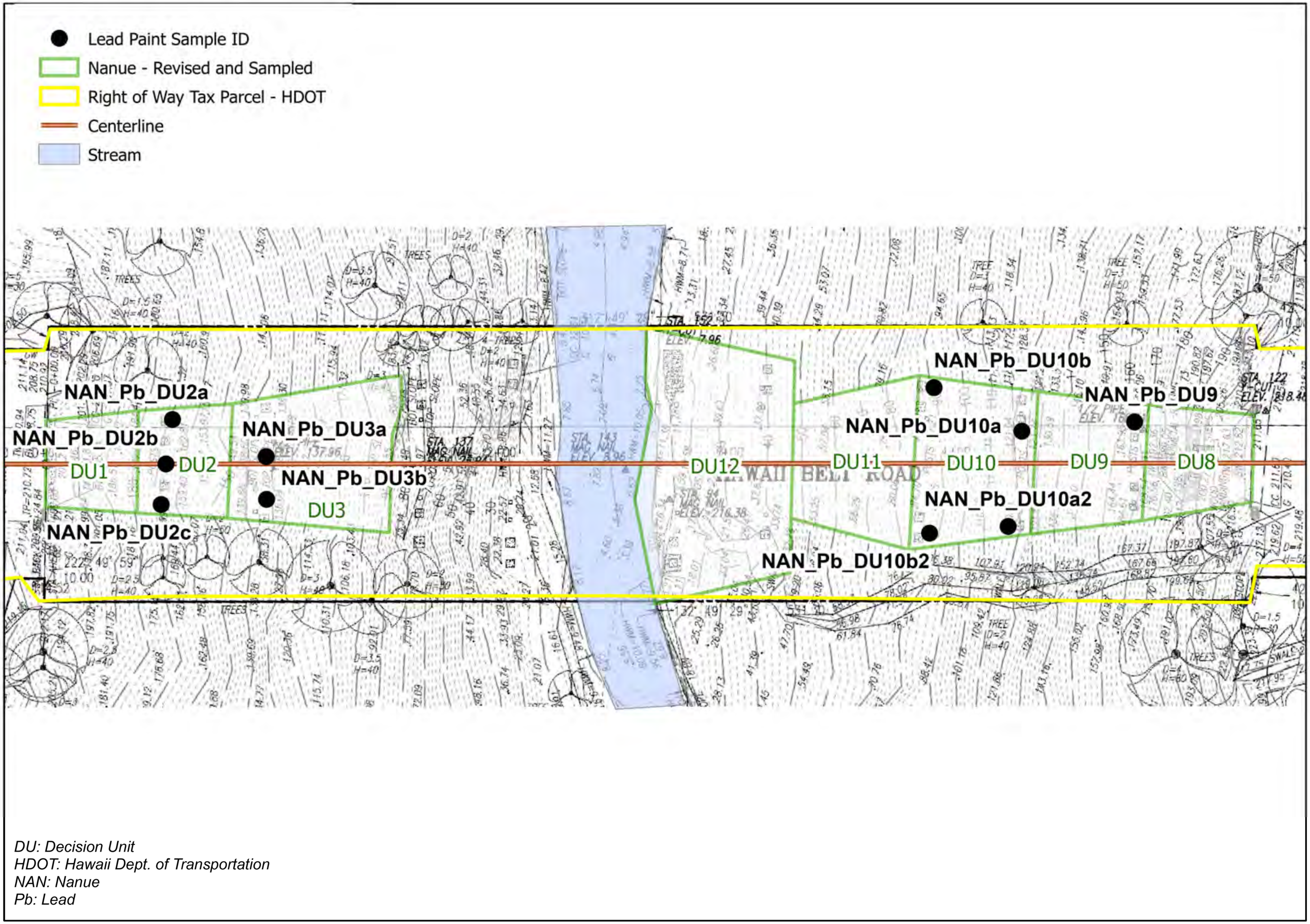


Map not to scale
Locations are approximate

Figure 1
Nanue Decision Units and Tax Map
Nanue Stream Bridge, Hawaii County, HI



N

0 25 50 100
Feet

Map not to scale
Locations are approximate

Figure 2
Lead Paint Sample Locations and ID
Nanue Stream Bridge, Hawaii County, HI

Figure 3a
Total Lead Results (mg/kg) 0 - 3 Inches bgs
Nanue Stream Bridge, Hawaii County, HI

Map not to scale
Locations are approximate

Figure 3b
Total Lead (mg/kg) Results 3 - 6 Inches bgs
Nanue Stream Bridge, Hawaii County, HI

N

0 25 50 100
Feet

Map not to scale
Locations are approximate

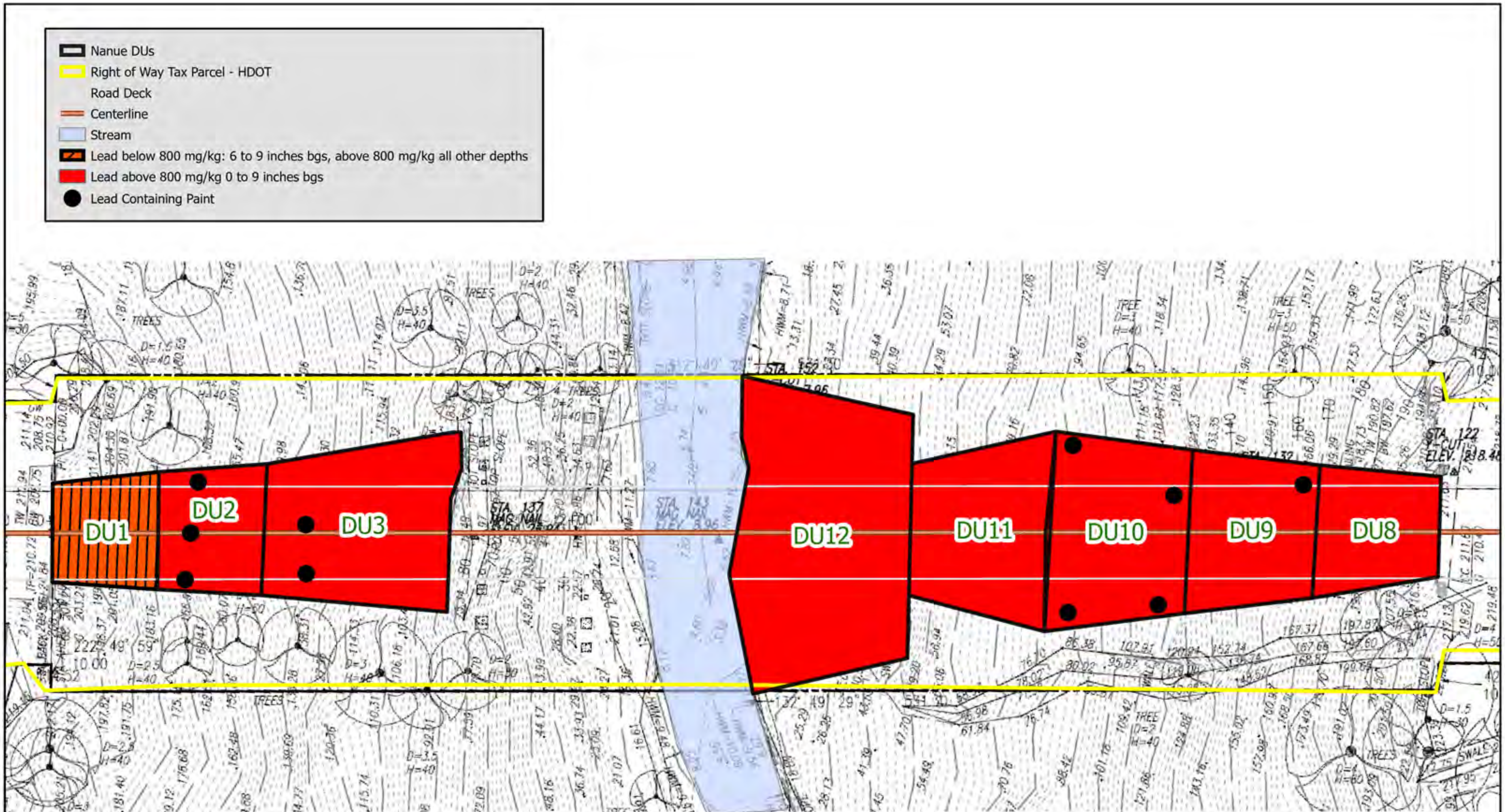
Figure 3c
Total Lead (mg/kg) Results 6 - 9 Inches bgs
Nanue Stream Bridge, Hawaii County, HI

N

0 25 50 100 Feet

Map not to scale
Locations are approximate

Figure 4
Total Arsenic (mg/kg) Results 0 to 9 inches bgs
Nanue Stream Bridge, Hawaii County, HI



bgs: below ground surface
DU: Decision Units
HDOT: Hawaii Dept. of Transportation
mg/kg: milligrams per kilogram

N

0 25 50 100
Feet

Map not to scale
Locations are approximate

Figure 5
Environmental Hazard Map
Nanue Bridge, Hawaii County, HI

APPENDIX A-1:

2024 SAMPLING RESULTS SUMMARY TABLES

RCRA8 and PCBs

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Table A-1a: Analytical Soil Profiling Results - Total RCRA Regulated Metals - Nanue Bridge (page 1 of 3)

							Sample Identifier	NAN_DU1_0-3			NAN_DU1_3-6			NAN_DU1_6-9			NAN_DU2_0-3		
							Sample Date	5-Mar-2024			5-Mar-2024			5-Mar-2024			6-Mar-2024		
							Sample Depth (inches bgs)	0-3			3-6			6-9			0-3		
Analyte	Analytical Method	Units	20 x Regulatory Limits for TCLP Metals+	HDOH Tier 1 EALs* (Unrestricted Use)	HDOH Tier 1 EALs (Residential Direct-Exposure)1	HDOH Tier 1 EALs (Commercial / Industrial Direct-Exposure)2	HDOH Tier 1 EALs (Construction Worker Direct-Exposure)3	Results	Q	RL	Results	Q	RL	Results	Q	RL	Results	Q	RL
Resource Conservation and Recovery Act (RCRA) Regulated Metals																			
Arsenic	EPA 6020B	mg/kg	100	24	23	95	110	26		0.47	23		0.49	17		0.48	14		0.47
Barium	EPA 6020B	mg/kg	2000	1,000	3,100	4,300	4,300	263		0.95	287		0.98	307		0.96	200		0.95
Cadmium	EPA 6020B	mg/kg	20	14	14	72	72	0.39	J	0.76	0.39	J	0.78	0.34	J	0.77	0.41	J	0.76
Chromium	EPA 6020B	mg/kg	100	1,100	NS	NS	NS	190		0.95	190		0.98	187		0.96	180		0.95
Lead	EPA 6020B	mg/kg	100	200	200	800	800	1,133		0.47	930		0.49	577		0.48	1,200		0.47
Mercury	EPA 7471A	mg/kg	4	4.7	4.7	61	130	0.14		0.020	0.15		0.021	0.14		0.021	0.15		0.022
Selenium	EPA 6020B	mg/kg	20	78	78	1,000	2,200	7.7		1.4	8.9		1.5	9.4		1.4	8.3		1.4
Silver	EPA 6020B	mg/kg	100	78	78	1,000	2,200	0.059	J	0.19	0.053	J	0.20	0.044	J	0.19	0.077	J	0.19

							Sample Identifier	NAN_DU2_3-6			NAN_DU2_6-9			NAN_DU3_0-3			NAN_DU3_3-6		
							Sample Date	6-Mar-2024			6-Mar-2024			6-Mar-2024			6-Mar-2024		
							Sample Depth (feet bgs)	3-6			6-9			0-3			3-6		
Analyte	Analytical Method	Units	20 x Regulatory Limits for TCLP Metals+	HDOH Tier 1 EALs* (Unrestricted Use)	HDOH Tier 1 EALs (Residential Direct-Exposure)1	HDOH Tier 1 EALs (Commercial / Industrial Direct-Exposure)2	HDOH Tier 1 EALs (Construction Worker Direct-Exposure)3	Results	Q	RL	Results	Q	RL	Results	Q	RL	Results	Q	RL
Resource Conservation and Recovery Act (RCRA) Regulated Metals																			
Arsenic	EPA 6020B	mg/kg	100	24	23	95	110	12		0.48	14		0.47	13		0.46	15		0.47
Barium	EPA 6020B	mg/kg	2000	1,000	3,100	4,300	4,300	190		0.95	210		0.95	130	J1	0.92	140		0.95
Cadmium	EPA 6020B	mg/kg	20	14	14	72	72	0.37	J	0.76	0.40	J	0.76	0.30	J	0.74	0.33	J	0.76
Chromium	EPA 6020B	mg/kg	100	1,100	NS	NS	NS	170		0.95	190		0.95	130	J1	0.92	140		0.95
Lead	EPA 6020B	mg/kg	100	200	200	800	800	1,000		0.48	1,400		0.47	1,200	J1	0.46	1,200		0.47
Mercury	EPA 7471A	mg/kg	4	4.7	4.7	61	130	0.15		0.021	0.18		0.020	0.15		0.024	0.16		0.022
Selenium	EPA 6020B	mg/kg	20	78	78	1,000	2,200	7.8		1.4	9.2		1.4	6.6		1.4	6.8		1.4
Silver	EPA 6020B	mg/kg	100	78	78	1,000	2,200	0.060	J	0.19	0.054	J	0.19	0.047	J	0.18	0.048	J	0.19

Notes:

+ If the total concentration of a RCRA metal exceeds 20 times the RCRA regulated toxicity characteristic concentrations then TCLP analysis is required for acceptance at a RCRA regulated waste disposal facility.

** This value represents the result of the Relative Percent Difference replicate comparison result (see Table 2-1a).

1 State of Hawaii Department of Health Tier I EALs, Residential Land-Use Scenario presented in Table I-1 of the Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (Fall 2017 Edition).

2 State of Hawaii Department of Health Tier I EALs, Commercial / Industrial Land-Use Scenario presented in Table I-2 of the Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (Fall 2017 Edition).

3 State of Hawaii Department of Health Tier I EALs, Construction/Trench Worker Exposure Scenario presented in Table I-3 of the Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (Fall 2017 Edition).

bgs = below ground surface

mg/kg = milligram(s) per kilogram

RL = reporting limit

Q = qualifier

J = The analyte was positively identified; the quantitation is an estimation

J1 = The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria

Table A-1a: Analytical Soil Profiling Results - Total RCRA Regulated Metals - Nanue Bridge (page 2 of 3)

							Sample Identifier	NAN_DU3_6-9			NAN_DU8_0-3			NAN_DU8_3-6			NAN_DU8_6-9		
							Sample Date	6-Mar-2024			3-Mar-2024			3-Mar-2024			3-Mar-2024		
							Sample Depth (inches bgs)	6-9			0-3			3-6			6-9		
Analyte	Analytical Method	Units	**20 x Regulatory Limits for TCLP Metals+**	**HDOH Tier 1 EALs* (Unrestricted Use)**	**HDOH Tier 1 EALs (Residential Direct-Exposure)1**	**HDOH Tier 1 EALs (Commercial / Industrial Direct-Exposure)2**	**HDOH Tier 1 EALs (Construction Worker Direct-Exposure)3**	**Results**	Q	RL	**Results**	Q	RL	**Results**	Q	RL	**Results**	Q	RL
Resource Conservation and Recovery Act (RCRA) Regulated Metals																			
Arsenic	EPA 6020B	mg/kg	**100**	**24**	**23**	**95**	**110**	**14**		0.48	**20**		0.47	**20**		0.48	**32**		0.47
Barium	EPA 6020B	mg/kg	**2000**	**1,000**	**3,100**	**4,300**	**4,300**	**140**		0.96	**150**		0.95	**200**		0.95	**180**		0.95
Cadmium	EPA 6020B	mg/kg	**20**	**14**	**14**	**72**	**72**	0.28	J	0.77	0.56	J	0.76	0.62	J	0.76	0.66	J	0.76
Chromium	EPA 6020B	mg/kg	**100**	**1,100**	**NS**	**NS**	**NS**	**130**		0.96	**170**		0.95	**180**		0.95	**180**		0.95
Lead	EPA 6020B	mg/kg	**100**	**200**	**200**	**800**	**800**	**1,500**		0.48	**4,300**		0.47	**3,100**		0.48	**2,900**		0.47
Mercury	EPA 7471A	mg/kg	**4**	**4.7**	**4.7**	**61**	**130**	**0.16**		0.022	**0.31**		0.022	**0.30**		0.021	**0.34**		0.020
Selenium	EPA 6020B	mg/kg	**20**	**78**	**78**	**1,000**	**2,200**	**7.3**		1.4	**5.8**		1.4	**6.8**		1.4	**7.1**		1.4
Silver	EPA 6020B	mg/kg	**100**	**78**	**78**	**1,000**	**2,200**	0.053	J	0.19	0.088	J	0.19	0.072	J	0.19	0.073	J	0.19

							Sample Identifier	NAN_DU9_0-3			NAN_DU9_3-6			NAN_DU9_6-9			NAN_DU10_0-3		
							Sample Date	9-Mar-2024			9-Mar-2024			9-Mar-2024			9-Mar-2024		
							Sample Depth (feet bgs)	0-3			3-6			6-9			0-3		
Analyte	Analytical Method	Units	**20 x Regulatory Limits for TCLP Metals+**	**HDOH Tier 1 EALs* (Unrestricted Use)**	**HDOH Tier 1 EALs (Residential Direct-Exposure)1**	**HDOH Tier 1 EALs (Commercial / Industrial Direct-Exposure)2**	**HDOH Tier 1 EALs (Construction Worker Direct-Exposure)3**	**Results**	Q	RL	**Results**	Q	RL	**Results**	Q	RL	**Results**	Q	RL
Resource Conservation and Recovery Act (RCRA) Regulated Metals																			
Arsenic	EPA 6020B	mg/kg	**100**	**24**	**23**	**95**	**110**	**24**		0.48	**25**		0.48	**24**		0.48	**9.6**		0.46
Barium	EPA 6020B	mg/kg	**2000**	**1,000**	**3,100**	**4,300**	**4,300**	**100**		0.96	**110**		0.96	**110**		0.95	**120**	J1	0.92
Cadmium	EPA 6020B	mg/kg	**20**	**14**	**14**	**72**	**72**	0.67	J	0.77	0.67	J	0.77	0.59	J	0.76	0.4	J	0.74
Chromium	EPA 6020B	mg/kg	**100**	**1,100**	**NS**	**NS**	**NS**	**160**		0.96	**190**		0.96	**180**		0.95	**150**	J1	0.92
Lead	EPA 6020B	mg/kg	**100**	**200**	**200**	**800**	**800**	**6,400**		48	**6,200**		48	**6,000**		48	**8,500**	J1	46
Mercury	EPA 7471A	mg/kg	**4**	**4.7**	**4.7**	**61**	**130**	**0.28**		0.024	**0.26**		0.027	**0.26**		0.026	**0.12**		0.023
Selenium	EPA 6020B	mg/kg	**20**	**78**	**78**	**1,000**	**2,200**	**4.9**		1.4	**5.1**		1.4	**6.7**		1.4	**5.8**		1.4
Silver	EPA 6020B	mg/kg	**100**	**78**	**78**	**1,000**	**2,200**	0.085	J	0.19	0.089	J	0.19	0.095	J	0.19	0.088	J	0.18

Notes:

+ If the total concentration of a RCRA metal exceeds 20 times the RCRA regulated toxicity characteristic concentrations then TCLP analysis is required for acceptance at a RCRA regulated waste disposal facility.

** This value represents the result of the Relative Percent Difference replicate comparison result (see Table 2-1a).

1 State of Hawaii Department of Health Tier I EALs, Residential Land-Use Scenario presented in Table I-1 of the Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (Fall 2017 Edition).

2 State of Hawaii Department of Health Tier I EALs, Commercial / Industrial Land-Use Scenario presented in Table I-2 of the Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (Fall 2017 Edition).

3 State of Hawaii Department of Health Tier I EALs, Construction/Trench Worker Exposure Scenario presented in Table I-3 of the Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (Fall 2017 Edition).

bgs = below ground surface

mg/kg = milligram(s) per kilogram

RL = reporting limit

Q = qualifier

J = The analyte was positively identified; the quantitation is an estimation

J1 = The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria

Table A-1a: Analytical Soil Profiling Results - Total RCRA Regulated Metals - Nanue Bridge (page 3 of 3)

								Sample Identifier	NAN_DU10_3-6			NAN_DU10_6-9			NAN_DU11_0-3			NAN_DU11_3-6		
								Sample Date	9-Mar-2024			9-Mar-2024			10-Mar-2024			10-Mar-2024		
								Sample Depth (inches bgs)	3-6			6-9			0-3			3-6		
Analyte	Analytical Method	Units	**20 x Regulatory Limits for TCLP Metals+**	**HDOH Tier 1 EALs* (Unrestricted Use)**	**HDOH Tier 1 EALs (Residential Direct-Exposure)1**	**HDOH Tier 1 EALs (Commercial / Industrial Direct-Exposure)2**	**HDOH Tier 1 EALs (Construction Worker Direct-Exposure)3**		**Results**	Q	RL	**Results**	Q	RL	**Results**	Q	RL	**Results**	Q	RL
Resource Conservation and Recovery Act (RCRA) Regulated Metals																				
Arsenic	EPA 6020B	mg/kg	**100**	**24**	**23**	**95**	**110**		**8.7**		0.47	**7.9**		0.47	**11**		0.47	**10.0**		0.48
Barium	EPA 6020B	mg/kg	**2000**	**1,000**	**3,100**	**4,300**	**4,300**		**130**		0.95	**160**		0.94	**110**		0.95	**100**		0.95
Cadmium	EPA 6020B	mg/kg	**20**	**14**	**14**	**72**	**72**		0.39	J	0.76	0.35	J	0.76	0.37	J	0.76	0.40	J	0.76
Chromium	EPA 6020B	mg/kg	**100**	**1,100**	**NS**	**NS**	**NS**		**160**		0.95	**170**		0.94	**130**		0.95	**150**		0.95
Lead	EPA 6020B	mg/kg	**100**	**200**	**200**	**800**	**800**		**9,700**		47	**8,100**		47	**4,300**		47	**6,400**		48
Mercury	EPA 7471A	mg/kg	**4**	**4.7**	**4.7**	**61**	**130**		**0.16**		0.007	**0.13**		0.024	**0.10**		0.025	**0.12**		0.027
Selenium	EPA 6020B	mg/kg	**20**	**78**	**78**	**1,000**	**2,200**		**6.9**		1.4	**7.8**		1.4	**4.8**		1.4	**6.2**		1.4
Silver	EPA 6020B	mg/kg	**100**	**78**	**78**	**1,000**	**2,200**		0.10	J	0.19	0.078	J	0.19	0.081	J	0.19	0.086	J	0.19

								Sample Identifier	NAN_DU11_6-9			NAN_DU12_0-3			NAN_DU12_3-6			NAN_DU12_6-9		
								Sample Date	10-Mar-2024			10-Mar-2024			10-Mar-2024			10-Mar-2024		
								Sample Depth (feet bgs)	6-9			0-3			3-6			6-9		
Analyte	Analytical Method	Units	**20 x Regulatory Limits for TCLP Metals+**	**HDOH Tier 1 EALs* (Unrestricted Use)**	**HDOH Tier 1 EALs (Residential Direct-Exposure)1**	**HDOH Tier 1 EALs (Commercial / Industrial Direct-Exposure)2**	**HDOH Tier 1 EALs (Construction Worker Direct-Exposure)3**		**Results**	Q	RL	**Results**	Q	RL	**Results**	Q	RL	**Results**	Q	RL
Resource Conservation and Recovery Act (RCRA) Regulated Metals																				
Arsenic	EPA 6020B	mg/kg	**100**	**24**	**23**	**95**	**110**		**8.7**		0.46	**16**		0.46	**11**		0.46	**10**		0.47
Barium	EPA 6020B	mg/kg	**2000**	**1,000**	**3,100**	**4,300**	**4,300**		**110**		0.92	**79**		0.92	**50**		0.92	**69**		0.94
Cadmium	EPA 6020B	mg/kg	**20**	**14**	**14**	**72**	**72**		0.39	J	0.74	0.4	J	0.74	0.29	J	0.74	0.30	J	0.75
Chromium	EPA 6020B	mg/kg	**100**	**1,100**	**NS**	**NS**	**NS**		**150**		0.92	**130**		0.92	**87**		0.92	**90**		0.94
Lead	EPA 6020B	mg/kg	**100**	**200**	**200**	**800**	**800**		**6,000**		0.46	**6,300**		0.46	**7,900**		0.46	**6,500**		0.47
Mercury	EPA 7471A	mg/kg	**4**	**4.7**	**4.7**	**61**	**130**		**0.16**		0.025	**0.09**		0.023	**0.12**		0.022	**0.12**		0.023
Selenium	EPA 6020B	mg/kg	**20**	**78**	**78**	**1,000**	**2,200**		**6.3**		1.4	**2.8**		1.4	**3.4**		1.4	**3.6**		1.4
Silver	EPA 6020B	mg/kg	**100**	**78**	**78**	**1,000**	**2,200**		0.083	J	0.18	0.088	J	0.18	0.086	J	0.18	0.068		0.19

Notes:

+ If the total concentration of a RCRA metal exceeds 20 times the RCRA regulated toxicity characteristic concentrations then TCLP analysis is required for acceptance at a RCRA regulated waste disposal facility.

** This value represents the result of the Relative Percent Difference replicate comparison result (see Table 2-1a).

1 State of Hawaii Department of Health Tier I EALs, Residential Land-Use Scenario presented in Table I-1 of the Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (Fall 2017 Edition).

2 State of Hawaii Department of Health Tier I EALs, Commercial / Industrial Land-Use Scenario presented in Table I-2 of the Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (Fall 2017 Edition).

3 State of Hawaii Department of Health Tier I EALs, Construction/Trench Worker Exposure Scenario presented in Table I-3 of the Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (Fall 2017 Edition).

bgs = below ground surface

mg/kg = milligram(s) per kilogram

RL = reporting limit

Q = qualifier

J = The analyte was positively identified; the quantitation is an estimation

J1 = The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria

Table A-1b: Replicate Sample Results Comparison - Total RCRA Regulated Metals - Nanue Bridge (page 1 of 3)

Analyte	EPA Method	Sample Identification	Sample Type	Result (mg/kg)	Relative Percent Difference: Primary and Duplicate	Relative Percent Difference: Primary and Triplicate	Mean	Standard Deviation*	Relative Standard Deviation	Comment
Arsenic	EPA 6020B	NAN_DU1_0-3_A	Primary	28	0%	24%	26.0	3.5	13%	RSD is less than 50% so the mean concentration is used as the reported concentration. The result is less than 20 x regulatory limits for TCLP metals, but above HDOH Tier 1 EAL.
		NAN_DU1_0-3_B	Duplicate	28						
		NAN_DU1_0-3_C	Triplicate	22						
Barium	EPA 6020B	NAN_DU1_0-3_A	Primary	260	4%	7%	263.3	15.3	6%	RSD is less than 50% so the mean concentration is used as the reported concentration.The mean concentration is below HDOH Tier 1 EAL and less than 20x regulatory limits for TCLP metals.
		NAN_DU1_0-3_B	Duplicate	250						
		NAN_DU1_0-3_C	Triplicate	280						
Cadmium	EPA 6020B	NAN_DU1_0-3_A	Primary	0.37	13%	3%	0.390	0.026	7%	RSD is less than 50% so the mean concentration is used as the reported concentration.The mean concentration is below HDOH Tier 1 EAL and less than 20x regulatory limits for TCLP metals.
		NAN_DU1_0-3_B	Duplicate	0.42						
		NAN_DU1_0-3_C	Triplicate	0.38						
Chromium	EPA 6020B	NAN_DU1_0-3_A	Primary	180	5%	11%	190	10.0	5%	RSD is less than 50% so the mean concentration is used as the reported concentration. The result is above 20 x regulatory limits for TCLP metals. Mean concentration is below HDOH Tier 1 EAL.
		NAN_DU1_0-3_B	Duplicate	190						
		NAN_DU1_0-3_C	Triplicate	200						
Lead	EPA 6020B	NAN_DU1_0-3_A	Primary	1100	9%	0%	1,133	57.7	5%	RSD is less than 50% so the mean concentration is used as the reported concentration. The result is above 20 x regulatory limits for TCLP metal and above HDOH Tier 1 EAL.
		NAN_DU1_0-3_B	Duplicate	1200						
		NAN_DU1_0-3_C	Triplicate	1100						
Mercury	EPA 7471A	NAN_DU1_0-3_A	Primary	0.15	14%	0%	0.143	0.012	8%	RSD is less than 50% so the mean concentration is used as the reported concentration.The mean concentration is below HDOH Tier 1 EAL and less than 20x regulatory limits for TCLP metals.
		NAN_DU1_0-3_B	Duplicate	0.13						
		NAN_DU1_0-3_C	Triplicate	0.15						
Selenium	EPA 6020B	NAN_DU1_0-3_A	Primary	8.1	8%	9%	7.67	0.38	5%	RSD is less than 50% so the mean concentration is used as the reported concentration.The mean concentration is below HDOH Tier 1 EAL and less than 20x regulatory limits for TCLP metals.
		NAN_DU1_0-3_B	Duplicate	7.5						
		NAN_DU1_0-3_C	Triplicate	7.4						
Silver	EPA 6020B	NAN_DU1_0-3_A	Primary	0.064	17%	10%	0.0587	0.0050	9%	RSD is less than 50% so the mean concentration is used as the reported concentration.The mean concentration is below HDOH Tier 1 EAL and less than 20x regulatory limits for TCLP metals.
		NAN_DU1_0-3_B	Duplicate	0.054						
		NAN_DU1_0-3_C	Triplicate	0.058						

Notes:
* Standard Deviation: If < 50% use the arithmatic mean, if < 50% then use the max of the replicate group.

Result below HDOH Tier 1 EAL

Result above 20 x Regulatory Limits for TCLP Metals

Table A-1b: Replicate Sample Results Comparison - Total RCRA Regulated Metals - Nanue Bridge (page 2 of 3)

Analyte	EPA Method	Sample Identification	Sample Type	Result (mg/kg)	Relative Percent Difference: Primary and Duplicate	Relative Percent Difference: Primary and Triplicate	Mean	Standard Deviation*	Relative Standard Deviation	Comment
Arsenic	EPA 6020B	NAN_DU1_3-6_A	Primary	24	4%	9%	23.0	1.0	4%	RSD is less than 50% so the mean concentration is used as the reported concentration. The result is less than 20 x regulatory limits for TCLP, but above HDOH Tier 1 EAL.
		NAN_DU1_3-6_B	Duplicate	23						
		NAN_DU1_3-6_C	Triplicate	22						
Barium	EPA 6020B	NAN_DU1_3-6_A	Primary	270	11%	7%	286.7	15.3	5%	RSD is less than 50% so the mean concentration is used as the reported concentration.The mean concentration is below HDOH Tier 1 EAL and less than 20x regulatory limits for TCLP metals.
		NAN_DU1_3-6_B	Duplicate	300						
		NAN_DU1_3-6_C	Triplicate	290						
Cadmium	EPA 6020B	NAN_DU1_3-6_A	Primary	0.42	13%	13%	0.387	0.029	7%	RSD is less than 50% so the mean concentration is used as the reported concentration.The mean concentration is below HDOH Tier 1 EAL and less than 20x regulatory limits for TCLP metals.
		NAN_DU1_3-6_B	Duplicate	0.37						
		NAN_DU1_3-6_C	Triplicate	0.37						
Chromium	EPA 6020B	NAN_DU1_3-6_A	Primary	190	0%	0%	190	0.0	0%	RSD is less than 50% so the mean concentration is used as the reported concentration. The result is above 20 x regulatory limits for TCLP metals. Mean concentration is below HDOH Tier 1 EAL.
		NAN_DU1_3-6_B	Duplicate	190						
		NAN_DU1_3-6_C	Triplicate	190						
Lead	EPA 6020B	NAN_DU1_3-6_A	Primary	980	2%	14%	930	70.0	8%	RSD is less than 50% so the mean concentration is used as the reported concentration. The result is above 20 x regulatory limits for TCLP metal and above HDOH Tier 1 EAL.
		NAN_DU1_3-6_B	Duplicate	960						
		NAN_DU1_3-6_C	Triplicate	850						
Mercury	EPA 7471A	NAN_DU1_3-6_A	Primary	0.16	0%	21%	0.150	0.017	12%	RSD is less than 50% so the mean concentration is used as the reported concentration.The mean concentration is below HDOH Tier 1 EAL and less than 20x regulatory limits for TCLP metals.
		NAN_DU1_3-6_B	Duplicate	0.16						
		NAN_DU1_3-6_C	Triplicate	0.13						
Selenium	EPA 6020B	NAN_DU1_3-6_A	Primary	9.6	11%	12%	8.90	0.61	7%	RSD is less than 50% so the mean concentration is used as the reported concentration.The mean concentration is below HDOH Tier 1 EAL and less than 20x regulatory limits for TCLP metals.
		NAN_DU1_3-6_B	Duplicate	8.6						
		NAN_DU1_3-6_C	Triplicate	8.5						
Silver	EPA 6020B	NAN_DU1_3-6_A	Primary	0.057	19%	4%	0.0530	0.0053	10%	RSD is less than 50% so the mean concentration is used as the reported concentration.The mean concentration is below HDOH Tier 1 EAL and less than 20x regulatory limits for TCLP metals.
		NAN_DU1_3-6_B	Duplicate	0.047						
		NAN_DU1_3-6_C	Triplicate	0.055						

Notes:
* Standard Deviation: If < 50% use the arithmatic mean, if < 50% then use the max of the replicate group.

Result below HDOH Tier 1 EAL (green)

Result above 20 x Regulatory Limits for TCLP Metals (red)

Table A-1b: Replicate Sample Results Comparison - Total RCRA Regulated Metals - Nanue Bridge (page 3 of 3)

Analyte	EPA Method	Sample Identification	Sample Type	Result (mg/kg)	Relative Percent Difference		Mean	Standard Deviation*	Relative Standard Deviation	Comment
					Primary and Duplicate	Primary and Triplicate				
Arsenic	EPA 6020B	NAN_DU1_6-9_A	Primary	17	0%	6%	17.3	0.6	3%	RSD is less than 50% so the mean concentration is used as the reported concentration.The mean concentration is below HDOH Tier 1 EAL and less than 20x regulatory limits for TCLP metals.
		NAN_DU1_6-9_B	Duplicate	17						
		NAN_DU1_6-9_C	Triplicate	18						
Barium	EPA 6020B	NAN_DU1_6-9_A	Primary	340	3%	31%	306.7	49.3	16%	RSD is less than 50% so the mean concentration is used as the reported concentration.The mean concentration is below HDOH Tier 1 EAL and less than 20x regulatory limits for TCLP metals.
		NAN_DU1_6-9_B	Duplicate	330						
		NAN_DU1_6-9_C	Triplicate	250						
Cadmium	EPA 6020B	NAN_DU1_6-9_A	Primary	0.32	14%	0%	0.337	0.029	9%	RSD is less than 50% so the mean concentration is used as the reported concentration.The mean concentration is below HDOH Tier 1 EAL and less than 20x regulatory limits for TCLP metals.
		NAN_DU1_6-9_B	Duplicate	0.37						
		NAN_DU1_6-9_C	Triplicate	0.32						
Chromium	EPA 6020B	NAN_DU1_6-9_A	Primary	190	5%	11%	186.7	15.3	8%	RSD is less than 50% so the mean concentration is used as the reported concentration. The result is above 20 x regulatory limits for TCLP metals. Mean concentration is below HDOH Tier 1 EAL.
		NAN_DU1_6-9_B	Duplicate	200						
		NAN_DU1_6-9_C	Triplicate	170						
Lead	EPA 6020B	NAN_DU1_6-9_A	Primary	640	3%	31%	576.7	92.9	16%	RSD is less than 50% so the mean concentration is used as the reported concentration. The result is above 20 x regulatory limits for TCLP metal and above HDOH Tier 1 EAL.
		NAN_DU1_6-9_B	Duplicate	620						
		NAN_DU1_6-9_C	Triplicate	470						
Mercury	EPA 7471A	NAN_DU1_6-9_A	Primary	0.15	6%	22%	0.143	0.021	15%	RSD is less than 50% so the mean concentration is used as the reported concentration.The mean concentration is below HDOH Tier 1 EAL and less than 20x regulatory limits for TCLP metals.
		NAN_DU1_6-9_B	Duplicate	0.16						
		NAN_DU1_6-9_C	Triplicate	0.12						
Selenium	EPA 6020B	NAN_DU1_6-9_A	Primary	10.0	3%	16%	9.40	0.79	8%	RSD is less than 50% so the mean concentration is used as the reported concentration.The mean concentration is below HDOH Tier 1 EAL and less than 20x regulatory limits for TCLP metals.
		NAN_DU1_6-9_B	Duplicate	9.7						
		NAN_DU1_6-9_C	Triplicate	8.5						
Silver	EPA 6020B	NAN_DU1_6-9_A	Primary	0.043	13%	5%	0.0443	0.0042	9%	RSD is less than 50% so the mean concentration is used as the reported concentration.The mean concentration is below HDOH Tier 1 EAL and less than 20x regulatory limits for TCLP metals.
		NAN_DU1_6-9_B	Duplicate	0.049						
		NAN_DU1_6-9_C	Triplicate	0.041						

Notes:
* Standard Deviation: If < 50% use the arithmatic mean, if < 50% then use the max of the replicate group.

Result below HDOH Tier 1 EAL (green)

Result above 20 x Regulatory Limits for TCLP Metals (red)

Table A-1c: Analytical Soil Profiling Results - Polychlorinated Biphenyls - Nanue Bridge (page 1 of 1)

						Sample Identifier	NAN_DU10_0-3			NAN_DU10_3-6			NAN_DU11_3-6		
						Sample Date	9-Mar-2024			9-Mar-2024			10-Mar-2024		
						Sample Depth (inches bgs)	0-3			3-6			3-6		
Analyte	Analytical Method	Units	**HDOH Tier 1 EALs* (Unrestricted Use)**	**HDOH Tier 1 EALs (Residential Direct-Exposure)1**	**HDOH Tier 1 EALs (Commercial/Industrial Direct-Exposure)2**	**HDOH Tier 1 EALs (Construction Worker Direct-Exposure)3**	**Results**	Q	RL	**Results**	Q	RL	**Results**	Q	RL
Polychlorinated Biphenyls (PCBs)															
PCB-1016	EPA 8082A/3546	mg/kg	**1.2**	**1.2**	**8.6**	**25**	ND	M	0.019	ND		0.019	0.017	M	0.019
PCB-1221	EPA 8082A/3546	mg/kg	**1.2**	**1.2**	**8.6**	**25**	ND		0.019	ND		0.019	0.017		0.019
PCB-1232	EPA 8082A/3546	mg/kg	**1.2**	**1.2**	**8.6**	**25**	ND		0.019	ND		0.019	0.017		0.019
PCB-1242	EPA 8082A/3546	mg/kg	**1.2**	**1.2**	**8.6**	**25**	ND	M	0.019	ND		0.019	0.017	M	0.019
PCB-1248	EPA 8082A/3546	mg/kg	**1.2**	**1.2**	**8.6**	**25**	ND	M	0.019	ND		0.019	0.017	M	0.019
PCB-1254	EPA 8082A/3546	mg/kg	**1.2**	**1.2**	**8.6**	**25**	**0.055**	M	0.019	**0.037**	J1 M	0.019	**0.20**	M	0.019
PCB-1260	EPA 8082A/3546	mg/kg	**1.2**	**1.2**	**8.6**	**25**	ND	J1 M	0.019	ND	M	0.019	0.017	M	0.019

Notes:

* State of Hawaii Department of Health Tier I Environmental Action Levels (EALs), Groundwater is a Current or Potential Source of Drinking Water (<150 meter to surface water body) presented in Table A of the Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (Fall 2017 Edition).

1 State of Hawaii Department of Health Tier I EALs, Residential Land-Use Scenario presented in Table I-1 of the Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (Fall 2017 Edition).

2 State of Hawaii Department of Health Tier I EALs, Commercial / Industrial Land-Use Scenario presented in Table I-2 of the Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (Fall 2017 Edition).

3 State of Hawaii Department of Health Tier I EALs, Construction/Trench Worker Exposure Scenario presented in Table I-3 of the Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (Fall 2017 Edition).

M = Manual integrated compound.

mg/kg = milligram(s) per kilogram

ND = not detected in concentrations above the laboratories method reporting limit

RL = reporting limit

Q = qualifier

J1 = The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria

bgs = below ground surface

APPENDIX A-2:

2024 LABORATORY ANALYTICAL REPORTS

J137730-1: RCRA8 Metals and PCBs

J137730-1: Revision 1 TCLP and SPLP

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ANALYTICAL REPORT

PREPARED FOR

Attn: Scott Moncrief
EnviroQuest, Inc.
98-029 Hekaha Street
Suite 21
Aiea, Hawaii 96701

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JOB DESCRIPTION

Nanue Bridge

JOB NUMBER

580-137730-1

Eurofins Seattle
5755 8th Street East
Tacoma WA 98424

See page two for job notes and contact information.

myEOL

Job Notes

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Job ID: 580-137730-1 Eurofins Seattle

**Job Narrative
580-137730-1**

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Receipt
The samples were received on 3/14/2024 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 13.2°C and 13.3°C.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

Receipt Exceptions
All samples contained in this login were delayed in shipment by Federal Express.

Method 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography
Samples NAN_DU10_0-3 (580-137730-22), NAN_DU10_3-6 (580-137730-23) and NAN_DU11_3-6 (580-137730-26) were analyzed for Polychlorinated Biphenyls (PCBs) by Gas Chromatography. The samples were composited on 3/18/2024, prepared on 3/20/2024 and analyzed on 4/1/2024.

The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 580-454054 and 580-454340 and analytical batch 580-455366 were outside control limits for one or more analytes. See QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

The %RPD between the primary and confirmation column exceeded 40% for PCB-1254 for the following sample: NAN_DU10_3-6 (580-137730-23). The lower value(s) has been reported and qualified in accordance with the laboratory's SOP.

The following samples required a TBA clean-up to reduce matrix interferences caused by sulfur TBA_00037:
NAN_DU10_0-3 (580-137730-22), NAN_DU10_3-6 (580-137730-23), NAN_DU11_3-6 (580-137730-26), (LCS 580-454340/2-A), (LCSD 580-454340/3-A), (MB 580-454340/1-A), (580-137730-A-22-D MS) and (580-137730-A-22-E MSD)
.

Method 6020B - Metals (ICP/MS)
Samples NAN_DU8_0-3 (580-137730-1), NAN_DU8_3-6 (580-137730-2), NAN_DU8_6-9 (580-137730-3), NAN_DU1_0-3_A (580-137730-4), NAN_DU1_3-6_A (580-137730-5), NAN_DU1_6-9_A (580-137730-6), NAN_DU1_0-3_B (580-137730-7), NAN_DU1_3-6_B (580-137730-8), NAN_DU1_6-9_B (580-137730-9), NAN_DU1_0-3_C (580-137730-10), NAN_DU1_3-6_C (580-137730-11), NAN_DU1_6-9_C (580-137730-12), NAN_DU3_0-3 (580-137730-13), NAN_DU3_3-6 (580-137730-14), NAN_DU3_6-9 (580-137730-15), NAN_DU2_0-3 (580-137730-16), NAN_DU2_3-6 (580-137730-17), NAN_DU2_6-9 (580-137730-18), NAN_DU9_0-3 (580-137730-19), NAN_DU9_3-6 (580-137730-20), NAN_DU9_6-9 (580-137730-21), NAN_DU10_0-3 (580-137730-22), NAN_DU10_3-6 (580-137730-23), NAN_DU10_6-9 (580-137730-24), NAN_DU11_0-3 (580-137730-25), NAN_DU11_3-6 (580-137730-26), NAN_DU11_6-9 (580-137730-27), NAN_DU12_0-3 (580-137730-28), NAN_DU12_3-6 (580-137730-29) and NAN_DU12_6-9 (580-137730-30) were analyzed for Metals (ICP/MS). The samples were composited on 3/18/2024, prepared on 3/28/2024 and 4/1/2024 and analyzed on 3/29/2024, 3/30/2024, 4/1/2024, 4/4/2024 and 4/5/2024.

Samples NAN_DU9_0-3 (580-137730-19)[2000x], NAN_DU9_3-6 (580-137730-20)[2000x], NAN_DU9_6-9 (580-137730-21)[2000x], NAN_DU10_0-3 (580-137730-22)[2000x], NAN_DU10_3-6 (580-137730-23)[2000x], NAN_DU10_6-9

(580-137730-24)[2000x], NAN_DU11_0-3 (580-137730-25)[2000x], NAN_DU11_3-6 (580-137730-26)[2000x], NAN_DU11_6-9 (580-137730-27)[2000x], NAN_DU12_0-3 (580-137730-28)[2000x], NAN_DU12_3-6 (580-137730-29)[2000x] and NAN_DU12_6-9 (580-137730-30)[2000x] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

Method 7471A - Mercury (CVAA)
Samples NAN_DU8_0-3 (580-137730-1), NAN_DU8_3-6 (580-137730-2), NAN_DU8_6-9 (580-137730-3), NAN_DU1_0-3_A (580-137730-4), NAN_DU1_3-6_A (580-137730-5), NAN_DU1_6-9_A (580-137730-6), NAN_DU1_0-3_B (580-137730-7), NAN_DU1_3-6_B (580-137730-8), NAN_DU1_6-9_B (580-137730-9), NAN_DU1_0-3_C (580-137730-10), NAN_DU1_3-6_C (580-137730-11), NAN_DU1_6-9_C (580-137730-12), NAN_DU3_0-3 (580-137730-13), NAN_DU3_3-6 (580-137730-14), NAN_DU3_6-9 (580-137730-15), NAN_DU2_0-3 (580-137730-16), NAN_DU2_3-6 (580-137730-17), NAN_DU2_6-9 (580-137730-18), NAN_DU9_0-3 (580-137730-19), NAN_DU9_3-6 (580-137730-20), NAN_DU9_6-9 (580-137730-21), NAN_DU10_0-3 (580-137730-22), NAN_DU10_3-6 (580-137730-23), NAN_DU10_6-9 (580-137730-24), NAN_DU11_0-3 (580-137730-25), NAN_DU11_3-6 (580-137730-26), NAN_DU11_6-9 (580-137730-27), NAN_DU12_0-3 (580-137730-28), NAN_DU12_3-6 (580-137730-29) and NAN_DU12_6-9 (580-137730-30) were analyzed for Mercury (CVAA). The samples were composited on 3/18/2024, prepared on 3/25/2024 and 4/2/2024 and analyzed on 3/26/2024 and 4/2/2024.

Method 2540G - SM 2540G
Samples NAN_DU8_0-3 (580-137730-1), NAN_DU8_3-6 (580-137730-2), NAN_DU8_6-9 (580-137730-3), NAN_DU1_0-3_A (580-137730-4), NAN_DU1_3-6_A (580-137730-5), NAN_DU1_6-9_A (580-137730-6), NAN_DU1_0-3_B (580-137730-7), NAN_DU1_3-6_B (580-137730-8), NAN_DU1_6-9_B (580-137730-9), NAN_DU1_0-3_C (580-137730-10), NAN_DU1_3-6_C (580-137730-11), NAN_DU1_6-9_C (580-137730-12), NAN_DU3_0-3 (580-137730-13), NAN_DU3_3-6 (580-137730-14), NAN_DU3_6-9 (580-137730-15), NAN_DU2_0-3 (580-137730-16), NAN_DU2_3-6 (580-137730-17), NAN_DU2_6-9 (580-137730-18), NAN_DU9_0-3 (580-137730-19), NAN_DU9_3-6 (580-137730-20), NAN_DU9_6-9 (580-137730-21), NAN_DU10_0-3 (580-137730-22), NAN_DU10_3-6 (580-137730-23), NAN_DU10_6-9 (580-137730-24), NAN_DU11_0-3 (580-137730-25), NAN_DU11_3-6 (580-137730-26), NAN_DU11_6-9 (580-137730-27), NAN_DU12_0-3 (580-137730-28), NAN_DU12_3-6 (580-137730-29) and NAN_DU12_6-9 (580-137730-30) were analyzed for SM 2540G. The samples were composited on 3/18/2024 and analyzed on 3/26/2024.

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
J1	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
M	Manual integrated compound.
U	Undetected at the Limit of Detection.

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
J1	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
U	Undetected at the Limit of Detection.

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

1 2 3 4 5 6 7 8 9 10 11

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU8_0-3

Date Collected: 03/03/24 10:00
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-1
Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	20		0.50	0.099	mg/Kg		03/28/24 09:38	03/29/24 06:51	20
Barium	150		0.99	0.23	mg/Kg		03/28/24 09:38	03/29/24 06:51	20
Cadmium	0.56	J	0.79	0.077	mg/Kg		03/28/24 09:38	03/29/24 06:51	20
Chromium	170		0.99	0.063	mg/Kg		03/28/24 09:38	03/29/24 06:51	20
Lead	4300		0.50	0.048	mg/Kg		03/28/24 09:38	03/29/24 06:51	20
Selenium	5.8		1.5	0.28	mg/Kg		03/28/24 09:38	03/29/24 06:51	20
Silver	0.088	J	0.20	0.020	mg/Kg		03/28/24 09:38	03/29/24 06:51	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	71.8		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	28.2		0.1	0.1	%			03/26/24 11:00	1

Client Sample ID: NAN_DU8_0-3 **Lab Sample ID: 580-137730-1**
Date Collected: 03/03/24 10:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 71.8**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.31		0.022	0.0067	mg/Kg	☼	03/25/24 10:07	03/26/24 14:21	1

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU8_3-6 **Lab Sample ID: 580-137730-2**
Date Collected: 03/03/24 10:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	20		0.50	0.099	mg/Kg		03/28/24 09:38	03/29/24 06:57	20
Barium	200		0.99	0.23	mg/Kg		03/28/24 09:38	03/29/24 06:57	20
Cadmium	0.62	J	0.80	0.077	mg/Kg		03/28/24 09:38	03/29/24 06:57	20
Chromium	180		0.99	0.063	mg/Kg		03/28/24 09:38	03/29/24 06:57	20
Lead	3100		0.50	0.048	mg/Kg		03/28/24 09:38	03/29/24 06:57	20
Selenium	6.8		1.5	0.28	mg/Kg		03/28/24 09:38	03/29/24 06:57	20
Silver	0.072	J	0.20	0.020	mg/Kg		03/28/24 09:38	03/29/24 06:57	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	70.8		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	29.2		0.1	0.1	%			03/26/24 11:00	1

Client Sample ID: NAN_DU8_3-6 Lab Sample ID: 580-137730-2

Date Collected: 03/03/24 10:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 70.8**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.30		0.024	0.0071	mg/Kg	☼	03/25/24 10:07	03/26/24 14:28	1

Client Sample ID: NAN_DU8_6-9

Lab Sample ID: 580-137730-3

Date Collected: 03/03/24 10:00

Matrix: Solid

Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	32		0.47	0.095	mg/Kg		03/28/24 09:38	03/29/24 06:54	20
Barium	180		0.95	0.22	mg/Kg		03/28/24 09:38	03/29/24 06:54	20
Cadmium	0.66	J	0.76	0.073	mg/Kg		03/28/24 09:38	03/29/24 06:54	20
Chromium	180		0.95	0.060	mg/Kg		03/28/24 09:38	03/29/24 06:54	20
Lead	2900		0.47	0.046	mg/Kg		03/28/24 09:38	03/29/24 06:54	20
Selenium	7.1		1.4	0.27	mg/Kg		03/28/24 09:38	03/29/24 06:54	20
Silver	0.073	J	0.19	0.019	mg/Kg		03/28/24 09:38	03/29/24 06:54	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	69.0		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	31.0		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU8_6-9 **Lab Sample ID: 580-137730-3**
Date Collected: 03/03/24 10:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 69.0**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.34**		0.024	0.0072	mg/Kg	☼	03/25/24 10:07	03/26/24 14:31	1

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU1_0-3_A

Lab Sample ID: 580-137730-4

Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	28		0.47	0.095	mg/Kg		03/28/24 09:38	03/29/24 06:49	20
Barium	260		0.95	0.22	mg/Kg		03/28/24 09:38	03/29/24 06:49	20
Cadmium	0.37	J	0.76	0.073	mg/Kg		03/28/24 09:38	03/29/24 06:49	20
Chromium	180		0.95	0.060	mg/Kg		03/28/24 09:38	03/29/24 06:49	20
Lead	1100		0.47	0.046	mg/Kg		03/28/24 09:38	03/29/24 06:49	20
Selenium	8.1		1.4	0.27	mg/Kg		03/28/24 09:38	03/29/24 06:49	20
Silver	0.064	J	0.19	0.019	mg/Kg		03/28/24 09:38	03/29/24 06:49	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	82.3		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	17.7		0.1	0.1	%			03/26/24 11:00	1

Client Sample ID: NAN_DU1_0-3_A Lab Sample ID: 580-137730-4

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 82.3**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.15		0.020	0.0060	mg/Kg	☼	03/25/24 10:07	03/26/24 14:33	1

Client Sample ID: NAN_DU1_3-6_A

Lab Sample ID: 580-137730-5

Date Collected: 03/05/24 16:00

Matrix: Solid

Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	24		0.49	0.098	mg/Kg		03/28/24 09:38	03/29/24 06:23	20
Barium	270		0.98	0.22	mg/Kg		03/28/24 09:38	03/29/24 06:23	20
Cadmium	0.42	J	0.78	0.076	mg/Kg		03/28/24 09:38	03/29/24 06:23	20
Chromium	190		0.98	0.062	mg/Kg		03/28/24 09:38	03/29/24 06:23	20
Lead	980		0.49	0.047	mg/Kg		03/28/24 09:38	03/29/24 06:23	20
Selenium	9.6		1.5	0.28	mg/Kg		03/28/24 09:38	03/29/24 06:23	20
Silver	0.057	J	0.20	0.020	mg/Kg		03/28/24 09:38	03/29/24 06:23	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	78.6		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	21.4		0.1	0.1	%			03/26/24 11:00	1

1 2 3 4 5 6 7 8 9 10 11

Client Sample ID: NAN_DU1_3-6_A

Lab Sample ID: 580-137730-5

Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 78.6

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.16		0.021	0.0063	mg/Kg	☼	03/25/24 10:07	03/26/24 14:36	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU1_6-9_A Lab Sample ID: 580-137730-6

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	17		0.48	0.096	mg/Kg		03/28/24 09:38	03/29/24 07:37	20
Barium	340		0.96	0.22	mg/Kg		03/28/24 09:38	03/29/24 07:37	20
Cadmium	0.32	J	0.77	0.074	mg/Kg		03/28/24 09:38	03/29/24 07:37	20
Chromium	190		0.96	0.060	mg/Kg		03/28/24 09:38	03/29/24 07:37	20
Lead	640		0.48	0.046	mg/Kg		03/28/24 09:38	03/29/24 07:37	20
Selenium	10		1.4	0.27	mg/Kg		03/28/24 09:38	03/29/24 07:37	20
Silver	0.043	J	0.19	0.019	mg/Kg		03/28/24 09:38	03/29/24 07:37	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	75.2		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	24.8		0.1	0.1	%			03/26/24 11:00	1

Client Sample ID: NAN_DU1_6-9_A

Lab Sample ID: 580-137730-6

Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 75.2

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.15		0.021	0.0063	mg/Kg	☼	03/25/24 10:07	03/26/24 14:43	1

Client: EnviroQuest, Inc. | Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU1_0-3_B | **Lab Sample ID: 580-137730-7**
Date Collected: 03/05/24 16:00 | **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	28		0.49	0.098	mg/Kg		03/28/24 09:38	03/29/24 07:40	20
Barium	250		0.98	0.22	mg/Kg		03/28/24 09:38	03/29/24 07:40	20
Cadmium	0.42	J	0.78	0.075	mg/Kg		03/28/24 09:38	03/29/24 07:40	20
Chromium	190		0.98	0.061	mg/Kg		03/28/24 09:38	03/29/24 07:40	20
Lead	1200		0.49	0.047	mg/Kg		03/28/24 09:38	03/29/24 07:40	20
Selenium	7.5		1.5	0.28	mg/Kg		03/28/24 09:38	03/29/24 07:40	20
Silver	0.054	J	0.20	0.020	mg/Kg		03/28/24 09:38	03/29/24 07:40	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	83.0		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	17.0		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU1_0-3_B Lab Sample ID: 580-137730-7

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 83.0**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.13		0.021	0.0062	mg/Kg	☼	03/25/24 10:07	03/26/24 14:45	1

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU1_3-6_B

Lab Sample ID: 580-137730-8

Date Collected: 03/05/24 16:00
Date Received: 03/14/24 09:30

Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	23		0.49	0.099	mg/Kg		03/28/24 09:38	03/29/24 07:42	20
Barium	300		0.99	0.23	mg/Kg		03/28/24 09:38	03/29/24 07:42	20
Cadmium	0.37	J	0.79	0.076	mg/Kg		03/28/24 09:38	03/29/24 07:42	20
Chromium	190		0.99	0.062	mg/Kg		03/28/24 09:38	03/29/24 07:42	20
Lead	960		0.49	0.047	mg/Kg		03/28/24 09:38	03/29/24 07:42	20
Selenium	8.6		1.5	0.28	mg/Kg		03/28/24 09:38	03/29/24 07:42	20
Silver	0.047	J	0.20	0.020	mg/Kg		03/28/24 09:38	03/29/24 07:42	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	77.6		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	22.4		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU1_3-6_B **Lab Sample ID: 580-137730-8**
Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 77.6**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.16**		0.020	0.0061	mg/Kg	☼	03/25/24 10:07	03/26/24 14:48	1

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU1_6-9_B

Date Collected: 03/05/24 16:00
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-9
Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	17		0.47	0.095	mg/Kg		03/28/24 09:38	03/29/24 07:45	20
Barium	330		0.95	0.22	mg/Kg		03/28/24 09:38	03/29/24 07:45	20
Cadmium	0.37	J	0.76	0.073	mg/Kg		03/28/24 09:38	03/29/24 07:45	20
Chromium	200		0.95	0.060	mg/Kg		03/28/24 09:38	03/29/24 07:45	20
Lead	620		0.47	0.046	mg/Kg		03/28/24 09:38	03/29/24 07:45	20
Selenium	9.7		1.4	0.27	mg/Kg		03/28/24 09:38	03/29/24 07:45	20
Silver	0.049	J	0.19	0.019	mg/Kg		03/28/24 09:38	03/29/24 07:45	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	75.8		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	24.2		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client Sample ID: NAN_DU1_6-9_B
Date Collected: 03/05/24 16:00
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-9
Matrix: Solid
Percent Solids: 75.8

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.16**		0.023	0.0068	mg/Kg	☼	03/25/24 10:07	03/26/24 14:50	1

Client Sample ID: NAN_DU1_0-3_C
Date Collected: 03/05/24 16:00
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-10
Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	22		0.46	0.091	mg/Kg		03/28/24 09:38	03/29/24 07:48	20
Barium	280		0.91	0.21	mg/Kg		03/28/24 09:38	03/29/24 07:48	20
Cadmium	0.38	J	0.73	0.070	mg/Kg		03/28/24 09:38	03/29/24 07:48	20
Chromium	200		0.91	0.058	mg/Kg		03/28/24 09:38	03/29/24 07:48	20
Lead	1100		0.46	0.044	mg/Kg		03/28/24 09:38	03/29/24 07:48	20
Selenium	7.4		1.4	0.26	mg/Kg		03/28/24 09:38	03/29/24 07:48	20
Silver	0.058	J	0.18	0.018	mg/Kg		03/28/24 09:38	03/29/24 07:48	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	80.0		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	20.0		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU1_0-3_C

Lab Sample ID: 580-137730-10

Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 80.0

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.15		0.022	0.0065	mg/Kg	☼	03/25/24 10:07	03/26/24 14:52	1

Client Sample ID: NAN_DU1_3-6_C Lab Sample ID: 580-137730-11

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	22		0.48	0.095	mg/Kg		03/28/24 09:38	03/29/24 07:08	20
Barium	290		0.95	0.22	mg/Kg		03/28/24 09:38	03/29/24 07:08	20
Cadmium	0.37	J	0.76	0.073	mg/Kg		03/28/24 09:38	03/29/24 07:08	20
Chromium	190		0.95	0.060	mg/Kg		03/28/24 09:38	03/29/24 07:08	20
Lead	850		0.48	0.046	mg/Kg		03/28/24 09:38	03/29/24 07:08	20
Selenium	8.5		1.4	0.27	mg/Kg		03/28/24 09:38	03/29/24 07:08	20
Silver	0.055	J	0.19	0.019	mg/Kg		03/28/24 09:38	03/29/24 07:08	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	77.6		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	22.4		0.1	0.1	%			03/26/24 11:00	1

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU1_3-6_C
Date Collected: 03/05/24 16:00
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-11
Matrix: Solid
Percent Solids: 77.6

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.13		0.021	0.0064	mg/Kg	☼	03/25/24 10:07	03/26/24 14:55	1

Client Sample ID: NAN_DU1_6-9_C
Lab Sample ID: 580-137730-12
Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	18		0.47	0.094	mg/Kg		03/28/24 13:37	03/30/24 01:09	20
Barium	250		0.94	0.22	mg/Kg		03/28/24 13:37	03/30/24 01:09	20
Cadmium	0.32	J	0.75	0.073	mg/Kg		03/28/24 13:37	03/30/24 01:09	20
Chromium	170		0.94	0.059	mg/Kg		03/28/24 13:37	03/30/24 01:09	20
Lead	470		0.47	0.045	mg/Kg		03/28/24 13:37	03/30/24 01:09	20
Selenium	8.5		1.4	0.27	mg/Kg		03/28/24 13:37	03/30/24 01:09	20
Silver	0.041	J	0.19	0.019	mg/Kg		03/28/24 13:37	03/30/24 01:09	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	73.7		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	26.3		0.1	0.1	%			03/26/24 11:00	1

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU1_6-9_C
Lab Sample ID: 580-137730-12
Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 73.7

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.12		0.022	0.0067	mg/Kg	☼	03/25/24 10:07	03/26/24 14:57	1

1 2 3 4 5 6 7 8 9 10 11

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU3_0-3 Lab Sample ID: 580-137730-13

Date Collected: 03/06/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	13		0.46	0.092	mg/Kg		03/28/24 13:37	03/30/24 00:46	20
Barium	130	J1	0.92	0.21	mg/Kg		03/28/24 13:37	03/30/24 00:46	20
Cadmium	0.30	J	0.74	0.071	mg/Kg		03/28/24 13:37	03/30/24 00:46	20
Chromium	130	J1	0.92	0.058	mg/Kg		03/28/24 13:37	03/30/24 00:46	20
Lead	1200	J1	0.46	0.044	mg/Kg		03/28/24 13:37	03/30/24 00:46	20
Selenium	6.6		1.4	0.26	mg/Kg		03/28/24 13:37	03/30/24 00:46	20
Silver	0.047	J	0.18	0.018	mg/Kg		03/28/24 13:37	03/30/24 00:46	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	69.3		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	30.7		0.1	0.1	%			03/26/24 11:00	1

Client Sample ID: NAN_DU3_0-3 **Lab Sample ID: 580-137730-13**
Date Collected: 03/06/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 69.3**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.15		0.024	0.0073	mg/Kg	☼	03/25/24 10:07	03/26/24 14:59	1

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU3_3-6
Date Collected: 03/06/24 12:30
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-14
Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	15		0.47	0.095	mg/Kg		03/28/24 13:37	03/30/24 02:33	20
Barium	140		0.95	0.22	mg/Kg		03/28/24 13:37	03/30/24 02:33	20
Cadmium	0.33	J	0.76	0.073	mg/Kg		03/28/24 13:37	03/30/24 02:33	20
Chromium	140		0.95	0.060	mg/Kg		03/28/24 13:37	03/30/24 02:33	20
Lead	1200		0.47	0.045	mg/Kg		03/28/24 13:37	03/30/24 02:33	20
Selenium	6.8		1.4	0.27	mg/Kg		03/28/24 13:37	03/30/24 02:33	20
Silver	0.048	J	0.19	0.019	mg/Kg		03/28/24 13:37	03/30/24 02:33	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	70.7		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	29.3		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU3_3-6

Date Collected: 03/06/24 12:30
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-14

Matrix: Solid
Percent Solids: 70.7

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.16		0.022	0.0067	mg/Kg	☼	03/25/24 10:07	03/26/24 15:02	1

Client Sample ID: NAN_DU3_6-9

Lab Sample ID: 580-137730-15

Date Collected: 03/06/24 12:30
Matrix: Solid
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	14		0.48	0.096	mg/Kg		03/28/24 13:37	03/30/24 02:30	20
Barium	140		0.96	0.22	mg/Kg		03/28/24 13:37	03/30/24 02:30	20
Cadmium	0.28	J	0.77	0.074	mg/Kg		03/28/24 13:37	03/30/24 02:30	20
Chromium	130		0.96	0.060	mg/Kg		03/28/24 13:37	03/30/24 02:30	20
Lead	1500		0.48	0.046	mg/Kg		03/28/24 13:37	03/30/24 02:30	20
Selenium	7.3		1.4	0.27	mg/Kg		03/28/24 13:37	03/30/24 02:30	20
Silver	0.053	J	0.19	0.019	mg/Kg		03/28/24 13:37	03/30/24 02:30	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	72.9		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	27.1		0.1	0.1	%			03/26/24 11:00	1

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU3_6-9
Date Collected: 03/06/24 12:30
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-15
Matrix: Solid
Percent Solids: 72.9

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.16		0.022	0.0067	mg/Kg	☼	03/25/24 10:07	03/26/24 15:04	1

Client Sample ID: NAN_DU2_0-3

Lab Sample ID: 580-137730-16

Date Collected: 03/06/24 15:00

Matrix: Solid

Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	14		0.47	0.095	mg/Kg		03/28/24 13:37	03/30/24 01:34	20
Barium	200		0.95	0.22	mg/Kg		03/28/24 13:37	03/30/24 01:34	20
Cadmium	0.41	J	0.76	0.073	mg/Kg		03/28/24 13:37	03/30/24 01:34	20
Chromium	180		0.95	0.060	mg/Kg		03/28/24 13:37	03/30/24 01:34	20
Lead	1200		0.47	0.045	mg/Kg		03/28/24 13:37	03/30/24 01:34	20
Selenium	8.3		1.4	0.27	mg/Kg		03/28/24 13:37	03/30/24 01:34	20
Silver	0.077	J	0.19	0.019	mg/Kg		03/28/24 13:37	03/30/24 01:34	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	75.8		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	24.2		0.1	0.1	%			03/26/24 11:00	1

Client Sample ID: NAN_DU2_0-3
Date Collected: 03/06/24 15:00
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-16
Matrix: Solid
Percent Solids: 75.8

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.15		0.022	0.0067	mg/Kg	☼	03/25/24 10:07	03/26/24 15:11	1

Client Sample ID: NAN_DU2_3-6
Date Collected: 03/06/24 15:00
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-17
Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	12		0.48	0.095	mg/Kg		03/28/24 13:37	03/30/24 01:48	20
Barium	190		0.95	0.22	mg/Kg		03/28/24 13:37	03/30/24 01:48	20
Cadmium	0.37	J	0.76	0.073	mg/Kg		03/28/24 13:37	03/30/24 01:48	20
Chromium	170		0.95	0.060	mg/Kg		03/28/24 13:37	03/30/24 01:48	20
Lead	1000		0.48	0.046	mg/Kg		03/28/24 13:37	03/30/24 01:48	20
Selenium	7.8		1.4	0.27	mg/Kg		03/28/24 13:37	03/30/24 01:48	20
Silver	0.060	J	0.19	0.019	mg/Kg		03/28/24 13:37	03/30/24 01:48	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	77.2		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	22.8		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU2_3-6 **Lab Sample ID: 580-137730-17**
Date Collected: 03/06/24 15:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 77.2**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.15**		0.021	0.0063	mg/Kg	☼	03/25/24 10:07	03/26/24 15:14	1

Client Sample Results

Client Sample ID: NAN_DU2_6-9
Lab Sample ID: 580-137730-18

Date Collected: 03/06/24 15:00
Matrix: Solid
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	14		0.47	0.095	mg/Kg		03/28/24 13:37	03/30/24 02:22	20
Barium	210		0.95	0.22	mg/Kg		03/28/24 13:37	03/30/24 02:22	20
Cadmium	0.40	J	0.76	0.073	mg/Kg		03/28/24 13:37	03/30/24 02:22	20
Chromium	190		0.95	0.060	mg/Kg		03/28/24 13:37	03/30/24 02:22	20
Lead	1400		0.47	0.046	mg/Kg		03/28/24 13:37	03/30/24 02:22	20
Selenium	9.2		1.4	0.27	mg/Kg		03/28/24 13:37	03/30/24 02:22	20
Silver	0.054	J	0.19	0.019	mg/Kg		03/28/24 13:37	03/30/24 02:22	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	77.3		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	22.7		0.1	0.1	%			03/26/24 11:00	1

1
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10
11

Client Sample ID: NAN_DU2_6-9

Lab Sample ID: 580-137730-18

Date Collected: 03/06/24 15:00

Matrix: Solid

Date Received: 03/14/24 09:30

Percent Solids: 77.3

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.18		0.020	0.0060	mg/Kg	☼	03/25/24 10:07	03/26/24 15:16	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU9_0-3 Lab Sample ID: 580-137730-19

Date Collected: 03/09/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	24		0.48	0.096	mg/Kg		03/28/24 13:37	03/30/24 02:28	20
Barium	100		0.96	0.22	mg/Kg		03/28/24 13:37	03/30/24 02:28	20
Cadmium	0.67	J	0.77	0.074	mg/Kg		03/28/24 13:37	03/30/24 02:28	20
Chromium	160		0.96	0.060	mg/Kg		03/28/24 13:37	03/30/24 02:28	20
Lead	6400		48	4.6	mg/Kg		03/28/24 13:37	04/01/24 18:07	2000
Selenium	4.9		1.4	0.27	mg/Kg		03/28/24 13:37	03/30/24 02:28	20
Silver	0.085	J	0.19	0.019	mg/Kg		03/28/24 13:37	03/30/24 02:28	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	70.3		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	29.7		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

1 2 3 4 5 6 7 8 9 10 11

Client Sample ID: NAN_DU9_0-3

Date Collected: 03/09/24 12:30
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-19

Matrix: Solid
Percent Solids: 70.3

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.28		0.024	0.0071	mg/Kg	☼	03/25/24 10:09	03/26/24 15:19	1

Client Sample ID: NAN_DU9_3-6

Lab Sample ID: 580-137730-20

Date Collected: 03/09/24 12:30

Matrix: Solid

Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	25		0.48	0.096	mg/Kg		03/28/24 13:37	03/30/24 02:25	20
Barium	110		0.96	0.22	mg/Kg		03/28/24 13:37	03/30/24 02:25	20
Cadmium	0.67	J	0.77	0.074	mg/Kg		03/28/24 13:37	03/30/24 02:25	20
Chromium	190		0.96	0.060	mg/Kg		03/28/24 13:37	03/30/24 02:25	20
Lead	6200		48	4.6	mg/Kg		03/28/24 13:37	04/01/24 18:04	2000
Selenium	5.1		1.4	0.27	mg/Kg		03/28/24 13:37	03/30/24 02:25	20
Silver	0.089	J	0.19	0.019	mg/Kg		03/28/24 13:37	03/30/24 02:25	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	61.5		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	38.5		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU9_3-6 **Lab Sample ID: 580-137730-20**
Date Collected: 03/09/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 61.5**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.26		0.027	0.0082	mg/Kg	☼	03/25/24 10:09	03/26/24 15:21	1

Client Sample ID: NAN_DU9_6-9 Lab Sample ID: 580-137730-21

Date Collected: 03/09/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	24		0.48	0.095	mg/Kg		04/01/24 12:29	04/05/24 04:50	20
Barium	110		0.95	0.22	mg/Kg		04/01/24 12:29	04/05/24 04:50	20
Cadmium	0.59	J	0.76	0.073	mg/Kg		04/01/24 12:29	04/05/24 04:50	20
Chromium	180		0.95	0.060	mg/Kg		04/01/24 12:29	04/05/24 04:50	20
Lead	6000		48	4.6	mg/Kg		04/01/24 12:29	04/05/24 04:52	2000
Selenium	6.7		1.4	0.27	mg/Kg		04/01/24 12:29	04/05/24 04:50	20
Silver	0.095	J	0.19	0.019	mg/Kg		04/01/24 12:29	04/05/24 04:50	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	64.5		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	35.5		0.1	0.1	%			03/26/24 11:00	1

1 2 3 4 5 6 7 8 9 10 11

Client Sample ID: NAN_DU9_6-9
Lab Sample ID: 580-137730-21
Date Collected: 03/09/24 12:30
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 64.5

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.26		0.026	0.0079	mg/Kg	☼	04/02/24 13:03	04/02/24 16:10	1

Client Sample ID: NAN_DU10_0-3
Date Collected: 03/09/24 14:30
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-22
Matrix: Solid

Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	0.017	U M	0.019	0.0070	mg/Kg		03/20/24 15:22	04/01/24 14:54	1
PCB-1221	0.017	U	0.019	0.011	mg/Kg		03/20/24 15:22	04/01/24 14:54	1
PCB-1232	0.017	U	0.019	0.0046	mg/Kg		03/20/24 15:22	04/01/24 14:54	1
PCB-1242	0.017	U M	0.019	0.0075	mg/Kg		03/20/24 15:22	04/01/24 14:54	1
PCB-1248	0.017	U M	0.019	0.0066	mg/Kg		03/20/24 15:22	04/01/24 14:54	1
PCB-1254	**0.055**	**M**	0.019	0.0085	mg/Kg		03/20/24 15:22	04/01/24 14:54	1
PCB-1260	0.017	U J1 M	0.019	0.0070	mg/Kg		03/20/24 15:22	04/01/24 14:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*89*		*44 - 130*	*03/20/24 15:22*	*04/01/24 14:54*	*1*
DCB Decachlorobiphenyl	*96*	*M*	*40 - 135*	*03/20/24 15:22*	*04/01/24 14:54*	*1*

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**9.6**		0.46	0.092	mg/Kg		04/01/24 12:29	04/04/24 17:39	20
Barium	**120**	**J1**	0.92	0.21	mg/Kg		04/01/24 12:29	04/04/24 17:39	20
Cadmium	**0.35**	**J**	0.74	0.071	mg/Kg		04/01/24 12:29	04/04/24 17:39	20
Chromium	**150**	**J1**	0.92	0.058	mg/Kg		04/01/24 12:29	04/04/24 17:39	20
Lead	**8500**	**J1**	46	4.4	mg/Kg		04/01/24 12:29	04/04/24 18:01	2000
Selenium	**5.8**		1.4	0.26	mg/Kg		04/01/24 12:29	04/04/24 17:39	20
Silver	**0.088**	**J**	0.18	0.018	mg/Kg		04/01/24 12:29	04/04/24 17:39	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	**71.0**		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	**29.0**		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc.
Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU10_0-3
Lab Sample ID: 580-137730-22

Date Collected: 03/09/24 14:30
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 71.0

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.12**		0.023	0.0070	mg/Kg	☼	04/02/24 13:03	04/02/24 16:13	1

Client Sample ID: NAN_DU10_3-6

Lab Sample ID: 580-137730-23

Date Collected: 03/09/24 14:30

Matrix: Solid

Date Received: 03/14/24 09:30

Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	0.017	U	0.019	0.0070	mg/Kg		03/20/24 15:22	04/01/24 15:47	1
PCB-1221	0.017	U	0.019	0.011	mg/Kg		03/20/24 15:22	04/01/24 15:47	1
PCB-1232	0.017	U	0.019	0.0046	mg/Kg		03/20/24 15:22	04/01/24 15:47	1
PCB-1242	0.017	U	0.019	0.0076	mg/Kg		03/20/24 15:22	04/01/24 15:47	1
PCB-1248	0.017	U	0.019	0.0066	mg/Kg		03/20/24 15:22	04/01/24 15:47	1
PCB-1254	**0.037**	**J1 M**	0.019	0.0085	mg/Kg		03/20/24 15:22	04/01/24 15:47	1
PCB-1260	0.017	U M	0.019	0.0070	mg/Kg		03/20/24 15:22	04/01/24 15:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*92*		*44 - 130*	*03/20/24 15:22*	*04/01/24 15:47*	*1*
DCB Decachlorobiphenyl	*98*	*M*	*40 - 135*	*03/20/24 15:22*	*04/01/24 15:47*	*1*

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**8.7**		0.47	0.095	mg/Kg		04/01/24 12:29	04/05/24 05:01	20
Barium	**130**		0.95	0.22	mg/Kg		04/01/24 12:29	04/05/24 05:01	20
Cadmium	**0.39**	**J**	0.76	0.073	mg/Kg		04/01/24 12:29	04/05/24 05:01	20
Chromium	**160**		0.95	0.060	mg/Kg		04/01/24 12:29	04/05/24 05:01	20
Lead	**9700**		47	4.5	mg/Kg		04/01/24 12:29	04/05/24 05:04	2000
Selenium	**6.9**		1.4	0.27	mg/Kg		04/01/24 12:29	04/05/24 05:01	20
Silver	**0.10**	**J**	0.19	0.019	mg/Kg		04/01/24 12:29	04/05/24 05:01	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	**70.8**		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	**29.2**		0.1	0.1	%			03/26/24 11:00	1

Client Sample ID: NAN_DU10_3-6 Lab Sample ID: 580-137730-23

Date Collected: 03/09/24 14:30 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 70.8**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.16		0.024	0.0071	mg/Kg	☼	04/02/24 13:03	04/02/24 15:45	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU10_6-9

Lab Sample ID: 580-137730-24

Date Collected: 03/09/24 14:30 **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	7.9		0.47	0.094	mg/Kg		04/01/24 12:29	04/04/24 17:52	20
Barium	160		0.94	0.22	mg/Kg		04/01/24 12:29	04/04/24 17:52	20
Cadmium	0.35	J	0.76	0.073	mg/Kg		04/01/24 12:29	04/04/24 17:52	20
Chromium	170		0.94	0.060	mg/Kg		04/01/24 12:29	04/04/24 17:52	20
Lead	8100		47	4.5	mg/Kg		04/01/24 12:29	04/04/24 18:14	2000
Selenium	7.8		1.4	0.27	mg/Kg		04/01/24 12:29	04/04/24 17:52	20
Silver	0.078	J	0.19	0.019	mg/Kg		04/01/24 12:29	04/04/24 17:52	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	68.6		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	31.4		0.1	0.1	%			03/26/24 11:00	1

Client Sample ID: NAN_DU10_6-9
Lab Sample ID: 580-137730-24

Date Collected: 03/09/24 14:30
Matrix: Solid

Date Received: 03/14/24 09:30
Percent Solids: 68.6

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.13		0.024	0.0072	mg/Kg	☼	04/02/24 13:03	04/02/24 15:54	1

Client: EnviroQuest, Inc.	Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU11_0-3 **Lab Sample ID: 580-137730-25**
Date Collected: 03/10/24 12:20 **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	11		0.47	0.095	mg/Kg		04/01/24 12:29	04/05/24 05:47	20
Barium	110		0.95	0.22	mg/Kg		04/01/24 12:29	04/05/24 05:47	20
Cadmium	0.37	J	0.76	0.073	mg/Kg		04/01/24 12:29	04/05/24 05:47	20
Chromium	130		0.95	0.060	mg/Kg		04/01/24 12:29	04/05/24 05:47	20
Lead	4300		47	4.5	mg/Kg		04/01/24 12:29	04/05/24 05:50	2000
Selenium	4.8		1.4	0.27	mg/Kg		04/01/24 12:29	04/05/24 05:47	20
Silver	0.081	J	0.19	0.019	mg/Kg		04/01/24 12:29	04/05/24 05:47	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	62.7		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	37.3		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU11_0-3
Date Collected: 03/10/24 12:20
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-25
Matrix: Solid
Percent Solids: 62.7

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.10**		0.025	0.0076	mg/Kg	☼	04/02/24 13:03	04/02/24 15:36	1

Client Sample ID: NAN_DU11_3-6

Date Collected: 03/10/24 12:20
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-26

Matrix: Solid

Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	0.017	U M	0.019	0.0070	mg/Kg		03/20/24 15:22	04/01/24 16:04	1
PCB-1221	0.017	U	0.019	0.011	mg/Kg		03/20/24 15:22	04/01/24 16:04	1
PCB-1232	0.017	U	0.019	0.0047	mg/Kg		03/20/24 15:22	04/01/24 16:04	1
PCB-1242	0.017	U M	0.019	0.0076	mg/Kg		03/20/24 15:22	04/01/24 16:04	1
PCB-1248	0.017	U M	0.019	0.0067	mg/Kg		03/20/24 15:22	04/01/24 16:04	1
PCB-1254	**0.20**	**M**	0.019	0.0086	mg/Kg		03/20/24 15:22	04/01/24 16:04	1
PCB-1260	0.017	U M	0.019	0.0070	mg/Kg		03/20/24 15:22	04/01/24 16:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*85*		*44 - 130*	*03/20/24 15:22*	*04/01/24 16:04*	*1*
DCB Decachlorobiphenyl	*89*	*M*	*40 - 135*	*03/20/24 15:22*	*04/01/24 16:04*	*1*

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**10**		0.48	0.095	mg/Kg		04/01/24 12:29	04/05/24 04:44	20
Barium	**100**		0.95	0.22	mg/Kg		04/01/24 12:29	04/05/24 04:44	20
Cadmium	**0.40**	**J**	0.76	0.073	mg/Kg		04/01/24 12:29	04/05/24 04:44	20
Chromium	**150**		0.95	0.060	mg/Kg		04/01/24 12:29	04/05/24 04:44	20
Lead	**6400**		48	4.6	mg/Kg		04/01/24 12:29	04/05/24 04:47	2000
Selenium	**6.2**		1.4	0.27	mg/Kg		04/01/24 12:29	04/05/24 04:44	20
Silver	**0.086**	**J**	0.19	0.019	mg/Kg		04/01/24 12:29	04/05/24 04:44	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	**65.0**		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	**35.0**		0.1	0.1	%			03/26/24 11:00	1

Client Sample ID: NAN_DU11_3-6
Lab Sample ID: 580-137730-26
Date Collected: 03/10/24 12:20
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 65.0

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.12		0.027	0.0081	mg/Kg	☼	04/02/24 13:03	04/02/24 15:56	1

Client Sample Results

Client: EnviroQuest, Inc.   Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU11_6-9   **Lab Sample ID: 580-137730-27**
Date Collected: 03/10/24 12:20   **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	8.7		0.46	0.092	mg/Kg		04/01/24 12:29	04/05/24 05:41	20
Barium	110		0.92	0.21	mg/Kg		04/01/24 12:29	04/05/24 05:41	20
Cadmium	0.39	J	0.74	0.071	mg/Kg		04/01/24 12:29	04/05/24 05:41	20
Chromium	150		0.92	0.058	mg/Kg		04/01/24 12:29	04/05/24 05:41	20
Lead	6000		46	4.4	mg/Kg		04/01/24 12:29	04/05/24 05:44	2000
Selenium	6.3		1.4	0.26	mg/Kg		04/01/24 12:29	04/05/24 05:41	20
Silver	0.083	J	0.18	0.018	mg/Kg		04/01/24 12:29	04/05/24 05:41	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	66.2		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	33.8		0.1	0.1	%			03/26/24 11:00	1

Client Sample ID: NAN_DU11_6-9 **Lab Sample ID: 580-137730-27**
Date Collected: 03/10/24 12:20 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 66.2**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.16		0.025	0.0075	mg/Kg	☼	04/02/24 13:03	04/02/24 15:59	1

Client Sample ID: NAN_DU12_0-3 **Lab Sample ID: 580-137730-28**
Date Collected: 03/10/24 13:10 **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	16		0.46	0.092	mg/Kg		04/01/24 12:29	04/05/24 04:55	20
Barium	79		0.92	0.21	mg/Kg		04/01/24 12:29	04/05/24 04:55	20
Cadmium	0.41	J	0.74	0.071	mg/Kg		04/01/24 12:29	04/05/24 04:55	20
Chromium	130		0.92	0.058	mg/Kg		04/01/24 12:29	04/05/24 04:55	20
Lead	6300		46	4.4	mg/Kg		04/01/24 12:29	04/05/24 04:58	2000
Selenium	2.8		1.4	0.26	mg/Kg		04/01/24 12:29	04/05/24 04:55	20
Silver	0.088	J	0.18	0.018	mg/Kg		04/01/24 12:29	04/05/24 04:55	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	68.0		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	32.0		0.1	0.1	%			03/26/24 11:00	1

Client Sample ID: NAN_DU12_0-3   Lab Sample ID: 580-137730-28

Date Collected: 03/10/24 13:10   **Matrix: Solid**
Date Received: 03/14/24 09:30   **Percent Solids: 68.0**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.086		0.023	0.0069	mg/Kg	☼	04/02/24 13:03	04/02/24 16:02	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU12_3-6 **Lab Sample ID: 580-137730-29**
Date Collected: 03/10/24 13:10 **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	11		0.46	0.092	mg/Kg		04/01/24 12:29	04/05/24 05:35	20
Barium	50		0.92	0.21	mg/Kg		04/01/24 12:29	04/05/24 05:35	20
Cadmium	0.29	J	0.74	0.071	mg/Kg		04/01/24 12:29	04/05/24 05:35	20
Chromium	87		0.92	0.058	mg/Kg		04/01/24 12:29	04/05/24 05:35	20
Lead	7900		46	4.4	mg/Kg		04/01/24 12:29	04/05/24 05:38	2000
Selenium	3.4		1.4	0.26	mg/Kg		04/01/24 12:29	04/05/24 05:35	20
Silver	0.086	J	0.18	0.018	mg/Kg		04/01/24 12:29	04/05/24 05:35	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	75.6		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	24.4		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU12_3-6
Date Collected: 03/10/24 13:10
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-29
Matrix: Solid
Percent Solids: 75.6

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.12**		0.022	0.0065	mg/Kg	☼	04/02/24 13:03	04/02/24 16:05	1

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Client Sample ID: NAN_DU12_6-9

Date Collected: 03/10/24 13:10
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-30
Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	10		0.47	0.094	mg/Kg		04/01/24 12:29	04/05/24 05:52	20
Barium	69		0.94	0.21	mg/Kg		04/01/24 12:29	04/05/24 05:52	20
Cadmium	0.30	J	0.75	0.073	mg/Kg		04/01/24 12:29	04/05/24 05:52	20
Chromium	90		0.94	0.059	mg/Kg		04/01/24 12:29	04/05/24 05:52	20
Lead	6500		47	4.5	mg/Kg		04/01/24 12:29	04/05/24 05:55	2000
Selenium	3.6		1.4	0.27	mg/Kg		04/01/24 12:29	04/05/24 05:52	20
Silver	0.068	J	0.19	0.019	mg/Kg		04/01/24 12:29	04/05/24 05:52	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	72.9		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	27.1		0.1	0.1	%			03/26/24 11:00	1

Client Sample ID: NAN_DU12_6-9 Lab Sample ID: 580-137730-30

Date Collected: 03/10/24 13:10 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 72.9**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.12		0.023	0.0069	mg/Kg	☼	04/02/24 13:03	04/02/24 16:08	1

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 580-454340/1-A
Matrix: Solid
Analysis Batch: 455366

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 454340

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	0.018	U	0.020	0.0074	mg/Kg		03/20/24 15:22	04/01/24 14:01	1
PCB-1221	0.018	U	0.020	0.012	mg/Kg		03/20/24 15:22	04/01/24 14:01	1
PCB-1232	0.018	U	0.020	0.0049	mg/Kg		03/20/24 15:22	04/01/24 14:01	1
PCB-1242	0.018	U	0.020	0.0080	mg/Kg		03/20/24 15:22	04/01/24 14:01	1
PCB-1248	0.018	U	0.020	0.0070	mg/Kg		03/20/24 15:22	04/01/24 14:01	1
PCB-1254	0.018	U	0.020	0.0090	mg/Kg		03/20/24 15:22	04/01/24 14:01	1
PCB-1260	0.018	U	0.020	0.0074	mg/Kg		03/20/24 15:22	04/01/24 14:01	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*95*		*44 - 130*	*03/20/24 15:22*	*04/01/24 14:01*	*1*
DCB Decachlorobiphenyl	*85*	*M*	*40 - 135*	*03/20/24 15:22*	*04/01/24 14:01*	*1*

Lab Sample ID: LCS 580-454340/2-A
Matrix: Solid
Analysis Batch: 455366

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 454340

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
PCB-1016	0.100	0.102	M	mg/Kg		102	47 - 134
PCB-1260	0.100	0.0955	M	mg/Kg		96	53 - 140

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*91*	*M*	*44 - 130*
DCB Decachlorobiphenyl	*102*	*M*	*40 - 135*

Lab Sample ID: LCSD 580-454340/3-A
Matrix: Solid
Analysis Batch: 455366

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 454340

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
PCB-1016	0.100	0.101	M	mg/Kg		101	47 - 134	7	30
PCB-1260	0.100	0.105	M	mg/Kg		105	53 - 140	10	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Tetrachloro-m-xylene	*99*		*44 - 130*
DCB Decachlorobiphenyl	*112*		*40 - 135*

Lab Sample ID: 580-137730-22 MS
Matrix: Solid
Analysis Batch: 455366

Client Sample ID: NAN_DU10_0-3
Prep Type: Total/NA
Prep Batch: 454340

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
PCB-1016	0.017	U M	0.0934	0.0948	M	mg/Kg		102	47 - 134
PCB-1260	0.017	U J1 M	0.0934	0.171	J1 M	mg/Kg		183	53 - 140

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Tetrachloro-m-xylene	*94*		*44 - 130*
DCB Decachlorobiphenyl	*101*	*M*	*40 - 135*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 580-137730-22 MSD — **Client Sample ID: NAN_DU10_0-3**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 455366 — **Prep Batch: 454340**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
PCB-1016	0.017	U M	0.0943	0.0908	M	mg/Kg		96	47 - 134	4	30
PCB-1260	0.017	U J1 M	0.0943	0.162	J1 M	mg/Kg		172	53 - 140	5	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Tetrachloro-m-xylene	*88*		*44 - 130*
DCB Decachlorobiphenyl	*94*	*M*	*40 - 135*

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 580-455023/23-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 455179 — **Prep Batch: 455023**

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.40	U	0.50	0.10	mg/Kg		03/28/24 09:38	03/29/24 05:58	20
Barium	0.40	U	1.0	0.23	mg/Kg		03/28/24 09:38	03/29/24 05:58	20
Cadmium	0.20	U	0.80	0.077	mg/Kg		03/28/24 09:38	03/29/24 05:58	20
Chromium	0.25	U	1.0	0.063	mg/Kg		03/28/24 09:38	03/29/24 05:58	20
Lead	0.19	U	0.50	0.048	mg/Kg		03/28/24 09:38	03/29/24 05:58	20
Selenium	1.0	U	1.5	0.29	mg/Kg		03/28/24 09:38	03/29/24 05:58	20
Silver	0.050	U	0.20	0.020	mg/Kg		03/28/24 09:38	03/29/24 05:58	20

Lab Sample ID: LCS 580-455023/24-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 455179 — **Prep Batch: 455023**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	25.0	24.3		mg/Kg		97	82 - 118
Barium	25.0	26.5		mg/Kg		106	86 - 116
Cadmium	25.0	24.7		mg/Kg		99	84 - 116
Chromium	25.0	22.1		mg/Kg		89	83 - 119
Lead	25.0	22.1		mg/Kg		88	84 - 118
Selenium	25.0	24.3		mg/Kg		97	80 - 119
Silver	25.0	24.6		mg/Kg		98	83 - 118

Lab Sample ID: LCSD 580-455023/25-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 455179 — **Prep Batch: 455023**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	25.0	24.4		mg/Kg		97	82 - 118	0	20
Barium	25.0	26.9		mg/Kg		108	86 - 116	1	20
Cadmium	25.0	25.2		mg/Kg		101	84 - 116	2	20
Chromium	25.0	22.3		mg/Kg		89	83 - 119	1	20
Lead	25.0	22.3		mg/Kg		89	84 - 118	1	20
Selenium	25.0	25.2		mg/Kg		101	80 - 119	3	20
Silver	25.0	25.1		mg/Kg		101	83 - 118	2	20

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 580-455073/23-A
Matrix: Solid
Analysis Batch: 455285

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 455073

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.40	U	0.50	0.10	mg/Kg		03/28/24 13:37	03/30/24 00:43	20
Barium	0.40	U	1.0	0.23	mg/Kg		03/28/24 13:37	03/30/24 00:43	20
Cadmium	0.20	U	0.80	0.077	mg/Kg		03/28/24 13:37	03/30/24 00:43	20
Chromium	0.25	U	1.0	0.063	mg/Kg		03/28/24 13:37	03/30/24 00:43	20
Lead	0.19	U	0.50	0.048	mg/Kg		03/28/24 13:37	03/30/24 00:43	20
Selenium	1.0	U	1.5	0.29	mg/Kg		03/28/24 13:37	03/30/24 00:43	20
Silver	0.050	U	0.20	0.020	mg/Kg		03/28/24 13:37	03/30/24 00:43	20

Lab Sample ID: LCS 580-455073/24-A
Matrix: Solid
Analysis Batch: 455285

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 455073

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	25.0	24.2		mg/Kg		97	82 - 118
Barium	25.0	24.2		mg/Kg		97	86 - 116
Cadmium	25.0	24.4		mg/Kg		98	84 - 116
Chromium	25.0	24.9		mg/Kg		100	83 - 119
Lead	25.0	22.8		mg/Kg		91	84 - 118
Selenium	25.0	26.6		mg/Kg		106	80 - 119
Silver	25.0	25.0		mg/Kg		100	83 - 118

Lab Sample ID: LCSD 580-455073/25-A
Matrix: Solid
Analysis Batch: 455285

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 455073

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	25.0	23.9		mg/Kg		96	82 - 118	1	20
Barium	25.0	23.9		mg/Kg		96	86 - 116	1	20
Cadmium	25.0	24.0		mg/Kg		96	84 - 116	2	20
Chromium	25.0	24.1		mg/Kg		96	83 - 119	3	20
Lead	25.0	22.6		mg/Kg		91	84 - 118	1	20
Selenium	25.0	26.0		mg/Kg		104	80 - 119	2	20
Silver	25.0	24.7		mg/Kg		99	83 - 118	2	20

Lab Sample ID: MB 580-455329/13-A
Matrix: Solid
Analysis Batch: 455760

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 455329

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.40	U	0.50	0.10	mg/Kg		04/01/24 12:29	04/04/24 17:08	20
Barium	0.40	U	1.0	0.23	mg/Kg		04/01/24 12:29	04/04/24 17:08	20
Cadmium	0.20	U	0.80	0.077	mg/Kg		04/01/24 12:29	04/04/24 17:08	20
Chromium	0.25	U	1.0	0.063	mg/Kg		04/01/24 12:29	04/04/24 17:08	20
Lead	0.19	U	0.50	0.048	mg/Kg		04/01/24 12:29	04/04/24 17:08	20
Selenium	1.0	U	1.5	0.29	mg/Kg		04/01/24 12:29	04/04/24 17:08	20
Silver	0.050	U	0.20	0.020	mg/Kg		04/01/24 12:29	04/04/24 17:08	20

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 580-455329/18-A
Matrix: Solid
Analysis Batch: 455760

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 455329

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.40	U	0.50	0.10	mg/Kg		04/01/24 12:51	04/04/24 17:11	20
Barium	0.40	U	1.0	0.23	mg/Kg		04/01/24 12:51	04/04/24 17:11	20
Cadmium	0.20	U	0.80	0.077	mg/Kg		04/01/24 12:51	04/04/24 17:11	20
Chromium	0.25	U	1.0	0.063	mg/Kg		04/01/24 12:51	04/04/24 17:11	20
Lead	0.19	U	0.50	0.048	mg/Kg		04/01/24 12:51	04/04/24 17:11	20
Selenium	1.0	U	1.5	0.29	mg/Kg		04/01/24 12:51	04/04/24 17:11	20
Silver	0.050	U	0.20	0.020	mg/Kg		04/01/24 12:51	04/04/24 17:11	20

Lab Sample ID: MB 580-455329/19-A
Matrix: Solid
Analysis Batch: 455760

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 455329

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.40	U	0.50	0.10	mg/Kg		04/01/24 12:51	04/04/24 17:14	20
Barium	0.40	U	1.0	0.23	mg/Kg		04/01/24 12:51	04/04/24 17:14	20
Cadmium	0.20	U	0.80	0.077	mg/Kg		04/01/24 12:51	04/04/24 17:14	20
Chromium	0.25	U	1.0	0.063	mg/Kg		04/01/24 12:51	04/04/24 17:14	20
Lead	0.19	U	0.50	0.048	mg/Kg		04/01/24 12:51	04/04/24 17:14	20
Selenium	1.0	U	1.5	0.29	mg/Kg		04/01/24 12:51	04/04/24 17:14	20
Silver	0.050	U	0.20	0.020	mg/Kg		04/01/24 12:51	04/04/24 17:14	20

Lab Sample ID: LCS 580-455329/16-A
Matrix: Solid
Analysis Batch: 455760

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 455329

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	25.0	24.9		mg/Kg		100	82 - 118
Barium	25.0	23.9		mg/Kg		96	86 - 116
Cadmium	25.0	23.9		mg/Kg		95	84 - 116
Chromium	25.0	24.4		mg/Kg		98	83 - 119
Lead	25.0	24.2		mg/Kg		97	84 - 118
Selenium	25.0	25.6		mg/Kg		102	80 - 119
Silver	25.0	24.4		mg/Kg		98	83 - 118

Lab Sample ID: LCSD 580-455329/17-A
Matrix: Solid
Analysis Batch: 455760

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 455329

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	25.0	24.8		mg/Kg		99	82 - 118	0	20
Barium	25.0	24.7		mg/Kg		99	86 - 116	3	20
Cadmium	25.0	24.8		mg/Kg		99	84 - 116	4	20
Chromium	25.0	24.7		mg/Kg		99	83 - 119	1	20
Lead	25.0	24.2		mg/Kg		97	84 - 118	0	20
Selenium	25.0	25.3		mg/Kg		101	80 - 119	1	20
Silver	25.0	24.9		mg/Kg		100	83 - 118	2	20

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 580-137730-22 MS
Matrix: Solid
Analysis Batch: 455760

Client Sample ID: NAN_DU10_0-3
Prep Type: Total/NA
Prep Batch: 455329

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	9.6		23.5	30.0		mg/Kg		87	82 - 118
Barium	120	J1	23.5	145	4	mg/Kg		117	86 - 116
Cadmium	0.35	J	23.5	23.1		mg/Kg		97	84 - 116
Chromium	150	J1	23.5	178	4	mg/Kg		121	83 - 119
Selenium	5.8		23.5	24.6		mg/Kg		80	80 - 119
Silver	0.088	J	23.5	22.5		mg/Kg		95	83 - 118

Lab Sample ID: 580-137730-22 MS
Matrix: Solid
Analysis Batch: 455760

Client Sample ID: NAN_DU10_0-3
Prep Type: Total/NA
Prep Batch: 455329

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Lead	8500	J1	23.5	8620	4	mg/Kg		701	84 - 118

Lab Sample ID: 580-137730-22 MSD
Matrix: Solid
Analysis Batch: 455760

Client Sample ID: NAN_DU10_0-3
Prep Type: Total/NA
Prep Batch: 455329

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	9.6		23.5	30.7		mg/Kg		90	82 - 118	2	20
Barium	120	J1	23.5	150	4	mg/Kg		140	86 - 116	4	20
Cadmium	0.35	J	23.5	22.6		mg/Kg		94	84 - 116	2	20
Chromium	150	J1	23.5	180	4	mg/Kg		127	83 - 119	1	20
Selenium	5.8		23.5	26.3		mg/Kg		87	80 - 119	7	20
Silver	0.088	J	23.5	22.6		mg/Kg		96	83 - 118	1	20

Lab Sample ID: 580-137730-22 MSD
Matrix: Solid
Analysis Batch: 455760

Client Sample ID: NAN_DU10_0-3
Prep Type: Total/NA
Prep Batch: 455329

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Lead	8500	J1	23.5	8090	4	mg/Kg		-1541	84 - 118	6	20

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 580-454663/23-A
Matrix: Solid
Analysis Batch: 454854

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 454663

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.010	U	0.018	0.0054	mg/Kg		03/25/24 10:09	03/26/24 14:14	1

Lab Sample ID: LCS 580-454663/24-A
Matrix: Solid
Analysis Batch: 454854

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 454663

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.100	0.119		mg/Kg		119	80 - 124

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Method: 7471A - Mercury (CVAA) (Continued)

Lab Sample ID: LCSD 580-454663/25-A
Matrix: Solid
Analysis Batch: 454854

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 454663

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury			0.100	0.112		mg/Kg		112	80 - 124	6	20

Lab Sample ID: 580-137730-1 MS
Matrix: Solid
Analysis Batch: 454854

Client Sample ID: NAN_DU8_0-3
Prep Type: Total/NA
Prep Batch: 454663

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Mercury	0.31		0.127	0.431		mg/Kg	☼	97	80 - 124		

Lab Sample ID: 580-137730-1 MSD
Matrix: Solid
Analysis Batch: 454854

Client Sample ID: NAN_DU8_0-3
Prep Type: Total/NA
Prep Batch: 454663

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	0.31		0.128	0.418		mg/Kg	☼	85	80 - 124	3	20

Lab Sample ID: MB 580-455462/13-A
Matrix: Solid
Analysis Batch: 455504

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 455462

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.010	U	0.018	0.0054	mg/Kg		04/02/24 13:03	04/02/24 15:27	1

Lab Sample ID: LCS 580-455462/14-A
Matrix: Solid
Analysis Batch: 455504

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 455462

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Mercury			0.100	0.116		mg/Kg		116	80 - 124		

Lab Sample ID: LCSD 580-455462/15-A
Matrix: Solid
Analysis Batch: 455504

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 455462

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury			0.100	0.111		mg/Kg		111	80 - 124	5	20

Lab Sample ID: 580-137730-25 MS
Matrix: Solid
Analysis Batch: 455504

Client Sample ID: NAN_DU11_0-3
Prep Type: Total/NA
Prep Batch: 455462

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Mercury	0.10		0.140	0.257		mg/Kg	☼	109	80 - 124		

Lab Sample ID: 580-137730-25 MSD
Matrix: Solid
Analysis Batch: 455504

Client Sample ID: NAN_DU11_0-3
Prep Type: Total/NA
Prep Batch: 455462

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	0.10		0.143	0.249		mg/Kg	☼	101	80 - 124	3	20

Method: 2540G - SM 2540G

Lab Sample ID: 580-137730-1 DU
Matrix: Solid
Analysis Batch: 454764

Client Sample ID: NAN_DU8_0-3
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Solids	71.8		76.4		%		6	20
Percent Moisture	28.2		23.6		%		18	20

Lab Chronicle

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU8_0-3
Lab Sample ID: 580-137730-1
Date Collected: 03/03/24 10:00
Matrix: Solid
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 06:51
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU8_0-3
Lab Sample ID: 580-137730-1
Date Collected: 03/03/24 10:00
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 71.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:21

Client Sample ID: NAN_DU8_3-6
Lab Sample ID: 580-137730-2
Date Collected: 03/03/24 10:00
Matrix: Solid
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 06:57
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU8_3-6
Lab Sample ID: 580-137730-2
Date Collected: 03/03/24 10:00
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 70.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:28

Client Sample ID: NAN_DU8_6-9
Lab Sample ID: 580-137730-3
Date Collected: 03/03/24 10:00
Matrix: Solid
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 06:54
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Lab Chronicle

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU8_6-9
Lab Sample ID: 580-137730-3
Date Collected: 03/03/24 10:00
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 69.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:31

Client Sample ID: NAN_DU1_0-3_A
Lab Sample ID: 580-137730-4
Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 06:49
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU1_0-3_A
Lab Sample ID: 580-137730-4
Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 82.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:33

Client Sample ID: NAN_DU1_3-6_A
Lab Sample ID: 580-137730-5
Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 06:23
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU1_3-6_A
Lab Sample ID: 580-137730-5
Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 78.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:36

Client Sample ID: NAN_DU1_6-9_A — Lab Sample ID: 580-137730-6

Date Collected: 03/05/24 16:00 — **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 07:37
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU1_6-9_A — Lab Sample ID: 580-137730-6

Date Collected: 03/05/24 16:00 — **Matrix: Solid**
Date Received: 03/14/24 09:30 — **Percent Solids: 75.2**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:43

Client Sample ID: NAN_DU1_0-3_B — Lab Sample ID: 580-137730-7

Date Collected: 03/05/24 16:00 — **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 07:40
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU1_0-3_B — Lab Sample ID: 580-137730-7

Date Collected: 03/05/24 16:00 — **Matrix: Solid**
Date Received: 03/14/24 09:30 — **Percent Solids: 83.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:45

Client Sample ID: NAN_DU1_3-6_B — Lab Sample ID: 580-137730-8

Date Collected: 03/05/24 16:00 — **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 07:42
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU1_3-6_B Lab Sample ID: 580-137730-8

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 77.6**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:48

Client Sample ID: NAN_DU1_6-9_B Lab Sample ID: 580-137730-9

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 07:45
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU1_6-9_B Lab Sample ID: 580-137730-9

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 75.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:50

Client Sample ID: NAN_DU1_0-3_C Lab Sample ID: 580-137730-10

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 07:48
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU1_0-3_C Lab Sample ID: 580-137730-10

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 80.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:52

Client Sample ID: NAN_DU1_3-6_C Lab Sample ID: 580-137730-11
Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 07:08
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU1_3-6_C Lab Sample ID: 580-137730-11
Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 77.6**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:55

Client Sample ID: NAN_DU1_6-9_C Lab Sample ID: 580-137730-12
Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 01:09
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU1_6-9_C Lab Sample ID: 580-137730-12
Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 73.7**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:57

Client Sample ID: NAN_DU3_0-3 Lab Sample ID: 580-137730-13
Date Collected: 03/06/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 00:46
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Lab Chronicle

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU3_0-3

Lab Sample ID: 580-137730-13
Date Collected: 03/06/24 12:30
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 69.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:59

Client Sample ID: NAN_DU3_3-6

Lab Sample ID: 580-137730-14
Date Collected: 03/06/24 12:30
Matrix: Solid
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 02:33
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU3_3-6

Lab Sample ID: 580-137730-14
Date Collected: 03/06/24 12:30
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 70.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 15:02

Client Sample ID: NAN_DU3_6-9

Lab Sample ID: 580-137730-15
Date Collected: 03/06/24 12:30
Matrix: Solid
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 02:30
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU3_6-9

Lab Sample ID: 580-137730-15
Date Collected: 03/06/24 12:30
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 72.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 15:04

Client Sample ID: NAN_DU2_0-3 Lab Sample ID: 580-137730-16

Date Collected: 03/06/24 15:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 01:34
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU2_0-3 Lab Sample ID: 580-137730-16

Date Collected: 03/06/24 15:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 75.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 15:11

Client Sample ID: NAN_DU2_3-6 Lab Sample ID: 580-137730-17

Date Collected: 03/06/24 15:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 01:48
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU2_3-6 Lab Sample ID: 580-137730-17

Date Collected: 03/06/24 15:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 77.2**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 15:14

Client Sample ID: NAN_DU2_6-9 Lab Sample ID: 580-137730-18

Date Collected: 03/06/24 15:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 02:22
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU2_6-9 Lab Sample ID: 580-137730-18

Date Collected: 03/06/24 15:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 77.3**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 15:16

Client Sample ID: NAN_DU9_0-3 Lab Sample ID: 580-137730-19

Date Collected: 03/09/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 02:28
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		2000	455425	FCW	EET SEA	04/01/24 18:07
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU9_0-3 Lab Sample ID: 580-137730-19

Date Collected: 03/09/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 70.3**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:09
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 15:19

Client Sample ID: NAN_DU9_3-6 Lab Sample ID: 580-137730-20

Date Collected: 03/09/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 02:25
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		2000	455425	FCW	EET SEA	04/01/24 18:04
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU9_3-6 Lab Sample ID: 580-137730-20

Date Collected: 03/09/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 61.5**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:09
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 15:21

Client Sample ID: NAN_DU9_6-9 Lab Sample ID: 580-137730-21

Date Collected: 03/09/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/05/24 04:50
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/05/24 04:52
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU9_6-9 Lab Sample ID: 580-137730-21

Date Collected: 03/09/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 64.5**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 16:10

Client Sample ID: NAN_DU10_0-3 Lab Sample ID: 580-137730-22

Date Collected: 03/09/24 14:30 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3546			454340	E1W	EET SEA	03/20/24 15:22
Total/NA	Analysis	8082A		1	455366	TL1	EET SEA	04/01/24 14:54
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/04/24 17:39
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/04/24 18:01
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU10_0-3 Lab Sample ID: 580-137730-22

Date Collected: 03/09/24 14:30 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 71.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 16:13

Client Sample ID: NAN_DU10_3-6 Lab Sample ID: 580-137730-23

Date Collected: 03/09/24 14:30 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3546			454340	E1W	EET SEA	03/20/24 15:22
Total/NA	Analysis	8082A		1	455366	TL1	EET SEA	04/01/24 15:47
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/05/24 05:01
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/05/24 05:04
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU10_3-6 Lab Sample ID: 580-137730-23

Date Collected: 03/09/24 14:30 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 70.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 15:45

Client Sample ID: NAN_DU10_6-9 Lab Sample ID: 580-137730-24

Date Collected: 03/09/24 14:30 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/04/24 17:52
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/04/24 18:14
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU10_6-9 **Lab Sample ID: 580-137730-24**
Date Collected: 03/09/24 14:30 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 68.6**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 15:54

Client Sample ID: NAN_DU11_0-3 **Lab Sample ID: 580-137730-25**
Date Collected: 03/10/24 12:20 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/05/24 05:47
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/05/24 05:50
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU11_0-3 **Lab Sample ID: 580-137730-25**
Date Collected: 03/10/24 12:20 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 62.7**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 15:36

Client Sample ID: NAN_DU11_3-6 **Lab Sample ID: 580-137730-26**
Date Collected: 03/10/24 12:20 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3546			454340	E1W	EET SEA	03/20/24 15:22
Total/NA	Analysis	8082A		1	455366	TL1	EET SEA	04/01/24 16:04
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/05/24 04:44
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/05/24 04:47
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

1 2 3 4 5 6 7 8 9 10 11

Client Sample ID: NAN_DU11_3-6 Lab Sample ID: 580-137730-26

Date Collected: 03/10/24 12:20 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 65.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 15:56

Client Sample ID: NAN_DU11_6-9 Lab Sample ID: 580-137730-27

Date Collected: 03/10/24 12:20 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/05/24 05:41
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/05/24 05:44
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU11_6-9 Lab Sample ID: 580-137730-27

Date Collected: 03/10/24 12:20 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 66.2**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 15:59

Client Sample ID: NAN_DU12_0-3 Lab Sample ID: 580-137730-28

Date Collected: 03/10/24 13:10 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/05/24 04:55
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/05/24 04:58
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU12_0-3 Lab Sample ID: 580-137730-28

Date Collected: 03/10/24 13:10 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 68.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 16:02

Client Sample ID: NAN_DU12_3-6 Lab Sample ID: 580-137730-29

Date Collected: 03/10/24 13:10 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/05/24 05:35
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/05/24 05:38
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU12_3-6 Lab Sample ID: 580-137730-29

Date Collected: 03/10/24 13:10 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 75.6**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 16:05

Client Sample ID: NAN_DU12_6-9 Lab Sample ID: 580-137730-30

Date Collected: 03/10/24 13:10 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/05/24 05:52
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/05/24 05:55
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU12_6-9
Lab Sample ID: 580-137730-30

Date Collected: 03/10/24 13:10
Matrix: Solid

Date Received: 03/14/24 09:30
Percent Solids: 72.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 16:08

Laboratory References:

EET SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Laboratory: Eurofins Seattle

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

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2236	01-19-25

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
2540G		Solid	Percent Moisture
2540G		Solid	Percent Solids

Sample Summary

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-137730-1	NAN_DU8_0-3	Solid	03/03/24 10:00	03/14/24 09:30
580-137730-2	NAN_DU8_3-6	Solid	03/03/24 10:00	03/14/24 09:30
580-137730-3	NAN_DU8_6-9	Solid	03/03/24 10:00	03/14/24 09:30
580-137730-4	NAN_DU1_0-3_A	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-5	NAN_DU1_3-6_A	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-6	NAN_DU1_6-9_A	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-7	NAN_DU1_0-3_B	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-8	NAN_DU1_3-6_B	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-9	NAN_DU1_6-9_B	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-10	NAN_DU1_0-3_C	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-11	NAN_DU1_3-6_C	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-12	NAN_DU1_6-9_C	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-13	NAN_DU3_0-3	Solid	03/06/24 12:30	03/14/24 09:30
580-137730-14	NAN_DU3_3-6	Solid	03/06/24 12:30	03/14/24 09:30
580-137730-15	NAN_DU3_6-9	Solid	03/06/24 12:30	03/14/24 09:30
580-137730-16	NAN_DU2_0-3	Solid	03/06/24 15:00	03/14/24 09:30
580-137730-17	NAN_DU2_3-6	Solid	03/06/24 15:00	03/14/24 09:30
580-137730-18	NAN_DU2_6-9	Solid	03/06/24 15:00	03/14/24 09:30
580-137730-19	NAN_DU9_0-3	Solid	03/09/24 12:30	03/14/24 09:30
580-137730-20	NAN_DU9_3-6	Solid	03/09/24 12:30	03/14/24 09:30
580-137730-21	NAN_DU9_6-9	Solid	03/09/24 12:30	03/14/24 09:30
580-137730-22	NAN_DU10_0-3	Solid	03/09/24 14:30	03/14/24 09:30
580-137730-23	NAN_DU10_3-6	Solid	03/09/24 14:30	03/14/24 09:30
580-137730-24	NAN_DU10_6-9	Solid	03/09/24 14:30	03/14/24 09:30
580-137730-25	NAN_DU11_0-3	Solid	03/10/24 12:20	03/14/24 09:30
580-137730-26	NAN_DU11_3-6	Solid	03/10/24 12:20	03/14/24 09:30
580-137730-27	NAN_DU11_6-9	Solid	03/10/24 12:20	03/14/24 09:30
580-137730-28	NAN_DU12_0-3	Solid	03/10/24 13:10	03/14/24 09:30
580-137730-29	NAN_DU12_3-6	Solid	03/10/24 13:10	03/14/24 09:30
580-137730-30	NAN_DU12_6-9	Solid	03/10/24 13:10	03/14/24 09:30

Eurofins Environmental Testing Northwest, LLC
5755 8th Street East
Tacoma, WA 98424

Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler: KC, SM, RK	Lab PM: Tracy Dutton	Carrier Tracking No(s):	COC No:
Client Contact: Scott Moncrief	Phone: 808 2860222	E-Mail: scottmoncrief808@gmail.com	State of Origin: HI	Page: Page 1 of 3
Company: Kealamahi Pacific	PWSID:	Analysis Requested		Job #:
Address: 103 S Kalaheo Ave	Due Date Requested: std TAT			
City: Kailua	TAT Requested (days): std			
State, Zip: HI 96734	Compliance Project: Δ Yes Δ No			
Phone: 808 2860222	PO #: Purchase Order not required			
Email: scottmoncrief808@gmail.com	WO #:			
Project Name: Nanue Bridge	Project #:			
Site:	SSOW#:			

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	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)	8 RCRA Metals	% moisture	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
NAN-DU8-0-3	3/3/24	1000	MIS	S			X	X		50 increment DU
NAN_DU8_3-6	↓	1000					X	X		
NAN-DU8_6-9		1000					X	X		
NAN-DU1-0-3_A	3/5/24	1600					X	X		
NAN_DU1-3-6-A		1600					X	X		
NAN-DU1-6-9-A		1600					X	X		
NAN-DU1-0-3-B		1600					X	X		
NAN-DU1-3-6-B		1600					X	X		
NAN-DU1-6-9-B		1600					X	X		
NAN-DU1-0-3-C		1600					X	X		
NAN-DU1-3-6-C	↓	1600	↓	↓			X	X		

580-137730 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

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) std

Special Instructions/QC Requirements:

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

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Scott Moncrief	3/11/24 1100 Am	KPC	[signature]	3/14/24 0930	EETN
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
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: 01/16/2019 4/8/2024

Eurofins Environmental Testing Northwest, LLC
5755 8th Street East
Tacoma, WA 98424

Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler:	Lab PM:	Carrier Tracking No(s):	COC No:
Client Contact:	Phone:	E-Mail:	State of Origin:	Page: ~~Page 1 of 1~~ KC 2 of 3
Company: Kealamahi Pacific	PWSID:	Analysis Requested		Job #:
Address:	Due Date Requested:			Preservation Codes:
City:	TAT Requested (days):			
State, Zip:	Compliance Project: Δ Yes Δ No			
Phone:	PO #: Purchase Order not required			
Email:	WO #:			
Project Name: Nanue Bridge	Project #:			
Site:	SSOW#:			Other:

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)

Sample Identification	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)	8 RCRA Metals	% moisture	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
NAN-DU~~1~~9-6-9-C (KC)	3/5/24	1600	MIS	S			X	X		50 increment DU
NAN-DU3-0-3	3/6/24	1230	↓	↓			X	X		↓
NAN-DU3-3-6	↓	1230	↓	↓			X	X		↓
NAN-DU3-6-9	↓	1230	↓	↓			X	X		↓
NAN-DU2-0-3	↓	1500	↓	↓			X	X		↓
NAN-DU2-3-6	↓	1500	↓	↓			X	X		↓
NAN-DU2-6-9	↓	1500	↓	↓			X	X		↓
NAN-DU9-0-3	3/9/24	1230	↓	↓			X	X		↓
NAN-DU9-3-6	↓	1230	↓	↓			X	X		↓
NAN-DU9-6-9	↓	1230	↓	↓			X	X		↓
NAN-DU10-0-3	↓	1430	↓	↓			X	X		↓

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

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) std

Special Instructions/QC Requirements:

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

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Scott Moncrief [signature]	3/11/24 11:00 AM		[signature]	3/14/24 0930	EETN
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
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:

Eurofins Environmental Testing Northwest, LLC
5755 8th Street East
Tacoma, WA 98424

Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler:	Lab PM:	Carrier Tracking No(s):	COC No:
Client Contact:	Phone:	E-Mail:	State of Origin:	Page: KC Page ~~1 of 1~~ 3 of 3
Company: Kealamahi Pacific	PWSID:	Analysis Requested		Job #:
Address:	Due Date Requested:			Preservation Codes:
City:	TAT Requested (days):			
State, Zip:	Compliance Project: Δ Yes Δ No			
Phone:	PO #: Purchase Order not required			
Email:	WO #:			
Project Name: Nanue Bridge	Project #:			
Site:	SSOW#:			Other:

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)

Sample Identification	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)	8 RCRA Metals	% moisture	PCBs	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
NAN_DU10_3-6	3/9/24	1430	MIS	S			X	X	X		50 increment DU
NAN_DU10_6-9	↓	1430	↓	↓			X	X			↓
NAN_DU11_0-3	3/10/24	1220	↓	↓			X	X			↓
NAN_DU11_3-6	↓	1220	↓	↓			X	X	X		↓
NAN_DU11_6-9	↓	1220	↓	↓			X	X			↓
NAN_DU12_0-3	↓	1310	↓	↓			X	X			↓
NAN_DU12_3-6	↓	1310	↓	↓			X	X			↓
NAN_DU12_6-9	↓	1310	↓	↓			X	X			↓
		LAST ENTRY									

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

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) std

Special Instructions/QC Requirements:

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

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Scott Moncrief [signature]	3/11/24 11:00 AM		[signature]	3/14/24 0930	EETN
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
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: 01/16/2019 4/8/2024

#1 IRll 13.3/13.2 LB/Ice/no/FPO

#2 IRll 13.2/13.1 LR/Ice/no/FPO

Login Sample Receipt Checklist

Client: EnviroQuest, Inc. | Job Number: 580-137730-1

Login Number: 137730 | **List Source: Eurofins Seattle**
List Number: 1
Creator: Groves, Elizabeth

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 outside limits,acceptable per client data quality objectives
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	

Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Scott Moncrief
EnviroQuest, Inc.
98-029 Hekaha Street
Suite 21
Aiea, Hawaii 96701

Generated 5/6/2024 6:48:09 PM Revision 1

JOB DESCRIPTION

Nanue Bridge

JOB NUMBER

580-137730-1

Eurofins Seattle
5755 8th Street East
Tacoma WA 98424

See page two for job notes and contact information.

Eurofins Seattle

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northwest, LLC Project Manager.

Authorization

Tracy Dutton

Generated
5/6/2024 6:48:09 PM
Revision 1

Authorized for release by
Tracy Dutton, Client Relations Manager
Tracy.Dutton@et.eurofinsus.com
(253)248-4970

1 2 3 4 5 6 7 8 9 10 11

Table of Contents

Job ID: 580-137730-1 Eurofins Seattle

**Job Narrative
580-137730-1**

REVISION
The report being provided is a revision of the original report sent on 4/8/2024. The report (revision 1) is being revised due to client added TCLP RCRA metals and SPLP Lead analyses to several samples in the job (see narrative notes below).

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Receipt
The samples were received on 3/14/2024 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 13.2°C and 13.3°C.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

Receipt Exceptions
All samples contained in this login were delayed in shipment.

NAN_DU8_0-3 (580-137730-1), NAN_DU8_3-6 (580-137730-2), NAN_DU8_6-9 (580-137730-3), NAN_DU1_0-3_A (580-137730-4), NAN_DU1_3-6_A (580-137730-5), NAN_DU1_6-9_A (580-137730-6), NAN_DU1_0-3_B (580-137730-7), NAN_DU1_3-6_B (580-137730-8), NAN_DU1_6-9_B (580-137730-9), NAN_DU1_0-3_C (580-137730-10), NAN_DU1_3-6_C (580-137730-11), NAN_DU1_6-9_C (580-137730-12), NAN_DU3_0-3 (580-137730-13), NAN_DU3_3-6 (580-137730-14), NAN_DU3_6-9 (580-137730-15), NAN_DU2_0-3 (580-137730-16), NAN_DU2_3-6 (580-137730-17), NAN_DU2_6-9 (580-137730-18), NAN_DU9_0-3 (580-137730-19), NAN_DU9_3-6 (580-137730-20), NAN_DU9_6-9 (580-137730-21), NAN_DU10_0-3 (580-137730-22), NAN_DU10_3-6 (580-137730-23), NAN_DU10_6-9 (580-137730-24), NAN_DU11_0-3 (580-137730-25), NAN_DU11_3-6 (580-137730-26), NAN_DU11_6-9 (580-137730-27), NAN_DU12_0-3 (580-137730-28), NAN_DU12_3-6 (580-137730-29) and NAN_DU12_6-9 (580-137730-30)

Method 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography
Samples NAN_DU10_0-3 (580-137730-22), NAN_DU10_3-6 (580-137730-23) and NAN_DU11_3-6 (580-137730-26) were analyzed for Polychlorinated Biphenyls (PCBs) by Gas Chromatography. The samples were composited on 3/18/2024, prepared on 3/20/2024 and analyzed on 4/1/2024.

The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 580-454054 and 580-454340 and analytical batch 580-455366 were outside control limits for one or more analytes. See QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

The %RPD between the primary and confirmation column exceeded 40% for PCB-1254 for the following sample: NAN_DU10_3-6 (580-137730-23). The lower value(s) has been reported and qualified in accordance with the laboratory's SOP.

The following samples required a TBA clean-up to reduce matrix interferences caused by sulfur TBA_00037: NAN_DU10_0-3 (580-137730-22), NAN_DU10_3-6 (580-137730-23), NAN_DU11_3-6 (580-137730-26), (LCS 580-454340/2-A), (LCSD 580-454340/3-A), (MB 580-454340/1-A), (580-137730-A-22-D MS) and (580-137730-A-22-E MSD)
.

Method 6010D - Metals (ICP) - TCLP

Job ID: 580-137730-1 (Continued) Eurofins Seattle

Samples NAN_DU8_0-3 (580-137730-1), NAN_DU1_0-3_B (580-137730-7), NAN_DU3_6-9 (580-137730-15), NAN_DU2_6-9 (580-137730-18), NAN_DU9_0-3 (580-137730-19), NAN_DU10_3-6 (580-137730-23), NAN_DU11_3-6 (580-137730-26) and NAN_DU12_3-6 (580-137730-29) were analyzed for Metals (ICP) - TCLP. The samples were leached on 4/23/2024, prepared on 4/25/2024 and 4/26/2024 and analyzed on 4/25/2024 and 5/1/2024.

The following samples were prepared outside of preparation holding time due to the client activating TCLP 7470 analysis on 04/24/2024 after receiving the total 7471 mercury results: NAN_DU8_0-3 (580-137730-1), NAN_DU1_0-3_B (580-137730-7), NAN_DU3_6-9 (580-137730-15), NAN_DU2_6-9 (580-137730-18), NAN_DU9_0-3 (580-137730-19), NAN_DU10_3-6 (580-137730-23), NAN_DU11_3-6 (580-137730-26) and NAN_DU12_3-6 (580-137730-29).

Because the client activated both TCLP and SPLP methods after receiving results for total metals and mercury, insufficient samples were provided by ISM to perform both leaching procedures with the required 100g for the following samples: NAN_DU8_0-3 (580-137730-1), NAN_DU1_0-3_B (580-137730-7), NAN_DU3_6-9 (580-137730-15), NAN_DU2_6-9 (580-137730-18), NAN_DU9_0-3 (580-137730-19), NAN_DU10_3-6 (580-137730-23), NAN_DU11_3-6 (580-137730-26) and NAN_DU12_3-6 (580-137730-29). The volume of leaching fluid was adjusted proportionally to maintain a 20:1 ratio of leaching fluid to weight of sample. Reporting limits (RLs) are not affected.

Method 6020B - Metals (ICP/MS)
Samples NAN_DU8_0-3 (580-137730-1), NAN_DU8_3-6 (580-137730-2), NAN_DU8_6-9 (580-137730-3), NAN_DU1_0-3_A (580-137730-4), NAN_DU1_3-6_A (580-137730-5), NAN_DU1_6-9_A (580-137730-6), NAN_DU1_0-3_B (580-137730-7), NAN_DU1_3-6_B (580-137730-8), NAN_DU1_6-9_B (580-137730-9), NAN_DU1_0-3_C (580-137730-10), NAN_DU1_3-6_C (580-137730-11), NAN_DU1_6-9_C (580-137730-12), NAN_DU3_0-3 (580-137730-13), NAN_DU3_3-6 (580-137730-14), NAN_DU3_6-9 (580-137730-15), NAN_DU2_0-3 (580-137730-16), NAN_DU2_3-6 (580-137730-17), NAN_DU2_6-9 (580-137730-18), NAN_DU9_0-3 (580-137730-19), NAN_DU9_3-6 (580-137730-20), NAN_DU9_6-9 (580-137730-21), NAN_DU10_0-3 (580-137730-22), NAN_DU10_3-6 (580-137730-23), NAN_DU10_6-9 (580-137730-24), NAN_DU11_0-3 (580-137730-25), NAN_DU11_3-6 (580-137730-26), NAN_DU11_6-9 (580-137730-27), NAN_DU12_0-3 (580-137730-28), NAN_DU12_3-6 (580-137730-29) and NAN_DU12_6-9 (580-137730-30) were analyzed for Metals (ICP/MS). The samples were composited on 3/18/2024, prepared on 3/28/2024 and 4/1/2024 and analyzed on 3/29/2024, 3/30/2024, 4/1/2024, 4/4/2024 and 4/5/2024.

Samples NAN_DU9_0-3 (580-137730-19)[2000x], NAN_DU9_3-6 (580-137730-20)[2000x], NAN_DU9_6-9 (580-137730-21)[2000x], NAN_DU10_0-3 (580-137730-22)[2000x], NAN_DU10_3-6 (580-137730-23)[2000x], NAN_DU10_6-9 (580-137730-24)[2000x], NAN_DU11_0-3 (580-137730-25)[2000x], NAN_DU11_3-6 (580-137730-26)[2000x], NAN_DU11_6-9 (580-137730-27)[2000x], NAN_DU12_0-3 (580-137730-28)[2000x], NAN_DU12_3-6 (580-137730-29)[2000x] and NAN_DU12_6-9 (580-137730-30)[2000x] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

Method 7470A - Mercury (CVAA) - TCLP
Samples NAN_DU8_0-3 (580-137730-1), NAN_DU1_0-3_B (580-137730-7), NAN_DU3_6-9 (580-137730-15), NAN_DU2_6-9 (580-137730-18), NAN_DU9_0-3 (580-137730-19), NAN_DU10_3-6 (580-137730-23), NAN_DU11_3-6 (580-137730-26) and NAN_DU12_3-6 (580-137730-29) were analyzed for Mercury (CVAA) - TCLP. The samples were leached on 4/23/2024, prepared on 4/25/2024 and analyzed on 4/30/2024.

The following samples were prepared outside of preparation holding time due to the client activating TCLP 7470 analysis on 04/24/2024 after receiving the total 7471 mercury results: NAN_DU8_0-3 (580-137730-1), NAN_DU1_0-3_B (580-137730-7), NAN_DU3_6-9 (580-137730-15), NAN_DU2_6-9 (580-137730-18), NAN_DU9_0-3 (580-137730-19), NAN_DU10_3-6 (580-137730-23), NAN_DU11_3-6 (580-137730-26) and NAN_DU12_3-6 (580-137730-29).

Because the client activated both TCLP and SPLP methods after receiving results for total metals and mercury, insufficient samples were provided by ISM to perform both leaching procedures with the required 100g for the following samples: NAN_DU8_0-3 (580-137730-1), NAN_DU1_0-3_B (580-137730-7), NAN_DU3_6-9 (580-137730-15), NAN_DU2_6-9 (580-137730-18), NAN_DU9_0-3 (580-137730-19), NAN_DU10_3-6 (580-137730-23), NAN_DU11_3-6 (580-137730-26) and NAN_DU12_3-6 (580-137730-29). The volume of leaching fluid was adjusted proportionally to maintain a 20:1 ratio of leaching fluid to weight of sample. Reporting limits (RLs) are not affected.

Method 7471A - Mercury (CVAA)
Samples NAN_DU8_0-3 (580-137730-1), NAN_DU8_3-6 (580-137730-2), NAN_DU8_6-9 (580-137730-3), NAN_DU1_0-3_A (580-137730-4), NAN_DU1_3-6_A (580-137730-5), NAN_DU1_6-9_A (580-137730-6), NAN_DU1_0-3_B (580-137730-7), NAN_DU1_3-6_B (580-137730-8), NAN_DU1_6-9_B (580-137730-9), NAN_DU1_0-3_C (580-137730-10), NAN_DU1_3-6_C (580-137730-11), NAN_DU1_6-9_C (580-137730-12), NAN_DU3_0-3 (580-137730-13), NAN_DU3_3-6 (580-137730-14), NAN_DU3_6-9 (580-137730-15), NAN_DU2_0-3 (580-137730-16), NAN_DU2_3-6 (580-137730-17), NAN_DU2_6-9 (580-137730-18), NAN_DU9_0-3 (580-137730-19), NAN_DU9_3-6 (580-137730-20), NAN_DU9_6-9 (580-137730-21),

1 2 3 4 5 6 7 8 9 10 11

NAN_DU10_0-3 (580-137730-22), NAN_DU10_3-6 (580-137730-23), NAN_DU10_6-9 (580-137730-24), NAN_DU11_0-3 (580-137730-25), NAN_DU11_3-6 (580-137730-26), NAN_DU11_6-9 (580-137730-27), NAN_DU12_0-3 (580-137730-28), NAN_DU12_3-6 (580-137730-29) and NAN_DU12_6-9 (580-137730-30) were analyzed for Mercury (CVAA). The samples were composited on 3/18/2024, prepared on 3/25/2024 and 4/2/2024 and analyzed on 3/26/2024 and 4/2/2024.

Method 2540G - SM 2540G
Samples NAN_DU8_0-3 (580-137730-1), NAN_DU8_3-6 (580-137730-2), NAN_DU8_6-9 (580-137730-3), NAN_DU1_0-3_A (580-137730-4), NAN_DU1_3-6_A (580-137730-5), NAN_DU1_6-9_A (580-137730-6), NAN_DU1_0-3_B (580-137730-7), NAN_DU1_3-6_B (580-137730-8), NAN_DU1_6-9_B (580-137730-9), NAN_DU1_0-3_C (580-137730-10), NAN_DU1_3-6_C (580-137730-11), NAN_DU1_6-9_C (580-137730-12), NAN_DU3_0-3 (580-137730-13), NAN_DU3_3-6 (580-137730-14), NAN_DU3_6-9 (580-137730-15), NAN_DU2_0-3 (580-137730-16), NAN_DU2_3-6 (580-137730-17), NAN_DU2_6-9 (580-137730-18), NAN_DU9_0-3 (580-137730-19), NAN_DU9_3-6 (580-137730-20), NAN_DU9_6-9 (580-137730-21), NAN_DU10_0-3 (580-137730-22), NAN_DU10_3-6 (580-137730-23), NAN_DU10_6-9 (580-137730-24), NAN_DU11_0-3 (580-137730-25), NAN_DU11_3-6 (580-137730-26), NAN_DU11_6-9 (580-137730-27), NAN_DU12_0-3 (580-137730-28), NAN_DU12_3-6 (580-137730-29) and NAN_DU12_6-9 (580-137730-30) were analyzed for SM 2540G. The samples were composited on 3/18/2024 and analyzed on 3/26/2024.

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
J1	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
M	Manual integrated compound.
U	Undetected at the Limit of Detection.

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
H	Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
J1	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
U	Undetected at the Limit of Detection.

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

Client Sample Results

Client: EnviroQuest, Inc.
Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU8_0-3
Lab Sample ID: 580-137730-1
Date Collected: 03/03/24 10:00
Matrix: Solid
Date Received: 03/14/24 09:30

Method: SW846 6010D - Metals (ICP) - SPLP West

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**0.59**		0.030	0.0027	mg/L		05/06/24 15:58	05/01/24 22:22	1

Method: SW846 6010D - TCLP Metals (ICP) - TCLP

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.029	U	0.060	0.0072	mg/L		04/25/24 11:48	04/25/24 19:56	1
Barium	**1.1**		0.020	0.0010	mg/L		04/25/24 11:48	04/25/24 19:56	1
Cadmium	**0.0025**	**J**	0.020	0.00090	mg/L		04/25/24 11:48	04/25/24 19:56	1
Chromium	0.0052	U	0.025	0.0027	mg/L		04/25/24 11:48	04/25/24 19:56	1
Lead	**3.7**		0.030	0.0027	mg/L		04/25/24 11:48	04/25/24 19:56	1
Selenium	0.035	U	0.10	0.0087	mg/L		04/25/24 11:48	04/25/24 19:56	1
Silver	0.034	U	0.050	0.0085	mg/L		04/25/24 11:48	04/25/24 19:56	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**20**		0.50	0.099	mg/Kg		03/28/24 09:38	03/29/24 06:51	20
Barium	**150**		0.99	0.23	mg/Kg		03/28/24 09:38	03/29/24 06:51	20
Cadmium	**0.56**	**J**	0.79	0.077	mg/Kg		03/28/24 09:38	03/29/24 06:51	20
Chromium	**170**		0.99	0.063	mg/Kg		03/28/24 09:38	03/29/24 06:51	20
Lead	**4300**		0.50	0.048	mg/Kg		03/28/24 09:38	03/29/24 06:51	20
Selenium	**5.8**		1.5	0.28	mg/Kg		03/28/24 09:38	03/29/24 06:51	20
Silver	**0.088**	**J**	0.20	0.020	mg/Kg		03/28/24 09:38	03/29/24 06:51	20

Method: SW846 7470A - TCLP Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0020	U H	0.0030	0.0015	mg/L		04/25/24 12:11	04/30/24 15:37	1

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	**71.8**		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	**28.2**		0.1	0.1	%			03/26/24 11:00	1

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU8_0-3
Date Collected: 03/03/24 10:00
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-1
Matrix: Solid
Percent Solids: 71.8

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.31		0.022	0.0067	mg/Kg	☼	03/25/24 10:07	03/26/24 14:21	1

Client Sample ID: NAN_DU8_3-6

Lab Sample ID: 580-137730-2

Date Collected: 03/03/24 10:00

Matrix: Solid

Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	20		0.50	0.099	mg/Kg		03/28/24 09:38	03/29/24 06:57	20
Barium	200		0.99	0.23	mg/Kg		03/28/24 09:38	03/29/24 06:57	20
Cadmium	0.62	J	0.80	0.077	mg/Kg		03/28/24 09:38	03/29/24 06:57	20
Chromium	180		0.99	0.063	mg/Kg		03/28/24 09:38	03/29/24 06:57	20
Lead	3100		0.50	0.048	mg/Kg		03/28/24 09:38	03/29/24 06:57	20
Selenium	6.8		1.5	0.28	mg/Kg		03/28/24 09:38	03/29/24 06:57	20
Silver	0.072	J	0.20	0.020	mg/Kg		03/28/24 09:38	03/29/24 06:57	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	70.8		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	29.2		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU8_3-6 **Lab Sample ID: 580-137730-2**
Date Collected: 03/03/24 10:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 70.8**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.30		0.024	0.0071	mg/Kg	☼	03/25/24 10:07	03/26/24 14:28	1

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU8_6-9

Lab Sample ID: 580-137730-3

Date Collected: 03/03/24 10:00

Matrix: Solid

Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	32		0.47	0.095	mg/Kg		03/28/24 09:38	03/29/24 06:54	20
Barium	180		0.95	0.22	mg/Kg		03/28/24 09:38	03/29/24 06:54	20
Cadmium	0.66	J	0.76	0.073	mg/Kg		03/28/24 09:38	03/29/24 06:54	20
Chromium	180		0.95	0.060	mg/Kg		03/28/24 09:38	03/29/24 06:54	20
Lead	2900		0.47	0.046	mg/Kg		03/28/24 09:38	03/29/24 06:54	20
Selenium	7.1		1.4	0.27	mg/Kg		03/28/24 09:38	03/29/24 06:54	20
Silver	0.073	J	0.19	0.019	mg/Kg		03/28/24 09:38	03/29/24 06:54	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	69.0		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	31.0		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc.
Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU8_6-9
Lab Sample ID: 580-137730-3

Date Collected: 03/03/24 10:00
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 69.0

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.34**		0.024	0.0072	mg/Kg	☼	03/25/24 10:07	03/26/24 14:31	1

Client Sample ID: NAN_DU1_0-3_A **Lab Sample ID: 580-137730-4**
Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	28		0.47	0.095	mg/Kg		03/28/24 09:38	03/29/24 06:49	20
Barium	260		0.95	0.22	mg/Kg		03/28/24 09:38	03/29/24 06:49	20
Cadmium	0.37	J	0.76	0.073	mg/Kg		03/28/24 09:38	03/29/24 06:49	20
Chromium	180		0.95	0.060	mg/Kg		03/28/24 09:38	03/29/24 06:49	20
Lead	1100		0.47	0.046	mg/Kg		03/28/24 09:38	03/29/24 06:49	20
Selenium	8.1		1.4	0.27	mg/Kg		03/28/24 09:38	03/29/24 06:49	20
Silver	0.064	J	0.19	0.019	mg/Kg		03/28/24 09:38	03/29/24 06:49	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	82.3		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	17.7		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU1_0-3_A Lab Sample ID: 580-137730-4

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 82.3**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.15**		0.020	0.0060	mg/Kg	☼	03/25/24 10:07	03/26/24 14:33	1

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1 2 3 4 5 6 7 8 9 10 11

Client Sample ID: NAN_DU1_3-6_A **Lab Sample ID: 580-137730-5**
Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	24		0.49	0.098	mg/Kg		03/28/24 09:38	03/29/24 06:23	20
Barium	270		0.98	0.22	mg/Kg		03/28/24 09:38	03/29/24 06:23	20
Cadmium	0.42	J	0.78	0.076	mg/Kg		03/28/24 09:38	03/29/24 06:23	20
Chromium	190		0.98	0.062	mg/Kg		03/28/24 09:38	03/29/24 06:23	20
Lead	980		0.49	0.047	mg/Kg		03/28/24 09:38	03/29/24 06:23	20
Selenium	9.6		1.5	0.28	mg/Kg		03/28/24 09:38	03/29/24 06:23	20
Silver	0.057	J	0.20	0.020	mg/Kg		03/28/24 09:38	03/29/24 06:23	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	78.6		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	21.4		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client Sample ID: NAN_DU1_3-6_A

Lab Sample ID: 580-137730-5

Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 78.6

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.16**		0.021	0.0063	mg/Kg	☼	03/25/24 10:07	03/26/24 14:36	1

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU1_6-9_A

Lab Sample ID: 580-137730-6

Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	17		0.48	0.096	mg/Kg		03/28/24 09:38	03/29/24 07:37	20
Barium	340		0.96	0.22	mg/Kg		03/28/24 09:38	03/29/24 07:37	20
Cadmium	0.32	J	0.77	0.074	mg/Kg		03/28/24 09:38	03/29/24 07:37	20
Chromium	190		0.96	0.060	mg/Kg		03/28/24 09:38	03/29/24 07:37	20
Lead	640		0.48	0.046	mg/Kg		03/28/24 09:38	03/29/24 07:37	20
Selenium	10		1.4	0.27	mg/Kg		03/28/24 09:38	03/29/24 07:37	20
Silver	0.043	J	0.19	0.019	mg/Kg		03/28/24 09:38	03/29/24 07:37	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	75.2		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	24.8		0.1	0.1	%			03/26/24 11:00	1

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Client Sample ID: NAN_DU1_6-9_A **Lab Sample ID: 580-137730-6**
Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 75.2**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.15		0.021	0.0063	mg/Kg	☼	03/25/24 10:07	03/26/24 14:43	1

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU1_0-3_B
Date Collected: 03/05/24 16:00
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-7
Matrix: Solid

Method: SW846 6010D - Metals (ICP) - SPLP West

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**0.080**		0.030	0.0027	mg/L		05/06/24 15:58	05/01/24 22:49	1

Method: SW846 6010D - TCLP Metals (ICP) - TCLP

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.029	U	0.060	0.0072	mg/L		04/25/24 11:48	04/25/24 20:00	1
Barium	**0.89**		0.020	0.0010	mg/L		04/25/24 11:48	04/25/24 20:00	1
Cadmium	0.0016	U	0.020	0.00090	mg/L		04/25/24 11:48	04/25/24 20:00	1
Chromium	0.0052	U	0.025	0.0027	mg/L		04/25/24 11:48	04/25/24 20:00	1
Lead	**0.60**		0.030	0.0027	mg/L		04/25/24 11:48	04/25/24 20:00	1
Selenium	0.035	U	0.10	0.0087	mg/L		04/25/24 11:48	04/25/24 20:00	1
Silver	0.034	U	0.050	0.0085	mg/L		04/25/24 11:48	04/25/24 20:00	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**28**		0.49	0.098	mg/Kg		03/28/24 09:38	03/29/24 07:40	20
Barium	**250**		0.98	0.22	mg/Kg		03/28/24 09:38	03/29/24 07:40	20
Cadmium	**0.42**	**J**	0.78	0.075	mg/Kg		03/28/24 09:38	03/29/24 07:40	20
Chromium	**190**		0.98	0.061	mg/Kg		03/28/24 09:38	03/29/24 07:40	20
Lead	**1200**		0.49	0.047	mg/Kg		03/28/24 09:38	03/29/24 07:40	20
Selenium	**7.5**		1.5	0.28	mg/Kg		03/28/24 09:38	03/29/24 07:40	20
Silver	**0.054**	**J**	0.20	0.020	mg/Kg		03/28/24 09:38	03/29/24 07:40	20

Method: SW846 7470A - TCLP Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0020	U H	0.0030	0.0015	mg/L		04/25/24 12:11	04/30/24 15:39	1

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	**83.0**		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	**17.0**		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client Sample ID: NAN_DU1_0-3_B
Lab Sample ID: 580-137730-7
Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 83.0

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.13**		0.021	0.0062	mg/Kg	☼	03/25/24 10:07	03/26/24 14:45	1

Client Sample Results

Client: EnviroQuest, Inc.
Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU1_3-6_B
Lab Sample ID: 580-137730-8
Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	23		0.49	0.099	mg/Kg		03/28/24 09:38	03/29/24 07:42	20
Barium	300		0.99	0.23	mg/Kg		03/28/24 09:38	03/29/24 07:42	20
Cadmium	0.37	J	0.79	0.076	mg/Kg		03/28/24 09:38	03/29/24 07:42	20
Chromium	190		0.99	0.062	mg/Kg		03/28/24 09:38	03/29/24 07:42	20
Lead	960		0.49	0.047	mg/Kg		03/28/24 09:38	03/29/24 07:42	20
Selenium	8.6		1.5	0.28	mg/Kg		03/28/24 09:38	03/29/24 07:42	20
Silver	0.047	J	0.20	0.020	mg/Kg		03/28/24 09:38	03/29/24 07:42	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	77.6		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	22.4		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc.
Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU1_3-6_B
Lab Sample ID: 580-137730-8

Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 77.6

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.16**		0.020	0.0061	mg/Kg	☼	03/25/24 10:07	03/26/24 14:48	1

Client Sample Results

Client Sample ID: NAN_DU1_6-9_B

Lab Sample ID: 580-137730-9
Matrix: Solid

Date Collected: 03/05/24 16:00
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	17		0.47	0.095	mg/Kg		03/28/24 09:38	03/29/24 07:45	20
Barium	330		0.95	0.22	mg/Kg		03/28/24 09:38	03/29/24 07:45	20
Cadmium	0.37	J	0.76	0.073	mg/Kg		03/28/24 09:38	03/29/24 07:45	20
Chromium	200		0.95	0.060	mg/Kg		03/28/24 09:38	03/29/24 07:45	20
Lead	620		0.47	0.046	mg/Kg		03/28/24 09:38	03/29/24 07:45	20
Selenium	9.7		1.4	0.27	mg/Kg		03/28/24 09:38	03/29/24 07:45	20
Silver	0.049	J	0.19	0.019	mg/Kg		03/28/24 09:38	03/29/24 07:45	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	75.8		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	24.2		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU1_6-9_B **Lab Sample ID: 580-137730-9**
Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 75.8**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.16		0.023	0.0068	mg/Kg	☼	03/25/24 10:07	03/26/24 14:50	1

Client Sample Results

Client: EnviroQuest, Inc.
Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU1_0-3_C
Lab Sample ID: 580-137730-10

Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	22		0.46	0.091	mg/Kg		03/28/24 09:38	03/29/24 07:48	20
Barium	280		0.91	0.21	mg/Kg		03/28/24 09:38	03/29/24 07:48	20
Cadmium	0.38	J	0.73	0.070	mg/Kg		03/28/24 09:38	03/29/24 07:48	20
Chromium	200		0.91	0.058	mg/Kg		03/28/24 09:38	03/29/24 07:48	20
Lead	1100		0.46	0.044	mg/Kg		03/28/24 09:38	03/29/24 07:48	20
Selenium	7.4		1.4	0.26	mg/Kg		03/28/24 09:38	03/29/24 07:48	20
Silver	0.058	J	0.18	0.018	mg/Kg		03/28/24 09:38	03/29/24 07:48	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	80.0		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	20.0		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU1_0-3_C Lab Sample ID: 580-137730-10

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 80.0**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.15		0.022	0.0065	mg/Kg	☼	03/25/24 10:07	03/26/24 14:52	1

Client Sample ID: NAN_DU1_3-6_C

Lab Sample ID: 580-137730-11

Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	22		0.48	0.095	mg/Kg		03/28/24 09:38	03/29/24 07:08	20
Barium	290		0.95	0.22	mg/Kg		03/28/24 09:38	03/29/24 07:08	20
Cadmium	0.37	J	0.76	0.073	mg/Kg		03/28/24 09:38	03/29/24 07:08	20
Chromium	190		0.95	0.060	mg/Kg		03/28/24 09:38	03/29/24 07:08	20
Lead	850		0.48	0.046	mg/Kg		03/28/24 09:38	03/29/24 07:08	20
Selenium	8.5		1.4	0.27	mg/Kg		03/28/24 09:38	03/29/24 07:08	20
Silver	0.055	J	0.19	0.019	mg/Kg		03/28/24 09:38	03/29/24 07:08	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	77.6		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	22.4		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU1_3-6_C **Lab Sample ID: 580-137730-11**
Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 77.6**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.13**		0.021	0.0064	mg/Kg	☼	03/25/24 10:07	03/26/24 14:55	1

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU1_6-9_C
Date Collected: 03/05/24 16:00
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-12
Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	18		0.47	0.094	mg/Kg		03/28/24 13:37	03/30/24 01:09	20
Barium	250		0.94	0.22	mg/Kg		03/28/24 13:37	03/30/24 01:09	20
Cadmium	0.32	J	0.75	0.073	mg/Kg		03/28/24 13:37	03/30/24 01:09	20
Chromium	170		0.94	0.059	mg/Kg		03/28/24 13:37	03/30/24 01:09	20
Lead	470		0.47	0.045	mg/Kg		03/28/24 13:37	03/30/24 01:09	20
Selenium	8.5		1.4	0.27	mg/Kg		03/28/24 13:37	03/30/24 01:09	20
Silver	0.041	J	0.19	0.019	mg/Kg		03/28/24 13:37	03/30/24 01:09	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	73.7		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	26.3		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc.
Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU1_6-9_C
Lab Sample ID: 580-137730-12
Date Collected: 03/05/24 16:00
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 73.7

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.12**		0.022	0.0067	mg/Kg	☼	03/25/24 10:07	03/26/24 14:57	1

Client: EnviroQuest, Inc. | Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU3_0-3 | **Lab Sample ID: 580-137730-13**
Date Collected: 03/06/24 12:30 | **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	13		0.46	0.092	mg/Kg		03/28/24 13:37	03/30/24 00:46	20
Barium	130	J1	0.92	0.21	mg/Kg		03/28/24 13:37	03/30/24 00:46	20
Cadmium	0.30	J	0.74	0.071	mg/Kg		03/28/24 13:37	03/30/24 00:46	20
Chromium	130	J1	0.92	0.058	mg/Kg		03/28/24 13:37	03/30/24 00:46	20
Lead	1200	J1	0.46	0.044	mg/Kg		03/28/24 13:37	03/30/24 00:46	20
Selenium	6.6		1.4	0.26	mg/Kg		03/28/24 13:37	03/30/24 00:46	20
Silver	0.047	J	0.18	0.018	mg/Kg		03/28/24 13:37	03/30/24 00:46	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	69.3		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	30.7		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU3_0-3

Date Collected: 03/06/24 12:30
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-13

Matrix: Solid
Percent Solids: 69.3

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.15		0.024	0.0073	mg/Kg	☼	03/25/24 10:07	03/26/24 14:59	1

Client Sample ID: NAN_DU3_3-6
Lab Sample ID: 580-137730-14
Date Collected: 03/06/24 12:30
Matrix: Solid
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	15		0.47	0.095	mg/Kg		03/28/24 13:37	03/30/24 02:33	20
Barium	140		0.95	0.22	mg/Kg		03/28/24 13:37	03/30/24 02:33	20
Cadmium	0.33	J	0.76	0.073	mg/Kg		03/28/24 13:37	03/30/24 02:33	20
Chromium	140		0.95	0.060	mg/Kg		03/28/24 13:37	03/30/24 02:33	20
Lead	1200		0.47	0.045	mg/Kg		03/28/24 13:37	03/30/24 02:33	20
Selenium	6.8		1.4	0.27	mg/Kg		03/28/24 13:37	03/30/24 02:33	20
Silver	0.048	J	0.19	0.019	mg/Kg		03/28/24 13:37	03/30/24 02:33	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	70.7		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	29.3		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU3_3-6 Lab Sample ID: 580-137730-14

Date Collected: 03/06/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 70.7**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.16		0.022	0.0067	mg/Kg	☼	03/25/24 10:07	03/26/24 15:02	1

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU3_6-9 Lab Sample ID: 580-137730-15

Date Collected: 03/06/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6010D - Metals (ICP) - SPLP West

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**0.41**		0.030	0.0027	mg/L		05/06/24 15:58	05/01/24 22:53	1

Method: SW846 6010D - TCLP Metals (ICP) - TCLP

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.029	U	0.060	0.0072	mg/L		04/25/24 11:48	04/25/24 20:03	1
Barium	**1.0**		0.020	0.0010	mg/L		04/25/24 11:48	04/25/24 20:03	1
Cadmium	0.0016	U	0.020	0.00090	mg/L		04/25/24 11:48	04/25/24 20:03	1
Chromium	0.0052	U	0.025	0.0027	mg/L		04/25/24 11:48	04/25/24 20:03	1
Lead	**1.1**		0.030	0.0027	mg/L		04/25/24 11:48	04/25/24 20:03	1
Selenium	0.035	U	0.10	0.0087	mg/L		04/25/24 11:48	04/25/24 20:03	1
Silver	0.034	U	0.050	0.0085	mg/L		04/25/24 11:48	04/25/24 20:03	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**14**		0.48	0.096	mg/Kg		03/28/24 13:37	03/30/24 02:30	20
Barium	**140**		0.96	0.22	mg/Kg		03/28/24 13:37	03/30/24 02:30	20
Cadmium	**0.28**	**J**	0.77	0.074	mg/Kg		03/28/24 13:37	03/30/24 02:30	20
Chromium	**130**		0.96	0.060	mg/Kg		03/28/24 13:37	03/30/24 02:30	20
Lead	**1500**		0.48	0.046	mg/Kg		03/28/24 13:37	03/30/24 02:30	20
Selenium	**7.3**		1.4	0.27	mg/Kg		03/28/24 13:37	03/30/24 02:30	20
Silver	**0.053**	**J**	0.19	0.019	mg/Kg		03/28/24 13:37	03/30/24 02:30	20

Method: SW846 7470A - TCLP Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0020	U H	0.0030	0.0015	mg/L		04/25/24 12:11	04/30/24 15:42	1

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	**72.9**		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	**27.1**		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc.
Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU3_6-9
Lab Sample ID: 580-137730-15
Date Collected: 03/06/24 12:30
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 72.9

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.16**		0.022	0.0067	mg/Kg	☼	03/25/24 10:07	03/26/24 15:04	1

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Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU2_0-3 Lab Sample ID: 580-137730-16

Date Collected: 03/06/24 15:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	14		0.47	0.095	mg/Kg		03/28/24 13:37	03/30/24 01:34	20
Barium	200		0.95	0.22	mg/Kg		03/28/24 13:37	03/30/24 01:34	20
Cadmium	0.41	J	0.76	0.073	mg/Kg		03/28/24 13:37	03/30/24 01:34	20
Chromium	180		0.95	0.060	mg/Kg		03/28/24 13:37	03/30/24 01:34	20
Lead	1200		0.47	0.045	mg/Kg		03/28/24 13:37	03/30/24 01:34	20
Selenium	8.3		1.4	0.27	mg/Kg		03/28/24 13:37	03/30/24 01:34	20
Silver	0.077	J	0.19	0.019	mg/Kg		03/28/24 13:37	03/30/24 01:34	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	75.8		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	24.2		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU2_0-3 Lab Sample ID: 580-137730-16

Date Collected: 03/06/24 15:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 75.8**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.15**		0.022	0.0067	mg/Kg	☼	03/25/24 10:07	03/26/24 15:11	1

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU2_3-6 **Lab Sample ID: 580-137730-17**
Date Collected: 03/06/24 15:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	12		0.48	0.095	mg/Kg		03/28/24 13:37	03/30/24 01:48	20
Barium	190		0.95	0.22	mg/Kg		03/28/24 13:37	03/30/24 01:48	20
Cadmium	0.37	J	0.76	0.073	mg/Kg		03/28/24 13:37	03/30/24 01:48	20
Chromium	170		0.95	0.060	mg/Kg		03/28/24 13:37	03/30/24 01:48	20
Lead	1000		0.48	0.046	mg/Kg		03/28/24 13:37	03/30/24 01:48	20
Selenium	7.8		1.4	0.27	mg/Kg		03/28/24 13:37	03/30/24 01:48	20
Silver	0.060	J	0.19	0.019	mg/Kg		03/28/24 13:37	03/30/24 01:48	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	77.2		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	22.8		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU2_3-6 **Lab Sample ID: 580-137730-17**
Date Collected: 03/06/24 15:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 77.2**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.15**		0.021	0.0063	mg/Kg	☼	03/25/24 10:07	03/26/24 15:14	1

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Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU2_6-9

Date Collected: 03/06/24 15:00
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-18
Matrix: Solid

Method: SW846 6010D - TCLP Metals (ICP) - TCLP

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.029	U	0.060	0.0072	mg/L		04/25/24 11:48	04/25/24 20:07	1
Barium	**0.98**		0.020	0.0010	mg/L		04/25/24 11:48	04/25/24 20:07	1
Cadmium	0.0016	U	0.020	0.00090	mg/L		04/25/24 11:48	04/25/24 20:07	1
Chromium	0.0052	U	0.025	0.0027	mg/L		04/25/24 11:48	04/25/24 20:07	1
Lead	**0.69**		0.030	0.0027	mg/L		04/25/24 11:48	04/25/24 20:07	1
Selenium	0.035	U	0.10	0.0087	mg/L		04/25/24 11:48	04/25/24 20:07	1
Silver	0.034	U	0.050	0.0085	mg/L		04/25/24 11:48	04/25/24 20:07	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**14**		0.47	0.095	mg/Kg		03/28/24 13:37	03/30/24 02:22	20
Barium	**210**		0.95	0.22	mg/Kg		03/28/24 13:37	03/30/24 02:22	20
Cadmium	**0.40**	**J**	0.76	0.073	mg/Kg		03/28/24 13:37	03/30/24 02:22	20
Chromium	**190**		0.95	0.060	mg/Kg		03/28/24 13:37	03/30/24 02:22	20
Lead	**1400**		0.47	0.046	mg/Kg		03/28/24 13:37	03/30/24 02:22	20
Selenium	**9.2**		1.4	0.27	mg/Kg		03/28/24 13:37	03/30/24 02:22	20
Silver	**0.054**	**J**	0.19	0.019	mg/Kg		03/28/24 13:37	03/30/24 02:22	20

Method: SW846 7470A - TCLP Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0020	U H	0.0030	0.0015	mg/L		04/25/24 12:11	04/30/24 15:45	1

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	**77.3**		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	**22.7**		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc.
Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU2_6-9
Lab Sample ID: 580-137730-18
Date Collected: 03/06/24 15:00
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 77.3

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.18		0.020	0.0060	mg/Kg	☼	03/25/24 10:07	03/26/24 15:16	1

1 2 3 4 5 6 7 8 9 10 11

Client Sample ID: NAN_DU9_0-3
Lab Sample ID: 580-137730-19
Date Collected: 03/09/24 12:30
Matrix: Solid
Date Received: 03/14/24 09:30

Method: SW846 6010D - TCLP Metals (ICP) - TCLP

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.029	U	0.060	0.0072	mg/L		04/25/24 11:48	04/25/24 20:10	1
Barium	**0.64**		0.020	0.0010	mg/L		04/25/24 11:48	04/25/24 20:10	1
Cadmium	**0.0015**	**J**	0.020	0.00090	mg/L		04/25/24 11:48	04/25/24 20:10	1
Chromium	**0.0034**	**J**	0.025	0.0027	mg/L		04/25/24 11:48	04/25/24 20:10	1
Lead	**2.8**		0.030	0.0027	mg/L		04/25/24 11:48	04/25/24 20:10	1
Selenium	0.035	U	0.10	0.0087	mg/L		04/25/24 11:48	04/25/24 20:10	1
Silver	0.034	U	0.050	0.0085	mg/L		04/25/24 11:48	04/25/24 20:10	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**24**		0.48	0.096	mg/Kg		03/28/24 13:37	03/30/24 02:28	20
Barium	**100**		0.96	0.22	mg/Kg		03/28/24 13:37	03/30/24 02:28	20
Cadmium	**0.67**	**J**	0.77	0.074	mg/Kg		03/28/24 13:37	03/30/24 02:28	20
Chromium	**160**		0.96	0.060	mg/Kg		03/28/24 13:37	03/30/24 02:28	20
Lead	**6400**		48	4.6	mg/Kg		03/28/24 13:37	04/01/24 18:07	2000
Selenium	**4.9**		1.4	0.27	mg/Kg		03/28/24 13:37	03/30/24 02:28	20
Silver	**0.085**	**J**	0.19	0.019	mg/Kg		03/28/24 13:37	03/30/24 02:28	20

Method: SW846 7470A - TCLP Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0020	U H	0.0030	0.0015	mg/L		04/25/24 12:11	04/30/24 15:47	1

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	**70.3**		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	**29.7**		0.1	0.1	%			03/26/24 11:00	1

Client Sample ID: NAN_DU9_0-3

Lab Sample ID: 580-137730-19

Date Collected: 03/09/24 12:30
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 70.3

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.28**		0.024	0.0071	mg/Kg	☼	03/25/24 10:09	03/26/24 15:19	1

Client Sample Results

Client: EnviroQuest, Inc.
Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU9_3-6
Lab Sample ID: 580-137730-20

Date Collected: 03/09/24 12:30
Matrix: Solid
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	25		0.48	0.096	mg/Kg		03/28/24 13:37	03/30/24 02:25	20
Barium	110		0.96	0.22	mg/Kg		03/28/24 13:37	03/30/24 02:25	20
Cadmium	0.67	J	0.77	0.074	mg/Kg		03/28/24 13:37	03/30/24 02:25	20
Chromium	190		0.96	0.060	mg/Kg		03/28/24 13:37	03/30/24 02:25	20
Lead	6200		48	4.6	mg/Kg		03/28/24 13:37	04/01/24 18:04	2000
Selenium	5.1		1.4	0.27	mg/Kg		03/28/24 13:37	03/30/24 02:25	20
Silver	0.089	J	0.19	0.019	mg/Kg		03/28/24 13:37	03/30/24 02:25	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	61.5		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	38.5		0.1	0.1	%			03/26/24 11:00	1

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Client Sample ID: NAN_DU9_3-6 **Lab Sample ID: 580-137730-20**
Date Collected: 03/09/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 61.5**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.26		0.027	0.0082	mg/Kg	☼	03/25/24 10:09	03/26/24 15:21	1

Client Sample ID: NAN_DU9_6-9 **Lab Sample ID: 580-137730-21**
Date Collected: 03/09/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	24		0.48	0.095	mg/Kg		04/01/24 12:29	04/05/24 04:50	20
Barium	110		0.95	0.22	mg/Kg		04/01/24 12:29	04/05/24 04:50	20
Cadmium	0.59	J	0.76	0.073	mg/Kg		04/01/24 12:29	04/05/24 04:50	20
Chromium	180		0.95	0.060	mg/Kg		04/01/24 12:29	04/05/24 04:50	20
Lead	6000		48	4.6	mg/Kg		04/01/24 12:29	04/05/24 04:52	2000
Selenium	6.7		1.4	0.27	mg/Kg		04/01/24 12:29	04/05/24 04:50	20
Silver	0.095	J	0.19	0.019	mg/Kg		04/01/24 12:29	04/05/24 04:50	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	64.5		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	35.5		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU9_6-9

Date Collected: 03/09/24 12:30
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-21

Matrix: Solid
Percent Solids: 64.5

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.26**		0.026	0.0079	mg/Kg	☼	04/02/24 13:03	04/02/24 16:10	1

Client Sample ID: NAN_DU10_0-3
Date Collected: 03/09/24 14:30
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-22
Matrix: Solid

Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	0.017	U M	0.019	0.0070	mg/Kg		03/20/24 15:22	04/01/24 14:54	1
PCB-1221	0.017	U	0.019	0.011	mg/Kg		03/20/24 15:22	04/01/24 14:54	1
PCB-1232	0.017	U	0.019	0.0046	mg/Kg		03/20/24 15:22	04/01/24 14:54	1
PCB-1242	0.017	U M	0.019	0.0075	mg/Kg		03/20/24 15:22	04/01/24 14:54	1
PCB-1248	0.017	U M	0.019	0.0066	mg/Kg		03/20/24 15:22	04/01/24 14:54	1
PCB-1254	**0.055**	**M**	0.019	0.0085	mg/Kg		03/20/24 15:22	04/01/24 14:54	1
PCB-1260	0.017	U J1 M	0.019	0.0070	mg/Kg		03/20/24 15:22	04/01/24 14:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*89*		*44 - 130*	*03/20/24 15:22*	*04/01/24 14:54*	*1*
DCB Decachlorobiphenyl	*96*	*M*	*40 - 135*	*03/20/24 15:22*	*04/01/24 14:54*	*1*

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**9.6**		0.46	0.092	mg/Kg		04/01/24 12:29	04/04/24 17:39	20
Barium	**120**	**J1**	0.92	0.21	mg/Kg		04/01/24 12:29	04/04/24 17:39	20
Cadmium	**0.35**	**J**	0.74	0.071	mg/Kg		04/01/24 12:29	04/04/24 17:39	20
Chromium	**150**	**J1**	0.92	0.058	mg/Kg		04/01/24 12:29	04/04/24 17:39	20
Lead	**8500**	**J1**	46	4.4	mg/Kg		04/01/24 12:29	04/04/24 18:01	2000
Selenium	**5.8**		1.4	0.26	mg/Kg		04/01/24 12:29	04/04/24 17:39	20
Silver	**0.088**	**J**	0.18	0.018	mg/Kg		04/01/24 12:29	04/04/24 17:39	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	**71.0**		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	**29.0**		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU10_0-3
Date Collected: 03/09/24 14:30
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-22
Matrix: Solid
Percent Solids: 71.0

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.12**		0.023	0.0070	mg/Kg	☼	04/02/24 13:03	04/02/24 16:13	1

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1 2 3 4 5 6 7 8 9 10 11

Client Sample ID: NAN_DU10_3-6
Date Collected: 03/09/24 14:30
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-23
Matrix: Solid

Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	0.017	U	0.019	0.0070	mg/Kg		03/20/24 15:22	04/01/24 15:47	1
PCB-1221	0.017	U	0.019	0.011	mg/Kg		03/20/24 15:22	04/01/24 15:47	1
PCB-1232	0.017	U	0.019	0.0046	mg/Kg		03/20/24 15:22	04/01/24 15:47	1
PCB-1242	0.017	U	0.019	0.0076	mg/Kg		03/20/24 15:22	04/01/24 15:47	1
PCB-1248	0.017	U	0.019	0.0066	mg/Kg		03/20/24 15:22	04/01/24 15:47	1
PCB-1254	**0.037**	**J1 M**	0.019	0.0085	mg/Kg		03/20/24 15:22	04/01/24 15:47	1
PCB-1260	0.017	U M	0.019	0.0070	mg/Kg		03/20/24 15:22	04/01/24 15:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*92*		*44 - 130*	*03/20/24 15:22*	*04/01/24 15:47*	*1*
DCB Decachlorobiphenyl	*98*	*M*	*40 - 135*	*03/20/24 15:22*	*04/01/24 15:47*	*1*

Method: SW846 6010D - Metals (ICP) - SPLP West

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**8.0**		0.030	0.0027	mg/L		05/06/24 15:58	05/01/24 22:56	1

Method: SW846 6010D - TCLP Metals (ICP) - TCLP

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.029	U	0.060	0.0072	mg/L		04/25/24 11:48	04/25/24 20:14	1
Barium	**1.1**		0.020	0.0010	mg/L		04/25/24 11:48	04/25/24 20:14	1
Cadmium	**0.0018**	**J**	0.020	0.00090	mg/L		04/25/24 11:48	04/25/24 20:14	1
Chromium	0.0052	U	0.025	0.0027	mg/L		04/25/24 11:48	04/25/24 20:14	1
Lead	**17**		0.030	0.0027	mg/L		04/25/24 11:48	04/25/24 20:14	1
Selenium	0.035	U	0.10	0.0087	mg/L		04/25/24 11:48	04/25/24 20:14	1
Silver	0.034	U	0.050	0.0085	mg/L		04/25/24 11:48	04/25/24 20:14	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**8.7**		0.47	0.095	mg/Kg		04/01/24 12:29	04/05/24 05:01	20
Barium	**130**		0.95	0.22	mg/Kg		04/01/24 12:29	04/05/24 05:01	20
Cadmium	**0.39**	**J**	0.76	0.073	mg/Kg		04/01/24 12:29	04/05/24 05:01	20
Chromium	**160**		0.95	0.060	mg/Kg		04/01/24 12:29	04/05/24 05:01	20
Lead	**9700**		47	4.5	mg/Kg		04/01/24 12:29	04/05/24 05:04	2000
Selenium	**6.9**		1.4	0.27	mg/Kg		04/01/24 12:29	04/05/24 05:01	20
Silver	**0.10**	**J**	0.19	0.019	mg/Kg		04/01/24 12:29	04/05/24 05:01	20

Method: SW846 7470A - TCLP Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0020	U H	0.0030	0.0015	mg/L		04/25/24 12:11	04/30/24 15:50	1

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	**70.8**		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	**29.2**		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU10_3-6 **Lab Sample ID: 580-137730-23**
Date Collected: 03/09/24 14:30 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 70.8**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.16**		0.024	0.0071	mg/Kg	☼	04/02/24 13:03	04/02/24 15:45	1

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU10_6-9

Date Collected: 03/09/24 14:30
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-24

Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	7.9		0.47	0.094	mg/Kg		04/01/24 12:29	04/04/24 17:52	20
Barium	160		0.94	0.22	mg/Kg		04/01/24 12:29	04/04/24 17:52	20
Cadmium	0.35	J	0.76	0.073	mg/Kg		04/01/24 12:29	04/04/24 17:52	20
Chromium	170		0.94	0.060	mg/Kg		04/01/24 12:29	04/04/24 17:52	20
Lead	8100		47	4.5	mg/Kg		04/01/24 12:29	04/04/24 18:14	2000
Selenium	7.8		1.4	0.27	mg/Kg		04/01/24 12:29	04/04/24 17:52	20
Silver	0.078	J	0.19	0.019	mg/Kg		04/01/24 12:29	04/04/24 17:52	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	68.6		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	31.4		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU10_6-9 **Lab Sample ID: 580-137730-24**
Date Collected: 03/09/24 14:30 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 68.6**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.13**		0.024	0.0072	mg/Kg	☼	04/02/24 13:03	04/02/24 15:54	1

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Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU11_0-3

Date Collected: 03/10/24 12:20
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-25
Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	11		0.47	0.095	mg/Kg		04/01/24 12:29	04/05/24 05:47	20
Barium	110		0.95	0.22	mg/Kg		04/01/24 12:29	04/05/24 05:47	20
Cadmium	0.37	J	0.76	0.073	mg/Kg		04/01/24 12:29	04/05/24 05:47	20
Chromium	130		0.95	0.060	mg/Kg		04/01/24 12:29	04/05/24 05:47	20
Lead	4300		47	4.5	mg/Kg		04/01/24 12:29	04/05/24 05:50	2000
Selenium	4.8		1.4	0.27	mg/Kg		04/01/24 12:29	04/05/24 05:47	20
Silver	0.081	J	0.19	0.019	mg/Kg		04/01/24 12:29	04/05/24 05:47	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	62.7		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	37.3		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc.
Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU11_0-3
Lab Sample ID: 580-137730-25
Date Collected: 03/10/24 12:20
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 62.7

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.10**		0.025	0.0076	mg/Kg	☼	04/02/24 13:03	04/02/24 15:36	1

Client Sample ID: NAN_DU11_3-6

Lab Sample ID: 580-137730-26

Date Collected: 03/10/24 12:20

Matrix: Solid

Date Received: 03/14/24 09:30

Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	0.017	U M	0.019	0.0070	mg/Kg		03/20/24 15:22	04/01/24 16:04	1
PCB-1221	0.017	U	0.019	0.011	mg/Kg		03/20/24 15:22	04/01/24 16:04	1
PCB-1232	0.017	U	0.019	0.0047	mg/Kg		03/20/24 15:22	04/01/24 16:04	1
PCB-1242	0.017	U M	0.019	0.0076	mg/Kg		03/20/24 15:22	04/01/24 16:04	1
PCB-1248	0.017	U M	0.019	0.0067	mg/Kg		03/20/24 15:22	04/01/24 16:04	1
PCB-1254	**0.20**	**M**	0.019	0.0086	mg/Kg		03/20/24 15:22	04/01/24 16:04	1
PCB-1260	0.017	U M	0.019	0.0070	mg/Kg		03/20/24 15:22	04/01/24 16:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*85*		*44 - 130*	*03/20/24 15:22*	*04/01/24 16:04*	*1*
DCB Decachlorobiphenyl	*89*	*M*	*40 - 135*	*03/20/24 15:22*	*04/01/24 16:04*	*1*

Method: SW846 6010D - Metals (ICP) - SPLP West

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**3.5**		0.030	0.0027	mg/L		05/06/24 15:58	05/01/24 22:59	1

Method: SW846 6010D - TCLP Metals (ICP) - TCLP

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.029	U	0.060	0.0072	mg/L		04/25/24 11:48	04/25/24 20:17	1
Barium	**0.92**		0.020	0.0010	mg/L		04/25/24 11:48	04/25/24 20:17	1
Cadmium	**0.0021**	**J**	0.020	0.00090	mg/L		04/25/24 11:48	04/25/24 20:17	1
Chromium	0.0052	U	0.025	0.0027	mg/L		04/25/24 11:48	04/25/24 20:17	1
Lead	**12**		0.030	0.0027	mg/L		04/25/24 11:48	04/25/24 20:17	1
Selenium	0.035	U	0.10	0.0087	mg/L		04/25/24 11:48	04/25/24 20:17	1
Silver	0.034	U	0.050	0.0085	mg/L		04/25/24 11:48	04/25/24 20:17	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**10**		0.48	0.095	mg/Kg		04/01/24 12:29	04/05/24 04:44	20
Barium	**100**		0.95	0.22	mg/Kg		04/01/24 12:29	04/05/24 04:44	20
Cadmium	**0.40**	**J**	0.76	0.073	mg/Kg		04/01/24 12:29	04/05/24 04:44	20
Chromium	**150**		0.95	0.060	mg/Kg		04/01/24 12:29	04/05/24 04:44	20
Lead	**6400**		48	4.6	mg/Kg		04/01/24 12:29	04/05/24 04:47	2000
Selenium	**6.2**		1.4	0.27	mg/Kg		04/01/24 12:29	04/05/24 04:44	20
Silver	**0.086**	**J**	0.19	0.019	mg/Kg		04/01/24 12:29	04/05/24 04:44	20

Method: SW846 7470A - TCLP Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0020	U H	0.0030	0.0015	mg/L		04/25/24 12:11	04/30/24 15:59	1

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	**65.0**		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	**35.0**		0.1	0.1	%			03/26/24 11:00	1

Client Sample ID: NAN_DU11_3-6 **Lab Sample ID: 580-137730-26**
Date Collected: 03/10/24 12:20 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 65.0**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.12		0.027	0.0081	mg/Kg	☼	04/02/24 13:03	04/02/24 15:56	1

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU11_6-9
Date Collected: 03/10/24 12:20
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-27
Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	8.7		0.46	0.092	mg/Kg		04/01/24 12:29	04/05/24 05:41	20
Barium	110		0.92	0.21	mg/Kg		04/01/24 12:29	04/05/24 05:41	20
Cadmium	0.39	J	0.74	0.071	mg/Kg		04/01/24 12:29	04/05/24 05:41	20
Chromium	150		0.92	0.058	mg/Kg		04/01/24 12:29	04/05/24 05:41	20
Lead	6000		46	4.4	mg/Kg		04/01/24 12:29	04/05/24 05:44	2000
Selenium	6.3		1.4	0.26	mg/Kg		04/01/24 12:29	04/05/24 05:41	20
Silver	0.083	J	0.18	0.018	mg/Kg		04/01/24 12:29	04/05/24 05:41	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	66.2		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	33.8		0.1	0.1	%			03/26/24 11:00	1

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU11_6-9 **Lab Sample ID: 580-137730-27**
Date Collected: 03/10/24 12:20 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 66.2**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.16		0.025	0.0075	mg/Kg	☼	04/02/24 13:03	04/02/24 15:59	1

Client Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU12_0-3

Date Collected: 03/10/24 13:10
Date Received: 03/14/24 09:30

Lab Sample ID: 580-137730-28
Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	16		0.46	0.092	mg/Kg		04/01/24 12:29	04/05/24 04:55	20
Barium	79		0.92	0.21	mg/Kg		04/01/24 12:29	04/05/24 04:55	20
Cadmium	0.41	J	0.74	0.071	mg/Kg		04/01/24 12:29	04/05/24 04:55	20
Chromium	130		0.92	0.058	mg/Kg		04/01/24 12:29	04/05/24 04:55	20
Lead	6300		46	4.4	mg/Kg		04/01/24 12:29	04/05/24 04:58	2000
Selenium	2.8		1.4	0.26	mg/Kg		04/01/24 12:29	04/05/24 04:55	20
Silver	0.088	J	0.18	0.018	mg/Kg		04/01/24 12:29	04/05/24 04:55	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	68.0		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	32.0		0.1	0.1	%			03/26/24 11:00	1

Client Sample Results

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU12_0-3 Lab Sample ID: 580-137730-28

Date Collected: 03/10/24 13:10 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 68.0**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.086		0.023	0.0069	mg/Kg	☼	04/02/24 13:03	04/02/24 16:02	1

1 2 3 4 5 6 7 8 9 10 11

Client Sample ID: NAN_DU12_3-6
Lab Sample ID: 580-137730-29
Date Collected: 03/10/24 13:10
Matrix: Solid
Date Received: 03/14/24 09:30

Method: SW846 6010D - Metals (ICP) - SPLP West

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**5.0**		0.030	0.0027	mg/L		05/06/24 15:58	05/01/24 23:03	1

Method: SW846 6010D - TCLP Metals (ICP) - TCLP

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.029	U	0.060	0.0072	mg/L		04/25/24 11:48	04/25/24 20:21	1
Barium	**0.86**		0.020	0.0010	mg/L		04/25/24 11:48	04/25/24 20:21	1
Cadmium	**0.0026**	**J**	0.020	0.00090	mg/L		04/25/24 11:48	04/25/24 20:21	1
Chromium	0.0052	U	0.025	0.0027	mg/L		04/25/24 11:48	04/25/24 20:21	1
Lead	**23**		0.030	0.0027	mg/L		04/25/24 11:48	04/25/24 20:21	1
Selenium	0.035	U	0.10	0.0087	mg/L		04/25/24 11:48	04/25/24 20:21	1
Silver	0.034	U	0.050	0.0085	mg/L		04/25/24 11:48	04/25/24 20:21	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**11**		0.46	0.092	mg/Kg		04/01/24 12:29	04/05/24 05:35	20
Barium	**50**		0.92	0.21	mg/Kg		04/01/24 12:29	04/05/24 05:35	20
Cadmium	**0.29**	**J**	0.74	0.071	mg/Kg		04/01/24 12:29	04/05/24 05:35	20
Chromium	**87**		0.92	0.058	mg/Kg		04/01/24 12:29	04/05/24 05:35	20
Lead	**7900**		46	4.4	mg/Kg		04/01/24 12:29	04/05/24 05:38	2000
Selenium	**3.4**		1.4	0.26	mg/Kg		04/01/24 12:29	04/05/24 05:35	20
Silver	**0.086**	**J**	0.18	0.018	mg/Kg		04/01/24 12:29	04/05/24 05:35	20

Method: SW846 7470A - TCLP Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0020	U H	0.0030	0.0015	mg/L		04/25/24 12:11	04/30/24 16:02	1

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	**75.6**		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	**24.4**		0.1	0.1	%			03/26/24 11:00	1

Client Sample ID: NAN_DU12_3-6 **Lab Sample ID: 580-137730-29**
Date Collected: 03/10/24 13:10 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 75.6**

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.12		0.022	0.0065	mg/Kg	☼	04/02/24 13:03	04/02/24 16:05	1

Client Sample ID: NAN_DU12_6-9 **Lab Sample ID: 580-137730-30**
Date Collected: 03/10/24 13:10 **Matrix: Solid**
Date Received: 03/14/24 09:30

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	10		0.47	0.094	mg/Kg		04/01/24 12:29	04/05/24 05:52	20
Barium	69		0.94	0.21	mg/Kg		04/01/24 12:29	04/05/24 05:52	20
Cadmium	0.30	J	0.75	0.073	mg/Kg		04/01/24 12:29	04/05/24 05:52	20
Chromium	90		0.94	0.059	mg/Kg		04/01/24 12:29	04/05/24 05:52	20
Lead	6500		47	4.5	mg/Kg		04/01/24 12:29	04/05/24 05:55	2000
Selenium	3.6		1.4	0.27	mg/Kg		04/01/24 12:29	04/05/24 05:52	20
Silver	0.068	J	0.19	0.019	mg/Kg		04/01/24 12:29	04/05/24 05:52	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (SM22 2540G)	72.9		0.1	0.1	%			03/26/24 11:00	1
Percent Moisture (SM22 2540G)	27.1		0.1	0.1	%			03/26/24 11:00	1

Client Sample ID: NAN_DU12_6-9

Lab Sample ID: 580-137730-30

Date Collected: 03/10/24 13:10
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 72.9

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.12		0.023	0.0069	mg/Kg	☼	04/02/24 13:03	04/02/24 16:08	1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 580-454340/1-A
Matrix: Solid
Analysis Batch: 455366

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 454340

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	0.018	U	0.020	0.0074	mg/Kg		03/20/24 15:22	04/01/24 14:01	1
PCB-1221	0.018	U	0.020	0.012	mg/Kg		03/20/24 15:22	04/01/24 14:01	1
PCB-1232	0.018	U	0.020	0.0049	mg/Kg		03/20/24 15:22	04/01/24 14:01	1
PCB-1242	0.018	U	0.020	0.0080	mg/Kg		03/20/24 15:22	04/01/24 14:01	1
PCB-1248	0.018	U	0.020	0.0070	mg/Kg		03/20/24 15:22	04/01/24 14:01	1
PCB-1254	0.018	U	0.020	0.0090	mg/Kg		03/20/24 15:22	04/01/24 14:01	1
PCB-1260	0.018	U	0.020	0.0074	mg/Kg		03/20/24 15:22	04/01/24 14:01	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*95*		*44 - 130*	*03/20/24 15:22*	*04/01/24 14:01*	*1*
DCB Decachlorobiphenyl	*85*	*M*	*40 - 135*	*03/20/24 15:22*	*04/01/24 14:01*	*1*

Lab Sample ID: LCS 580-454340/2-A
Matrix: Solid
Analysis Batch: 455366

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 454340

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
PCB-1016	0.100	0.102	M	mg/Kg		102	47 - 134
PCB-1260	0.100	0.0955	M	mg/Kg		96	53 - 140

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*91*	*M*	*44 - 130*
DCB Decachlorobiphenyl	*102*	*M*	*40 - 135*

Lab Sample ID: LCSD 580-454340/3-A
Matrix: Solid
Analysis Batch: 455366

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 454340

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
PCB-1016	0.100	0.101	M	mg/Kg		101	47 - 134	7	30
PCB-1260	0.100	0.105	M	mg/Kg		105	53 - 140	10	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Tetrachloro-m-xylene	*99*		*44 - 130*
DCB Decachlorobiphenyl	*112*		*40 - 135*

Lab Sample ID: 580-137730-22 MS
Matrix: Solid
Analysis Batch: 455366

Client Sample ID: NAN_DU10_0-3
Prep Type: Total/NA
Prep Batch: 454340

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
PCB-1016	0.017	U M	0.0934	0.0948	M	mg/Kg		102	47 - 134
PCB-1260	0.017	U J1 M	0.0934	0.171	J1 M	mg/Kg		183	53 - 140

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Tetrachloro-m-xylene	*94*		*44 - 130*
DCB Decachlorobiphenyl	*101*	*M*	*40 - 135*

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

1 2 3 4 5 6 7 8 9 10 11

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 580-137730-22 MSD | **Client Sample ID: NAN_DU10_0-3**
Matrix: Solid | **Prep Type: Total/NA**
Analysis Batch: 455366 | **Prep Batch: 454340**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
PCB-1016	0.017	U M	0.0943	0.0908	M	mg/Kg		96	47 - 134	4	30
PCB-1260	0.017	U J1 M	0.0943	0.162	J1 M	mg/Kg		172	53 - 140	5	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Tetrachloro-m-xylene	*88*		*44 - 130*
DCB Decachlorobiphenyl	*94*	*M*	*40 - 135*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 580-458590/7-B | **Client Sample ID: Method Blank**
Matrix: Solid | **Prep Type: Total/NA**
Analysis Batch: 458233 | **Prep Batch: 458592**

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.011	U	0.030	0.0027	mg/L		05/06/24 15:58	05/01/24 22:12	1

Lab Sample ID: LCS 580-458590/8-B | **Client Sample ID: Lab Control Sample**
Matrix: Solid | **Prep Type: Total/NA**
Analysis Batch: 458233 | **Prep Batch: 458592**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Lead	1.00	1.00		mg/L		100	86 - 113

Lab Sample ID: LCSD 580-458590/9-B | **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid | **Prep Type: Total/NA**
Analysis Batch: 458233 | **Prep Batch: 458592**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Lead	1.00	0.998		mg/L		100	86 - 113	1	20

Lab Sample ID: 580-137730-1 MS | **Client Sample ID: NAN_DU8_0-3**
Matrix: Solid | **Prep Type: SPLP West**
Analysis Batch: 458233 | **Prep Batch: 458592**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Lead	0.59		1.00	1.65		mg/L		106	86 - 113

Lab Sample ID: 580-137730-1 MSD | **Client Sample ID: NAN_DU8_0-3**
Matrix: Solid | **Prep Type: SPLP West**
Analysis Batch: 458233 | **Prep Batch: 458592**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Lead	0.59		1.00	1.63		mg/L		104	86 - 113	1	20

Lab Sample ID: 580-137730-1 DU | **Client Sample ID: NAN_DU8_0-3**
Matrix: Solid | **Prep Type: SPLP West**
Analysis Batch: 458233 | **Prep Batch: 458592**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Lead	0.59		0.613		mg/L		4	20

Method: 6010D - TCLP Metals (ICP)

Lab Sample ID: MB 580-457398/15-B **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 457695 **Prep Batch: 457588**

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.029	U	0.060	0.0072	mg/L		04/25/24 11:48	04/25/24 18:49	1
Barium	0.00690	J	0.020	0.0010	mg/L		04/25/24 11:48	04/25/24 18:49	1
Cadmium	0.0016	U	0.020	0.00090	mg/L		04/25/24 11:48	04/25/24 18:49	1
Chromium	0.0052	U	0.025	0.0027	mg/L		04/25/24 11:48	04/25/24 18:49	1
Lead	0.011	U	0.030	0.0027	mg/L		04/25/24 11:48	04/25/24 18:49	1
Selenium	0.035	U	0.10	0.0087	mg/L		04/25/24 11:48	04/25/24 18:49	1
Silver	0.034	U	0.050	0.0085	mg/L		04/25/24 11:48	04/25/24 18:49	1

Lab Sample ID: MB 580-457398/16-B **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 457695 **Prep Batch: 457588**

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.029	U	0.060	0.0072	mg/L		04/25/24 11:48	04/25/24 18:52	1
Barium	0.00850	J	0.020	0.0010	mg/L		04/25/24 11:48	04/25/24 18:52	1
Cadmium	0.0016	U	0.020	0.00090	mg/L		04/25/24 11:48	04/25/24 18:52	1
Chromium	0.0052	U	0.025	0.0027	mg/L		04/25/24 11:48	04/25/24 18:52	1
Lead	0.011	U	0.030	0.0027	mg/L		04/25/24 11:48	04/25/24 18:52	1
Selenium	0.035	U	0.10	0.0087	mg/L		04/25/24 11:48	04/25/24 18:52	1
Silver	0.034	U	0.050	0.0085	mg/L		04/25/24 11:48	04/25/24 18:52	1

Lab Sample ID: LCS 580-457398/17-B **Client Sample ID: Lab Control Sample**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 457695 **Prep Batch: 457588**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1.00	1.06		mg/L		106	87 - 113
Barium	1.00	1.01		mg/L		101	88 - 113
Cadmium	1.00	1.07		mg/L		107	88 - 113
Chromium	1.00	1.05		mg/L		105	90 - 113
Lead	1.00	1.03		mg/L		103	86 - 113
Selenium	1.00	1.11		mg/L		111	83 - 114
Silver	1.00	1.00		mg/L		100	84 - 115

Lab Sample ID: LCSD 580-457398/18-B **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 457695 **Prep Batch: 457588**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	1.00	1.04		mg/L		104	87 - 113	2	20
Barium	1.00	0.999		mg/L		100	88 - 113	1	20
Cadmium	1.00	1.05		mg/L		105	88 - 113	1	20
Chromium	1.00	1.03		mg/L		103	90 - 113	2	20
Lead	1.00	1.02		mg/L		102	86 - 113	2	20
Selenium	1.00	1.09		mg/L		109	83 - 114	2	20
Silver	1.00	1.00		mg/L		100	84 - 115	0	20

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 580-455023/23-A
Matrix: Solid
Analysis Batch: 455179

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 455023

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.40	U	0.50	0.10	mg/Kg		03/28/24 09:38	03/29/24 05:58	20
Barium	0.40	U	1.0	0.23	mg/Kg		03/28/24 09:38	03/29/24 05:58	20
Cadmium	0.20	U	0.80	0.077	mg/Kg		03/28/24 09:38	03/29/24 05:58	20
Chromium	0.25	U	1.0	0.063	mg/Kg		03/28/24 09:38	03/29/24 05:58	20
Lead	0.19	U	0.50	0.048	mg/Kg		03/28/24 09:38	03/29/24 05:58	20
Selenium	1.0	U	1.5	0.29	mg/Kg		03/28/24 09:38	03/29/24 05:58	20
Silver	0.050	U	0.20	0.020	mg/Kg		03/28/24 09:38	03/29/24 05:58	20

Lab Sample ID: LCS 580-455023/24-A
Matrix: Solid
Analysis Batch: 455179

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 455023

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	25.0	24.3		mg/Kg		97	82 - 118
Barium	25.0	26.5		mg/Kg		106	86 - 116
Cadmium	25.0	24.7		mg/Kg		99	84 - 116
Chromium	25.0	22.1		mg/Kg		89	83 - 119
Lead	25.0	22.1		mg/Kg		88	84 - 118
Selenium	25.0	24.3		mg/Kg		97	80 - 119
Silver	25.0	24.6		mg/Kg		98	83 - 118

Lab Sample ID: LCSD 580-455023/25-A
Matrix: Solid
Analysis Batch: 455179

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 455023

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	25.0	24.4		mg/Kg		97	82 - 118	0	20
Barium	25.0	26.9		mg/Kg		108	86 - 116	1	20
Cadmium	25.0	25.2		mg/Kg		101	84 - 116	2	20
Chromium	25.0	22.3		mg/Kg		89	83 - 119	1	20
Lead	25.0	22.3		mg/Kg		89	84 - 118	1	20
Selenium	25.0	25.2		mg/Kg		101	80 - 119	3	20
Silver	25.0	25.1		mg/Kg		101	83 - 118	2	20

Lab Sample ID: MB 580-455073/23-A
Matrix: Solid
Analysis Batch: 455285

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 455073

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.40	U	0.50	0.10	mg/Kg		03/28/24 13:37	03/30/24 00:43	20
Barium	0.40	U	1.0	0.23	mg/Kg		03/28/24 13:37	03/30/24 00:43	20
Cadmium	0.20	U	0.80	0.077	mg/Kg		03/28/24 13:37	03/30/24 00:43	20
Chromium	0.25	U	1.0	0.063	mg/Kg		03/28/24 13:37	03/30/24 00:43	20
Lead	0.19	U	0.50	0.048	mg/Kg		03/28/24 13:37	03/30/24 00:43	20
Selenium	1.0	U	1.5	0.29	mg/Kg		03/28/24 13:37	03/30/24 00:43	20
Silver	0.050	U	0.20	0.020	mg/Kg		03/28/24 13:37	03/30/24 00:43	20

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 580-455073/24-A **Client Sample ID: Lab Control Sample**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 455285 **Prep Batch: 455073**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	25.0	24.2		mg/Kg		97	82 - 118
Barium	25.0	24.2		mg/Kg		97	86 - 116
Cadmium	25.0	24.4		mg/Kg		98	84 - 116
Chromium	25.0	24.9		mg/Kg		100	83 - 119
Lead	25.0	22.8		mg/Kg		91	84 - 118
Selenium	25.0	26.6		mg/Kg		106	80 - 119
Silver	25.0	25.0		mg/Kg		100	83 - 118

Lab Sample ID: LCSD 580-455073/25-A **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 455285 **Prep Batch: 455073**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	25.0	23.9		mg/Kg		96	82 - 118	1	20
Barium	25.0	23.9		mg/Kg		96	86 - 116	1	20
Cadmium	25.0	24.0		mg/Kg		96	84 - 116	2	20
Chromium	25.0	24.1		mg/Kg		96	83 - 119	3	20
Lead	25.0	22.6		mg/Kg		91	84 - 118	1	20
Selenium	25.0	26.0		mg/Kg		104	80 - 119	2	20
Silver	25.0	24.7		mg/Kg		99	83 - 118	2	20

Lab Sample ID: MB 580-455329/13-A **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 455760 **Prep Batch: 455329**

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.40	U	0.50	0.10	mg/Kg		04/01/24 12:29	04/04/24 17:08	20
Barium	0.40	U	1.0	0.23	mg/Kg		04/01/24 12:29	04/04/24 17:08	20
Cadmium	0.20	U	0.80	0.077	mg/Kg		04/01/24 12:29	04/04/24 17:08	20
Chromium	0.25	U	1.0	0.063	mg/Kg		04/01/24 12:29	04/04/24 17:08	20
Lead	0.19	U	0.50	0.048	mg/Kg		04/01/24 12:29	04/04/24 17:08	20
Selenium	1.0	U	1.5	0.29	mg/Kg		04/01/24 12:29	04/04/24 17:08	20
Silver	0.050	U	0.20	0.020	mg/Kg		04/01/24 12:29	04/04/24 17:08	20

Lab Sample ID: MB 580-455329/18-A **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 455760 **Prep Batch: 455329**

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.40	U	0.50	0.10	mg/Kg		04/01/24 12:51	04/04/24 17:11	20
Barium	0.40	U	1.0	0.23	mg/Kg		04/01/24 12:51	04/04/24 17:11	20
Cadmium	0.20	U	0.80	0.077	mg/Kg		04/01/24 12:51	04/04/24 17:11	20
Chromium	0.25	U	1.0	0.063	mg/Kg		04/01/24 12:51	04/04/24 17:11	20
Lead	0.19	U	0.50	0.048	mg/Kg		04/01/24 12:51	04/04/24 17:11	20
Selenium	1.0	U	1.5	0.29	mg/Kg		04/01/24 12:51	04/04/24 17:11	20
Silver	0.050	U	0.20	0.020	mg/Kg		04/01/24 12:51	04/04/24 17:11	20

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 580-455329/19-A **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 455760 **Prep Batch: 455329**

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.40	U	0.50	0.10	mg/Kg		04/01/24 12:51	04/04/24 17:14	20
Barium	0.40	U	1.0	0.23	mg/Kg		04/01/24 12:51	04/04/24 17:14	20
Cadmium	0.20	U	0.80	0.077	mg/Kg		04/01/24 12:51	04/04/24 17:14	20
Chromium	0.25	U	1.0	0.063	mg/Kg		04/01/24 12:51	04/04/24 17:14	20
Lead	0.19	U	0.50	0.048	mg/Kg		04/01/24 12:51	04/04/24 17:14	20
Selenium	1.0	U	1.5	0.29	mg/Kg		04/01/24 12:51	04/04/24 17:14	20
Silver	0.050	U	0.20	0.020	mg/Kg		04/01/24 12:51	04/04/24 17:14	20

Lab Sample ID: LCS 580-455329/16-A **Client Sample ID: Lab Control Sample**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 455760 **Prep Batch: 455329**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	25.0	24.9		mg/Kg		100	82 - 118
Barium	25.0	23.9		mg/Kg		96	86 - 116
Cadmium	25.0	23.9		mg/Kg		95	84 - 116
Chromium	25.0	24.4		mg/Kg		98	83 - 119
Lead	25.0	24.2		mg/Kg		97	84 - 118
Selenium	25.0	25.6		mg/Kg		102	80 - 119
Silver	25.0	24.4		mg/Kg		98	83 - 118

Lab Sample ID: LCSD 580-455329/17-A **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 455760 **Prep Batch: 455329**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	25.0	24.8		mg/Kg		99	82 - 118	0	20
Barium	25.0	24.7		mg/Kg		99	86 - 116	3	20
Cadmium	25.0	24.8		mg/Kg		99	84 - 116	4	20
Chromium	25.0	24.7		mg/Kg		99	83 - 119	1	20
Lead	25.0	24.2		mg/Kg		97	84 - 118	0	20
Selenium	25.0	25.3		mg/Kg		101	80 - 119	1	20
Silver	25.0	24.9		mg/Kg		100	83 - 118	2	20

Lab Sample ID: 580-137730-22 MS **Client Sample ID: NAN_DU10_0-3**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 455760 **Prep Batch: 455329**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	9.6		23.5	30.0		mg/Kg		87	82 - 118
Barium	120	J1	23.5	145	4	mg/Kg		117	86 - 116
Cadmium	0.35	J	23.5	23.1		mg/Kg		97	84 - 116
Chromium	150	J1	23.5	178	4	mg/Kg		121	83 - 119
Selenium	5.8		23.5	24.6		mg/Kg		80	80 - 119
Silver	0.088	J	23.5	22.5		mg/Kg		95	83 - 118

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 580-137730-22 MS **Client Sample ID: NAN_DU10_0-3**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 455760 **Prep Batch: 455329**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Lead	8500	J1	23.5	8620	4	mg/Kg		701	84 - 118		

Lab Sample ID: 580-137730-22 MSD **Client Sample ID: NAN_DU10_0-3**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 455760 **Prep Batch: 455329**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	9.6		23.5	30.7		mg/Kg		90	82 - 118	2	20
Barium	120	J1	23.5	150	4	mg/Kg		140	86 - 116	4	20
Cadmium	0.35	J	23.5	22.6		mg/Kg		94	84 - 116	2	20
Chromium	150	J1	23.5	180	4	mg/Kg		127	83 - 119	1	20
Selenium	5.8		23.5	26.3		mg/Kg		87	80 - 119	7	20
Silver	0.088	J	23.5	22.6		mg/Kg		96	83 - 118	1	20

Lab Sample ID: 580-137730-22 MSD **Client Sample ID: NAN_DU10_0-3**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 455760 **Prep Batch: 455329**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Lead	8500	J1	23.5	8090	4	mg/Kg		-1541	84 - 118	6	20

Method: 7470A - TCLP Mercury (CVAA)

Lab Sample ID: MB 580-457398/15-C **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 458032 **Prep Batch: 457590**

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0020	U	0.0030	0.0015	mg/L		04/25/24 12:11	04/30/24 15:04	1

Lab Sample ID: MB 580-457398/16-C **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 458032 **Prep Batch: 457590**

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0020	U	0.0030	0.0015	mg/L		04/25/24 12:11	04/30/24 15:07	1

Lab Sample ID: LCS 580-457398/17-C **Client Sample ID: Lab Control Sample**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 458032 **Prep Batch: 457590**

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Mercury			0.0200	0.0214		mg/L		107	82 - 119		

Lab Sample ID: LCSD 580-457398/18-C **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 458032 **Prep Batch: 457590**

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury			0.0200	0.0223		mg/L		111	82 - 119	4	20

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 580-454663/23-A
Matrix: Solid
Analysis Batch: 454854
Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 454663

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.010	U	0.018	0.0054	mg/Kg		03/25/24 10:09	03/26/24 14:14	1

Lab Sample ID: LCS 580-454663/24-A
Matrix: Solid
Analysis Batch: 454854
Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 454663

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Mercury			0.100	0.119		mg/Kg		119	80 - 124		

Lab Sample ID: LCSD 580-454663/25-A
Matrix: Solid
Analysis Batch: 454854
Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 454663

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury			0.100	0.112		mg/Kg		112	80 - 124	6	20

Lab Sample ID: 580-137730-1 MS
Matrix: Solid
Analysis Batch: 454854
Client Sample ID: NAN_DU8_0-3
Prep Type: Total/NA
Prep Batch: 454663

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Mercury	0.31		0.127	0.431		mg/Kg	☼	97	80 - 124		

Lab Sample ID: 580-137730-1 MSD
Matrix: Solid
Analysis Batch: 454854
Client Sample ID: NAN_DU8_0-3
Prep Type: Total/NA
Prep Batch: 454663

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	0.31		0.128	0.418		mg/Kg	☼	85	80 - 124	3	20

Lab Sample ID: MB 580-455462/13-A
Matrix: Solid
Analysis Batch: 455504
Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 455462

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.010	U	0.018	0.0054	mg/Kg		04/02/24 13:03	04/02/24 15:27	1

Lab Sample ID: LCS 580-455462/14-A
Matrix: Solid
Analysis Batch: 455504
Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 455462

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Mercury			0.100	0.116		mg/Kg		116	80 - 124		

Lab Sample ID: LCSD 580-455462/15-A
Matrix: Solid
Analysis Batch: 455504
Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 455462

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury			0.100	0.111		mg/Kg		111	80 - 124	5	20

QC Sample Results

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Method: 7471A - Mercury (CVAA)

Lab Sample ID: 580-137730-25 MS
Matrix: Solid
Analysis Batch: 455504

Client Sample ID: NAN_DU11_0-3
Prep Type: Total/NA
Prep Batch: 455462

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.10		0.140	0.257		mg/Kg	☼	109	80 - 124

Lab Sample ID: 580-137730-25 MSD
Matrix: Solid
Analysis Batch: 455504

Client Sample ID: NAN_DU11_0-3
Prep Type: Total/NA
Prep Batch: 455462

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	0.10		0.143	0.249		mg/Kg	☼	101	80 - 124	3	20

Method: 2540G - SM 2540G

Lab Sample ID: 580-137730-1 DU
Matrix: Solid
Analysis Batch: 454764

Client Sample ID: NAN_DU8_0-3
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Solids	71.8		76.4		%		6	20
Percent Moisture	28.2		23.6		%		18	20

1 2 3 4 5 6 7 8 9 10 11

Client Sample ID: NAN_DU8_0-3

Lab Sample ID: 580-137730-1

Date Collected: 03/03/24 10:00

Matrix: Solid

Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
SPLP West	Analysis	6010D		1	458233	JLS	EET SEA	05/01/24 22:22
SPLP West	ISM Prep	Increment, prep			458588	JLS	EET SEA	05/06/24 15:49
SPLP West	Leach	1312			458590	JLS	EET SEA	05/06/24 15:52 - 05/06/24 15:53 [1]
SPLP West	Prep	3010A			458592	JLS	EET SEA	05/06/24 15:58
TCLP	ISM Prep	Increment, prep			457395	JL	EET SEA	04/23/24 17:04
TCLP	Leach	1311			457398	JL	EET SEA	04/23/24 17:24 - 04/25/24 11:45 [1]
TCLP	Prep	3010A			457588	JL	EET SEA	04/25/24 11:48
TCLP	Analysis	6010D		1	457695	JLS	EET SEA	04/25/24 19:56
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 06:51
TCLP	ISM Prep	Increment, prep			457395	JL	EET SEA	04/23/24 17:04
TCLP	Leach	1311			457398	JL	EET SEA	04/23/24 17:24 - 04/25/24 11:45 [1]
TCLP	Prep	7470A			457590	JL	EET SEA	04/25/24 12:11
TCLP	Analysis	7470A		1	458032	JL	EET SEA	04/30/24 15:37
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU8_0-3

Lab Sample ID: 580-137730-1

Date Collected: 03/03/24 10:00

Matrix: Solid

Date Received: 03/14/24 09:30

Percent Solids: 71.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:21

Client Sample ID: NAN_DU8_3-6

Lab Sample ID: 580-137730-2

Date Collected: 03/03/24 10:00

Matrix: Solid

Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 06:57
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU8_3-6

Lab Sample ID: 580-137730-2

Date Collected: 03/03/24 10:00

Matrix: Solid

Date Received: 03/14/24 09:30

Percent Solids: 70.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:28

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU8_6-9 **Lab Sample ID: 580-137730-3**
Date Collected: 03/03/24 10:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 06:54
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU8_6-9 **Lab Sample ID: 580-137730-3**
Date Collected: 03/03/24 10:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 69.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:31

Client Sample ID: NAN_DU1_0-3_A **Lab Sample ID: 580-137730-4**
Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 06:49
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU1_0-3_A **Lab Sample ID: 580-137730-4**
Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 82.3**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:33

Client Sample ID: NAN_DU1_3-6_A **Lab Sample ID: 580-137730-5**
Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 06:23
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Lab Chronicle

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU1_3-6_A Lab Sample ID: 580-137730-5

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 78.6**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:36

Client Sample ID: NAN_DU1_6-9_A Lab Sample ID: 580-137730-6

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 07:37
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU1_6-9_A Lab Sample ID: 580-137730-6

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 75.2**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:43

Client Sample ID: NAN_DU1_0-3_B Lab Sample ID: 580-137730-7

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
SPLP West	Analysis	6010D		1	458233	JLS	EET SEA	05/01/24 22:49
SPLP West	ISM Prep	Increment, prep			458588	JLS	EET SEA	05/06/24 15:49
SPLP West	Leach	1312			458590	JLS	EET SEA	05/06/24 15:52 - 05/06/24 15:53 [1]
SPLP West	Prep	3010A			458592	JLS	EET SEA	05/06/24 15:58
TCLP	Leach	1311			457398	JL	EET SEA	04/23/24 17:24 - 04/25/24 11:45 [1]
TCLP	ISM Prep	Increment, prep			457484	AUA	EET SEA	04/24/24 11:30
TCLP	Prep	3010A			457588	JL	EET SEA	04/25/24 11:48
TCLP	Analysis	6010D		1	457695	JLS	EET SEA	04/25/24 20:00
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 07:40
TCLP	Leach	1311			457398	JL	EET SEA	04/23/24 17:24 - 04/25/24 11:45 [1]
TCLP	ISM Prep	Increment, prep			457484	AUA	EET SEA	04/24/24 11:30
TCLP	Prep	7470A			457590	JL	EET SEA	04/25/24 12:11
TCLP	Analysis	7470A		1	458032	JL	EET SEA	04/30/24 15:39
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Eurofins Seattle

Lab Chronicle

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU1_0-3_B

Lab Sample ID: 580-137730-7

Date Collected: 03/05/24 16:00
Date Received: 03/14/24 09:30

Matrix: Solid
Percent Solids: 83.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:45

Client Sample ID: NAN_DU1_3-6_B

Lab Sample ID: 580-137730-8

Date Collected: 03/05/24 16:00
Date Received: 03/14/24 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 07:42
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU1_3-6_B

Lab Sample ID: 580-137730-8

Date Collected: 03/05/24 16:00
Date Received: 03/14/24 09:30

Matrix: Solid
Percent Solids: 77.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:48

Client Sample ID: NAN_DU1_6-9_B

Lab Sample ID: 580-137730-9

Date Collected: 03/05/24 16:00
Date Received: 03/14/24 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 07:45
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU1_6-9_B

Lab Sample ID: 580-137730-9

Date Collected: 03/05/24 16:00
Date Received: 03/14/24 09:30

Matrix: Solid
Percent Solids: 75.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:50

Client Sample ID: NAN_DU1_0-3_C Lab Sample ID: 580-137730-10

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 07:48
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU1_0-3_C Lab Sample ID: 580-137730-10

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 80.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:52

Client Sample ID: NAN_DU1_3-6_C Lab Sample ID: 580-137730-11

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455023	AUA	EET SEA	03/28/24 09:38
Total/NA	Analysis	6020B		20	455179	FCW	EET SEA	03/29/24 07:08
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU1_3-6_C Lab Sample ID: 580-137730-11

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 77.6**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:55

Client Sample ID: NAN_DU1_6-9_C Lab Sample ID: 580-137730-12

Date Collected: 03/05/24 16:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 01:09
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

1 2 3 4 5 6 7 8 9 10 11

Client Sample ID: NAN_DU1_6-9_C **Lab Sample ID: 580-137730-12**

Date Collected: 03/05/24 16:00 **Matrix: Solid**

Date Received: 03/14/24 09:30 **Percent Solids: 73.7**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:57

Client Sample ID: NAN_DU3_0-3 **Lab Sample ID: 580-137730-13**

Date Collected: 03/06/24 12:30 **Matrix: Solid**

Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 00:46
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU3_0-3 **Lab Sample ID: 580-137730-13**

Date Collected: 03/06/24 12:30 **Matrix: Solid**

Date Received: 03/14/24 09:30 **Percent Solids: 69.3**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 14:59

Client Sample ID: NAN_DU3_3-6 **Lab Sample ID: 580-137730-14**

Date Collected: 03/06/24 12:30 **Matrix: Solid**

Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 02:33
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU3_3-6 **Lab Sample ID: 580-137730-14**

Date Collected: 03/06/24 12:30 **Matrix: Solid**

Date Received: 03/14/24 09:30 **Percent Solids: 70.7**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 15:02

1 2 3 4 5 6 7 8 9 10 11

Client Sample ID: NAN_DU3_6-9 Lab Sample ID: 580-137730-15
Date Collected: 03/06/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
SPLP West	Analysis	6010D		1	458233	JLS	EET SEA	05/01/24 22:53
SPLP West	ISM Prep	Increment, prep			458588	JLS	EET SEA	05/06/24 15:49
SPLP West	Leach	1312			458590	JLS	EET SEA	05/06/24 15:52 - 05/06/24 15:53 [1]
SPLP West	Prep	3010A			458592	JLS	EET SEA	05/06/24 15:58
TCLP	ISM Prep	Increment, prep			457395	JL	EET SEA	04/23/24 17:04
TCLP	Leach	1311			457398	JL	EET SEA	04/23/24 17:24 - 04/25/24 11:45 [1]
TCLP	Prep	3010A			457588	JL	EET SEA	04/25/24 11:48
TCLP	Analysis	6010D		1	457695	JLS	EET SEA	04/25/24 20:03
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 02:30
TCLP	ISM Prep	Increment, prep			457395	JL	EET SEA	04/23/24 17:04
TCLP	Leach	1311			457398	JL	EET SEA	04/23/24 17:24 - 04/25/24 11:45 [1]
TCLP	Prep	7470A			457590	JL	EET SEA	04/25/24 12:11
TCLP	Analysis	7470A		1	458032	JL	EET SEA	04/30/24 15:42
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU3_6-9 Lab Sample ID: 580-137730-15
Date Collected: 03/06/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 72.9**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 15:04

Client Sample ID: NAN_DU2_0-3 Lab Sample ID: 580-137730-16
Date Collected: 03/06/24 15:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 01:34
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU2_0-3 Lab Sample ID: 580-137730-16
Date Collected: 03/06/24 15:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 75.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 15:11

Client Sample ID: NAN_DU2_3-6 Lab Sample ID: 580-137730-17

Date Collected: 03/06/24 15:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 01:48
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU2_3-6 Lab Sample ID: 580-137730-17

Date Collected: 03/06/24 15:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 77.2**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 15:14

Client Sample ID: NAN_DU2_6-9 Lab Sample ID: 580-137730-18

Date Collected: 03/06/24 15:00 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	ISM Prep	Increment, prep			457395	JL	EET SEA	04/23/24 17:04
TCLP	Leach	1311			457398	JL	EET SEA	04/23/24 17:24 - 04/25/24 11:45 [1]
TCLP	Prep	3010A			457588	JL	EET SEA	04/25/24 11:48
TCLP	Analysis	6010D		1	457695	JLS	EET SEA	04/25/24 20:07
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 02:22
TCLP	ISM Prep	Increment, prep			457395	JL	EET SEA	04/23/24 17:04
TCLP	Leach	1311			457398	JL	EET SEA	04/23/24 17:24 - 04/25/24 11:45 [1]
TCLP	Prep	7470A			457590	JL	EET SEA	04/25/24 12:11
TCLP	Analysis	7470A		1	458032	JL	EET SEA	04/30/24 15:45
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU2_6-9 Lab Sample ID: 580-137730-18

Date Collected: 03/06/24 15:00 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 77.3**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:07
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 15:16

Lab Chronicle

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU9_0-3

Lab Sample ID: 580-137730-19

Date Collected: 03/09/24 12:30
Date Received: 03/14/24 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	ISM Prep	Increment, prep			457395	JL	EET SEA	04/23/24 17:04
TCLP	Leach	1311			457398	JL	EET SEA	04/23/24 17:24 - 04/25/24 11:45 [1]
TCLP	Prep	3010A			457588	JL	EET SEA	04/25/24 11:48
TCLP	Analysis	6010D		1	457695	JLS	EET SEA	04/25/24 20:10
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 02:28
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		2000	455425	FCW	EET SEA	04/01/24 18:07
TCLP	ISM Prep	Increment, prep			457395	JL	EET SEA	04/23/24 17:04
TCLP	Leach	1311			457398	JL	EET SEA	04/23/24 17:24 - 04/25/24 11:45 [1]
TCLP	Prep	7470A			457590	JL	EET SEA	04/25/24 12:11
TCLP	Analysis	7470A		1	458032	JL	EET SEA	04/30/24 15:47
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU9_0-3

Lab Sample ID: 580-137730-19

Date Collected: 03/09/24 12:30
Date Received: 03/14/24 09:30

Matrix: Solid
Percent Solids: 70.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:09
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 15:19

Client Sample ID: NAN_DU9_3-6

Lab Sample ID: 580-137730-20

Date Collected: 03/09/24 12:30
Date Received: 03/14/24 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		20	455285	FCW	EET SEA	03/30/24 02:25
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455073	CSS	EET SEA	03/28/24 13:37
Total/NA	Analysis	6020B		2000	455425	FCW	EET SEA	04/01/24 18:04
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU9_3-6 **Lab Sample ID: 580-137730-20**
Date Collected: 03/09/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 61.5**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			454663	JL	EET SEA	03/25/24 10:09
Total/NA	Analysis	7471A		1	454854	JL	EET SEA	03/26/24 15:21

Client Sample ID: NAN_DU9_6-9 **Lab Sample ID: 580-137730-21**
Date Collected: 03/09/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/05/24 04:50
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/05/24 04:52
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU9_6-9 **Lab Sample ID: 580-137730-21**
Date Collected: 03/09/24 12:30 **Matrix: Solid**
Date Received: 03/14/24 09:30 **Percent Solids: 64.5**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 16:10

Client Sample ID: NAN_DU10_0-3 **Lab Sample ID: 580-137730-22**
Date Collected: 03/09/24 14:30 **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3546			454340	E1W	EET SEA	03/20/24 15:22
Total/NA	Analysis	8082A		1	455366	TL1	EET SEA	04/01/24 14:54
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/04/24 17:39
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/04/24 18:01
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU10_0-3

Lab Sample ID: 580-137730-22
Date Collected: 03/09/24 14:30
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 71.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 16:13

Client Sample ID: NAN_DU10_3-6

Lab Sample ID: 580-137730-23
Date Collected: 03/09/24 14:30
Matrix: Solid
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3546			454340	E1W	EET SEA	03/20/24 15:22
Total/NA	Analysis	8082A		1	455366	TL1	EET SEA	04/01/24 15:47
SPLP West	Analysis	6010D		1	458233	JLS	EET SEA	05/01/24 22:56
SPLP West	ISM Prep	Increment, prep			458588	JLS	EET SEA	05/06/24 15:49
SPLP West	Leach	1312			458590	JLS	EET SEA	05/06/24 15:52 - 05/06/24 15:53 [1]
SPLP West	Prep	3010A			458592	JLS	EET SEA	05/06/24 15:58
TCLP	ISM Prep	Increment, prep			457395	JL	EET SEA	04/23/24 17:04
TCLP	Leach	1311			457398	JL	EET SEA	04/23/24 17:24 - 04/25/24 11:45 [1]
TCLP	Prep	3010A			457588	JL	EET SEA	04/25/24 11:48
TCLP	Analysis	6010D		1	457695	JLS	EET SEA	04/25/24 20:14
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/05/24 05:01
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/05/24 05:04
TCLP	ISM Prep	Increment, prep			457395	JL	EET SEA	04/23/24 17:04
TCLP	Leach	1311			457398	JL	EET SEA	04/23/24 17:24 - 04/25/24 11:45 [1]
TCLP	Prep	7470A			457590	JL	EET SEA	04/25/24 12:11
TCLP	Analysis	7470A		1	458032	JL	EET SEA	04/30/24 15:50
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU10_3-6

Lab Sample ID: 580-137730-23
Date Collected: 03/09/24 14:30
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 70.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 15:45

Lab Chronicle

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU10_6-9

Lab Sample ID: 580-137730-24
Date Collected: 03/09/24 14:30
Matrix: Solid
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/04/24 17:52
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/04/24 18:14
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU10_6-9

Lab Sample ID: 580-137730-24
Date Collected: 03/09/24 14:30
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 68.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 15:54

Client Sample ID: NAN_DU11_0-3

Lab Sample ID: 580-137730-25
Date Collected: 03/10/24 12:20
Matrix: Solid
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/05/24 05:47
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/05/24 05:50
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU11_0-3

Lab Sample ID: 580-137730-25
Date Collected: 03/10/24 12:20
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 62.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 15:36

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Client Sample ID: NAN_DU11_3-6

Lab Sample ID: 580-137730-26

Date Collected: 03/10/24 12:20

Matrix: Solid

Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3546			454340	E1W	EET SEA	03/20/24 15:22
Total/NA	Analysis	8082A		1	455366	TL1	EET SEA	04/01/24 16:04
SPLP West	Analysis	6010D		1	458233	JLS	EET SEA	05/01/24 22:59
SPLP West	ISM Prep	Increment, prep			458588	JLS	EET SEA	05/06/24 15:49
SPLP West	Leach	1312			458590	JLS	EET SEA	05/06/24 15:52 - 05/06/24 15:53 [1]
SPLP West	Prep	3010A			458592	JLS	EET SEA	05/06/24 15:58
TCLP	ISM Prep	Increment, prep			457395	JL	EET SEA	04/23/24 17:04
TCLP	Leach	1311			457398	JL	EET SEA	04/23/24 17:24 - 04/25/24 11:45 [1]
TCLP	Prep	3010A			457588	JL	EET SEA	04/25/24 11:48
TCLP	Analysis	6010D		1	457695	JLS	EET SEA	04/25/24 20:17
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/05/24 04:44
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/05/24 04:47
TCLP	ISM Prep	Increment, prep			457395	JL	EET SEA	04/23/24 17:04
TCLP	Leach	1311			457398	JL	EET SEA	04/23/24 17:24 - 04/25/24 11:45 [1]
TCLP	Prep	7470A			457590	JL	EET SEA	04/25/24 12:11
TCLP	Analysis	7470A		1	458032	JL	EET SEA	04/30/24 15:59
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU11_3-6

Lab Sample ID: 580-137730-26

Date Collected: 03/10/24 12:20

Matrix: Solid

Date Received: 03/14/24 09:30

Percent Solids: 65.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 15:56

Client Sample ID: NAN_DU11_6-9

Lab Sample ID: 580-137730-27

Date Collected: 03/10/24 12:20

Matrix: Solid

Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/05/24 05:41
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/05/24 05:44
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client: EnviroQuest, Inc. Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU11_6-9 — Lab Sample ID: 580-137730-27
Date Collected: 03/10/24 12:20 — **Matrix: Solid**
Date Received: 03/14/24 09:30 — **Percent Solids: 66.2**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 15:59

Client Sample ID: NAN_DU12_0-3 — Lab Sample ID: 580-137730-28
Date Collected: 03/10/24 13:10 — **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/05/24 04:55
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/05/24 04:58
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU12_0-3 — Lab Sample ID: 580-137730-28
Date Collected: 03/10/24 13:10 — **Matrix: Solid**
Date Received: 03/14/24 09:30 — **Percent Solids: 68.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 16:02

Client Sample ID: NAN_DU12_3-6 — Lab Sample ID: 580-137730-29
Date Collected: 03/10/24 13:10 — **Matrix: Solid**
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
SPLP West	Analysis	6010D		1	458233	JLS	EET SEA	05/01/24 23:03
SPLP West	ISM Prep	Increment, prep			458588	JLS	EET SEA	05/06/24 15:49
SPLP West	Leach	1312			458590	JLS	EET SEA	05/06/24 15:52 - 05/06/24 15:53 [1]
SPLP West	Prep	3010A			458592	JLS	EET SEA	05/06/24 15:58
TCLP	ISM Prep	Increment, prep			457395	JL	EET SEA	04/23/24 17:04
TCLP	Leach	1311			457398	JL	EET SEA	04/23/24 17:24 - 04/25/24 11:45 [1]
TCLP	Prep	3010A			457588	JL	EET SEA	04/25/24 11:48
TCLP	Analysis	6010D		1	457695	JLS	EET SEA	04/25/24 20:21
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/05/24 05:35
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/05/24 05:38

Lab Chronicle

Client: EnviroQuest, Inc.
Job ID: 580-137730-1
Project/Site: Nanue Bridge

Client Sample ID: NAN_DU12_3-6
Lab Sample ID: 580-137730-29
Date Collected: 03/10/24 13:10
Matrix: Solid
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	ISM Prep	Increment, prep			457395	JL	EET SEA	04/23/24 17:04
TCLP	Leach	1311			457398	JL	EET SEA	04/23/24 17:24 - 04/25/24 11:45 [1]
TCLP	Prep	7470A			457590	JL	EET SEA	04/25/24 12:11
TCLP	Analysis	7470A		1	458032	JL	EET SEA	04/30/24 16:02
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU12_3-6
Lab Sample ID: 580-137730-29
Date Collected: 03/10/24 13:10
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 75.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 16:05

Client Sample ID: NAN_DU12_6-9
Lab Sample ID: 580-137730-30
Date Collected: 03/10/24 13:10
Matrix: Solid
Date Received: 03/14/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		20	455760	FCW	EET SEA	04/05/24 05:52
Total/NA	ISM Prep	Increment, prep			454054	MR	EET SEA	03/18/24 14:14
Total/NA	Prep	3050B			455329	CA	EET SEA	04/01/24 12:29
Total/NA	Analysis	6020B		2000	455760	FCW	EET SEA	04/05/24 05:55
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Analysis	2540G		1	454764	AUA	EET SEA	03/26/24 11:00

Client Sample ID: NAN_DU12_6-9
Lab Sample ID: 580-137730-30
Date Collected: 03/10/24 13:10
Matrix: Solid
Date Received: 03/14/24 09:30
Percent Solids: 72.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	ISM Prep	Increment, prep			454052	MR	EET SEA	03/18/24 13:58
Total/NA	Prep	7471A			455462	JL	EET SEA	04/02/24 13:03
Total/NA	Analysis	7471A		1	455504	JL	EET SEA	04/02/24 16:08

[1] This procedure uses a method stipulated length of time for the process. Both start and end times are displayed.

Laboratory References:

EET SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Laboratory: Eurofins Seattle

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

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2236	01-19-25

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
2540G		Solid	Percent Moisture
2540G		Solid	Percent Solids
7470A	7470A	Solid	Mercury

Sample Summary

Client: EnviroQuest, Inc.
Project/Site: Nanue Bridge

Job ID: 580-137730-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-137730-1	NAN_DU8_0-3	Solid	03/03/24 10:00	03/14/24 09:30
580-137730-2	NAN_DU8_3-6	Solid	03/03/24 10:00	03/14/24 09:30
580-137730-3	NAN_DU8_6-9	Solid	03/03/24 10:00	03/14/24 09:30
580-137730-4	NAN_DU1_0-3_A	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-5	NAN_DU1_3-6_A	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-6	NAN_DU1_6-9_A	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-7	NAN_DU1_0-3_B	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-8	NAN_DU1_3-6_B	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-9	NAN_DU1_6-9_B	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-10	NAN_DU1_0-3_C	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-11	NAN_DU1_3-6_C	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-12	NAN_DU1_6-9_C	Solid	03/05/24 16:00	03/14/24 09:30
580-137730-13	NAN_DU3_0-3	Solid	03/06/24 12:30	03/14/24 09:30
580-137730-14	NAN_DU3_3-6	Solid	03/06/24 12:30	03/14/24 09:30
580-137730-15	NAN_DU3_6-9	Solid	03/06/24 12:30	03/14/24 09:30
580-137730-16	NAN_DU2_0-3	Solid	03/06/24 15:00	03/14/24 09:30
580-137730-17	NAN_DU2_3-6	Solid	03/06/24 15:00	03/14/24 09:30
580-137730-18	NAN_DU2_6-9	Solid	03/06/24 15:00	03/14/24 09:30
580-137730-19	NAN_DU9_0-3	Solid	03/09/24 12:30	03/14/24 09:30
580-137730-20	NAN_DU9_3-6	Solid	03/09/24 12:30	03/14/24 09:30
580-137730-21	NAN_DU9_6-9	Solid	03/09/24 12:30	03/14/24 09:30
580-137730-22	NAN_DU10_0-3	Solid	03/09/24 14:30	03/14/24 09:30
580-137730-23	NAN_DU10_3-6	Solid	03/09/24 14:30	03/14/24 09:30
580-137730-24	NAN_DU10_6-9	Solid	03/09/24 14:30	03/14/24 09:30
580-137730-25	NAN_DU11_0-3	Solid	03/10/24 12:20	03/14/24 09:30
580-137730-26	NAN_DU11_3-6	Solid	03/10/24 12:20	03/14/24 09:30
580-137730-27	NAN_DU11_6-9	Solid	03/10/24 12:20	03/14/24 09:30
580-137730-28	NAN_DU12_0-3	Solid	03/10/24 13:10	03/14/24 09:30
580-137730-29	NAN_DU12_3-6	Solid	03/10/24 13:10	03/14/24 09:30
580-137730-30	NAN_DU12_6-9	Solid	03/10/24 13:10	03/14/24 09:30

Eurofins Environmental Testing Northwest, LLC
5755 8th Street East
Tacoma, WA 98424

Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler: KC, SM, RK	Lab PM: Tracy Dutton	Carrier Tracking No(s):	COC No:
Client Contact: Scott Moncrief	Phone: 808 2860222	E-Mail: scottmoncrief808@gmail.com	State of Origin: HI	Page: Page 1 of ~~1~~ KC 3
Company: Kealamahi Pacific	PWSID:	Analysis Requested		Job #:
Address: 103 S Kalaheo Ave	Due Date Requested: std TAT			Preservation Codes:
City: Kailua	TAT Requested (days): std			
State, Zip: HI 96734	Compliance Project: Δ Yes Δ No			
Phone: 808 2860222	PO #: Purchase Order not required			
Email: scottmoncrief808@gmail.com	WO #:			
Project Name: Nanue Bridge	Project #:			
Site:	SSOW#:			Other:

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)

Sample Identification	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)	8 RCRA Metals	% moisture	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
NAN-DU8-0-3	3/3/24	1000	M/S	S			X	X		50 increment DU
NAN-DU8-3-6	↓	1000					X	X		
NAN-DU8-6-9		1000					X	X		
NAN-DU1-0-3-A	3/5/24	1600					X	X		
NAN-DU~~9~~ KC 1-3-6-A		1600					X	X		
NAN-DU~~9~~ KC 1-6-9-A		1600					X	X		
NAN-DU~~9~~ KC 1-0-3-B		1600					X	X		
NAN-DU~~9~~ KC 1-3-6-B		1600					X	X		
NAN-DU~~9~~ KC 1-6-9-B		1600					X	X		
NAN-DU~~9~~ KC 1-0-3-C		1600					X	X		
NAN-DU~~9~~ KC 1-3-6-C	↓	1600	↓	↓			X	X		

580-137730 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

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) std

Special Instructions/QC Requirements:

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

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Scott Moncrief [signature]	3/11/24 1100 Am	KPC	[signature]	3/14/24 0930	EETN
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
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:

Eurofins Environmental Testing Northwest, LLC
5755 8th Street East
Tacoma, WA 98424

Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler:	Lab PM:	Carrier Tracking No(s):	COC No:
Client Contact:	Phone:	E-Mail:	State of Origin:	Page: ~~Page 1 of 1~~ 2 of 3
Company: Kealamahi Pacific	PWSID:	**Analysis Requested**		Job #:
Address:	**Due Date Requested:**			
City:	**TAT Requested (days):**			
State, Zip:	**Compliance Project:** Δ Yes Δ No			
Phone:	PO #: Purchase Order not required			
Email:	WO #:			
Project Name: Nanue Bridge	Project #:			
Site:	SSOW#:			

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	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)	8 RCRA Metals	% moisture	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
NAN-DU1-6-9-C	3/5/24	1600	MIS	S			X	X		50 increment DU
NAN-DU3-0-3	3/6/24	1230	↓	↓			X	X		↓
NAN-DU3-3-6	↓	1230					X	X		
NAN-DU3-6-9		1230					X	X		
NAN-DU2-0-3		1500					X	X		
NAN-DU2-3-6		1500					X	X		
NAN-DU2-6-9	↓	1500					X	X		
NAN-DU9-0-3	3/9/24	1230					X	X		
NAN-DU9-3-6	↓	1230					X	X		
NAN-DU9-6-9		1230					X	X		
NAN-DU10-0-3	↓	1430	↓	↓			X	X		↓

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

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) std

Special Instructions/QC Requirements:

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

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Scott Moncrieff [signature]	3/11/24 11:00 Am		[signature]	3/14/24 0930	EETN
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
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: 5/6/2024 (Rev. 1)

Eurofins Environmental Testing Northwest, LLC
5755 8th Street East
Tacoma, WA 98424

Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler:	Lab PM:	Carrier Tracking No(s):	COC No:
Client Contact:	Phone:	E-Mail:	State of Origin:	Page: ~~Page 1 of 1~~ KC 3 of 3
Company: Kealamahi Pacific	PWSID:	**Analysis Requested**		Job #:

Address:	**Due Date Requested:**	
City:	**TAT Requested (days):**	
State, Zip:	**Compliance Project:** Δ Yes Δ No	
Phone:	PO #: Purchase Order not required	
Email:	WO #:	
Project Name: Nanne Bridge	Project #:	
Site:	SSOW#:	

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	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)	8 RCRA Metals	% moisture	PCBs	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
NAN_DU10_3-6	3/9/24	1430	MIS	S			X	X	X		50 increment DU
NAN_DU10_6-9	↓	1430	↓	↓			X	X			↓
NAN_DU11_0-3	3/10/24	1220	↓	↓			X	X			↓
NAN_DU11_3-6	↓	1220	↓	↓			X	X	X		↓
NAN_DU11_6-9	↓	1220	↓	↓			X	X			↓
NAN_DU12_0-3	↓	1310	↓	↓			X	X			↓
NAN_DU12_3-6	↓	1310	↓	↓			X	X			↓
NAN_DU12_6-9	↓	1310	↓	↓			X	X			↓
LAST ENTRY											

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

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) std

Special Instructions/QC Requirements:

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

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Scott Moncrief [signature]	3/11/24 11:00 AM		[signature]	3/14/24 0930	RETN

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

#1 IR11 13.3/13.2 LB/Ice/no/FPO

#2 IR11 13.2/13.1 LR/Ice/no/FPO

Login Sample Receipt Checklist

Client: EnviroQuest, Inc. Job Number: 580-137730-1

Login Number: 137730 **List Source: Eurofins Seattle**
List Number: 1
Creator: Groves, Elizabeth

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 outside limits,acceptable per client data quality objectives
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	

APPENDIX B1:

Synthetic Precipitation Leaching Procedure (SPLP)

Batch Test Leaching Method Results

Lab Report Available in Appendix A2

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Table B-1: Analytical Soil Profiling Results - SPLP Pb - Nanue Bridge

			NAN_DU1_0-3_B 5-Mar-2024 0-3 inches bgs				NAN_DU3_6-9 6-Mar-2024 6-9 inches bgs				NAN_DU8_0-3 3-Mar-2024 0-3 inches bgs			
Analyte	Analytical Method	Units	**Results**	Q	RL	LOQ	**Results**	Q	RL	LOQ	**Results**	Q	RL	LOQ
Synthetic Precipitation Leaching Procedure (SPLP) Resource Conservation and Recovery Act (RCRA) Regulated Metals														
Total Lead	EPA 6020B	mg/kg	1133		0.47		1500		0.47		4300		0.47	
SPLP Lead	EPA 6010D	mg/L	0.080			0.030	0.41			0.030	0.59			0.030
SPLP Lead	EPA 6010D	ug/L	80				410			0.030	590			0.030
Kd Coefficient			**14,143**				**3,636**				**7,268**			

			NAN_DU10_3-6 9-Mar-2024 3-6 inches bgs				NAN_DU11_3-6 10-Mar-2024 3-6 inches bgs				NAN_DU12_3-6 10-Mar-2024 3-6 inches bgs			
Analyte	Analytical Method	Units	**Results**	Q	RL	LOQ	**Results**	Q	RL	LOQ	**Results**	Q	RL	LOQ
Synthetic Precipitation Leaching Procedure (SPLP) Resource Conservation and Recovery Act (RCRA) Regulated Metals														
Total Lead	EPA 6020B	mg/kg	9700		0.47		6400		0.48		7900		0.46	
SPLP Lead	EPA 6010D	mg/L	8.0			0.030	3.5			0.030	5.0			0.030
SPLP Lead	EPA 6010D	ug/L	8,000				3,500				5,000			
Kd Coefficient			**1193**				**1809**				**1560**			

Note: Kd Coefficient is greater than 20. Contaminant is not significantly mobile for concentration and soil type tested.

Notes:

bgs = below ground surface

mg/kg = miligram(s) per kilogram

mg/L = milligram(s) per liter

Kd = desorption coefficient

LOQ = Limit of quantification

Q = qualifier

Pb = lead

RL = reporting limit

SPLP = Synthetic Precipitation Leaching Procedure

ug/L = micrograms per liter

Batch Test Leaching Model NAN _DU1 0 to 3 inches B

Version: Fall 2011

Hawai'i Department of Health

Hazard Evaluation and Emergency Response Office

-Refer to accompanying technical memorandum for background and use of this spreadsheet (HDOH 2007).
-Physiochemical constants updated in Fall 2011 (refer to HDOH 2011).
-Spreadsheet calculates Kd desorption coefficient based on input contaminant concentration in soil and Batch Test data.
-Correlative concentration of contaminant in leachate calculated based on estimated Kd value (may differ from batch test data).
-Future impacts to groundwater estimated using simple groundwater/leachate dilution factor.
-Alternative model based on soil gas data provided in accompanying worksheet.
-Possibility of past impacts to groundwater not considered and must be evaluated separately.
-Check to ensure that this is an up-to-date version of the spreadsheet.
-Remove write protection if problems occur in selection of contaminant. Password to unprotect worksheet is "EAL" (under Tools menu).

STEPS:

1. Select chemical from pulldown list (unlisted chemicals - unprotect spreadsheet and input chemical name and chemical constants).
2. Input total contaminant concentration and SPLP (or other applicable batch test) concentration.
3. Input sample properties. Use default values if sample-specific data are not available.
4. Input Batch Test method information. Default SPLP method parameter values noted.
5. Input groundwater:leachate dilution factor (DF of 1.0 = no dilution; USEPA default = 20, USEPA 2002).
6. Input target groundwater action level for comparison to model calculation of groundwater impacts (optional).
7. Input chemical-specific Henry's Law Constant (Kh) and solubility if "Generic (Volatile)" or "Generic (Nonvolatile)" selected from pulldown list. Input "0" if values not available.
8. Spreadsheet calculates sample-specific Kd value and dissolved-phase concentration of contaminant in saturated sample.
9. Spreadsheet calculates concentration of contaminant in groundwater following impact by leachate.

Step 1: [10]Select Contaminant (use pulldown list)	**LEAD**

Step 2: Input Sample Data	**DEFAULT**	**INPUT**
[1]Concentration in soil sample (mg/kg)	N/A	1.2E+03
[1]Concentration in Batch Test solution (ug/L)	N/A	8.0E-02
Step 3: Input Sample Properties ([5]USEPA soil defaults noted)		
Sample density (g/cm^3)	1.50	1.50
Particle density (g/cm^3)	2.65	2.65
Fraction air-filled porosity (assume saturated soil)	0.00	0.00
Step 4: Batch Test Method Data (SPLP defaults noted)		
[2]Batch Test Solution Volume (ml):	2,000	2,000
[2]Batch Test Solution Density (g/cm^3):	1.0	1.0
[2]Batch Test Sample Weight (grams)	100	100

[3]Step 5: Input Groundwater/ Leachate Dilution Factor	**DEFAULT**	**INPUT**
	20	20
[4]Step 6 (optional): Input Target Groundwater Concentration (ug/L)		

Model Results	
[5]Kd partition Coefficient (cm^3/g):	1.5E+07
[6]Estimated Concentration in Source Area Leachate (ug/L):	-
[7]Estimated Concentration in Groundwater (ug/L):	-

Step 7: [10]Chemical Constants [Generic Chemical only]	

Kd >20. Contaminant not significantly mobile for concentration and soil type tested. Do not place below water table without further evaluation. Address other potential environmental concerns as needed (direct exposure, gross contamination, etc.).

Calculations:	
Sample porosity - total	0.43
Sample porosity - air-filled	0.00
Sample porosity - water-filled	0.43
Batch Test Solution Mass (grams)	2.0E+03
Batch Test Sample Mass (grams)	1.0E+02
Sample Mass:Solution Mass Ratio (gm/gm)	5.0E-02
Total Mass of Contaminant (ug)	1.2E+05
Mass Contaminant in Batch Test Solution (ug)	1.6E-01
Mass Contaminant Sorbed to Soil (ug)	1.2E+05
Concentration Sorbed (ug/kg)	1.2E+06
Batch Test Percent Solid Phase	100.0%
Batch Test Percent Dissolved Phase	0.0%
Batch Test Solid-Phase Contaminant Conc. (mg/kg)	1.2E+03
Batch Test Solution Contaminant Conc. (ug/L)	8.0E-02

Notes (refer also to accompanying memo).

1. Total contaminant concentration measured in soil sample and results of Batch Test analysis (e.g., SPLP).
2. Batch Test: Default SPLP method calls for 100 grams of sample and 2 liters of solution with a density of approximately 1.0
3. Site-specific or default groundwater/leachate dilution factor (default = 20, USEPA 2002).
4. Target groundwater action level. Refer to HDOH EAL document and appropriate groundwater category.
5. Partition Coefficient (Kd) = $Concentration_{sorbed}$/$Concentration_{solution}$ (after Roy et al 1992).
   Partition Coefficient units in L/Kg [(ug/Kg)/ug/L)] or cm^3/g [(ug/g)/ug/cm^3)]
   and assumed equilibrium partitioning (USEPA 2002). Refer to discussion and equations presented in accompanying HDOH
   contaminant concentration in leachate during transport through vadose zone not considered. Refer to Tier 2 concentration
8. Caution Message: A caution message will appear if the input batch test concentration is greater than 75% of the assumed contaminant solubility and a Kd value will not be generated (refer to "Leaching Evaluation of Heavily Contaminated Soils" in text). Model assumes that free product is present in the batch test solution and a Kd cannot be calculated (see text).
9. Error Message: The batch test data are not valid if the contaminant mass calculated for solute exceeds total mass calculated for sample (based on sample mass and input total contaminant concentration). This may not be uncommon given the potential for lab error at very low concentrations of contaminants.
10. "GENERIC CHEMICAL" can be selected from pulldown menu an used to model of any chemical, including chemicals not listed. Selection requires input of Kh (atm m3/mole) and Solubility constants in Step 7 if available. Note that a chemicals physiochemcial constants affect results for VOCs only if input Fraction Air-Filled Porosity is >0% (model considers partitioning into pore space air for VOCs as well as leachate).

References:

HDOH, 2007, Use of laboratory batch tests to evaluate potential leaching of contaminants from soil (updated April 2007): Hawai'i Dept. of Health, Hazard Evaluation and Emergency Response, http://hawaii.gov/health/environmental/hazard/index.html

HDOH, 2011, Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater: Hawai'i Department of Health, Office of Hazard Evaluation and Emergency Response, Fall 2011, www.hawaii.gov/health/environmental/hazard/eal2005.html.

USEPA, 1994, Synthetic Precipitation Leaching Procedure: U.S. Environmental Protection Agency, Office of Solid Waste, SW-846 Method 1312, September 1994, www.epa.gov/epaoswer/hazwaste/test/main.htm.

USEPA, 1999, Understanding Variation in Partition Coefficient, Kd, Values: Office of Air and Radiation, August 1999, EPA/402/R/99/004A, http://www.epa.gov/radiation/docs/kdreport/

USEPA, 2002, Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites: U.S. Environmental Protection Agency, Solid Waste and Emergency Response, OSWER 9355.4-24, December 2002, http://www.epa.gov/superfund/resources/soil/ssg_main.pdf

Batch Test Leaching Model NAN_DU3 6 to 9 inches

Version: Fall 2011

Hawai'i Department of Health

Hazard Evaluation and Emergency Response Office

-Refer to accompanying technical memorandum for background and use of this spreadsheet (HDOH 2007).
-Physiochemical constants updated in Fall 2011 (refer to HDOH 2011).
-Spreadsheet calculates Kd desorption coefficient based on input contaminant concentration in soil and Batch Test data.
-Correlative concentration of contaminant in leachate calculated based on estimated Kd value (may differ from batch test data).
-Future impacts to groundwater estimated using simple groundwater/leachate dilution factor.
-Alternative model based on soil gas data provided in accompanying worksheet.
-Possibility of past impacts to groundwater not considered and must be evaluated separately.
-Check to ensure that this is an up-to-date version of the spreadsheet.
-Remove write protection if problems occur in selection of contaminant. Password to unprotect worksheet is "EAL" (under Tools menu).

STEPS:

1. Select chemical from pulldown list (unlisted chemicals - unprotect spreadsheet and input chemical name and chemical constants).
2. Input total contaminant concentration and SPLP (or other applicable batch test) concentration.
3. Input sample properties. Use default values if sample-specific data are not available.
4. Input Batch Test method information. Default SPLP method parameter values noted.
5. Input groundwater:leachate dilution factor (DF of 1.0 = no dilution; USEPA default = 20, USEPA 2002).
6. Input target groundwater action level for comparison to model calculation of groundwater impacts (optional).
7. Input chemical-specific Henry's Law Constant (Kh) and solubility if "Generic (Volatile)" or "Generic (Nonvolatile)" selected from pulldown list. Input "0" if values not available.
8. Spreadsheet calculates sample-specific Kd value and dissolved-phase concentration of contaminant in saturated sample.
9. Spreadsheet calculates concentration of contaminant in groundwater following impact by leachate.

Step 1: [10]Select Contaminant (use pulldown list)	**LEAD**

Step 2: Input Sample Data	**DEFAULT**	**INPUT**
[1]Concentration in soil sample (mg/kg)	N/A	1.5E+03
[1]Concentration in Batch Test solution (ug/L)	N/A	4.1E-01
Step 3: Input Sample Properties ([5]USEPA soil defaults noted)		
Sample density (g/cm^3)	1.50	1.50
Particle density (g/cm^3)	2.65	2.65
Fraction air-filled porosity (assume saturated soil)	0.00	0.00
Step 4: Batch Test Method Data (SPLP defaults noted)		
[2]Batch Test Solution Volume (ml):	2,000	2,000
[2]Batch Test Solution Density (g/cm^3):	1.0	1.0
[2]Batch Test Sample Weight (grams)	100	100

[3]Step 5: Input Groundwater/ Leachate Dilution Factor	**DEFAULT**	**INPUT**
	20	20
[4]Step 6 (optional): Input Target Groundwater Concentration (ug/L)		

Model Results	
[5]Kd partition Coefficient (cm^3/g):	3.7E+06
[6]Estimated Concentration in Source Area Leachate (ug/L):	-
[7]Estimated Concentration in Groundwater (ug/L):	-

Step 7: [10]Chemical Constants [Generic Chemical only]	

Kd >20. Contaminant not significantly mobile for concentration and soil type tested. Do not place below water table without further evaluation. Address other potential environmental concerns as needed (direct exposure, gross contamination, etc.).

Calculations:	
Sample porosity - total	0.43
Sample porosity - air-filled	0.00
Sample porosity - water-filled	0.43
Batch Test Solution Mass (grams)	2.0E+03
Batch Test Sample Mass (grams)	1.0E+02
Sample Mass:Solution Mass Ratio (gm/gm)	5.0E-02
Total Mass of Contaminant (ug)	1.5E+05
Mass Contaminant in Batch Test Solution (ug)	8.2E-01
Mass Contaminant Sorbed to Soil (ug)	1.5E+05
Concentration Sorbed (ug/kg)	1.5E+06
Batch Test Percent Solid Phase	100.0%
Batch Test Percent Dissolved Phase	0.0%
Batch Test Solid-Phase Contaminant Conc. (mg/kg)	1.5E+03
Batch Test Solution Contaminant Conc. (ug/L)	4.1E-01

Notes (refer also to accompanying memo).

1. Total contaminant concentration measured in soil sample and results of Batch Test analysis (e.g., SPLP).
2. Batch Test: Default SPLP method calls for 100 grams of sample and 2 liters of solution with a density of approximately 1.0
3. Site-specific or default groundwater/leachate dilution factor (default = 20, USEPA 2002).
4. Target groundwater action level. Refer to HDOH EAL document and appropriate groundwater category.
5. Partition Coefficient (Kd) = $Concentration_{sorbed}/Concentration_{solution}$ (after Roy et al 1992).
   Partition Coefficient units in L/Kg [(ug/Kg)/ug/L)] or cm^3/g [(ug/g)/ug/cm^3)]
   and assumed equilibrium partitioning (USEPA 2002). Refer to discussion and equations presented in accompanying HDOH
   contaminant concentration in leachate during transport through vadose zone not considered. Refer to Tier 2 concentration
8. Caution Message: A caution message will appear if the input batch test concentration is greater than 75% of the assumed contaminant solubility and a Kd value will not be generated (refer to "Leaching Evaluation of Heavily Contaminated Soils" in text). Model assumes that free product is present in the batch test solution and a Kd cannot be calculated (see text).
9. Error Message: The batch test data are not valid if the contaminant mass calculated for solute exceeds total mass calculated for sample (based on sample mass and input total contaminant concentration). This may not be uncommon given the potential for lab error at very low concentrations of contaminants.
10. "GENERIC CHEMICAL" can be selected from pulldown menu an used to model of any chemical, including chemicals not listed. Selection requires input of Kh (atm m3/mole) and Solubility constants in Step 7 if available. Note that a chemicals physiochemcial constants affect results for VOCs only if input Fraction Air-Filled Porosity is >0% (model considers partitioning into pore space air for VOCs as well as leachate).

References:

HDOH, 2007, Use of laboratory batch tests to evaluate potential leaching of contaminants from soil (updated April 2007): Hawai'i Dept. of Health, Hazard Evaluation and Emergency Response, http://hawaii.gov/health/environmental/hazard/index.html

HDOH, 2011, Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater: Hawai'i Department of Health, Office of Hazard Evaluation and Emergency Response, Fall 2011, www.hawaii.gov/health/environmental/hazard/eal2005.html.

USEPA, 1994, Synthetic Precipitation Leaching Procedure: U.S. Environmental Protection Agency, Office of Solid Waste, SW-846 Method 1312, September 1994, www.epa.gov/epaoswer/hazwaste/test/main.htm.

USEPA, 1999, Understanding Variation in Partition Coefficient, Kd, Values: Office of Air and Radiation, August 1999, EPA/402/R/99/004A, http://www.epa.gov/radiation/docs/kdreport/

USEPA, 2002, Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites: U.S. Environmental Protection Agency, Solid Waste and Emergency Response, OSWER 9355.4-24, December 2002, http://www.epa.gov/superfund/resources/soil/ssg_main.pdf

Batch Test Leaching Model NAN_DU8 0 to 3 inches

Version: Fall 2011

Hawai'i Department of Health

Hazard Evaluation and Emergency Response Office

-Refer to accompanying technical memorandum for background and use of this spreadsheet (HDOH 2007).
-Physiochemical constants updated in Fall 2011 (refer to HDOH 2011).
-Spreadsheet calculates Kd desorption coefficient based on input contaminant concentration in soil and Batch Test data.
-Correlative concentration of contaminant in leachate calculated based on estimated Kd value (may differ from batch test data).
-Future impacts to groundwater estimated using simple groundwater/leachate dilution factor.
-Alternative model based on soil gas data provided in accompanying worksheet.
-Possibility of past impacts to groundwater not considered and must be evaluated separately.
-Check to ensure that this is an up-to-date version of the spreadsheet.
-Remove write protection if problems occur in selection of contaminant. Password to unprotect worksheet is "EAL" (under Tools menu).

STEPS:

1. Select chemical from pulldown list (unlisted chemicals - unprotect spreadsheet and input chemical name and chemical constants).
2. Input total contaminant concentration and SPLP (or other applicable batch test) concentration.
3. Input sample properties. Use default values if sample-specific data are not available.
4. Input Batch Test method information. Default SPLP method parameter values noted.
5. Input groundwater:leachate dilution factor (DF of 1.0 = no dilution; USEPA default = 20, USEPA 2002).
6. Input target groundwater action level for comparison to model calculation of groundwater impacts (optional).
7. Input chemical-specific Henry's Law Constant (Kh) and solubility if "Generic (Volatile)" or "Generic (Nonvolatile)" selected from pulldown list. Input "0" if values not available.
8. Spreadsheet calculates sample-specific Kd value and dissolved-phase concentration of contaminant in saturated sample.
9. Spreadsheet calculates concentration of contaminant in groundwater following impact by leachate.

Step 1: [10]Select Contaminant (use pulldown list)	**LEAD**

Step 2: Input Sample Data	**DEFAULT**	**INPUT**
[1]Concentration in soil sample (mg/kg)	N/A	4.3E+03
[1]Concentration in Batch Test solution (ug/L)	N/A	5.9E-01
Step 3: Input Sample Properties ([5]USEPA soil defaults noted)		
Sample density (g/cm^3)	1.50	1.50
Particle density (g/cm^3)	2.65	2.65
Fraction air-filled porosity (assume saturated soil)	0.00	0.00
Step 4: Batch Test Method Data (SPLP defaults noted)		
[2]Batch Test Solution Volume (ml):	2,000	2,000
[2]Batch Test Solution Density (g/cm^3):	1.0	1.0
[2]Batch Test Sample Weight (grams)	100	100

[3]Step 5: Input Groundwater/ Leachate Dilution Factor	**DEFAULT**	**INPUT**
	20	20
[4]Step 6 (optional): Input Target Groundwater Concentration (ug/L)		

Model Results	
[5]Kd partition Coefficient (cm^3/g):	7.3E+06
[6]Estimated Concentration in Source Area Leachate (ug/L):	-
[7]Estimated Concentration in Groundwater (ug/L):	-

Step 7: [10]Chemical Constants [Generic Chemical only]	

Kd >20. Contaminant not significantly mobile for concentration and soil type tested. Do not place below water table without further evaluation. Address other potential environmental concerns as needed (direct exposure, gross contamination, etc.).

Calculations:	
Sample porosity - total	0.43
Sample porosity - air-filled	0.00
Sample porosity - water-filled	0.43
Batch Test Solution Mass (grams)	2.0E+03
Batch Test Sample Mass (grams)	1.0E+02
Sample Mass:Solution Mass Ratio (gm/gm)	5.0E-02
Total Mass of Contaminant (ug)	4.3E+05
Mass Contaminant in Batch Test Solution (ug)	1.2E+00
Mass Contaminant Sorbed to Soil (ug)	4.3E+05
Concentration Sorbed (ug/kg)	4.3E+06
Batch Test Percent Solid Phase	100.0%
Batch Test Percent Dissolved Phase	0.0%
Batch Test Solid-Phase Contaminant Conc. (mg/kg)	4.3E+03
Batch Test Solution Contaminant Conc. (ug/L)	5.9E-01

Notes (refer also to accompanying memo).

1. Total contaminant concentration measured in soil sample and results of Batch Test analysis (e.g., SPLP).
2. Batch Test: Default SPLP method calls for 100 grams of sample and 2 liters of solution with a density of approximately 1.0
3. Site-specific or default groundwater/leachate dilution factor (default = 20, USEPA 2002).
4. Target groundwater action level. Refer to HDOH EAL document and appropriate groundwater category.
5. Partition Coefficient (Kd) = $Concentration_{sorbed}/Concentration_{solution}$ (after Roy et al 1992).
   Partition Coefficient units in L/Kg [(ug/Kg)/ug/L)] or cm^3/g [(ug/g)/ug/cm^3)]
   and assumed equilibrium partitioning (USEPA 2002). Refer to discussion and equations presented in accompanying HDOH
   contaminant concentration in leachate during transport through vadose zone not considered. Refer to Tier 2 concentration
8. Caution Message: A caution message will appear if the input batch test concentration is greater than 75% of the assumed contaminant solubility and a Kd value will not be generated (refer to "Leaching Evaluation of Heavily Contaminated Soils" in text). Model assumes that free product is present in the batch test solution and a Kd cannot be calculated (see text).
9. Error Message: The batch test data are not valid if the contaminant mass calculated for solute exceeds total mass calculated for sample (based on sample mass and input total contaminant concentration). This may not be uncommon given the potential for lab error at very low concentrations of contaminants.
10. "GENERIC CHEMICAL" can be selected from pulldown menu an used to model of any chemical, including chemicals not listed. Selection requires input of Kh (atm m3/mole) and Solubility constants in Step 7 if available. Note that a chemicals physiochemcial constants affect results for VOCs only if input Fraction Air-Filled Porosity is >0% (model considers partitioning into pore space air for VOCs as well as leachate).

References:

HDOH, 2007, Use of laboratory batch tests to evaluate potential leaching of contaminants from soil (updated April 2007): Hawai'i Dept. of Health, Hazard Evaluation and Emergency Response, http://hawaii.gov/health/environmental/hazard/index.html

HDOH, 2011, Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater: Hawai'i Department of Health, Office of Hazard Evaluation and Emergency Response, Fall 2011, www.hawaii.gov/health/environmental/hazard/eal2005.html.

USEPA, 1994, Synthetic Precipitation Leaching Procedure: U.S. Environmental Protection Agency, Office of Solid Waste, SW-846 Method 1312, September 1994, www.epa.gov/epaoswer/hazwaste/test/main.htm.

USEPA, 1999, Understanding Variation in Partition Coefficient, Kd, Values: Office of Air and Radiation, August 1999, EPA/402/R/99/004A, http://www.epa.gov/radiation/docs/kdreport/

USEPA, 2002, Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites: U.S. Environmental Protection Agency, Solid Waste and Emergency Response, OSWER 9355.4-24, December 2002, http://www.epa.gov/superfund/resources/soil/ssg_main.pdf

Batch Test Leaching Model NAN DU10 3 to 6 inches

Version: Fall 2011

Hawai'i Department of Health

Hazard Evaluation and Emergency Response Office

-Refer to accompanying technical memorandum for background and use of this spreadsheet (HDOH 2007).
-Physiochemical constants updated in Fall 2011 (refer to HDOH 2011).
-Spreadsheet calculates Kd desorption coefficient based on input contaminant concentration in soil and Batch Test data.
-Correlative concentration of contaminant in leachate calculated based on estimated Kd value (may differ from batch test data).
-Future impacts to groundwater estimated using simple groundwater/leachate dilution factor.
-Alternative model based on soil gas data provided in accompanying worksheet.
-Possibility of past impacts to groundwater not considered and must be evaluated separately.
-Check to ensure that this is an up-to-date version of the spreadsheet.
-Remove write protection if problems occur in selection of contaminant. Password to unprotect worksheet is "EAL" (under Tools menu).

STEPS:

1. Select chemical from pulldown list (unlisted chemicals - unprotect spreadsheet and input chemical name and chemical constants).
2. Input total contaminant concentration and SPLP (or other applicable batch test) concentration.
3. Input sample properties. Use default values if sample-specific data are not available.
4. Input Batch Test method information. Default SPLP method parameter values noted.
5. Input groundwater:leachate dilution factor (DF of 1.0 = no dilution; USEPA default = 20, USEPA 2002).
6. Input target groundwater action level for comparison to model calculation of groundwater impacts (optional).
7. Input chemical-specific Henry's Law Constant (Kh) and solubility if "Generic (Volatile)" or "Generic (Nonvolatile)" selected from pulldown list. Input "0" if values not available.
8. Spreadsheet calculates sample-specific Kd value and dissolved-phase concentration of contaminant in saturated sample.
9. Spreadsheet calculates concentration of contaminant in groundwater following impact by leachate.

Step 1: [10]Select Contaminant (use pulldown list)	**LEAD**

Step 2: Input Sample Data	**DEFAULT**	**INPUT**
[1]Concentration in soil sample (mg/kg)	N/A	9.7E+03
[1]Concentration in Batch Test solution (ug/L)	N/A	8.0E+00
Step 3: Input Sample Properties ([5]USEPA soil defaults noted)		
Sample density (g/cm^3)	1.50	1.50
Particle density (g/cm^3)	2.65	2.65
Fraction air-filled porosity (assume saturated soil)	0.00	0.00
Step 4: Batch Test Method Data (SPLP defaults noted)		
[2]Batch Test Solution Volume (ml):	2,000	2,000
[2]Batch Test Solution Density (g/cm^3):	1.0	1.0
[2]Batch Test Sample Weight (grams)	100	100

[3]Step 5: Input Groundwater/ Leachate Dilution Factor	**DEFAULT**	**INPUT**
	20	20
[4]Step 6 (optional): Input Target Groundwater Concentration (ug/L)		

Model Results	
[5]Kd partition Coefficient (cm^3/g):	1.2E+06
[6]Estimated Concentration in Source Area Leachate (ug/L):	-
[7]Estimated Concentration in Groundwater (ug/L):	-

Step 7: [10]Chemical Constants [Generic Chemical only]	

Kd >20. Contaminant not significantly mobile for concentration and soil type tested. Do not place below water table without further evaluation. Address other potential environmental concerns as needed (direct exposure, gross contamination, etc.).

Calculations:	
Sample porosity - total	0.43
Sample porosity - air-filled	0.00
Sample porosity - water-filled	0.43
Batch Test Solution Mass (grams)	2.0E+03
Batch Test Sample Mass (grams)	1.0E+02
Sample Mass:Solution Mass Ratio (gm/gm)	5.0E-02
Total Mass of Contaminant (ug)	9.7E+05
Mass Contaminant in Batch Test Solution (ug)	1.6E+01
Mass Contaminant Sorbed to Soil (ug)	9.7E+05
Concentration Sorbed (ug/kg)	9.7E+06
Batch Test Percent Solid Phase	100.0%
Batch Test Percent Dissolved Phase	0.0%
Batch Test Solid-Phase Contaminant Conc. (mg/kg)	9.7E+03
Batch Test Solution Contaminant Conc. (ug/L)	8.0E+00

Notes (refer also to accompanying memo).

1. Total contaminant concentration measured in soil sample and results of Batch Test analysis (e.g., SPLP).
2. Batch Test: Default SPLP method calls for 100 grams of sample and 2 liters of solution with a density of approximately 1.0
3. Site-specific or default groundwater/leachate dilution factor (default = 20, USEPA 2002).
4. Target groundwater action level. Refer to HDOH EAL document and appropriate groundwater category.
5. Partition Coefficient (Kd) = $Concentration_{sorbed}/Concentration_{solution}$ (after Roy et al 1992).
   Partition Coefficient units in L/Kg [(ug/Kg)/ug/L)] or cm^3/g [$(ug/g)/ug/cm^3$)]
   and assumed equilibrium partitioning (USEPA 2002). Refer to discussion and equations presented in accompanying HDOH
   contaminant concentration in leachate during transport through vadose zone not considered. Refer to Tier 2 concentration
8. Caution Message: A caution message will appear if the input batch test concentration is greater than 75% of the assumed contaminant solubility and a Kd value will not be generated (refer to "Leaching Evaluation of Heavily Contaminated Soils" in text). Model assumes that free product is present in the batch test solution and a Kd cannot be calculated (see text).
9. Error Message: The batch test data are not valid if the contaminant mass calculated for solute exceeds total mass calculated for sample (based on sample mass and input total contaminant concentration). This may not be uncommon given the potential for lab error at very low concentrations of contaminants.
10. "GENERIC CHEMICAL" can be selected from pulldown menu an used to model of any chemical, including chemicals not listed. Selection requires input of Kh (atm m3/mole) and Solubility constants in Step 7 if available. Note that a chemicals physiochemcial constants affect results for VOCs only if input Fraction Air-Filled Porosity is >0% (model considers partitioning into pore space air for VOCs as well as leachate).

References:

HDOH, 2007, Use of laboratory batch tests to evaluate potential leaching of contaminants from soil (updated April 2007): Hawai'i Dept. of Health, Hazard Evaluation and Emergency Response, http://hawaii.gov/health/environmental/hazard/index.html

HDOH, 2011, Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater: Hawai'i Department of Health, Office of Hazard Evaluation and Emergency Response, Fall 2011, www.hawaii.gov/health/environmental/hazard/eal2005.html.

USEPA, 1994, Synthetic Precipitation Leaching Procedure: U.S. Environmental Protection Agency, Office of Solid Waste, SW-846 Method 1312, September 1994, www.epa.gov/epaoswer/hazwaste/test/main.htm.

USEPA, 1999, Understanding Variation in Partition Coefficient, Kd, Values: Office of Air and Radiation, August 1999, EPA/402/R/99/004A, http://www.epa.gov/radiation/docs/kdreport/

USEPA, 2002, Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites: U.S. Environmental Protection Agency, Solid Waste and Emergency Response, OSWER 9355.4-24, December 2002, http://www.epa.gov/superfund/resources/soil/ssg_main.pdf

Batch Test Leaching Model NAN DU11 3 to 6 inches

Version: Fall 2011

Hawai'i Department of Health

Hazard Evaluation and Emergency Response Office

-Refer to accompanying technical memorandum for background and use of this spreadsheet (HDOH 2007).
-Physiochemical constants updated in Fall 2011 (refer to HDOH 2011).
-Spreadsheet calculates Kd desorption coefficient based on input contaminant concentration in soil and Batch Test data.
-Correlative concentration of contaminant in leachate calculated based on estimated Kd value (may differ from batch test data).
-Future impacts to groundwater estimated using simple groundwater/leachate dilution factor.
-Alternative model based on soil gas data provided in accompanying worksheet.
-Possibility of past impacts to groundwater not considered and must be evaluated separately.
-Check to ensure that this is an up-to-date version of the spreadsheet.
-Remove write protection if problems occur in selection of contaminant. Password to unprotect worksheet is "EAL" (under Tools menu).

STEPS:

1. Select chemical from pulldown list (unlisted chemicals - unprotect spreadsheet and input chemical name and chemical constants).
2. Input total contaminant concentration and SPLP (or other applicable batch test) concentration.
3. Input sample properties. Use default values if sample-specific data are not available.
4. Input Batch Test method information. Default SPLP method parameter values noted.
5. Input groundwater:leachate dilution factor (DF of 1.0 = no dilution; USEPA default = 20, USEPA 2002).
6. Input target groundwater action level for comparison to model calculation of groundwater impacts (optional).
7. Input chemical-specific Henry's Law Constant (Kh) and solubility if "Generic (Volatile)" or "Generic (Nonvolatile)" selected from pulldown list. Input "0" if values not available.
8. Spreadsheet calculates sample-specific Kd value and dissolved-phase concentration of contaminant in saturated sample.
9. Spreadsheet calculates concentration of contaminant in groundwater following impact by leachate.

Step 1: [10]Select Contaminant (use pulldown list)	LEAD

Step 2: Input Sample Data	DEFAULT	INPUT
[1]Concentration in soil sample (mg/kg)	N/A	6.4E+03
[1]Concentration in Batch Test solution (ug/L)	N/A	3.5E+00
Step 3: Input Sample Properties ([5]USEPA soil defaults noted)		
Sample density (g/cm^3)	1.50	1.50
Particle density (g/cm^3)	2.65	2.65
Fraction air-filled porosity (assume saturated soil)	0.00	0.00
Step 4: Batch Test Method Data (SPLP defaults noted)		
[2]Batch Test Solution Volume (ml):	2,000	2,000
[2]Batch Test Solution Density (g/cm^3):	1.0	1.0
[2]Batch Test Sample Weight (grams)	100	100

[3]Step 5: Input Groundwater/ Leachate Dilution Factor	DEFAULT	INPUT
	20	20
[4]Step 6 (optional): Input Target Groundwater Concentration (ug/L)		

Model Results	
[5]Kd partition Coefficient (cm^3/g):	1.8E+06
[6]Estimated Concentration in Source Area Leachate (ug/L):	-
[7]Estimated Concentration in Groundwater (ug/L):	-

Step 7: [10]Chemical Constants [Generic Chemical only]	

Kd >20. Contaminant not significantly mobile for concentration and soil type tested. Do not place below water table without further evaluation. Address other potential environmental concerns as needed (direct exposure, gross contamination, etc.).

Calculations:	
Sample porosity - total	0.43
Sample porosity - air-filled	0.00
Sample porosity - water-filled	0.43
Batch Test Solution Mass (grams)	2.0E+03
Batch Test Sample Mass (grams)	1.0E+02
Sample Mass:Solution Mass Ratio (gm/gm)	5.0E-02
Total Mass of Contaminant (ug)	6.4E+05
Mass Contaminant in Batch Test Solution (ug)	7.0E+00
Mass Contaminant Sorbed to Soil (ug)	6.4E+05
Concentration Sorbed (ug/kg)	6.4E+06
Batch Test Percent Solid Phase	100.0%
Batch Test Percent Dissolved Phase	0.0%
Batch Test Solid-Phase Contaminant Conc. (mg/kg)	6.4E+03
Batch Test Solution Contaminant Conc. (ug/L)	3.5E+00

Notes (refer also to accompanying memo).

1. Total contaminant concentration measured in soil sample and results of Batch Test analysis (e.g., SPLP).
2. Batch Test: Default SPLP method calls for 100 grams of sample and 2 liters of solution with a density of approximately 1.0
3. Site-specific or default groundwater/leachate dilution factor (default = 20, USEPA 2002).
4. Target groundwater action level. Refer to HDOH EAL document and appropriate groundwater category.
5. Partition Coefficient (Kd) = $Concentration_{sorbed}/Concentration_{solution}$ (after Roy et al 1992).
   Partition Coefficient units in L/Kg [(ug/Kg)/ug/L)] or cm^3/g [(ug/g)/ug/cm^3)]
   and assumed equilibrium partitioning (USEPA 2002). Refer to discussion and equations presented in accompanying HDOH
   contaminant concentration in leachate during transport through vadose zone not considered. Refer to Tier 2 concentration
8. Caution Message: A caution message will appear if the input batch test concentration is greater than 75% of the assumed contaminant solubility and a Kd value will not be generated (refer to "Leaching Evaluation of Heavily Contaminated Soils" in text). Model assumes that free product is present in the batch test solution and a Kd cannot be calculated (see text).
9. Error Message: The batch test data are not valid if the contaminant mass calculated for solute exceeds total mass calculated for sample (based on sample mass and input total contaminant concentration). This may not be uncommon given the potential for lab error at very low concentrations of contaminants.
10. "GENERIC CHEMICAL" can be selected from pulldown menu an used to model of any chemical, including chemicals not listed. Selection requires input of Kh (atm m3/mole) and Solubility constants in Step 7 if available. Note that a chemicals physiochemcial constants affect results for VOCs only if input Fraction Air-Filled Porosity is >0% (model considers partitioning into pore space air for VOCs as well as leachate).

References:

HDOH, 2007, Use of laboratory batch tests to evaluate potential leaching of contaminants from soil (updated April 2007): Hawai'i Dept. of Health, Hazard Evaluation and Emergency Response, http://hawaii.gov/health/environmental/hazard/index.html

HDOH, 2011, Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater: Hawai'i Department of Health, Office of Hazard Evaluation and Emergency Response, Fall 2011, www.hawaii.gov/health/environmental/hazard/eal2005.html.

USEPA, 1994, Synthetic Precipitation Leaching Procedure: U.S. Environmental Protection Agency, Office of Solid Waste, SW-846 Method 1312, September 1994, www.epa.gov/epaoswer/hazwaste/test/main.htm.

USEPA, 1999, Understanding Variation in Partition Coefficient, Kd, Values: Office of Air and Radiation, August 1999, EPA/402/R/99/004A, http://www.epa.gov/radiation/docs/kdreport/

USEPA, 2002, Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites: U.S. Environmental Protection Agency, Solid Waste and Emergency Response, OSWER 9355.4-24, December 2002, http://www.epa.gov/superfund/resources/soil/ssg_main.pdf

Batch Test Leaching Model NAN DU12 3 to 6 inches

Version: Fall 2011

Hawai'i Department of Health

Hazard Evaluation and Emergency Response Office

-Refer to accompanying technical memorandum for background and use of this spreadsheet (HDOH 2007).
-Physiochemical constants updated in Fall 2011 (refer to HDOH 2011).
-Spreadsheet calculates Kd desorption coefficient based on input contaminant concentration in soil and Batch Test data.
-Correlative concentration of contaminant in leachate calculated based on estimated Kd value (may differ from batch test data).
-Future impacts to groundwater estimated using simple groundwater/leachate dilution factor.
-Alternative model based on soil gas data provided in accompanying worksheet.
-Possibility of past impacts to groundwater not considered and must be evaluated separately.
-Check to ensure that this is an up-to-date version of the spreadsheet.
-Remove write protection if problems occur in selection of contaminant. Password to unprotect worksheet is "EAL" (under Tools menu).

STEPS:

1. Select chemical from pulldown list (unlisted chemicals - unprotect spreadsheet and input chemical name and chemical constants).
2. Input total contaminant concentration and SPLP (or other applicable batch test) concentration.
3. Input sample properties. Use default values if sample-specific data are not available.
4. Input Batch Test method information. Default SPLP method parameter values noted.
5. Input groundwater:leachate dilution factor (DF of 1.0 = no dilution; USEPA default = 20, USEPA 2002).
6. Input target groundwater action level for comparison to model calculation of groundwater impacts (optional).
7. Input chemical-specific Henry's Law Constant (Kh) and solubility if "Generic (Volatile)" or "Generic (Nonvolatile)" selected from pulldown list. Input "0" if values not available.
8. Spreadsheet calculates sample-specific Kd value and dissolved-phase concentration of contaminant in saturated sample.
9. Spreadsheet calculates concentration of contaminant in groundwater following impact by leachate.

Step 1: [10]Select Contaminant (use pulldown list)	**LEAD**

Step 2: Input Sample Data	**DEFAULT**	**INPUT**
[1]Concentration in soil sample (mg/kg)	N/A	7.9E+03
[1]Concentration in Batch Test solution (ug/L)	N/A	5.0E+00
Step 3: Input Sample Properties ([5]USEPA soil defaults noted)		
Sample density (g/cm^3)	1.50	1.50
Particle density (g/cm^3)	2.65	2.65
Fraction air-filled porosity (assume saturated soil)	0.00	0.00
Step 4: Batch Test Method Data (SPLP defaults noted)		
[2]Batch Test Solution Volume (ml):	2,000	2,000
[2]Batch Test Solution Density (g/cm^3):	1.0	1.0
[2]Batch Test Sample Weight (grams)	100	100

[3]Step 5: Input Groundwater/ Leachate Dilution Factor	**DEFAULT**	**INPUT**
	20	20
[4]Step 6 (optional): Input Target Groundwater Concentration (ug/L)		

Model Results	
[5]Kd partition Coefficient (cm^3/g):	1.6E+06
[6]Estimated Concentration in Source Area Leachate (ug/L):	-
[7]Estimated Concentration in Groundwater (ug/L):	-

Step 7: [10]Chemical Constants [Generic Chemical only]	

Kd >20. Contaminant not significantly mobile for concentration and soil type tested. Do not place below water table without further evaluation. Address other potential environmental concerns as needed (direct exposure, gross contamination, etc.).

Calculations:	
Sample porosity - total	0.43
Sample porosity - air-filled	0.00
Sample porosity - water-filled	0.43
Batch Test Solution Mass (grams)	2.0E+03
Batch Test Sample Mass (grams)	1.0E+02
Sample Mass:Solution Mass Ratio (gm/gm)	5.0E-02
Total Mass of Contaminant (ug)	7.9E+05
Mass Contaminant in Batch Test Solution (ug)	1.0E+01
Mass Contaminant Sorbed to Soil (ug)	7.9E+05
Concentration Sorbed (ug/kg)	7.9E+06
Batch Test Percent Solid Phase	100.0%
Batch Test Percent Dissolved Phase	0.0%
Batch Test Solid-Phase Contaminant Conc. (mg/kg)	7.9E+03
Batch Test Solution Contaminant Conc. (ug/L)	5.0E+00

Notes (refer also to accompanying memo).

1. Total contaminant concentration measured in soil sample and results of Batch Test analysis (e.g., SPLP).
2. Batch Test: Default SPLP method calls for 100 grams of sample and 2 liters of solution with a density of approximately 1.0
3. Site-specific or default groundwater/leachate dilution factor (default = 20, USEPA 2002).
4. Target groundwater action level. Refer to HDOH EAL document and appropriate groundwater category.
5. Partition Coefficient (Kd) = $\text{Concentration}_{sorbed}/\text{Concentration}_{solution}$ (after Roy et al 1992).
   Partition Coefficient units in L/Kg [(ug/Kg)/ug/L)] or cm^3/g [(ug/g)/ug/cm^3)]
   and assumed equilibrium partitioning (USEPA 2002). Refer to discussion and equations presented in accompanying HDOH
   contaminant concentration in leachate during transport through vadose zone not considered. Refer to Tier 2 concentration
8. Caution Message: A caution message will appear if the input batch test concentration is greater than 75% of the assumed contaminant solubility and a Kd value will not be generated (refer to "Leaching Evaluation of Heavily Contaminated Soils" in text). Model assumes that free product is present in the batch test solution and a Kd cannot be calculated (see text).
9. Error Message: The batch test data are not valid if the contaminant mass calculated for solute exceeds total mass calculated for sample (based on sample mass and input total contaminant concentration). This may not be uncommon given the potential for lab error at very low concentrations of contaminants.
10. "GENERIC CHEMICAL" can be selected from pulldown menu an used to model of any chemical, including chemicals not listed. Selection requires input of Kh (atm m3/mole) and Solubility constants in Step 7 if available. Note that a chemicals physiochemcial constants affect results for VOCs only if input Fraction Air-Filled Porosity is >0% (model considers partitioning into pore space air for VOCs as well as leachate).

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In reply, please refer to:
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TO: Interested Parties 2007-223-RB

FROM: Roger Brewer, Ph.D
Environmental Risk Assessment
Hazard Evaluation and Emergency Response

THROUGH: Barbara Brooks, Ph.D
Toxicologist
Hazard Evaluation and Emergency Response

DATE: April 12, 2007

SUBJECT: Use of laboratory batch tests to evaluate potential leaching of contaminants from soil (update to November 2006 technical memorandum)

Executive Summary

This technical memorandum presents the Batch Test Leaching Model (BTLM), a simple, Tier 3 approach for assessing the potential impact to groundwater posed by leaching of contaminants from vadose-zone soils. The BTLM uses site-specific soil data to evaluate contaminant mobility and estimate contaminant concentrations in soil leachate. If the contaminant is deemed sufficiently mobile, the model predicts future impacts to groundwater based on simple leachate dilution assumption. This can then be compared to target groundwater action levels appropriate for the site. An Excel spreadsheet is included to facilitate use of the model. Use of the spreadsheet model only requires input of the concentration of the contaminant in soil (in mg/kg) and the result of the batch test analysis (in µg/L). The BTLM can also be used to develop more realistic, site-specific soil action levels in lieu of the conservative, Tier 1 action levels for this concern published by HDOH. This guidance will be updated periodically as additional information and improved approaches are identified.

The guidance is most pertinent to vadose zone soils. Direct monitoring of groundwater should be carried out to evaluate leaching of contaminants in soils situated below the water table. Guidance presented in this memo does not apply to the evaluation of waste being placed in regulated landfills or to hazardous waste determinations. Evaluation of waste to be placed in landfills must be carried out under direction of the HDOH Solid and Hazardous Waste Branch.

Introduction

At a screening level, leaching of contaminants from soil is the primary environmental concern for the majority of the organic contaminants presented in the Hawai'i Department of Health (HDOH) document *Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater* (i.e., Tier 1 soil action levels for leaching concerns are lower than action levels for direct exposure, vapor intrusion, ecotoxicity and gross contamination concerns, HDOH 2005). Site-specific evaluation is recommended when soil action levels for leaching concerns are exceeded. In addition, action levels for metals are not provided in the document and leaching concerns must again be evaluated on a site-by-site basis. However, easy-to-use and technically sound soil leaching models that can be applied to both organic and inorganic contaminants have been lacking. The guidance presented below is intended to help address this issue.

The guidance focuses on the use of laboratory batch tests to quantify the mobility of the contaminant in soil and estimate the initial concentration of the contaminant in soil leachate. Batch tests involve placing a small amount of the soil in buffered, de-ionized water, agitating the mixture for a set period of time and measuring the fraction of the contaminant that desorbs from the soil and goes into solution. The ratio of the mass of a contaminant that remains sorbed to the mass that goes into solution, adjusted to the test method, is referred to the contaminant's "desorption coefficient" or "Kd" value.

A contaminant's Kd value is a key parameter in soil leaching models. The lower the Kd value, the greater the mobility of the contaminant in soil and the greater the leaching threat. Contaminants with Kd values less than 1.0 are considered to be highly mobile and pose a significant threat to groundwater resources. Contaminants with Kd values greater than 20 are considered to be so tightly bound to the soil that they are essentially immobile and do not pose a significant leaching concern. The strength of binding can vary among different soil types, as well as contaminant concentration and the age of the release.

Batch test data can be input into an Excel spreadsheet model ("Batch Test Leaching Model (April 2007)) that accompanies this technical memorandum to calculate Kd values for target contaminants. Use of the model only requires input of the concentration of the contaminant in soil (in mg/kg) and the results of batch test analysis (in µg/L). Additional, default parameter values in the model can be adjusted if needed but this is generally not recommended. The concentration of the contaminant in leachate hypothetically derived from the soil tested is calculated based on the Kd value determined for the contaminant. The spreadsheet then estimates the ultimate concentration of the contaminant in groundwater based on a simple groundwater/leachate mixing model. The inclusion of a more refined approach for estimating contaminant concentrations in groundwater is anticipated for future updates to this guidance.

The remainder of this guidance provides a detailed discussion of contaminant partitioning in soil, key questions to be asked in site-specific leaching models, batch test methodologies for estimation of site-specific Kd values and calculation of contaminant concentrations in soil leachate and groundwater. Equations used in the Batch Test Leaching Model are presented in Appendix 1. The use of soil gas data to estimate concentrations of volatile contaminants in leachate is also briefly introduced. A detailed understanding of these topics is not necessarily needed to use the accompanying spreadsheets and carry out a simple, site-specific evaluation of potential soil leaching concerns using batch test data. A basic understanding of contaminant fate and transport in the subsurface is very useful, however, in determining how confident one can be in applying the results of the models to actual field conditions.

This memo updates a previous November 2006 version of the guidance and replaces text regarding use of the SPLP test presented in the May 2005 edition of the HDOH document *Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater"* (Volume 1, Section 3.3.3; HDOH 2005). The approach described should be considered guidance only. Alternative approaches can be proposed for specific sites. This guidance will be updated as needed in the future. Comments and suggestions are welcome at any time and should be directed to Roger Brewer of HDOH at roger.brewer@doh.hawaii.gov.

Partitioning of Contaminants in Soil

Contaminants released into soil will partition into up to four different phases in the soil matrix (Figure 1). Some of the contaminant will dissolve into the soil moisture to form leachate. Another portion will chemically bind ("sorb") to soil particles, primarily organic carbon and clay particles. If the contaminant is volatile, a portion will also partition into air-filled pore space as a vapor phase. If the total mass of the contaminant is great enough, the soil particles, soil moisture and soil vapor will become saturated and free-phase product will also be present.

In theory, the various phases of a contaminant will eventually come into equilibrium with each other. The nature of this equilibrium is controlled by the chemical properties of the contaminant, the chemistry and physical properties of the soil and the presence of other contaminants. Contaminants that readily bind to soil particles will be present primarily in the sorbed phase (e.g., PAHs, PCBs, etc.). Contaminants that are not very sorptive will accumulate in the soil moisture or soil vapor (e.g., perchlorate, chlorinated herbicides, BTEX, MTBE, solvents, etc.). Contaminants that are by nature gases will persist mainly as vapors in the air-filled pore space, especially if the soil is very dry (e.g., vinyl chloride).

In the absence of free product, the relationship between sorbed, dissolved and vapor phases of a contaminant in soil is relatively straightforward and can be described by simple partition coefficients (USEPA 2001). A contaminant's "Henry's Law Constant" is the ratio of the vapor-phase concentration of a contaminant to the dissolved-phase concentration, at equilibrium. The Henry's Law Constant is relatively constant between sites, although it may vary slightly due to differences in soil temperature and the presence of other contaminants.

A contaminants sorption coefficient, or "Kd" value, is the ratio of the sorbed-phase concentration to the dissolved-phase concentration, at equilibrium (see Figure 1). For initial screening purposes and calculation of Tier 1 soil Action Levels, Kd values for organic chemicals are estimated using published *sorption* coefficients ("koc" values) and assumptions about the organic carbon content of the soil (Kd = published koc value x assumed fraction organic carbon in soil, typically 0.1%). Generic Kd values have also been published for a limited number of metals and other inorganic contaminants, although they are considered to much less reliable than for organic compounds. In the field, however, contaminant sorption (or more specifically "desorption") coefficients can vary significantly between sites, due to differences in soil properties, the mixture of contaminants present and even the age of the release. The variability of contaminant Kd values in the field implies that this parameter should be included in site-specific evaluations of potential leaching concerns. In practice, this is rarely done.

A contaminants Henry's Law Constant and assumed (or site-specific) Kd value can be used in conjunction with assumed or know soil properties to determine how the contaminant is actually distributed in the soil. Table 1 summarizes the distribution of several common contaminants in soil as assumed in the leaching models used to generate Tier 1 action levels published but HDOH (HDOH 2005). The percent mass in each phase is calculated based rearrangement of a simple equilibrium partitioning equation presented in USEPA's *Soil Screening Guidance* (USEPA 2001, refer also to Appendix 1). Similar assumptions about contaminant partitioning in soil are made in the models used to generate the USEPA Preliminary Remediation Goals or Preliminary Remediation Goals, although this cannot be readily discerned from the equations presented in the accompanying guidance document (USEPA 2004).

As expected, contaminants such as benzo(a)pyrene and PCBs are almost entirely absorbed to soil particles (refer to Table 1). Perhaps surprising, however, is the tendency for the main mass of moderately volatile contaminants such as benzene, PCE and MTBE to be sorbed to soil particles or dissolved in soil moisture, versus being present as vapors in the soil air space. Confusion about this issue has led to over estimation (and probably over concern) of contaminant loss during sampling of soil for this group of chemicals. Compare this to contaminants that are gases and truly volatile by nature, such as vinyl chloride (see Table 1). Testing soil samples for the presence of vinyl chloride and estimating leaching concerns is probably not a worthwhile effort. The use of soil gas samples to estimate concentrations of highly volatile contaminants in soil leachate and even monitor the downward migrating vapor plumes is much more preferable. A brief introduction to this approach is provided later in this guidance and also included in the BTLM spreadsheet.

Site-Specific Evaluation of Soil Leaching Concerns

Four basic questions need to be posed when evaluating the potential for contaminants to leach from soil and impact groundwater (Figure 2):

1. "Is the contaminant potentially mobile?"

2. "What is the concentration of the contaminant in leachate in the primary source area?"

3. "What is the concentration of the contaminant in leachate at the point that the leachate reaches the top of the water table?" and

4. "What is the concentration of the contaminant in groundwater after the leachate has impacted the groundwater?"

Each of these relatively common sense and straight forward questions should be answered in a site-specific evaluation of potential soil leaching concerns. In practice, they rarely are, due in part to the "black box" nature of most soil leaching models. The guidance presented in this technical memorandum focuses on the first two of these questions, contaminant mobility and the initial concentration of the contaminant in leachate.

<u>Mobility in Soil</u>

Contaminant mobility in soil is evaluated in terms of how tightly bound the contaminant is to soil particles. From a modeling perspective, this is again described in terms of the contaminant's desorption coefficient or Kd value. Increasing Kd values reflect decreasing mobility in soil.

Figure 3 presents default, Tier 1 Kd values for several common contaminants and subdivides them in terms of relative mobility or leachability in soil (after Fetter 1993). Contaminants with a generic Kd value of less than 1.0 are considered to be highly mobile in soil, a fact that correlates well with field data and a list of common groundwater contaminants. Contaminants with a Kd value of greater than 20 in soil are considered to be essentially immobile. Not surprisingly, contaminants such as MTBE, PCE, BTEX, perchlorate and chlorinated pesticides like atrazine are predicted to be highly mobile in soil, at least at a screening level, whereas PAHs, PCBs and similar contaminants are considered to be essentially immobile. (Note that trace levels of strongly sorptive contaminants like chlordane in groundwater indicate that these contaminants can be mobile under some circumstances, especially if the leachate is migrating through unweathered bed rock.)

The ability of a contaminant to bind to soil is very much tied to the nature and concentration of the contaminant, the presence of other contaminants that may compete for prime sorption spots, the soil mineralogy and chemistry (including organic carbon and clay content) and the time elapsed since the release of the contaminant. Use of generic Kd values could in theory *under* predict how strongly bound a contaminant is to soil, especially in the presence of other contaminants or in soils with extreme pH, redox or other soil conditions. Based on (admittedly limited) data collected to date, however, generic Kd values typically used for organic contaminants tend to significantly *over* predict the potential mobility of contaminants in soils. This is especially true for organic contaminants. This makes the use of laboratory batch tests very important when Tier 1 action levels or screening levels for potential leaching concerns (based on generic Kd values) suggest that leaching concerns need to be further evaluated.

<u>Initial Concentration in Leachate</u>
A contaminant's Kd value is used in conjunction with it's Henry's Law Constant and assumptions about soil properties to estimate the initial concentration of a contaminant in leachate. The relatively simple equation used to perform this calculation is presented in Appendix 1 and incorporated into the accompanying spreadsheet. The proportion of the contaminant that will move into soil leachate is again mainly controlled or reflected by the contaminant's Kd value. A Kd value less than 1.0 indicates that most of the contaminant will move into soil leachate in comparison to the fraction of the contaminant that will remain sorbed to soil particles.

<u>Concentration in Leachate at Groundwater Interface</u>
As the leachate migrates downward, contaminant concentrations can be progressively reduced due to resorption of the contaminant to soil particles, chemical or biological degradation or volatilization into the soil air space. Estimates of contaminant concentrations in leachate at the point that the leachate reaches the groundwater interface can be made using a vadose-zone fate and transport model. This important step is not included into the BTLM at this time. The BTLM model instead very conservatively assumes that the concentration of the contaminant in leachate at the groundwater interface is equal to that in the initial source area. A more detailed evaluation of contaminant fate and transport in soil leachate (e.g., using SESOIL, VLEACH or other

vadose-zone leaching models) may be particularly useful at sites where the depth to groundwater from the base of the contaminated soil is greater than approximately ten meters and target contaminants that have default koc values greater than 1,000 cm^3/g (e.g., naphthalene), are highly degradable (e.g., TPH and BTEX), and/or are moderately or highly volatile (e.g., PCE and vinyl chloride).

<u>Concentration in Groundwater</u>
The concentration of a contaminant in groundwater after mixing of the leachate with the groundwater can be estimated by either dividing the concentration of the contaminant in leachate by simple dilution factor or again by use of a more rigorous fate and transport model (refer to equations in Appendix 1). The BTLM model presented relies on the former, although a more refined approach may be added in the future.

The HDOH Environmental Action Levels document (or EAL Surfer) should be referred to for target groundwater goals (HDOH 2005). Target groundwater goals will in general be the lowest of the drinking water goal (i.e., lowest of Primary and Secondary MCLs or equivalents), surface water goal (assuming potential discharge to a body of surface water, acute or chronic aquatic toxicity goal based on site location) and any other applicable goals (vapor intrusion, gross contamination, etc.).

Use of Batch Test Data To Estimate Contaminant Kd Values
Relatively simple batch test methods have been in use for decades to evaluate leaching of metals from mine tailings and estimate the mobility of pesticides sprayed on agricultural lands (USEPA 1992, 1999). The tests collectively account for a host of factors that may control binding to (sorption) and leaching of (desorption) contaminants from soil. The tests do not identify exactly how the contaminant is bound to the soil, although a review of soil properties and chemistry can shed light on this issue if needed. The most commonly used batch test method to evaluate potential leaching of contaminants from soil is the *Synthetic Precipitation Leaching Procedure* or "SPLP" test (USEPA 1994, similar to the California "WET" test). The SPLP test is carried out as follows:

Step 1. Analyze soil sample for concentrations of target contaminants (e.g., in mg/kg)

Step 2. Run SPLP test on split sample:

- Place 100 grams soil in two liters of a de-ionized water solution (pH 5.5, 25° C),
- Remove airspace (especially for VOCs),
- Agitate 18 hours.

Step 3. Analyze extract for contaminants of concern.

Step 4. Estimate Kd by comparison of the mass of contaminant that remained sorbed to the soil to the mass of the contaminant that went into solution.

The equations used to calculate a contaminant's Kd value in soil based on batch test data are provided in Appendix 1 and incorporated into the accompanying BTLM spreadsheet. The calculated Kd value is then used to evaluate the potential mobility of the contaminant in the soil and estimate the initial concentration of the contaminant in soil leachate and groundwater, as described in the previous section.

For batch test results that are below standard, commercial lab Method reporting Limits (MRL), Kd can be estimated using 1/2 the MRL. If the estimated Kd is less than 20, a worst-case concentration of the contaminant in groundwater can calculated as described above.

Contaminant Kd values estimated through use of batch tests apply only to the soil tested and only for the reported concentration of the contaminant in the soil. Kd values could vary with respect to contaminant concentration in the same soil type. This may need to be evaluated on a site-specific basis in cases where soil contamination is widespread and very heterogeneous.

For large areas where contaminant concentrations vary significantly and individual spill areas cannot be easily identified, it may be useful to conduct a series of batch tests and evaluate the variation in Kd with respect to contaminant concentrations in soil (keeping in mind the need to separate different soil types). Soil cleanup levels can then be developed by plotting contaminant concentration in soil versus estimated concentration in leachate, generating a regression line through the data (USEPA 1992, 1999). Soil cleanup levels can be calculated or read directly off of the graph by setting a target concentration of the contaminant in the leachate (e.g., target groundwater concentration times assumed groundwater/leachate dilution factor). An example of this approach based on perchlorate soil and SPLP data collected at a site in California is given in Figure 4. (Note that final cleanup standards varied slightly from that noted in the figure due to assumptions about representative contaminant distribution and Kd values in soil across the site.) In Hawai‘i, this approach may be especially useful in the evaluation of large, pesticide mixing areas associated with former agricultural lands.

It is important to understand that batch tests were not designed to directly estimate the concentration of a contaminant in soil leachate. Batch tests were instead designed to calculate Kd sorption or desorption coefficients, which can then be used to estimate contaminant concentrations in leachate if desired. The volume of solution used in batch test can be used to illustrate this point. A solution volume of two liters was selected primarily to help ensure that laboratory detection limits could be met, not to mimic the supposed concentration of the contaminant in actual soil leachate – as is commonly misinterpreted (USEPA 1992). If the same mass of soil (generally 100 grams) were placed in a swimming pool-size volume of solution then the resulting concentrations of target contaminants in the batch test would of course be very different. Assuming that the contaminant is not completely stripped from the soil, however, the ratio of the mass that remains sorbed to the mass that moves into solution (i.e., the Kd value) should be constant. For highly sorptive contaminants (e.g., PCBs and PAHs) and for many metals, the difference between batch test results and calculated concentration of the contaminant in leachate may indeed be very small. For less sorptive contaminants like BTEX, MTBE, perchlorate and moderately mobile pesticides, however, estimated concentrations in leachate may be an order of magnitude or more greater than the concentration reported in the batch test data. This is especially true for contaminants with Kd values less than 20 in the soil tested, where a significant fraction of the contaminant partitions into the batch test solute (e.g., >25%).

Soil Sampling Strategies

A minimum of three soil samples is generally needed to validate batch test data for each area investigated. Recording the soil type and testing for the total organic carbon content and percent clay content of the soil is also recommended. Although not directly incorporated into the BTLM, this information may prove useful in understanding the nature of contaminant binding in the soil and help direct soil cleanup actions, if needed.

For large sites with varying soil types, contaminant mixtures or release histories, it may be necessary to define multiple “decision units” and evaluate each area separately. For example, the binding capacity of sandy soils is likely to be much lower than clayey or organic-rich soils. If both soil types are present at a contaminated site, it would be prudent to treat each soil type area as a separate decision unit.

The collection and analysis of multi-increment samples (essentially very good “composite” samples) is preferred for easily identifiable spill areas or “hot spots,” especially where the primary contaminants are non-volatile. Collection and field-based extraction of multi-increment samples for volatile contaminants may also feasible, although this subject is beyond the current scope of this memo. Guidance on the collection and evaluation of multi-increment samples is currently being prepared by HDOH. In the interim, and especially for cases under the formal oversight of HDOH, it is recommended that potential users of the BTLM guidance review sampling plans with the HDOH project manager prior to collection and submittal of the samples for analysis.

Use of Soil Gas Data to Evaluate Groundwater Protection Concerns

Batch tests can be used to evaluate both nonvolatile and volatile contaminants, although special care must be taken during sampling and testing of the latter (refer to USEPA 1994 SPLP method guidance). The concurrent use of soil gas data to estimate the concentration of volatile contaminants in soil leachate may also be prudent. Reasonably accurate estimations of the contaminant concentrations in soil moisture or leachate can be made by dividing the concentration of the contaminant in soil gas (converted to ug/L) by the chemical’s dimensionless Henry’s Law Constant (see equation in Appendix 1). A simple model based on this approach and incorporating a groundwater:leachate dilution factor is presented in Appendix 1 and included in the BTLM spreadsheet.

Cases where soil gas data may prove beneficial for evaluation of potential impacts to groundwater include: 1) sites with releases of relatively persistent, volatile chemicals that remain very dry throughout much of the year (i.e., non-irrigated areas with very low precipitation, or paved areas that overlie shallow groundwater), 2) sites known to be impacted by volatile contaminants but where specific source areas have not been identified, 3) sites where the threat to groundwater is primarily posed by downward releases of vapors from underground tanks, pipelines, etc., and 4) sites where the vulnerability and sensitivity of the first-encountered groundwater resource is very high (e.g., unconfined aquifer that is currently used as a source of drinking water). In very wet or heavily irrigated areas (e.g., groundwater recharge greater than ten inches or 25cm per year), mass loading of the contaminant to groundwater via vapor-phase plumes is likely to be insignificant in comparison to contaminant migration via leachate. In very dry areas, however, the amount of moisture in the soils may not be sufficient to initiate the downward migration of leachate by the force of gravity. If this is the case then the model discussed above will overstate the potential threat to groundwater posed by dissolved-phase contaminants in the soil moisture.

A focus on the potential for vapor plumes to impact groundwater will be more appropriate for dry areas. Easy-to-use models that specifically evaluate the downward migration of vapor plumes to groundwater are not currently available. An evaluation of potential groundwater impact concerns may instead have to rely on long-term monitoring of soil gas in the vadose zone. Soil gas “action levels” for protection of groundwater can be developed by rearranging the Herny’s Law Constant equation to solve for the concentration of the contaminant in soil vapor and setting the dissolved-phase concentration of the contaminant equal to a target groundwater or leachate goal (refer to equations in Appendix 1).

Soil gas data will be less useful for estimation of semi-volatile contaminant concentrations in leachate. This is due to the very low Henry’s Law Constants for these contaminants and associated limitations on soil gas method reporting limits. As noted in Table 1 for PAHs, the overwhelming majority of the contaminant mass will also be sorbed to the soil, rather than in the soil vapor. Batch tests on representative soil samples therefore offer a better approach for the evaluation of leaching concerns related to these contaminants.

Leaching of Heavily Contaminated Soils

Soils that contain significant amounts of pure-phase or “free” product” may not be amenable to use of the Batch Test Leaching Model as described above (i.e., contaminant that is not sorbed to the soil, dissolved into the soil moisture or present as vapors in air-filled pore space). This is particularly true for soils that are heavily contaminated with petroleum. Contaminant Kd values can only be calculated if any free product present completely dissolves into the batch test solution. If free product forms in the batch test solution then analysis of solution for dissolved-phase constituents will not accurately reflect the total mass of contaminants that were stripped from the soil during the test. This will cause the model to over predict the mass of the contaminant that remained sorbed to the soil and in turn over predict the contaminants Kd value.

If the reported concentration of a contaminant in a batch test analysis exceeds 75% of the assumed solubility then it should be assumed that pure-phase contaminant product may be present in the batch test solution. In such cases, the spreadsheet model will generate a caution message and a Kd value will not be calculated. The potential mobility of the contaminant with respect to it’s Kd value therefore cannot be accurately evaluated. In the spreadsheet model, the estimated concentration of contaminant in soil leachate is set to the highest of the contaminant’s solubility and the reported concentration of the contaminant in the batch test analysis. Potential impacts to groundwater are estimated by dividing the assumed concentration of the contaminant in leachate by the input groundwater:leachate dilution factor. The potential downward mobility of liquid-phase free product in the soil should also be further evaluated.

Special Considerations For Petroleum-Contaminated Soils

Soils impacted by petroleum should be tested for both Total Petroleum Hydrocarbons (TPH) and target indicator compounds, including BTEX, MTBE and related fuel oxygenates and the PAHs naphthalene and methylnaphthalene (refer to Volume 1, Section 2.2.2 in HDOH EAL document, HDOH 2005). Testing for other PAHs is not necessary, due to their relative immobility in soil and low concentration in most petroleum products.

Problems related to the presence of free product in the batch test solution as discussed above could be especially pronounced for soils heavily impacted with middle distillates (diesel, jet fuel, etc.) and heavier residual fuels (waste oil, hydraulic fluid, etc.). The low solubility of these fuels in comparison to gasoline can lead to the presence of droplets of free product in soil at concentrations above only a few hundred parts-per-million (mg/kg) TPH. At high enough concentrations, this could lead to the presence of free product in the batch test solution. This will negate use of the BTLM model to calculate a Kd value for the sample tested and evaluate the potential mobility of the contaminant, as discussed in the previous section.

If the batch test results for Total Petroleum Hydrocarbons (TPH) suggest the potential presence of free product in the solution then the concentration of TPH in soil leachate should be assumed to be equal to the higher of the reported result and the assumed solubility of the targeted petroleum product. In the absence of a more site-specific review, the potential concentration of the contaminant in groundwater should be estimated by dividing the concentration in leachate but the groundwater:leachate dilution factor selected for the site. This is automatically carried out in the accompanying BTLM spreadsheet.

The presence of potentially mobile free product in the soil should also be evaluated. This can be done by comparison of TPH data for vadose-zone soil to HDOH action levels for gross contamination concerns in subsurface soils (HDOH 2005, Appendix 1). An action level of 2,000 mg/kg for gasoline contaminated soils. A somewhat higher action level 5,000 mg/kg is used for soils contaminated with either middle range petroleum distillates (e.g., diesel fuel and jet fuel) or residual fuels (motor oil, waste oil, etc.). These action levels are intended to minimize the presence of mobile free product in soil and are based on field observations and published studies (e.g, API 2000). Minimum conditions for use of the action levels in other areas include: 1) the source of the release has been eliminated, 2) grossly contaminated soil has been removed to the extent practicable (e.g., within 15 feet of the ground surface and/or to the top of bedrock) and 3) remaining contamination does not threaten nearby water supply wells or aquatic habitat (refer also to Volume 1, Section 2.2 of the HDOH 2005 EAL document).

Residual petroleum contamination in soil can be expected to naturally degrade over time. Note that impacted soil that is disturbed during future subsurface activities must also be properly managed. Continued groundwater monitoring may also be required for highly sensitive sites. Additional guidance for the long-term management of petroleum-contaminated soil (and groundwater) is currently being prepared by HDOH.

Other Limitations

Evaluation of Past Impacts to Groundwater

The approach described in this technical memorandum can only be used to predict *future* leaching of contaminants from soil and subsequent impacts to groundwater. Batch tests on residual contaminants in soil cannot necessarily be used to predict if *past* impacts to groundwater may have occurred. In part this is because the contaminants may be much more strongly bound to soil particles under current conditions than during the initial release. The possibility of past impacts to groundwater must be evaluated on a site-by-site basis, based on the nature of the contaminant released, the subsurface geology and the depth to groundwater among other factors.

Placement of Soil Below Water Table

The batch test method may not accurately mimic the placement of contaminated soil or other media below the water table for long periods of time and should not be used to predict these conditions. Long-term immersion could significantly enhance desorption of contaminants, especially if rate-limited processes such as desorption, organic carbon decay or mineral dissolution affect contaminant partitioning. Long-term immersion of the soil could increase impacts to groundwater that significantly exceed levels predicted by short-term batch tests. In the absence of a more detailed groundwater impact study, placement of contaminated soil below the water table or at a depth that is subject to future inundation by a rise in groundwater should be avoided (e.g., areas where the water table has dropped significantly due a prolonged dry period but is expected to rise again in the future). If this cannot be avoided and nearby water supply wells or aquatic habitats could be threatened, then long-term monitoring of the groundwater to verify that the contaminants are not significantly mobile is probably warranted.

Long-Term Groundwater Monitoring

Although the batch test method is believed to be very accurate, long-term groundwater monitoring may be prudent in some cases to verify the results of the evaluation. Monitoring may be especially warranted at sites where batch test data suggest that relatively high concentrations of chlorinated solvents, pesticides or other persistent contaminants can be left in place (e.g., in comparison to Tier 1 action levels for leaching concerns) but important drinking water resources are potentially threatened. Monitoring may also be needed at site where subsurface conditions could change over time and allow for increased leaching of contaminants (e.g., rising water table).

Use of Kd Values in Fate & Transport Models

Contaminant Kd values derived from batch tests cannot necessarily be incorporated into vadose-zone fate and transport models for deeper soils, even if the soil types are very similar. This is because the Kd value most likely reflects an increased difficulty in desorbing or leaching of *aged* contaminants from the tested soil. Use of the Kd value to evaluate migration of the contaminant in leachate through deeper soils not yet impacted by the initial release could over predict *resorption* to soil particles thus *under* predict potential impacts to groundwater. The use of batch tests to estimate site-specific *sorption* coefficients for contaminants in deeper soils may be practical but is beyond the current scope of this technical memorandum.

Evaluation of Solid or Hazardous Waste

Guidance presented in this memo does not apply to the evaluation of waste being placed in regulated landfills or to hazardous waste determinations. Evaluation of waste to be placed in landfills must be carried out under direction of the HDOH Solid and Hazardous Waste Branch.

References:

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Roy, W.R; Krapac, I.G.; Chou, S.F.J.; and R.A. Griffin, 1992, *Batch Type Leaching Procedures For Estimating Soil Absorption of Chemicals*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, EPA/530/SW-87/006-F.

USEPA, 1994, Synthetic Precipitation Leaching Procedure: U.S. Environmental Protection Agency, Office of Solid Waste, SW-846 Method 1312, September 1994, www.epa.gov/epaoswer/hazwaste/test/main.htm.

USEPA, 1999, *Understanding Variation in Partition Coefficient, Kd, Values*: Office of Air and Radiation, August 1999, EPA/402/R/99/004A, http://www.epa.gov/radiation/docs/kdreport/

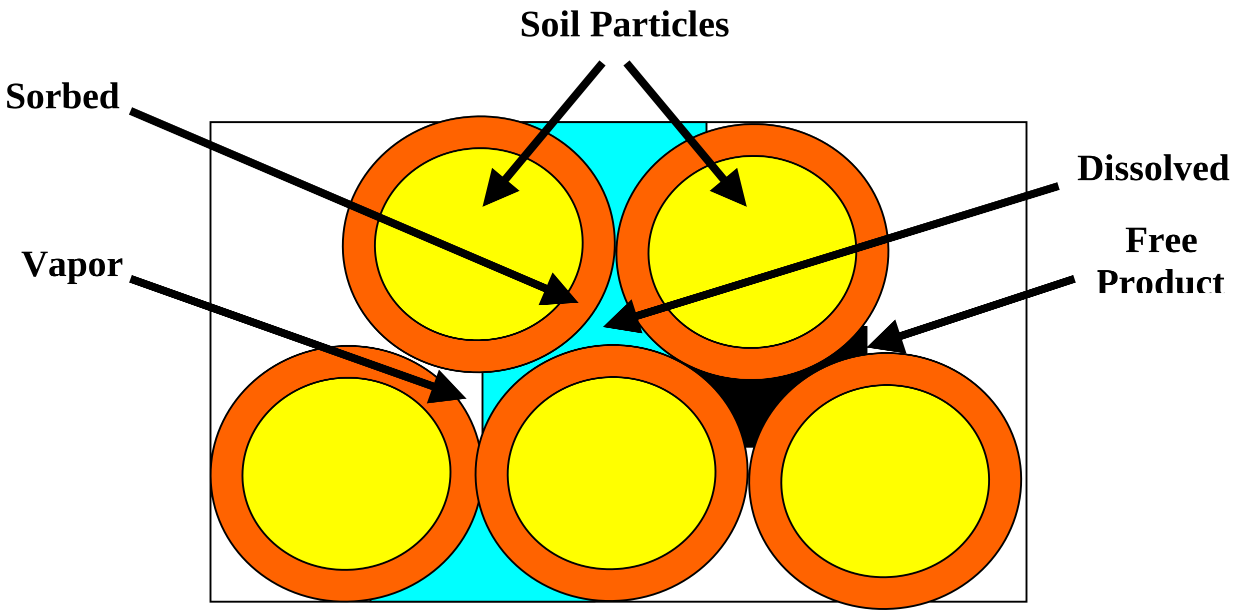
USEPA, 2001, *Supplemental Guidance For Developing Soil Screening Levels For Superfund Sites* (Peer Review Draft, May 2001): U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Publication 9355.4-24.

USEPA, 2004, *Preliminary Remediation Goals*: U.S. Environmental Protection Agency, Region IX, October 2004, www.epa.gov/region09/waste/sfund/prg/index.htm.

Table 1. Distribution of contaminants in soil based on contaminant properties and soil characteristics assumed in Tier 1 leaching models. Note how the fraction of the contaminant in the dissolved-phase is strongly tied to the assumed sorption coefficient or "Kd" value.

Chemical	Default Sorption Coefficient (Kd)	*Contaminant Phase Versus Percent Total Mass in Soil		
		Sorbed	Dissolved	Vapor
Arsenic	29	99.9+%	0.0004%	0%
Benzo(a)pyrene	5,500	99.9+%	0.002%	0%
PCBs	33	99.7%	0.3%	0.01%
TPH	5.0	98%	1.9%	0.1%
Atrazine	0.23	70%	30%	0%
PCE	0.16	39%	25%	35%
Benzene	0.059	29%	50%	21%
MTBE	0.006	5%	91%	4%
Vinyl Chloride	0.0	5%	31%	64%

*Based on soil equilibrium partitioning equation presented in USEPA *Soil Screening Guidance* (USEPA 2001). Leachate is represented by the dissolved-phase mass of the contaminant. For organic contaminants, Tier 1 Kd value = published sorption coefficient (koc) x assumed total organic carbon content in soil of 0.1% (refer to HDOH 2005, Appendix 1, Table H). Assumes and soil moisture content of 0.10. Arsenic default Kd from USEPA *Soil Screening Guidance*.



Partition Coefficients

Kd = Sorbed Concentration/Dissolved Concentration

Henry's Law constant = Vapor Concentration/Dissolved Concentration

Figure 1. Partitioning of contaminants in soil between sorbed, dissolved and vapor phases.

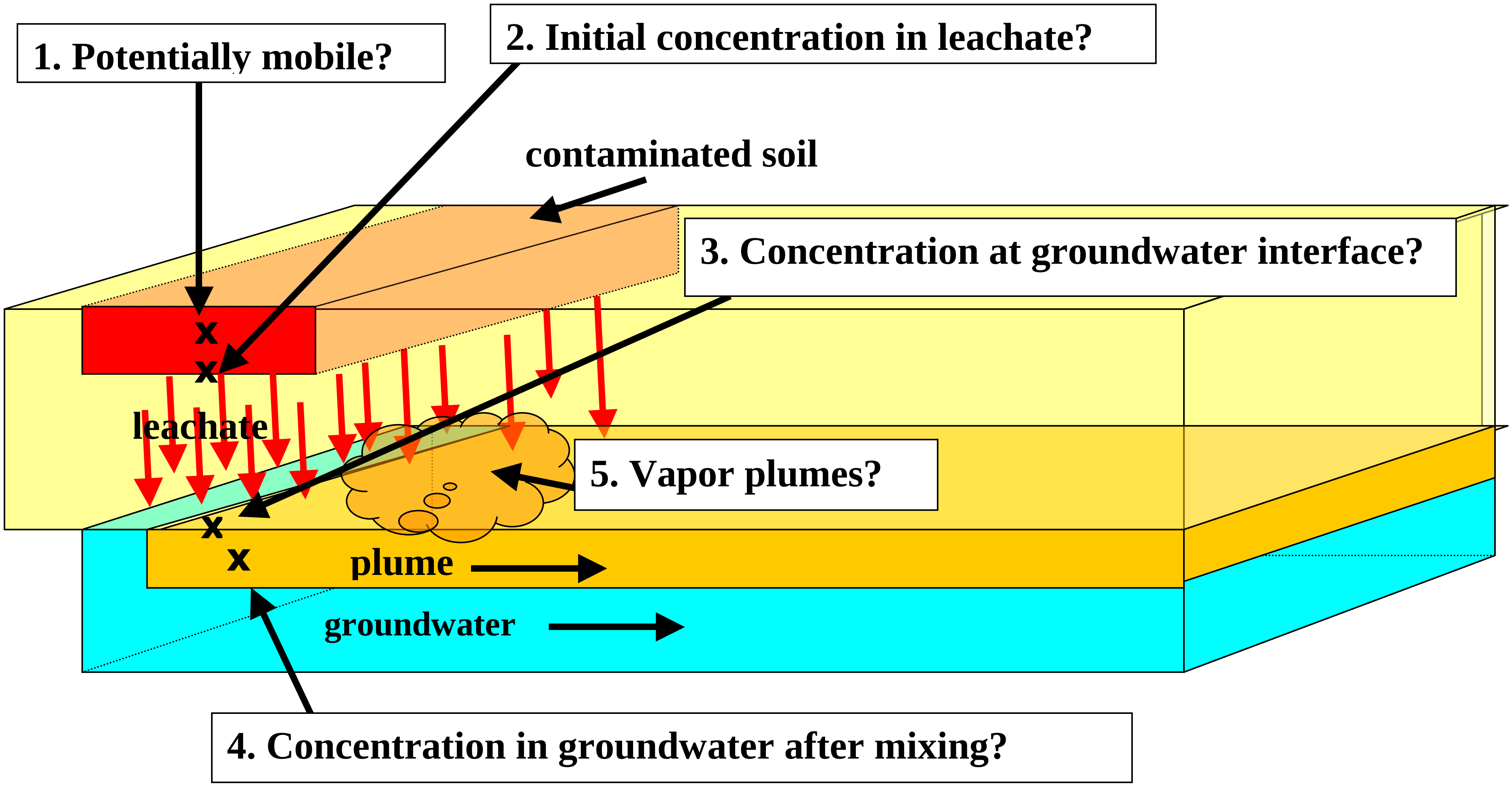


Figure 2. Basic questions that should be answered in all site-specific evaluations of soil leaching concerns. The guidance focuses on site-specific approaches to answering Questions 1 and 2, although approaches for answering the remaining questions are also provided.

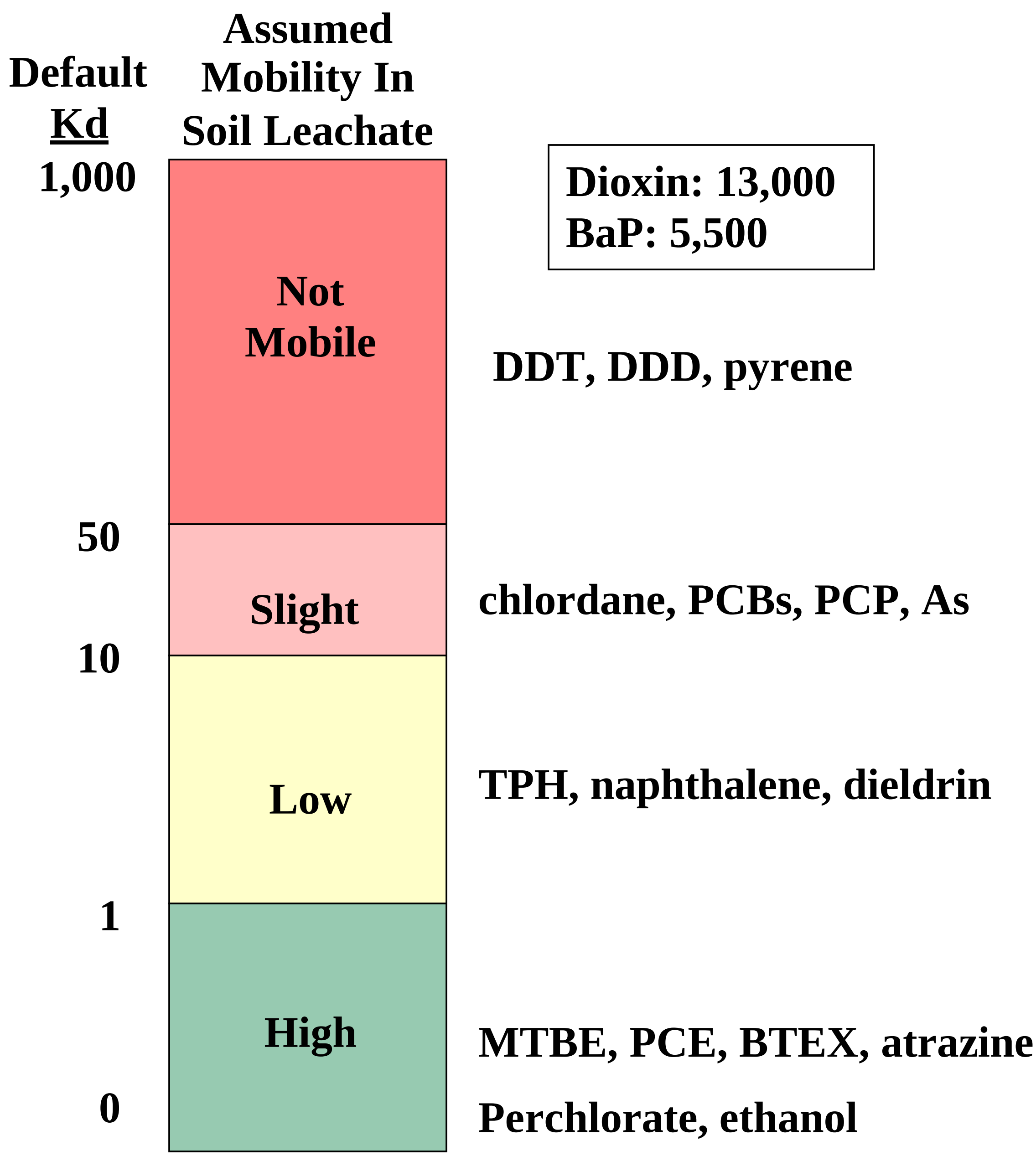


Figure 3. Assumed mobility of contaminants in soil leachate with respect to default Kd values used to develop HDOH Tier 1 soil action levels for leaching concerns. For organic contaminants, Kd values based on published koc sorption coefficients and total organic carbon content in soil of 0.1% (refer to Appendix 1 in HDOH EAL document, HDOH 2005). For arsenic, default Kd value of 29 from USEPA *Soil Screening Guidance* (USEPA 2001).

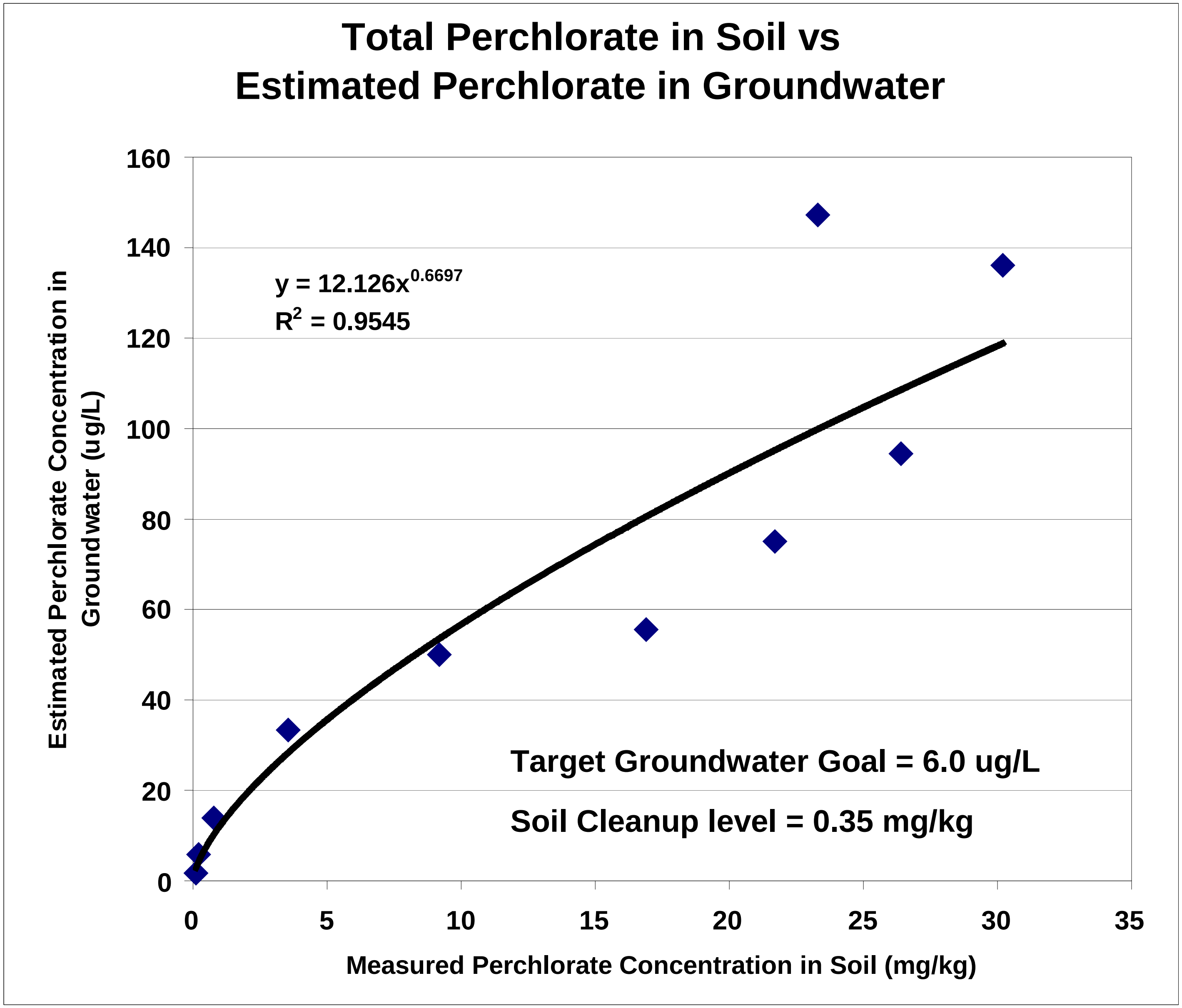


Figure 4. Example graphical calculation of soil cleanup levels based on use of multiple batch tests to estimated perchlorate desorption coefficients and correlative concentrations of perchlorate in soil leachate and groundwater at varying soil concentrations of perchlorate in soil. (For example only.)

Batch Test Leaching Model

Version: April 2007

Hawai'i Department of Health

Hazard Evaluation and Emergency Response Office

Contact: Roger Brewer (roger.brewer@doh.hawaii.gov)

-Refer to accompanying technical memorandum for background and use of this spreadsheet (HDOH 2007).
-Spreadsheet calculates Kd desorption coefficient based on input contaminant concentration in soil and Batch Test data.
-Correlative concentration of contaminant in leachate calculated based on estimated Kd value (may differ from batch test data).
-Future impacts to groundwater estimated using simple groundwater/leachate dilution factor.
-Alternative model based on soil gas data provided in accompanying worksheet.
-Possibility of past impacts to groundwater not considered and must be evaluated separately.
-Check to ensure that this is an up-to-date version of the spreadsheet.
-Password to unprotect worksheet is "EAL" (under Tools menu).

STEPS:

1. Select chemical from pulldown list (unlisted chemicals - unprotect spreadsheet and input chemical name and chemical constants).
2. Input total contaminant concentration and SPLP (or other applicable batch test) concentration.
3. Input sample properties. Use default values if sample-specific data are not available.
4. Input Batch Test method information. Default SPLP method parameter values noted.
5. Input groundwater:leachate dilution factor (DF of 1.0 = no dilution; USEPA default = 20, USEPA 2001).
6. Input target groundwater action level for comparison to model calculation of groundwater impacts (optional).
7. Spreadsheet calculates sample-specific Kd value and dissolved-phase concentration of contaminant in saturated sample.
8. Spreadsheet calculates concentration of contaminant in groundwater following impact by leachate.

Step 1: Select Contaminant (use pulldown list)	**PERCHLORATE**

Step 2: Input Sample Data	**DEFAULT**	**INPUT**
[1]Concentration in soil sample (mg/kg)	N/A	9.2E+00
[1]Concentration in Batch Test solution (ug/L)	N/A	3.7E+02
Step 3: Input Sample Properties ([5]USEPA soil defaults noted)		
Sample density (g/cm^3)	1.50	1.50
Particle density (g/cm^3)	2.65	2.65
Fraction air-filled porosity (assume saturated soil)	0.00	0.00
Step 4: Batch Test Method Data (SPLP defaults noted)		
[2]Batch Test Solution Volume (ml):	2,000	2,000
[2]Batch Test Solution Density (g/cm^3):	1.0	1.0
[2]Batch Test Sample Weight (grams)	100	100

[3]**Step 5: Input Groundwater/ Leachate Dilution Factor**	**DEFAULT**	**INPUT**
	20	20
[4]**Step 6 (optional): Input Target Groundwater Concentration (ug/L)**		5.0E+00

Model Results	
[5]Kd partition Coefficient (cm^3/g):	4.8E+00
[6]Estimated Concentration in Source Area Leachate (ug/L):	1.8E+03
[7]Estimated Concentration in Groundwater (ug/L):	9.0E+01

Chemical Constants (selected from Constants worksheet)	
Kh (atm m3/mole)	0.00E+00
Kh (dimensionless)	0.00E+00
Solubility (ug/L)	2.00E+08

Kd <20. Contaminant potentially mobile in leachate for concentration and soil type tested. Soil leaching and groundwater impact concerns must be addressed if target groundwater action level is exceeded.

Calculations:	
Sample porosity - total	0.43
Sample porosity - air-filled	0.00
Sample porosity - water-filled	0.43
Batch Test Solution Mass (grams)	2.0E+03
Batch Test Sample Mass (grams)	1.0E+02
Sample Mass:Solution Mass Ratio (gm/gm)	5.0E-02
Total Mass of Contaminant (ug)	9.2E+02
Mass Contaminant in Batch Test Solution (ug)	7.4E+02
Mass Contaminant Sorbed to Soil (ug)	1.8E+02
Concentration Sorbed (ug/kg)	1.8E+03
Batch Test Percent Solid Phase	19.3%
Batch Test Percent Dissolved Phase	80.7%
Batch Test Solid-Phase Contaminant Conc. (mg/kg)	1.8E+00
Batch Test Solution Contaminant Conc. (ug/L)	3.7E+02

Figure 5. Main page of HDOH Batch Test Leaching Model that accompanies the technical memorandum (as of April 2007).

Appendix 1
Batch Test and Soil Gas Leaching Model Equations

Batch Test Leaching Model Equations

The equations discussed below are incorporated into the Excel-based Batch Test Leaching Model that accompanies this technical memorandum. Figure 5 in the main text depicts the first page of the model (April 2007 version). The model will be updated as needed in the future.

Step 1. Calculate a partition coefficient for each chemical of potential concern.

The results of the SPLP test can be used to develop a sample-specific partition coefficient (Kd) for each chemical of potential of concern. The partition coefficient is calculated as follows (after Roy et. al, 1992; see also McClean and Bledsoe, 1992, and USEPA 1999):

$$Kd\ (L/kg) = \frac{Concentration_{sorbed}(\mu g/Kg)}{Concentration_{solution}(\mu g/L)} \tag{1}$$

where $Concentration_{sorbed}$ is the concentration of the contaminant that remained sorbed to the soil following the batch test and $Concentration_{solution}$ is the resulting concentration of the contaminant in the batch test solution. The term Kd is commonly reported in equivalent units of (ug/g)/(ug/cm^3) or cm^3/g, based on an assumed batch test solution density of 1.0 g/cm^3.

The sorbed concentration of the contaminant is calculated as follows:

$$Concentration_{sorbed}(ug/kg) = \frac{Mass_{sorbed}(\mu g)}{Sample\ Mass\,(kg)}. \tag{2}$$

where $Mass_{sorbed}$ is the mass of the contaminant still sorbed to the soil following the batch test. The mass of the sample called for in the SPLP batch test is 100 grams or 0.1 Kg (USEPA 1994).

The mass of the contaminant sorbed to the soil is calculated by subtracting the mass of the contaminant that went into the batch test solution from the initial, total mass of the contaminant in the soil sample:

$$Mass_{sorbed}(\mu g) = Mass_{total}(\mu g) - Mass_{solution}(\mu g) \tag{3}$$

where $Mass_{total}$ is original, total mass of the contaminant in the soil sample and $Mass_{solution}$ is the mass of the contaminant in the batch test solution. The total mass of the contaminant in the soil sample is calculated as:

$$Mass_{total}(\mu g) = Concentration_{total}\ (mg/kg) \times \left(\frac{1{,}000\,\mu g}{1mg}\right) \times Sample\ Mass(kg) \tag{4}$$

where $Concentration_{total}$ is the reported total concentration of the contaminant in the soil sample that used in the batch test (tested on a split sample). The mass of the contaminant in the batch test solution is calculated as:

$$Mass_{solution}(\mu g) = Concentration_{solution}(\mu g/L) \times Solution\,Volume(L)\,. \tag{5}$$

The default volume of solution used in SPLP batch tests is two liters (USEPA 1994).

Note that use of the batch test method to estimate Kd values is not longer valid if the solubility limit of the contaminant is exceeded in the batch test solution (refer to section on Leaching of Heavily Contaminated Soils in the main text). Exceeding the contaminants solubility suggests that free product is present in the soil (either liquid or dry). As a precautionary measure, a cutoff of 75% the assumed contaminant solubility is used in the Batch Test Leaching Model spreadsheet to identify if free product may be present in the batch test solution. The free product acts as a second reservoir of contaminant mass that will bias the true equilibrium concentration of the contaminant in the dissolved and sorbed phases. To accurately calculate desorption coefficients, batch test analyses must be run samples with lower concentrations of the contaminant in soil.

Step 2. Estimate the concentration of the contaminant in source-area leachate.
Once the soil-specific Kd value for a target contaminant has been determined, it is relatively simple to estimate the concentration of the contaminant in the soil moisture or "leachate" within the main body of contaminated soil or the leachate "source area"). This is done by incorporating the calculated Kd into a simple equilibrium partitioning equation and assuming default (or site-specific) soil properties (after USEPA 2001):

$$C_{total} = C_{leachate} \times \left(Kd + \left(\frac{\theta_w + (\theta_a \times H')}{\rho b} \right) \right) \times \left(\frac{1mg}{1000\mu g} \right) \qquad (6)$$

where: C_{total} = Total concentration of chemical in sample (mg/kg);

$C_{leachate}$ = Dissolved-phase concentration of chemical (µg/L);

Kd = Estimated or measured partition coefficient L/kg;

$Theta_w$ = water-filled porosity (L_{water}/L_{soil});

$Theta_a$ = air-filled porosity (L_{air}/L_{soil});

H' = Henry's Law Constant at 25°C ((µg/L-vapor)/(µg/L-water)); and

p_b = Soil bulk density (Kg/L).

Table H in Appendix 1 of the HDOH EAL document provides a summary of "dimensionless" Henry's Law Constants (H') for common volatile contaminants (HDOH 2005). For the purpose of calculating Tier 1 action levels, Kd is calculated as the chemical's published organic carbon partition coefficient (koc) times the fraction organic carbon in the soil (foc). This is discussed in Appendix 1 of the HDOH Environmental Action Levels document (HDOH 2005). Note that in this equation Kd and p_b are expressed in units of L/Kg and Kg/L, respectively, rather than in equivalent units of cm^3/g and g/cm^3. A default soil density of 1.5 Kg/L and soil porosity of 43% (0.43) are typically used in Tier 1 risk assessment models (e.g., USEPA 2001, 2004).

Equation 6 can be rearranged to solve for $C_{leachate}$ as follows:

$$C_{leachate} = C_{total} \div \left(\left(Kd + \left(\frac{\theta_w + (\theta_a \times H')}{\rho b} \right) \right) \times \left(\frac{1mg}{1000\mu g} \right) \right). \quad (7)$$

This equation is incorporated into the "Batch Test Leaching Model" worksheet of the Excel file that accompanies this technical memo. The sorption coefficient should be used to estimate the dissolved-phase concentration of the contaminant in a hypothetical, saturated sample of soil at equilibrium and at the same contaminant concentration as the SPLP test. Since the soil is assumed to be fully saturated with water, the vapor-phase term of the equation "θ_a x H'" goes to zero.

Step 3. Tier 3 calculation of ultimate contaminant concentration in groundwater.

A conservative estimate of the contaminant concentration in groundwater that cuold be impacted by the leachate is made by dividing the calculated concentration of the contaminant in leachate by an assumed groundwater:leachate dilution factor (DF):

$$C_{groundwaater} = \frac{C_{leachate}}{DF} \quad (8)$$

$$DF = \frac{\text{Volume Impacted Groundwater}}{\text{Volume Leachate}}. \quad (9)$$

where: $C_{groundwater}$ = Concentration of chemical in groundwater (µg/L);
$C_{leachate}$ = Concentration of chemical in leachate (µg/L); and
DF = Groundwater/Leachate dilution factor (m^3/m^3).

This equation is incorporated into the Batch Test Leaching Model spreadsheet that accompanies this technical memo. A default DF of 20 is considered appropriate for sites less than or equal to 0.5 acres in size (USEPA 2001). A more site-specific DF factor can be calculated if needed, based on the following equation (USEPA 2001):

$$\text{Dilution Factor} = 1 + \left(\frac{K \times i \times d}{I \times L} \right) \quad (10)$$

where "K" is the aquifer hydraulic conductivity (m/year), "i" is the regional hydraulic gradient, "d" is the assuming mixing zone depth (default is two meters), "I" is the surface water infiltration rate (m/year" and "L" is the length of the contamianted soil area that is parallel to groundwater flow (m).

Note that this equation does not consider an expected reduction in contaminant concentrations as the leachat migrates downward. This component of the evalaution can be included in more site-specific evaluations as needed.

Soil Gas Leaching Model

For volatile contaminants, soil gas data offer an alternative approach for estimation of contaminant concentrations in leachate as well as a method to evaluate the threat posed to groundwater by downward migrating vapor plumes. The relationship between vapor-phase and dissolved-phase volatile chemicals under equilibrium conditions is relatively straightforward:

$$H' = \frac{Cvapor\ (ug/L)}{Cleachate\ (ug/L)}. \qquad (11)$$

where: H'=Henry's Law Constant at 25°C;
C_{vapor}= Vapor-phase concentration in soil gas;
$C_{leachate}$= Dissolved-phase concentration in soil pore waters.

Table H in Appendix 1 of the HDOH EAL document provides a summary of "dimensionless" Henry's Law Constants (H') for common volatile contaminants (HDOH 2005). To calculate the concentration of the contaminant in the soil moisture the equation is rearranged to solve for "$C_{leachate}$." The C_{vapor} term is also adjusted to units of ug/m3 to correspond with the units typically reported in site data:

$$Cleachate\ (ug/L) = \frac{Cvapor\ (ug/m3) \times \frac{1\ m3}{1{,}000\ L}}{H'}. \qquad (12)$$

Equation 8 above can be used to estimate potential impacts to groundwater with respect to soil gas-based estimates of contaminant concentrations of the in leachate.

Soil gas "action levels" for protection of groundwater can be developed by rearranging the equation to solve for C_{vapor} and setting $C_{leachate}$ equal to a target leachate goal (e.g., groundwater action level times appropriate groundwater:leachate dilution factor):

$$\mathrm{Cvapor\ (ug/m3) = Cleachate\ (ug/L) \times H' \times \frac{1{,}000\ L}{1\ m3} \times AF} \qquad (13)$$

The term "AF" is an attenuation factor that describes the anticipated decrease in contaminant concentrations over time as the vapor migrates to and eventually impacts groundwater (e.g., via natural degradation, resorption to soil particles or migration into soil moisture). Approaches for calculation of site-specific, vapor attenuation factors are not well established and beyond the scope of this technical memorandum.

APPENDIX B2:

Toxicity Characteristic Leaching Procedure (TCLP) Results

Lab Report Available in Appendix A2

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Table B2: Analytical Soil Profiling Results - TCLP RCRA Regulated Metals - Nanue Bridge (Page 1 of 3)

			Sample Identifier	NAN_DU1_0-3_B			NAN_DU2_6-9			NAN_DU3_6-9		
			Sample Date	5-Mar-2024			6-Mar-2024			6-Mar-2024		
			Sample Depth (inches bgs)	0-3			6-9			6-9		
Analyte	Analytical Method	Units	Regulatory Limits for TCLP Metals	**Results**	Q	RL	**Results**	Q	RL	**Results**	Q	RL
Toxic Characteristic Leaching Procedure (TCLP) Resource Conservation and Recovery Act (RCRA) Regulated Metals												
Arsenic	EPA 6010D	mg/L	5.0	ND		0.060	ND		0.060	ND		0.060
Barium	EPA 6010D	mg/L	100	**0.89**		0.020	**0.98**		0.020	**1.0**		0.020
Cadmium	EPA 6010D	mg/L	1.0	ND		0.020	ND		0.020	ND		0.020
Chromium	EPA 6010D	mg/L	5.0	ND		0.025	ND		0.025	ND		0.025
Lead	EPA 6010D	mg/L	5.0	**0.60**		0.030	**0.69**		0.030	**1.1**		0.030
Mercury	EPA 7470A	mg/L	0.2	ND	H	0.0030	ND	H	0.0030	ND	H	0.0030
Selenium	EPA 6010D	mg/L	1.0	ND		0.10	ND		0.10	ND		0.10
Silver	EPA 6010D	mg/L	5.0	ND		0.050	ND		0.050	ND		0.050

Notes:

BGS = below ground surface

mg/L = milligram(s) per liter

ND = not detected in concentrations above the laboratories method reporting limit

RL = reporting limit

Q = qualifier

H = Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.

Table B2: Analytical Soil Profiling Results - TCLP RCRA Regulated Metals - Nanue Bridge (Page 2 of 3)

			Sample Identifier	NAN_DU8_0-3			NAN_DU9_0-3			NAN_DU10_3-6		
			Sample Date	3-Mar-2024			9-Mar-2024			9-Mar-2024		
			Sample Depth (inches bgs)	0-3			0-3			3-6		
Analyte	Analytical Method	Units	Regulatory Limits for TCLP Metals	**Results**	Q	RL	**Results**	Q	RL	**Results**	Q	RL
Toxic Characteristic Leaching Procedure (TCLP) Resource Conservation and Recovery Act (RCRA) Regulated Metals												
Arsenic	EPA 6010D	mg/L	5.0	ND		0.060	ND		0.060	ND		0.060
Barium	EPA 6010D	mg/L	100	**1.1**		0.020	**0.64**		0.020	**1.1**		0.020
Cadmium	EPA 6010D	mg/L	1.0	ND		0.020	ND		0.020	ND		0.020
Chromium	EPA 6010D	mg/L	5.0	ND		0.025	ND		0.025	ND		0.025
Lead	EPA 6010D	mg/L	5.0	**3.7**		0.030	**2.8**		0.030	**17 ****		0.030
Mercury	EPA 7470A	mg/L	0.2	ND	H	0.0030	ND	H	0.0030	ND	H	0.0030
Selenium	EPA 6010D	mg/L	1.0	ND		0.10	ND		0.10	ND		0.10
Silver	EPA 6010D	mg/L	5.0	ND		0.050	ND		0.050	ND		0.050

Notes:

BGS = below ground surface

mg/L = milligram(s) per liter

ND = not detected in concentrations above the laboratories method reporting limit

RL = reporting limit

Q = qualifier

H = Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.

** = above regulatory limits

Table B2: Analytical Soil Profiling Results - TCLP RCRA Regulated Metals - Nanue Bridge (Page 3 of 3)

			Sample Identifier Sample Date Sample Depth (inches bgs)	NAN_DU11_3-6 10-Mar-2024 6-Mar			NAN_DU12_3-6 10-Mar-2024 3-6		
Analyte	Analytical Method	Units	Regulatory Limits for TCLP Metals	**Results**	Q	RL	**Results**	Q	RL
Toxic Characteristic Leaching Procedure (TCLP) Resource Conservation and Recovery Act (RCRA) Regulated Metals									
Arsenic	EPA 6010D	mg/L	5.0	ND		0.060	ND		0.060
Barium	EPA 6010D	mg/L	100	**0.92**		0.020	**0.86**		0.020
Cadmium	EPA 6010D	mg/L	1.0	ND		0.020	ND		0.020
Chromium	EPA 6010D	mg/L	5.0	ND		0.025	ND		0.025
Lead	EPA 6010D	mg/L	5.0	**12 ** **		0.030	**23 ** **		0.030
Mercury	EPA 7470A	mg/L	0.2	ND	H	0.0030	ND	H	0.0030
Selenium	EPA 6010D	mg/L	1.0	ND		0.10	ND		0.10
Silver	EPA 6010D	mg/L	5.0	ND		0.050	ND		0.050

Notes:

BGS = below ground surface

mg/L = milligram(s) per liter

ND = not detected in concentrations above the laboratories method reporting limit

RL = reporting limit

Q = qualifier

H = Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.

** = above regulatory limits

APPENDIX C:

Limited Lead Paint Sampling Report

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EnviroQuest

Mr. Randall Urasaki
WSP USA
1001 Bishop Street, Suite 2400
American Savings Bank Tower
Honolulu, Hawaii 96813

August 21, 2024

Subject: Limited Lead Paint Sampling
Nanue Bridge
Hawaii County, Hawaii

Dear Mr. Urasaki

On August 4, 2024, under the guidance of WSP USA, Inc., EnviroQuest, Inc, (EQI) collected ten paint chips samples for lead analysis at Nanue Bridge in Hawaii County, Hawaii. Samples were collected from the steel beam and girders which may be repaired or replaced during repair work by Hawaii Department of Transportation. All samples were gray paint, and no other colors were present/visible during sample collection. Samples were collected to bare metal substrate. All samples were collected from ground level to 6 ft above ground elevation. Access and slope conditions limited the sample collection area.

Figure 1 identifies the general site area of Nanue Bridge, and Figure 2 identifies the sample locations. The sample IDs (DU2, DU3, etc.) correspond to decision units from the Spring 2024 EQI soil sample site investigation at Nanue Bridge.

Samples were submitted to Hawaii Analytical Laboratory (HAL) in Honolulu, Hawaii, an American Industrial Hygiene Association (AIHA) accredited laboratory with a specific accreditation for lead analysis under AIHA Environmental Lead Laboratory Accreditation Program. The paint film samples were analyzed by NIOSH Method 7082m *Lead by Flame* Atomic Absorption Spectrophotometry.

Based on the laboratory analytical results, none of the 10 samples exceeded the EPA guidelines for lead based paint. The EPA defines lead-based paint as paint or other coatings containing lead equal to, or in excess of, 0.5% lead by weight.

For the purpose of this report, lead containing paint (LCP) is classified as paint where the lead detected is greater than the laboratory analytical detection limit but less than 0.5% lead by weight. All of the samples were classified as LCP under this scenario. A summary of the data is presented in Table 1.

Prior to the disturbance of any LCP, the contractor's employees disturbing the painted materials must be informed that it contains lead and must conduct all lead paint disturbance work in accordance with Occupational Safety and Health Administration (OSHA) 29 CFR 1926.62 *Lead*.

If lead paint chip or waste is generated during the renovation and/or demolition work, composite samples of the generated waste must be collected for *Toxicity Characteristic Leaching Procedure* (TCLP) analysis to determine the waste disposal characterization. *Hawaii Administrative Rules, Title 11, Department of Health, Chapter 261, Hazardous Waste*

Management allows a maximum concentration of lead contaminant by TCLP at 5.0 mg/L. TCLP results exceeding the 5.0 mg/L threshold requires the material to be disposed of as hazardous waste. Results below this threshold allow for the lead waste to be disposed of as construction debris.

TABLE 1
Paint Chip Sample Summary
Nanue Bridge, HI

Sample No.	Sample Location/Description	Result (wt. %)	**LBP[1] (Y/N)**	**LCP[2] (Y/N)**
NAN_Pb_DU2a	N. Embankment, DU2, eastern support girder	0.14	N	Y
NAN_Pb_DU2b	N. Embankment, DU2, middle	0.041	N	Y
NAN_Pb_DU2c	N. Embankment, DU2, western support	0.021	N	Y
NAN_Pb_DU3a	N. Embankment, DU3, middle	0.0087	N	Y
NAN_Pb_DU3b	N. Embankment, DU3, western beam	0.066	N	Y
NAN_Pb_DU9	S. Embankment, DU9, southeastern footing	0.019	N	Y
NAN_Pb_DU10a	S. Embankment, DU10, southeastern footing	0.094	N	Y
NAN_Pb_DU10a2	S. Embankment, DU10, southwestern footing	0.047	N	Y
NAN_Pb_DU10b	S. Embankment, DU10, northeastern footing	0.055	N	Y
NAN_Pb_DU10b2	S. Embankment, DU10, northwestern footing	0.031	N	Y

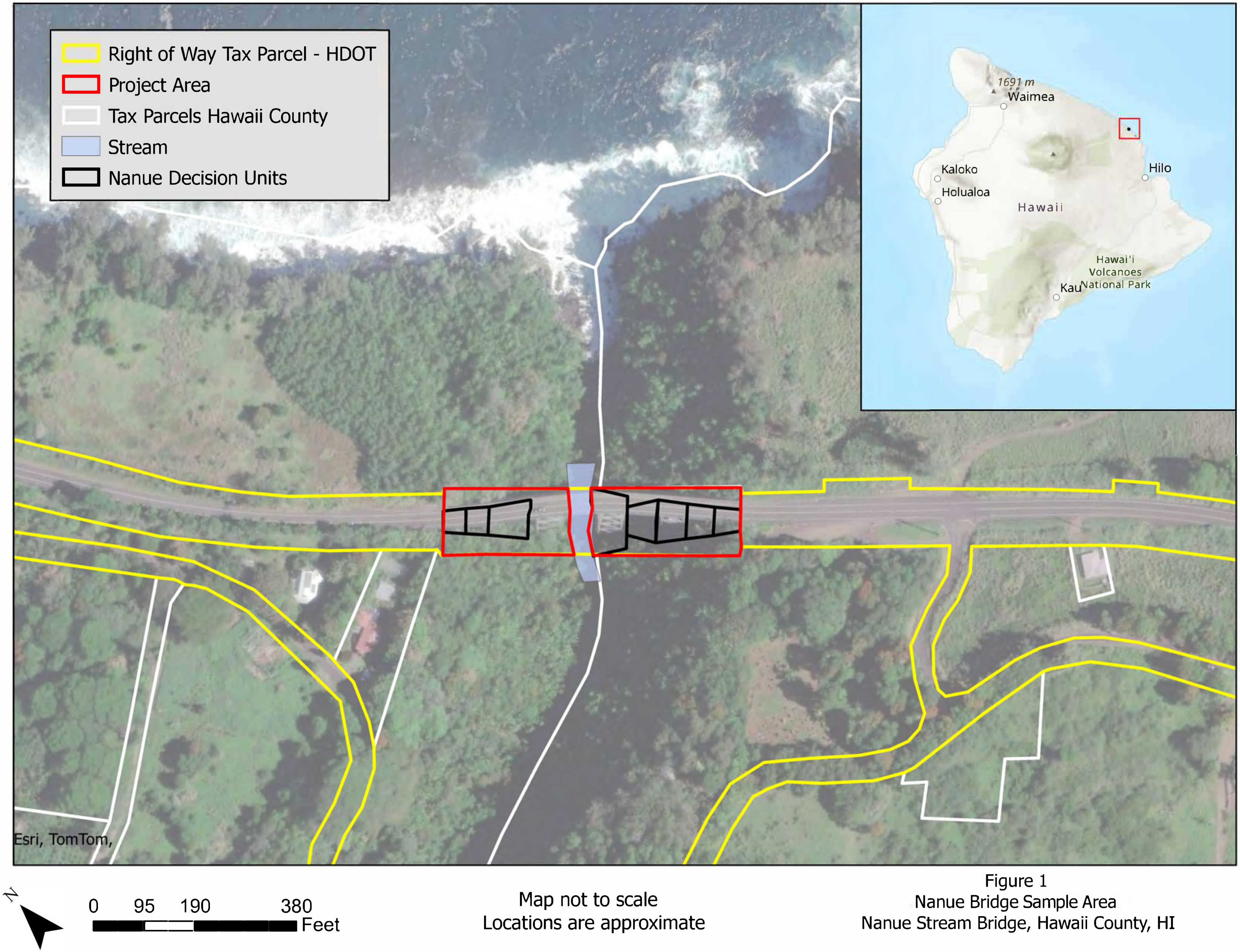
1. LBP = >0.5% lead by weight
2. LCP = >laboratory detection limit but <0.5%
3. BDL= Below the laboratory detection limit

EQI appreciates this opportunity to assist with your lead sampling needs. Any question regarding our work and this report, the presentation of the information, and the interpretation of the data are welcome and should be referred to the undersigned. We look forward to working with you again in the future.

Sincerely,

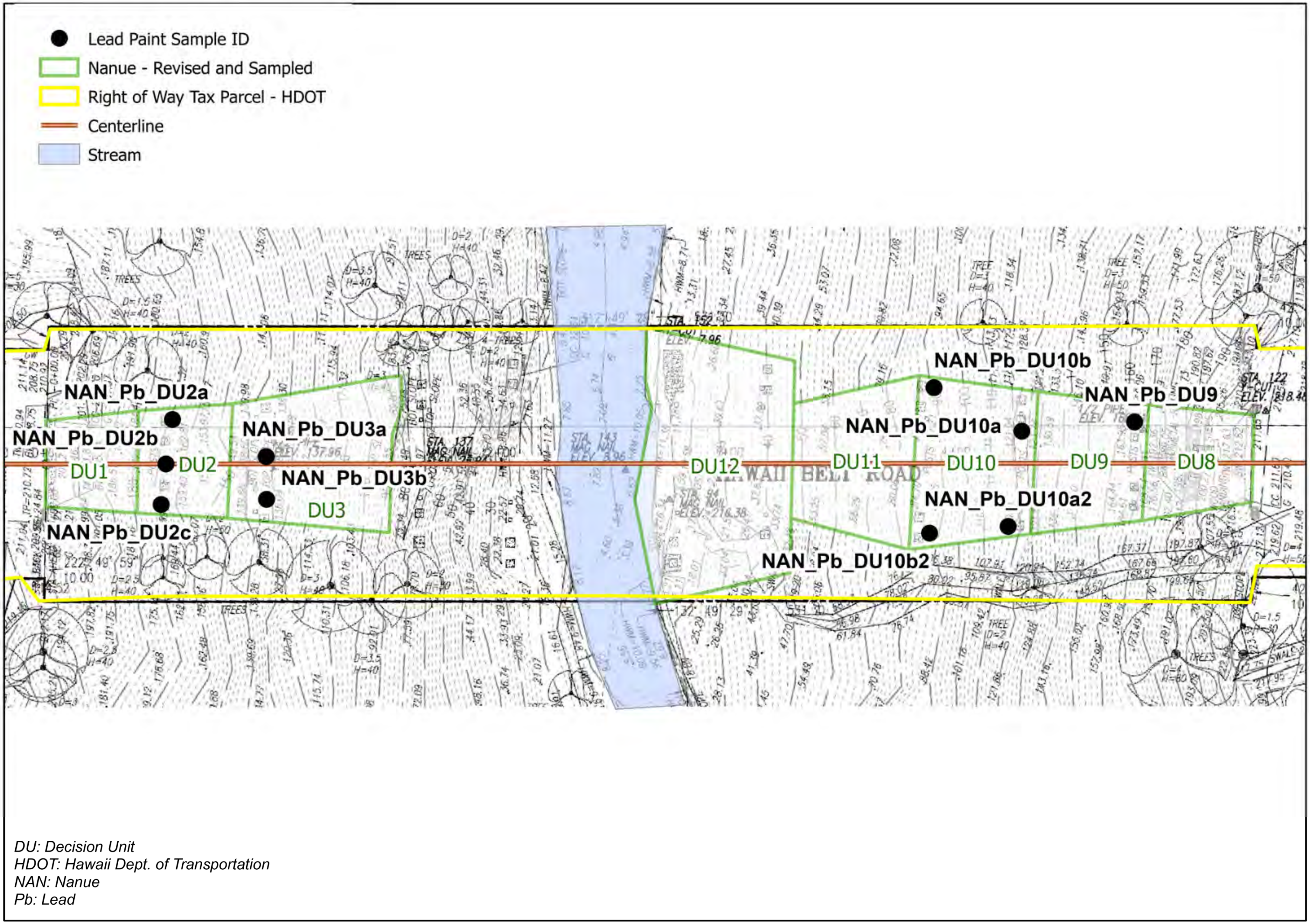
Scott Moncrief, LG

Attachments
Laboratory Analytical Report
Figure 1: Nanue Bridge Sample Area
Figure 2: Lead Paint Sample Locations and ID



Map not to scale
Locations are approximate

Figure 1
Nanue Bridge Sample Area
Nanue Stream Bridge, Hawaii County, HI



DU: Decision Unit
HDOT: Hawaii Dept. of Transportation
NAN: Nanue
Pb: Lead

Map not to scale
Locations are approximate

Figure 2
Lead Paint Sample Locations and ID
Nanue Stream Bridge, Hawaii County, HI

EnviroQuest

Nanue Bridge Lead Paint Chip Samples: August 4, 2024

Sample NAN_PB_DU2a

Sample NAN_PB_DU2b

Sample NAN_PB_DU2c

Sample NAN_PB_DU3a

EnviroQuest

 Sample NAN_PB_DU3b	 Sample NAN_PB_DU9a
 Sample NAN_PB_DU10a	 Sample NAN_PB_DU10a2

Sample NAN_PB_DU10b	Sample NAN_PB_DU10b2

Hawaii Analytical Laboratory
ANALYTICAL REPORT

Monday, August 12, 2024

EnviroQuest, Inc.
98-029 Hekaha Street, Suite 21
Aiea HI 96701

Phone Number: (808)486-5881
Facsimile: (808) 486-5889
Email: eqi@enviroquestinc.com

Lab Job No: 202407893
Date Submitted: 8/5/2024
Project Name: Nanue Bridge Lead Assessment, 8/4/24

Total Lead (paint chips)

NIOSH Method: 7082m LEAD by FAAS

Sample No.	Your Sample ID / Description	Results	Units	Date Analyzed
202454276	**NAN_Pb_DU9**	0.019	wt %	8/7/2024
Comments				
202454277	**NAN_Pb_DU10a**	0.094	wt %	8/7/2024
Comments				
202454278	**NAN_Pb_DU10a2**	0.047	wt %	8/7/2024
Comments				
202454279	**NAN_Pb_DU10b**	0.055	wt %	8/7/2024
Comments				
202454280	**NAN_Pb_DU10b2**	0.031	wt %	8/7/2024
Comments				
202454281	**NAN_Pb_DU2a**	0.14	wt %	8/7/2024
Comments				
202454282	**NAN_Pb_DU2b**	0.041	wt %	8/7/2024
Comments				
202454283	**NAN_Pb_DU2c**	0.021	wt %	8/7/2024
Comments				
202454284	**NAN_Pb_DU3a**	0.0087	wt %	8/7/2024
Comments				

EnviroQuest, Inc.
98-029 Hekaha Street, Suite 21
Aiea HI 96701

Phone Number: (808)486-5881
Facsimile: (808) 486-5889
Email: eqi@enviroquestinc.com

Lab Job No: 202407893
Date Submitted: 8/5/2024
Project Name: Nanue Bridge Lead Assessment, 8/4/24

Total Lead (paint chips)

NIOSH Method: 7082m LEAD by FAAS

Sample No.	Your Sample ID / Description	Results	Units	Date Analyzed
202454285	**NAN_Pb_DU3b**	0.066	wt %	8/7/2024
Comments				

All Quality Control data are acceptable unless otherwise noted.
MRL for lead air is 5ug.
MRL for lead wipe is 10ug.
MRL for lead paint or soil is 40 mg/kg for a 0.25g sample.

General Comments
The sample[s] analysis subject of this analytical report were conducted in general accordance with the procedures associated with the "analytical method" referenced above. Modifications to this methodology may have been made based upon the analyst's professional judgment and / or sample matrix effects encountered. The analysis of sample relates only to the sample analyzed, and may or may not be representative of the original source of the material submitted for our analysis. All analysts participate in interlaboratory quality control testing to continuously document profiency. This report is not to be duplicated except in full without the expressed written permission of Hawaii Analytical Laboratory. This report should not be construed as an endorsement for a product or a service by the AIHA LAP, LLC or any affiliated organizations. Sample and associated sampling / collection data is reported as provided by client. TWA values have been calculated based on information supplied by the client that the laboratory has not independently verified. Results have not been corrected for blank determinations unless noted in remarks. Unless otherwise indicated the sample condition at the time of receipt was acceptable.

Results and Symbols Definitions
> This testing result is greater than the numerical value listed.
< This testing result is less than the numerical value listed.
# = Analytical methods marked with an "#" are not within our AIHA LAP, LLC Scope of Accreditation.
MRL = Method Reporting Limit.

Anne Antin

Anne Antin
Quality Control Manager

HAWAII ANALYTICAL LABORATORY, LLC

3615 Harding Avenue, Suite 308
Honolulu, HI 96816
Ph: 808-735-0422 - Fax: 808-735-0047
https://analyzehawaii.com

☐ New Client?

Report To*	: Scott Moncrief / David Leigh
Company	: EnviroQuest Inc
Address*	: 98-029 Hekaha St., St. 21
City, State, Zipcode	: Pearl City Hawaii, 96734
Phone / Cell No.*	: 808 286 0222
Report results to	: David Leigh and Scott Moncrief
Email / Fax	: dleigh@enviroquestinc.com scottmoncrief808@gmail.com

Invoice To*	: EnviroQuest Inc
Company	: David Leigh, Randy Takemoto
Address*	: 98-029 Hekaha St. 21 Aiea, Hawaii 96701
Phone / Cell No.*	: 808 258 4860
Purchase Order No.	:
Email Invoice To	:

Need Results By*:

- ☒ 5 Working Days (WD)
- ☐ 4 WD
- ☐ 3 WD
- ☐ 2 WD
- ☐ 24 hours
- ☐ 6 hours or less
- ☐ 4 hours or less
- ☐ 1-2 hours

Client Project No.:

Site/Project Name: Nanue Bridge Lead Assessment

Sampled By & Certif. #:

Special Instructions:

PLM POSITIVE STOP? ☐ + stop / SAMPLE ☐ + stop / LAYER

Verbal results? ☐

Lab Report No.: 202407891[3] SN

	Sample ID	Sample Description*	Date Sampled* (mm/dd/yy)	Collection Medium	Sample Area / Air Volume	Analysis Requested*	Method Reference	***Lab Sample(s) No.:***
1	NAN_Pb_DU9	Paint Sample	08/04/2024			Total Lead		202454276
2	NAN_Pb_DU10a	"	↓			↓		202454277
3	NAN_Pb_DU10a2	"	↓			↓		202454278
4	NAN_Pb_DU10b	"	↓			↓		202454279
5	NAN_Pb_DU10b2	"	↓			↓		202454280
6	NAN_Pb_DU2a	"	↓			↓		202454281
7	NAN_Pb_DU2b	"	↓			↓		202454282
8	NAN_Pb_DU2c	"	↓			↓		202454283
9	NAN_Pb_DU3a	"	↓			↓		202454284
10	NAN_Pb_DU3b	"	↓			↓		202454285
11								
12								

Relinquished By (Print and Sign)	Date/Time	Received By (Print and Sign)	Date/Time
Scott Moncrief [signature]	08/05/2024 2:45 pm	Savannah Newman [signature]	08-05-24P02:49 RCVD

*Sample description can be paint chips, concrete, specific sample collection location, etc…
If matrix is 'soil', please specify if it is a FOREIGN SOIL SAMPLE (outside Hawaii) in the comment section.
All samples submitted are subject to Hawaii Analytical Laboratory terms and conditions.
*Required fields, failure to complete these fields may result in a delay in your samples being processed.

Lab Notes: ☐ via HAC ☐ via USPS ☐ via drop box ☐ via FedEx ☐ via pick up

awb#: 173-

Page: _______ of _______