United States Coast Guard

Soil Removal Action Completion Report

Burrows Island Light Station

Skagit County, Washington

Contract No. 70Z05019DARCADI01

Task Order No. 70Z08821FPXA00300

May 2024

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Prepared By:
Arcadis U.S., Inc.
1420 5th Avenue, Suite 2400
Seattle, Washington 98101

Prepared For:
United States Coast Guard

Our Ref:
30092874

Mark Ullery, P.E. WA, No. 56333
Project Environmental Engineer

Paul McCullough, P.E. WA, No. 43590
Principal Environmental Engineer

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Acronyms and Abbreviations

ACM	asbestos-containing material
Arcadis	Arcadis U.S., Inc.
AST	aboveground storage tank
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
CUL	cleanup level
cy	cubic yard
DAHP	Department of Archaeology and Historic Preservation
Ecology	Washington State Department of Ecology
EMSL	EMSL Analytical Inc.
mg/kg	milligram per kilogram
MDP	Monitoring and Discovery Plan
MTCA	Model Toxics Cleanup Act
NTCRA	non-time-critical removal action
OnSite	OnSite Environmental Inc.
Otak	Otak, Inc.
PCB	polychlorinated biphenyl
QA/QC	quality assurance and quality control
RAO	removal action objective
Report	Soil Removal Action Completion Report
RI	remedial investigation
RI/FFS	Remedial Investigation and Focused Feasibility Study
Site	Burrows Island Light Station, located in Skagit County, Washington
TPH-DRO	total petroleum hydrocarbons as diesel-range organics
TPH-HO	total petroleum hydrocarbons as heavy oil
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
UST	underground storage tank
WillametteCRA	Willamette Cultural Resources Associates
XRF	x-ray fluorescence

1 Introduction

Arcadis U.S., Inc. (Arcadis) prepared this Soil Removal Action Completion Report (Report) on behalf of the United States Coast Guard (USCG), in partial fulfillment of Contract 70Z0501DARCADI01, Task Order 70Z08821FPXA00300. This Report was prepared in support of a non-time-critical removal action (NTCRA) at the Burrows Island Light Station, located in Skagit County, Washington (Site; Figure 1). The NTCRA consisted of removing and off-island disposal of lead, petroleum, and polychlorinated biphenyl (PCB) impacted soil, encapsulation of surfaces with deteriorated paint, removal of asbestos-containing material (ACM) from roofing, and repair of the access stairs from the boat landing to the light station. The NTCRA was conducted in accordance with the Final Remedial Design Report (Arcadis 2020a) and Final Removal Action Memorandum (USCG 2023).

The purpose of the NTCRA is to protect human health and the environment by eliminating an unacceptable risk from lead, PCBs, and petroleum in surface and near-surface soil from previous operations at the Site, as documented in the Remedial Investigation and Focused Feasibility Study (RI/FFS; Arcadis 2020b). Implementation of this NTCRA is intended to achieve Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) § 120(h) certification and a no further action determination by the USCG, with concurrence from the Washington State Department of Ecology (Ecology). Encapsulation of lead-based paint will mitigate potential risk for recontamination of soil, and the replacement of the asbestos roof on the duplex eliminates the risk of potential future release of friable asbestos to the environment.

This Report describes field monitoring and soil sampling activities conducted as part of the NTCRA. The NTCRA was performed by Sustainable Group Inc. and their General Contractor (Brice Environmental Services) from September 6 to October 12, 2023. Environmental monitoring was conducted by Arcadis during this period, except from September 27 through October 26, 2023, when no soil removal activities were conducted. Arcadis' subcontractors included Willamette Cultural Resources Associates (WillametteCRA) for cultural resource monitoring, Otak, Inc. (Otak) for surveying, Clark/Barnes for historic architecture support, OnSite Environmental Inc. (OnSite) for analytical chemistry, EMSL Analytical Inc. (EMSL) for asbestos analysis, and HWA Geosciences Inc. for soil bulk density testing.

2 Background

This section presents a description of the Site, the Site history, and the removal action conducted at the Site.

2.1 Site Description

The Site is located on the western tip of Burrows Island, approximately ¼ mile southeast of Anacortes, Washington, on Rosario Strait, within the western portion of Section 32, Township 35 North, Range 1 East, Willamette Meridian (Figure 1). The latitude and longitude for the Site are 48º 28' 40" North and -122º 42' 48" West (North American Datum of 1983). Primary access to the Site is by boat via the fixed concrete dock located on the north side of the Site.

The Site is located on USCG-owned property identified as Parcel Number P32494 in Skagit County records (Skagit County 2018). The USCG property is approximately 8.2 acres, of which 2 acres is cleared land and the remainder is heavily forested. The Skagit County designated land use for Parcel P32494 is (740) Recreational

Activities. Parcels adjacent to the USCG property are owned by Washington State Parks and Recreation and have similar land use designations as the USCG property. The adjacent parcels are undeveloped and heavily forested. Several parcels of land on Burrows Island are owned by private individuals: Parcels P32502, P32500, P32503, P32452, P99308, and P99309. The privately owned parcels are located on the opposite (eastern) side of Burrows Island from the USCG property. The USCG currently leases the buildings and property to the Northwest Schooner Society.

The Site is located on a rocky outcropping, with no shoreline access. The cleared area is encompassed by the tree line on the south and east, and the cliff edge on the north and west. Soil is present at greater thickness moving east from the bluff with intermittent bedrock outcroppings. Soil tends to be well-graded, with some organic content from surface vegetation. Topography of the Site generally slopes to the Rosario Strait.

2.2 Site Geology and Hydrogeology

Burrows Island is part of the archipelago that includes the San Juan Islands located in the northern Puget Sound between the Strait of Juan de Fuca and the Strait of Georgia. The San Juan Islands include late Cretaceous thrust faults known as the San Juan thrust system. The San Juan thrust system is divided into five terranes, with Burrows Island located on the Decatur terrane (Brandon 1988). The Decatur terrane is composed of two stratigraphically related sections: the Fidalgo Igneous Complex and the Lummi Formation. Formations at Burrows Island primarily belong to the Fidalgo Igneous Complex, which is a middle-late volcanic Jurassic formation mostly associated with minor conglomerates of sandstone and mudstone, Jurassic pillow lava, and brecciated gabro and diabase (Brandon 1988).

The Site has many bedrock outcroppings that consist of oceanic crusts (terranes) and igneous rock (ERRG, Inc. 2009). Soil is present at greater thickness moving east from the shoreline. Shallow soil primarily consists of sand near the buildings. Soil is generally well-graded with some organic content from surface vegetation based on visual observations (Arcadis 2020b).

The elevation at the tree line is approximately 78 feet above mean sea level with a decrease to 45 feet at the cliff edge prior to dropping down to the water surrounding the island. The topography of the Site generally slopes to the Rosario Strait. No major surface channels or overland runoff features have been identified. Most of the shoreline consists of rocky bluffs.

Groundwater is likely not present in a consistent aquifer due to the presence of shallow bedrock. Historically, groundwater collected from a seep located northeast of the main developed portion of the Site was used as a water source for residents of the station. The drainage area that flows into the seep is topographically separated from the rest of the Site. No surface water bodies have been documented or observed near the Site, other than Puget Sound. There is likely no tidal influence on groundwater at the Site because the outcropped bedrock is approximately 40 feet above mean higher high water (as measured at monitoring station 9444900, Port Townsend, Washington [National Oceanic and Atmospheric Administration 2019]).

2.3 Site History

The Site is an active USCG light station and was first developed for that purpose in 1906. The light signal was automated in 1972, and no dedicated USCG personnel have occupied the Site since that time. Infrastructure was developed to support operation of the light station, including residential and operational buildings, fuel storage tanks and underground pipelines, and electrical generation and transmission equipment. The following structures were associated with Site operations:

- *Boathouse*. Operational building located on the north side of the Site near the dock.
- *Duplex*. Former residential building located on the south side of the Site. Sidewalks are present around the perimeter and a fence runs around a portion of the yard on the east side of the building.
- *Light and Fog Signal Building*. Operational building located on the southwestern portion of the Site. Houses the automated light signal.
- *Helicopter Pad.* Constructed of interlocking metal plates and located in the central portion of the Site.
- *Former Officer in Charge Quarters*. Residential building located north of the Duplex and south of the Boathouse. Structure has been demolished, but portions of the foundation are present in the footprint of the former building.
- *Former Oil and Paint Storage Building*. Operational and storage structure located north of the Light and Fog Signal Building. Structure has been demolished and the concrete footing remains in place.
- *Former Firehouse Pump Building*. Operational structure located east of the Duplex. Structure has been demolished and the concrete footing remains in place.

Fuel oil was historically used at the Site for heat and to generate electricity. Based on historical documentation, multiple tanks were present while the Site was operational, including the following:

- One 10,000-gallon fuel oil aboveground storage tank (AST) located southeast of the Duplex.
- Two 675-gallon fuel oil ASTs located east of the Duplex and connected to the furnaces and gas ranges in the building via underground piping.
- One 675-gallon fuel oil AST located on the southeast corner of the Light and Fog Signal Building.
- One 200-gallon fuel oil underground storage tank (UST) located on the east side of the former Officer in Charge Quarters.
- One gasoline storage tank located west of the former Oil and Paint Storage Building.
- Two fuel oil ASTs (690 and 540 gallons) located southeast of the Light and Fog Signal Building.

The fuel oil tanks were connected via underground piping to a ship-to-shore connection located east of the Boathouse. Additional underground piping connected the tanks to the buildings and the main fuel oil line. All tanks have been removed (AGI Technologies 1999). Remaining infrastructure includes concrete support structures and underground piping.

A power transformer that supported onsite electrical generation was previously located southeast of the Light and Fog Signal Building (USCG 1980a,b). Oil in the transformer is known to have contained PCBs. A spill of approximately 5 to 50 gallons of transformer oil occurred on February 22, 1980 (USCG 1980b). Approximately 86 cubic yards (cy) of soil were removed from around the transformer and transformer pad (USCG 1980b). The transformer and electrical equipment are no longer present at the Site.

The locations of current and historical structures are shown on Figure 2.

2.4 Previous Site Investigations

Multiple investigations and remedial actions have been conducted at the Site. A timeline of these activities and associated documents is presented below.

- *1980*. Removal of approximately 86 cy of PCB-impacted soil from a transformer oil release (USCG 1980a,b).
- *1999*. Removal of the UST located near the Former Officer in Charge Quarters. Corrosion was observed on the bottom of the steel UST and 2 cy of petroleum-contaminated soil were removed from the excavation. One sidewall and one excavation bottom sample were collected and analyzed for total petroleum hydrocarbons as diesel-range organics (TPH-DRO) and total petroleum hydrocarbons as heavy oil (TPH-HO). TPH-DRO was not detected, and TPH-HO concentrations were 190 and 240 milligrams per kilogram (mg/kg) from the sidewall and bottom samples, respectively (AGI Technologies 1999).
- *2005*. The Duplex, Light and Fog Signal Building, and Boathouse main structures were encapsulated to prevent the continued deterioration of lead-based paint remaining on the structures. Lead-contaminated soil (75 tons) was removed from the immediate area surrounding the Duplex, placed into drums, and transported offsite for disposal. Soil with lead concentrations greater than 1,000 mg/kg was noted in areas surrounding the Duplex, Light and Fog Signal Building, and the Boathouse (Kellco Services, Inc. 2005).
- *2009*. A Phase II environmental investigation was performed to assess lead in soil near the Duplex, Light and Fog Signal Building, and Boathouse. Elevated levels of lead were identified at all of these locations (ERRG, Inc. 2009).
- *2015*. A soil stabilization study was conducted to assess reducing the leachability of lead impacts in soil using phosphate-based reagents. Soil samples were collected based on x-ray fluorescence (XRF) screening and mixed with reagents to determine the relative impacts on lead leachability. The study concluded that soil amendments were not an effective method to reduce lead leachability for Site soil (Arcadis 2015).
- *2018.* Preliminary XRF screening was conducted to assess shallow soil for lead. Co-located soil samples were collected for laboratory lead analysis to determine the correlation between XRF and laboratory results. Several soil samples were also collected to analyze for PCBs or waste characterization purposes (Arcadis 2020b).
- *2019.* A comprehensive remedial investigation (RI) was completed using incremental sampling methodology and discrete sampling methods. The RI was conducted to characterize lateral and vertical extents of constituents of concern (COCs) in soil associated with historical activities at the Site. Samples were collected and analyzed for lead, PCBs, and petroleum constituents (total petroleum hydrocarbons as gasoline range organics, TPH-DRO and TPH-HO) based on historical documentation and areas where chemicals were stored and used at the Site. The results of the RI are provided in the RI/FFS report (Arcadis 2020b).

2.5 Nature and Extent

Based on the previous investigations described in Section 2.4, lead, PCBs, TPH-DRO and TPH-HO were identified as COCs in soil. These COCs are likely the result of historical Site use related to the buildings and infrastructure developed in support of lighthouse operations. This section discusses the nature and extent of these COCs in soil. Data generated from previous Site investigations was compared to Model Toxics Control Act (MTCA) Method A cleanup levels (CUL), which are risk-based human health standards that are protective of unrestricted future Site usage. Additional details on the Site characterization are provided in the RI/FFS report (Arcadis 2020b).

2.5.1 Lead

Lead impacts are primarily a result of weathering and flaking of lead-based paint that was historically applied to structures at the Site. Previous investigations documented the presence of elevated levels of lead in shallow soil around the former and existing structures. Sample results from the RI/FFS (Arcadis 2020b) confirmed the presence of lead in shallow soil at concentrations greater than the MTCA Method A CUL of 250 mg/kg around the Duplex, Light and Fog Signal Building, former Oil and Paint Storage Building, former Firehouse Pump Building, and former 10,000-gallon fuel oil AST. The spatial distribution of lead concentrations in soil demonstrate that concentrations generally decrease with distance from the buildings and soil depth, suggesting that the physical weathering and flaking of lead-based paint from the buildings is the primary source of lead in the soil.

Lead is relatively immobile and persistent in soil. Analytical results from the RI/FFS (Arcadis 2020b) demonstrate that lead impacts are generally present in the areas immediately surrounding current or former structures that were treated with lead-based paint and have not migrated to areas of the Site where structures are not present. Transport of lead may occur from wind or by erosion of soil particles in areas not covered by structures.

2.5.2 Polychlorinated Biphenyls

Previous investigations documented the presence of PCBs in soil near the transformer historically located south of the Light and Fog Signal Building. A transformer oil spill occurred in 1980 based on historical documentation (USCG 1980a,b). Sampling conducted as part of the RI/FFS (Arcadis 2020b) found PCB concentrations exceeding the MTCA Method A CUL (1 mg/kg) surrounding the concrete area where the transformer and remedial excavation were located. Because no other documented sources of PCBs are known at the Site, the residual impacts are likely present from the transformer oil spill in 1980.

Heavy-end petroleum contaminants from PCB-containing transformer oil are expected to adhere to soil particles and have relatively low mobility in soil. PCBs are persistent in the environment and do not significantly degrade through time. Primary transport mechanisms for PCBs include erosion of shallow, impacted soil by wind or water. Analytical data from the RI/FFS (Arcadis 2020b) indicate that these constituents are present near the anticipated source areas and migration away from these areas has been limited.

2.5.3 Diesel Range Organics and Heavy Oil

Gasoline, diesel, and fuel oil were historically used and stored onsite in tanks and transferred from ships to the storage tanks via underground pipelines. There is no historical documentation of gasoline, diesel, or fuel oil releases at the Site. However, petroleum-contaminated soil was documented during removal of the UST near the Former Officer in Charge Quarters (AGI Technologies 1999). Soil sampling conducted during the RI/FFS (Arcadis 2020b) identified two locations with concentrations of TPH-DRO and TPH-HO underneath the former 10,000-gallon fuel oil AST and adjacent to the tanks located near the Firehouse Pump Building. None of the tanks remain in place, and there was no visual evidence of residual source material in soil. The extent of petroleum-contaminated soil is limited and does not indicate that substantial petroleum releases occurred near the former tanks and piping. TPH-DRO and TPH-HO typically have low mobility in soil and are readily degraded by naturally occurring microorganisms in the environment and typically diminish over time through biodegradation and volatilization.

2.5.4 Asbestos Containing Materials

Roof tiles on the Duplex were suspected to contain asbestos. At the time of the RI, the Duplex roof was partially intact with areas of damage on the main structure. Evidence of areas where tiles were removed and/or replaced with new tiles placed over asbestos tiles was present on the porches on the west side of the structure, and the single-story portion on the east side. Based on visual inspection during the RI, asbestos tiles were present over the full roof area of the Duplex.

2.6 Potential Receptors and Pathways

Potential human receptors to COCs at the Site include Site workers and visitors. Potential exposure pathways to humans include direct contact with contaminated soil and inhalation of contaminated dust particles. Groundwater, if any, is likely not present at a quantity that could be beneficially used due to the presence of shallow bedrock. The spring at the Pumphouse and Spring Cistern building that was historically used as a water source is located in a drainage area that is topographically separated from the main portion of the Site where contaminant migration is highly unlikely. There are no surface water bodies present at the Site, other than Puget Sound, which is saline and not suitable for potable uses. Areas of sediment near the Site are limited due to the rocky nature of the coastline. The sandy area located to the northeast of the Boathouse is the only observable area with sediment present along the shoreline adjacent to the Site. Samples collected in this area did not contain detectable concentrations of lead. Based on these considerations, there is no significant exposure pathway from groundwater, surface water, or sediment.

2.7 Remedial Action Objectives

COCs present in soil at concentrations that present a risk to human health and the environment are lead, PCBs, TPH-DRO, and TPH-HO. The goal of the removal action is to achieve the following removal action objectives (RAOs):

- Prevent exposure of humans and ecological receptors to COCs in soil at concentrations greater than the MTCA Method A CULs.
- Comply with applicable or relevant and appropriate requirements at the Site as summarized in the RI/FFS (Arcadis 2020b) and Final Removal Action Memorandum (USCG 2023).

The RAOs and applicable CULs were selected in the RI/FFS and approved by the USCG in the Final Removal Action Memorandum dated June 20, 2023 (USCG 2023) after conducting consultations with Ecology and other stakeholders and completing the public review process. Applicable MTCA Method A CULs are presented in Table 1.

Table 1. Soil Cleanup Levels

Constituent	MTCA Method A CUL[a] (mg/kg)
Lead	250
TPH-DRO	2,000
TPH-HO	2,000
TPH as mineral oil	4,000
PCB mixtures	1

Notes:

[a] CULs based on unrestricted land use in accordance with Washington Administrative Code 173-340-900 Table 740-1.

2.8 Selected Removal Action

Conceptual technologies and alternatives to achieve the RAOs were presented in the RI/FFS and evaluated based on the criteria described in 40 Code of Federal Regulations § 300.430 and United Stated Environmental Protection Agency (USEPA) guidance for developing and screening alternatives (USEPA 1988). Prior to finalization of the RI/FFS report, Ecology and other stakeholders were consulted and a public review was completed (Arcadis 2020b). The Action Memo prepared by USCG described the Site conditions, evaluated the risk to human health and the environment, and presented the proposed action (USCG 2023). The remedy selected in the RI/FFS (Arcadis 2020b) and presented in the Final Removal Action Memorandum (USCG 2023) consists of the following elements:

- Removal and off-island disposal of lead-, PCB-, and petroleum-impacted soil from historical operations at the Site that exceed applicable MTCA Method A CULs.
- Encapsulation of exterior surfaces of the Duplex, Light and Fog Signal Building, and Boathouse structures where prior encapsulation has either deteriorated or was otherwise not applied during previous remedial activities. This will prevent further chipping and flaking of lead-based paint, which will remove a potential future source of lead contamination to soil. The surfaces will be painted to match the existing color and finish using non-lead paint.
- Removal and replacement of the asbestos tile roof on the Duplex to eliminate a potential source of friable asbestos-containing material to soil.
- Repair of the damaged Site access staircase to allow safe access to the Site, which is required to facilitate the removal action.

A Final Remedial Design Report (Arcadis 2020a) was prepared to describe the work activities required as part of the removal action, including removing soil to achieve the RAOs and environmental monitoring activities to document completion. Additional work activities described in the Final Remedial Design Report include encapsulating exterior paint on the Duplex and Light and Fog Signal Building, removing suspected ACM from the Duplex roof, repairing the staircase providing access to the dock, and restoring the Site following soil removal.

3 Summary of Work Performed

Work activities conducted as part of the removal action were performed between September 6 and October 12, 2023 (36 days onsite). The removal action construction components and environmental monitoring activities are summarized below. Daily reports and a photograph log documenting Site activities are provided in Appendix A.

3.1 Construction Team

The agencies and contractors responsible for implementation of the removal action include the following:

- USCG – Owner and lead agency for implementation of the NTCRA.
- Sustainable Group Inc. – Primary contractor for completion of the NTCRA. Supported by Brice Environmental Services as the general contractor. Additional subcontractors used for the work include:
  - Walker Specialty Construction for ACM removal;
  - Mt Roofing Services for Duplex roof replacement;
  - Sturdy Engineering for design of the staircase repair;
  - Culbertson Marine for marine transportation; and
  - Waste Management for waste hauling and disposal.
- Arcadis – Responsible for confirmation sampling, monitoring, and preparing this Report. Supported by the following subcontractors:
  - WillametteCRA for cultural resource monitoring;
  - Otak for surveying;
  - Clark/Barnes for historic architecture support;
  - OnSite for analytical chemistry;
  - EMSL for asbestos analysis; and
  - HWA Geosciences Inc. for soil bulk density testing.

3.2 Design Clarifications and Modifications

The removal action was performed in accordance with the Final Remedial Design Report (Arcadis 2020a), with no substantial modifications that impacted the performance or completeness of the remedy. Minor field modifications based on conditions encountered at the time of construction included:

- Soil was removed until confirmation analytical results indicated that the concentrations of COCs in soil at the excavation bottom and sidewalls were less than the applicable MTCA Method A CULs, or until bedrock was encountered. The excavation depth and limits were expanded where soil concentrations were greater than the MTCA Method A CULs. The soil removal achieved CULs in all locations based on final confirmation soil samples or encountering bedrock. Additional details on soil removal and confirmation sampling activities are discussed in Section 3.4.
- Waste generated from the removal action was transported offsite for disposal. Soil was classified as nonhazardous waste, except for PCB-impacted soil with total PCB concentrations greater than 2 mg/kg, which were managed as Washington State Dangerous Waste. Painted wood debris was generated from

demolition of a fence located on the east side of the Duplex, which was removed to allow for additional soil removal based on confirmation soil sample results. The woody debris from the fence was managed as residential wood waste and disposed at the Chemical Waste Management landfill in Arlington, Oregon. Waste characterization and disposal is discussed in Section 3.7.

- Debris was encountered in various portions of the Site both inside and outside the soil removal limits and included concrete, wood, and scrap metal. The debris was characterized and transported offsite for disposal.

3.3 Site Preparation and Temporary Facilities

Heavy equipment, supplies, and personnel were mobilized to the Site by Sustainable Group Inc. on September 6, 2023. A barge and crane were used to transport and lift equipment and supplies to the Site. The barge was spudded near the shoreline at the northwest corner of the Site (see photos in Appendix A). Temporary facilities were staged on the north side of the Site near the Boathouse and outside of the removal limits, including a job trailer, diesel electric generator, and portable restrooms. Security fencing was installed around the perimeter of the work area. Stormwater best management practices were implemented to mitigate runoff from the work area and included silt fence and straw waddles placed around open excavations.

The excavation limits and control points were staked out prior to initiating soil removal activities by Otak. The control points were marked based on the limits shown in the Final Remedial Design Report (Arcadis 2020a). Pre-construction conditions are documented in a survey performed on March 10, 2020, and provided in Appendix B.

3.4 Soil Removal and Backfill

Soil was removed by Sustainable Group Inc. between September 9 and 25, 2023 to the limits and depths described in the Final Remedial Design Report (Arcadis 2020a), or to refusal if bedrock was encountered shallower than the target removal depth. Excavators were used to remove the soil and load into sift-proof United States Department of Transportation-rated bags. After each bag was filled, it was sealed and moved to staging areas on the Site either outside of the limits of excavation or in areas where excavation was completed using a loader. The bags were tracked to estimate the removal volumes from each excavation area and to correspond with waste characterization samples to establish profiles for offsite disposal. A total of 457 supersacks of waste, including soil and debris, were characterized and transported offsite for disposal as described in Section 3.7. The removal and backfill quantities estimated based on surveys performed following excavation and backfill placement are presented in Table 2.

Following excavation, soil confirmation samples were collected as described in Section 3.4.1. Additional removal beyond the lateral and vertical extents of the soil removal identified in the Final Remedial Design Report was conducted where soil confirmation results indicated that concentrations of COCs in soil did not meet CULs. The areas where additional excavation was completed are summarized in Table 3.

Backfill consisting of sand and topsoil was placed in the excavation following confirmation that CULs had been met, as described in Section 3.4.2. The backfill and existing soil were graded to provide smooth surfaces and the disturbed areas of the Site were reseeded prior to demobilization. The target soil removal limits and depths based on the Final Remedial Design Report are presented on Figure 3. The removal areas and approximate extents of bedrock encountered within the excavation areas are shown on Figures 4 through 11. A comparison of the pre-removal action and post-removal action grades is provided on Figure 12.

Table 2. Summary of Soil Removal and Disposal Quantities.

Component	Quantity	Unit	Notes
Surveyed Quantities			
Soil excavation	960	cy	In-situ volume based on post-excavation survey completed on September 27, 2023, by Otak (Appendix B)
Backfill	870	cy	In-situ volume based on post-restoration survey completed on October 26, 2023, by Otak (Appendix B)
Waste Disposal			
Soil (Washington State Dangerous Waste)	1153	Tons	Quantity based on disposal weight tickets (Appendix C)
Woody Debris (Residential Wood Waste)	1.7	Tons	Quantity based on disposal weight ticket (Appendix C)
Asbestos Containing Materials (Non-hazardous)	6.4	Tons	Quantity based on disposal weight ticket (Appendix C)
Debris and Concrete (Non-hazardous)	35	Tons	Quantity based on disposal weight tickets (Appendix C)
Scrap Metal (Recycled)	1.9	Tons	Quantity based on disposal weight ticket (Appendix C)

3.4.1 Confirmation Soil Sampling and Analyses

Confirmation soil samples were collected from the bottom and sidewalls of each excavation area following removal of soil to the approximate limits and depths presented in the Final Remedial Design Report (Arcadis 2020a). Samples were collected as five-point composites that were spatially representative of the sampling area at a frequency of one sample per 400 square feet of excavation bottom and 20 linear feet of sidewall. At least one sample was collected from each excavation area, at minimum. An equal volume of soil was collected from each of the five composite points, homogenized in a disposable plastic bag, and placed in laboratory-provided containers.

Confirmation soil sample locations were based on field conditions and are shown on Figures 4 through 11. Samples were collected in each excavation area as soil removal was completed and submitted to the laboratory on an ongoing basis. Analytical results were compared to MTCA Method A CULs to determine if CULs had been achieved. For samples with COC concentrations greater than the MTCA Method A CULs, the excavation area was expanded, and additional soil was removed. Sidewalls were expanded laterally at the same depth as the initial excavation. Additional excavation for bottom samples was performed in 1-foot increments within the area where the confirmation sample was collected. After additional excavation, confirmation samples were collected again. Based on confirmation sample results, additional excavation was conducted in Areas F, H, J, and K, as summarized below in Table 3. All areas where COC concentrations in confirmation samples exceeded the CULs were excavated.

Table 3. Summary of Additional Excavation Based on Confirmation Sample Results.

Area	COC	Samples Above CULs		Additional Soil Removal
		Sidewall	Excavation Bottom	
F	Lead	SS-F-002 SS-F-005 SS-F-009	None	• Excavation expanded laterally in three areas where sidewall samples were above the CUL. Additional confirmation samples in step-out areas met the CUL.
H	Lead	SS-H-014 SS-H-015 SS-H-016 SS-H-018	EB-H-009 EB-H-011 EB-H-014	• Excavation expanded to the north, south, and east of east side of Duplex where sidewall samples were above the CUL. • An additional 1-foot excavation completed in locations with excavation bottom samples above the CUL. • Sidewall and excavation bottom confirmation samples in step-out areas met the CUL or the excavation was bounded by bedrock.
J	PCBs	None	EB-J-001 EB-J-002	• Soil was removed to bedrock in areas where excavation bottom samples were above the CUL.
K	PCBs	SS-K-003 SS-K-004 SS-K-005	EB-K-001 OS-K-001[a]	• Excavation expanded laterally to the south where sidewall samples were above the CUL. Sidewall confirmation samples in step-out areas met the CUL or the excavation was bounded by bedrock. • Soil was removed to bedrock in areas where excavation bottom samples were above the CUL. The concrete slab was removed, and soil underneath excavated to bedrock.

Note:

[a] Sample OS-K-001 was collected from soil underneath the concrete slab located in Area K. The concrete slab and underlying soil were subsequently removed to bedrock.

Concentrations of COCs in samples collected from the additional excavation areas were less than the MTCA Method A CULs. Confirmation sample locations are shown on Figures 4 through 11, and analytical results are presented in Tables 4, 5, and 6. Laboratory analytical reports are provided in Appendix D. Samples were placed on ice and submitted to OnSite for analysis of one or more of the following constituents, based on COCs identified for each excavation area in the Final Remedial Design Report:

- Lead by USEPA Method 6010;
- PCBs by USEPA Method 8082; and
- TPH-DRO and TPH-HO by NWTPH-Dx.

Soil samples were collected for bulk density testing from in-situ material prior to excavation. Samples were collected in stainless steel sampling rings driven using a manual core sampler. Samples were submitted to HWA Geosciences Inc. for testing using ASTM International Method D2937. The results of bulk density testing are presented in Table 7. Laboratory reports are provided in Appendix D.

3.4.2 Backfill

Imported fill material was placed in the excavation areas to restore surface conditions following soil removal and confirmation that the RAOs were achieved. Fill material consisted of sand and topsoil sourced from Sunland Bark and Topsoil, located in Anacortes, Washington.

Prior to mobilization to the Site, samples were collected from stockpiles of the fill materials and submitted to OnSite for analysis of the following:

- TPH-DRO and TPH-HO by NWTPH-Dx;
- Volatile organic compounds by USEPA Method 8260;
- Semivolatile organic compounds by USEPA Method 8270;
- PCBs by USEPA Method 8082;
- Organochlorine pesticides by USEPA Method 8081;
- Total metals (arsenic, barium, cadmium, chromium, lead, selenium, and silver) by USEPA Method 6010; and
- Total mercury by USEPA Method 7471.

Analytical results were compared to MTCA Method A CULs and determined to be acceptable for fill material at the Site. The analytical results for fill material samples are presented in Table 8. Fill materials were packed in supersacks and transported to the Site by barge. Sand was placed in the excavation first and lightly compacted prior to placement of topsoil. A total of 870 cy of backfill were placed based on an in-situ survey conducted by Otak following placement and restoration (Table 2). A comparison of the pre-removal action and post-removal action grades is provided on Figure 12. A 3-way perennial ryegrass and wildflower seed mix was placed over disturbed surfaces and backfill following completion of the work, as discussed in Section 3.8.

3.5 Roofing Tile Removal and Replacement

Roofing materials on the Duplex were suspected to be comprised of ACM cement tiles based on visual inspection during the RI (Arcadis 2020b). The ACM roofing tiles may be friable and could pose a health risk to future Site users. The roofing materials were removed from the Duplex and replaced with new asphalt shingles (Certainteed, Grand Manor, Georgian Brick). The ACM roofing material was removed, placed in appropriate containers, and transported offsite for disposal. Asbestos samples were collected from the removed roofing material by an Arcadis Accredited Asbestos Hazard Emergency Response Act Building Inspector and submitted to EMSL, located in Seattle, Washington, for analysis. The samples collected from the roofing material confirmed the presence of asbestos. Sample results are presented in Table 9. Product information for the replacement shingles was provided to the State Historic Preservation Office prior to installation and is provided in Appendix E.

3.6 Paint Encapsulation

Portions of the Duplex (all window and door frames) and Pumphouse, where existing paint was flaking or degrading, were encapsulated. Product information and proposed colors were reviewed and approved by the USCG prior to application. The encapsulation was visually inspected by the Sustainable Group to verify coverage. Once cured, all encapsulated areas were painted with the USCG approved products and colors. Additional details on the encapsulation material and paint are provided in Appendix E.

3.7 Waste Characterization and Disposal

Waste materials generated during the removal action were placed into United States Department of Transportation-approved packaging and transported offsite for disposal at a licensed facility. Waste materials included the following:

- Nonhazardous soil from removal activities;
- Liquid generated from decommissioning of the cistern located south of the Light and Signal Building;
- Roofing ACM;
- Wood waste from demolition of fencing east of the Duplex;
- Other general building debris and scrap metal; and
- Concrete waste generated from sidewalks and staircase replacement.

Samples were collected and submitted to OnSite for analysis to characterize the waste. Characterization samples were collected from soil at a frequency of one sample per 200 cy of soil. Samples were analyzed for the following constituents:

- TPH-DRO and TPH-HO by NWTPH-Dx;
- Volatile organic compounds by USEPA Method 8260;
- Semivolatile organic compounds by USEPA Method 8270;
- PCBs by USEPA Method 8082;
- Total metals (arsenic, barium, cadmium, chromium, lead, selenium, and silver) by USEPA Method 6010; and
- Total mercury by USEPA Method 7471.

If total metals concentrations exceeded the 20 times rule (e.g., total concentrations were greater than the leachable toxicity standard multiplied by 20), samples were analyzed using the toxicity characteristic leaching protocol for metals by USEPA Methods 1311 and 6010. Only lead and chromium in select samples were detected at concentrations greater than the 20 times rule, and none of the leachable concentrations exceeded the toxicity criteria for hazardous waste. Analytical results are presented in Table 10.

Excavated soil and concrete were characterized as nonhazardous. Wood debris with painted surfaces from demolition of fencing located on the east side of the Duplex and present in a stockpile located near the Boathouse contained lead concentrations exceeding the toxicity characteristic for hazardous waste. This debris was segregated for material handling and disposal. Waste materials were transferred from the Site in sift-proof bags by crane to a barge, transferred to an offloading facility, loaded into trucks, and transported to the Columbia Ridge and Chemical Waste Management landfills, both located in Arlington, Oregon, for final disposal. Non-contaminated scrap metal was transferred offsite and recycled at Skagit River Steel & Recycling, Inc., located in Burlington, Washington. The total volume of each waste stream is presented in Table 2. Waste disposal documentation is provided in Appendix C.

3.8 Site Restoration

Following completion of the removal action and confirmation that the RAOs had been met, the Site was restored. Backfill was placed in limited areas to fill in excavations around the Site structures and deeper removal areas. Where possible, removal areas were graded using existing soil. Backfill materials included sand and a topsoil mixture, which were sampled to confirm that the materials met the MTCA Method A CULs and were acceptable for placement, as described in Section 3.4.2. Backfill was placed using a skid steer and excavator and compacted by tracking the equipment over the ground surface. A surface comparison of the pre-construction and post-backfill and graded surface is provided on Figure 12. Following placement and compaction of the backfill, disturbed surfaces were seeded with grass (3-way perennial rye mix) and wildflowers. The seed mix was placed at approximately 1 pound per 1,000 square feet. Manufacturer's information on the grass and wildflower seed mixes is provided in Appendix E.

The staircase, which was demolished at the beginning of the project, was restored, and a new concrete support was placed along with the reused aluminum stairs. Temporary facilities and equipment were demobilized using a crane and barge.

4 Quality Assurance/Quality Control and Data Validation

Field quality assurance and quality control (QA/QC) samples were collected to assess potential variability within samples (e.g., duplicates, matrix spike, and matrix spike duplicates) and evaluate potential sources of cross contamination (e.g., rinsate). Field QA/QC samples were collected at the frequencies presented in Table 11, below, and achieved the target frequency for each sample type.

The analytical data were verified and validated according to Tier I and II procedures. A Tier II data quality assessment, including a review of data package completeness, was conducted on laboratory reports containing confirmation sample results from OnSite. Data validation qualifiers are incorporated into the data presented in the tables and figures. The soil confirmation analytical data are considered usable based on the data validation. Data validation reports are provided in Appendix F.

Table 11. Confirmation and QA/QC Sample Summary

Sample Type	Target Frequency	Quantity
Confirmation soil samples	1 per 400 square feet of excavation bottom 1 per 20 linear feet of excavation sidewall	180
Duplicates	1 per 10 samples	19
Matrix spike/matrix spike duplicate	1 per 20 samples	10
Rinsate blanks	1 per day	11

5 Archaeological Monitoring

WillametteCRA was contracted by Arcadis on behalf of the USCG to conduct archaeological monitoring of ground-disturbing activities associated with the removal action. The NTCRA was conducted under the authority of CERCLA Section 104 and Executive Order 12580, which requires the USCG to identify potential effects to historic properties. As administered under CERCLA, the NTCRA was not required to be reviewed under Section 106 of the National Historic Preservation Act; however the USCG identified an area of potential effects and determined that the project will have No Adverse Effect on historic properties. The USCG consulted with the Washington State Historic Preservation Officer at the Department of Archaeology and Historic Preservation (DAHP) and affected Tribes in January 2023, requesting comments on the NTCRA. At the request of USCG, WillametteCRA also contacted DAHP and the affected Tribes via email in June 2023, in order to re-introduce the project and informally request comments on the Monitoring and Discovery Plan (MDP) prepared by WillametteCRA to describe archaeological monitoring to be conducted during ground-disturbing activities (WillametteCRA 2023). Tribes contacted were the Lummi Nation, the Samish Indian Nation, the Swinomish Indian Tribal Community, the Sauk-Suiattle Tribe, the Snoqualmie Tribe, the Tulalip Tribes, the Upper Skagit Tribe, and the Confederated Tribes of the Colville Reservation in June 2023. No comments were received from the Tribes regarding the MDP or archaeological monitoring.

Archaeological monitoring was conducted between September 8, 2023, and September 24, 2023, by WillametteCRA archaeologists John Montine (September 8-12, 2023), Yonara Carrilho (September 13-17, 2023), Althea Fitzpow (September 18-20, 2023), Mai McMurdie (September 23-24, 2023) and supervised by Project Manager, Stephenie Kramer, in accordance with the MDP. The monitors met the Secretary of the Interior's Professional Qualifications Standard for Archaeology (48 FR 44738). Results of the archaeological monitoring are reported under separate cover due to confidentiality.

6 Conclusion

The removal action was conducted at the Site in substantial accordance with the Final Removal Action Memorandum (USCG 2023) and the Final Remedial Design Report (Arcadis 2020a). The removal action achieved the RAOs through excavating soil with concentrations of COCs greater than the MTCA Method A CULs. Confirmation soil samples were collected from the excavation bottom and sidewalls, except where the excavation extended to bedrock.

Analytical results indicate that concentrations of COCs in the remaining soil are less than the MTCA Method A CULs. Based on the sampling results and monitoring conducted during construction, the NTCRA achieved compliance with MTCA A CULs for unrestricted land use throughout the Site and no further action is necessary. The USCG plans to proceed with a timely transfer of the Site, currently owned by USCG, out of federal ownership pursuant to CERCLA § 120(h) authority and with no proposed land use restrictions.

7 References

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Tables

Table 4
Confirmation Soil Sample Results – Lead
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

Sample ID	Sample Date	Total Lead[a] (mg/kg)	Removed With Additional Excavation[b]
MTCA Method A Cleanup Level		**250**	
Area A			
SS-A-001-091723	9/17/2023	**29**	--
SS-A-002-091723	9/17/2023	**15**	--
SS-A-003-091723	9/17/2023	**15**	--
SS-A-004-091723	9/17/2023	**6.6**	--
EB-A-001-091723	9/17/2023	**100**	--
EB-A-002-091723	9/17/2023	**50**	--
EB-A-003-091723	9/17/2023	**7.9**	--
EB-A-003-091723 (DUP-008-091723)	9/17/2023	**7.8**	--
Area B			
EB-B-001-091723	9/17/2023	**13**	--
Area C			
EB-C-001-091723	9/17/2023	**15**	--
SS-C-001-091723	9/17/2023	**190**	--
SS-C-002-091723	9/17/2023	**6.7**	--
Area E			
SS-E-001-090923	9/9/2023	< 5.6	--
SS-E-002-090923	9/9/2023	**34**	--
SS-E-003-090923	9/9/2023	**35**	--
SS-E-004-090923	9/9/2023	< 5.3	--
SS-E-005-090923	9/9/2023	**21**	--
SS-E-006-090923	9/9/2023	**58**	--
SS-E-007-090923	9/9/2023	**82**	--
SS-E-008-090923	9/9/2023	**28**	--
SS-E-009-090923	9/9/2023	**39**	--
SS-E-010-090923	9/9/2023	**28**	--
SS-E-011-090923	9/9/2023	**44**	--
SS-E-012-090923	9/9/2023	**12**	--
EB-E-001-090923	9/9/2023	< 5.5	--
EB-E-002-090923	9/9/2023	< 5.3	--
EB-E-003-090923	9/9/2023	**9.9**	--
EB-E-003-090923 (DUP-001-090923)	9/9/2023	**11**	--
EB-E-004-090923	9/9/2023	**13**	--
EB-E-005-090923	9/9/2023	**6.3**	--
EB-E-006-090923	9/9/2023	**61**	--

Table 4
Confirmation Soil Sample Results – Lead
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

Sample ID	Sample Date	Total Lead[a] (mg/kg)	Removed With Additional Excavation[b]
MTCA Method A Cleanup Level		**250**	
Area E			
EB-E-007-090923	9/9/2023	**21**	--
EB-E-008-090923	9/9/2023	**100**	--
EB-E-008-090923 (DUP-002-090923)	9/9/2023	**98**	--
EB-E-009-090923	9/9/2023	**91**	--
Area F			
SS-F-001-092023	9/20/2023	**220**	--
SS-F-002-092023	9/20/2023	**350**	X
SS-F-002-092023 (DUP-015-092023)	9/20/2023	**470**	X
SS-F-003-092023	9/20/2023	**88**	--
SS-F-003-092023 (DUP-016-092023)	9/20/2023	**81**	--
SS-F-004-092023	9/20/2023	**170**	--
SS-F-005-092023	9/20/2023	**290**	X
SS-F-006-092023	9/20/2023	**190 J**	--
SS-F-006-092023 (DUP-017-092023)	9/20/2023	**110 J**	--
SS-F-007-092023	9/20/2023	**78**	--
SS-F-008-092023	9/20/2023	**210**	--
SS-F-009-092023	9/20/2023	**250**	X
SS-F-010-092023	9/20/2023	**68**	--
SS-F-011-092423	9/24/2023	**120**	--
SS-F-012-092423	9/24/2023	**88**	--
SS-F-013-092423	9/24/2023	**150**	--
SS-F-014-092423	9/24/2023	**94**	--
SS-F-015-092423	9/24/2023	**47**	--
SS-F-016-092423	9/24/2023	**65**	--
EB-F-001-092023	9/20/2023	**13**	--
EB-F-002-092023	9/20/2023	**85**	--
EB-F-003-092023	9/20/2023	**82**	--
EB-F-004-092023	9/20/2023	**43**	--
EB-F-005-092423	9/24/2023	**45**	--
EB-F-006-092423	9/24/2023	**38**	--
EB-F-007-092423	9/24/2023	**18**	--

Table 4
Confirmation Soil Sample Results – Lead
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

ARCADIS

Sample ID	Sample Date	Total Lead[a] (mg/kg)	Removed With Additional Excavation[b]
MTCA Method A Cleanup Level		**250**	
Area G			
SS-G-001-091323	9/14/2023	**74**	--
SS-G-002-091323	9/14/2023	**96**	--
SS-G-003-091323	9/14/2023	**130**	--
SS-G-004-091323	9/14/2023	**140**	--
SS-G-005-091323	9/14/2023	**150**	--
SS-G-006-091323	9/14/2023	**33**	--
SS-G-007-091323	9/14/2023	**110**	--
EB-G-001-091323	9/14/2023	**52**	--
EB-G-002-091323	9/14/2023	**90**	--
Area H			
SS-H-001-091823	9/18/2023	**21 J**	--
SS-H-001-091823 (DUP-011-091823)	9/18/2023	**19**	--
SS-H-002-091823	9/18/2023	**27**	--
SS-H-003-091823	9/18/2023	**27**	--
SS-H-004-091823	9/18/2023	**43**	--
SS-H-005-091823	9/18/2023	**52**	--
SS-H-006-091823	9/18/2023	**23**	--
SS-H-007-091823	9/18/2023	**33**	--
SS-H-008-091823	9/18/2023	**61**	--
SS-H-009-091823	9/18/2023	**28**	--
SS-H-010-091823	9/18/2023	**23**	--
SS-H-011-091823	9/18/2023	**29**	--
SS-H-012-091823	9/18/2023	**51**	--
SS-H-013-091823	9/18/2023	**72**	--
SS-H-014-091923	9/19/2023	**270 J**	X
SS-H-014-091923 (DUP-012-091923)	9/19/2023	**6,300 J**	X
SS-H-015-091923	9/19/2023	**440 J**	X
SS-H-016-091923	9/19/2023	**330 J**	X
SS-H-017-091923	9/19/2023	**210**	X
SS-H-018-091923	9/19/2023	**470 J**	X
SS-H-019-091923	9/19/2023	**209 J**	X
SS-H-020-091923	9/19/2023	**200 J**	--
SS-H-021-091923	9/19/2023	**83 J**	--
SS-H-022-091923	9/19/2023	**63 J**	--

Table 4
Confirmation Soil Sample Results – Lead
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Burrows Island Light Station
Skagit County, Washington

ARCADIS

Sample ID	Sample Date	Total Lead[a] (mg/kg)	Removed With Additional Excavation[b]
MTCA Method A Cleanup Level		**250**	
Area H			
SS-H-023-091923	9/19/2023	**79 J**	--
SS-H-024-091923	9/19/2023	**120 J**	--
SS-H-025-091923	9/19/2023	**71 J**	--
SS-H-026-092323	9/23/2023	**79**	--
SS-H-027-092323	9/23/2023	**52**	--
SS-H-028-092423	9/24/2023	**100**	--
SS-H-029-092423	9/25/2023	**47**	--
EB-H-001-091823	9/18/2023	**22**	--
EB-H-001-091823 (DUP-009-091823)	9/18/2023	**16**	--
EB-H-002-091823	9/18/2023	**24**	--
EB-H-003-091823	9/18/2023	**39**	--
EB-H-004-091823	9/18/2023	**30**	--
EB-H-005-091823	9/18/2023	**160**	--
EB-H-006-091823	9/18/2023	**74**	--
EB-H-007-091823	9/18/2023	**74**	--
EB-H-008-091823	9/18/2023	**230**	--
EB-H-009-091823	9/18/2023	**250**	X
EB-H-010-091823	9/18/2023	**120**	--
EB-H-010-091823 (DUP-010-091823)	9/18/2023	**120**	--
EB-H-011-091923	9/19/2023	**720**	X
EB-H-012-091923	9/19/2023	**60**	--
EB-H-012-091923 (DUP-013-091923)	9/19/2023	**83**	--
EB-H-013-091923	9/19/2023	**35**	--
EB-H-014-091923	9/19/2023	**250**	X
EB-H-015-091923	9/19/2023	**31**	--
EB-H-016-091923	9/19/2023	**7.0**	--
EB-H-017-091923	9/19/2023	**39**	--
EB-H-018-091923	9/19/2023	**160**	--
EB-H-019-091923	9/19/2023	**38**	--
EB-H-020-091923	9/19/2023	**59**	--
EB-H-021-092323	9/23/2023	< 5.6	--
EB-H-022-092423	9/24/2023	**8.6**	--

Table 4
Confirmation Soil Sample Results – Lead
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

Sample ID	Sample Date	Total Lead[a] (mg/kg)	Removed With Additional Excavation[b]
MTCA Method A Cleanup Level		**250**	
Area H			
EB-H-022-092423 (DUP-018-092423)	9/24/2023	**10**	--
EB-H-023-092423	9/24/2023	**14**	--
EB-H-023-092423 (DUP-019-092423	9/24/2023	**6.0**	--
EB-H-024-092423	9/24/2023	**90**	--
EB-H-025-092423	9/24/2023	**100**	--
Area I			
SS-I-001-091623	9/16/2023	**39**	--
SS-I-002-091624	9/16/2023	**19**	--
SS-I-003-091624	9/16/2023	**11**	--
SS-I-003-091624 (DUP-007-091623)	9/16/2023	**8.8**	--
SS-I-004-091625	9/16/2023	**17**	--
SS-I-005-091625	9/16/2023	**12**	--
EB-I-001-091623	9/16/2023	**6.1**	--
EB-I-002-091624	9/16/2023	**130**	--
EB-I-003-091625	9/16/2023	**71**	--
Area J			
SS-J-001-091423	9/14/2023	**19**	--
SS-J-002-091423	9/14/2023	**9.4**	--
SS-J-003-091423	9/14/2023	**5.6**	--
SS-J-004-091423	9/14/2023	**34**	--
SS-J-004-091423 (DUP-006-091423)	9/14/2023	**29**	--
SS-J-005-091423	9/14/2023	**44**	--
EB-J-001-091423	9/14/2023	**7.8**	X
EB-J-002-091423	9/14/2023	< 5.2	X
EB-J-003-091423	9/14/2023	**9.4**	--
Area K			
SS-K-001-091123	9/11/2023	**38**	--
SS-K-001-091123 (DUP-005-091123)	9/11/2023	**37**	--
SS-K-002-091123	9/11/2023	**13**	--
SS-K-003-091123	9/11/2023	**27**	X
SS-K-004-091123	9/11/2023	< 5.3	X

Table 4
Confirmation Soil Sample Results – Lead
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

Sample ID	Sample Date	Total Lead[a] (mg/kg)	Removed With Additional Excavation[b]
MTCA Method A Cleanup Level		**250**	
Area K			
SS-K-005-091123	9/11/2023	**10**	X
SS-K-006-091123	9/11/2023	**7.4**	--
SS-K-007-091123	9/11/2023	**12**	--
SS-K-008-092023	9/20/2023	**110**	--
SS-K-009-092023	9/20/2023	**120**	--
EB-K-001-091123	9/11/2023	< 5.3	X
OS-K-001-091123	9/11/2023	< 5.3	X
Area L			
SS-L-001-091323	9/14/2023	**94**	--
SS-L-002-091323	9/14/2023	< 5.3	--
SS-L-003-091323	9/14/2023	**7.5**	--
SS-L-004-091323	9/14/2023	**59**	--
SS-L-005-091323	9/14/2023	**68**	--
SS-L-006-091323	9/14/2023	**150**	--
SS-L-007-091323	9/14/2023	**34**	--
EB-L-001-091323	9/14/2023	**13**	--
EB-L-002-091323	9/14/2023	**52**	--
Area M			
SS-M-001-091923	9/10/2023	**36**	--
SS-M-002-091923	9/10/2023	**58**	--
SS-M-003-091923	9/10/2023	**53**	--
SS-M-004-091023	9/10/2023	**47**	--
SS-M-005-091923	9/10/2023	**92**	--
SS-M-006-091923	9/10/2023	**100**	--
EB-M-001-091923	9/10/2023	**84**	--
EB-M-002-091023	9/10/2023	**24**	--
EB-M-003-091923	9/10/2023	**44 J**	--
EB-M-003-091923 (DUP-004-091923)	9/10/2023	**72**	--
Area N			
SS-N-001-090923	9/9/2023	**11**	--
SS-N-002-090923	9/9/2023	**9.9**	--
SS-N-003-090923	9/9/2023	**14**	--
SS-N-004-090923	9/9/2023	**20**	--
SS-N-004-090923 (DUP-003-090923)	9/9/2023	**12**	--

Table 4
Confirmation Soil Sample Results – Lead
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

Sample ID	Sample Date	Total Lead[a] (mg/kg)	Removed With Additional Excavation[b]
MTCA Method A Cleanup Level		**250**	
Area N			
EB-N-001-090923	9/9/2023	**8.4**	--
Area O			
SS-O-001-091423	9/14/2023	**190**	--
SS-O-002-091423	9/14/2023	**23**	--
SS-O-003-091423	9/14/2023	**130**	--
SS-O-004-091423	9/14/2023	**110**	--
SS-O-005-091423	9/14/2023	**30**	--
SS-O-006-091423	9/14/2023	**94**	--
EB-O-001-091423	9/14/2023	**31**	--
Area P			
SS-P-001-092023	9/20/2023	**110**	--
SS-P-001-092023 (DUP-014-092023)	9/20/2023	**180**	--
SS-P-002-092023	9/20/2023	**240 J**	--
SS-P-003-092023	9/20/2023	**44**	--
SS-P-004-092023	9/20/2023	**42**	--
EB-P-001-092023	9/20/2023	**6.7**	--

Notes:

1. **Bold** indicates the analyte was detected at a concentration greater than the PQL.
2. Gray shading indicates concentration greater than the MTCA Method A CUL.

[a] Total lead analyzed using USEPA Method 6020.

[b] Samples with concentrations greater than the MTCA Method A CUL were removed during subsequent excavation. Confirmation samples were collected following additional excavation if there was soil remaining.

Acronyms and Abbreviations:

-- not applicable

< = Analyte was analyzed for, but not detected. The associated value is the PQL.

CUL = cleanup level

mg/kg = milligram per kilogram

MTCA = Model Toxics Control Act

PQL = practical quantitation limit

USEPA = United States Environmental Protection Agency

X = sample removed as part of additional excavation

Qualifier:

J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.

Table 5
Confirmation Soil Sample Results – TPH
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

Sample ID	Sample Date	TPH-DRO (mg/kg)	TPH-HO (mg/kg)	TPH as Mineral Oil (mg/kg)
MTCA Method A Cleanup Level		**2,000**	**2,000**	**4,000**
Area J				
SS-J-001-091423	9/14/2023	< 27	**140**	--
SS-J-002-091423	9/14/2023	**33**	< 53	--
SS-J-003-091423	9/14/2023	**290**	**280**	--
SS-J-004-091423	9/14/2023	**180**	**78**	--
SS-J-004-091423 (DUP-006-091423)	9/14/2023	**170**	**61**	--
SS-J-005-091423	9/14/2023	**130**	**58**	--
EB-J-001-091423	9/14/2023	**91**	< 54	--
EB-J-002-091423	9/14/2023	< 26	< 52	--
EB-J-003-091423	9/14/2023	**97**	**60**	--
Area K				
EB-K-001-091123	9/11/2023	< 26	< 53	< 26
SS-K-001-091123	9/11/2023	< 27	**61**	< 27
SS-K-001-091123 (DUP-005-091123)	9/11/2023	< 27	**65**	< 27
SS-K-002-091123	9/11/2023	< 28	**130**	< 33
SS-K-003-091123	9/11/2023	< 35	**500**	< 45
SS-K-004-091123	9/11/2023	< 27	**98**	< 27
SS-K-005-091123	9/11/2023	**29**	**140**	< 39
SS-K-006-091123	9/11/2023	< 28	< 56	< 28
SS-K-007-091123	9/11/2023	< 26	**58**	< 26
OS-K-001-091123	9/11/2023	**1,300**	< 63	--
SS-K-008-092023	9/20/2023	< 27	< 53	--
SS-K-009-092023	9/20/2023	< 27	**66**	--
Area L				
SS-L-001-091323	9/14/2023	< 27	**57**	--
SS-L-002-091323	9/14/2023	**45**	**220**	--
SS-L-003-091323	9/14/2023	**45**	**200**	--
SS-L-004-091323	9/14/2023	**1,100**	**760 J**	--
SS-L-005-091323	9/14/2023	**1,300**	**710 J**	--
SS-L-006-091323	9/14/2023	**84**	**260**	--
SS-L-007-091323	9/14/2023	< 27	**68**	--

Table 5
Confirmation Soil Sample Results – TPH
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

Sample ID	Sample Date	TPH-DRO (mg/kg)	TPH-HO (mg/kg)	TPH as Mineral Oil (mg/kg)
MTCA Method A Cleanup Level		**2,000**	**2,000**	**4,000**
Area L				
EB-L-001-091323	9/14/2023	< 27	**61**	--
EB-L-002-091323	9/14/2023	**83**	**90**	--
Area M				
SS-M-001-091923	9/10/2023	< 27	**56**	--
SS-M-002-091923	9/10/2023	< 27	< 55	--
SS-M-003-091923	9/10/2023	**31**	**160**	--
EB-M-003-091023 (DUP-004-091923)	9/10/2023	**98**	**76**	--
SS-M-004-091023	9/10/2023	**31**	**93**	--
SS-M-005-091923	9/10/2023	**39**	**170**	--
SS-M-006-091923	9/10/2023	**77**	**270**	--
EB-M-001-091923	9/10/2023	**50**	**160**	--
EB-M-002-091023	9/10/2023	**770**	**350 J**	--
EB-M-003-091923	9/10/2023	**79**	**60**	--

Notes:
1. TPH-DRO, TPH-HO, and TPH as mineral oil analyzed using Washington Department of Ecology Method NWTPH-Dx.
2. **Bold** indicates that the analyte was detected at a concentration greater than the PQL.

Acronyms and Abbreviations:
-- = not applicable
< = not detected greater than the PQL
mg/kg = milligram per kilogram
MTCA = Model Toxics Control Act
PQL = practical quantitation limit
TPH = total petroleum hydrocarbons
TPH-DRO = total petroleum hydrocarbons as diesel-range organics
TPH-HO = total petroleum hydrocarbons as heavy oil

Qualifier:
J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.

Table 6
Confirmation Soil Sample Results – PCBs
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

ARCADIS

Sample ID	Sample Date	Aroclor 1016 (mg/kg)	Aroclor 1221 (mg/kg)	Aroclor 1232 (mg/kg)	Aroclor 1242 (mg/kg)	Aroclor 1248 (mg/kg)	Aroclor 1254 (mg/kg)	Aroclor 1260 (mg/kg)	Aroclor 1262 (mg/kg)	Aroclor 1268 (mg/kg)	Total PCB Mixture (mg/kg)	Removed With Additional Excavation[a]
MTCA Method A Cleanup Level		--	--	--	--	--	--	--	--	--	1.0	
Area J												
SS-J-001-091423	9/14/2023	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	--
SS-J-002-091423	9/14/2023	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	**0.96**	< 0.053	< 0.053	**0.96**	--
SS-J-003-091423	9/14/2023	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	**0.062**	< 0.053	< 0.053	**0.062**	--
SS-J-004-091423	9/14/2023	< 0.052	< 0.052	< 0.052	< 0.052	< 0.052	< 0.052	**0.40**	< 0.052	< 0.052	**0.40**	--
SS-J-005-091423	9/14/2023	< 0.054	< 0.054	< 0.054	< 0.054	< 0.054	< 0.054	**0.29**	< 0.054	< 0.054	**0.29**	--
EB-J-001-091423	9/14/2023	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	**1.7**	< 0.11	< 0.11	**1.7**	X
EB-J-002-091423	9/14/2023	< 0.52	< 0.52	< 0.52	< 0.52	< 0.52	< 0.52	**8.3**	< 0.52	< 0.52	**8.3**	X
EB-J-003-091423	9/14/2023	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	--
SS-J-004-091423 (DUP-006-091423)	9/14/2023	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	**0.46**	< 0.053	< 0.053	**0.46**	--
Area K												
EB-K-001-091123	9/11/2023	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	**5.2**	< 0.26	< 0.26	**5.2**	X
SS-K-001-091123	9/11/2023	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	--
SS-K-002-091123	9/11/2023	< 0.056	< 0.056	< 0.056	< 0.056	< 0.056	< 0.056	**0.83**	< 0.056	< 0.056	**0.83**	--
SS-K-003-091123	9/11/2023	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	**2.9**	< 0.16	< 0.16	**2.9**	X
SS-K-004-091123	9/11/2023	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	**11**	< 0.53	< 0.53	**11**	X
SS-K-005-091123	9/11/2023	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	**15**	< 1.1	< 1.1	**15**	X
SS-K-006-091123	9/11/2023	< 0.056	< 0.056	< 0.056	< 0.056	< 0.056	< 0.056	**0.32**	< 0.056	< 0.056	**0.32**	--
SS-K-007-091123	9/11/2023	< 0.052	< 0.052	< 0.052	< 0.052	< 0.052	< 0.052	**0.29**	< 0.052	< 0.052	**0.29**	--
SS-K-001-091123 (DUP-005-091123)	9/11/2023	< 0.054	< 0.054	< 0.054	< 0.054	< 0.054	< 0.054	< 0.054	< 0.054	< 0.054	< 0.054	--
OS-K-001-091123	9/11/2023	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	**3.5**	< 0.27	< 0.27	**3.5**	X
Area K Overexcavation												
SS-K-008-092023	9/20/2023	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	**0.25**	< 0.053	< 0.053	**0.25**	--
SS-K-009-092023	9/20/2023	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	**0.58**	< 0.053	< 0.053	**0.58**	--

Notes:

1. PCBs were analyzed using USEPA Method 8082.
2. **Bold** indicates that the analyte was detected at a concentration greater than the PQL.
3. Gray shading indicates concentration greater than the MTCA Method A CUL.

[a] Samples with concentrations greater than the MTCA Method A CUL were removed during subsequent excavation. Confirmation samples were collected following additional excavation if there was soil remaining.

Acronyms and Abbreviations:

-- = not applicable
< = not detected greater than the PQL
CUL = cleanup level
mg/kg = milligram per kilogram
MTCA = Model Toxics Control Act
PCB = polychlorinated biphenyl
PQL = practical quantitation limit
USEPA = United States Environmental Protection Agency
X = sample removed as part of additional excavation

Table 7
Bulk Density Soil Sample Results
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

Sample ID	Sample Date	Location	Visual-Manual Description	Moisture Content (%)	Bulk Density[a] (pcf)	Dry Density[b] (pcf)
BD-001-091523	9/15/2023	North side of Area F	Very dark brown, silty sand with gravel and organics	12.1	69.8	62.3
BD-002-091523	9/25/2023	Northeast corner of Area H	Very dark brown, silty sand with gravel and organics	7.5	76.6	71.2
BD-003-091523	9/25/2023	Northwest corner of Area H	Dark reddish-brown, silty sand with gravel and organics	6.9	91.6	85.7
BD-004-091523	9/25/2023	Center of Area A	Brown, silty sand with gravel and organics	11.1	61.5	55.4

Notes:
[a] Samples were delivered to the laboratory in 1.9-inch stainless steel tubes and were analyzed for unit weight per ASTM D2937.
[b] The bulk density was converted to dry unit weight by dividing it by 1+ the moisture content of the sample.

Acronyms and Abbreviations:
% = percent
ASTM = ASTM International
pcf = pound per cubic foot

Table 8
Fill Material Sample Results
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

Chemical	Units	Sand-Comp-1	Sand-Comp-2	Top-Comp-1	Top-Comp-2
	Sample Name	Sand-Comp-1	Sand-Comp-2	Top-Comp-1	Top-Comp-2
	Sample Type	Soil	Soil	Soil	Soil
	Date Collected	08/18/23	07/03/23	07/03/23	07/03/23
Chemical	Units	Result	Result	Result	Result
TPH-DRO and TPH-HO (Washington State Department of Ecology Method NWTPH-Dx)					
TPH-DRO	mg/kg	< 26	< 26	**42 J**	**32 J**
TPH-HO	mg/kg	< 52	< 52	**600**	**490**
Volatile Organic Compounds (USEPA Method 8260D)					
Dichlorodifluoromethane	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Chloromethane	µg/kg	< 3.2	< 4.9	< 11	< 9.7
Vinyl chloride	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Bromomethane	µg/kg	< 3.2	< 4.9	< 11	< 9.7
Chloroethane	µg/kg	< 3.2	< 4.9	< 11	< 9.7
Trichlorofluoromethane	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
1,1-Dichloroethene	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Acetone	µg/kg	< 6.3	< 9.8	< 22	< 19
Iodomethane	µg/kg	< 3.2	< 4.9	< 11	< 9.7
Carbon Disulfide	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Methylene Chloride	µg/kg	< 3.2	< 4.9	< 11	< 9.7
trans-1,2-Dichloroethene	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Methyl T-Butyl Ether	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
1,1-Dichloroethane	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Vinyl Acetate	µg/kg	< 3.2	< 4.9	< 11	< 9.7
2,2-Dichloropropane	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
cis-1,2-Dichloroethene	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
2-Butanone	µg/kg	< 3.2	< 4.9	< 11	< 9.7
Bromochloromethane	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Chloroform	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
1,1,1-Trichloroethane	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Carbon tetrachloride	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
1,1-Dichloropropene	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Benzene	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
1,2-Dichloroethane	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Trichloroethene	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
1,2-Dichloropropane	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Dibromomethane	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Bromodichloromethane	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
2-Chloroethyl Vinyl Ether	µg/kg	< 3.2	< 4.9	< 11	< 9.7
cis-1,3-Dichloropropene	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Methyl Isobutyl Ketone	µg/kg	< 3.2	< 4.9	< 11	< 9.7
Toluene	µg/kg	< 3.2	< 4.9	< 11	< 9.7
trans-1,3-Dichloropropene	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
1,1,2-Trichloroethane	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Tetrachloroethene	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9

Table 8
Fill Material Sample Results
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

Sample Name		Sand-Comp-1	Sand-Comp-2	Top-Comp-1	Top-Comp-2
Sample Type		Soil	Soil	Soil	Soil
Date Collected		08/18/23	07/03/23	07/03/23	07/03/23
Chemical	Units	Result	Result	Result	Result
Volatile Organic Compounds (USEPA Method 8260D), continued					
1,3-Dichloropropane	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
2-Hexanone	µg/kg	< 3.2	< 4.9	< 11	< 9.7
Dibromochloromethane	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
1,2-Dibromoethane	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Chlorobenzene	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
1,1,1,2-Tetrachloroethane	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Ethylbenzene	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
m-Xylene & p-Xylene	µg/kg	< 1.3	< 2.0	< 4.3	< 3.9
o-Xylene	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Styrene	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Bromoform	µg/kg	< 3.2	< 4.9	< 11	< 9.7
Isopropylbenzene	µg/kg	< 0.63	< 0.98	< 2.2	< 1.9
Bromobenzene	µg/kg	< 0.63	< 0.98	< 58	< 1.9
1,1,2,2-Tetrachloroethane	µg/kg	< 0.63	< 0.98	< 58	< 1.9
1,2,3-Trichloropropane	µg/kg	< 0.63	< 0.98	< 58	< 1.9
N-Propylbenzene	µg/kg	< 0.63	< 0.98	< 58	< 1.9
2-Chlorotoluene	µg/kg	< 0.63	< 0.98	< 58	< 1.9
4-Chlorotoluene	µg/kg	< 0.63	< 0.98	< 58	< 1.9
1,3,5-Trimethylbenzene	µg/kg	< 0.63	< 0.98	< 58	< 1.9
T-Butylbenzene	µg/kg	< 0.63	< 0.98	< 58	< 1.9
1,2,4-Trimethylbenzene	µg/kg	< 0.63	< 0.98	< 58	< 1.9
sec-Butylbenzene	µg/kg	< 0.63	< 0.98	< 58	< 1.9
1,3-Dichlorobenzene	µg/kg	< 0.63	< 0.98	< 58	< 1.9
p-Isopropyltoluene	µg/kg	< 0.63	< 0.98	< 58	< 1.9
1,4-Dichlorobenzene	µg/kg	< 0.63	< 0.98	< 58	< 1.9
1,2-Dichlorobenzene	µg/kg	< 0.63	< 0.98	< 58	< 1.9
N-Butylbenzene	µg/kg	< 0.63	< 0.98	< 58	< 1.9
1,2-Dibromo 3-Chloropropane	µg/kg	< 3.2	< 4.9	< 290	< 9.7
1,2,4-Trichlorobenzene	µg/kg	< 0.63	< 0.98	< 58	< 1.9
Hexachlorobutadiene	µg/kg	< 3.2	< 4.9	< 290	< 9.7
Naphthalene	µg/kg	< 3.2	< 4.9	< 290	< 9.7
1,2,3-Trichlorobenzene	µg/kg	< 0.63	< 0.98	< 58	< 1.9

Table 8
Fill Material Sample Results
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

	Sample Name	Sand-Comp-1	Sand-Comp-2	Top-Comp-1	Top-Comp-2
	Sample Type	Soil	Soil	Soil	Soil
	Date Collected	08/18/23	07/03/23	07/03/23	07/03/23
Chemical	**Units**	**Result**	**Result**	**Result**	**Result**
Semivolatile Organic Compounds (USEPA Method 8270E/SIM)					
n-Nitrosodimethylamine	µg/kg	< 35	< 34	< 36	< 36
Pyridine	µg/kg	< 350	< 340	< 360	< 360
Phenol	µg/kg	< 35	< 34	< 36	< 36
Aniline	µg/kg	< 170	< 170	< 180	< 180
bis(2-Chloroethyl)ether	µg/kg	< 35	< 34	< 36	< 36
2-Chorophenol	µg/kg	< 35	< 34	< 36	< 36
1,3-Dichlorobenezene	µg/kg	< 35	< 34	< 36	< 36
1,4-Dichlorobenzene	µg/kg	< 35	< 34	< 36	< 36
Benzyl alcohol	µg/kg	< 70	< 69	< 72	< 72
1,2-Dichlorobenzene	µg/kg	< 35	< 34	< 36	< 36
2-Methylphenol (o-Cresol)	µg/kg	< 35	< 34	< 36	< 36
bis(2-Chloroisoproply)ether	µg/kg	< 35	< 34	< 36	< 36
(3+4)-Methylphenol (m,p-Cresol)	µg/kg	< 35	< 34	< 36	< 36
n-Nitroso-di-n-propylamine	µg/kg	< 35	< 34	< 36	< 36
Hexachlorothane	µg/kg	< 35	< 34	< 36	< 36
Nitrobenzene	µg/kg	< 35	< 34	< 36	< 36
Isophorone	µg/kg	< 35	< 34	< 36	< 36
2-Nitrophenol	µg/kg	< 35	< 34	< 36	< 36
2,4-Dimethylphenol	µg/kg	< 35	< 34	< 36	< 36
bis(2-Chloroethoxy)methane	µg/kg	< 35	< 34	< 36	< 36
2,4-Dichlorophenol	µg/kg	< 70	< 69	< 72	< 72
1,2,4-Trichlorobenzene	µg/kg	< 35	< 34	< 36	< 36
Naphthalene	µg/kg	< 7.0	< 6.9	< 7.2	< 7.2
4-Chloro-3-methylphenol	µg/kg	< 170	< 170	< 180	< 180
2-Methylnaphthalene	µg/kg	< 35	< 34	< 36	< 36
4-Chloro-3-methylphenol	µg/kg	< 35	< 34	< 36	< 36
2-Methylnaphthalene	µg/kg	< 7	< 6.9	< 7.2	< 7.2
1-Methylnaphthalene	µg/kg	< 7	< 6.9	< 7.2	< 7.2
Hexachlorocyclopentadiene	µg/kg	< 170	< 170	< 180	< 180
2,4,6-Trichlorophenol	µg/kg	< 35	< 34	< 36	< 36
2,3-Dichloroaniline	µg/kg	< 35	< 34	< 36	< 36
2,4,5-Trichlorophenol	µg/kg	< 35	< 34	< 36	< 36
2-Chloronaphthalene	µg/kg	< 35	< 34	< 36	< 36
2-Nitroaniline	µg/kg	< 35	< 34	< 36	< 36
1,4-Dinitrobenzene	µg/kg	< 35	< 34	< 36	< 36
Dimethylphthalate	µg/kg	< 35	< 34	< 36	< 36
1,3-Dinitrobenzene	µg/kg	< 35	< 34	< 36	< 36
2,6-Dinitrotoluene	µg/kg	< 35	< 34	< 36	< 36
1,2-Dinitrobenzene	µg/kg	< 35	< 34	< 36	< 36

Table 8
Fill Material Sample Results
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

	Sample Name	Sand-Comp-1	Sand-Comp-2	Top-Comp-1	Top-Comp-2
	Sample Type	Soil	Soil	Soil	Soil
	Date Collected	08/18/23	07/03/23	07/03/23	07/03/23
Chemical	**Units**	**Result**	**Result**	**Result**	**Result**
Semivolatile Organic Compounds (USEPA Method 8270E/SIM), continued					
Acenaphthylene	µg/kg	< 7.0	< 6.9	< 7.2	< 7.2
3-Nitroaniline	µg/kg	< 35	< 34	< 36	< 36
2,4-Dinitrophenol	µg/kg	< 170	< 170	< 180	< 180
Acenaphthylene	µg/kg	< 7.0	< 6.9	< 7.2	< 7.2
4-Nitrophenol	µg/kg	< 35	< 34	< 36	< 36
2,4-Dinitrotoluene	µg/kg	< 35	< 34	< 36	< 36
Dibenzofuran	µg/kg	< 35	< 34	< 36	< 36
2,3,5,6-Tetrachlorophenol	µg/kg	< 35	< 34	< 36	< 36
2,3,4,6-Tetrachlorophenol	µg/kg	< 35	< 34	< 36	< 36
Diethylphthalate	µg/kg	< 35	< 34	< 36	< 36
4-Chlorophenyl-phenylether	µg/kg	< 35	< 34	< 36	< 36
4-Nitroaniline	µg/kg	< 35	< 34	< 36	< 36
Fluorene	µg/kg	< 7.0	< 6.9	< 7.2	< 7.2
4,6-Dinitro-2-methylphenol	µg/kg	< 170	< 170	< 180	< 180
n-Nitrosodiphenylamine	µg/kg	< 35	< 34	< 36	< 36
1,2-Diphenylhydrazine	µg/kg	< 35	< 34	< 36	< 36
4-Bromophenyl-phenylether	µg/kg	< 35	< 34	< 36	< 36
Hexachlorobenzene	µg/kg	< 35	< 34	< 36	< 36
Pentachlorophenol	µg/kg	< 70	< 69	< 72	< 72
Phenanthrene	µg/kg	< 7.0	< 6.9	< 7.2	< 7.2
Anthracene	µg/kg	< 7.0	< 6.9	< 7.2	< 7.2
Carazole	µg/kg	< 35	< 34	< 36	< 36
Di-n-butylphthalate	µg/kg	< 170	< 170	< 180	< 180
Fluoranthene	µg/kg	< 7.0	< 6.9	< 7.2	< 7.2
Pyrene	µg/kg	< 7.0	< 6.9	< 7.2	< 7.2
Butylbenzylphthalate	µg/kg	< 70	< 68	< 72	< 72
bis-2-Ethylhexyladipate	µg/kg	< 170	< 170	< 180	< 180
3,3'-Dichlorobenzidine	µg/kg	< 170	< 170	< 180	< 180
Benzo[a]anthracene	µg/kg	< 7.0	< 6.9	< 7.2	< 7.2
Chrysene	µg/kg	< 7.0	< 6.9	< 7.2	< 7.2
bis(2-Ethylhexyl)phthalate	µg/kg	< 170	< 170	< 180	< 180
Di-n-octylphthalate	µg/kg	< 35	< 34	< 36	< 36
Benzo[b]fluoranthene	µg/kg	< 7.0	< 6.9	< 7.2	< 7.2
Benzo(j,k)fluoranthene	µg/kg	< 7.0	< 6.9	< 7.2	< 7.2
Benzo[a]pyrene	µg/kg	< 7.0	< 6.9	< 7.2	< 7.2
Indeno[1,2,3-cd]pyrene	µg/kg	< 7.0	< 6.9	< 7.2	< 7.2
Dibenz[a,h]anthracene	µg/kg	< 7.0	< 6.9	< 7.2	< 7.2
Benzo[g,h,i]perylene	µg/kg	< 7.0	< 6.9	< 7.2	< 7.2

Table 8
Fill Material Sample Results
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

	Sample Name	Sand-Comp-1	Sand-Comp-2	Top-Comp-1	Top-Comp-2
	Sample Type	Soil	Soil	Soil	Soil
	Date Collected	08/18/23	07/03/23	07/03/23	07/03/23
Chemical	**Units**	**Result**	**Result**	**Result**	**Result**
Organochlorine Pesticides (USEPA Method 8081B)					
alpha-BHC	µg/kg	< 5.2	< 5.1	< 5.4	< 5.4
gamma-BHC	µg/kg	< 5.2	< 5.1	< 5.4	< 5.4
beta-BHC	µg/kg	< 5.2	< 5.1	< 5.4	< 5.4
delta-BHC	µg/kg	< 5.2	< 5.1	< 5.4	< 5.4
Heptachlor	µg/kg	< 5.2	< 5.1	< 5.4	< 5.4
Aldrin	µg/kg	< 5.2	< 5.1	< 5.4	< 5.4
Heptachlor epoxide	µg/kg	< 5.2	< 5.1	< 5.4	< 5.4
gamma-Chlordane	µg/kg	< 10	< 10	< 11	< 11
alpha-Chlordane	µg/kg	< 10	< 10	< 11	< 11
4-4'-DDE	µg/kg	< 10	< 10	< 11	< 11
Endosulfan I	µg/kg	< 5.2	< 5.1	< 5.4	< 5.4
Dieldrin	µg/kg	< 10	< 10	< 11	< 11
Endrin	µg/kg	< 10	< 10	< 11	< 11
4,4'-DDD	µg/kg	< 10	< 10	< 11	< 11
Endosulfan II	µg/kg	< 10	< 10	< 11	< 11
4,4'-DDT	µg/kg	< 10	< 10	< 11	< 11
Endrin aldehyde	µg/kg	< 10	< 10	< 11	< 11
Methoxychlor	µg/kg	< 10	< 10	< 11 UJ	< 11 UJ
Endosulfan sulfate	µg/kg	< 10	< 10	< 11	< 11
Endrin ketone	µg/kg	< 10	< 10	< 11	< 11
Toxaphene	µg/kg	< 52	< 51	< 54	< 54
PCBs (USEPA Method 8082A)					
Aroclor 1016	µg/kg	< 52	< 51	< 54	< 54
Aroclor 1221	µg/kg	< 52	< 51	< 54	< 54
Aroclor 1232	µg/kg	< 52	< 51	< 54	< 54
Aroclor 1242	µg/kg	< 52	< 51	< 54	< 54
Aroclor 1248	µg/kg	< 52	< 51	< 54	< 54
Aroclor 1254	µg/kg	< 52	< 51	< 54	< 54
Aroclor 1260	µg/kg	< 52	< 51	< 54	< 54
Aroclor 1262	µg/kg	< 52	< 51	< 54	< 54
Aroclor 1268	µg/kg	< 52	< 51	< 54	< 54

Table 8
Fill Material Sample Results
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

Sample Name Sample Type Date Collected		Sand-Comp-1 Soil 08/18/23	Sand-Comp-2 Soil 07/03/23	Top-Comp-1 Soil 07/03/23	Top-Comp-2 Soil 07/03/23
Chemical	**Units**	**Result**	**Result**	**Result**	**Result**
Total Metals (USEPA Method 6010D/7471B)					
Arsenic	mg/kg	< 10	< 10	< 11	< 11
Barium	mg/kg	**14**	**14**	**23**	**18**
Cadmium	mg/kg	< 0.52	< 0.51	< 0.54	< 0.54
Chromium	mg/kg	**10**	**8.4**	**14**	**11**
Lead	mg/kg	< 5.2	< 5.1	< 5.4	< 5.4
Mercury	mg/kg	< 0.26	< 0.26	< 0.27	< 0.27
Selenium	mg/kg	< 10	< 10	< 11	< 11
Silver	mg/kg	< 1.0	< 1.0	< 1.1	< 1.1

Notes:
1. **Bold** indicates that the analyte was detected at a concentration greater than the PQL.

Acronyms and Abbreviations:
< = not detected greater than the PQL
µg/kg = microgram per kilogram
mg/kg = milligram per kilogram
PQL = practical quantitation limit
SIM = selected ion monitoring
TPH-DRO = total petroleum hydrocarbons as diesel-range organics
TPH-HO = total petroleum hydrocarbons as heavy oil
USEPA = United States Environmental Protection Agency

Qualifiers:
J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
UJ = The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

Table 9
Asbestos Building Material Sample Results
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

Sample ID	Sample Date	Description	Appearance	Nonasbestos[1]		Asbestos[1]	
				% Fibrous	% Nonfibrous	%	Type
Roof Shingle							
1A	9/25/2023	Cement roof shingle	Brown/gray fibrous heterogeneous	--	30% calcium carbonate 45% nonfibrous (other)	25	Chrysotile
1B	9/25/2023	Cement roof shingle	Brown/gray fibrous heterogeneous	--	25% calcium carbonate 45% nonfibrous (other)	30	Chrysotile
1C	9/25/2023	Cement roof shingle	Gray/pink fibrous homogeneous	--	5% quartz 70% nonfibrous (other)	25	Chrysotile
Cable							
2A	9/25/2023	Black wire wrap	Brown/black fibrous homogeneous	11% cellulose	89% nonfibrous (other)	None detected	
2B	9/25/2023	Black wire wrap	No sample submitted				
2C	9/25/2023	Black wire wrap	Brown/black fibrous homogeneous	15% cellulose	85% nonfibrous (other)	None detected	
3A	9/25/2023	Brown wire insulation	Brown/gray fibrous heterogeneous	90% cellulose	10% nonfibrous (other)	None detected	
3B	9/25/2023	Brown wire insulation	Brown/gray fibrous heterogeneous	90% cellulose	10% nonfibrous (other)	None detected	
3A	9/25/2023	Brown wire insulation	Brown/gray fibrous heterogeneous	65% cellulose	35% nonfibrous (other)	None detected	

Note:

[1] Asbestos analysis of bulk materials performed by EMSL Analytical, Inc. via AHERA Method 40 CFR 763 Subpart E Appendix E supplemented with USEPA Method 600/R-93/116 using polarized light microscopy.

Acronyms and Abbreviations:

% = percent
-- = not applicable
AHERA = Asbestos Hazard Emergency Response Act
CFR = Code of Federal Regulations

Table 10
Waste Characterization Sample Results
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

Sample Name:			WC-001-091923	WC-002-091223	WC-003-091423	WC-004-091523	WC-005-091523	WC-006-091523	WC-007-091523	WC-008-091523	WC-009-091523	WC-010-091523	WC-011-091523		WC-012-092223	WC-013-092423
Sample Type:			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Concrete	Wood	Water		Wood	Wood
Sample Location:		RCRA Hazardous Waste Toxicity Characteristic[1]	Bags 1-60, Areas E, N, M, and K	Bags 61-101, 112-120, Areas J and K	Bags 131-147, 156-161, 165-186, Areas J, K and L	Bags 102-111, 148-155, 162-164, 187-22, Areas I, G, and O	5-point composite from Area H, prior to excavation	5-point composite from each of Areas A and P, prior to excavation	5-point composite from Area F, prior to excavation	5-point composite from each of Areas B, C, and D, prior to excavation	10-point composite, representative cross section of various concrete materials	Representative sample of stockpiled painted wood in Area O	Grab water sample from septic tank north of Area E		Representative sample of wood shingles	Representative sample of fence demolished in Area H
Date Collected:			09/10/23	09/12/23	09/14/23	09/15/23	09/15/23	09/15/23	09/15/23	09/15/23	09/15/23	09/15/23	09/15/23		09/22/23	09/24/23
Chemical	Units		Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Units	Result	Result	Result
TPH-DRO and TPH-HO (Washington State Department of Ecolgy Method NWTPH-Dx)																
TPH-DRO	mg/kg	--	**27**	**68**	**170**	**68**	< 27	**38**	**49**	< 37	< 25	--	mg/L	< 0.15	--	--
TPH-HO	mg/kg	--	**63**	**98**	**180**	**410**	**86**	**340**	**200**	**650**	< 50	--	mg/L	**0.32**	--	--
Volatile Organic Compounds (USEPA Method 8260D)																
Dichlorodifluoromethane	mg/kg	--	< 0.00097	< 0.0018	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Chloromethane	mg/kg	--	< 0.0049	< 0.0063	< 0.0057	< 0.0074	< 0.0052	< 0.0096	< 0.0076	< 0.0086	< 0.0061	--	µg/L	< 1	--	--
Vinyl chloride	mg/kg	4	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Bromomethane	mg/kg	--	< 0.0049	< 0.079	< 0.0057	< 0.0095	< 0.0067	< 0.012	< 0.0097	< 0.011	< 0.0078	--	µg/L	< 1	--	--
Chloroethane	mg/kg	--	< 0.0049	< 0.0063	< 0.0057	< 0.0074	< 0.0052	< 0.0096	< 0.0076	< 0.0086	< 0.0061	--	µg/L	< 1	--	--
Trichlorofluoromethane	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
1,1-Dichloroethene	mg/kg	14	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Acetone	mg/kg	--	**0.095**	**0.23**	**0.20**	**0.35**	**0.19**	**0.65**	**0.35**	**0.35**	< 0.012	--	µg/L	< 6.4	--	--
Iodomethane	mg/kg	--	< 0.0049	< 0.0063	< 0.0057	< 0.0074	< 0.0052	< 0.0096	< 0.0076	< 0.0086	< 0.0061	--	µg/L	< 10	--	--
Carbon Disulfide	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Methylene Chloride	mg/kg	--	< 0.0049	< 0.0063	< 0.0079	< 0.0074	< 0.0052	< 0.0096	< 0.0076	< 0.0086	**0.0063**	--	µg/L	**7**	--	--
trans-1,2-Dichloroethene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Methyl T-Butyl Ether	mg/kg	--	< 0.00097	< 0.0063	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
1,1-Dichloroethane	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Vinyl Acetate	mg/kg	--	< 0.0049	< 0.0063	< 0.0057	< 0.0074	< 0.0052	< 0.0096	< 0.0076	< 0.0086	< 0.0061	--	µg/L	< 1	--	--
2,2-Dichloropropane	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
cis-1,2-Dichloroethene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
2-Butanone	mg/kg	4000	< 0.0097	< 0.013	< 0.011	**0.018**	< 0.01	**0.044**	< 0.015	**0.026**	< 0.0061	--	µg/L	< 5	--	--
Bromochloromethane	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Chloroform	mg/kg	120	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
1,1,1-Trichloroethane	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Carbon tetrachloride	mg/kg	10	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
1,1-Dichloropropene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Benzene	mg/kg	10	< 0.00097	< 0.0013	< 0.0011	**0.0023**	< 0.001	**0.0023**	< 0.0015	**0.0023**	< 0.0012	--	µg/L	< 0.2	--	--
1,2-Dichloroethane	mg/kg	10	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Trichloroethene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
1,2-Dichloropropane	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Dibromomethane	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Bromodichloromethane	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
2-Chloroethyl Vinyl Ether	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	--	--	--	--	--	< 0.016	--	µg/L	< 0.2	--	--
cis-1,3-Dichloropropene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Methyl Isobutyl Ketone	mg/kg	--	< 0.0049	< 0.0063	< 0.0057	< 0.0074	< 0.0052	< 0.0096	< 0.0076	< 0.0086	< 0.0061	--	µg/L	< 2	--	--
Toluene	mg/kg	--	< 0.0049	< 0.0063	< 0.0057	< 0.0074	< 0.0052	< 0.0096	< 0.0076	< 0.0086	< 0.0061	--	µg/L	< 1	--	--
trans-1,3-Dichloropropene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
1,1,2-Trichloroethane	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Tetrachloroethene	mg/kg	14	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
1,3-Dichloropropane	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
2-Hexanone	mg/kg	--	< 0.0049	< 0.0063	< 0.0057	< 0.0074	< 0.0052	< 0.0096	< 0.0076	< 0.0086	< 0.0061	--	µg/L	< 2	--	--
Dibromochloromethane	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
1,2-Dibromoethane	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Chlorobenzene	mg/kg	2000	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
1,1,1,2-Tetrachloroethane	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Ethylbenzene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
m-Xylene & p-Xylene	mg/kg	--	< 0.0019	< 0.0025	< 0.0023	< 0.003	< 0.0021	< 0.0038	< 0.003	< 0.0034	< 0.0024	--	µg/L	< 0.4	--	--
o-Xylene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Styrene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Bromoform	mg/kg	--	< 0.0049	< 0.0063	< 0.0057	< 0.0074	< 0.0052	< 0.0096	< 0.0076	< 0.0086	< 0.0061	--	µg/L	< 1	--	--
Isopropylbenzene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--

ARCADIS

Sample Name: Sample Type: Sample Location: Date Collected:		RCRA Hazardous Waste Toxicity Characteristic[1]	WC-001-091923 Soil Bags 1-60, Areas E, N, M, and K 09/10/23	WC-002-091223 Soil Bags 61-101, 112-120, Areas J and K 09/12/23	WC-003-091423 Soil Bags 131-147, 156-161, 165-186, Areas J, K and L 09/14/23	WC-004-091523 Soil Bags 102-111, 148-155, 162-164, 187-22, Areas I, G, and O 09/15/23	WC-005-091523 Soil 5-point composite from Area H, prior to excavation 09/15/23	WC-006-091523 Soil 5-point composite from each of Areas A and P, prior to excavation 09/15/23	WC-007-091523 Soil 5-point composite from Area F, prior to excavation 09/15/23	WC-008-091523 Soil 5-point composite from each of Areas B, C, and D, prior to excavation 09/15/23	WC-009-091523 Concrete 10-point composite, representative cross section of various concrete materials 09/15/23	WC-010-091523 Wood Representative sample of stockpiled painted wood in Area O 09/15/23	WC-011-091523 Water Grab water sample from septic tank north of Area E 09/15/23		WC-012-092223 Wood Representative sample of wood shingles 09/22/23	WC-013-092423 Wood Representative sample of fence demolished in Area H 09/24/23
Chemical	**Units**		**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Units**	**Result**	**Result**	**Result**
Volatile Organic Compounds, continued (USEPA Method 8260D)																
Bromobenzene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
1,1,2,2-Tetrachloroethane	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
1,2,3-Trichloropropane	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
N-Propylbenzene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
2-Chlorotoluene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
4-Chlorotoluene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
1,3,5-Trimethylbenzene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
T-Butylbenzene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
1,2,4-Trimethylbenzene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
sec-Butylbenzene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
1,3-Dichlorobenzene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
p-Isopropyltoluene	mg/kg	--	< 0.00097	< 0.0013	**0.0015**	< 0.0015	**0.0012**	**0.007**	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
1,4-Dichlorobenzene	mg/kg	150	< 0.00097	**1.3**	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	**0.31**	--	--
1,2-Dichlorobenzene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
N-Butylbenzene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
1,2-Dibromo 3-Chloropropane	mg/kg	--	< 0.0049	< 0.0063	< 0.0057	< 0.0074	< 0.0052	< 0.0096	< 0.0076	< 0.0086	< 0.0061	--	µg/L	< 1	--	--
1,2,4-Trichlorobenzene	mg/kg	--	< 0.00097	**1.7**	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Hexachlorobutadiene	mg/kg	10	< 0.00097	< 0.0063	< 0.0057	< 0.0074	< 0.0052	< 0.0096	< 0.0076	< 0.0086	< 0.0061	--	µg/L	< 1	--	--
Naphthalene	mg/kg	--	< 0.0049	< 0.0063	< 0.0057	< 0.0074	< 0.0052	< 0.0096	< 0.0076	< 0.0086	< 0.0061	--	µg/L	< 1	--	--
1,2,3-Trichlorobenzene	mg/kg	--	< 0.00097	< 0.0013	< 0.0011	< 0.0015	< 0.001	< 0.0019	< 0.0015	< 0.0017	< 0.0012	--	µg/L	< 0.2	--	--
Semivolatile Organic Compounds (USEPA Method 8270E)																
n-Nitrosodimethylamine	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
Pyridine	mg/kg	100	< 0.33	< 0.74	< 0.36	< 0.37	< 0.35	< 0.41	< 0.37	< 0.38	< 0.2	--	µg/L	< 0.96	--	--
Phenol	mg/kg	--	< 0.033	< 0.074	< 0.036	**0.054**	**0.32**	< 0.041	< 0.037	**0.043**	< 0.02	--	µg/L	< 0.96	--	--
Aniline	mg/kg	--	< 0.17	< 0.37	< 0.18	**0.41**	**2.2**	< 0.2	< 0.19	**0.31**	< 0.1	--	µg/L	< 4.8	--	--
bis(2-Chloroethyl)ether	mg/kg	--	< 0.033	< 0.074	**0.044**	< 0.048	**0.39**	**0.13**	**0.12**	**0.44**	< 0.026	--	µg/L	< 0.96	--	--
2-Chorophenol	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
1,3-Dichlorobenezene	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
1,4-Dichlorobenzene	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
Benzyl alcohol	mg/kg	--	< 0.067	< 0.15	< 0.073	< 0.074	< 0.071	< 0.081	< 0.074	< 0.076	< 0.04	--	µg/L	< 0.96	--	--
1,2-Dichlorobenzene	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
2-Methylphenol (o-Cresol)	mg/kg	4000	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
bis(2-Chloroisoproply)ether	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
(3+4)-Methylphenol (m,p-Cresol)	mg/kg	4000	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
n-Nitroso-di-n-propylamine	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
Hexachloroethane	mg/kg	60	< 0.033	< 0.074	< 0.036	< 0.086	< 0.083	< 0.094	< 0.086	< 0.089	< 0.046	--	µg/L	< 0.96	--	--
Nitrobenzene	mg/kg	40	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
Isophorone	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
2-Nitrophenol	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
2,4-Dimethylphenol	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
bis(2-Chloroethoxy)methane	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
2,4-Dichlorophenol	mg/kg	--	< 0.067	< 0.15	< 0.073	< 0.074	< 0.071	< 0.081	< 0.074	< 0.076	< 0.4	--	µg/L	< 1.9	--	--
1,2,4-Trichlorobenzene	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
Naphthalene	mg/kg	--	< 0.0067	< 0.0074	< 0.0073	**0.0081**	< 0.0071	< 0.0081	< 0.0074	**0.017**	< 0.004	--	µg/L	< 0.096	--	--
4-Chloroaniline	mg/kg	--	< 0.17	< 0.074	< 0.18	< 0.18	< 0.18	< 0.2	< 0.19	< 0.19	< 0.1	--	µg/L	< 0.96	--	--
Hexachlorobutadiene	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
4-Chloro-3-methylphenol	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
2-Methylnaphthalene	mg/kg	--	< 0.0067	< 0.0074	< 0.0073	**0.02**	< 0.0071	**0.0094**	< 0.0074	**0.028**	< 0.004	--	µg/L	< 0.096	--	--
1-Methylnaphthalene	mg/kg	--	< 0.0067	< 0.0074	< 0.0073	**0.013**	< 0.0071	< 0.0081	< 0.0074	**0.012**	< 0.004	--	µg/L	< 0.096	--	--
Hexachlorocyclopentadiene	mg/kg	--	< 0.48	< 0.37	< 0.23	< 2.5	< 2.4	< 2.7	< 2.5	< 2.6	< 1.3	--	µg/L	< 4.8	--	--
2,4,6-Trichlorophenol	mg/kg	40	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--

Table 10
Waste Characterization Sample Results
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

Sample Name:			WC-001-091923	WC-002-091223	WC-003-091423	WC-004-091523	WC-005-091523	WC-006-091523	WC-007-091523	WC-008-091523	WC-009-091523	WC-010-091523	WC-011-091523		WC-012-092223	WC-013-092423
Sample Type:			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Concrete	Wood	Water		Wood	Wood
Sample Location:		RCRA Hazardous Waste Toxicity Characteristic[1]	Bags 1-60, Areas E, N, M, and K	Bags 61-101, 112-120, Areas J and K	Bags 131-147, 156-161, 165-186, Areas J, K and L	Bags 102-111, 148-155, 162-164, 187-22, Areas I, G, and O	5-point composite from Area H, prior to excavation	5-point composite from each of Areas A and P, prior to excavation	5-point composite from Area F, prior to excavation	5-point composite from each of Areas B, C, and D, prior to excavation	10-point composite, representative cross section of various concrete materials	Representative sample of stockpiled painted wood in Area O	Grab water sample from septic tank north of Area E		Representative sample of wood shingles	Representative sample of fence demolished in Area H
Date Collected:			09/10/23	09/12/23	09/14/23	09/15/23	09/15/23	09/15/23	09/15/23	09/15/23	09/15/23	09/15/23	09/15/23		09/22/23	09/24/23
Chemical	Units		Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Units	Result	Result	Result
Semivolatile Organic Compounds, continued (USEPA Method 8270E)																
2,3-Dichloroaniline	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
2,4,5-Trichlorophenol	mg/kg	8000	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
2-Chloronaphthalene	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
2-Nitroaniline	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
1,4-Dinitrobenzene	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
Dimethylphthalate	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 4.8	--	--
1,3-Dinitrobenzene	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
2,6-Dinitrotoluene	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
1,2-Dinitrobenzene	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
Acenaphthylene	mg/kg	--	< 0.0067	< 0.0074	< 0.0073	< 0.0074	< 0.0071	< 0.0081	< 0.0074	< 0.0076	< 0.004	--	µg/L	< 0.096	--	--
3-Nitroaniline	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
2,4-Dinitrophenol	mg/kg	--	< 0.46	< 0.37	< 0.18	< 0.43	< 0.42	< 0.48	< 0.43	< 0.45	< 0.23	--	µg/L	< 6.2	--	--
Acenaphthene	mg/kg	--	< 0.0067	< 0.0074	< 0.0073	< 0.0074	< 0.0071	< 0.0081	< 0.0074	< 0.0076	< 0.004	--	µg/L	< 0.0096	--	--
4-Nitrophenol	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.0036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 1.9	--	--
2,4-Dinitrotoluene	mg/kg	2.6	< 0.033	< 0.074	< 0.036	< 0.048	< 0.047	< 0.053	< 0.049	< 0.05	< 0.026	--	µg/L	< 0.96	--	--
Dibenzofuran	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
2,3,5,6-Tetrachlorophenol	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	**0.041**	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 1.9	--	--
2,3,4,6-Tetrachlorophenol	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 1.9	--	--
Diethylphthalate	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
4-Chlorophenyl-phenylether	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
4-Nitroaniline	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
Fluorene	mg/kg	--	< 0.0067	< 0.0074	< 0.0073	< 0.0074	< 0.0071	< 0.0081	< 0.0074	< 0.0076	< 0.004	--	µg/L	< 0.096	--	--
4,6-Dinitro-2-methylphenol	mg/kg	--	< 0.48	< 0.37	< 0.18	< 0.6	< 0.58	< 0.67	< 0.61	< 0.63	< 0.33	--	µg/L	< 4.8	--	--
n-Nitrosodiphenylamine	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
1,2-Diphenylhydrazine	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
4-Bromophenyl-phenylether	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
Hexachlorobenzene	mg/kg	2.6	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
Pentachlorophenol	mg/kg	2000	< 0.067	< 0.15	< 0.18	< 0.074	< 0.071	< 0.081	< 0.074	< 0.076	< 0.04	--	µg/L	< 4.8	--	--
Phenanthrene	mg/kg	--	< 0.0067	< 0.0074	**0.074**	**0.055**	**0.0091**	**0.015**	< 0.0074	**0.0086**	< 0.004	--	µg/L	< 0.096	--	--
Anthracene	mg/kg	--	< 0.0067	< 0.0074	**0.0095**	**0.0097**	< 0.0071	< 0.0081	< 0.0074	< 0.0074	< 0.004	--	µg/L	< 0.096	--	--
Carbazole	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
Di-n-butylphthalate	mg/kg	--	< 0.17	< 0.37	< 0.18	< 0.18	< 0.18	< 0.2	< 0.19	< 0.19	< 0.1	--	µg/L	< 4.8	--	--
Fluoranthene	mg/kg	--	< 0.0067	< 0.0074	**0.055**	**0.049**	**0.011**	**0.014**	< 0.0074	**0.01**	< 0.004	--	µg/L	< 0.096	--	--
Pyrene	mg/kg	--	**0.0078**	< 0.0074	**0.081**	**0.067**	**0.016**	**0.023**	< 0.0074	**0.016**	< 0.004	--	µg/L	< 0.096	--	--
Butylbenzylphthalate	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
bis-2-Ethylhexyladipate	mg/kg	--	< 0.17	< 0.37	< 0.18	< 0.24	< 0.23	< 0.27	< 0.25	< 0.25	< 0.13	--	µg/L	< 6.4	--	--
3,3'-Dichlorobenzidine	mg/kg	--	< 0.22	< 0.37	< 0.18	< 0.18	< 0.18	< 0.2	< 0.19	< 0.19	< 0.1	--	µg/L	< 4.8	--	--
Benzo[a]anthracene	mg/kg	--	< 0.0067	< 0.0074	**0.034**	**0.027**	**0.0083**	**0.0091**	< 0.0074	**0.017**	< 0.004	--	µg/L	< 0.0096	--	--
Chrysene	mg/kg	--	< 0.0067	< 0.0074	**0.032**	**0.038**	**0.011**	**0.012**	< 0.0074	**0.044**	< 0.004	--	µg/L	< 0.0096	--	--
bis(2-Ethylhexyl)phthalate	mg/kg	--	< 0.17	< 0.37	< 0.18	< 0.24	< 0.24	< 0.27	< 0.25	< 0.25	< 0.13	--	µg/L	< 6.3	--	--
Di-n-octylphthalate	mg/kg	--	< 0.033	< 0.074	< 0.036	< 0.037	< 0.036	< 0.041	< 0.037	< 0.038	< 0.02	--	µg/L	< 0.96	--	--
Benzo[b]fluoranthene	mg/kg	--	< 0.0067	< 0.0074	**0.028**	**0.028**	**0.011**	**0.012**	< 0.0074	**0.062**	< 0.004	--	µg/L	< 0.0096	--	--
Benzo(j,k)fluoranthene	mg/kg	--	< 0.0067	< 0.0074	**0.035**	**0.0085**	< 0.071	< 0.0081	< 0.0074	**0.015**	< 0.004	--	µg/L	< 0.0096	--	--
Benzo[a]pyrene	mg/kg	--	< 0.0067	< 0.0074	**0.03**	**0.024**	**0.0096**	**0.0094**	< 0.0074	**0.053**	< 0.004	--	µg/L	< 0.0096	--	--
Indeno[1,2,3-cd]pyrene	mg/kg	--	< 0.0067	< 0.0074	**0.018**	**0.016**	< 0.071	< 0.0081	< 0.0074	**0.032**	< 0.004	--	µg/L	< 0.0096	--	--
Dibenz[a,h]anthracene	mg/kg	--	< 0.0067	< 0.0074	< 0.0073	< 0.0074	< 0.071	< 0.0081	< 0.0074	**0.011**	< 0.004	--	µg/L	< 0.0096	--	--
Benzo[g,h,i]perylene	mg/kg	--	< 0.0067	**8.6**	**0.021**	**0.017**	**0.0079**	< 0.0081	< 0.0074	**0.043**	< 0.004	--	µg/L	< 0.0096	--	--
PCBs (USEPA Method 8082A)																
Aroclor 1016	mg/kg	--	< 0.05	< 0.0011	< 0.11	< 0.055	< 0.053	< 0.061	< 0.056	< 0.057	< 0.05	--	µg/L	< 0.05	--	--
Aroclor 1221	mg/kg	--	< 0.05	< 0.0011	< 0.11	< 0.055	< 0.053	< 0.061	< 0.056	< 0.057	< 0.05	--	µg/L	< 0.05	--	--
Aroclor 1232	mg/kg	--	< 0.05	< 0.0011	< 0.11	< 0.055	< 0.053	< 0.061	< 0.056	< 0.057	< 0.05	--	µg/L	< 0.05	--	--

Table 10
Waste Characterization Sample Results
Soil Removal Action Completion Report
Burrows Island Light Station
Skagit County, Washington

Sample Name:			WC-001-091923	WC-002-091223	WC-003-091423	WC-004-091523	WC-005-091523	WC-006-091523	WC-007-091523	WC-008-091523	WC-009-091523	WC-010-091523	WC-011-091523		WC-012-092223	WC-013-092423
Sample Type:			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Concrete	Wood	Water		Wood	Wood
Sample Location:		RCRA Hazardous Waste Toxicity Characteristic[1]	Bags 1-60, Areas E, N, M, and K	Bags 61-101, 112-120, Areas J and K	Bags 131-147, 156-161, 165-186, Areas J, K and L	Bags 102-111, 148-155, 162-164, 187-22, Areas I, G, and O	5-point composite from Area H, prior to excavation	5-point composite from each of Areas A and P, prior to excavation	5-point composite from Area F, prior to excavation	5-point composite from each of Areas B, C, and D, prior to excavation	10-point composite, representative cross section of various concrete materials	Representative sample of stockpiled painted wood in Area O	Grab water sample from septic tank north of Area E		Representative sample of wood shingles	Representative sample of fence demolished in Area H
Date Collected:			09/10/23	09/12/23	09/14/23	09/15/23	09/15/23	09/15/23	09/15/23	09/15/23	09/15/23	09/15/23	09/15/23		09/22/23	09/24/23
Chemical	Units		Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Units	Result	Result	Result
PCBs (USEPA Method 8082A)																
Aroclor 1242	mg/kg	--	< 0.05	< 0.0011	< 0.11	< 0.055	< 0.053	< 0.061	< 0.056	< 0.057	< 0.05	--	µg/L	< 0.05	--	--
Aroclor 1248	mg/kg	--	< 0.05	< 0.0011	< 0.11	< 0.055	< 0.053	< 0.061	< 0.056	< 0.057	< 0.05	--	µg/L	< 0.05	--	--
Aroclor 1254	mg/kg	--	< 0.05	< 0.0011	< 0.11	< 0.055	< 0.053	< 0.061	< 0.056	< 0.057	< 0.05	--	µg/L	< 0.05	--	--
Aroclor 1260	mg/kg	--	< 0.05	**0.012**	**1.8**	< 0.055	< 0.053	< 0.061	< 0.056	< 0.057	< 0.05	--	µg/L	< 0.05	--	--
Aroclor 1262	mg/kg	--	< 0.05	< 0.0011	< 0.11	< 0.055	< 0.053	< 0.061	< 0.056	< 0.057	< 0.05	--	µg/L	< 0.05	--	--
Aroclor 1268	mg/kg	--	< 0.05	< 0.0011	< 0.11	< 0.055	< 0.053	< 0.061	< 0.056	< 0.057	< 0.05	--	µg/L	< 0.05	--	--
Total Metals (USEPA Method 6010D/7471B [Solids] and 200.8/7470A [Water])																
Arsenic	mg/kg	100	**24**	**11**	**18**	**30**	**37**	**49**	< 11	**19**	< 10	--	µg/L	**81**	--	--
Barium	mg/kg	2000	**52**	**70**	**92**	**150**	**76**	**200**	**150**	**160**	**55**	--	µg/L	< 28	--	--
Cadmium	mg/kg	20	< 0.5	< 0.55	**0.62**	**0.76**	< 0.53	**1.7**	< 0.56	**3.5**	< 0.5	--	µg/L	< 4.4	--	--
Chromium	mg/kg	100	**35**	**64**	**58**	**110**	**93**	**130**	**41**	**190**	**19**	--	µg/L	< 11	--	--
Copper	mg/kg	--	**12**	**24**	**19**	**94**	**18**	**94**	**47**	**53**	**12**	--	µg/L	< 11	--	--
Lead	mg/kg	100	**56**	**88**	**120**	**430**	**310**	**680**	**260**	**2100**	**16**	--	µg/L	**3.2**	--	--
Mercury	mg/kg	4	< 0.25	< 0.28	< 0.27	< 0.28	< 0.27	< 0.31	< 0.28	< 0.29	< 0.25	--	µg/L	< 0.5	--	--
Nickel	mg/kg	--	**150**	**310**	**230**	**420**	**300**	**1100**	**200**	**740**	**52**	--	µg/L	< 22	--	--
Selenium	mg/kg	20	< 10	< 11	< 11	< 11	< 11	< 12	< 11	< 11	< 10	--	µg/L	< 5.6	--	--
Silver	mg/kg	100	< 1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.2	< 1.1	< 1.1	< 1	--	µg/L	< 11	--	--
Zinc	mg/kg	--	**68**	**180**	**170**	**470**	**200**	**780**	**310**	**2100**	**63**	--	µg/L	< 28	--	--
TCLP Metals (USEPA 1311/6010D)																
TCLP Lead	mg/L	5	--	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	**0.37**	< 0.2	**8.7**	mg/L	--	**1.6**	**27**
TCLP Chromium	mg/L	5	--	--	--	< 0.02	--	< 0.02	--	< 0.02	--	--	mg/L	--	--	--

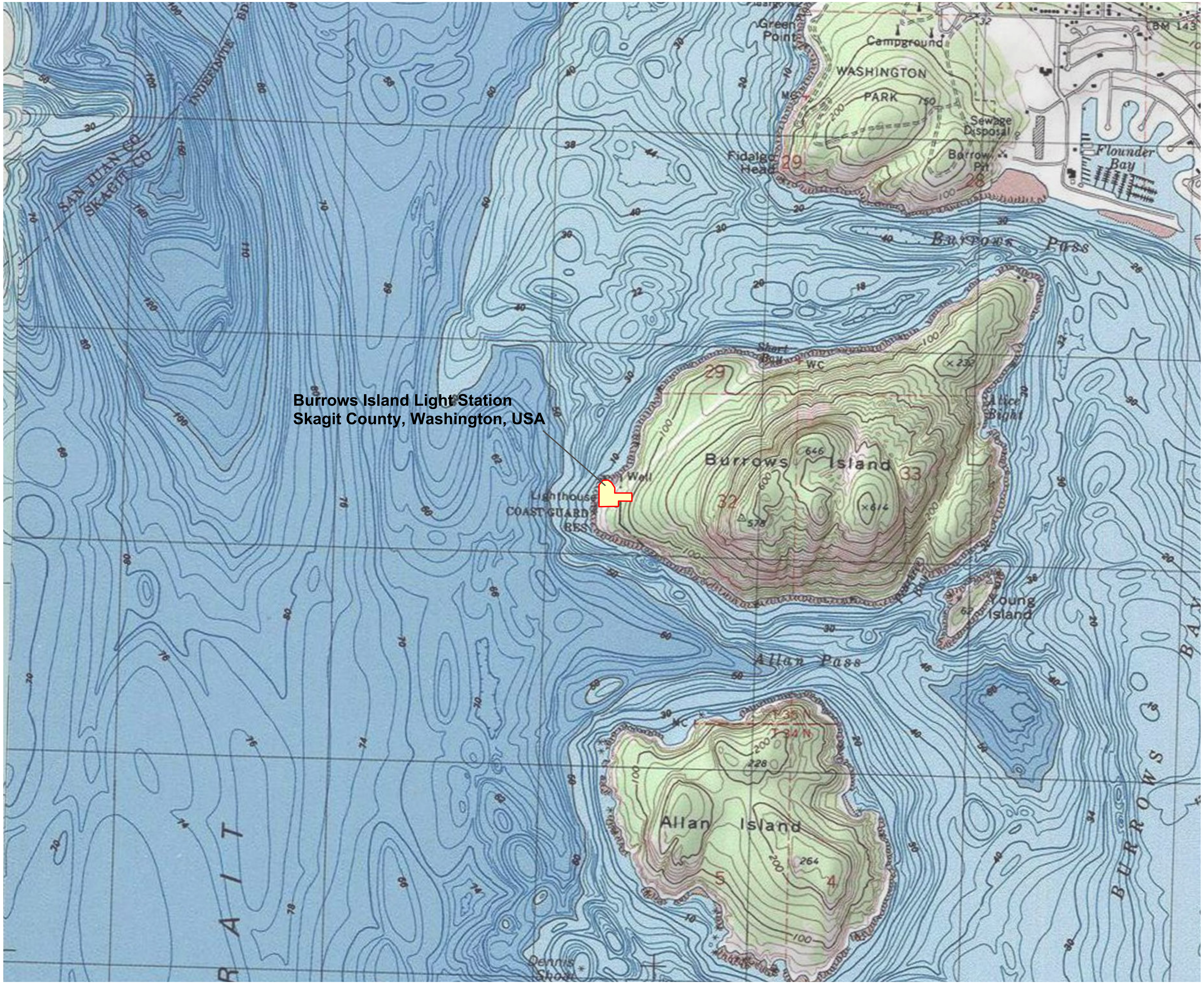
Notes:
[1] Screening levels for toxicity characteristic are based on Table 1 in 40 CFR 261.24. Dry weight values are derived by multiplying the regulatory level by 20, which corresponds to the dilution used in the TCLP. This represents the theoretical maximum dry weight concentration that will not exceed the toxicity characteristic regulatory level.

1. **Bold** indicates that the analyte was detected at a concentration greater than the PQL.

Constituent detected at or above the toxicity characteristic screening level. Sample analyzed for leaching using TCLP by USEPA Method 1311.
Sample exceeds RCRA toxicity characteristic for hazardous waste

Acronyms and Abbreviations:
< = not detected greater than the PQL
-- = not applicable, not available, or not analyzed
µg/L = microgram per liter
mg/kg = milligram per kilogram
mg/L = milligram per liter
PCB = polychlorinated biphenyl
PQL = practical quantitation limit
RCRA = Resource Conservation and Recovery Act
TCLP = Toxicity Characteristic Leaching Procedure
TPH-DRO = total petroleum hydrocarbons as diesel-range organics
TPH-HO = total petroleum hydrocarbons as heavy oil
USEPA = United States Environmental Protection Agency

Figures



Legend

Site Location

Service Layer Credits: National Geographic World Map: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
USA Topo Maps: Copyright:© 2013 National Geographic Society, i-cubed

0 1,500 3,000
SCALE IN FEET

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BURROWS ISLAND LIGHT STATION
SKAGIT COUNTY, WASHINGTON
SOIL REMOVAL ACTION COMPLETION REPORT

Site Location Map

ARCADIS

FIGURE
1

DIV/GROUP: ENV/IMDV DB: KGPeters LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\Burrows_Island_Lighthouse_2018\MXD\2023\SiteLocation2023\SiteLocation2023.aprx DATE: 1/8/2024 7:27 AM

LEGEND
- Light and Fog Signal Building
- Former Oil and Paint Storage Building
- Duplex
- Former Officer In Charge Quarters
- Boathouse
- Pumphouse and Spring Cistern
- Former Firehouse Pump Building
- Saltwater Flushing Pumphouse
- Concrete/Sidewalks
- Concrete Fill
- Former Fog Signal Structure
- Solar Panel
- Former Fuel Oil Tanks
- Former Transformer Oil Spill Excavation Area
- Transformer Pad
- Helicopter Pad
- Debris Pile
- Water Tanks/Platforms
- Septic Tank
- Concrete Cistern
- Former Gasoline Storage Tank
- Landing/Dock
- 3-foot Utility Line Buffer
- Active Electric Utility Line
- Water Line
- Septic Line
- Fuel Line
- Fence
- Parcel Boundary

Notes:
1. Buildings and infrastructure shown are based on historical drawings and survey data. Aerial imagery may not align with features shown on the figure.
2. Ground surface and existing site features are based on survey completed by Otak Inc. on March 10 and 11, 2020. Historical site features are based on USCG historical drawings No. 60.5804 (December 1960) and No. 60.5805 (June 1958). Electrical transformer is based on USCG drawings No. 60.8001 and 60.8002 (March 1980). Additional former utility features are based on utility locates completed by Arcadis on March 6, 2015 and February 26, 2019.
3. USCG = United States Coast Guard

0 50 100
SCALE IN FEET

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Site Plan with Current and Historical Features

ARCADIS

FIGURE
2

CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: KGPeters LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\Burrows_Island_Lighthouse_2018\MXD\2023\SiteLocation2023.aprx DATE: 1/8/2024 10:56 AM

LEGEND

- Excavation Areas
- A Polychlorinated Biphenyl Area

Structures

- Light and Fog Signal Building
- Former Oil and Paint Storage Building
- Duplex
- Boathouse
- Former Firehouse Pump Building
- Saltwater Flushing Pumphouse
- Concrete/Sidewalks
- Former Fog Signal Structure
- Solar Panel
- Water Tanks/Platforms
- Former Gasoline Storage Tank
- Landing/Dock
- 3-foot Utility Line Buffer

Target Excavation Depth (feet bgs)

- 0.5 foot
- 1.0 foot
- 1.5 feet
- 2.0 feet
- 2.5 feet
- 3.0 feet

Notes:
1. Buildings and infrastructure shown are based on historical drawings and survey data. Aerial imagery may not align with features shown on the figure.
2. Ground surface and existing site features are based on survey completed by Otak Inc. on March 10 and 11, 2020. Historical site features are based on USCG historical drawings No. 60.5804 (December 1960) and No. 60.5805 (June 1958). Electrical transformer is based on USCG drawings No. 60.8001 and 60.8002 (March 1980). Additional former utility features are based on utility locates completed by Arcadis on March 6, 2015 and February 26, 2019.
3. Removal depths and extents based on the Burrows Island Remedial Design (Arcadis, 2020b)
4. bgs - below ground surface
5. USCG = United States Coast Guard

0 60 120
SCALE IN FEET

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Planned Soil Removal Extents

ARCADIS

FIGURE
3

LEGEND

Confirmation Sampling

- Excavation Bottom Sample (EB)
- Sidewall Sample Extent (SS)
- A Remedial Excavation Areas

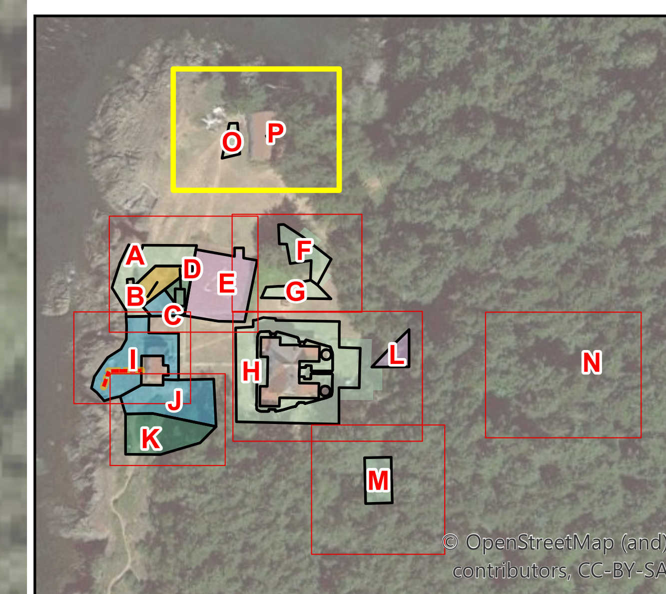
Structures

- Boathouse
- Landing/Dock

Excavation Area Features

- Bedrock

Note:
1. Buildings and infrastructure shown are based on historical drawings and survey data. Aerial imagery may not align with features shown on the figure.
2. Sample locations, extent of bedrock, and other features are approximate and based on field observations.



Feet
0 10 20

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BURROWS ISLAND LIGHT STATION
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SOIL REMOVAL ACTION COMPLETION REPORT

Confirmation Sample Locations
Areas O and P

ARCADIS

FIGURE
4

CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: KGPeters LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\Burrows_Island_Lighthouse_2018\MXD\2023\Confirmation Sample Locations mapseries 2023\Confirmation Sample Locations mapseries 2023.aprx DATE: 1/8/2024 9:54 AM

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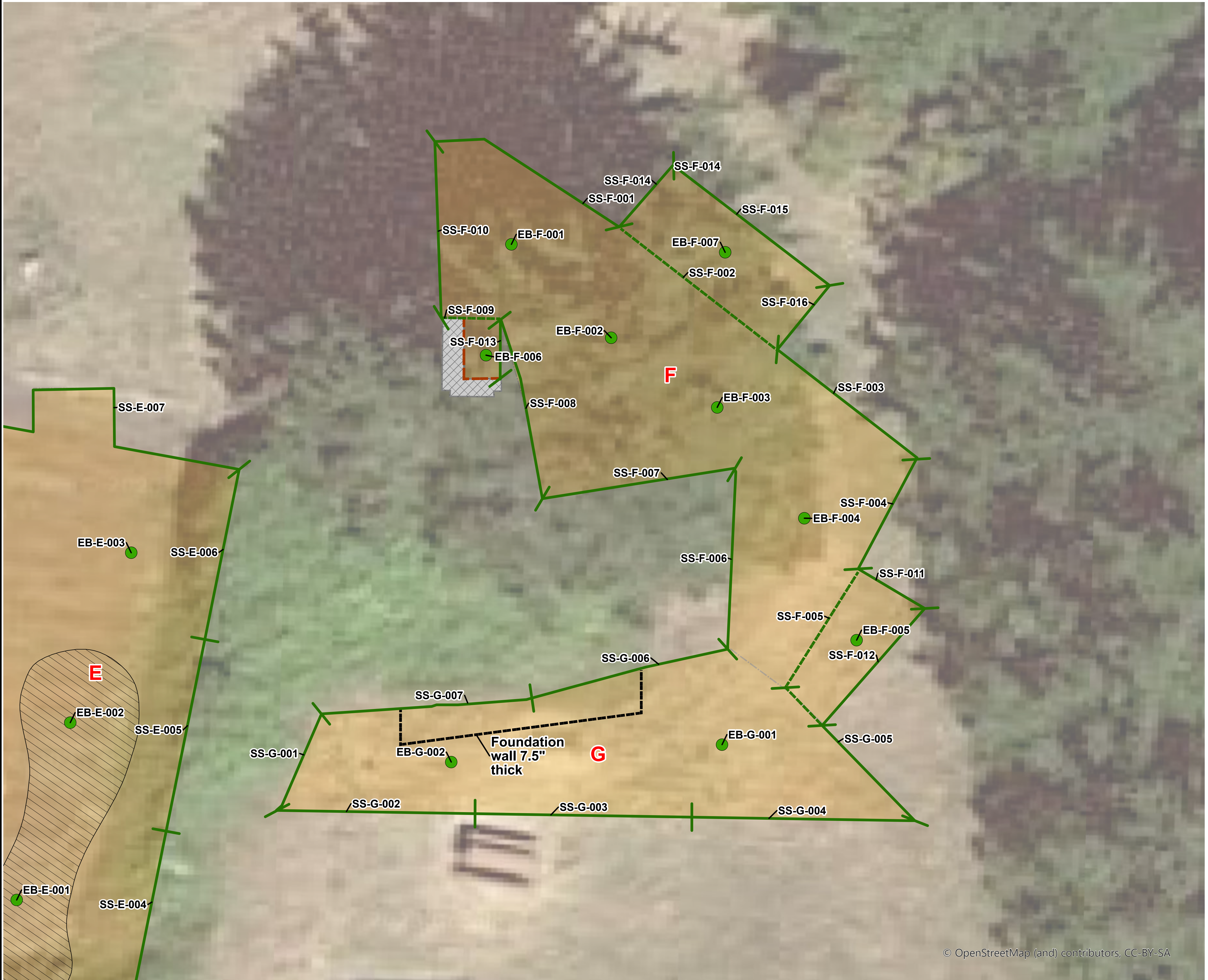


LEGEND

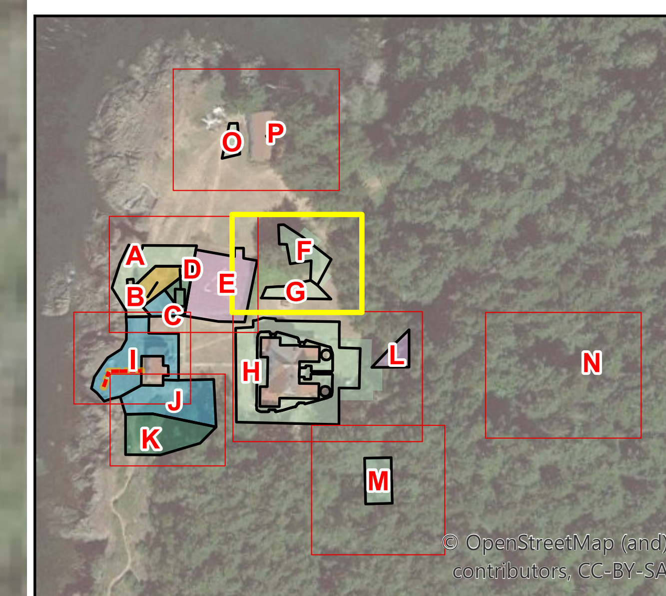
Confirmation Sampling

- Excavation Bottom Sample (EB)
- Sidewall Sample Extent (SS)
- A Remedial Excavation Areas
- No Sidewall Sample
- Overexcavated Sidewall Extent (SS)
- Foundation Wall - 7.5 inch thick

Excavation Area Features

- Bedrock
- Concrete

Note:
1. Buildings and infrastructure shown are based on historical drawings and survey data. Aerial imagery may not align with features shown on the figure.
2. Sample locations, extent of bedrock, and other features are approximate and based on field observations.



Feet
0 8 16

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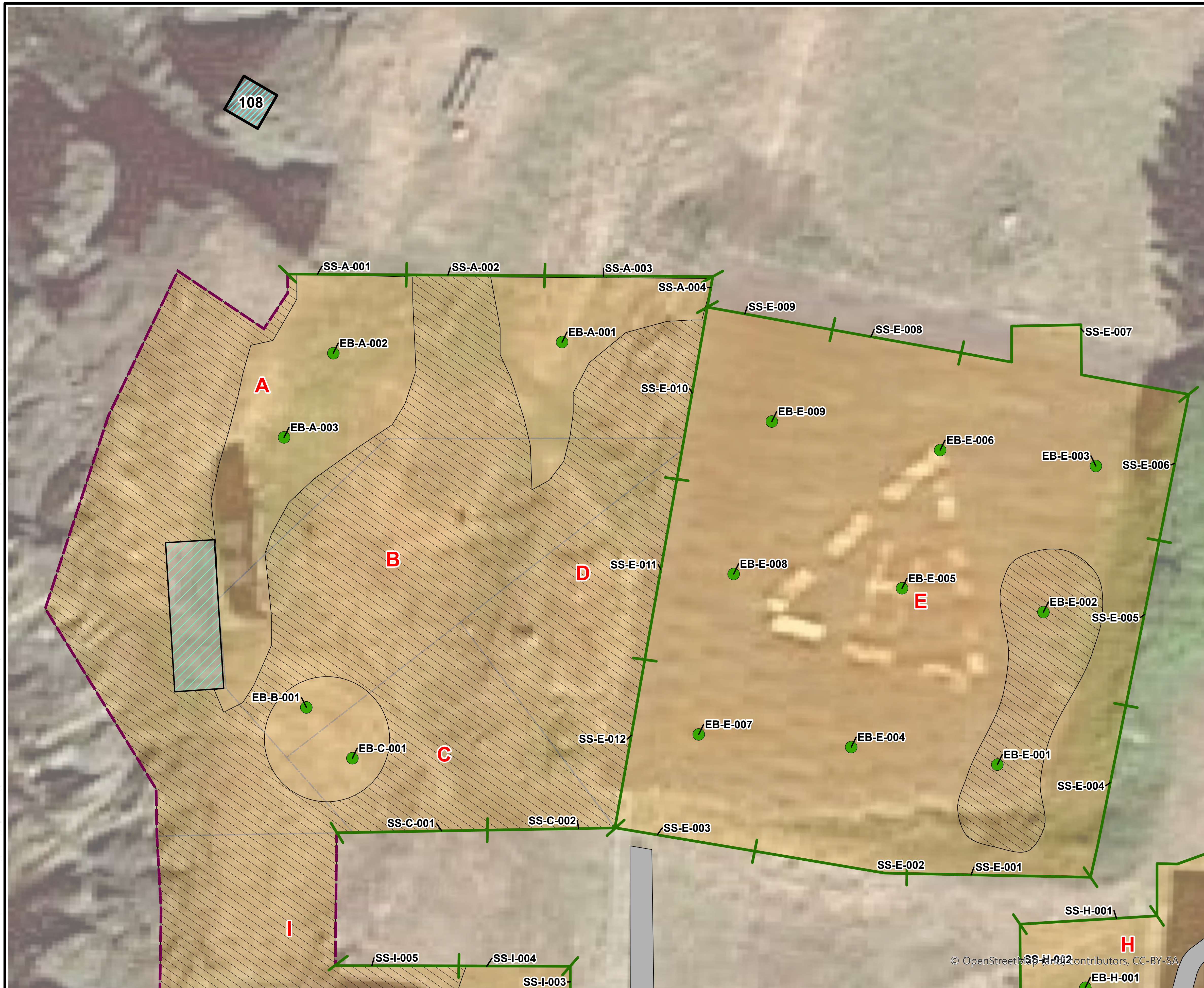
Confirmation Sample Locations
Areas F and G

ARCADIS

FIGURE
5



LEGEND

Confirmation Sampling

- Excavation Bottom Sample (EB)
- Sidewall Sample Extent (SS)
- A Remedial Excavation Areas
- No sidewall present due to bedrock

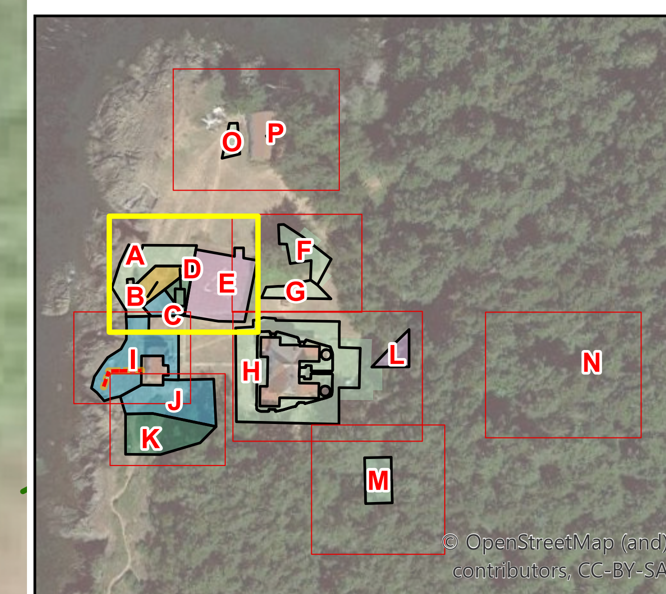
Structures

- Saltwater Flushing Pumphouse
- Concrete/Sidewalks
- Fog Signal Structure

Excavation Area Features

- Bedrock

Note:
1. Buildings and infrastructure shown are based on historical drawings and survey data. Aerial imagery may not align with features shown on the figure.
2. Sample locations, extent of bedrock, and other features are approximate and based on field observations.



0 9.5 19 Feet

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BURROWS ISLAND LIGHT STATION
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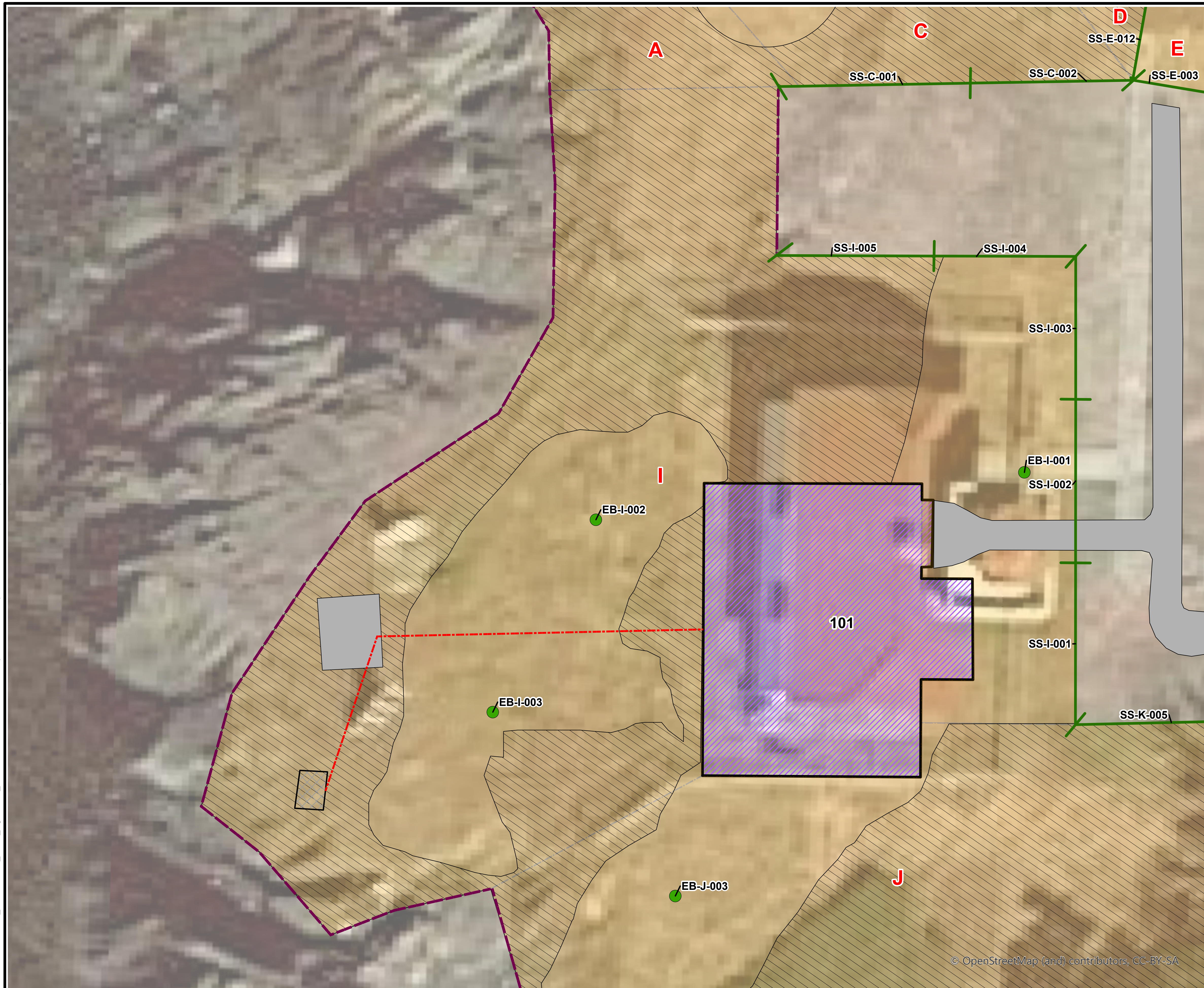
SOIL REMOVAL ACTION COMPLETION REPORT

Confirmation Sample Locations
Areas A, B, C, D and E

ARCADIS

FIGURE
6

CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: KGPeters LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\Burrows_Island_Lighthouse_2018\MXD\2023\Confirmation Sample Locations mapseries 2023\Confirmation Sample Locations mapseries 2023.aprx DATE: 1/8/2024 10:41 AM



LEGEND

Confirmation Sampling

- Excavation Bottom Sample (EB)
- Sidewall Sample Extent (SS)
- Remedial Excavation Areas
- No sidewall present due to bedrock
- Electric Utility Line

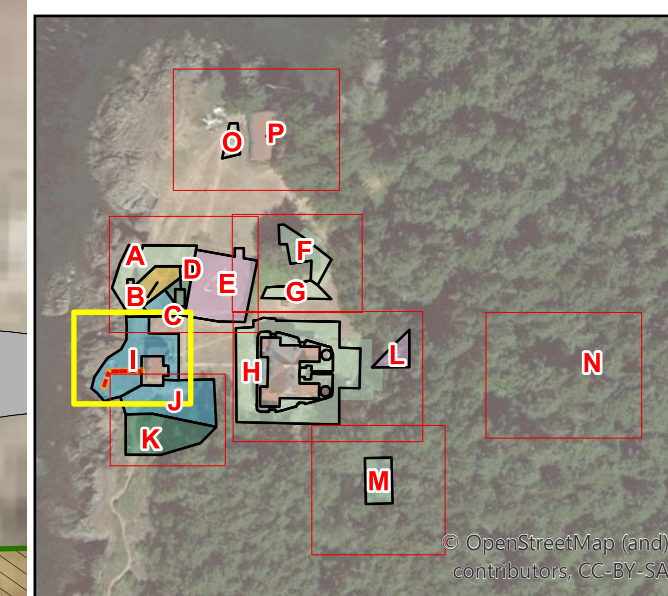
Structures

- Light and Fog Signal Building
- Concrete/Sidewalks
- Solar Panel

Excavation Area Features

- Bedrock

Note:
1. Buildings and infrastructure shown are based on historical drawings and survey data. Aerial imagery may not align with features shown on the figure.
2. Sample locations, extent of bedrock, and other features are approximate and based on field observations.



Feet
0 7.5 15

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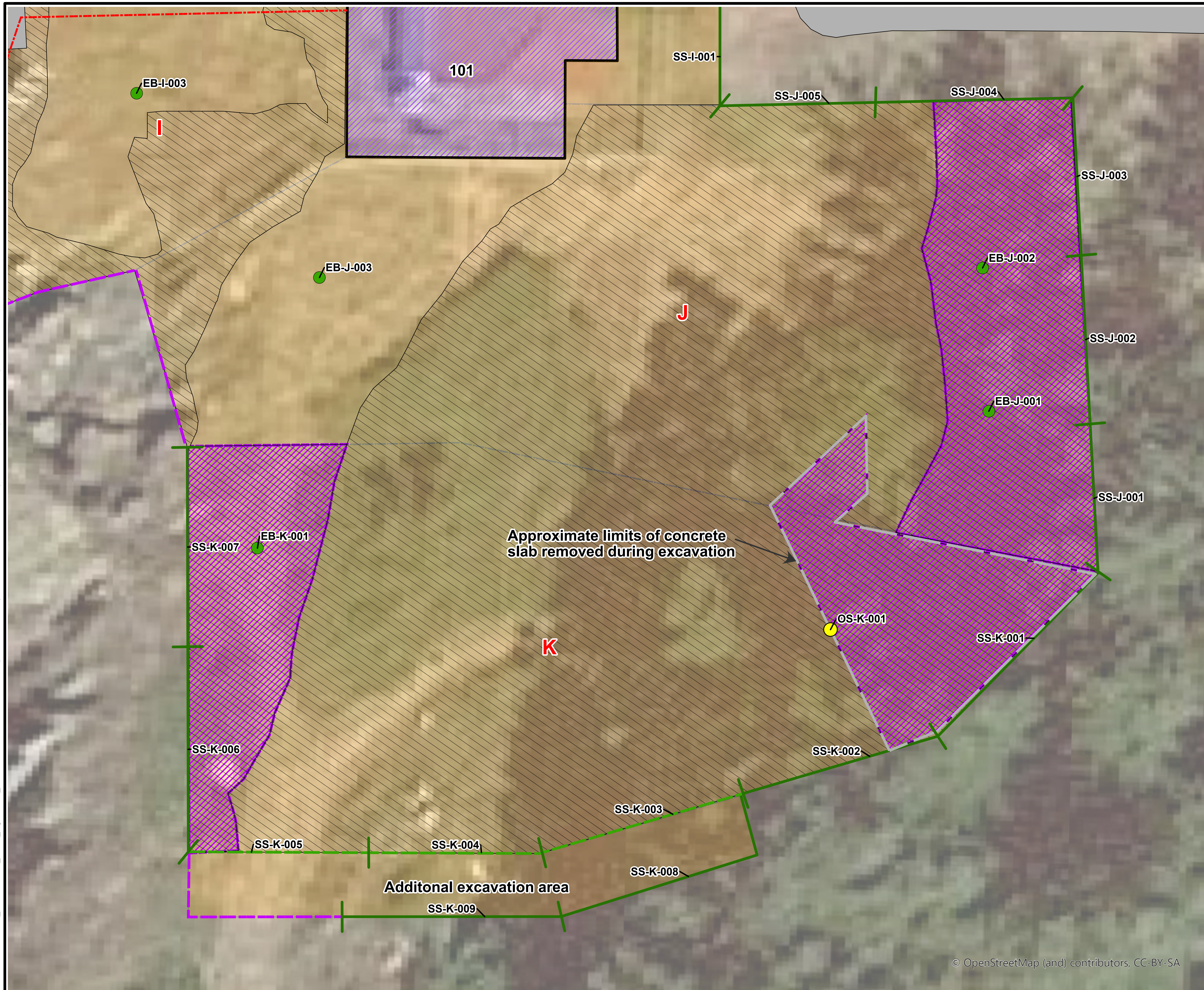
SOIL REMOVAL ACTION COMPLETION REPORT

Confirmation Sample Locations
Area I

ARCADIS

FIGURE
7

CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: KGPeters LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\Burrows_Island_Lighthouse_2018\MXD\2023\Confirmation Sample Locations mapseries 2023\Confirmation Sample Locations mapseries 2023.aprx DATE: 1/8/2024 10:41 AM



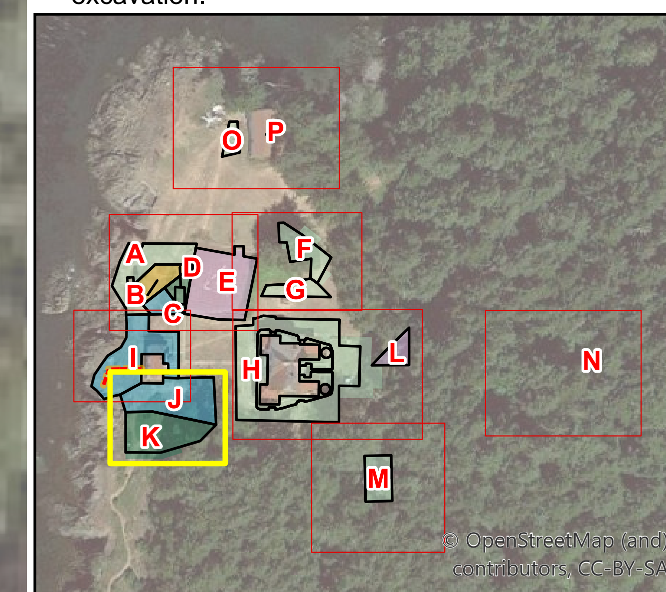
LEGEND

Confirmation Sampling
- Excavation Bottom Sample (EB)
- Grab Soil Sample (Note 3)
- Sidewall Sample Extent (SS)
- Remedial Excavation Areas
- No sidewall present due to bedrock
- Samples Removed
- Electric Utility Line

Structures
- Light and Fog Signal Building
- Concrete/Sidewalks
- Former Concrete Slab Extent

Excavation Area Features
- Overexcavated Area
- Bedrock

Note:
1. Buildings and infrastructure shown are based on historical drawings and survey data. Aerial imagery may not align with features shown on the figure.
2. Sample locations, extent of bedrock, and other features are approximate and based on field observations.
3. OS-K-001 was collected from soil between concrete slab and bedrock and removed during additional excavation.



0 7.5 15 Feet

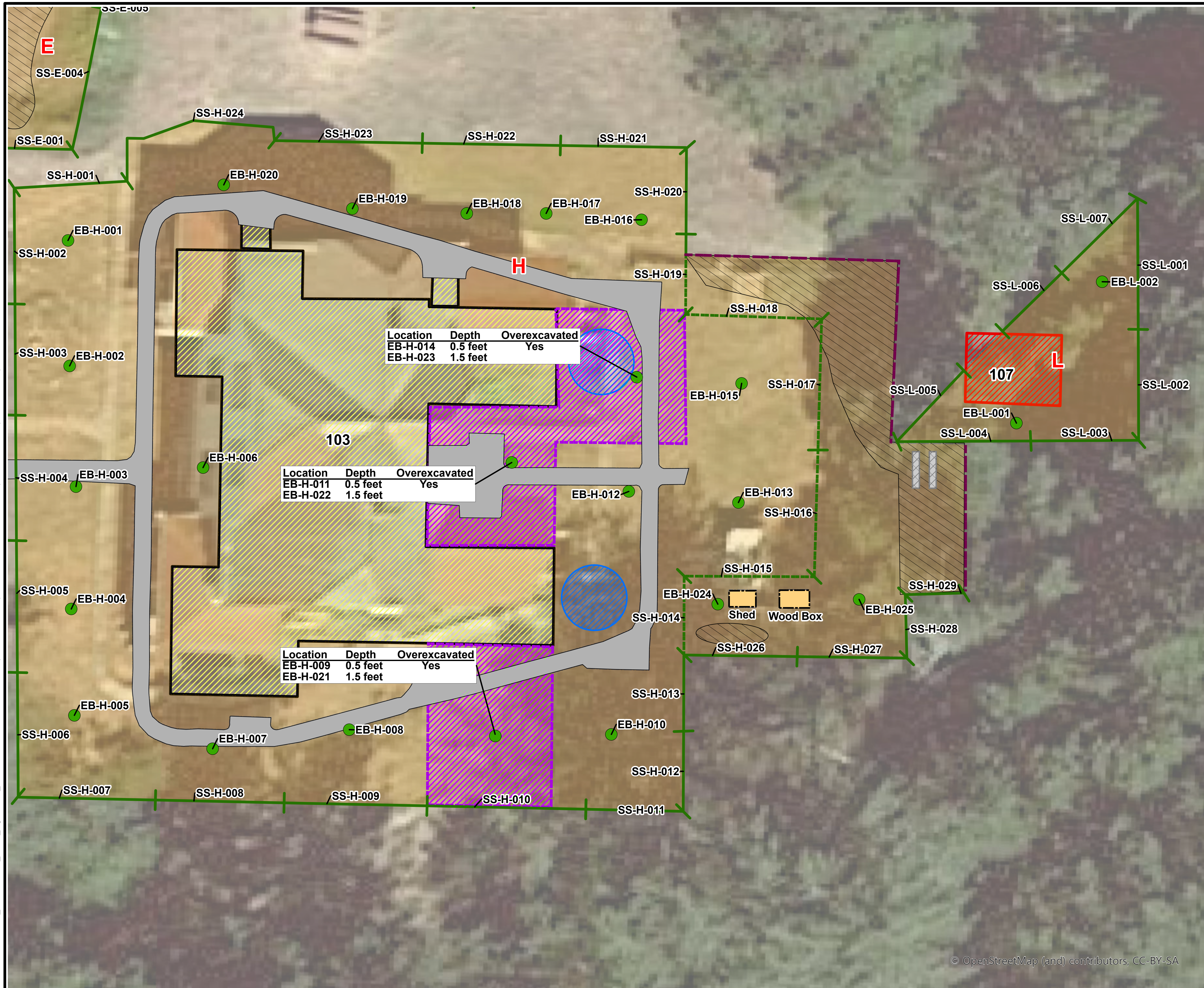
UNITED STATES COAST GUARD
BURROWS ISLAND LIGHT STATION
SKAGIT COUNTY, WASHINGTON
SOIL REMOVAL ACTION COMPLETION REPORT

Confirmation Sample Locations Areas J and K

ARCADIS

FIGURE 8

CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: KGPeters LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\Burrows_Island_Lighthouse_2018\MXD\2023\Confirmation Sample Locations mapseries 2023\Confirmation Sample Locations mapseries 2023.aprx DATE: 5/29/2024 1:34 PM



LEGEND

Confirmation Sampling

- Excavation Bottom Sample (EB)
- Sidewall Sample Extent (SS)
- A Remedial Excavation Areas
- Overexcavated Sidewall Extent (SS)
- No sidewall present due to bedrock

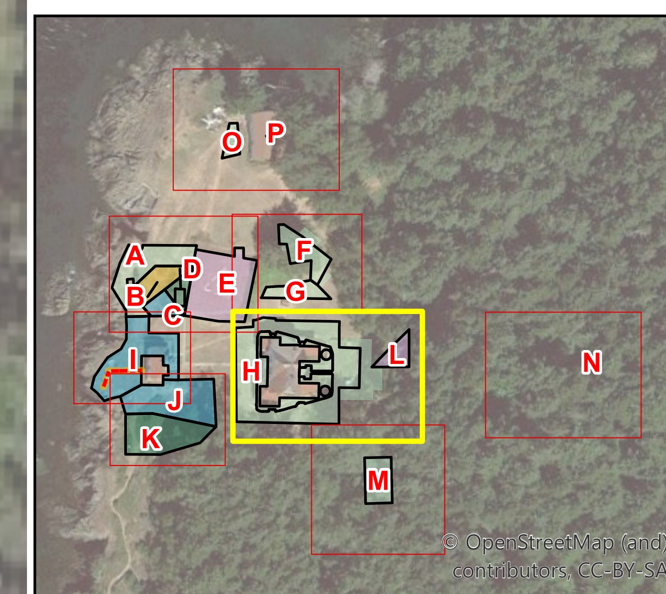
Structures

- Duplex
- Former Firehouse Pump Building
- Concrete/Sidewalks
- Water Tanks/Platforms

Excavation Area Features

- Overexcavated Area
- Bedrock
- Concrete

Note:
1. Buildings and infrastructure shown are based on historical drawings and survey data. Aerial imagery may not align with features shown on the figure.
2. Sample locations, extent of bedrock, and other features are approximate and based on field observations.



Feet
0 10 20

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Confirmation Sample Locations
Areas H and L

ARCADIS

FIGURE
9

CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: KGPeters LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\Burrows_Island_Lighthouse_2018\MXD\2023\Confirmation Sample Locations mapseries 2023\Confirmation Sample Locations mapseries 2023.aprx DATE: 1/8/2024 10:48 AM

LEGEND

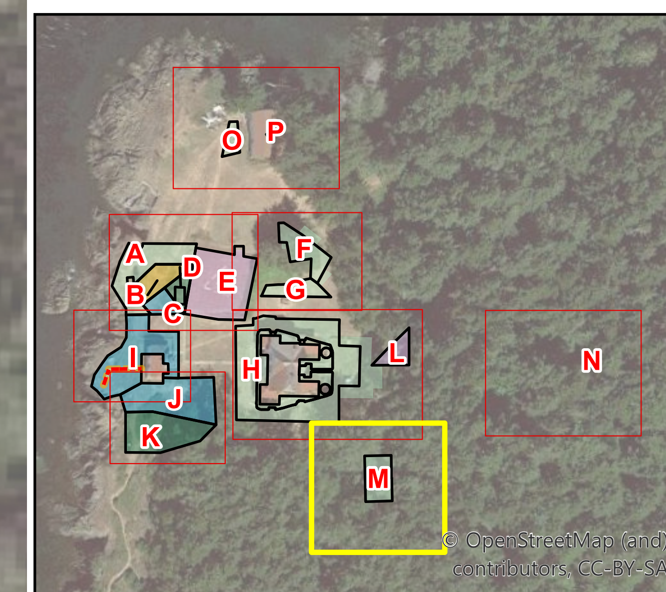
Confirmation Sampling

- Excavation Bottom Sample (EB)
- Sidewall Sample Extent (SS)
- A Remedial Excavation Areas

Excavation Area Features

- Concrete

Note:
1. Buildings and infrastructure shown are based on historical drawings and survey data. Aerial imagery may not align with features shown on the figure.
2. Sample locations, extent of bedrock, and other features are approximate and based on field observations.



Feet
0 9.5 19

UNITED STATES COAST GUARD
BURROWS ISLAND LIGHT STATION
SKAGIT COUNTY, WASHINGTON
SOIL REMOVAL ACTION COMPLETION REPORT

Confirmation Sample Locations
Area M

ARCADIS

FIGURE
10

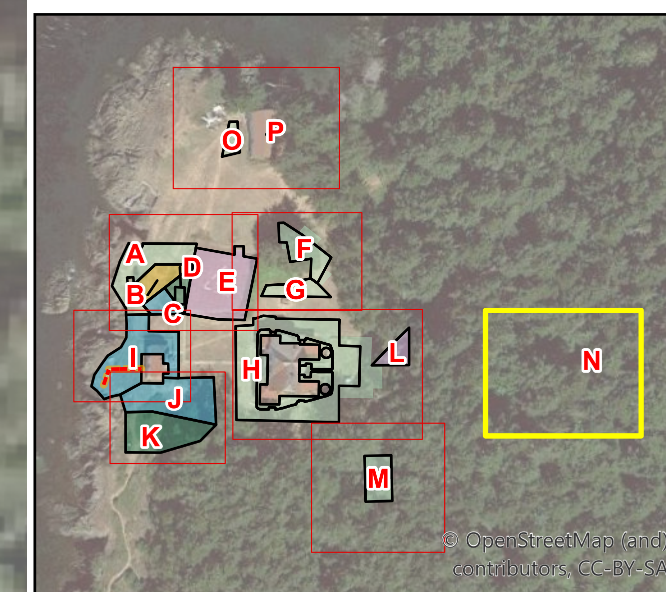
CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: KGPeters LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\Burrows_Island_Lighthouse_2018\MXD\2023\Confirmation Sample Locations mapseries 2023\Confirmation Sample Locations mapseries 2023.aprx DATE: 1/8/2024 10:49 AM

LEGEND

Confirmation Sampling

- Excavation Bottom Sample (EB)
- Sidewall Sample Extent (SS)
- A Remedial Excavation Areas
- Water Tanks/Platforms

Note:
1. Buildings and infrastructure shown are based on historical drawings and survey data. Aerial imagery may not align with features shown on the figure.
2. Sample locations, extent of bedrock, and other features are approximate and based on field observations.



Feet
0 9.5 19

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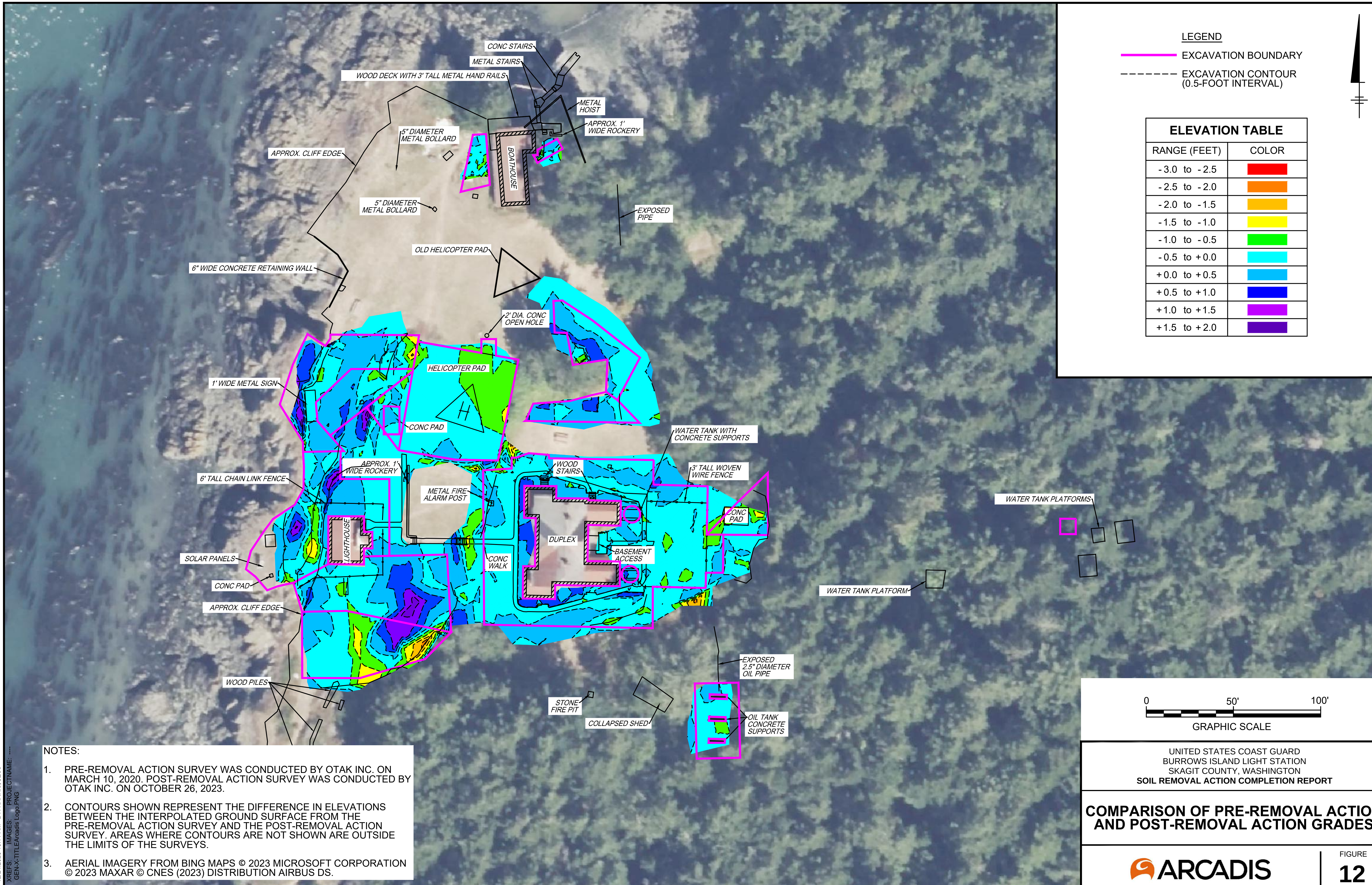
Confirmation Sample Locations
Area N

ARCADIS

FIGURE
11

CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: KGPeters LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\Burrows_Island_Lighthouse_2018\MXD\2023\Confirmation Sample Locations mapseries 2023\Confirmation Sample Locations mapseries 2023.aprx DATE: 1/8/2024 10:50 AM



LEGEND

EXCAVATION BOUNDARY

EXCAVATION CONTOUR (0.5-FOOT INTERVAL)

ELEVATION TABLE	
RANGE (FEET)	COLOR
-3.0 to -2.5	red
-2.5 to -2.0	orange
-2.0 to -1.5	light orange
-1.5 to -1.0	yellow
-1.0 to -0.5	green
-0.5 to +0.0	cyan
+0.0 to +0.5	light blue
+0.5 to +1.0	blue
+1.0 to +1.5	magenta
+1.5 to +2.0	purple

NOTES:

1. PRE-REMOVAL ACTION SURVEY WAS CONDUCTED BY OTAK INC. ON MARCH 10, 2020. POST-REMOVAL ACTION SURVEY WAS CONDUCTED BY OTAK INC. ON OCTOBER 26, 2023.
2. CONTOURS SHOWN REPRESENT THE DIFFERENCE IN ELEVATIONS BETWEEN THE INTERPOLATED GROUND SURFACE FROM THE PRE-REMOVAL ACTION SURVEY AND THE POST-REMOVAL ACTION SURVEY. AREAS WHERE CONTOURS ARE NOT SHOWN ARE OUTSIDE THE LIMITS OF THE SURVEYS.
3. AERIAL IMAGERY FROM BING MAPS © 2023 MICROSOFT CORPORATION © 2023 MAXAR © CNES (2023) DISTRIBUTION AIRBUS DS.

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COMPARISON OF PRE-REMOVAL ACTION AND POST-REMOVAL ACTION GRADES

ARCADIS

FIGURE
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