
# UPLANDS REMEDIAL INVESTIGATION WORK PLAN: ADDENDUM #1

Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, Washington 98221
Facility Site ID #21847524

*Prepared For:*

Guemes Channel Holdings, LLC

*By:*

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September 4, 2025

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# ACRONYMS & ABBREVIATIONS

| | |
|---|---|
| AST | Above ground storage tank |
| COC | Contaminant of concern |
| CSM | Conceptual site model |
| CUL | Cleanup level |
| DAHP | Washington Department of Archaeology and Historic Preservation |
| DMMP | Dredge Material Management Program |
| D/O | Diesel- and oil-range petroleum |
| Ecology | Washington State Department of Ecology |
| EIM | Environmental information management system |
| GCH | Guemes Channel Holdings LLC |
| GPR | Ground penetrating radar |
| HASP | Health and Safety Plan |
| HCID | Hydrocarbon identification |
| IDP | Inadvertant Discovery Plan |
| MDL | Method detection limit |
| MTCA | Model Toxics Control Act |
| PAHs | Polycyclic aromatic hydrocarbons |
| PCB | Polychlorinated biphenyl |
| PID | Photoionization detector |
| Property | Parcels of real property that are included in the Site |
| QAPP | Quality Assurance Project Plan |
| REC | Recognized environmental condition |
| RL | Reporting limit |
| RPD | Relative percent difference |
| SAP | Sampling & Analysis Plan |
| Site | Area of known or suspected contamination at Lovric's Sea Craft (3100 Oakes Avenue in Anacortes, WA) |
| SMI | Stabbert Maritime & Industrial, Inc. |
| sVOC | Semi-volatile organic compound |
| TBT | Tributyltin |
| TCLP | Toxics Characteristic Leaching Protocal |
| TEE | Terrestrial Ecological Evaluation |
| USACE | United Stated Army Corps of Engineers |
| UST | Underground storage tank |
| VI | Vapor intrusion |
| VOC | Volatile organic compound |
| WAC | Washington Administrative Code |

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September 4, 2025

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**Re: Uplands Remedial Investigation Work Plan Addendum #1**
Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, Washington 98221
Facility Site ID #21847524

Dear Ms. Allison:

This document presents an addendum to the remedial investigation work plan dated January 15, 2025 to evaluate the upland portion of the Lovric's Sea-Craft Site (Site) in Anacortes, Washington. The goal of this addendum is to fill in data gaps associated with soil and groundwater quality that remain after completion of the originally proposed remedial investigation (RI) scope of work dated January 15, 2025. This proposed investigation is designed to comply with the state cleanup requirements under the Washington Department of Ecology's Model Toxics Control Act (MTCA) for compliance with the necessary elements for a remedial investigation (WAC 173-340-350(7)).

This work plan addendum #1 addresses data gaps in sampling data for the upland portions of the Site following completion of the field work for the January 2025 RI work plan.

Should you have any questions concerning this work plan, please do not hesitate to contact us at (360) 714-9409.

Sincerely,
**Stratum Group**

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# 1.0 INTRODUCTION

Stratum Group has prepared this remedial investigation work plan (RI WP) for the Lovric's Sea-Craft Site (Site) located at 3100 Oakes Avenue in Anacortes, Washington (Property). This proposed work plan is an addendum to the work plan dated January 15, 2025 and approved by the Washington Department of Ecology (Ecology).

The purpose of this work plan addendum #1 is to address data gaps in the characterization of site contamination that remain after completion of the scope of work outlined in the January 15, 2025 work plan. This addendum also presents a set of proposed subsurface explorations to improve our understanding of geotechnical and environmental conditions in two spit peninsulas that extend into the industrial marina basin that are being considered for removal and fill geotechnical data gaps in several other upland areas.

This document includes a brief summary of the sampling results from the original scope of work, identification of outstanding data gaps, and a proposed scope of work to complete the site's characterization. An addendum to the original site sampling and analysis plan and quality assurance plan (SAP/QAPP) will be submitted to Ecology alongside this RI WP addendum. These addenda will be submitted to Ecology for their review and approval under Agreed Order No. DE 22368.

# 2.0 BACKGROUND

The Property is located on the north shore of Fidalgo Island within the city limits of Anacortes, Washington in Skagit County. The Property is located approximately 1.4 miles west-southwest of the historical downtown core of Anacortes, between Dakota Avenue to the east and Hartford Avenue to the west and utilizes the street address 3100 Oakes Avenue. The location of the Property is presented in Figure 1 in Appendix I.

The Property consists of ten tax parcels that cover approximately 8.7 acres, portions of which are submerged below the high-water mark of Guemes Channel to the north. The upland consists of a steep vegetated hillside and a relatively level shoreline commercial area that is developed with multiple buildings and marine railways. The elevation of the Property along Oakes Avenue is approximately 70 feet above mean sea level, with a steep 50-to-60-foot elevation drop to the nearshore and shoreline areas where the shipyard infrastructure development is present. The Property is bordered by single-family residential properties to the south along Oakes Avenue, undeveloped land to the east and west, and Guemes Channel to the north. According to the City of Anacortes, the Property is mostly zoned as Light Manufacturing (LM). However, the bluff top area along Oakes Avenue is zoned as Residential Low Density 2A (R2A).

The Property has been developed since at least the late 1890s, when the Russian Cement plant was constructed on the east side of the property. Robinson Fisheries established a cod cannery on

the west side of the Property circa 1912, and the property operated as a fish processing facility through the mid-1960s. Lovric's Sea-Craft shipyard was established on the Property by 1965, which operated through early 2023, when the current owners, Guemes Channel Holdings LLC (GCH), purchased the Property. The property continues to operate as a large vessel shipyard.

A variety of structures are located on the Site which were constructed over a period of time by prior owners to facilitate site uses. Details of key site features are presented in the original RI WP and are labeled in Figures 2 and 3 in Appendix I.

A preliminary conceptual site model for the Lovric's Site is presented in the initial RI WP.

## 2.1 Geology and Soils

The following descriptions of the surficial deposits in the vicinity of the Property were interpreted from the *Geologic Map of the Bellingham 1:100,000 Quadrangle, Washington* (Lapen, 2000). Lapen maps the upland portion of the Property as being underlain by surficial deposits of Vashon till (Qgt). Continental-derived sediment deposits including sand, silt and clay with lesser gravel and peat of the Whidbey Formation ($Qc_w$) are mapped as lying below the till. These two geologic units are suspected to compose the majority of the shoreline bluff on the southern edge of the property.

Our interpretations of historical aerial imagery of the vicinity indicate that much of the land area north of the access road that runs along the base of the shoreline bluff consists of fill material imported to produce the existing breakwater, jetties, and ship repair areas. Fill material likely consists of a mix of dredge spoils from the harbor area (unconsolidated sand, silt and clay) and man-made debris based upon our soil observations during environmental drilling.

Soils observed in environmental borings completed in March 2025 consisted of silt, sand and gravel interpreted as fill material between 2 and 7 feet thick across most of the site. Fill was generally thicker toward the waterward edge of the bulkhead (north) and thinner toward the shoreline bluff (south). However, fill deposits up to 15 feet thick were observed toward the western edge of the property. Human-derived debris (e.g., plastic, glass, metal) was generally limited to the upper 6 to 12 inches. However, wood debris was observed in fill up to 9 feet bgs in isolated locations.

Beneath the fill material, native nearshore sand and slightly silty sand deposits that are generally between 5 and 10 feet thick transition into glaciomarine or glaciolacustrine deposits of fine silty sand to silt and sandy silt to depths of at least 50 feet bgs, per geotechnical borings completed on the Property in 2022.

## 2.2 Hydrology

Guemes Channel, a waterway of the Salish Sea, bounds the Property to the north. No other natural surface water features are present on the Property.

Stormwater on the Property directly infiltrates into the subsurface or flows off the surface towards Guemes Channel. A City of Anacortes municipal stormwater outfall is located on the Property, just east of the base of the east driveway (Dakota Avenue). No stormwater from the Property is collected and discharged through this outfall pipe.

Additionally, two steel hanging pipes that carry surface water and/or stormwater collected from offsite exit a slope on the southwest corner of the Property and discharge onto the slope below. The drainage then flows into another underground pipe and discharges into Guemes Channel west of the existing breakwater.

The direction of shallow groundwater flow is generally a function of topography and proximity to surface water features. The Property is located on topography that slopes gently to steeply to the north toward Guemes Channel.

Subsurface investigations in 2025 identified groundwater across most of the Site between 3 and 10 feet below the ground surface (bgs), except for one location at the west end of the Site where groundwater was encountered at approximately 15 feet bgs. Groundwater was generally deeper on higher elevation portions of the Site and shallower on lower elevation portions of the site. No groundwater was encountered in B16, on a bench cut into the former shoreline bluff, which was also the highest elevation sampling location completed at that time.

Based on the proximity to Guemes Channel, groundwater depth and flow direction on this portion of the Property may be tidally influenced.

## 3.0 PRELIMINARY RI FINDINGS

Eighteen environmental borings were completed across the Site on March 4-6, 2025 for collection of soil and reconnaissance groundwater samples in areas of high environmental concern based upon historical site uses and previously observed evidence of releases. Surface soils were sampled from eight additional locations.

A summary of the analytical results from the March 2025 investigation and a 2022 Limited Phase II environmental site assessment are provided below. The most restrictive Model Toxics Control Act (MTCA) cleanup levels were used as screening levels (SLs) to determine whether a given analyte was a contaminant of concern (COC) at each sampling location. The preliminary soil data are presented on maps in Figures 4 through 6 and the preliminary groundwater data are presented on maps in Figures 7 through 9.

### Soil

- Diesel- and oil-range petroleum (D/O) exceeds the SLs in the immediate vicinity of the former bunker oil USTs and clean boundaries to the impacted area have been established to the north, west, and south. Limited hot spots of D/O contamination were also identified

in surface soils in two areas of the east half of the Site.

- Carcinogenic polycyclic aromatic hydrocarbons (cPAHs) exceed SLs throughout surface soils and shallow fill across most of the site. SL exceedances were present in native soils in a few isolated locations.
- Naphthalenes exceeded SLs in a few locations that also contained high concentrations of cPAHs.
- Metals including arsenic, chromium, lead, mercury, copper, and zinc exceeded SLs predominately in surface soils and shallow fill, with arsenic exceedances being particularly widespread.
- Polychlorinated biphenyls (PCBs) exceeded SLs in a surface sample in one location on the Site, which corresponded to an area of high metals concentrations. All other samples contained no PCBs above laboratory reporting limits.
- Volatile organic compounds (VOCs) were not detected above SLs on the Site.
- Tributyltin (TBT) was not detected above the SL on the Site.
- Gasoline-range petroleum was detected above the VOC-present SL in one location on the Site between the two railways. However, no VOC data was collected from this location to determine which whether the VOC-present or VOC-not present SL is most appropriate. All other gasoline-range petroleum detections were below the lowest potential SL.

### Groundwater

- D/O exceeds groundwater SLs in the former bunker oil UST area, and around the former soil stockpile area west of the east warehouse. Marginal exceedances were observed immediately east of the west warehouse near a former surface spill and near an old utility sink by the northeast corner of the west warehouse but may be biased high due to turbidity.
- cPAHs and naphthalenes exceed groundwater SLs in the former soil stockpile area. Detections above SLs were present elsewhere initially but after the samples were laboratory filtered to remove residual particulate matter, dissolved concentrations dropped below the SLs across the rest of the Site.
- Metals, particularly arsenic, were initially detected above the SLs on the Site. Lead and chromium also exceeded SLs in one or more samples. Samples were laboratory filtered to remove residual particulate matter and reanalyzed to get more representative concentrations. Arsenic continued to exceed groundwater SLs west and northeast of the east warehouse after filtration.
- Volatile organic compounds (VOCs) were not detected above SLs on the Site.
- PCBs were not detected above the groundwater SL on the Site.
- TBT was not detected above the groundwater SL on the Site.
- Gasoline-range petroleum was not detected above the groundwater SL on the Site.

Based on these results, VOCs, TBT, and gasoline-range petroleum should no longer be considered COCs for the uplands of the Site.

## 4.0 IDENTIFIED UPLAND DATA GAPS

Based upon the results of the initial sampling conducted for the remedial investigation, characterization of contamination on the upland portion of the Site is nearly complete. However, a few data gaps remain that warrant further investigation to complete site characterization, including:

- Incomplete characterization of the lateral extent of the D/O petroleum plume in groundwater in the northeast corner of the Site.
- Water quality in the former soil stockpile area was turbid during sampling and therefore initial groundwater contaminant concentrations may be biased high in this area.
- Undetermined natural background concentration of arsenic in area groundwater.

Recent communications from the Property owners have identified two additional elements of the Site that warrant additional investigation:

- GCH wishes to consider removal of the west and central spit peninsulas to improve functionality of the industrial marina basin.
- GCH has identified data gaps in its previous geotechnical testing for the site, including data necessary to engineer and permit a permanent retaining wall structure to replace the temporary shoring at the base of the west hillside.

## 5.0 PROPOSED SUPPLEMENTAL UPLAND WORK PLAN

This addendum #1 work plan proposed herein was designed to address the identified data gaps and complete characterization of the nature and extent of contamination on the upland portions of the Site.

This proposal recommends completion of five additional reconnaissance borings for collection of soil and groundwater samples and four permanent groundwater monitoring wells. Six additional borings are proposed solely for evaluation of geotechnical Site conditions.

Stratum Group personnel will coordinate and be onsite to oversee subcontractors and collect soil and groundwater samples. Subcontractors will be utilized, as needed, during the project including well drilling professionals, Ecology accredited laboratories for sample analysis, and ground penetrating radar and private utility locate professionals.

All fieldwork and sampling activities will be completed in accordance with the project health and safety plan (HASP) and sampling analysis plan and quality assurance project plan (SAP/QAPP). The project HASP was previously submitted and is unaltered for this addendum. An updated SAP/QAPP is provided in Appendix II.

## 5.1 Preparatory Activities

Prior to implementation of this work plan addendum, written approval will be obtained from Ecology and GCH.

At least two business days prior to the scheduled commencement of ground disturbing activities, proposed subsurface sampling locations will be marked with white paint and the One-Call Utility Notification Service will be notified.

A professional private utility locating service will be engaged to do a conductible locate and a ground penetrating radar (GPR) to further identify any underground utilities and/or buried objects in the vicinity of the proposed sampling locations. The utilities identified through the private locate company will be marked with paint on the ground surface and flagged for future information purposes.

## 5.2 Cultural Resources Assessment

The Site is undergoing remedial investigation under an Agreed Order with the State of Washington. Per WAC 173-340-815(3)(b), the Washington Department of Archaeology and Historic Preservation (DAHP) and affected Indian tribes must be consulted on the potential effects of the planned activities. However, communication with Ecology personnel on June 26, 2025 indicates that because the proposed scope of work in this addendum #1 is generally within the scope of the original consultation, no additional consultation is needed prior to completion of the work. However, field activities will still be subject to the same cultural resource requirements laid out for the original RI WP.

If items of potential cultural resource value are observed during ground disturbing activities, field personnel will follow the conditions of the Inadvertent Discovery Plan (IDP) prepared for the original RI work plan.

## 5.3 Subsurface Soil and Reconnaissance Groundwater Sampling

We propose completion of five additional borings in the upland areas of the Site. Drilling and sampling activities will be conducted in accordance with the updated SAP/QAPP, provided in Appendix II.

Our proposed boring locations are provided in Figure 10 in Appendix I. Soil boring locations are identified as SB19 through SB23. Rationale for each of the boring locations is provided in Table 1, below.

**Table 1.** Boring Location Rationale

| Boring ID | Location | Rationale |
|---|---|---|
| SB19 | NE of former UST area | Evaluate northeastern and eastern extent of petroleum contamination from former fuel oil USTs |
| SB20 | E property edge E of former UST area | |
| SB21 | N end of west peninsula | Evaluate environmental and geotechnical subsurface conditions for potential removal |
| SB22 | Middle of central peninsula | |
| SB23 | N end of central peninsula | |

A continuous 2-inch diameter core of the subsurface soils will be collected for visual analysis and sampling. Soil cores will be field examined by Stratum Group personnel for obvious indications of contamination including discoloration, odors, and petroleum sheens. Field personnel will utilize a photoionization detector (PID) to scan for volatile vapors associated with contaminants of concern.

Borings will be advanced to depths of approximately 15 feet bgs. We anticipate that these borings will be completed at least 3 feet into native soil deposits and well into the shallow groundwater zone. If areas of fill greater than 15 feet thick are observed, the boring will be advanced further at least 3 feet into native material, or the drill rig encounters refusal. If contamination is suspected at the base of the boring through field testing, then the boring will be extended until field testing indicates that clean soils are encountered, or the drill rig encounters refusal.

Stratum Group will be onsite to collect soil samples during drilling of the environmental borings. A minimum of three soil samples will be collected from each boring location:

- One sample from fill material between 0 to 5 feet bgs (~3 feet bgs)
- One sample from fill material between 5 and 10 feet bgs (~7 feet bgs)
- One sample from underlying native soil/fill (~10 feet bgs)

If fill material greater than 10 feet thick is encountered, one additional soil sample will be collected from fill between 10 and 15 feet bgs. Samples will be collected where historical research and field evidence suggest contamination is most likely to be present. Obvious field indications of contamination may be used to adjust sampling depths and/or inform additional sampling depths during field activities.

After completion of each boring, a temporary well will be placed in the borehole for collection of reconnaissance groundwater samples. The well screen will be placed to capture the top of the groundwater table encountered in that boring. Temporary wells will be purged using low flow pumping techniques prior to sampling until turbidity has been greatly reduced. Once purge water turbidity appears to have stabilized, Stratum Group personnel will collect one reconnaissance

groundwater sample from each of the temporary wells.

If field observations indicate that petroleum contamination remains present at the east parcel boundary (SB20), one additional boring may be completed farther to the east to establish the eastern edge of the contaminant plume. Additional borings will be labeled in a continuation of the numerical order.

After soil and reconnaissance groundwater samples have been collected, the temporary wells will be removed, and the borings will be decommissioned in accordance with the SAP/QAPP.

## 5.4 Groundwater Monitoring Wells

During the same mobilization as the soil borings described above, we propose installation of four permanent groundwater monitoring wells. Monitoring well construction, development, and sampling will be completed in accordance with the updated SAP/QAPP provided in Appendix II. Groundwater samples collected from permanent monitoring wells are useful because the well installation and development process can significantly reduce turbidity and other disturbances to subsurface hydrology caused by drilling activities that can cause high-biased groundwater contaminant detections. Samples collected from permanent monitoring wells are generally considered more representative of true groundwater conditions.

The proposed monitoring well locations have been labeled MW1 through MW4 and are shown on Figure 10 in Appendix I. A description of the proposed monitoring well locations and the rationale for their location is provided in Table 2.

**Table 2.** Monitoring Well Location Rationale

| Boring ID | Location | Rationale |
|---|---|---|
| MW1 | N of former bunker UST area near East Pier access | More accurately assess petroleum and arsenic contamination in groundwater down gradient of the former bunker UST area |
| MW2 | Adjacent to SB7, thru former soil stockpile area | Further investigate groundwater quality in the soil stockpile area to evaluate whether contamination detected in reconnaissance samples is representative |
| MW3 | Thru S access road on the E side of the Site | Assess groundwater quality to evaluate background arsenic levels |
| MW4 | Adjacent to NE corner of W warehouse | Re-evaluate for petroleum contamination in groundwater |

One well (MW1) will be installed on the downgradient (north) side of the former bunker UST area in the immediate vicinity of previous boring SB1. Installing and sampling a well in this location will serve multiple purposes, as GCH is in the planning stages of conducting an interim remedial action to address petroleum contaminated soil in the vicinity of the former bunker USTs. The residual contaminant mass in soil is suspected to be the primary driver of petroleum contamination in groundwater on this portion of the site. A monitoring well down gradient of the

anticipated interim remedial action would allow for both a more accurate understanding of pre-remediation groundwater conditions and observation of changes in groundwater petroleum concentrations once that remedial action is complete. Since petroleum concentrations in soil met site screening levels at the SB1 sampling location, we do not anticipate that MW1 would be damaged by the anticipated soil cleanup action. Arsenic concentrations also exceeded site SLs in the groundwater at this location. By analyzing arsenic concentrations in groundwater collected from a monitoring well, from roughly the same location as a sample from a temporary well, we look to gain a more accurate understanding of Site groundwater quality and help determine whether dissolved arsenic will require remediation on this Site.

One well (MW2) will be installed through the former soil stockpile area adjacent to previous boring SB7. Groundwater collected from a reconnaissance boring at SB7 contained concentrations of cPAHs, naphthalenes, and petroleum that exceeded the initial site SLs. However, the detected cPAH and naphthalene concentrations only marginally exceeded the screening levels after laboratory filtration. Contamination on this part of the site is suspected to be largely associated with the interaction of infiltrating surface water with fill materials that included creosote-treated timbers and other debris. The vast majority of this debris was removed as part of the owner's maintenance activities at the property in 2023, such that we anticipate groundwater quality to naturally clean up through time. Installation of a well in this location will allow monitoring of this process and help determine whether additional future remedial actions will be required in the soil stockpile area.

Elevated concentrations of arsenic were detected in most of the reconnaissance groundwater sampling locations on the east side of the Site. We propose installing one monitoring well (MW3) in an up gradient position that is unlikely to have been negatively impacted by historical industrial activities on the Site to evaluate natural background groundwater quality and determine whether there are naturally elevated concentrations of arsenic on the Site that may explain the initial sampling results.

Finally, one well (MW4) will be installed adjacent to the northeast corner of the west warehouse building. This location was last sampled in 2022 as part of a collaboration with geotechnical drilling activities. Concentrations of D/O were detected at 680 µg/L from a 2022 reconnaissance sample, slightly above the Site SL of 500 µg/L. The hollow stem auger equipment used during that investigation creates more subsurface disturbance, particularly for collection of reconnaissance groundwater samples, which may have caused biased high results. Lastly, based on problems identified on samples from similar projects completed around the same time in 2022, we have reason to believe that the laboratory we utilized at that time was having quality control issues that resulted in detections of D/O petroleum that either were not actually present or were biased high. Therefore, we feel that re-evaluation of petroleum concentrations in groundwater from this location is warranted and may remove this as an area of concern for groundwater contamination on the Site.

Borings will be advanced to depths of approximately 15 feet bgs. We anticipate that these

borings will be completed at least 3 feet into native soil deposits and well into the shallow groundwater zone. If areas of fill greater than 15 feet thick are observed, the boring will be advanced further at least 3 feet into native material, or the drill rig encounters refusal. If contamination is suspected at the base of the boring through field testing, then the boring will be extended until clean soils are encountered, or the drill rig encounters refusal.

Monitoring wells will be completed to a depth of approximately 15 feet bgs, consistent with the other borings completed on the Site. However, based on the higher elevation of the proposed MW3 location and groundwater having been previously encountered along the upper access road at approximately 25 feet bgs, MW3 is planned to be completed to approximately 25 feet or a minimum of 2-3 feet below the top of the water table, whichever is shallower.

Wells will be constructed with 10 feet of screen, with the bottom of the screened section set at the bottom of the borehole completed for each respective well. Based on previously recorded groundwater depths in the proposed well locations, we anticipate this well screen placement will capture the top of the groundwater table.

Soil samples will only be collected from the MW3 borehole in accordance with the procedures outlined in Section 5.3 above and the project SAP/QAPP. No soil samples will be collected from MW1, MW2, or MW4 because soil samples have been collected from SB1, SB7, and SG4, in very close proximity to the proposed well locations.

## 5.5 Geotechnical Borings

PanGeo Inc., on behalf of GCH, has proposed completion of approximately six borings in upland areas of the Site. The purpose of these borings is to fill data gaps from previous investigations and to gather information necessary to engineer and permit a permanent retaining wall structure at the base of the west hillside.

The proposed boring locations are provided in Figure 10 in Appendix I.

Geotechnical borings will be completed using hollow stem auger drilling equipment. Each boring will be completed to a maximum depth of approximately 30 feet bgs. Soil samples will be collected for geotechnical parameter evaluation using standard penetration testing (SPT) methods and split-spoon sampling equipment. Samples will be collected every 2.5 feet from the upper 10 feet of the hole, and from every 5 feet to the bottom of the boring.

The proposed geotechnical borings are located in areas that have already been characterized for environmental purposes or are located in areas where no significant environmental concerns are known or suspected to exist, based on previous Site history investigations. Therefore, no environmental sample collection is proposed from the geotechnical borings. However, if evidence of significant environmental contamination is observed (e.g., foul odors, significant debris, etc.) in areas previously believed to be at low risk for contamination, PanGeo personnel will notify Stratum Group and those observations will be incorporated into the RI report.

After geotechnical soil samples have been collected by PanGeo personnel, the borings will be decommissioned in accordance with the SAP/QAPP.

## 5.6 Sample Analysis Plan

Environmental samples collected as part of this work plan will be delivered or shipped to a laboratory with Department of Ecology accreditation for the required analysis.

Significant volumes of organic material have not been encountered in Site fill material during investigations completed to date. However, if groundwater samples collected from the monitoring wells are found to contain elevated concentrations of D/O petroleum, samples may be reanalyzed for NWTPH-DX after being subjected to the silica gel cleanup (SGC) protocol. Application of SGC will be utilized to remove interference from non-petroleum polar organic material that may artificially bias sample results high. SGC will not be applied to reconnaissance groundwater samples collected for this investigation, as only water samples collected from permanent monitoring wells may be eligible to utilize SGC, per Ecology's guidance (Ecology, 2023).

Sampling and laboratory analysis results from work completed as part of the original RI WP have demonstrated that residual turbidity in reconnaissance water samples biases metals and cPAHs concentrations high, often resulting in concentrations being reported above their respective screening levels. Therefore, we propose that reconnaissance water samples be laboratory filtered prior to analysis for metals and cPAHs.

The proposed analytical schedule is provided in Table 3, below, including the methodology recommended for the analysis.

**Table 3.** Sample Analysis Plan

| Boring | Sample Description | Contaminants of Concern | Analytical Method |
|---|---|---|---|
| SB19 & SB20 | Up to 3 subsurface soil samples & 1 reconnaissance groundwater sample per boring | Diesel & Oil | NWTPH-Dx |
| SB21-SB23 | Up to 3 subsurface soil samples and 1 reconnaissance groundwater sample per boring | HCID | NWTPH-HCID |
| | | MTCA 5 metals + Cu, Zn | EPA 6020B & 1631E |
| | | cPAHs & Naphthalenes | EPA 8270E |
| MW1 | 1 groundwater sample | Diesel & Oil | NWTPH-Dx |
| | | Arsenic | EPA 6020B |
| MW2 | 1 groundwater sample | Diesel & Oil | NWTPH-Dx |
| | | Arsenic | EPA 6020B |
| | | cPAHs & Naphthalenes | EPA 8270E |
| MW3 | Up to 3 subsurface soil samples & 1 groundwater sample | MTCA 5 metals + Cu, Zn | EPA 6020B & 1631E |
| MW4 | 1 groundwater sample | Diesel & Oil | NWTPH-Dx |
| Six geotechnical borings | No samples for environmental analysis | N/A | N/A |

As stated above, the proposed geotechnical borings are located in areas that have already been characterized for environmental purposes or are located in areas where no significant environmental concerns are known or suspected to exist, based on previous Site history investigations. Therefore, no laboratory analysis is proposed for soil samples collected from the proposed geotechnical borings.

## 5.7 Contaminant Screening Levels

The current understanding of Site contamination is insufficient to develop site-specific CULs. A range of potential CULs for soil and groundwater for the suspected COCs were presented in Tables 4 and 5 in the original approved work plan, with one exception. The most restrictive potential CUL for each analyte will be used as SLs for this investigation until Site contamination is more well understood and the conceptual site model can be refined.

A study completed by Ecology titled *Natural Background Groundwater Arsenic Concentrations in Washington State* dated January 2022 compiled previous data to develop region-specific acceptable values for naturally occurring arsenic in groundwater. The study determined that the background threshold value in the Puget Sound Basin, which includes the Site, is 8 µg/L. Therefore, 8 µg/L will be the value used as the SL for arsenic in Site groundwater moving forward.

## 5.8 Timeline

An estimated timetable of proposed work activities is provided in Table 4, below.

The proposed timeline is based upon an estimated work plan addendum approval date. If work plan review, cultural resources assessments, or other project elements delay the start of field activities, the timetable will continue to provide our anticipated order of events and relative timing.

This timetable assumes that standard turnaround times for sample analysis will be used. Timetable dates are subject to subcontractor availability for drilling portions of the project.

**Table 4.** Estimated Project Timetable

| Task | Approximate Date of Completion |
|---|---|
| Initial submittal of work plan addendum to Ecology for review | September 3, 2025 |
| Ecology comments on draft work plan addendum | September 4, 2025 |
| Work plan re-submittal to Ecology for final approval | September 4, 2025 |
| 30-day public comment period | September 12-October 12, 2025 |
| GPR & private utility locate | September 23, 2025* |
| Drill borings and install monitoring wells | September 23-25, 2025* |
| Receive sample analytical results | October 2, 2025 |
| Preliminary Draft Remedial Investigation report | December 15, 2025 |

*Start timing of field activities dependent upon work plan and cultural resources permit approval, driller availability, and Stratum Group personnel availability.

## 5.9 Quality Control/Quality Assurance

Quality control and quality assurance protocols will be implemented for this investigation in accordance with the updated addendum #1 QAPP provided in Appendix II. Data will be submitted to LDC for third-party data validation.

## 5.10 Reporting

Based upon our current understanding of the Site, we anticipate the data collected as part of this work plan addendum will be sufficient to complete characterization of the upland portion of the Site. Stratum Group will prepare a Preliminary Draft RI report in general accordance with WAC 173-340-350. This report will document and summarize the results of recent environmental sampling, including sample data, maps showing the spatial distribution of the results, comparison of sample analysis results to initial screening concentrations, and update the Site's contaminants of concern and the conceptual site model. The Preliminary Draft RI report will include a Terrestrial Ecological Evaluation (TEE) for the Site, completed in accordance with WAC 173-

340-7490. The results of the TEE, our initial sampling work, and the available future Site improvement plans will be used to develop Site-specific CULs.

The Preliminary Draft RI report will be submitted to Ecology for review.

### 5.11 Data Submission

All data collected during this remedial investigation and previously collected sample data will be entered into Ecology's Environmental Information Management (EIM) system.

### 5.12 Management of Investigation Derived Waste (IDW)

All soil and water generated from environmental and geotechnical borings that is not used for sample analysis purposes will be placed in labeled 55-gallon drums and stored on-site pending characterization. We anticipate this waste will be stored on-site until cleanup activities commence, at which time the soil and water will be disposed of with soil and water removed during remediation. Disposal receipts will be obtained to verify proper disposal.

Waste personal protective equipment (e.g., gloves) and field supplies (e.g., plastic bags for PID testing) will be bagged and disposed of as general solid waste at the end of each field day.

# 6.0 REFERENCES

Stratum Group, 2025. *Remedial Investigation Work Plan. Lovric's Sea-Craft, 3100 Oakes Avenue, Anacortes, Washington 98221, Facility Site ID #21847524.* Project 6.1.21. January 15, 2025.

Washington State Department of Ecology, 2016. *Guidance for Remediation of Petroleum Contaminated Sites*. Toxics Cleanup Program Publication No. 10-09-057. June 2016.

Washington State Department of Ecology, 2022. *Natural Background Groundwater Arsenic Concentrations in Washington State*. Toxics Cleanup Program Publication No. 14-09-044. January 2022.

Washington State Department of Ecology, 2023. *Guidance for Silica Gel Cleanup in Washington State*. Toxics Cleanup Program Publication No. 22-09-059. November 2023.

# APPENDIX I

Figure 1 – Site Vicinity Map

Figure 2 – Annotated Aerial Photograph of the Subject Property & Vicinity

Figure 3 – Annotated Site Map and Areas of Environmental Concern

Figure 4E & 4W – Soil Sample Results Map – Petroleum & VOCs

Figure 5E & 5W – Soil Sample Results Map – Metals & PCBs

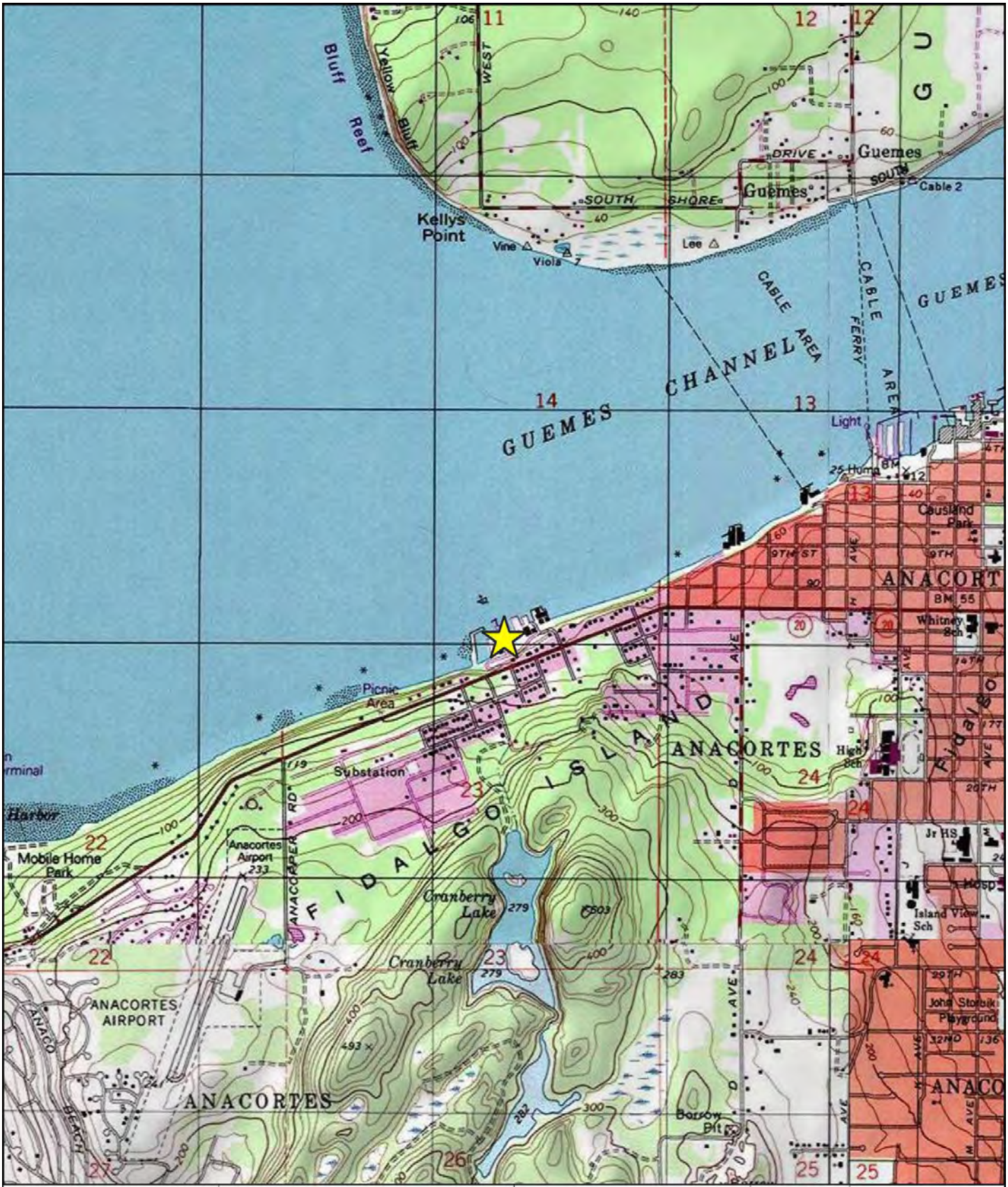
Figure 6E & 6W – Soil Sample Results Map – cPAHs & Naphthalenes

Figure 7E & 7W – Groundwater Sample Results Map – Petroleum & VOCs

Figure 8E & 8W – Groundwater Sample Results Map – Metals & PCBs

Figure 9E & 9W – Groundwater Sample Results Map – cPAHs & Naphthalenes

Figure 10E & 10W – Proposed Additional Investigations




Site Vicinity Map

**Figure 1**

Subject Property

Lovric's Sea-Craft
3022 Oakes Avenue
Anacortes, WA 98221

N

0 0.25 0.5 mi

STRATUM GROUP


Annotated Aerial Photograph of the Subject Property & Vicinity

Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, Washington 98221

**Figure 2**

0 125 250 500 Feet

N

STRATUM GROUP


Annotated Site Map & Areas of Environmental Concern

**Figure 3**

Lovric's Sea-Craft Site
3100 Oakes Avenue
Anacortes, Washington 98221

0 50 100 200 Feet

N

Stratum Group

Recreational Marina

Former paint shed

West Railways

East Railways

Utility sink drain

Former bilge water tote storage area

West Warehouse

Steep slope

Access road

Access road

Matchline

Main driveway

SB16

| SB15 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth | Oil | Diesel | Gas | B | T | E | X | N | 1,3,5-TMB | 1,2,4-TMB | VOCs |
| 0-0.5 | ND | 57 | ND | ND | 0.005 | 0.12 | 2.07 | 0.018 | 0.078 | 0.13 | ND |
| 2.5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 8 | ND | ND | ND | 0.004 | ND | ND | ND | ND | ND | ND | ND |

| SS7 | | | |
|---|---|---|---|
| Depth | Oil | Diesel | Gas |
| 0-0.5 | ND | ND | ND |

| SS8 | | | |
|---|---|---|---|
| Depth | Oil | Diesel | Gas |
| 0-0.5 | ND | ND | ND |

| SG4 | | |
|---|---|---|
| Depth | Oil | Diesel |
| 3 | ND | ND |
| 7.5 | ND | ND |

| SB14 | | | |
|---|---|---|---|
| Depth | Oil | Diesel | Gas |
| 0-0.5 | 280 | 220 | 8.3 |
| 3 | ND | ND | ND |
| 7.5 | ND | 160 | ND |

| SB13 | | | |
|---|---|---|---|
| Depth | Oil | Diesel | Gas |
| 1 | ND | ND | ND |
| 6 | ND | ND | ND |
| 9 | ND | ND | ND |

| SB18 | | | |
|---|---|---|---|
| Depth | Oil | Diesel | Gas |
| 0-0.5 | 820 | ND | ND |
| 3 | 310 | 140 | ND |
| 8 | ND | ND | ND |
| 13 | ND | ND | ND |
| 18 | ND | ND | ND |

| SS5 | | | |
|---|---|---|---|
| Depth | Oil | Diesel | Gas |
| 0-0.5 | ND | ND | ND |

| SS6 | | | |
|---|---|---|---|
| Depth | Oil | Diesel | Gas |
| 0-0.5 | ND | ND | ND |

| SB17 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Diesel | Oil | Gas | B | T | E | X | N | VOCs |
| 0-0.5 | ND | ND | ND | ND | 0.018 | 0.008 | 0.033 | 0.078 | ND |
| 3 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 8.5 | ND | ND | ND | ND | ND | ND | ND | ND | ND |

| Screening Levels (mg/kg) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Diesel | Oil | Gas | B | T | E | X | N | 1,3,5-TMB | 1,2,4-TMB | Other VOCs |
| Unsaturated | 2,000 | | 30/100 | 0.03 | 4.5 | 5.9 | 14 | 4.5 | 1.3 | 1.3 | * |
| Saturated | | | | | 0.27 | 0.34 | 0.83 | 0.24 | 0.071 | 0.072 | * |

ND = non-detect; **RED** = exceedance; *other VOC SLs presented in RI work plan

## Key

Surface
Shallow fill
Native soil
Meets SLs (green)
Exceeds SLs (red)
No data (black)

No longer present

Sample location with no analysis for these analytes

Soil Sample Results Map (West)
Petroleum & VOCs

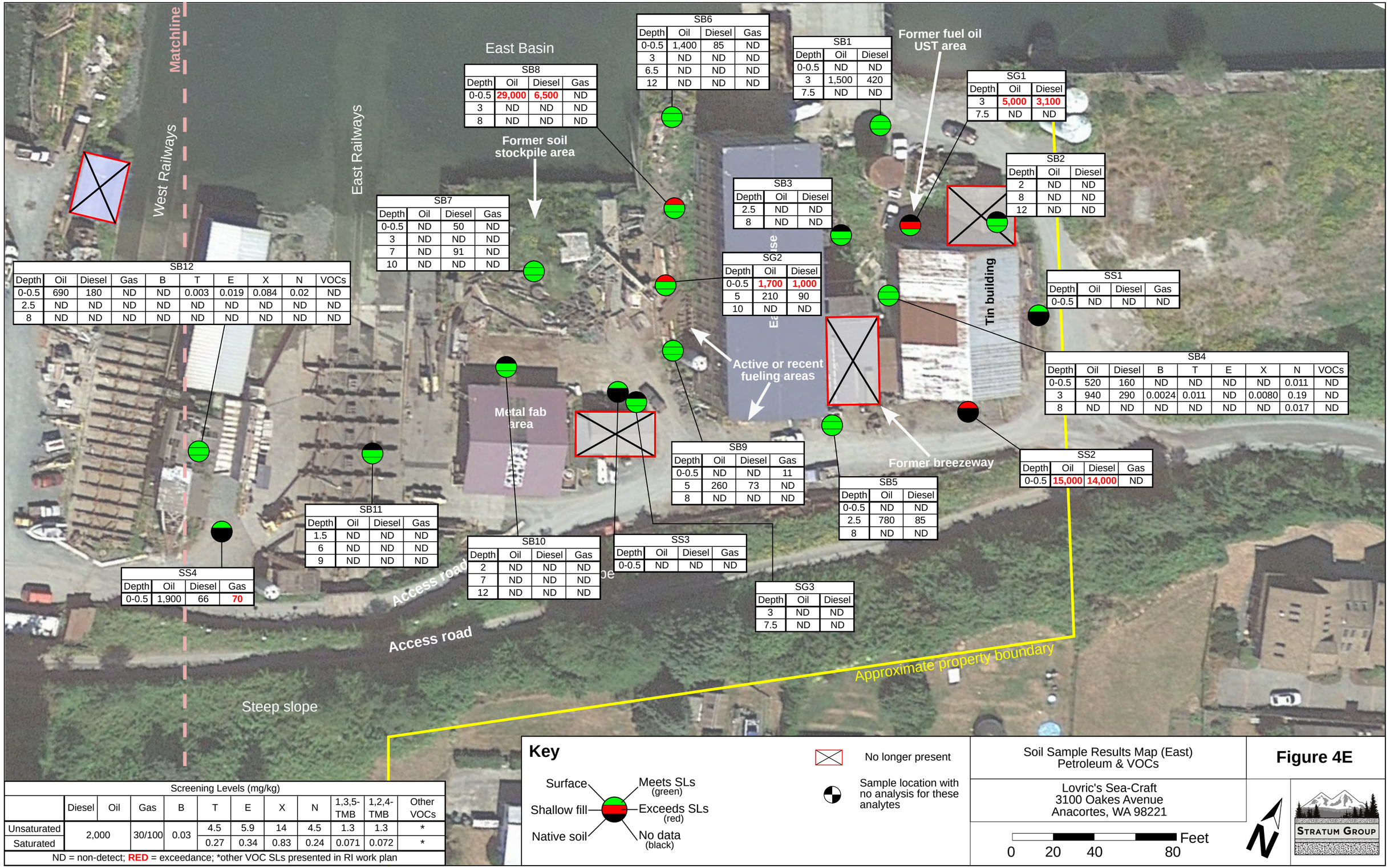
**Figure 4W**

Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, WA 98221

0 20 40 80 Feet

N

Stratum Group




| SB12 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Oil | Diesel | Gas | B | T | E | X | N | VOCs |
| 0-0.5 | 690 | 180 | ND | ND | 0.003 | 0.019 | 0.084 | 0.02 | ND |
| 2.5 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 8 | ND | ND | ND | ND | ND | ND | ND | ND | ND |

| SB8 | | | |
|---|---|---|---|
| Depth | Oil | Diesel | Gas |
| 0-0.5 | 29,000 | 6,500 | ND |
| 3 | ND | ND | ND |
| 8 | ND | ND | ND |

| SB7 | | | |
|---|---|---|---|
| Depth | Oil | Diesel | Gas |
| 0-0.5 | ND | 50 | ND |
| 3 | ND | ND | ND |
| 7 | ND | 91 | ND |
| 10 | ND | ND | ND |

| SB6 | | | |
|---|---|---|---|
| Depth | Oil | Diesel | Gas |
| 0-0.5 | 1,400 | 85 | ND |
| 3 | ND | ND | ND |
| 6.5 | ND | ND | ND |
| 12 | ND | ND | ND |

| SB1 | | |
|---|---|---|
| Depth | Oil | Diesel |
| 0-0.5 | ND | ND |
| 3 | 1,500 | 420 |
| 7.5 | ND | ND |

| SG1 | | |
|---|---|---|
| Depth | Oil | Diesel |
| 3 | 5,000 | 3,100 |
| 7.5 | ND | ND |

| SB2 | | |
|---|---|---|
| Depth | Oil | Diesel |
| 2 | ND | ND |
| 8 | ND | ND |
| 12 | ND | ND |

| SB3 | | |
|---|---|---|
| Depth | Oil | Diesel |
| 2.5 | ND | ND |
| 8 | ND | ND |

| SG2 | | |
|---|---|---|
| Depth | Oil | Diesel |
| 0-0.5 | 1,700 | 1,000 |
| 5 | 210 | 90 |
| 10 | ND | ND |

| SS1 | | | |
|---|---|---|---|
| Depth | Oil | Diesel | Gas |
| 0-0.5 | ND | ND | ND |

| SB4 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth | Oil | Diesel | B | T | E | X | N | VOCs |
| 0-0.5 | 520 | 160 | ND | ND | ND | ND | 0.011 | ND |
| 3 | 940 | 290 | 0.0024 | 0.011 | ND | 0.0080 | 0.19 | ND |
| 8 | ND | ND | ND | ND | ND | ND | 0.017 | ND |

| SB9 | | | |
|---|---|---|---|
| Depth | Oil | Diesel | Gas |
| 0-0.5 | ND | ND | 11 |
| 5 | 260 | 73 | ND |
| 8 | ND | ND | ND |

| SS2 | | | |
|---|---|---|---|
| Depth | Oil | Diesel | Gas |
| 0-0.5 | 15,000 | 14,000 | ND |

| SB5 | | |
|---|---|---|
| Depth | Oil | Diesel |
| 0-0.5 | ND | ND |
| 2.5 | 780 | 85 |
| 8 | ND | ND |

| SB11 | | | |
|---|---|---|---|
| Depth | Oil | Diesel | Gas |
| 1.5 | ND | ND | ND |
| 6 | ND | ND | ND |
| 9 | ND | ND | ND |

| SS4 | | | |
|---|---|---|---|
| Depth | Oil | Diesel | Gas |
| 0-0.5 | 1,900 | 66 | 70 |

| SB10 | | | |
|---|---|---|---|
| Depth | Oil | Diesel | Gas |
| 2 | ND | ND | ND |
| 7 | ND | ND | ND |
| 12 | ND | ND | ND |

| SS3 | | | |
|---|---|---|---|
| Depth | Oil | Diesel | Gas |
| 0-0.5 | ND | ND | ND |

| SG3 | | |
|---|---|---|
| Depth | Oil | Diesel |
| 3 | ND | ND |
| 7.5 | ND | ND |

| Screening Levels (mg/kg) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Diesel | Oil | Gas | B | T | E | X | N | 1,3,5-TMB | 1,2,4-TMB | Other VOCs |
| Unsaturated | 2,000 | | 30/100 | 0.03 | 4.5 | 5.9 | 14 | 4.5 | 1.3 | 1.3 | * |
| Saturated | | | | | 0.27 | 0.34 | 0.83 | 0.24 | 0.071 | 0.072 | * |

ND = non-detect; **RED** = exceedance; *other VOC SLs presented in RI work plan

**Key**

Surface / Shallow fill / Native soil

Meets SLs (green)
Exceeds SLs (red)
No data (black)

No longer present

Sample location with no analysis for these analytes

Soil Sample Results Map (East)
Petroleum & VOCs

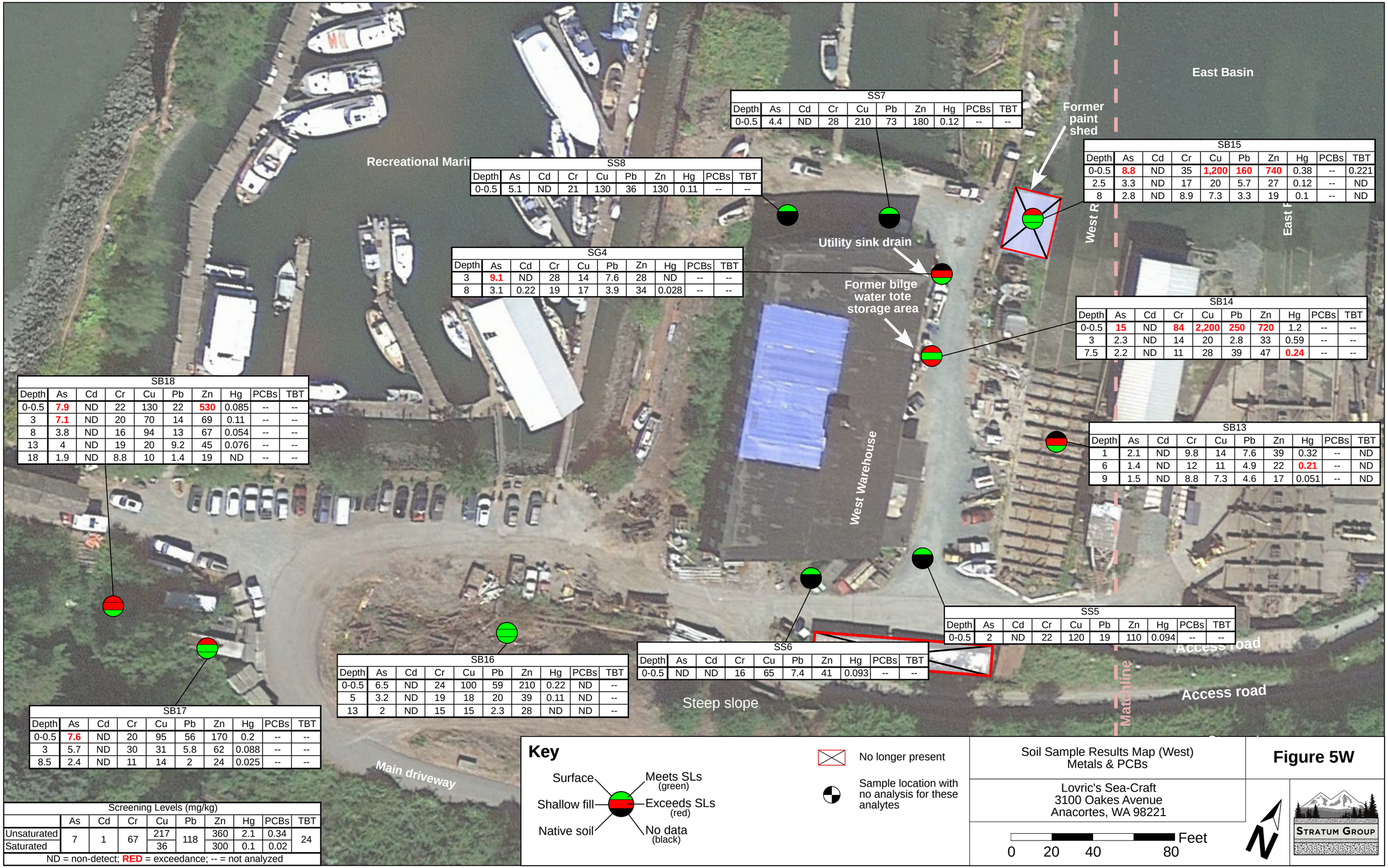
**Figure 4E**

Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, WA 98221

0 20 40 80 Feet

N

Stratum Group




| SS7 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
| 0-0.5 | 4.4 | ND | 28 | 210 | 73 | 180 | 0.12 | -- | -- |

| SS8 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
| 0-0.5 | 5.1 | ND | 21 | 130 | 36 | 130 | 0.11 | -- | -- |

| SG4 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
| 3 | **9.1** | ND | 28 | 14 | 7.6 | 28 | ND | -- | -- |
| 8 | 3.1 | 0.22 | 19 | 17 | 3.9 | 34 | 0.028 | -- | -- |

| SB15 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
| 0-0.5 | **8.8** | ND | 35 | **1,200** | **160** | **740** | 0.38 | -- | 0.221 |
| 2.5 | 3.3 | ND | 17 | 20 | 5.7 | 27 | 0.12 | -- | ND |
| 8 | 2.8 | ND | 8.9 | 7.3 | 3.3 | 19 | 0.1 | -- | ND |

| SB14 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
| 0-0.5 | **15** | ND | **84** | **2,200** | **250** | **720** | 1.2 | -- | -- |
| 3 | 2.3 | ND | 14 | 20 | 2.8 | 33 | 0.59 | -- | -- |
| 7.5 | 2.2 | ND | 11 | 28 | 39 | 47 | **0.24** | -- | -- |

| SB13 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
| 1 | 2.1 | ND | 9.8 | 14 | 7.6 | 39 | 0.32 | -- | ND |
| 6 | 1.4 | ND | 12 | 11 | 4.9 | 22 | **0.21** | -- | ND |
| 9 | 1.5 | ND | 8.8 | 7.3 | 4.6 | 17 | 0.051 | -- | ND |

| SB18 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
| 0-0.5 | **7.9** | ND | 22 | 130 | 22 | **530** | 0.085 | -- | -- |
| 3 | **7.1** | ND | 20 | 70 | 14 | 69 | 0.11 | -- | -- |
| 8 | 3.8 | ND | 16 | 94 | 13 | 67 | 0.054 | -- | -- |
| 13 | 4 | ND | 19 | 20 | 9.2 | 45 | 0.076 | -- | -- |
| 18 | 1.9 | ND | 8.8 | 10 | 1.4 | 19 | ND | -- | -- |

| SS5 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
| 0-0.5 | 2 | ND | 22 | 120 | 19 | 110 | 0.094 | -- | -- |

| SS6 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
| 0-0.5 | ND | ND | 16 | 65 | 7.4 | 41 | 0.093 | -- | -- |

| SB16 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
| 0-0.5 | 6.5 | ND | 24 | 100 | 59 | 210 | 0.22 | ND | -- |
| 5 | 3.2 | ND | 19 | 18 | 20 | 39 | 0.11 | ND | -- |
| 13 | 2 | ND | 15 | 15 | 2.3 | 28 | ND | ND | -- |

| SB17 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
| 0-0.5 | **7.6** | ND | 20 | 95 | 56 | 170 | 0.2 | -- | -- |
| 3 | 5.7 | ND | 30 | 31 | 5.8 | 62 | 0.088 | -- | -- |
| 8.5 | 2.4 | ND | 11 | 14 | 2 | 24 | 0.025 | -- | -- |

| Screening Levels (mg/kg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
| Unsaturated | 7 | 1 | 67 | 217 | 118 | 360 | 2.1 | 0.34 | 24 |
| Saturated | | | | 36 | | 300 | 0.1 | 0.02 | |

ND = non-detect; **RED** = exceedance; -- = not analyzed

## Key

Surface
Shallow fill
Native soil
Meets SLs (green)
Exceeds SLs (red)
No data (black)

No longer present

Sample location with no analysis for these analytes

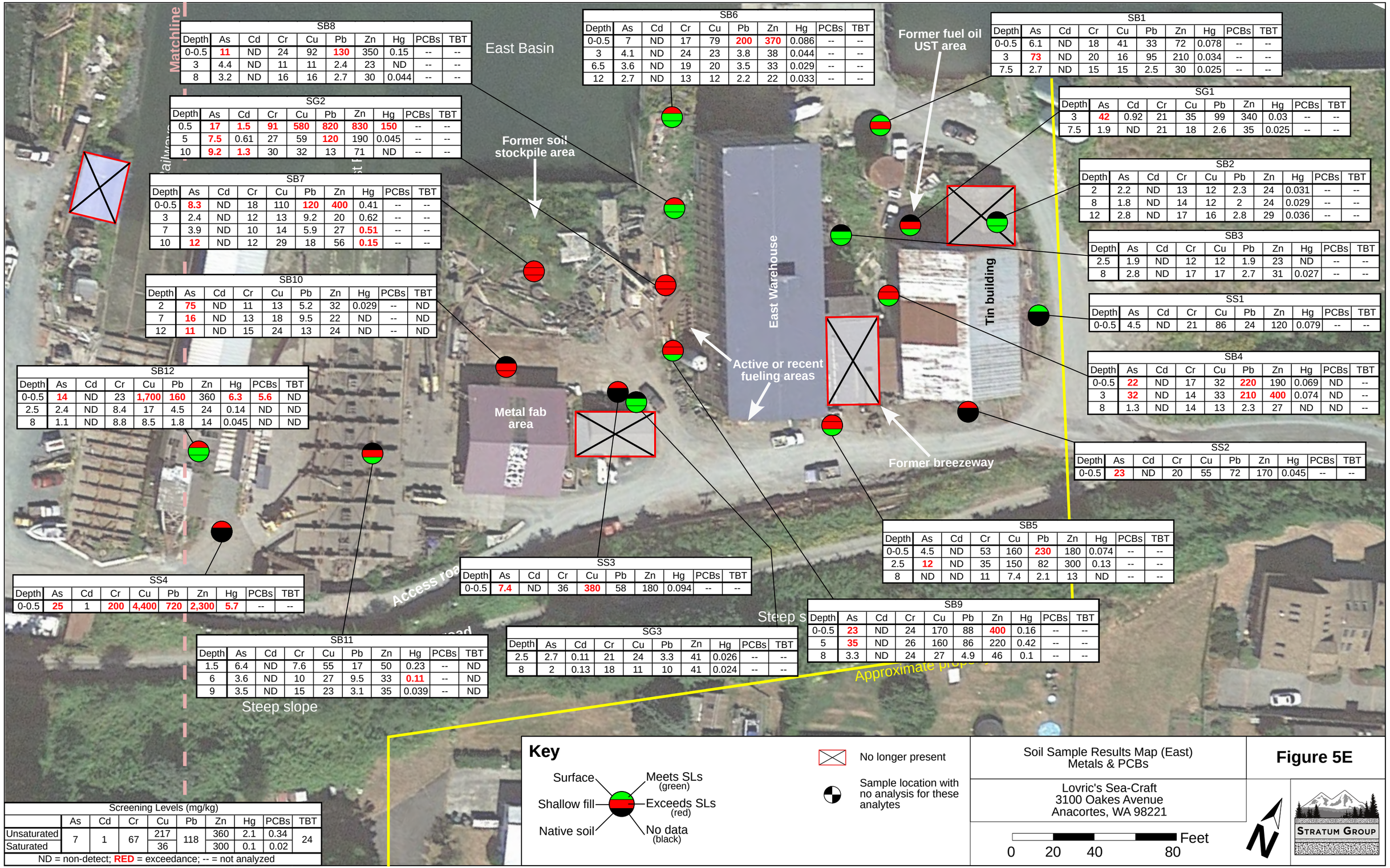
Soil Sample Results Map (West)
Metals & PCBs

**Figure 5W**

Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, WA 98221

0 20 40 80 Feet

STRATUM GROUP




**SB8**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 0-0.5 | **11** | ND | 24 | 92 | **130** | 350 | 0.15 | -- | -- |
| 3 | 4.4 | ND | 11 | 11 | 2.4 | 23 | ND | -- | -- |
| 8 | 3.2 | ND | 16 | 16 | 2.7 | 30 | 0.044 | -- | -- |

**SB6**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 0-0.5 | 7 | ND | 17 | 79 | **200** | **370** | 0.086 | -- | -- |
| 3 | 4.1 | ND | 24 | 23 | 3.8 | 38 | 0.044 | -- | -- |
| 6.5 | 3.6 | ND | 19 | 20 | 3.5 | 33 | 0.029 | -- | -- |
| 12 | 2.7 | ND | 13 | 12 | 2.2 | 22 | 0.033 | -- | -- |

**SB1**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 0-0.5 | 6.1 | ND | 18 | 41 | 33 | 72 | 0.078 | -- | -- |
| 3 | **73** | ND | 20 | 16 | 95 | 210 | 0.034 | -- | -- |
| 7.5 | 2.7 | ND | 15 | 15 | 2.5 | 30 | 0.025 | -- | -- |

**SG2**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | **17** | **1.5** | **91** | **580** | **820** | **830** | **150** | -- | -- |
| 5 | **7.5** | 0.61 | 27 | 59 | **120** | 190 | 0.045 | -- | -- |
| 10 | **9.2** | **1.3** | 30 | 32 | 13 | 71 | ND | -- | -- |

**SG1**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 3 | **42** | 0.92 | 21 | 35 | 99 | 340 | 0.03 | -- | -- |
| 7.5 | 1.9 | ND | 21 | 18 | 2.6 | 35 | 0.025 | -- | -- |

**SB7**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 0-0.5 | **8.3** | ND | 18 | 110 | **120** | **400** | 0.41 | -- | -- |
| 3 | 2.4 | ND | 12 | 13 | 9.2 | 20 | 0.62 | -- | -- |
| 7 | 3.9 | ND | 10 | 14 | 5.9 | 27 | **0.51** | -- | -- |
| 10 | **12** | ND | 12 | 29 | 18 | 56 | **0.15** | -- | -- |

**SB2**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 2.2 | ND | 13 | 12 | 2.3 | 24 | 0.031 | -- | -- |
| 8 | 1.8 | ND | 14 | 12 | 2 | 24 | 0.029 | -- | -- |
| 12 | 2.8 | ND | 17 | 16 | 2.8 | 29 | 0.036 | -- | -- |

**SB10**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 2 | **75** | ND | 11 | 13 | 5.2 | 32 | 0.029 | -- | ND |
| 7 | **16** | ND | 13 | 18 | 9.5 | 22 | ND | -- | ND |
| 12 | **11** | ND | 15 | 24 | 13 | 24 | ND | -- | ND |

**SB3**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 2.5 | 1.9 | ND | 12 | 12 | 1.9 | 23 | ND | -- | -- |
| 8 | 2.8 | ND | 17 | 17 | 2.7 | 31 | 0.027 | -- | -- |

**SS1**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 0-0.5 | 4.5 | ND | 21 | 86 | 24 | 120 | 0.079 | -- | -- |

**SB12**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 0-0.5 | **14** | ND | 23 | **1,700** | **160** | 360 | **6.3** | **5.6** | ND |
| 2.5 | 2.4 | ND | 8.4 | 17 | 4.5 | 24 | 0.14 | ND | ND |
| 8 | 1.1 | ND | 8.8 | 8.5 | 1.8 | 14 | 0.045 | ND | ND |

**SB4**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 0-0.5 | **22** | ND | 17 | 32 | **220** | 190 | 0.069 | ND | -- |
| 3 | **32** | ND | 14 | 33 | **210** | **400** | 0.074 | ND | -- |
| 8 | 1.3 | ND | 14 | 13 | 2.3 | 27 | ND | ND | -- |

**SS2**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 0-0.5 | **23** | ND | 20 | 55 | 72 | 170 | 0.045 | -- | -- |

**SS3**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 0-0.5 | **7.4** | ND | 36 | **380** | 58 | 180 | 0.094 | -- | -- |

**SB5**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 0-0.5 | 4.5 | ND | 53 | 160 | **230** | 180 | 0.074 | -- | -- |
| 2.5 | **12** | ND | 35 | 150 | 82 | 300 | 0.13 | -- | -- |
| 8 | ND | ND | 11 | 7.4 | 2.1 | 13 | ND | -- | -- |

**SS4**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 0-0.5 | **25** | 1 | **200** | **4,400** | **720** | **2,300** | **5.7** | -- | -- |

**SB11**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 1.5 | 6.4 | ND | 7.6 | 55 | 17 | 50 | 0.23 | -- | ND |
| 6 | 3.6 | ND | 10 | 27 | 9.5 | 33 | **0.11** | -- | ND |
| 9 | 3.5 | ND | 15 | 23 | 3.1 | 35 | 0.039 | -- | ND |

**SG3**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 2.5 | 2.7 | 0.11 | 21 | 24 | 3.3 | 41 | 0.026 | -- | -- |
| 8 | 2 | 0.13 | 18 | 11 | 10 | 41 | 0.024 | -- | -- |

**SB9**

| Depth | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| 0-0.5 | **23** | ND | 24 | 170 | 88 | **400** | 0.16 | -- | -- |
| 5 | **35** | ND | 26 | 160 | 86 | 220 | 0.42 | -- | -- |
| 8 | 3.3 | ND | 24 | 27 | 4.9 | 46 | 0.1 | -- | -- |

**Screening Levels (mg/kg)**

| | As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|
| Unsaturated | 7 | 1 | 67 | 217 | 118 | 360 | 2.1 | 0.34 | 24 |
| Saturated | | | | 36 | | 300 | 0.1 | 0.02 | |

ND = non-detect; **RED** = exceedance; -- = not analyzed

**Key**

Surface: Meets SLs (green)
Shallow fill: Exceeds SLs (red)
Native soil: No data (black)

No longer present

Sample location with no analysis for these analytes

Soil Sample Results Map (East)
Metals & PCBs

**Figure 5E**

Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, WA 98221

0 20 40 80 Feet

Stratum Group

Recreational Marina

East Basin

Former paint shed

West Railways

East Railways

Utility sink drain

Former bilge water tote storage area

West Warehouse

Steep slope

Access road

Access road

Matchline

Main driveway

| SS8 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | 0.079 | **2.5** |

| SS7 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | 0.084 | **0.58** |

| SB15 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | 0.25 | **1.3** |
| 2.5 | 0.32 | 0.091 |
| 8 | 0.028 | 0.018 |

| SG4 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 3 | ND | ND |
| 8 | ND | **0.279** |

| SB14 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | 0.1 | **0.63** |
| 3 | 3.85 | ND |
| 7.5 | **57.3** | **2.5** |

SB13

| SB18 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | 0.16 | **2.7** |
| 3 | **58** | **1.7** |
| 8 | 0.47 | **1.2** |
| 13 | 0.0061 | 0.0077 |
| 18 | 0.006 | ND |

| SB17 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | 0.26 | **0.65** |
| 3 | ND | ND |
| 8 | ND | ND |

| SB16 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | 0.084 | **2.0** |
| 5 | 0.0051 | 0.035 |
| 13 | ND | ND |

| SS6 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | ND | 0.021 |

| SS5 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | 0.027 | **0.25** |

| Screening Levels (mg/kg) | | |
|---|---|---|
| | Naphthalenes | cPAHs |
| Unsaturated | 4.5 | 0.19 |
| Saturated | 0.24 | 0.019 |

ND = non-detect; **RED** = exceedance; -- = not analyzed

## Key

Surface / Shallow fill / Native soil

Meets SLs (green)

Exceeds SLs (red)

No data (black)

No longer present

Sample location with no analysis for these analytes

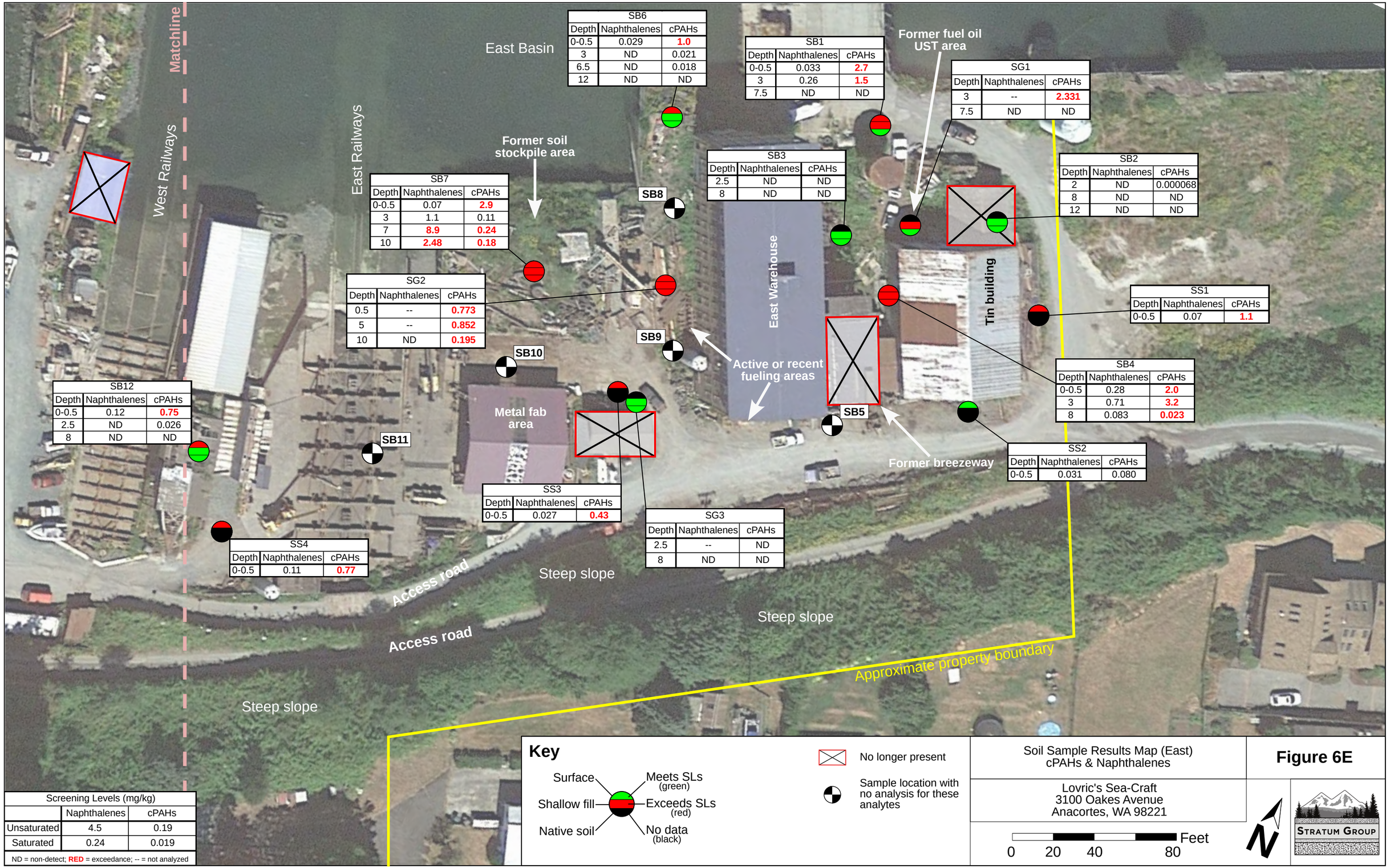
Soil Sample Results Map (West)
cPAHs & Naphthalenes

**Figure 6W**

Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, WA 98221

0 20 40 80 Feet

STRATUM GROUP




| SB6 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | 0.029 | **1.0** |
| 3 | ND | 0.021 |
| 6.5 | ND | 0.018 |
| 12 | ND | ND |

| SB1 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | 0.033 | **2.7** |
| 3 | 0.26 | **1.5** |
| 7.5 | ND | ND |

| SG1 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 3 | -- | **2.331** |
| 7.5 | ND | ND |

| SB7 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | 0.07 | **2.9** |
| 3 | 1.1 | 0.11 |
| 7 | **8.9** | **0.24** |
| 10 | **2.48** | **0.18** |

| SB3 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 2.5 | ND | ND |
| 8 | ND | ND |

| SB2 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 2 | ND | 0.000068 |
| 8 | ND | ND |
| 12 | ND | ND |

| SG2 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0.5 | -- | **0.773** |
| 5 | -- | **0.852** |
| 10 | ND | **0.195** |

| SS1 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | 0.07 | **1.1** |

| SB4 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | 0.28 | **2.0** |
| 3 | 0.71 | **3.2** |
| 8 | 0.083 | **0.023** |

| SB12 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | 0.12 | **0.75** |
| 2.5 | ND | 0.026 |
| 8 | ND | ND |

| SS2 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | 0.031 | 0.080 |

| SS3 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | 0.027 | **0.43** |

| SG3 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 2.5 | -- | ND |
| 8 | ND | ND |

| SS4 | | |
|---|---|---|
| Depth | Naphthalenes | cPAHs |
| 0-0.5 | 0.11 | **0.77** |

| Screening Levels (mg/kg) | | |
|---|---|---|
| | Naphthalenes | cPAHs |
| Unsaturated | 4.5 | 0.19 |
| Saturated | 0.24 | 0.019 |

ND = non-detect; **RED** = exceedance; -- = not analyzed

## Key

Surface
Shallow fill
Native soil
Meets SLs (green)
Exceeds SLs (red)
No data (black)

No longer present

Sample location with no analysis for these analytes

Soil Sample Results Map (East)
cPAHs & Naphthalenes

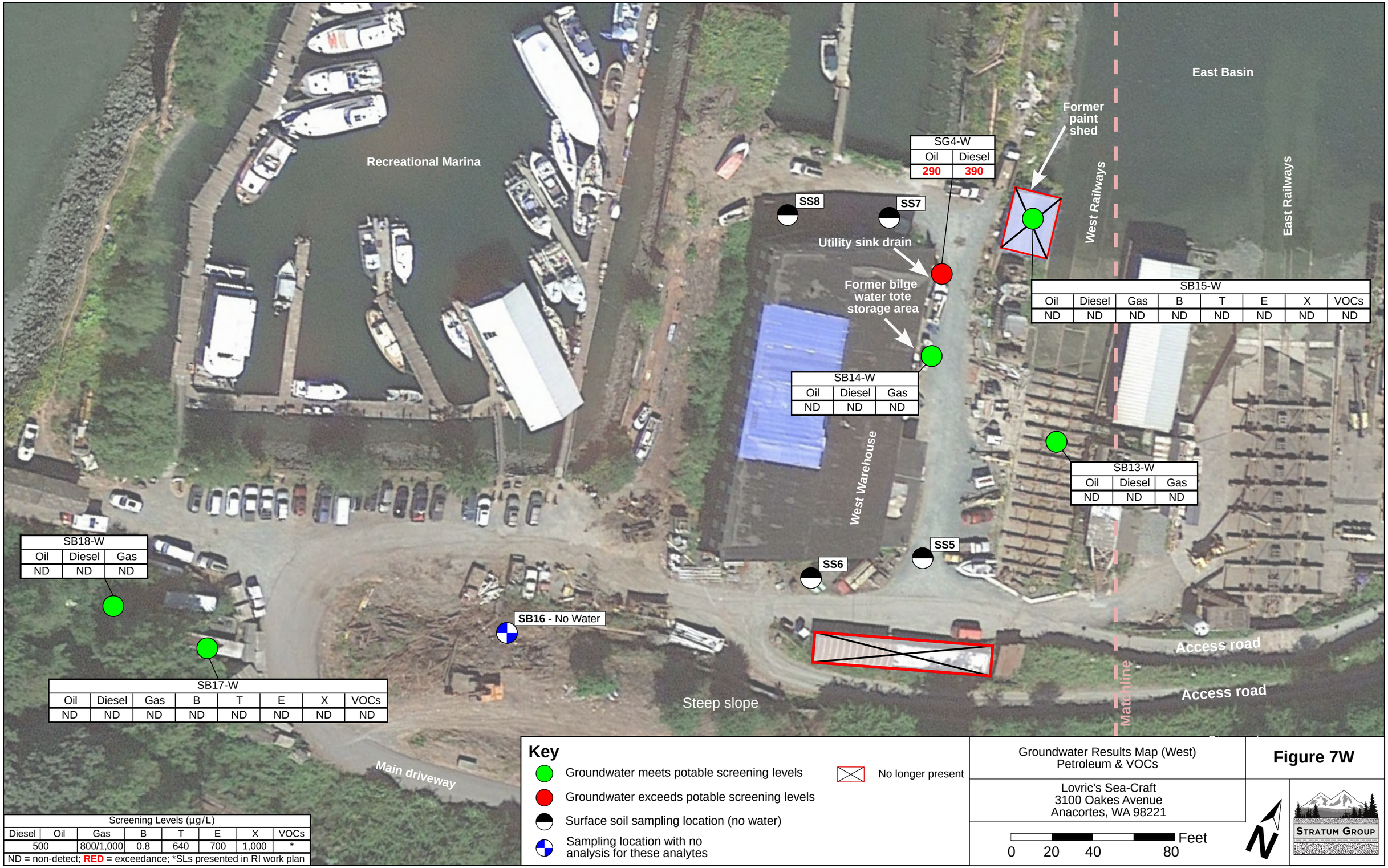
**Figure 6E**

Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, WA 98221

0 20 40 80 Feet

N

Stratum Group




| Screening Levels (µg/L) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Diesel | Oil | Gas | B | T | E | X | VOCs |
| 500 | | 800/1,000 | 0.8 | 640 | 700 | 1,000 | * |

ND = non-detect; **RED** = exceedance; *SLs presented in RI work plan

## Key

- Groundwater meets potable screening levels
- Groundwater exceeds potable screening levels
- Surface soil sampling location (no water)
- Sampling location with no analysis for these analytes
- No longer present

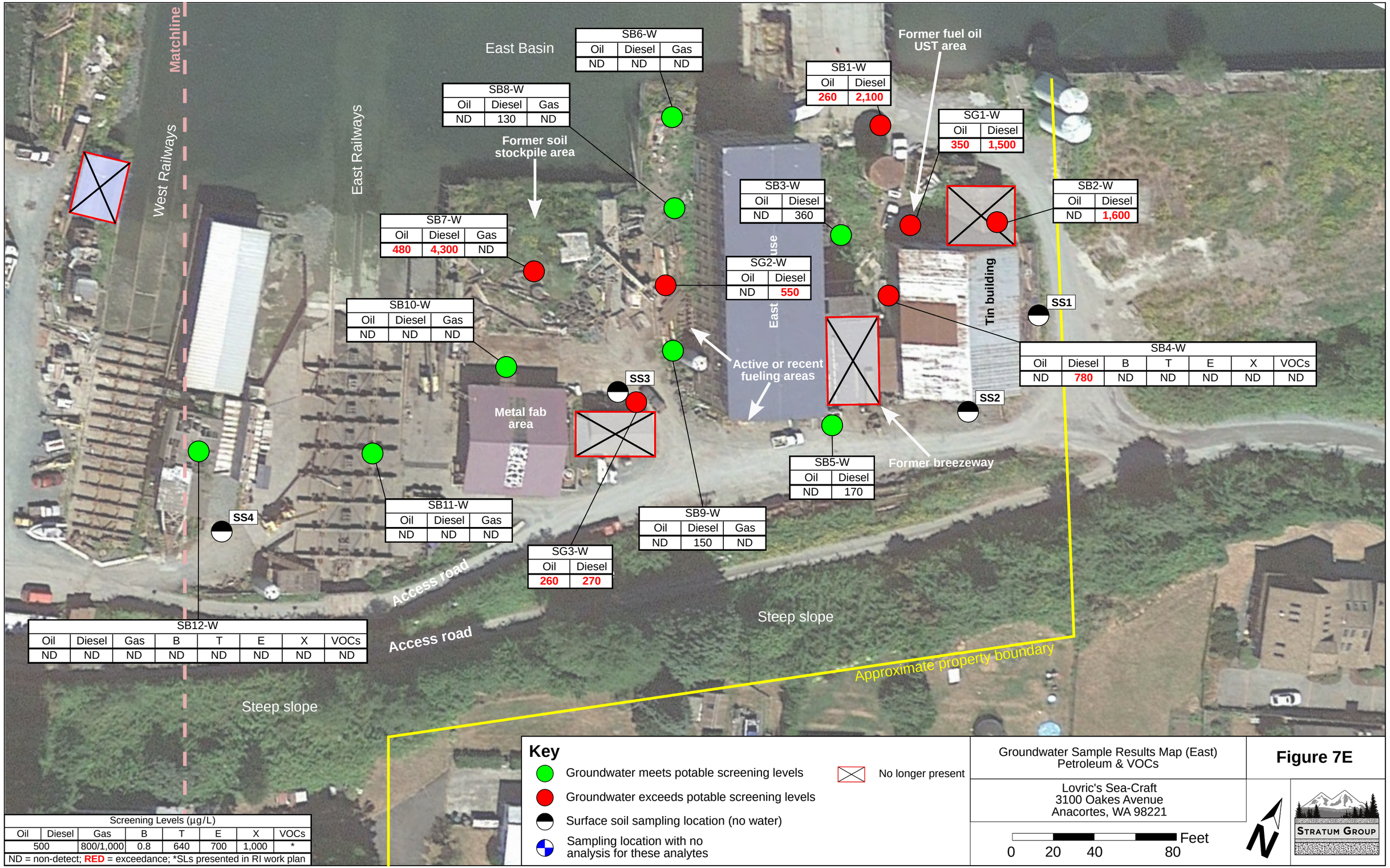
Groundwater Results Map (West)
Petroleum & VOCs

**Figure 7W**

Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, WA 98221

0 20 40 80 Feet

STRATUM GROUP




| Screening Levels (µg/L) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Oil | Diesel | Gas | B | T | E | X | VOCs |
| 500 | | 800/1,000 | 0.8 | 640 | 700 | 1,000 | * |

ND = non-detect; **RED** = exceedance; *SLs presented in RI work plan

## Key

- Groundwater meets potable screening levels
- Groundwater exceeds potable screening levels
- Surface soil sampling location (no water)
- Sampling location with no analysis for these analytes
- No longer present

Groundwater Sample Results Map (East)
Petroleum & VOCs

**Figure 7E**

Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, WA 98221

0 20 40 80 Feet

Stratum Group

| SB15-W | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| As | As (f) | Cd | Cr | Cu | Pb | Pb (f) | Zn | Hg | PCBs | TBT |
| 1.8 | 1.4 | ND | 2 | ND | ND | -- | ND | ND | -- | ND |

| SG4-W | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| As | As (f) | Cd | Cr | Cr (f) | Cu | Pb | Pb (f) | Zn | Hg |
| 18 | 2.5 | ND | 61 | ND | 94 | 42 | ND | 130 | ND |

| SB14-W | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| As | As (f) | Cd | Cr | Cu | Pb | Pb (f) | Zn | Hg | PCBs |
| 2.4 | ND | ND | 3.6 | 6.2 | 11 | -- | 21 | 0.02 | -- |

| SB13-W | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| As | As (f) | Cd | Cr | Cu | Pb | Pb (f) | Zn | Hg | PCBs | TBT |
| 1.3 | ND | ND | 3 | 7 | 2.7 | -- | 18 | ND | -- | ND |

| SB18-W | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| As | As (f) | Cd | Cr | Cu | Pb | Pb (f) | Zn | Hg | PCBs |
| 2.3 | ND | ND | 20 | 25 | 4 | -- | 37 | 0.048 | -- |

| SB17-W | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| As | As (f) | Cd | Cr | Cu | Pb | Pb (f) | Zn | Hg | PCBs |
| ND | ND | ND | 1.6 | ND | ND | -- | ND | 0.028 | -- |

| Screening Levels (µg/L) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
| 8 | 5 | 50 | 640 | 15 | 4,800 | 2 | 0.02 | 4.8 |
| ND = non-detect; **RED** = exceedance; -- = not analyzed | | | | | | | | |
| (f) = results after laboratory filtration | | | | | | | | |

Recreational Marina
East Basin
Former paint shed
West Railways
East Railways
SS8
SS7
Utility sink drain
Former bilge water tote storage area
West Warehouse
SS5
SS6
SB16 - No Water
Steep slope
Access road
Access road
Matchline
Main driveway

## Key

- Groundwater meets potable screening levels
- Groundwater exceeds potable screening levels
- Surface soil sampling location (no water)
- Sampling location with no analysis for these analytes
- No longer present

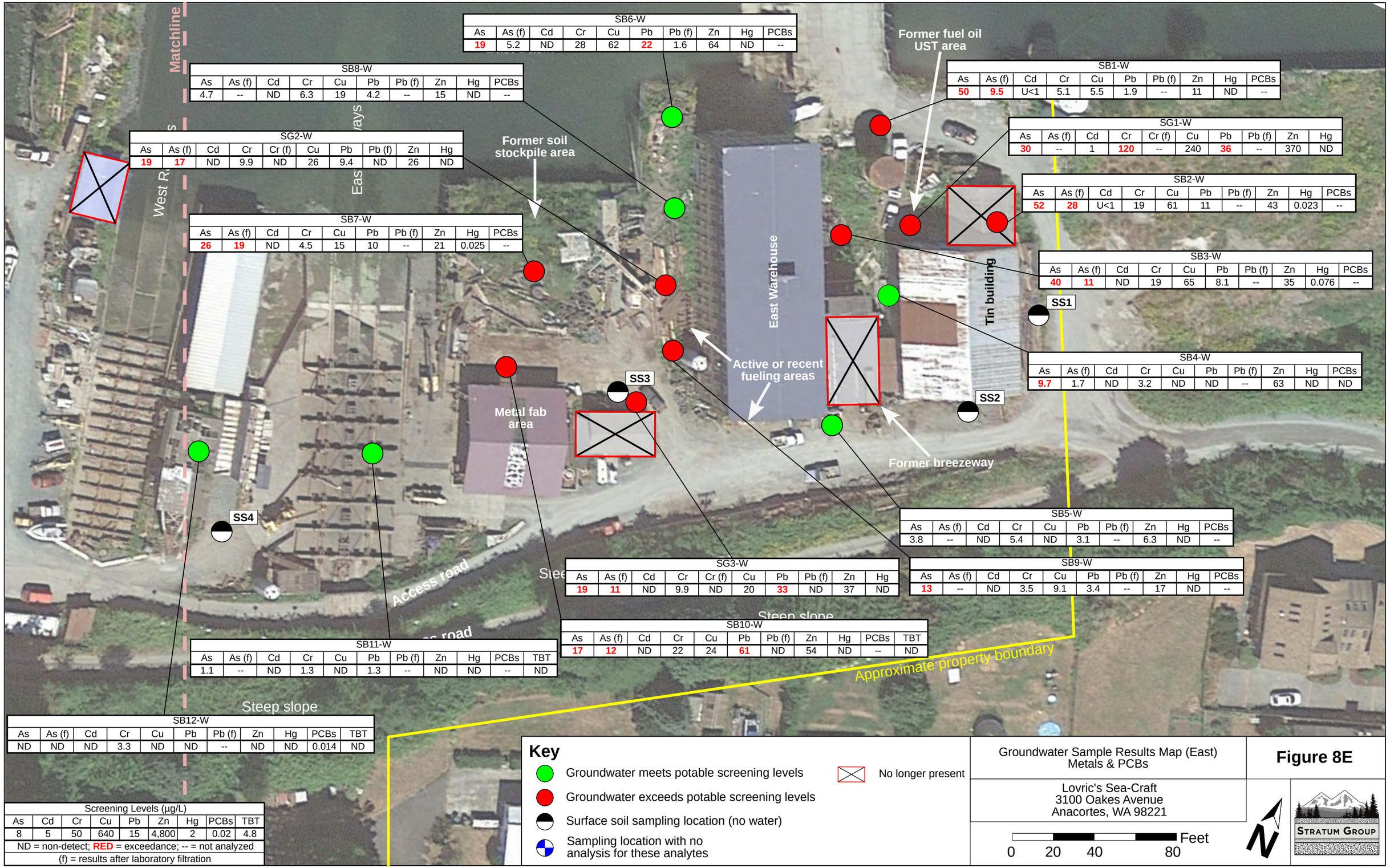
Groundwater Sample Results Map (West)
Metals & PCBs

**Figure 8W**

Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, WA 98221

0 20 40 80 Feet

STRATUM GROUP




SB6-W

| As | As (f) | Cd | Cr | Cu | Pb | Pb (f) | Zn | Hg | PCBs |
|---|---|---|---|---|---|---|---|---|---|
| 19 | 5.2 | ND | 28 | 62 | 22 | 1.6 | 64 | ND | -- |

SB8-W

| As | As (f) | Cd | Cr | Cu | Pb | Pb (f) | Zn | Hg | PCBs |
|---|---|---|---|---|---|---|---|---|---|
| 4.7 | -- | ND | 6.3 | 19 | 4.2 | -- | 15 | ND | -- |

SG2-W

| As | As (f) | Cd | Cr | Cr (f) | Cu | Pb | Pb (f) | Zn | Hg |
|---|---|---|---|---|---|---|---|---|---|
| 19 | 17 | ND | 9.9 | ND | 26 | 9.4 | ND | 26 | ND |

SB7-W

| As | As (f) | Cd | Cr | Cu | Pb | Pb (f) | Zn | Hg | PCBs |
|---|---|---|---|---|---|---|---|---|---|
| 26 | 19 | ND | 4.5 | 15 | 10 | -- | 21 | 0.025 | -- |

SB1-W

| As | As (f) | Cd | Cr | Cu | Pb | Pb (f) | Zn | Hg | PCBs |
|---|---|---|---|---|---|---|---|---|---|
| 50 | 9.5 | U<1 | 5.1 | 5.5 | 1.9 | -- | 11 | ND | -- |

SG1-W

| As | As (f) | Cd | Cr | Cr (f) | Cu | Pb | Pb (f) | Zn | Hg |
|---|---|---|---|---|---|---|---|---|---|
| 30 | -- | 1 | 120 | -- | 240 | 36 | -- | 370 | ND |

SB2-W

| As | As (f) | Cd | Cr | Cu | Pb | Pb (f) | Zn | Hg | PCBs |
|---|---|---|---|---|---|---|---|---|---|
| 52 | 28 | U<1 | 19 | 61 | 11 | -- | 43 | 0.023 | -- |

SB3-W

| As | As (f) | Cd | Cr | Cu | Pb | Pb (f) | Zn | Hg | PCBs |
|---|---|---|---|---|---|---|---|---|---|
| 40 | 11 | ND | 19 | 65 | 8.1 | -- | 35 | 0.076 | -- |

SB4-W

| As | As (f) | Cd | Cr | Cu | Pb | Pb (f) | Zn | Hg | PCBs |
|---|---|---|---|---|---|---|---|---|---|
| 9.7 | 1.7 | ND | 3.2 | ND | ND | -- | 63 | ND | ND |

SB5-W

| As | As (f) | Cd | Cr | Cu | Pb | Pb (f) | Zn | Hg | PCBs |
|---|---|---|---|---|---|---|---|---|---|
| 3.8 | -- | ND | 5.4 | ND | 3.1 | -- | 6.3 | ND | -- |

SB9-W

| As | As (f) | Cd | Cr | Cu | Pb | Pb (f) | Zn | Hg | PCBs |
|---|---|---|---|---|---|---|---|---|---|
| 13 | -- | ND | 3.5 | 9.1 | 3.4 | -- | 17 | ND | -- |

SG3-W

| As | As (f) | Cd | Cr | Cr (f) | Cu | Pb | Pb (f) | Zn | Hg |
|---|---|---|---|---|---|---|---|---|---|
| 19 | 11 | ND | 9.9 | ND | 20 | 33 | ND | 37 | ND |

SB10-W

| As | As (f) | Cd | Cr | Cu | Pb | Pb (f) | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|---|
| 17 | 12 | ND | 22 | 24 | 61 | ND | 54 | ND | -- | ND |

SB11-W

| As | As (f) | Cd | Cr | Cu | Pb | Pb (f) | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.1 | -- | ND | 1.3 | ND | 1.3 | -- | ND | ND | -- | ND |

SB12-W

| As | As (f) | Cd | Cr | Cu | Pb | Pb (f) | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|---|---|
| ND | ND | ND | 3.3 | ND | ND | -- | ND | ND | 0.014 | ND |

Screening Levels (µg/L)

| As | Cd | Cr | Cu | Pb | Zn | Hg | PCBs | TBT |
|---|---|---|---|---|---|---|---|---|
| 8 | 5 | 50 | 640 | 15 | 4,800 | 2 | 0.02 | 4.8 |

ND = non-detect; **RED** = exceedance; -- = not analyzed

(f) = results after laboratory filtration

## Key

- Groundwater meets potable screening levels
- Groundwater exceeds potable screening levels
- Surface soil sampling location (no water)
- Sampling location with no analysis for these analytes
- No longer present

Groundwater Sample Results Map (East)
Metals & PCBs

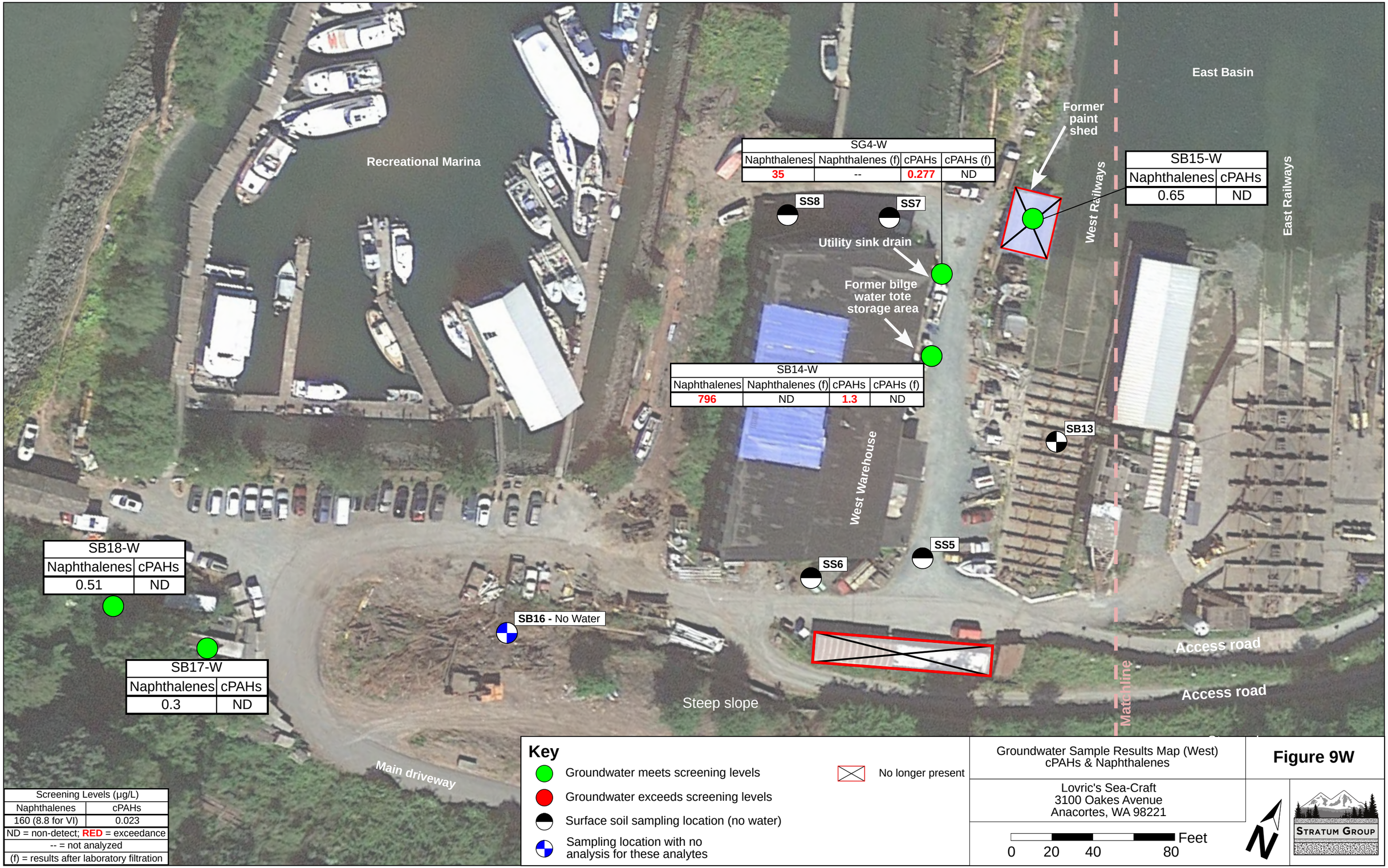
**Figure 8E**

Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, WA 98221

0 20 40 80 Feet

N

STRATUM GROUP




| Screening Levels (µg/L) | |
|---|---|
| Naphthalenes | cPAHs |
| 160 (8.8 for VI) | 0.023 |
| ND = non-detect; **RED** = exceedance | |
| -- = not analyzed | |
| (f) = results after laboratory filtration | |

## Key

- Groundwater meets screening levels
- Groundwater exceeds screening levels
- Surface soil sampling location (no water)
- Sampling location with no analysis for these analytes
- No longer present

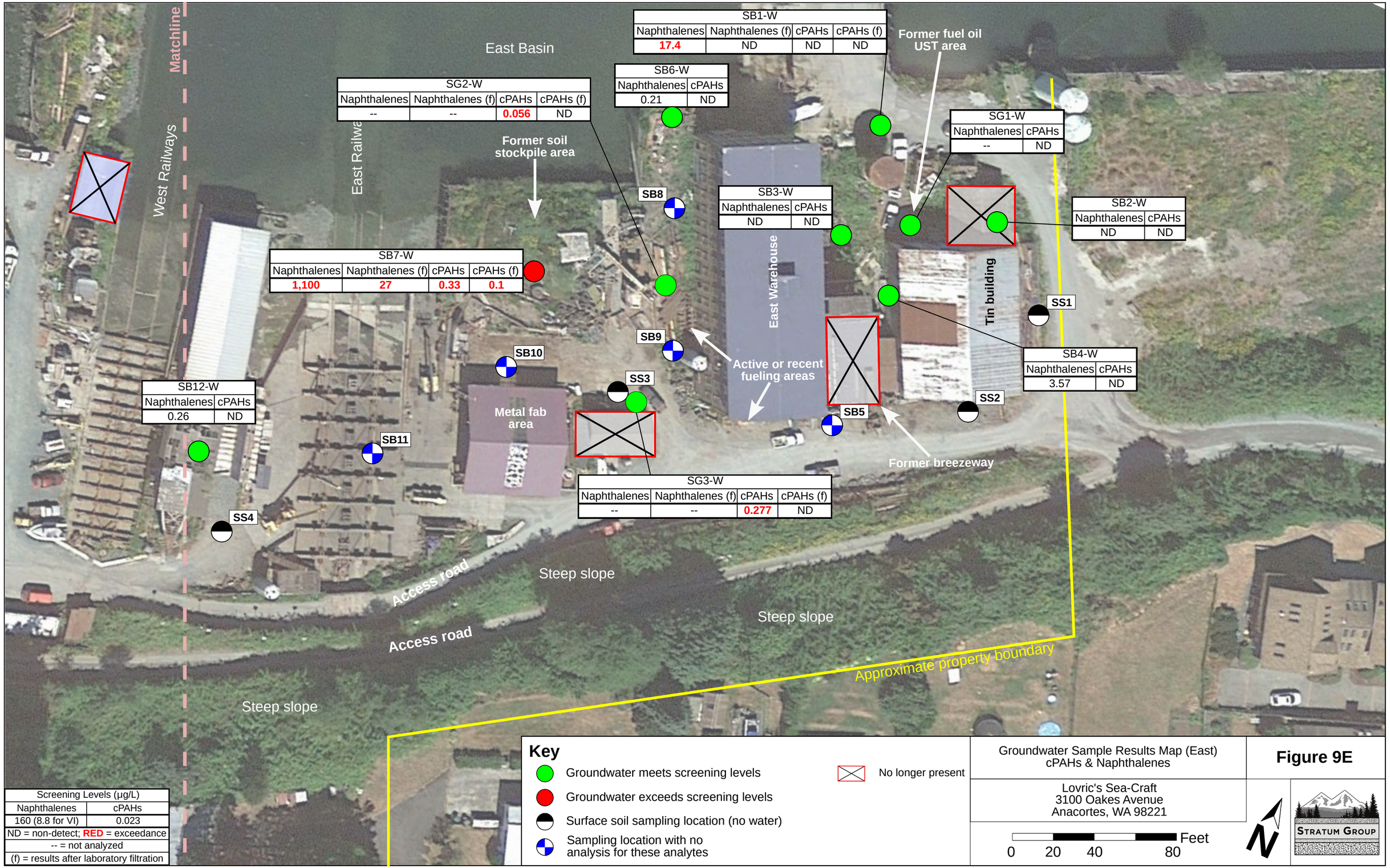
Groundwater Sample Results Map (West)
cPAHs & Naphthalenes

**Figure 9W**

Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, WA 98221

0 20 40 80 Feet

STRATUM GROUP


Matchline
West Railways
East Railways
East Basin
Former fuel oil UST area
Former soil stockpile area
East Warehouse
Tin building
Active or recent fueling areas
Former breezeway
Metal fab area
Steep slope
Steep slope
Steep slope
Access road
Access road
Approximate property boundary
SB1-W
Naphthalenes | Naphthalenes (f) | cPAHs | cPAHs (f)
17.4 | ND | ND | ND
SB6-W
Naphthalenes | cPAHs
0.21 | ND
SG2-W
Naphthalenes | Naphthalenes (f) | cPAHs | cPAHs (f)
-- | -- | 0.056 | ND
SG1-W
Naphthalenes | cPAHs
-- | ND
SB8
SB3-W
Naphthalenes | cPAHs
ND | ND
SB2-W
Naphthalenes | cPAHs
ND | ND
SB7-W
Naphthalenes | Naphthalenes (f) | cPAHs | cPAHs (f)
1,100 | 27 | 0.33 | 0.1
SB9
SS1
SB10
SS3
SB4-W
Naphthalenes | cPAHs
3.57 | ND
SB12-W
Naphthalenes | cPAHs
0.26 | ND
SB5
SS2
SB11
SG3-W
Naphthalenes | Naphthalenes (f) | cPAHs | cPAHs (f)
-- | -- | 0.277 | ND
SS4
Screening Levels (µg/L)
Naphthalenes | cPAHs
160 (8.8 for VI) | 0.023
ND = non-detect; RED = exceedance
-- = not analyzed
(f) = results after laboratory filtration
Key
Groundwater meets screening levels
Groundwater exceeds screening levels
Surface soil sampling location (no water)
Sampling location with no analysis for these analytes
No longer present
Groundwater Sample Results Map (East)
cPAHs & Naphthalenes
Figure 9E
Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, WA 98221
0 20 40 80 Feet
N
Stratum Group


## Key

- Proposed boring & temporary well
- Proposed monitoring well
- Previous boring (2022)
- Previous boring (2025)
- Previous surface sample (2025)
- Proposed geotechnical boring

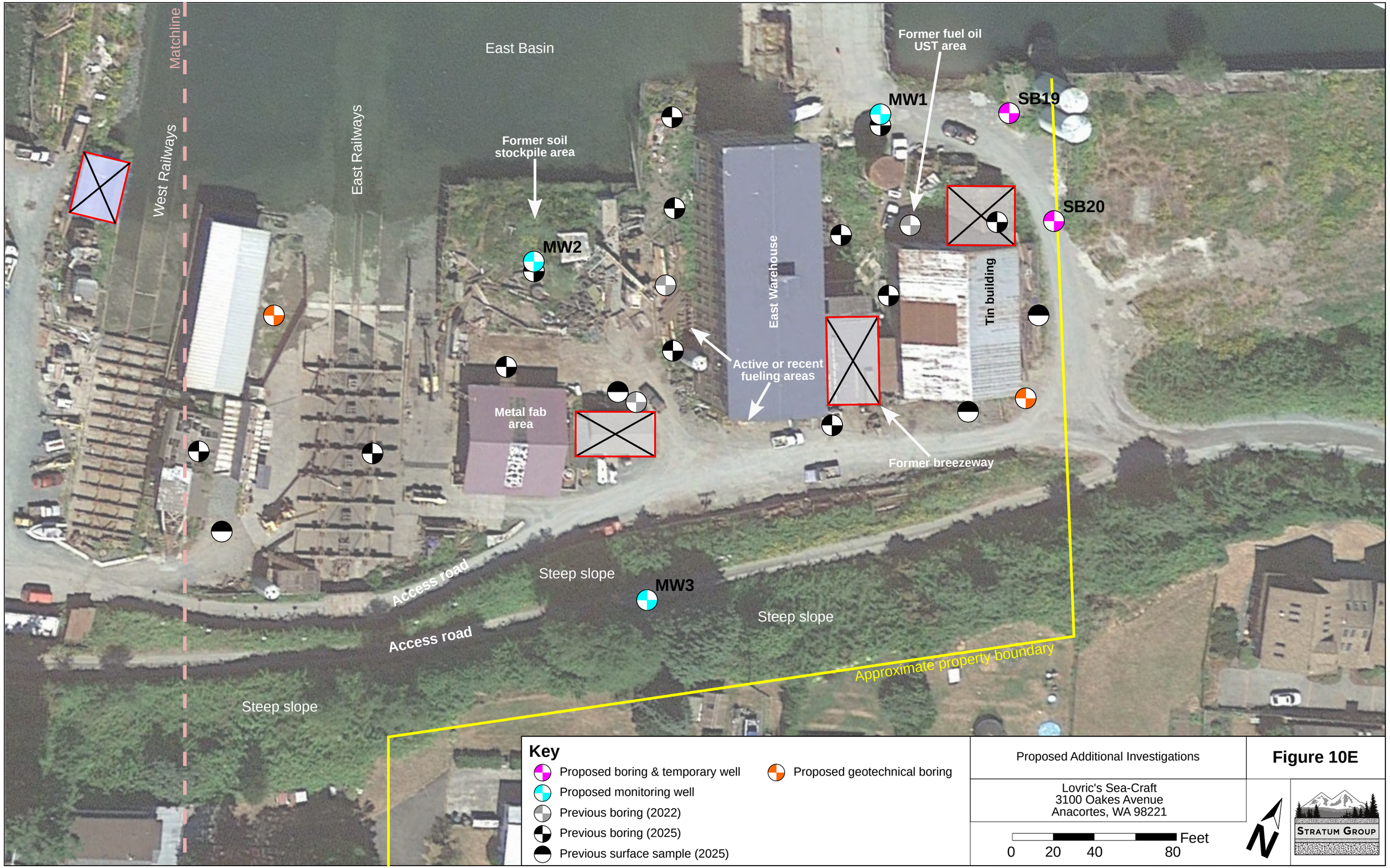
Proposed Additional Investigations

**Figure 10W**

Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, WA 98221

0 20 40 80 Feet

STRATUM GROUP




**Key**

- Proposed boring & temporary well
- Proposed monitoring well
- Previous boring (2022)
- Previous boring (2025)
- Previous surface sample (2025)
- Proposed geotechnical boring

Proposed Additional Investigations

**Figure 10E**

Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, WA 98221

0 20 40 80 Feet

N

Stratum Group

# APPENDIX II

Sampling & Analysis Plan/Quality Assurance Project Plan: Addendum #1


# SAMPLING & ANALYSIS PLAN/ QUALITY ASSURANCE PROJECT PLAN: ADDENDUM #1

Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, Washington 98221
Facility Site ID #21847524

*Prepared For:*

Guemes Channel Holdings, LLC

*By:*

PO Box 2546
Bellingham, WA 98227
(360) 714-9409

September 4, 2025
Addendum to SAP/QAPP (Stratum Group, January 15, 2025)

# TABLE OF CONTENTS



# APPENDICES

PO Box 2546, Bellingham, WA 98227
Phone: (360) 714-9409

September 4, 2025

Kelly Allison
Guemes Channel Holdings, LLC
2629 NW 54th, Suite 201
Seattle, WA 98107

**Re: Sampling & Analysis Plan/Quality Assurance Project Plan: Addendum #1**
Lovric's Sea-Craft
3100 Oakes Avenue
Anacortes, Washington 98221
Facility Site ID #21847524

Dear Ms. Allison:

This document presents an addendum to the Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) developed as part of the Remedial Investigation Work Plan (RIWP) for the upland portion of the Lovric's Sea-Craft Site (Site) in Anacortes, Washington to investigate and characterize contamination on the Site per Agreed Order No. DE 22368.

Should you have any questions concerning this SAP/QAPP, please do not hesitate to contact us at (360) 714-9409.

Sincerely,
**Stratum Group**

Ben Carlson, M.Sc., L.G.
Licensed Geologist

State of Washington
20120123
Licensed Geologist
Benjamin Carlson

Kim Ninnemann, B.S.
Licensed Geologist

State of Washington
2690
Licensed Geologist
KIM N NINNEMANN

# 1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) Addendum #1 was prepared as a partner to the Remedial Investigation Work Plan (RIWP) Addendum #1 to present a detailed description of the field and laboratory procedures to be used for sampling and sample analysis at the Lovric's Sea Craft site (Site) that were not previously outlined in the original SAP/QAPP. Field and laboratory procedures to be completed as part of RIWP Addendum #1 that are not explicitly described in this SAP/QAPP addendum shall be completed in a manner that is consistent with the original SAP/QAPP dated January 15, 2025.

The goal of this RI is to establish the nature and extent of potential contaminants of concern (COCs) in soil and groundwater at the Site. Project activities described herein are anticipated to commence in late summer to fall 2025 in accordance with the proposed project schedule presented in the RI Work Plan Addendum #1. This work is being completed as part of the Remedial Investigation (RI) under Agreed Order No. DE 22368.

This SAP/QAPP was prepared for compliance with Washington Administrative Code (WAC) 173-340-820 and in accordance with the Guidance for Preparation of Quality Assurance Project Plans, U.S. Environmental Protection Agency (EPA) Region 10, Quality Data Management Program (EPA, 2002) and the Washington State Department of Ecology's Guidelines for preparing Quality Assurance Project Plans for Environmental Studies (Ecology, 2016) when coupled with the original January 15, 2025 SAP/QAPP.

# 2.0 PROJECT BACKGROUND

## 2.1 Purpose

The purpose of this RI is to define the nature and extent of upland contamination on the Site such that plans for Site remediation and mitigation can be designed. The goal of this SAP/QAPP is to describe in detail the procedures for sample collection, sample analysis, and project quality assurance and quality control to demonstrate that data collected in this investigation can be relied upon and will be sufficient to meet the project goals.

After completion of the scope of the original RIWP, a few remaining data gaps remained to complete characterization of Site contamination:

- Incomplete characterization of the lateral extent of the D/O petroleum plume in groundwater in the northeast corner of the Site.
- Water quality in the former soil stockpile area was turbid during sampling and therefore initial groundwater contaminant concentrations may be biased high in this area.
- Undetermined natural background concentration of arsenic in area groundwater.

Recent communications from the Property owners have identified two additional elements of the Site that warrant additional investigation:

- Guemes Channel Holdings (GCH) wishes to consider removal of the west and central spit peninsulas to improve functionality of the industrial marina basin.
- GCH has identified data gaps in its previous geotechnical testing for the site, including data necessary to engineer and permit a permanent retaining wall structure to replace the temporary shoring at the base of the west hillside.

## 2.2 Property Location

The Property is located on the north shore of Fidalgo Island approximately 1.4 miles west-southwest of the historical downtown core of Anacortes. The site is bound by Dakota Avenue to the east, Hartford Avenue to the west, Oakes Avenue to the south, and Guemes Channel to the north. The Property business utilizes the street address 3100 Oakes Avenue. The location of the Property is presented in Figure 1 in Appendix I of the RI Work Plan.

The Property covers approximately 8.7 acres, portions of which are submerged below the high-water mark of Guemes Channel to the north. The upland consists of a steep vegetated hillside and a relatively level shoreline that is industrially developed with multiple buildings and marine railways. The elevation of the Property along Oakes Avenue is approximately 70 feet above mean sea level, with a steep 50-to-60-foot elevation drop to the nearshore and shoreline areas where the shipyard infrastructure development is present.

## 2.3 Development and Use History

The Property has been developed since at least the late 1890s, when the Russian Cement plant was constructed. The business produced glue, fertilizer, and fish oil from fish waste gathered from nearby canneries. Robinson Fisheries established a cod cannery on the west side of the Property circa 1912. The entire Property is believed to have operated as a fish processing facility through the mid-1960s.

Lovric's Sea-Craft shipyard was established on the Property by 1965. Shipyard activities are apparent on the Property by 1969. Significant filling of the waterfront areas of the Property occurred in the late 1970s and 1980s to create many of the existing flat areas surrounding the two main warehouses. The fill reportedly consists of a mix of marine dredge spoils and upland-derived fill. The Property has been in continuous operation as a shipyard since the mid-1960s, with activities including engine repair and maintenance, welding, painting, sandblasting, replacement of sacrificial anodes, boat upfitting, and general boat maintenance services.

## 2.4 Key Site Features

A variety of structures are located on the Site which were constructed over a period of time by prior owners to facilitate site uses including fish processing, a shipyard, and a marina. These site

features will be referred to throughout this SAP/QAPP to aid in the description of sampling locations. An annotated aerial photograph of the Property with key site features labeled is provided in Figure 2 in Appendix I of the RIWP Addendum #1.

## 3.0 PROJECT ORGANIZATION

Ben Carlson of Stratum Group will be the primary Project Manager responsible for development and implementation of the RIWP and SAP/QAPP, and addendums to these original documents, including fieldwork coordination, sample collection and delivery to the laboratory, and assessment and evaluation of the laboratory data. The primary Project Manager will also be responsible for the implementation of the project Health and Safety Plan. Kim Ninnemann of Stratum Group will be the assistant Project Manager in support of these efforts.

Fridman & Bruya Laboratory (F&B) will be the primary analytical laboratory responsible for sample analysis. Analytical Resources Inc (ARI) will be the secondary analytical laboratory responsible for completion of sample analysis that F&B is unable or uncertified to complete. Friedman & Bruya will be responsible for forwarding potentially contaminated media and data to ARI as needed.

Additional key project personnel and entities are outlined in Table 1, below.

**Table 1.** Project Personnel & Contact Information

| Name | Organization | Contact | Responsibilities |
|---|---|---|---|
| Ben Carlson | Stratum Group | 978-857-0728<br>ben@stratumgroup.net | Primary Project Manager including coordination & oversight of subcontractors, HASP implementation, well development, sample collection, evaluation of analytical results, reporting, & general QA/QC compliance |
| Kim Ninnemann | Stratum Group | 360-920-0468<br>kim@stratumgroup.net | Assistant Project Manager |
| David Horne | WA Department of Ecology | 360-742-1091<br>hoda461@ecy.wa.gov | Ecology Site Manager |
| Kelly Allison | Stabbert Maritime & Industrial | 425-736-9819<br>kellya@stabbertmaritime.com | Project Manager for GCH (property owner) |
| Eric Young | Friedman & Bruya Laboratory | 206-683-1731<br>eyoung@friedmanandbruya.com | Laboratory Director responsible for management and execution of analytical laboratory work and QA/QC |
| Anisa Harnden | Holocene Drilling | 253-848-6500<br>aharnden@holocenedrilling.com | Direct-push drilling, soil & groundwater recovery, & monitoring well installation |
| Larry Gasser | CNI Locates | 253-826-1177 | Private utility locator |
| Stella Cuenco | Laboratory Data Consultants | 760-827-1100 | 3rd party data verification and validation for QA/QC |

# 4.0 SOIL & GROUNDWATER SAMPLING PLAN

Soil and groundwater sampling will be completed for RIWP Addendum #1 via reconnaissance borings and groundwater monitoring wells installed using direct-push drilling equipment.

## 4.1 Sampling Locations

A minimum of five reconnaissance borings and four groundwater monitoring wells are proposed in the RIWP Addendum #1. Rationale for each of the sampling locations is provided in Table 2, below. Maps indicating the proposed sampling locations are provided as Figures 10E and 10W in Appendix I of the RIWP Addendum #1.

**Table 2.** Boring Location Rationale

| Boring ID | Location | Rationale | Media to be Sampled |
|---|---|---|---|
| SB19 | NE of former UST area | Evaluate northeastern and eastern extent of petroleum contamination from former fuel oil USTs | Soil & groundwater |
| SB20 | East property edge & east of former UST area | | |
| SB21 | N end of west peninsula | Evaluate environmental and geotechnical subsurface conditions for potential removal | Soil & groundwater |
| SB22 | Middle of central peninsula | | |
| SB23 | N end of central peninsula | | |
| MW1 | North of former bunker UST area near East Pier access | More accurately assess petroleum and arsenic contamination in groundwater down gradient of the former bunker UST area | Groundwater |
| MW2 | Adjacent to SB7 at former soil stockpile area | Further investigate groundwater quality in the soil stockpile area to evaluate whether contamination detected in reconnaissance samples is representative | |
| MW3 | Through south access road on the east side of the Site | Assess groundwater quality for background arsenic levels | Soil & groundwater |
| MW4 | Adjacent to NE corner of west warehouse | Re-evaluate for petroleum contamination in groundwater | Groundwater |

Approximately six additional borings will be completed for the purposes of geotechnical parameter evaluation. The proposed geotechnical borings are located in areas that have already been characterized for environmental contamination, or are located in areas where no significant environmental concerns are known or suspected to exist, based on previous Site history investigations. Therefore, no environmental sample collection and laboratory analysis is proposed from the geotechnical borings and work involving these geotechnical borings is not addressed in further detail below.

## 4.2 Sample Labelling

All sample containers will be laboratory supplied and affixed with a sampling label. Each sample label will include the site name (Lovric's) and the date and time of sample collection.

Soil samples will be collected from cores retrieved through push probe drilling. Subsurface soil samples collected from borings will be labeled "Boring ID – Depth" or "Well ID – Depth". For example, a subsurface sample collected from boring SB5 at 10 feet bgs would be labeled SB5-10.

Groundwater samples collected from temporary wells installed in the boring locations will be labeled with the boring identification following by a "W". For example, a water sample from SB5 would be labeled SB5-W. Groundwater samples collected from the monitoring wells will be labeled with the monitoring well name followed by the sample collection date. For example, a water sample collected from MW1 on July 1, 2025 would be labeled MW1-060125.

## 4.3 Field Screening

Soils recovered from the boreholes will be examined for field evidence of debris and/or contamination. Field screening procedures will be consistent with those presented in Section 4.3 of the original Site SAP/QAPP.

Purge water from each temporary well and monitoring well will be observed for evidence of sheen, odor, and discoloration before sampling. Observations will be recorded on the boring log or groundwater sampling log.

Please refer to Section 5.3 of the RIWP Addendum #1 for a more detailed discussion of soil sampling locations and rationale, sampling intervals, and analytical methods.

## 4.4 Surface Soil Sampling

No surface soil sampling is proposed in the RIWP Addendum #1.

## 4.5 Subsurface Soil Sampling

Stratum Group engages a professional drilling company, and a driller licensed in the State of Washington, to complete subsurface soil borings with a truck- or track-mounted direct-push drill rig. All drilling activities will be monitored and directed by a Stratum Group environmental professional.

Soil sampling is only proposed for the five reconnaissance borings and MW3 in the RIWP Addendum #1. Subsurface soil sampling procedures will be consistent with those presented in Section 4.5 of the original Site SAP/QAPP.

Soil cores collected from borings completed for MW1, MW2, and MW4 will be observed,

described on a boring log, and field screened in accordance with the procedures outlined for the other borings. However, no laboratory analysis of samples is planned for these locations because soil samples were collected from previous borings in roughly the same locations. Analysis of soil samples from these locations would be duplicative and provide no additional information about Site conditions.

After completion of each boring, a photograph will be taken of the drilling location and of the soil core.

An example boring log is provided in Appendix I.

## 4.6 Soil Sample Collection

Soil sample collection procedures will be consistent with those presented in Section 4.6 of the original Site SAP/QAPP.

## 4.7 Reconnaissance Groundwater Sample Collection

If groundwater is encountered during completion of a reconnaissance boring (SB19-SB23), a reconnaissance groundwater sample will be collected in accordance with the procedures outlined in Section 4.7 of the original Site SAP/QAPP.

Reconnaissance groundwater samples will not be collected from borings scheduled to be completed as monitoring wells.

## 4.8 Boring Decommissioning

Borings proposed in this investigation that will not be completed as monitoring wells will be decommissioned in accordance with Washington State regulations for resource protection wells (WAC 173-160-460) immediately after reconnaissance sampling is complete. Per the code, each soil boring not completed as a monitoring well will be decommissioned by sealing the boring from the bottom to the ground surface using bentonite chips, bentonite slurry, neat cement grout, or neat cement. The ground surface will be returned to its original condition to match the surrounding ground surface areas after decommissioning soil borings, including surface patching of asphalt or cement to match the surrounding surface, if applicable.

## 4.9 Monitoring Well Construction

Proposed groundwater monitoring wells will be drilled and installed by a driller licensed in the State of Washington and will be constructed in accordance with the Minimum Standards for Construction and Maintenance of Wells (WAC 173-160). Upon completion of the boring completed for locations slated to become monitoring wells, the boreholes will be re-drilled by the drilling contractor to the original completion depth with a 4.25-inch outer diameter casing to enlarge the diameter of the borehole annulus. A pre-packed PVC well casing will then be inserted into the borehole. These wells include a sand pack surrounded by a stainless steel mesh

screen that is attached to the exterior of the screened section of the well casing. The casing consists of 10 feet of 2-inch slotted Schedule 40 PVC pipe set at the bottom of the borehole, with blank 2-inch Schedule 40 PVC pipe rising to the surface. A PVC cap is attached to the bottom of the well casing and a sealing cap is placed in the top of the well casing to prevent accidental flow into the well casing.

Once the well casing is inserted, the annular space between the casing and the borehole is filled with additional silica sand up to approximately 1 to 2 feet above the well screen. Hydrated bentonite is used to fill the annular space from the filter pack to approximately one to two feet below the ground surface to form a surface seal. The surface is finished with concrete surrounding an 8-inch diameter steel flush-mount monument to protect the well and protect against surface water infiltration or placement of substances down the well casing. Well construction details including screen length and placement depth, filter pack thickness, and bentonite thickness are noted in the boring logs.

An example boring log with well construction details is provided in Appendix I.

We anticipate installation of additional monitoring wells will be required on the site in the future and the wells proposed at this time are not well placed to model site-wide groundwater flow direction. Therefore, we do not propose completion of a professional survey of the well elevations at this time. However, markings will be made on the north edge of the well casing to establish a consistent point for collecting depth-to-water measurements and denote the point of future survey locations.

### 4.10 Monitoring Well Development

Monitoring wells will be developed a minimum of 24 hours after construction and before water depth measurement or sampling activities to remove sediment accumulated at the base of the well casing and within the filter pack. Wells are developed using an agitation apparatus that consists of a stainless-steel rod with neoprene washers the diameter of the inside of the well casing. The agitation apparatus is surged up and down within the well casing to generate pressure and suction through the sand filter pack to loosen sediment in the filter pack. A high-volume battery-operated submersible pump is then lowered into well casing to purge the agitated water and remove the sediment. Alternating rounds of well agitation and purging are completed until the water runs clear with negligible visible turbidity or at least 10 well casing volumes have been evacuated, whichever comes first. If slow well recharge requires repeated stoppage of purging, well development may be stopped once purge water turbidity appears to stabilize.

The submersible pump and agitator apparatus are thoroughly washed and rinsed between wells to prevent cross contamination (see Section 4.12). The volume of water purged during development and observations of the purge water are recorded on the boring log with the well construction details.

## 4.11 Monitoring Well Groundwater Sample Collection

Initial sampling of the monitoring wells will be completed a minimum of 48 hours after well development is completed. Upon arrival to the Site, field personnel will open each well and remove the cap on the casing to allow the water table to equilibrate. Measurements of the depth to groundwater from the top of casing will be completed immediately upon cap removal and then again at least 30 minutes after the initial measurement. If the difference in the two depth measurements in a given well is greater than 0.05 feet, additional measurements will be taken at approximately 15-minute intervals until the difference between consecutive measurements is less than 0.05 feet.

Wells will be purged and sampled using a peristaltic pump and low flow sampling techniques. Single-use sample tubing will be placed approximately 1 to 2 feet below the top of the water table and will be adjusted as needed to account for drawdown. The well will be purged either until field parameters including temperature, pH, ORP, and/or conductivity stabilize, and the water is visually free of turbidity, or until a minimum of three well volumes has been purged, whichever comes first. If low water levels or low conductivity aquifers result in the wells pumping dry during purging, purging will halt, and the well will be allowed to recharge for 5 to 10 minutes until purging can continue. Multiple rounds of purging and recharging may be necessary to reach the prescribed volume of purge water or field parameter equalization. However, if a well purges dry more than five times, then the well will be sampled, and the reduced purge volume will be noted on the groundwater monitoring field log.

A record of field measurements and observations collected during well purging will be recorded on a groundwater monitoring field log. A copy of the field log is provided in Appendix I.

Once well purging is complete, groundwater samples will be collected from the wells in accordance with the water sampling procedures described in Section 4.7 of the original Site SAP/QAPP.

## 4.12 Decontamination Procedures

Downhole probe drilling, well development, and sampling equipment used for environmental site investigations will be washed with Alconox and triple rinsed with deionized water between each boring. Hand tools used for field testing will be similarly washed and rinsed between each sampling location.

Hollow stem auger downhole and sampling equipment to be used for geotechnical site investigations will be steam cleaned between each boring location. Wash water from steam cleaning will be collected, drummed, and stored on site as IDW.

Single-use sampling equipment including sampling syringes and gloves will be disposed of after collection of each sample. Sampling equipment used once per boring (e.g., soil boring liners, temporary will piping, groundwater sample tubing) will be disposed of between each borehole.

### 4.13 Management of Investigation Derived Waste (IDW)

All soil and water generated from environmental borings and monitoring well purging that is not used for sample analysis purposes and any decontamination fluid from equipment cleaning will be placed in labeled 55-gallon drums and stored on-site pending characterization. We anticipate this waste will be stored on-site until cleanup activities commence, at which time the soil and water will be disposed of with soil and water removed during remediation.

Waste personal protective equipment (e.g., gloves) and field supplies (e.g., plastic bags for PID testing) will be bagged and disposed of as general solid waste at the end of each field day.

## 5.0 LABORATORY SAMPLE ANALYSIS PLAN

Soil and reconnaissance groundwater samples will be delivered or mailed via Fed Ex to Friedman & Bruya Laboratory (F&B) of Seattle, Washington (accreditation C578). Analysis for substances that F&B is not accredited for will be forwarded on to Analytical Resources, LLC of Tukwila, Washington (C558). F&B will be responsible for ensuring that all laboratory analytical work for soil and water samples complies with project requirements and will promptly communicate any problems or concerns with the analytical laboratory work with Stratum Group.

The proposed analytical schedule is provided in Table 3, below, including the methodology recommended for the analysis.

**Table 3.** Sample Analysis Plan

| Boring | Sample Description | Contaminants of Concern | Analytical Method |
|---|---|---|---|
| SB19 & SB20 | Up to 3 subsurface soil samples & 1 reconnaissance groundwater sample per boring | Diesel & Oil | NWTPH-Dx |
| SB21-SB23 | Up to 3 subsurface soil samples and 1 reconnaissance groundwater sample per boring | HCID | NWTPH-HCID |
| | | MTCA 5 metals + Cu, Zn | EPA 6020B & 1631E |
| | | cPAHs & Naphthalenes | EPA 8270E |
| MW1 | 1 groundwater sample | Diesel & Oil | NWTPH-Dx |
| | | Arsenic | EPA 6020B |
| MW2 | 1 groundwater sample | Diesel & Oil | NWTPH-Dx |
| | | Arsenic | EPA 6020B |
| | | cPAHs & Naphthalenes | EPA 8270E |
| MW3 | Up to 3 subsurface soil samples & 1 groundwater sample | MTCA 5 metals + Cu, Zn | EPA 6020B & 1631E |
| MW4 | 1 groundwater sample | Diesel & Oil | NWTPH-Dx |

Samples will be preserved, if needed, in accordance with the sample QA/QC parameters outlined in Table 4 of the original SAP/QAPP.

If soil samples are found to contain elevated concentrations of diesel- and/or oil-range petroleum, samples may be reanalyzed for NWTPH-DX after being subjected to the silica gel cleanup (SGC) protocol. Water samples collected from monitoring wells on the Site that exhibit elevated concentrations of diesel- and/or oil-range petroleum may also be reanalyzed after being subjected to SGC. Application of SGC will be utilized to remove interference from non-petroleum polar organic material that may artificially bias sample results high. SGC will not be applied to water samples collected from temporary wells.

Groundwater samples that will be analyzed for metals and/or cPAHs will be laboratory filtered prior to analysis to obtain concentrations solely of dissolved metals/cPAHs.

## 6.0 Quality Assurance Project Plan (QAPP)

The purpose of the QAPP is to provide confidence in the analytical results through a system of quality assurance and quality control (QA/QC) checks with respect to data collection methods, laboratory analysis, data reporting, and corrective actions to achieve compliance with established performance and data quality criteria.

Field activities and data obtained during this investigation will be subject to the same QAPP presented in Section 6 of the original Site SAP/QAPP.

# 7.0 REFERENCES

Environmental Protection Agency (EPA), 2002. Guidance for Quality Assurance Project Plans, QA/R-5. EPA Publication 240/R-02/009. December 2002.

EPA, 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. January 2009.

EPA, 2020a. National Functional Guidelines for Organic Superfund Methods Review. November 2020.

EPA, 2020b. National Functional Guidelines for Inorganic Superfund Methods Review. November 2020.

Stratum Group, 2025. *Remedial Investigation Work Plan. Lovric's Sea-Craft, 3100 Oakes Avenue, Anacortes, Washington 98221, Facility Site ID #21847524.* Project 6.1.21. January 15, 2025.

Stratum Group, 2025. *Sampling & Analysis Plan/Quality Assurance Project Plan. Lovric's Sea-Craft, 3100 Oakes Avenue, Anacortes, Washington 98221, Facility Site ID #21847524.* Project 6.1.21. January 15, 2025.

Washington Department of Ecology (Ecology), 2016. Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies. Ecology Publication 04-03-030. July 2004. Revised December 2016.

# APPENDIX I

Example Boring Log

Example Groundwater Monitoring Log

# FIELD BORING LOG Boring _____

| | | |
|---|---|---|
| **PROJECT NUMBER** | **DRILLING COMPANY** | **COORDINATES** |
| **PROJECT NAME** | **DRILLER** | **COORD SYS** |
| **CLIENT** | **DRILL RIG** | **SURFACE ELEVATION** |
| **ADDRESS** | **DRILLING METHOD** | **WELL TOC** |
| **DRILLING DATE** | **TOTAL DEPTH** | **LOGGED BY** |
| | **DIAMETER** | |
| **COMPLETION** | **CASING** | **WELL SCREEN** |
| **COMMENTS (e.g., boring location)** | | |

| Depth (ft) | PID | Samples | Water | Material Description (e.g., color, composition, moisture, grain size, roundedness, density - Inferred geologic contact) | Additional Observations (e.g., environmental indicators, well screen depth, etc.) |
|---|---|---|---|---|---|
| 0.5 | | | | | |
| 1 | | | | | |
| 1.5 | | | | | |
| 2 | | | | | |
| 2.5 | | | | | |
| 3 | | | | | |
| 3.5 | | | | | |
| 4 | | | | | |
| 4.5 | | | | | |
| 5 | | | | | |
| 5.5 | | | | | |
| 6 | | | | | |
| 6.5 | | | | | |
| 7 | | | | | |
| 7.5 | | | | | |
| 8 | | | | | |
| 8.5 | | | | | |
| 9 | | | | | |
| 9.5 | | | | | |
| 10 | | | | | |

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# FIELD BORING LOG Boring _____

| Depth (ft) | PID | Samples | Water | Material Description (e.g., color, composition, moisture, grain size, roundedness, density - Inferred geologic contact) | Additional Observations (e.g., environmental indicators, well screen depth, etc.) |
|---|---|---|---|---|---|
| 10 | | | | | |
| 10.5 | | | | | |
| 11 | | | | | |
| 11.5 | | | | | |
| 12 | | | | | |
| 12.5 | | | | | |
| 13 | | | | | |
| 13.5 | | | | | |
| 14 | | | | | |
| 14.5 | | | | | |
| 15 | | | | | |
| 15.5 | | | | | |
| 16 | | | | | |
| 16.5 | | | | | |
| 17 | | | | | |
| 17.5 | | | | | |
| 18 | | | | | |
| 18.5 | | | | | |
| 19 | | | | | |
| 19.5 | | | | | |
| 20 | | | | | |
| 20.5 | | | | | |
| 21 | | | | | |
| 21.5 | | | | | |
| 22 | | | | | |

**Disclaimer** This bore log is intended for environmental not geotechnical purposes.

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# FIELD BORING LOG Boring _____

| Depth (ft) | PID | Samples | Water | Material Description (e.g., color, composition, moisture, grain size, roundedness, density - Inferred geologic contact) | Additional Observations (e.g., environmental indicators, well screen depth, etc.) |
|---|---|---|---|---|---|
| 22.5 | | | | | |
| 23 | | | | | |
| 23.5 | | | | | |
| 24 | | | | | |
| 24.5 | | | | | |
| 25 | | | | | |
| 25.5 | | | | | |
| 26 | | | | | |
| 26.5 | | | | | |
| 27 | | | | | |
| 27.5 | | | | | |
| 28 | | | | | |
| 28.5 | | | | | |
| 29 | | | | | |
| 29.5 | | | | | |
| 30 | | | | | |
| 30.5 | | | | | |
| 31 | | | | | |
| 31.5 | | | | | |
| 32 | | | | | |
| 32.5 | | | | | |
| 33 | | | | | |
| 33.5 | | | | | |
| 34 | | | | | |
| 34.5 | | | | | |

# Groundwater Sampling Log

Well ID #_____

Project Name: _____ Sampling Method: _____ Sampled By: _____

Project #: _____ Sampling Eqiupment: _____ Date: _____

Project Location: _____ Well Condition: _____ Weather: _____

## Well Information

Installed Depth: _____ Water Column Length: _____

Measured Depth: _____ Well Diameter: _____

Depth to Water: _____ Calculated 3 Well Volumes: _____

Criteria used to stop purging: Dry Well Parameter stabilization 3 Well Volumes

## Field Parameter Measurement

Free Product? Free Product Thickness:

| Time | Depth to Water (ft) | Total Discharge (gal) | pH | Total Dissolved Solids (ppm) | Dissolved Oxygen (%) | Temp (°C) | ORP (mV) | Notes |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Final Observations

Total Purge Volume: _____ Purge End Time: _____ Recharge Notes: _____

Color: _____ Odor: _____ Sheen: _____ Clarity: _____

## Well Sampling

Sample ID: _____ Duplicate?

Sample Time: _____ Duplicate Sample ID: _____

Field Filtered? _____ Duplicate Sample Time: _____