



Oregon

Kate Brown, Governor

Department of Environmental Quality

Northwest Region

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September 20, 2022

via electronic delivery

Thomas Benke
PO Box 83706
Portland, OR 97293

Re: PCB Areawide – N Bradford St. ROW, Portland, Oregon
ECSI ID# 6480

Dear Thomas Benke:

The Oregon Department of Environmental Quality (DEQ) reviewed the August 12, 2022 Response to Comment (RTC) letter prepared by The Environmental Compliance Organization and the August 9, 2022 revised *Work Plan Focused Surface Soil Investigation* (Work Plan) prepared by Evren Northwest, on behalf of Peninsula Iron Works (PIW). The work plan describes sampling around the PIW Facility, Building 2, at 6618 N. Alta Avenue near North Bradford Street in Portland, Oregon (ECSI #6480) to delineate the extent of polychlorinated biphenyls (PCBs) previously detected in this area.

In the interest of conducting sampling in an expedient manner, DEQ is accepting the work plan and requesting the additional information requested below be submitted via email and documented in site investigation report. Please submit the requested information within 30 days from the date of this letter along with a schedule of planned site sampling activities.

DEQ accepts the work plan, with following comments.

1. RTC Section 1.0 Introduction #2. DEQ disagrees with RTC Specific #2. In particular, DEQ requested, in an October 11, 2021 letter and subsequent conversations, that PIW conduct an investigation to “delineate the existing PCB contamination” and did not limit this to surface soils. Given the high concentrations of PCBs identified immediately to the west and southwest of the PIW property, delineation includes collecting samples on the PIW property itself, adjacent to the identified contamination. Furthermore, given PIW’s history of activities that may have used PCB-containing materials historically, soil borings should include locations beneath the PIW building. In particular, samples should be collected on the west side of PIW and near historical operations including the machine shop (wood floor), machine pit, oil and waste oil storage, air compressors, foundry (earth floor, elec. power), clay storage, and casting sands storage to determine the conceptual site model.
 - a. In the interest of conducting sampling in an expedient manner, DEQ agrees that the current round of sampling, described in the Work Plan, will focus on the areas around the PIW building. However, DEQ anticipates future sampling events, including locations beneath the PIW building to fully characterize the nature and extent of contamination and to determine / confirm the conceptual site model.
2. RTC Section 4.0 Risk-Based Assessment #1. Section 4.1. Data Evaluation and Identification of COPCs should be updated to reflect why the COI list is limited to PCBs.

DEQ recommends language similar to: “Although PCBs are not the only COI associated with historical activities at this site, given the current priority to delineate existing PCB contamination along N. Bradford St. ROW, this workplan represents an initial phase of investigation and is limited to the investigation of PCBs at this time.”

Sampling Procedures

3. The RTC General #1 states that some DUs have been removed because DEQ recently sampled in these areas using ISM methodology from 0 to 2 inches. DEQ recommends collecting soil borings (0-0.5 feet) in these areas to better characterize soil conditions. In particular 3 additional borings are recommended to be placed in the area that PIW identified as DU3.
4. Section 3.1.4 Discrete Soil Sampling proposes to collect discrete samples from soil borings in the 0.0 to 0.5 ft interval below the paved surface and associated subgrade aggregate. To better delineate vertical extent of soil contamination, DEQ recommends adding a sample in the 1.0 to 1.5 ft, and 2.0 to 2.5 ft intervals. DEQ generally uses depth ranges of 0 to 3 feet for surface soil (DEQ IMD, 2020).
5. DEQ continues to recommend that all samples, including discrete samples, be sieved in the lab to < 2 mm. Sieving samples will increase comparability between discrete and ISM samples by using the same defined soil fraction. DEQ notes that the different lab processing of ISM and discrete samples, in particular sieving means that concentrations will not be directly comparable and interpretation more difficult.
6. DEQ reiterates that given the historical activities at PIW, PCBs are not the only contaminants of interest for foundries and machine shops. In particular, DEQ recommends analysis NWTPH-Gx for gasoline range organics (GRO) and NWTPH-Dx for diesel range organics (DRO) and heavy oils, which may be co-located with PCBs.

ISM Sampling

7. DEQ accepts the use of 50 soils increments from the decision unit for ISM sampling. While using 50 increments reduces the number of replicates needed, it does not eliminate the need for replicates to characterize variability. *“If a sufficient number of increments are collected for each sample (>50), the RSD decreases and field replicates can be collected at a lower frequency (e.g. one per batch)”* (Section 3.1.4, DEQ IMD, 2020). Since only one DU will be analyzed, replicates (in triplicate) should be collected from this DU.
8. DEQ’s comment “Please include replicates of the laboratory processed sample for analytical subsampling to assess precision” refers to an independent replicate of the slab cake sample to test the precision of the laboratory subsampling used for extraction and analysis (Section 3.1.5, DEQ IMD, 2020). This is particularly important when milling is not conducted to reduce the particle sizes further from 2mm to a powder. The collection of this additional replicate should be noted in the laboratory SOP.
9. The SOP mentions 4 or 8 oz containers while the RTC mentions that 2000g will be collected from the ISM DU. Please ensure the laboratory can process this sample volume.

Please provide DEQ with a schedule of field activities and reporting within 30 days of the date of this letter.

Please contact me at (503) 229-5538 or franziska.landes@deq.oregon.gov if you have any questions.

Sincerely,

A handwritten signature in black ink that reads "Franziska Landes". The script is cursive and fluid.

Franziska Landes
Project Manager and Data Analyst
Northwest Region Cleanup Section

Ec: Lynn Green, EVREN NW Inc
Dave Johnson, Peninsula Iron Works
Katie Daugherty, DEQ
Kevin Parrett, DEQ
Todd Hudson, Oregon Health Authority

References:

DEQ IMD, 2020. DEQ's Decision Unit (DU) Characterization, Conducting Ecological Risk Assessment Internal Management Directive, September 2020
(<https://www.oregon.gov/deq/Hazards-and-Cleanup/env-cleanup/Pages/ERA.aspx>)



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Thomas R. Benke
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August 12, 2022

Mr. Kevin Parrett
NW Region Cleanup Program
Department of Environmental Quality
700 NE Multnomah St, Ste 600
Portland, OR 97232

**Re: Peninsula Iron Works, 6618 N Alta Ave, Portland, Oregon
PCB Areawide – N Bradford St ROW, Portland Oregon
ECSI ID#6480**

Dear Mr. Parrett,

As you know, I represent Peninsula Iron Works ("PIW"). This is in response to the Department's letter to Peninsula Iron Works dated July 26, 2022. Enclosed please find a revised Focused Surface Soil Investigation Workplan for the Department's review. PIW's responses to the Department's comments are as follows.

General Comments

1. Please refer to DEQ's Decision Unit (DU) Characterization document, as part of the updated Conducting Ecological Risk Assessment internal management directive (<https://www.oregon.gov/deq/Hazards-and-Cleanup/env-cleanup/Pages/ERA.aspx>).

We changed the reference from ITRC to ODEQ's guidance document, since ODEQ's guidance is based on the ITRC methodology.

In particular, please note the following:

1. DEQ IMD recommends collecting increments using a systematic random sampling scheme. Systematic random sampling begins with a random start

location in the first grid cell for the increment, and this location is then repeated across all cells.

Since ODEQ recently sampled several areas that we had including in our work plan, and since one of the areas where we had initially planned to sample as a decision unit was determined to have much more asphalt cover than originally assumed, there is only one long-narrow decision unit that will be sampled. This area will be sampled following Hawaii's guidance for sampling long-narrow decision units.

2. DEQ recommends collecting 50 increments instead of 30, and notes that for the 0 to 2 inch interval, 50 samples also facilitates collecting an adequate sample mass of a minimum of 1000 g. If fewer than 50 increments are collected per DU, replicates should be taken in triplicate and at a higher frequency equating to most if not all DUs. The total mass should be at least 1000 grams from each DU.

We updated the workplan to show 50 soil increments will be collected from the decision unit and that no replicates will be collected. The total mass that will be collected is 2000 grams.

3. Please clarify what tool will be used to collect the increments. DEQ recommends the use of cylindrical corers, augers, ISM tools, or drills and discourages trowels or shovels to ensure no sample bias in particle size.

We updated the workplan to show soil increments will be collected using stainless-steel push probes and augers.

4. Soil should be sieved to < 2mm.

We updated the workplan with the laboratory's SOP for ISM processing and subsampling attached, which shows the use of a #10 sieve (particle size < 2mm).

5. Please attach the laboratory SOP specific to processing ISM samples.

We updated the workplan with the laboratory's SOP for ISM processing and subsampling attached.

6. For reduction in mass, DEQ recommends using a sectoral splitter to collect the smaller representative sample (e.g. 100-200 grams) of the sieved sample (<2mm), then grinding this smaller sample to powder (approx. 60-70 μ m), and taking aliquots from this sample. If grinding is not possible, DEQ recommends using a sectoral splitter used to get a smaller sample of the entire sieved sample (<2mm)

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and using a slab cake approach to get aliquot samples. The last recommended approach is using the 30 increments from a slab cake of entire sieved sample (<2mm) to get aliquot samples, but doing it this way will introduce more variability.

The approach used by our lab is to take the 30 increments from a slab cake of entire sieved sample (<2mm) to get aliquot samples.

Specific comments

2. Section 1.0 Introduction.

1. City Catch Basin Sediment Sampling. While there is currently no discharge from the PIW property to the catch basin ANE911, this was not necessarily the case during the 2008 and 2011 sampling conducted by the City. According to May 2020 Source Control Evaluation, PIW installed source control measures in late 2019 early 2020 capturing all roof runoff from building roof and conveying it directly to the city stormwater sewer. Historical discharge prior to 2019 may have occurred.

Noted.

2. The last sentence states that "ODEQ requested a work plan for additional surface soil characterization for areas immediately adjacent to the subject property." DEQ requested in an October 11, 2021 letter that PIW conduct an investigation to delineate the existing contamination. Given the high concentrations of PCBs identified immediately to the west and southwest of the PIW property, delineation includes collecting samples on the PIW property itself, adjacent to the identified contamination. Furthermore, given PIW's history of activities that may have used PCB-containing materials historically, soil borings should include locations beneath the PIW building. In particular, samples should be collected on the west side of PIW and near historical operations including the machine shop (wood floor), machine pit, oil and waste oil storage, air compressors, foundry (earth floor, elec. power), clay storage, and casting sands storage. To keep the number of analytical samples similar, soil borings could be spaced on a 50 ft grid instead of a 25ft grid and including the PIW property.

The work plan was updated to state that ODEQ requested a work plan for "additional investigation to delineate the existing PCB contamination adjacent" to the PIW property. As discussed in our prior online meeting with ODEQ, the media of concern in the adjacent areas to PIW's property is surface soil. Since the soil underlying the PIW

building is capped by the building and given the thickness of the foundation are considered subsurface soil, and since the sampling of surface soil immediately adjacent to the PIW property that is the subject of this work plan has not been completed, sampling beneath the PIW building is not necessary at this time.

3. Section 2.0 Proposed Scope of Work

1. ISM sampling should follow DEQ's documents listed in General Comment #1 above.

We changed the reference from ITRC to ODEQ's guidance document, since ODEQ's guidance is based on the ITRC methodology.

2. Given the complexity of the site and coordination with multiple adjacent sampling activities, please submit figures of the increment locations for each DU and clarify the methodology for how increment locations were selected for DEQ review. Since the ISM DUs represent long rectangles, please refer to Section 4.2.5.1 in Hawaii's DU guidance for locating increments in long, narrow DUs (<https://health.hawaii.gov/heer/tgm/section-04/#4.2.5>).

The one decision unit will be sampled following Hawaii's guidance for sampling long-narrow decision units and Figure 4 has been updated to show the individual soil increment sampling locations.

3. ISM surface samples should be collected from the 0 to 2 inch interval to be most directly comparable to the ISM sampling conducted in Cathedral Park by DEQ in May 2022. Please make sure this is updated in Section 2.0 and Section 3.1.2 for consistency.

The work plan was updated to show that soil increments will be collected between 0 and 0.2 feet, as requested.

4. Section 3.0 Methods and Procedures

1. Due to the presence of larger rocks and fill materials, the workplan should describe how samples will be field screened prior to placement in sample containers. Regardless of the field screening approach, all samples should be sieved in the lab consistent with ISM methodology (<2 mm). Please attach the field sampling and laboratory processing and subsampling procedures.

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We updated section 3.1.1 of the workplan to show that wood debris and large rocks will be removed from each soil increment. Section 3.1.3 of the work plans states that the laboratory's SOP for ISM processing and subsampling is attached, which shows the use of a #10 sieve (particle size < 2mm).

2. Please archive all samples to allow for follow-up analysis for a minimum of one year, to be re-evaluated with DEQ after one year.

We updated section 3.2 of the workplan to show that the lab will be requested to archive all samples for up to one year.

3. Please update the ITRC citations to: ITRC, October, 2020. Incremental Soil Sampling Methodology (ISM) Update, Prepared by The Interstate Technology & Regulatory Council (ITRC).

We updated section 3.1.3 of the workplan with this reference.

4. 3.1.3 Ensure the increments used for replicate samples are placed far enough away from the primary sample (and each other) to be independent measures of the mean. Only a spacing of greater than a few feet is proposed here, but the replicate increments should be at approximately 1/4th of the calculated increment spacing for the DU from the midpoint of the cell in order to ensure adequate separation.

Since ODEQ recently sampled several areas that we had including in our work plan, and since one of the areas where we had initially planned to sample as a decision unit was determined to have much more asphalt cover than originally assumed, there is only one long-narrow decision unit that will be sampled. Since 50 soil increments are being collected from this DU (with a sample mass of approximately 2000 grams), replicates will no longer be collected.

5. 3.1.4 Laboratory Sub-Sampling and Compositing

1. i. Please attach the ISM processing SOP to the work plan and ensure that it meets DEQ's expectations as described in General Comment #1.

Section 3.1.3 of the work plans states that the laboratory's SOP for ISM processing and subsampling is attached.

6. 3.2 Laboratory Analysis

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1. i. Please confirm whether EPA method 8282-SIM (proposed in Table 3-1) is a typo as EPA 8082 is referenced in Table 3-2. Please ensure Aroclors 1262 and 1268 are added to the standard Aroclors included in the EPA 8082A. Please refer to this document for more information: <https://www.epa.gov/risk/regional-issues-paper-pcb-characterization>

Table 3-1 was updated with the correct lab method destination and shows all the list of aroclors is included.

2. ii. In order to determine if chemical weathering has impacted the accuracy of EPA method 8082, DEQ requests that laboratory chromatograms be provided for all samples and associated laboratory standards and QA samples, and that a portion of the samples be analyzed by both EPA method 8082 and EPA method 1668 (PCB congeners). This should include at least two samples at the high, medium, and low range of detected PCBs.

Section 3.2 was updated to show that the lab will be requested to provide gas chromatograms as part of the final laboratory data report. Table 3-1 was updated with the additional laboratory testing and sample rationale.

3. iii. Given the historical activities, DEQ recommends expanding the analyte list to include total petroleum hydrocarbons (TPH), metals, and polycyclic aromatic hydrocarbons (PAHs), in addition to PCB Aroclors (EPA method 8082). Please be aware that DEQ may not be able to issue an NFA based solely on the proposed analytical list of PCB Aroclors.

Noted. At this time the focus on investigation is related to PCBs in shallow surface soil and therefore the inclusion of additional constituents of interest is not necessary at this time.

4. iv. Please include replicates of the laboratory processed sample for analytical subsampling to assess precision.

Since ODEQ recently sampled several areas that we had including in our work plan, and since one of the areas where we had initially planned to sample as a decision unit was determined to have much more asphalt cover then originally assumed, there is only one long-narrow decision unit that will be sampled. Since 50 soil increments are being

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collected from this DU (with a sample mass of approximately 2000 grams), replicates will no longer be collected.

7. 3.8 Data Quality Assurance and Control.

1. i. Please clarify which EPA protocol will be followed for quality assurance review.

Section 3.8 was updated with this reference as well as additional information related to data validation and data quality objectives.

5. Section 4.0 Risk-Based Assessment

1. 4.1 Data Evaluation and Identification of COPCs

1. i. Contaminants of Interest, or COIs, should be developed at the Work Plan stage based on historical operations at PIW to determine the chemical analyte list.

Section 4.1 of the work plan was updated to show that at this time PCBs are the only COIs.

2. ii. The reference to DEQ's "Guidance for Conduct of Deterministic Human Health Risk Assessments" is outdated. Current guidance (2010) is "Human Health Risk Assessment Guidance."

Section 4.0 of the work plan was updated to reference this updated guidance document.

Please address all future correspondence regarding this matter to me. Should you have any questions, please do not hesitate to contact me by phone or email.

Sincerely,



Thomas R. Benke
Attorney – Managing Member

cc: Mr. Dave Johnson, VP
Peninsula Iron Works



May 2022 Work Plan
Focused Surface Soil Investigation
(Revised August 2022)

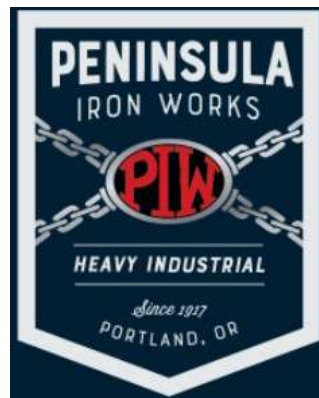
Peninsula Iron Works Facility
BUILDING 2

6618 N. Alta Avenue
Portland, Oregon

ODEQ ECSI#: 6480

August 9, 2022

Prepared for:



Peninsula Iron Works

Attn: Dave Johnson

PO BOX 83067

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Prepared by:



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Project No. 1355-21001-08

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Tables (in text)

- 3-1 Proposed Analytical Plan**
- 3-2 Analytical Protocol**

Tables (after text)

- 1 Summary of Analytical Data, Soil (City of Portland)**

Figures (after text)

- 1 Site Vicinity Map**
- 2 Site Plan**
- 3 Historical Sample Location Diagram**
- 4 Proposed Sample Location Diagram**

Attachment

Laboratory ISM SOP

May 2022 Work Plan
Focused Surface Soil Investigation
(Revised August 2022)

Peninsula Iron Works, Building 2

6618 N. Alta Avenue
Portland, Oregon
ODEQ ECSI#: 6480

1.0 INTRODUCTION

EVREN Northwest, Inc. (ENW) has prepared this Work Plan for environmental investigation of near surface soil in areas adjacent to the above-referenced subject property (Figures 1 and 2; subject site). Since the site is askew from cardinal directions, with respect to the subject property this work plan will use north as generally towards the adjacent N Alta Avenue Right-of-Way (ROW), south as generally towards the adjacent City parking lot, and west as generally towards the N. Bradford Street ROW and adjacent railroad corridor. Previous investigation of soil was conducted by City of Portland (City) and identified impacts of total polychlorinated biphenyls (PCBs) as Aroclors in catch basin sediment and in shallow soil in areas adjacent to the subject property (refer to Figure 3 for previous sample locations). Specifically:

- **City Catch Basin Sediment Sampling.** The City conducted source investigations in storm water Outfall Basin 52 between June 2008 and January 2011.¹ Catch basin ANE911 is located at the western end of N. Alta Avenue, adjacent to the PIW facility, and has no piped connections from adjacent properties (see Figure 3). The estimated drainage area to this inlet includes a parking area associated with Moonstruck Chocolate (former Portland Woolen Mills), improved N. Alta Avenue and N. Crawford Street [as well as improved portions of N. Crawford Street adjacent to Independent Marine Propeller (former Propeller Machine Shop)], and the railroad right-of-way (ROW) along unimproved N. Bradford Street. There is currently no discharge from the subject property that discharges to catch basin ANE911. Samples from catch basin ANE911 had total PCB concentrations at up to 8.16 mg/Kg (as Aroclor 1260). These concentrations exceed both the JSCS screening level as well as the EPA's cleanup objective listed in the 2017 Record of Decision (ROD) for the Portland Harbor.
- **BES Surface Soil Sampling.** Based on the source investigation results for catch basin ANE911, the City conducted additional investigation of surface soils in the vicinity of this catch basin to evaluate whether possible erodible surface soil that could be carried by overland flow into catch basin ANE911.¹ Nine surface soil composite samples (and one duplicate composite sample) were collected on January 6, 2011. The samples were collected within the N. Alta Avenue ROW, near the intersection with N. Bradford Street and in the N. Bradford Street ROW

¹ City of Portland, May 2012. Outfall 52, Source Investigation Report.

along the railroad corridor and adjacent to the subject property. The locations of the area represented by each composite surface soil sample are shown on Figure 3. The samples were analyzed for PCB Aroclors, and selected metals. Results suggested the presence of total PCBs at concentrations up to 11.9 mg/Kg (as Aroclor 1260) in composite surface soil samples collected from areas that drain to this catch basin, and at concentrations up to 21.7 mg/Kg (as Aroclor 1260) in composite surface soil samples collected in the N. Bradford Street ROW.

On September 20, 2011, the City collected additional surface soil samples from accessible (unpaved) areas adjacent to the parking surface south of the subject property and within the N Bradford Street ROW, on either side of the existing railroad tracks (NBRAD1 through NBRAD8), and advanced five shallow borings in areas just south of the subject property (B1 through B5). Refer to Figure 3 for these sample locations and Table 1 for analytical results. Total PCBs were detected in the NBRAD surface soil samples at up to 2.5 mg/Kg, with the highest concentrations found in surface soil sampled in the N Bradford Street ROW on either side of the existing railroad tracks. With the exception of the sample NBRAD2, all the NBRAD surface soil samples exceed ODEQ's generic screening-level risk-based concentrations (SLRBC) of 0.23 mg/kg, which assumes residential exposure to surface soil. Total PCBs were detected in soil samples retrieved from borings B1 through B5 at up to 1.05 mg/Kg, with the highest concentration in a soil sample retrieved from boring B1 between 0.5- and 1-foot depth below ground surface (bgs), which was sited adjacent to the southeast corner of the subject property. PCBs were detected in soil samples collected between 0.5- and 5-feet bgs in borings B1, and B3, and up to 3-feet depth bgs in boring B2. No PCBs were detected in borings B4 and B5, or in the sample collected from boring B2 between 3- and 5-feet bgs. Total PCBs concentrations exceeded its SLRBC in boring B1 (samples 0.5-1' and 1'-5'), B2 (samples 0.5'-1' and 1'-3') and boring B3 (samples 0.5'-1' and 1'-5').

Soil data is summarized in Table 1, attached.

Based on the results of previous soil investigation by the City, the Oregon Department of Environmental Quality (ODEQ) requested that Peninsula Iron Works (PIWs) join in into the State's Voluntary Cleanup Program for PCB contamination documented in areas adjacent to the subject property.² During subsequent discussions, ODEQ requested a work plan for additional investigation to delineate the existing PCB contamination adjacent to the subject property.

² ODEQ. January 18, 2022. Letter: PCB Areawide - N Bradford St. ROW, Portland, Oregon, ECSI ID# 6480

2.0 PROPOSED SCOPE OF WORK

ENW proposes the following specific scope of work:

- To obtain comprehensive surface soil data, a single decision unit (DU) has been defined in exposed soil areas adjacent to the subject property (Figure 4), e.g.:
 - Landscape strip immediately adjacent to the southern margin of the subject property (DU01).

Fifty (50) subsample increments collected in accordance with ODEQ's Decision Unit Characterization guidance³. Soil increments will be collected from approximately 0.0 to 0.2-foot bgs. The increments collected from DU1 will be dried, sieved, sub-sampled and composited at the laboratory, and one incremental sample will be analyzed for total PCBs.

- Soil samples will be collected from 15 borings sited within the N Alta Avenue ROW north of the subject property, 18 borings sited within paved portions of the City parking area south of the subject property, and 6 borings sited within paved portions of the area west of the subject property. Boring locations are based on 25-foot grid cells, with each boring placed in the approximate center of each grid unless obstructed. A depth-discrete sample will be collected from each boring between approximately 0 and 0.5-feet below the paved surface and associated subgrade aggregate, where present, otherwise, a depth-discrete sample will be collected at between approximately 0 and 0.5-feet depth. Following sample collection, each depth-discrete sample will be analyzed for total PCBs (as aroclors) by the analytical laboratory.

3.0 METHODS AND PROCEDURES

This section describes the methods proposed to complete the field work described above. All work will be performed by employees and subcontractors trained and licensed to work with hazardous materials. Safety procedures will be strictly enforced through the use of a Health and Safety Plan.

3.1 Incremental Sampling Method

ISM consists of collecting many small increments of soil (discrete soil increments) from a given DU and compositing them into one larger sample. The relatively large soil sample is thoroughly homogenized and subsampled in the laboratory. The resulting contaminant concentrations represent the average concentration for the entire DU. This sampling procedure will minimize effects of heterogeneity (micro scale and short scale) in the soil to provide a more accurate representation of contaminant concentrations within each DU. Sampling will follow the decision unit characterization guidance developed by the ODEQ.³

³ ODEQ, September 14, 2020. *Decision Unit Characterization. Internal Management Directive.*

3.1.1 Increment Sampling Locations

The locations targeted for sampling in DU01 and are illustrated in Figure 4. The decision unit will be divided in a grid pattern consisting of approximately 50 grids, following the State of Hawaii's guidance⁴ where the soil incremental locations are evenly spaced, and form a zig-zag pattern in long narrow DU. Soil increments (soil samples of equal mass) will be collected from the center node of each increment grid (grid-center systematic sampling) resulting in collection of 50 soil increments from the DU. Grid locations will be distributed evenly within the decision unit to ensure that the entire decision unit population is equally represented in the final multi-increment sample (see Figure 4). Soil increments will be sampled with a stainless-steel push probe and/or hand auger. Wood debris and large rocks will be removed from each soil increment prior to combining in the laboratory-provided sample container.

3.1.2 Incremental Sampling Depth

Soil increments from DU01 will be collected between approximately 0 and 0.2 feet bgs, or below aggregate fill, where present.

3.1.3 Laboratory Sub-Sampling and Compositing

All laboratory subsampling and sample preparations will be conducted in accordance with Interstate Technology & Regulatory Council (ITRC) protocols⁵ (air dried, sieved, subsampled, and composited). An ISM sub-sampling and compositing standard operating procedure prepared by Friedman & Bruya, Inc. (F&BI) of Seattle, Washington, is included as an Attachment.

3.1.4 Discrete Soil Sampling (from Temporary Soil Borings)

Depth-discrete soil samples will be collected from 15 borings sited within the N Alta Avenue ROW north of the subject property, the 18 borings sited within paved portions of the City parking area south of the subject property, and the 6 borings sited within paved portions of the area west of the subject property. A depth-discrete sample will be collected from each boring between approximately 0 and 0.5-feet below the paved surface and associated subgrade aggregate, where present, otherwise, a depth-discrete sample will be collected between approximately 0 and 0.5-foot depth. The soil samples will be placed in a laboratory-supplied jar, immediately sealed with minimal head space, uniquely labeled with sample designation, date and time.

⁴ State of Hawaii Department of Health, July 2021. Characterization of Decision Units. <https://health.hawaii.gov/heer/tgm/section-04/#4.2.5>

⁵ The Interstate Technology & Regulatory Council (ITRC). October 2020. Incremental Soil Sampling Methodology (ISM) Update.

Samples will be immediately placed in cooled storage until they are delivered to F&BI of Seattle, Washington, following chain-of-custody protocol. The samples will be analyzed according to the Analysis Plan shown in Table 3-1, below. Sample containers, preservatives, and holding times for each analytical method are provided on Table 3-2.

3.1.5 Soil Description

The depth of native soils below pavement and fill will be recorded for shallow boring locations. Soil samples will be described using appropriate geologic nomenclature and Unified Soil Classification System to the extent practical. Information such as percentage of gravel, sand, and fines; particle size range, shape, and angularity; will be recorded, as appropriate. In addition, the presence of odors, staining, or other apparent field evidence of impacts will be documented.

An example of the format to be utilized for soil descriptions shown below:

- Light brown silty SAND (SM) – 80% fine sand, sub-rounded, micaceous, 15 to 20% silty fines with low plasticity; firm; wet; some organic debris; petroleum-like odor; (FILL).

3.2 Laboratory Analyses

All DU and depth-discrete soil samples will be analyzed according to the Analysis Plan shown in Table 3-1, below. The laboratory will be requested to provide all gas chromatograms as part of the laboratory report and to archive all samples for up to one year. Sample containers, preservatives, and holding times for each analytical method are provided on Table 3-2.

Table 3-1. Proposed Analysis Plan

Analytical Method	Constituents	Soil
EPA 8082-SIM	Polychlorinated biphenyls (PCBs) (as Aroclors) • Aroclor 1221 • Aroclor 1232 • Aroclor 1016 • Aroclor 1242 • Aroclor 1248 • Aroclor 1254 • Aroclor 1260 • Aroclor 1262 • Aroclor 1268	All
EPA 1668	PCB Congeners	A total of 6 samples: • two samples at the high range of detected total PCBs • two samples at the medium range of detected total PCBs • two samples at the low range of detected total PCBs

EPA = U.S. Environmental Protection Agency

Table 3-2. Analytical Protocol

Analyte(s)	Analytical Method	Container and preservative	Holding time	Preservation
Soil:				
PCBs	EPA 8082 EPA 1668	2.5-oz (discrete) or 1-gallon (ISM) clear wide mouth glass	14-days	Ice

3.3 Decontamination Procedures

Before collecting any sample, collection tools will be decontaminated by using a sequential wash of Alconox® solution, rinsed in tap water from a known source (e.g., municipal water), and subjected to a final rinse with distilled water. Wash and rinse liquids will be changed frequently during sampling activities, as appropriate. Wash and rinsate fluids will be collected, if possible, and appropriately disposed. Fresh nitrile gloves will be worn during any sample collection and when handling tools which are to be inserted into sampling areas. Solid waste generated during sampling activities (gloves, paper towels, etc.) will be appropriately disposed.

3.4 Equipment Calibration

Monitoring equipment used during sampling (e.g., photoionization detector [PID]) will be calibrated according to manufacturer's specifications at the beginning of each sample day. Meter calibration will be checked at least twice during a sample day (middle and end of day) or when meter drift is suspected. The meters will be calibrated with gases or buffered solutions closest to known field parameters (VOC concentration = 100 µg/m³ methane or heptane for PID calibration).

3.5 Investigation-Derived Waste Storage and Disposal

Potentially impacted investigation-derived waste (IDW) may be generated during this investigation. It is assumed that this waste may be impacted with PCBs; however, characterization of all waste will be necessary to properly treat or dispose of generated waste.

3.5.1 Soil Cuttings, and Cores

Soil cuttings (if any) derived from sample collection will be placed in drums, sealed, and labeled as to the a) nature of the contents, b) date contents sealed, and c) responsible party. A composite soil sample will be collected from each soil cuttings drum to determine proper method of disposition.

3.5.2 Decontamination Water

Water associated with decontamination of sampling equipment will be drummed, sealed, and labeled.

Upon receipt of analytical data, the disposal requirements of the drummed fluid investigation-derived waste will be evaluated. It is anticipated that all waste generated will be handled as a hazardous material and will not be characteristic of hazardous waste. However, water waste determined to be

impacted with contaminants at levels regulated under RCRA⁶ rules as characteristic (hazardous waste) must be disposed or treated in a manner consistent with RCRA regulation.

3.6 FIELD DOCUMENTATION

Comprehensive field documentation will be made to aid in the interpretation of analytical results. For soil sampling, field documentation, at a minimum, will include the date, time, location, and a description of the weather. Sample collection information, such as how the sample was collected and any problems that occurred during collection, visual sample observations, and any other unusual circumstances that may affect the analytical results will be noted. All field measurements, including color, odor, texture, etc., will also be recorded. All field work will be photographically documented in a photographic log.

3.7 Sample Transport and COC Procedures

After surface soil samples have been collected, they will be placed in a cooler with chilling material (ice or equivalent) and transported to the analytical laboratory. Chain-of-custody (COC) procedures will begin in the field and will track delivery of the samples to the laboratory. Specific procedures are as follows:

- Individual sample containers will be packed to prevent breakage and leakage.
- COC forms will be placed in a sealed plastic bag and inside the cooler
- Signed and dated COC seals will be used to secure all coolers before shipping.

Upon transfer of samples to the laboratory, the COC form will be signed by the persons transferring custody of the coolers. Upon receipt of samples by the laboratory, the shipping-container seal will be broken, and the condition of the samples will be recorded by the receiver.

3.8 Quality Assurance Project Plan

This Quality Assurance Project Plan (QAPP) presents the quality assurance and quality control (QA/QC) program to be conducted as part of this investigation. The purpose of this QAPP is to describe the field and laboratory procedures that will be undertaken during this investigation of magnitude and extent to assure that data collected are suitable for their intended purposes. This QAPP has been developed in general accordance with the EPA Quality Assurance Guidance for Conducting Brownfields Site Assessments. The subject investigation will utilize the procedures included in the QAPP for the following elements:

- Project Management – Quality objectives and criteria for measurement data and documentation, and records.

⁶ Resource Conservation and Recovery Act.

- Data Generation and Acquisition – Sample process design; sampling methods; analytical methods; quality control; instrument/equipment testing, inspection, and maintenance; inspection/acceptance of supplies and consumables; non-direct measurements; and data management.
- Assessment and Oversight – Assessment and response actions, and routine reporting.
- Data Validation and Usability – Procedures and methods for data quality review, verification, validation, and reconciliation.

Field QA/QC samples will be used to assess data quality in terms of precision and accuracy and monitor whether sampling procedures, equipment cleaning, packaging, and shipping are compromising sample integrity or validity of sample data. Such QA/QC samples are prepared in the field to monitor the various phases of the sampling process.

- **Field Duplicates:** The field QA/QC activities will include collection of field duplicated soil samples. One field duplicate for soil will be collected for every 20 discrete soil samples collected. Field duplicates will be blind duplicates, meaning the identity of the samples will be unknown to the analyzing laboratory. Each field duplicate sample will be collected, handled, and analyzed in the same manner as its paired primary field sample.

Results from field duplicates are useful in determining potential sampling variability. Greater than expected differences between duplicates may occur due to variability within the sample matrix. Field duplicates shall be used as a quality control measure to monitor precision of sample collection methods.

Precision is independent of the error (accuracy) of the analyses and reflects only the degree to which the measurements agree with one another, not the degree to which they agree with the “true” value for the parameter measured. Precision is calculated in terms of Relative Percent Difference (RPD), which is expressed as:

$$RPD = \frac{|X_1 - X_2|}{(X_1 + X_2) / 2} \times 100$$

Where X1 and X2 represent the individual values found for the target analytes in the duplicate analyses. RPDs for field duplicate samples include the additional variability of field sampling methods and sample homogeneity. Therefore, RPDs for field duplicate samples will be evaluated against an acceptance criterion of 50 percent for quantitative data.

- **Rinsate Samples:** Rinsate samples will be used to evaluate the effectiveness of decontamination procedures to ensure samples have not been cross-contaminated by carryover from sampling equipment. One rinsate sample will be collected for every 20 field samples and analyzed for total PCBs by the laboratory.

Analytical QA/QC will be monitored through laboratory quality control checks. Laboratory data, including analytical results for laboratory control samples (LCSs), LCS duplicate samples, and matrix spike (MS), MS duplicate, and method blank samples, will undergo verification and validation.

Data quality objectives will be developed to ensure the collection of useful data for the risk screening. The data quality objectives for the project include the utilization of laboratory method reporting limits that are sufficiently low to allow for evaluation of results against generic human health risk-based screening levels. In general, the laboratory will be requested to ensure laboratory method reporting limits for total PCBs are lower than their respective risk-based screening level, based on current EPA laboratory methodologies.

4.0 Risk-Based Assessment

The investigation will be developed based on ODEQ's Risk-Based Decision Making (RBDM) cleanup guidance, which provides RBCs that are protective of human health under a number of exposure conditions. Data collected during this investigation will be used to develop a conceptual site exposure model.

The equations and exposure factors used in the RBDM document are generally consistent with those discussed in "Human Health Risk Assessment Guidance". The equations included in the RBDM guidance document are rearranged to calculate RBCs that are protective of human health. RBCs will be those developed in 2018 for media and constituents.

The evaluation of risk will be composed of four distinct elements:

- Data evaluation and identification of constituents of potential concern (COPCs; if any)
- Exposure assessment (if necessary)
- Toxicity assessment (if necessary)
- Risk characterization (if necessary)

4.1 Data Evaluation and Identification of COPCs

A risk-based screening procedure will be conducted to identify COPCs for the site. Maximum concentrations of constituents detected in each medium will be compared to screening RBCs.

Screening criteria are loosely based on Oregon Administrative Rule (OAR) 340-122-080(5), which allows for pre-baseline screening of contaminants. In this screening, contaminants detected at the site that have not been screened should be designated as "constituents of interest" (COIs), while those that have been included after screening should be designated as COPCs. Following a baseline risk evaluation using RBDM RBCs, contaminants that did not meet acceptable risk levels should be designated as "constituents of concern." At this time, PCBs are considered the COI and the data generated during this investigation will be screening to determine if PCBs are COPCs.

COIs will be screened against conservative (lowest) RBCs for PCBs in soil to determine whether they qualify as COPCs that should be carried forward in a risk assessment.

Constituents with maximum detected concentrations below screening-level RBCs will be eliminated from further consideration. Identified COPCs, if any, will be further evaluated for potential risk.

4.2 Toxicity and Exposure Assessment

In the event that COPCs exceed the lowest RBCs, exposure pathways applicable to the site will be selected based on potential receptors identified both onsite and offsite. Existing and potential reasonable future land use, beneficial water use, and the physical setting of the site, including climate, soil characteristics, hydrogeology, and general ground water quality (e.g., brackish) will be considered in developing the conceptual site exposure model. Future land-use plans, and zoning constraints of the site and surrounding area will be reviewed to identify reasonably likely future uses. Wells on file with the Oregon Water Resources Department and local water supplies will be used to evaluate the ground-water use in the area. Fate and transport of site-related chemicals also will be considered in the evaluation of potential exposure pathways.

Exposure parameters used in the RBDM equations will be evaluated for applicability at the site. Proposed changes will be reviewed with ODEQ, if applicable.

4.3 Risk Characterization

The analytical results from the investigations will be compared to risk-based concentrations for site-specific pathways. The results of the analysis will be used to provide recommendations on closure, additional investigation, or limited remediation, as applicable.

5.0 Report Preparation

A report will be prepared documenting the work conducted as described in Section 4.7. During the course of this investigation, should results indicate a need for additional work, ODEQ will be consulted regarding proposed actions.

6.0 Proposed Schedule

Surface soil sampling will be conducted as soon as practical following ODEQ approval of this Work Plan, and subsequent approval of an access agreement for ROW work with the City.

7.0 Certification

This Work Plan has been prepared under the supervision of the following Oregon-registered Certified Engineering Geologist and Geologist.

EVREN Northwest, Inc.

Lynn D. Green, C.E.G.
Principal Engineering Geologist



EXP. 2/1/2023

Evan Bruggeman, R.G.
Principal Field Geologist



TABLE

Table 1 - Summary of Analytical Data, Soil (2011 and 2012)

Location ID	52_15	52_16	52_17	52_18	52_19	52_20	52_21	52_22	52_23	NBRAD1	NBRAD2	NBRAD3	NBRAD4	NBRAD5	NBRAD6	NBRAD7	NBRAD8	B1	
Date Sampled	1/6/2011	1/6/2011	1/6/2011	1/6/2011	1/6/2011	1/6/2011	1/6/2011	1/6/2011	1/6/2011	9/20/2011	9/20/2011	9/20/2011	9/20/2011	9/20/2011	9/20/2011	9/20/2011	9/20/2011	9/20/2011	9/20/2011
Depth Sampled (feet)	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	0.5-1	1-5
Sample By	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland
Location	Five-point composite between RR track and cathedral park parking lot	Five-point composite between RR track and PIW	Five-point composite between RR track and PIW	Five-point composite between RR track and 6600 N Baltimore Ave	Five-point composite between RR track and 6600 N Baltimore Ave	Five-point composite between RR track and N Alta Ave	Two-point composite from potholes Northeast of CB ANE911	Discrete sample from pothole north-northwest of CB ANE911	Five-point composite between RR track and Cathedral Park	West of railroad tracks in N. Bradford ROW and City parking lot, north of NBRAD2	West of railroad tracks in N. Bradford ROW and City parking lot, south of NBRAD1	East of railroad tracks in N. Bradford ROW and west of City parking lot and NBRAD1	East of railroad tracks in N. Bradford ROW and west of City parking lot and NBRAD2	West end of landscape strip boring southern margin of City parking lot, east of NBRAD4	Landscape strip boring west margin of City parking lot, north of NBRAD5	West end of landscape strip boring southern margin of City parking lot, east of NBRAD5	West end of landscape strip boring southern margin of City parking lot, east of NBRAD6	In northeast corner of City parking lot	
Constituent of Interest	Note	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)
Semi-Volatile Organic Constituents (SVOCs)																			
Polychlorinated Biphenyls (PCBs)																			
Total PCBs (total as Aroclors)	c, nv	21.7	11.9	10.7	0.606	1.17	0.846	1.94	1.24	7.12	1.22	0.147	2.5	0.504	0.265	1.08	0.476	0.423	1.05

Notes:

ND = not detected at or above laboratory method reporting limits

— = not analyzed or not applicable.

NE = not established.

mk/Kg = milligrams per kilogram

Bolded/Shaded concentrations exceed ODEQ RBCs (based on recreational, occupational, construction and/or excavation worker potential exposure and soil ingestion, dermal contact and inhalation pathway)

Table 1 - Summary of Analytical Data, Soil (2011 and 2012)

Location ID	B2			B3		B4		B5		GS03	Maximum Detected Soil Concentration	ODEQ Risk- Based Concentration (Soil, Occupational Dermal Contact)	ODEQ Risk- Based Concentration (Soil, Construction Worker Dermal Contact)	ODEQ Risk- Based Concentration (soil, Excavation Worker Dermal Contact)	ODEQ Risk- Based Concentration (soil,Recreational User, Dermal Contact, as calculated by ODEQ)
Date Sampled	9/20/2011	9/20/2011	9/20/2011	9/20/2011	9/20/2011	9/20/2011	9/20/2011	9/20/2011	9/20/2011	9/12/2012					
Depth Sampled (feet)	0.5-1	1-3	3-5	0.5-1	1-5	0.5-1	1-4	0.5-1	1-5	5.5					
Sample By	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	City of Portland	ENW					
Location	In northeast corner of City parking lot, west of boring B1			In northeast corner of City parking lot, west of boring B2		In central portion of City parking lot		In central portion of City parking lot, west of boring B4		Assessment sample, north end of tank					
Constituent of Interest	Note	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)	mg/Kg (ppm)				
Semi-Volatile Organic Constituents (SVOCs)															
Polychlorinated Biphenyls (PCBs)															
Total PCBs (total as Aroclors)	c, nv	0.465	0.699	<0.010 (ND)	0.286	0.704	<0.010 (ND)	<0.010 (ND)	<0.010 (ND)	<0.010 (ND)	21.7	0.59	4.9	140	0.52

Notes:

ND = not detected at or above laboratory method reporting limits

— = not analyzed or not applicable.

NE = not established.

mk/Kg = milligrams per kilogram

Bolded/Shaded concentrations exceed ODEQ RBCs (based on recreational, occupational, construction and/or excavation worker potential exposure and soil ingestion, dermal contact and inhalation pathway)

FIGURES



Peninsula Iron Works – Building 2
6618 N Alta Avenue
Portland, Oregon

Project No.
351-12023

Figure No.
1



LEGEND:

SUBJECT PROPERTY BOUNDARY

SUBJECT BUILDING

SC

SHIPPING CONTAINER USED FOR STORAGE OF STEEL PARTS

CS

COVERED STORAGE AREA FOR MACHINING FIXTURES, RAW STEEL, AND TRASH BINS

- NOTES:
1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2018 AND ENW FIELD NOTES.

2. ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.

3. SYMBOLS REPRESENT LOCATION AND DO NOT ALWAYS REPRESENT EXACT SHAPE, SIZE, OR ORIENTATION.

APPROXIMATE SCALE

0

40

80 FEET

environmental natural resource consultants

PO BOX 14488, PORTLAND, OREGON 97293
P: (503)452-5561, E: ENW@EVREN-NW.COM

FIGURE 2

SITE PLAN

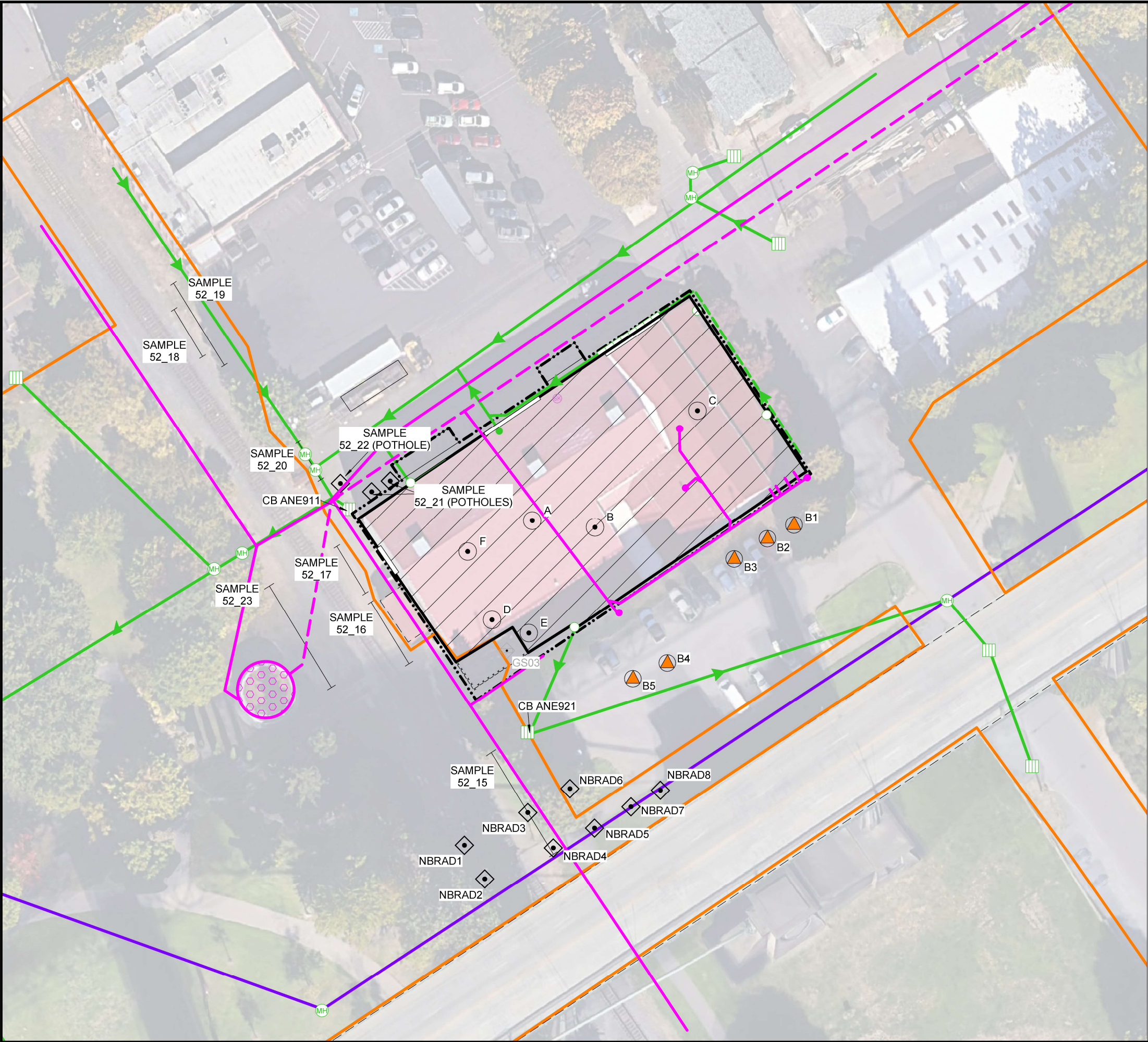
INDUSTRIAL PROPERTY
6618 N ALTA AVENUE
PORTLAND, OREGON

DRAWN BY
C. ROSEBROOK 03/25/2020

CHECKED BY
E. BRUGGEMAN 04/18/2022

APPROVED BY
L. GREEN 05/10/2022

DRAWING NUMBER
1355--21001(v01)



- LEGEND:
- SUBJECT PROPERTY BOUNDARY
 - SUBJECT BUILDING
 - DRAINAGE BASIN FOR CITY OUTFALL 52
 - STORM SEWER
 - STORM SEWER (PERFORATED)
 - ROOF DOWNSPOUT
 - TRENCH DRAIN
 - SANITARY SEWER
 - PRESSURIZED SANITARY SEWER
 - CITY COMBINED STORM/SANITARY SYSTEM
 - STORM SYSTEM FLOW DIRECTION
 - SANITARY SEWER CLEANOUT/FLOOR DRAIN
 - STORM SEWER PLUG (PER CITY OF PORTLAND PERMITS)
 - CATCH BASIN
 - PUMP STATION
 - 2010 CITY OF PORTLAND SEDIMENT SAMPLES (FROM CATCH BASINS ANE911 AND ANE921)
 - 2011 CITY OF PORTLAND GRAB SAMPLE LOCATION
 - 2011 CITY OF PORTLAND TEMPORARY SOIL BORING LOCATION
 - 2011 CITY OF PORTLAND SURFACE SOIL COMPOSITE AREA
 - 2012 PIW FLOOR WIPE SAMPLE LOCATION
 - 2012 ENW SOIL GRAB SAMPLE LOCATION

- NOTES:
1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2018 AND ENW FIELD NOTES.
 2. ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.
 3. SYMBOLS REPRESENT LOCATION AND DO NOT ALWAYS REPRESENT EXACT SHAPE, SIZE, OR ORIENTATION.

APPROXIMATE SCALE

0 50 100 FEET

PO BOX 14488, PORTLAND, OREGON 97293
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FIGURE 3
HISTORICAL SAMPLE LOCATION DIAGRAM
PENINSULA IRON WORKS - BUILDING 2
6618 N ALTA AVENUE
PORTLAND, OREGON

DRAWN BY C. ROSEBROOK 03/25/2020
CHECKED BY E. BRUGGEMAN 04/18/2022
APPROVED BY L. GREEN 08/04/2022
DRAWING NUMBER 1355--21001(v01)



- LEGEND:
- SUBJECT PROPERTY BOUNDARY
 - SUBJECT BUILDING
 - DRAINAGE BASIN FOR CITY OUTFALL 52
 - STORM SEWER
 - STORM SEWER (PERFORATED)
 - ROOF DOWNSPOUT
 - TRENCH DRAIN
 - CITY COMBINED STORM/SANITARY SYSTEM
 - STORM SYSTEM FLOW DIRECTION
 - SANITARY SEWER CLEANOUT/FLOOR DRAIN
 - STORM SEWER PLUG (PER CITY OF PORTLAN PERMITS)
 - CATCH BASIN
 - 2022 ENW SHALLOW SOIL BORING LOCATION
 - 2022 ENW DECISION UNIT FOR SHALLOW SOIL INCREMENTAL SAMPLING
 - SOIL INCREMENT SAMPLE LOCATION

- NOTES:
1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2018 AND ENW FIELD NOTES.
 2. ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.
 3. SYMBOLS REPRESENT LOCATION AND DO NOT ALWAYS REPRESENT EXACT SHAPE, SIZE, OR ORIENTATION.

APPROXIMATE SCALE

0 30 60 FEET

PO BOX 14488, PORTLAND, OREGON 97293
P: (503)452-5561, E: ENW@EVREN-NW.COM

FIGURE 4
PROPOSED SAMPLE LOCATION DIAGRAM
PENISULA IRON WORKS - BUILDING 2
6618 N ALTA AVENUE
PORTLAND, OREGON

ATTACHMENT

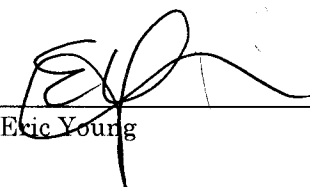
Sample Drying and Sieve Preparation for Multi Increment Soil Sampling

Friedman & Bruya, Inc. Standard Operating Procedure

Revision Number 2
September 25, 2019

Approved by

Extraction Manager:


Eric Young

Quality Assurance Manager:


Arina Podzonova

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Document Control Number: 2

1.0 SCOPE, APPLICATION, AND SUMMARY

- 1.1 This Standard Operating Procedure (SOP) is used by Friedman and Bruya, Inc. (F&BI) to prepare soil and solid samples that require sieve and/or drying prior to extraction and analysis, including sub samples collected for soil multi increment sampling.
- 1.2 Deviation from the procedures outlined in this SOP may sometimes be needed, due to specific project requirements, or due to laboratory circumstances. Deviations are documented using the extraction worksheet, analysis logs, and/or other documents such as the non-conformance report form.

2.0 METHOD BASIS

The following regulatory method serves as the basis for this standard operating procedure. Adherence to the minimum criteria set forth in this method is a general data quality objective of this SOP.

- 2.1 State of Alaska Department of Environmental Conservation, "Draft Guidance on Multi Increment Soil Sampling", March 2009.

3.0 DEFINITIONS

- 3.1 A list of definitions for terms used in this SOP may be found in the F&BI Quality Assurance Manual, appendix F.

4.0 SAFETY

- 4.1 The most important safety measure is to handle all samples and equipment in an appropriate manner to ensure a minimum of personal danger and exposure to potentially hazardous chemicals.
- 4.2 When samples are handled, appropriate personal protection equipment (PPE) should be used. Gloves, lab coat, and goggles are all available for use.
- 4.3 Glassware can break at any time, so caution needs to be used at all times when handling it. Cut resistant gloves are available for use.
- 4.4 MSDSs for all chemicals in the lab are available to all employees. They are located in the GC room, and all employees are strongly encouraged to read them.
- 4.5 Analysts are required to complete general safety training prior to performing any analysis. Details of initial and on-going safety training are provided in the F&BI Quality Assurance Manual and "Training" SOP.
- 4.6 If uncertain about the safety of a material or procedure or in the event that a spill or other potentially hazardous situation arises, notify your supervisor or any chemist immediately.

5.0 INTERFERENCES

- 5.1 Certain sample matrices may not be amenable to sieving, such as peat or tundra. Alternate sample processing measures would be required for those media.

6.0 APPARATUS AND EQUIPMENT

- 6.1 #10 Sieve – particle size <2mm
- 6.2 Drying Pans (Aluminum or Pyrex)
- 6.3 Stainless Steel Scoopula
- 6.4 Analytical Balance
- 6.5 4 oz. or 8 oz. Glass Jars with Lid
- 6.6 Steel Baking Sheet or Other Tray
- 6.7 Stainless Steel Bowl

7.0 REAGENTS AND CHEMICALS

- 7.1 Methylene Chloride, pesticide grade or better
- 7.2 Alconox

8.0 SAMPLE HANDLING, PRESERVATION, AND PREPARATION

- 8.1 Before preparing the samples, double check the sample identification on the container to that listed on the Chain of Custody. Document that the sample ID has been checked by initialing the extraction worksheet.
 - 8.1.1 If more than one container exists for the sample, write the corresponding letter of the container used in the extraction on the extraction paperwork.
- 8.2 Note any unexpected sample characteristics on the extraction worksheet under “Observations” heading.
- 8.3 Sample Moisture Determination Procedure
 - 8.3.1 The analyst will perform the following to determine if the sample will require a drying procedure. Drying should only be performed if necessary.
 - 8.3.2 Visually inspect the sample to determine if free liquid is present. Samples containing a visible liquid layer will require drying prior to sieve

preparation.

- 8.3.3 For samples that do not contain free liquid but appear moist, a small amount of sample (~10.0 grams) will be tested in the sieve. The sample will require the drying procedure if sample fines do not pass through the sieve screen.

8.4 Sample Drying Procedure

- 8.4.1 Assign F&B sample ID to a drying pan.
- 8.4.2 Empty the entire contents of the sample container into the drying pan to a depth of ½ to 1 inch in thickness.
- 8.4.3 Place drying pan in fume hood at ambient temperature until processing.
- 8.4.4 Drying at elevated temperatures, i.e. “baking” is not allowed. Turning the soil can be used to facilitate the drying process.
- 8.4.5 Drying is acceptable for less temperature sensitive contaminants such as metals, PCBs, DRO, RRO, etc. Drying may not be appropriate for some contaminants, including volatile constituents or PAHs. If samples are processed for non-appropriate testing, the data will be estimated and qualified appropriately.

8.5 Sieve Procedure

- 8.5.1 Wash sieve with warm water and Alconox and allow to dry.
- 8.5.2 For samples requiring organic analysis, triple rinse sieve screen with methylene chloride and allow to dry.
- 8.5.3 Place entire contents of sampling container or drying pan into the sieve. The minimum amount of sample required for sieve preparation is 30 g.
- 8.5.4 Shake sieve for 2 minutes.
- 8.5.5 Remove sample collection tray from sieve and collect the entire contents into a labeled 4 oz. or 8 oz. glass jar.
- 8.5.6 When multiple sub samples are sieved, the entire contents of each sieved sub sample will be poured into a stainless steel bowl, stirred for a minimum of 30 seconds and collected for sample analysis.

9.0 **SAMPLE ANALYSIS**

- 9.1 Wash a steel baking sheet or other tray with warm water and Alconox and allow to dry.

- 9.2 For samples requiring organic analysis, triple rinse the tray with methylene chloride and allow to dry.
- 9.3 Pour the entire contents of the sample into the tray to a depth of no more than ½ inch.
- 9.4 Individual aliquots of sample will be randomly scooped from a minimum of 20 distinctly different areas of the tray and added to the extraction vessel until the required sample amount is reached.

10.0 QUALITY CONTROL AND CORRECTIVE ACTIONS

General quality control procedures are outlined in the corresponding F&B analytical method SOPs. F&BI QC procedures are described in sections 12 and 13 of the QA Manual. If, following corrective actions, quality control results still fail, or if corrective actions are not possible, then affected results are reported with appropriate qualifying flags.

The minimum requirements for QC samples analyzed with each preparation batch (within 24 hours) of up to 20 samples are:

1 sample duplicate

11.0 DATA ARCHIVAL

- 11.1 The hardcopy of the QA paperwork is filed in the extraction room on the paperwork desk.
- 11.2 The extraction paperwork for each project is filed in the downstairs filing cabinets with the hardcopies of the final reports.

12.0 HAZARDOUS WASTE MANAGEMENT AND POLLUTION PREVENTION

- 12.1 Hazardous waste managements procedures are found in the F&BI QA Manual section 10, and the "Disposal" SOP.
- 12.2 Actions that can result in the reduction or elimination of chemical wastes and chemical pollutants associated with this SOP are strongly encouraged. Such actions should be discussed with the Executive Committee for approval prior to implementation.

END OF DOCUMENT