APPENDIX A

DECISION MEMORANDUM FOR IVBA SAMPLES

McCaig Kris SPOK

From: Buelow, Laura <Buelow.Laura@epa.gov>
Sent: Wednesday, December 14, 2016 2:12 PM
To: McCaig Kris SPOK
Cc: Dina Johnson (DLJohnson@ramboll.com); Kessel Cristy SPOK; Enos Dave SPOK; John Toll; Stifelman, Marc; thayer@srcinc.com; Marilyn Gauthier (Marilyn.Gauthier@ch2m.com); Cerise, Kathryn
Subject: RE: Res Soil Study - IVBA Sample Selection Memo

Kris,

EPA approves of the IVBA selection. Please proceed with the IVBA analysis on the samples from the memo.

Laura Buelow, Ph.D.
Project Manager
U.S. Environmental Protection Agency
Hanford Project Office
825 Jadwin Ave., Ste 210
Richland, WA 99352
Phone: 509 376-5466
Fax: 509 376-2396
E-mail: buelow.laura@epa.gov

From: McCaig Kris SPOK [mailto:Kris.McCaig@teck.com]
Sent: Sunday, December 04, 2016 9:12 PM
To: Buelow, Laura <Buelow.Laura@epa.gov>
Cc: Dina Johnson (DLJohnson@ramboll.com) <DLJohnson@ramboll.com>; Kessel Cristy SPOK <Cristy.Kessel@teck.com>; Enos Dave SPOK <Dave.Enos@teck.com>; John Toll <JohnT@windwardenv.com>
Subject: FW: Res Soil Study - IVBA Sample Selection Memo

Hi Laura,

Please the attached for your review and approval. Let us know if you have any questions.

Thanks,

Kris

Kris McCaig
Manager, Environment & Public Affairs
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From: Dina Johnson [mailto:DLJohnson@ramboll.com]
Sent: Friday, December 02, 2016 11:00 PM
To: McCaig Kris SPOK <Kris.McCaig@teck.com>
Cc: Kessel Cristy SPOK <Cristy.Kessel@teck.com>
Subject: Res Soil Study - IVBA Sample Selection Memo

Hi Kris,
Per your request, please find attached a memorandum summarizing the IVBA sample selection process. Also attached is the backup file that demonstrates the 4-step selection process.

Please let me know if you have any questions.

Thank you.
Dina

Dina L. Johnson

Senior Manager, Health Sciences

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RAMBOLL ENVIRON

ENVIRONMENT & HEALTH

MEMO

Job	**3023907E**
Client	**Teck American Incorporated**
Memo no.	**1**
Date	**December 2, 2016**
To	**Kris McCaig**
From	**Dina L. Johnson**
Copy to	**File**

1. Purpose and Background

The purpose of this memorandum is to summarize the list of soil samples collected during the 2016 Upper Columbia River (UCR) Residential Soil Study that will be submitted for in vitro bioaccessibility assay analysis (IVBA analysis; EPA Method 9200.2-81; USEPA 2012). As outlined in the Final Quality Assurance Project Plan (QAPP) Addendum for the 2016 UCR Residential Soil Study (Worksheet #14), at 20 percent of decision units (DUs) where non-dripline incremental composite (IC) samples have a lead or arsenic concentration greater than or equal to 100 or 20 mg/kg, respectively, these samples will be submitted for IVBA analysis. If a DU selected for IVBA analysis has one or more replicate IC soil samples with concentrations that are greater than or equal to 100 mg/kg lead or 20 mg/kg arsenic, one of the replicate IC soil samples will be randomly selected for testing. The QAPP Addendum specifies that soil cores (i.e., discrete soil samples) will not be submitted for IVBA analysis. The selection approach used to select samples for IVBA analysis is described below. Table 1 provides the list of selected samples resulting from this process.

2. Selection Approach

In accordance with the Final QAPP Addendum, on October 25, 2016, Teck American Incorporated (TAI) proposed a three step process to identify samples for IVBA analysis in an email to Laura Buelow, UCR Remedial Project Manager for the U.S. Environmental Protection Agency (EPA). In a reply email to Kris McCaig, TAI Project Coordinator, EPA requested a few modifications to the proposed approach, which TAI adopted in the approach summarized below. A copy of the above-referenced email correspondence is attached to this memorandum.

Date December 2, 2016

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Ref 2016 UCR Residential Soil Study – Selection of Incremental Composite Samples for In Vitro Bioaccessibility Assay Analysis

Step 1: Identify IVBA Eligible DUs

Preliminary (unvalidated) analytical laboratory data for lead and arsenic concentrations in IC soil samples were compiled by DU to identify which of the non-dripline DUs have a lead or arsenic soil concentration that is greater than or equal to 100 or 20 mg/kg, respectively. DUs with concentrations meeting these conditions (i.e., the "triggers") were considered eligible for further consideration in the IVBA analysis sample selection process. For this identification step, DUs with replicate IC samples were considered eligible if the maximum replicate lead or arsenic concentration (rounded) exceeded the respective triggers. The output of Step 1 was a list of 198 IVBA eligible DUs.

As noted in the attached, EPA requested that beach DUs be separated from non-beach DUs in subsequent steps of this approach. A summary of the 198 IVBA eligible non-beach and beach DUs is as follows:

- There were 192 IVBA eligible non-beach DUs.
  - Lead triggered inclusion of 190 of these DUs.
  - At 155 DUs, lead was the sole trigger for inclusion of the DU.
  - At 35 DUs, both lead and arsenic triggered inclusion of the DU.
  - At two DUs, arsenic was the sole trigger for inclusion of the DU.
- There were six IVBA eligible beach DUs.
  - Lead, but not arsenic triggered inclusion of these DUs.

Step 2: Divide Non-Beach DUs into Quarters based on Concentration

As noted in the attached, EPA requested that IVBA eligible non-beach DUs be divided into quarters based on concentration. Given that 99 percent of the IVBA eligible non-beach DUs were included based on the lead trigger, lead concentration was used to sort the 192 non-beach DUs from lowest to highest concentration. For DUs with replicates, the maximum lead concentration was used in the sort. The 192 sorted non-beach DUs were then divided into quartiles based on the maximum lead concentrations. Quartile 1 included DUs corresponding to the lowest 25 percent of lead results. Quartile 2 included DUs corresponding to the next 25 percent of lead results (i.e., the 25 to 50 percent quartile). Quartile 3 included DUs corresponding to the next 25 percent of lead results (i.e., the 50 to 75 percent quartile). Quartile 4 included DUs corresponding to the highest 25 percent of lead results (i.e., the 75 to 100 percent quartile). Each quartile included 48 DUs.

Step 3: Randomly select 20 percent of the IVBA eligible DUs resulting from Step 1.

The Final QAPP Addendum specifies that an IC sample from 20 percent of IVBA eligible non-dripline DUs will be randomly selected and submitted for IVBA analysis. Twenty percent of 198 IVBA eligible DUs identified in Step 1 equates to a total of 40 DUs (rounded up from 39.6). As noted in the attached, EPA requested a minimum of two beach DU samples be selected for IVBA analysis and that random selection of non-beach DUs be applied on a quartile basis (see Step 2 for description of quartiles).

In accordance with the Final QAPP Addendum and EPA's additional requests, the 40 DUs to be randomly selected were distributed as follows:

- 2 beach DUs;
- 9 non-beach DUs from Quartile 1;
- 10 non-beach DUs from Quartile 2;
- 9 non-beach DUs from Quartile 3; and
- 10 non-beach DUs from Quartile 4.

For each of the above groups (i.e., beach, Quartile 1, etc.), DUs were assigned a number using a random number generator function in Excel. The DUs were then sorted from lowest to highest using the assigned random numbers. Starting from the lowest number in each sort, consecutive DUs were selected to achieve the total number of DUs specified in the above distribution.

Step 4: Randomly Select an IVBA Eligible Replicate Sample from Selected DUs with more than one IVBA Eligible Replicates

If a DU randomly selected from Step 3 had only one IC sample that met the lead or arsenic triggers from Step 1, that sample was selected for IVBA analysis. If a randomly selected DU from Step 3 had more than one IC sample replicate that met the lead or arsenic triggers from Step 1, the sample selected for IVBA analysis from that DU was chosen randomly from all eligible IC sample replicates for that DU. Using a random number generator function in Excel, each eligible IC sample replicate for a given DU was assigned a random number. The IC replicate with the highest random number was selected.

3. Outcome of Selection Process

Table 1 summarizes the list of 40 samples that were randomly selected for IVBA analysis based on the process summarized above.

Table 1. List of Incremental Composite Soil Samples Randomly Selected for IVBA Analysis

Study ID	lab package	labsample	sample_no	Residence	DU Type & No	Depth (in)
Teck_2016_ResSoil	K1609028	K1609028-001	16R-075-H1-IC-01	075	H1	0 - 1
Teck_2016_ResSoil	K1609035	K1609035-006	16R-085-P1-IC-01	085	P1	0 - 1
Teck_2016_ResSoil	K1609037	K1609037-017	16R-094-P1-IC-01	094	P1	0 - 1
Teck_2016_ResSoil	K1609038	K1609038-008	16R-095-O1-IC-01	095	O1	0 - 1
Teck_2016_ResSoil	K1609028	K1609028-012	16R-096-O1-IC-03	096	O1	0 - 1
Teck_2016_ResSoil	K1609036	K1609036-005	16R-099-O1-IC-01	099	O1	0 - 1
Teck_2016_ResSoil	K1609036	K1609036-013	16R-101-O1-IC-01	101	O1	0 - 1
Teck_2016_ResSoil	K1609118	K1609118-014	16R-103-H1-IC-01	103	H1	0 - 1
Teck_2016_ResSoil	K1609828	K1609828-017	16R-112-O1-IC-03	112	O1	0 - 1
Teck_2016_ResSoil	K1610804	K1610804-004	16R-114-O1-IC-02	114	O1	0 - 1
Teck_2016_ResSoil	K1609038	K1609038-015	16R-122-P1-IC-01	122	P1	0 - 1
Teck_2016_ResSoil	K1609118	K1609118-003	16R-131-B1-IC-01	131	B1	0 - 5
Teck_2016_ResSoil	K1610805	K1610805-003	16R-135-G1-IC-01	135	G1	0 - 6
Teck_2016_ResSoil	K1610805	K1610805-013	16R-136-O1-IC-01	136	O1	0 - 1
Teck_2016_ResSoil	K1610809	K1610809-009	16R-146-H1-IC-03	146	H1	0 - 1
Teck_2016_ResSoil	K1610813	K1610813-017	16R-152-G1-IC-01	152	G1	0 - 4
Teck_2016_ResSoil	K1609031	K1609031-006	16R-153-O1-IC-03	153	O1	0 - 1
Teck_2016_ResSoil	K1609031	K1609031-007	16R-153-O2-IC-01	153	O2	0 - 1
Teck_2016_ResSoil	K1610809	K1610809-015	16R-157-B2-IC-01	157	B2	0 - 1
Teck_2016_ResSoil	K1610939	K1610939-016	16R-165-H1-IC-02	165	H1	0 - 1
Teck_2016_ResSoil	K1610939	K1610939-015	16R-165-O1-IC-01	165	O1	0 - 1
Teck_2016_ResSoil	K1609853	K1609853-016	16R-167-O4-IC-01	167	O4	0 - 1
Teck_2016_ResSoil	K1609853	K1609853-018	16R-167-O5-IC-01	167	O5	0 - 1
Teck_2016_ResSoil	K1609844	K1609844-015	16R-171-H1-IC-01	171	H1	0 - 1
Teck_2016_ResSoil	K1609831	K1609831-017	16R-180-O1-IC-02	180	O1	0 - 1
Teck_2016_ResSoil	K1610934	K1610934-017	16R-182-G2-IC-01	182	G2	0 - 3.5
Teck_2016_ResSoil	K1610939	K1610939-001	16R-182-H1-IC-01	182	H1	0 - 1
Teck_2016_ResSoil	K1610934	K1610934-019	16R-182-O2-IC-01	182	O2	0 - 1
Teck_2016_ResSoil	K1610934	K1610934-004	16R-187-H1-IC-02	187	H1	0 - 1
Teck_2016_ResSoil	K1610804	K1610804-017	16R-189-O1-IC-01	189	O1	0 - 1
Teck_2016_ResSoil	K1610934	K1610934-014	16R-197-H1-IC-03	197	H1	0 - 1
Teck_2016_ResSoil	K1610934	K1610934-007	16R-198-G1-IC-02	198	G1	0 - 4
Teck_2016_ResSoil	K1611487	K1611487-020	16R-202-O1-IC-01	202	O1	0 - 1
Teck_2016_ResSoil	K1610804	K1610804-010	16R-206-H2-IC-01	206	H2	0 - 1
Teck_2016_ResSoil	K1611487	K1611487-012	16R-207-O1-IC-02	207	O1	0 - 1
Teck_2016_ResSoil	K1611488	K1611488-009	16R-209-G1-IC-01	209	G1	0 - 1
Teck_2016_ResSoil	K1611486	K1611486-008	16R-210-H1-IC-01	210	H1	0 - 1
Teck_2016_ResSoil	K1611488	K1611488-002	16R-212-H1-IC-01	212	H1	0 - 1
Teck_2016_ResSoil	K1611488	K1611488-003	16R-212-H2-IC-01	212	H2	0 - 1
Teck_2016_ResSoil	K1610814	K1610814-007	16R-801-O2-IC-01	801	O2	0 - 1

Dina Johnson

From: Buelow, Laura <Buelow.Laura@epa.gov>
Sent: Friday, November 04, 2016 2:13 PM
To: McCaig Kris SPOK
Cc: Dina Johnson; Kessel Cristy SPOK; Enos Dave SPOK; Stifelman, Marc; thayer@srcinc.com; follansbee@srcinc.com; diamond@srcinc.com
Subject: RE: 2016 UCR Residential Soil Study – Proposed Process for Selection of Samples for Lead and Arsenic Bioaccessibility Testing

Kris,

EPA has a few modifications to the procedure:

Separate out beaches (there should be a minimum of 2 beaches sampled).

Step 1: Determine the non-dripline DUs that have a lead or arsenic soil concentration that is greater than or equal to 100 or 20 mg/kg, respectively.

Step 2: Divide the DUs into quarters based on concentrations (lowest 25% of results,25%-50%, 50%-75%, and 75%-100%).

Step 3: Randomly select 20 percent of the DUs from each quartile from Step 2.

Step 4:

a: If a DU resulting from Step 2 has only one IC sample that meets the lead or arsenic concentration criteria (see Step 1), that sample will be selected for IVBA analysis.

b: If a DU resulting from Step 2 has more than one IC sample that meets the lead or arsenic concentration criteria (see Step 1), one IC sample will be randomly selected for IVBA analysis from the eligible IC samples for that DU.

EPA requests to see the output of these steps and which DUs end up being selected before the final list is sent to ALS.

Let me know if you have any questions about our modifications.

Thanks,

Laura

From: McCaig Kris SPOK [mailto:Kris.McCaig@teck.com]
Sent: Tuesday, October 25, 2016 3:40 PM
To: Buelow, Laura <Buelow.Laura@epa.gov>
Cc: Dina Johnson (DLJohnson@ramboll.com) <DLJohnson@ramboll.com>; Kessel Cristy SPOK <Cristy.Kessel@teck.com>; Enos Dave SPOK <Dave.Enos@teck.com>
Subject: 2016 UCR Residential Soil Study – Proposed Process for Selection of Samples for Lead and Arsenic Bioaccessibility Testing

Hi Laura,

As outlined in the Final QAPP Addendum for the 2016 UCR Residential Soil Study (Worksheet #14), at 20 percent of decision units (DUs) where non-dripline incremental composite (IC) samples have a lead or arsenic concentration greater than or equal to 100 or 20 mg/kg, respectively, these samples will be submitted for in vitro bioaccessibility assay analysis

(IVBA analysis; EPA Method 9200.2-81; USEPA 2012). If a DU selected for IVBA analysis has one or more replicate IC soil samples with concentrations that are greater than or equal to 100 mg/kg lead or 20 mg/kg arsenic, one of the replicate IC soil samples will be randomly selected for testing. Soil cores (i.e., discrete soil samples) will not be submitted for IVBA analysis.

Proposed below is a three step process to identify samples for IVBA analysis in accordance with the QAPP Addendum:

Step 1: Determine the non-dripline DUs that have a lead or arsenic soil concentration that is greater than or equal to 100 or 20 mg/kg, respectively.

Step 2: Randomly select 20 percent of the DUs resulting from Step 1.

Step 3:

a: If a DU resulting from Step 2 has only one IC sample that meets the lead or arsenic concentration criteria (see Step 1), that sample will be selected for IVBA analysis.

b: If a DU resulting from Step 2 has more than one IC sample that meets the lead or arsenic concentration criteria (see Step 1), one IC sample will be randomly selected for IVBA analysis from the eligible IC samples for that DU.

Please let us know if you have any questions, as we would like to resolve them and make sure we are prepared to perform the process as soon as all preliminary results are in so we can keep things moving.

Thanks,

Kris

Kris McCaig
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APPENDIX B

FIELD SAMPLING REPORT

FINAL

UCR 2016 Residential Soils Study Field Sampling Report

Northport, Washington

Prepared for:

Teck American Incorporated

P.O. Box 3087
Spokane, WA 99220-3087

Prepared by

Tetra Tech

3380 Americana Terrace
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Boise, Idaho 83706
(208) 389-1030

January 20, 2017

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ACRONYMS AND ABBREVIATIONS

Bgs	Below Ground Surface
CCT	Colville Confederated Tribes
CNI	Columbia Navigation, Inc.
COC	Chain Of Custody
DQO	Data Quality Objectives
DU	Decision Unit
Ecology	Washington Department Of Ecology
EPA	U.S. Environmental Protection Agency
FRP	Field Reconnaissance Plan
FSP	Field Sampling Plan
HASP	Health And Safety Plan
IC	Incremental Composite
ITRC	Interstate Technology And Regulatory Council
LSI	Land Services, Inc.
MIST	Multi-Incremental Sampling Tool
PPE	Personal Protective Equipment
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance And Quality Control
RI/FS	Remedial Investigation And Feasibility Study
SHSP	General Site Health and Safety Plan
SOP	Standard Operating Procedure
TAI	Teck American Incorporated
UCR	Upper Columbia River

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1.0 INTRODUCTION

This field sampling report summarizes field activities conducted by Tetra Tech between August 1 and September 26, 2016 in support of a residential soil study of the Upper Columbia River (UCR) Site (hereafter the Site[1]). Field activities were conducted in accordance with the *Final Field Reconnaissance Plan, Upper Columbia River Site, Residential Soil Study, April 2016* (Final FRP; Ramboll Environ 2016a) and the *Final 2016 Residential Soil Study Quality Assurance Project Plan, Addendum No. 1 to the 2014 Residential Soil Study Quality Assurance Project Plan* (SRC Inc. 2014)*, July 2016* (Final QAPP Addendum; Ramboll Environ 2016b). The residential soil study was conducted as part of the remedial investigation and feasibility study (RI/FS) for the Site on behalf of Teck American Incorporated (TAI). The objective of the residential soil study is to collect data to support refinement of exposure estimates for residents in the 2016 UCR Residential Soil Study Area (**Figure 1**) to support the human health risk assessment.

1.1 Background

The residential soil study discussed in this report expands upon a 2014 residential soil study conducted by the U.S. Environmental Protection Agency (EPA). In 2014, EPA sampled 74 residential properties within a portion of the current study area along the Columbia River valley between Northport, WA and the US-Canada border. As part of the 2016 study, Tetra Tech, on behalf of TAI, sampled an additional 144 residential properties within the expanded study area (**Figure 1**) including properties within the area addressed by EPA in 2014. The objectives of the 2014 and 2016 residential soil studies are the same. The 2016 study design, methods, and analyses were developed for consistency with EPA's 2014 residential soil study as detailed in the EPA-approved Final FRP and Final QAPP Addendum (Ramboll Environ 2016a,b).

1.2 Study Area Description

The 2016 residential soil sampling study area extends from the US-Canada border to approximately the intersection of Williams Lake Road and Highway 25 on the east side of the river. **Figure 1** identifies the 2016 residential soil study area boundary.

1.3 Field Reconnaissance and Field Sampling Overview

The 2016 Residential Soil Study consists of two phases: the field reconnaissance phase, and the field sampling phase.

Field Reconnaissance Phase

The field reconnaissance phase was conducted in spring 2016 and consisted of visiting parcels where landowners agreed to participate in the study. The purpose of the field reconnaissance phase was to observe land use and parcel features and to interview the landowner or resident to determine the locations of decision units (DUs) at each residence for soil sampling. Findings from the site reconnaissance phase were incorporated in the Final QAPP Addendum. **Section 2** presents details and findings of the field reconnaissance phase.

Field Sampling Phase

The field sampling phase, outlined in the Final QAPP Addendum, was conducted in summer/fall 2016. Field activities specified in the Final QAPP Addendum described collecting incremental composite (IC) samples and discrete samples at 141 residences. In consultation with EPA, following finalization of the

[1] The Site, as defined in the June 2, 2006, Settlement Agreement (USEPA 2006b), is "the areal extent of hazardous substances contamination within the United States in or adjacent to the Upper Columbia River, including the Franklin D. Roosevelt Lake ("Lake Roosevelt"), from the border between the United States and Canada downstream to the Grand Coulee Dam, and all suitable areas in proximity to such contamination necessary for implementation of the response actions."

Final QAPP Addendum, six residences were added and three residences were eliminated bringing the total residences sampled to 144. **Section 3** presents the details of the field sampling program. **Figure 2** shows the locations of residential properties included in the study.

1.4 Health and Safety

In addition to the General Site Health and Safety Plan (SHSP) included as Attachment D3 of the Final QAPP Addendum, two site-specific health and safety plans (HASPs) were developed: one for the field reconnaissance phase and one for the field sampling phase. Both HASPs were prepared in accordance with the SHSP for the UCR project (QAPP Addendum, Attachment D3). The HASPs included sections on motor vehicle safety, accident prevention, first aid, outdoor heat exposure/weather related hazards, domestic animal and wildlife encounters, and employee training. The HASPs were subject to at least one level of Tetra Tech internal peer review for compliance with applicable State of Washington Administrative Code requirements (as partially described in 296-800 WAC) and United States Occupational Health & Safety Administration requirements (as partially described in 29 CFR 1910.120). Part of this peer-review included at least one person who is based in Washington and knowledgeable of Washington Department of Labor and Industries, Division of Occupational Safety and Health rules and regulations.

Health and Safety protocols, expectations, and an overview of the HASPs were provided to field and supervisor staff during the kickoff meetings for the field reconnaissance and the field sampling. **Appendix A** contains documentation of the daily tailgate health and safety meetings for both the field reconnaissance and field sampling phases.

1.5 Project Staffing

TAI's project management team consisted of a project manager, advisory and GIS staff. TAI also provided subcontracted cultural resource monitors and/or archaeologists during the field sampling phase. The Tetra Tech management team included a project manager, field supervisor, project liaison, GIS lead, and technical experts. To complement the management team, Tetra Tech identified three field team leads. These field team leads were present during the field reconnaissance phase and returned for the field sampling phase. For consistency and site familiarity, the field team leads were present at the same residences during field reconnaissance and sampling. During the field sampling phase, the field team leads were joined by three additional Tetra Tech staff per team. In addition, EPA and their subcontractors provided oversight during the field reconnaissance and field sampling. Colville Confederated Tribes (CCT) cultural resource monitors were also present during field sampling.

During the field sampling phase, a sample coordinator managed the temporary field office in Northport, Washington and was responsible for sample management, storage, and shipping as well as field supply management. Field data collected during both phases was managed and reviewed remotely by several Tetra Tech GIS and data management specialists.

The Tetra Tech team included two subcontractors: Land Services, Inc. (LSI) and Columbia Navigation, Inc. (CNI). LSI assisted Tetra Tech with landowner coordination and communication and provided three employees during the field reconnaissance phase and one employee during the field sampling phase. CNI, a local subcontractor, assisted with key logistics and provided sample courier service four times during the field sampling phase.

2.0 FIELD RECONNAISSANCE

2.1 Scope of Work

The field reconnaissance activities were completed in two separate mobilizations April 25 through May 4 and May 9 through May 19, 2016. The reconnaissance tasks consisted of the following:

- Planning
  - Conduct owner outreach and eligibility reviews
  - Review parcel information and communicate with owners or residents prior to site visit
- Field Reconnaissance
  - Reconnaissance team agency oversight
  - Interview owner or resident and conduct walk site
  - Document site use
  - Generate diagrams or sketches of parcel(s), site features, and establish use areas
  - Obtain GPS coordinates to delineate use area boundaries
  - Obtain digital photographs of each use area
- Sample Design
  - Data Compilation
  - Reporting

Details of specific tasks are provided below.

2.2 Planning: Property Eligibility and Outreach

Participation in the 2016 Residential Soil Study was voluntary. In advance of this study, TAI coordinated with EPA to develop a list of eligible parcels (hereafter, “properties”) within the study area and provided access agreements to owners of eligible properties and tribal allotments located within the study area requesting permission to conduct field reconnaissance and sampling activities. Based on the responses received, field reconnaissance to confirm resident usage was scheduled.

TAI received property owner responses for 260 individual properties, which included access approval to 137 properties and eight Tribal allotments reportedly containing or with planned residences. Property owners continued to return letters of consent during the field reconnaissance and field sampling phases bringing the total eligible property count evaluated to 273.

Property owners were contacted at least one week prior to the planned field reconnaissance event to schedule the site visit. The owners were asked a series of questions listed in Worksheet 1 (QAPP Addendum, FSP) to establish specific residential uses prior to the reconnaissance site walk. Owners were also asked to select a date for the reconnaissance team to visit the property and to participate in a site walk and on-site discussion.

Findings from the background review and pre-reconnaissance interviews were included as a part of the field folders used during the field reconnaissance.

2.3 Field Reconnaissance

2.3.1 Reconnaissance Teams and Agency Oversight

The 2016 field reconnaissance field staff were separated into three teams. Each team consisted of two Tetra Tech representatives responsible for conducting property owner interviews and field documentation. Technical oversight was provided by EPA or their designated subcontractor (CH2M Hill). Technical oversight personnel were present to observe all field tasks for each team and ensured

compliance with the project data quality objectives (DQO) and Final QAPP Addendum and to answer land owner questions regarding the project objectives, as needed. Occasional oversight from Washington Department of Ecology (Ecology) was also provided. Tetra Tech and technical oversight teams discussed their observations and identification of usage areas at each property. Because the field reconnaissance did not involve penetration or disturbance of the ground surface, the field teams were not accompanied by archaeological or cultural observers. The list of oversight and monitor personnel are identified in **Table 1**.

Table 1. Field Reconnaissance Technical Oversight Personnel

Observer	Organization
Laura Buelow	EPA
Marc Stifelman	EPA
Monica Tonel	EPA
Andrea LaTier	EPA
Dennis Faulk	EPA
Kay Morrison	EPA
Jeff Fowlow	EPA
John Roland	Ecology
Chuck Gruenenfelder	Ecology
Erika Bronson	Ecology
Marilyn Gauthier	CH2M HILL
Shannon Bartow	CH2M HILL

2.3.2 Owner Interview and Site Reconnaissance

The reconnaissance consisted of locating and visiting each property, interviewing the owner or resident, and then walking the property to assess key features (such as property size, land use types, play areas, gardens, etc.).

The reconnaissance team visited each property and when available, conducted an interview with the landowner. The interview process for each landowner was structured to include questions about property use, size, and household information. The interview was conducted and recorded by members of the Tetra Tech team; the landowner or resident responses to each question were recorded on the field data form.

2.3.3 Documenting Site Uses

Following the interview, the field team conducted the site walk of the property to determine the number and types of usage areas. The land use features considered during the interview and reconnaissance included:

- Current or planned residential structure areas, recreational vehicle pads, camping areas and livestock areas
- Gardens, lawns, manicured landscaping, or any similar modified landscape
- Child play areas, sandboxes, horseshoe pits, or other similar areas
- Features to be excluded from sampling to avoid potential influence of multiple metals sources on the soil chemistry of a usage area, such as:
    - Trash or fire wood burning areas; debris piles; equipment storage areas

  - Decking, fencing, and other treated wood features
  - Areas that appear to have been excavated or filled (for example, berms, ditches, borrow areas)
- Features to be excluded from sampling to avoid potential damage, such as:
  - Drive-way areas, septic tanks, outhouses, water wells (or other water sources)
  - Planned outdoor space, set aside for the display, cultivation, and enjoyment of plants and other forms of nature

2.3.4 Property Diagrams and Sketches

In conjunction with the interviews, photographs, GPS data collection, and site walk, the field team annotated key features and usage areas on the aerial photograph of the property and in the field notebook. The field teams included the following information to support the usage area selections:

- Illustrated and/or labelled property boundary, current or planned residence (house), detached buildings (if applicable, such as garage, shed, barn, etc.), driveways, parking areas, roads/intersections, and any other distinguishing site features or exclusion areas. The sketch/aerial also included the approximate dimensions of key features, including notes where the aerial photograph did not agree with observed conditions or structures noted during the site walk.
- Located and/or illustrated exclusion areas such as fire pits/burn areas, equipment and debris storage, water wells, utilities, septic systems, outhouses, decks, fences, and other surface/subsurface features as evidenced by using visual (non-invasive) methods.
- Identified the general boundaries of the usage areas based on visual examination of land use and interview responses. To the extent possible, the usage areas were constructed as polygons that best fit the land use area and considering any exclusion features.

Once the field team completed the site walk of the property, the property usage area sketches/aerials were reviewed with the property owner or resident, when available, to confirm and make corrections, as necessary, and to allow for EPA concurrence on the findings by signing the field sketches/aerials.

2.3.5 Property and Usage Area GPS Data

Usage area locations and area boundaries (including exclusion areas) were recorded using a Trimble GeoXH and field tablet. The trained GPS operator walked the entire boundary of the usage area collecting continuous latitude-longitude coordinates which were saved as decimal degrees in WGS 1984 datum. The corners of the usage areas were recorded in the field notebook, and the aerial maps for the property were annotated to show the representative position of the areas identified for potential soil sampling. The usage area GPS file was saved to the field tablet using the project labeling convention specified in the Final QAPP Addendum.

The GPS data was uploaded each day to the secure project server, where the data was cross checked to the aerial maps and uploaded to a web-based GeoManager site maintained by Tetra Tech.

2.3.6 Usage Area Digital Photographs

Representative geo-referenced digital photographs were collected for each usage area and associated features. The field tablet was used to capture these photographs which were saved as part of the GPS data files and identified using the labeling convention outlined in the Final QAPP Addendum.

At least one representative photograph was captured for each usage area to illustrate the primary land use and area condition and associated features. Locations and direction of the photographs were noted in the field notebooks and on the property aerial maps. Usage area identifiers were included on a whiteboard within the photographs to document the specific usage areas.

2.4 Study Design

This section describes the study design based on results of the field reconnaissance, data compilation, and review process, as well as the development of the final list of residences, transition from usage areas identified during the field reconnaissance into DUs to be sampled, and discrete sample sets identified in the Final QAPP Addendum.

2.4.1 Data Compilation

Hardcopies of the field data sheets, marked-up aerial photographs, interview Worksheets 1 and 2, and other notes for each property were assembled into a property-specific field folder; electronic copies were made and organized into folders on a secure SharePoint data compilation site.

Each day during field reconnaissance, a master summary list was compiled in conjunction with the daily field report which summarized the activities of the three field teams. A cross-check for completeness between the master list and the field data sheets was completed to ensure a complete set of hardcopy and electronic data.

The GPS coordinate data was collected and compiled for each residence and uploaded to the secure SharePoint data site. Each GPS file included unique reference IDs, positional IDs for proposed DUs, exclusion features and property boundaries, and related survey coordinates in latitude and longitude.

GPS waypoint files were downloaded from the units, checked for completeness, and compared to the positional IDs for each usage area to check for transcription errors. The GPS waypoint files were then converted to the GIS coordinate system and uploaded to the secure SharePoint folder and also the project GIS database where the field data could be included as a layer on the georeferenced aerial base maps.

Georeferenced digital photos collected using the GPS tablet were uploaded to the secure SharePoint site folder for each property to illustrate each usage area to assist with planning and agency review when selecting usage areas for the sampling phase, and also assist field staff with locating and setting up the sampling grid for field sampling effort.

2.4.2 Proposed Sampling Plan

At the conclusion of the field reconnaissance program, the findings and data were compiled into a summary of each of the parcels visited, grouped by residence. An individual residence included one or more contiguous parcels under the same ownership. Usage areas and usage types identified for each parcel were included in the summary. The summary also indicated residences where, based on owner interviews and site findings, no significant usage areas were identified and therefore no sampling was proposed. On June 2, 2016, TAI met with EPA to review the proposed usage areas. Usage areas identified during the reconnaissance were proposed as DUs for IC sampling based on the frequency and types of use. TAI provided EPA with maps for each residence presenting the proposed DU boundaries. Additional refinement of DUs occurred based on subsequent communications with EPA following this meeting.

Once the proposed list of residences and DUs were reviewed and approved by EPA, the residences were assigned a unique three digit Residence ID to be used for site identification and sample collection. DUs identified for discrete sample collection were selected randomly at a frequency of approximately 20 percent of the total DUs identified for IC sample collection from the 0-1 inch interval. To ensure a site-wide representative dataset for the discrete samples, the sampling area with the final selection of residential sampling locations was separated into three geographical areas, northeast, central, and southwest. Within each of these areas 28 DUs with a sampling depth of 0–1 inch were randomly identified using an algorithm developed within the web-based GeoManager site for discrete sample collection. The same approach was used for the eight Tribal Allotments which were considered separately from the three geographical areas.

The final list of approved DUs for sampling was summarized in Worksheet #18 of the Final QAPP Addendum. The worksheet presented the sampling locations, DU type, DU size, sample depths, and selection rationale. The Final QAPP Addendum Attachment C presented residence maps showing DU locations for all residences in Worksheet #18.

The Field Sampling Plan was presented as Attachment D (FSP) to the Final QAPP Addendum which discussed the sampling rationale, approach, methods, standard operating procedures (SOP) and timeline for the sampling phase.

The Final QAPP Addendum listed 141 residences that included 443 DUs with 719 IC samples and 336 discrete samples. .

2.5 Modifications and Deviations during the Field Reconnaissance Phase

The 2016 field reconnaissance was conducted in accordance to the FRP. There were no deviations from the FRP. Minor modifications to documentation procedures were conducted to improve the efficiency of site visits. For example, Worksheet #3 from the Final QAPP Addendum was not completed for each property as all the information on this form is found in the notes for the field reconnaissance.

3.0 FIELD SAMPLING

3.1 Scope of Work

Soil sampling activities were conducted from August 1 through September 26, 2016. The implementation of the field sampling program was consistent with the site reconnaissance phase in that sampling at each residence was conducted by the same Tetra Tech field team lead who conducted the site reconnaissance.

Of the 141 residences identified for sampling in the Final QAPP Addendum, three properties were removed for sampling consideration at the owners' requests during the field sampling phase. Six additional landowner consents were also obtained by TAI. Following the same process used to determine DUs for sampling at the originally approved 141 residences, TAI proposed DUs for each of the additional properties for EPA approval prior to conducting sampling. **Appendix B** contains a mapbook series for all 144 residences at which sampling was conducted. The locations of EPA-approved DUs sampled at each of the 144 residences is displayed on individual maps for each residence.

Field sampling tasks consisted of the following:

- Agency, Cultural and Tribal Monitoring/Oversight
- Sample Collection
    - IC Soil Sample Collection
    - Discrete Sample Collection
    - QA/QC Sample Collection
- Decontamination and Investigative Waste Management
- Sample Management
    - Sample Identification
    - Chain-of-Custody Procedures
- Documentation
- Securing Permits and Authorizations
- Documenting Modifications and Deviations During the Field Sampling Phase

TAI provided notifications to landowners prior to all sampling activities, including coordination of sampling dates, site access, and responded to any landowner questions or concerns. Notifications to private landowners or lessees were generally made at least 48 hours prior to entry unless otherwise specified.

3.2 Agency, Cultural and Tribal Monitoring/Oversight

During the field sampling, each team was accompanied at all times by: (1) EPA or their representative; (2) an archaeological monitor from AECOM to observe historical features; and (3) a Cultural Monitor provided by CCT.

Technical oversight was provided by the EPA or their designated subcontractor (CH2M Hill). Technical oversight personnel were present to observe all field tasks for each team and ensured the project DQO and Final QAPP Addendum approach were adhered to, and also provided input or consultation to land owners regarding the project objectives, as needed. Occasional oversight from Ecology was also provided. The Tetra Tech team, technical oversight, and cultural resource monitors were available to address owners' questions, and discuss field activities and consistency with the FSP and the Cultural Resource Coordination Plan (Final QAPP Addendum, Attachment H). The list of oversight and monitoring personnel is presented in **Table 2**.

Table 2. Oversight and Monitoring Personnel

Field Sampling Technical Oversight		Field Sampling Cultural Monitoring	
Observer	**Organization**	**Monitor**	**Organization**
Laura Buelow	EPA	Ragan Driver	AECOM
Marc Stifelman	EPA	Sarah McDaniel	AECOM
Monica Tonel	EPA	Michelle Lynch	AECOM
Andrea LaTier	EPA	Michelle Stegner	AECOM
Lynn Hood	EPA	Dave Killam	AECOM
Reuben Greer	CH2M HILL	Russ Bevill	AECOM
Mark Endo	CH2M HILL	Ollie Pasch	AECOM
Shannon Bartow	CH2M HILL	Ralph Koziarski	AECOM
Nicole Badon	CH2M HILL	Mike Kelly	AECOM
John Roland	Ecology	Brian Monaghan	CCT
Chuck Gruenenfelder	Ecology	Sylvia Peasley	CCT
Kathleen Falloner	Ecology	Dan Martin	CCT

Because field sampling methods associated with the investigation involve penetration/disturbance of the ground surface, the field teams were accompanied by cultural observers who assessed the effects of the work and advised on ways to avoid, minimize, or mitigate any adverse effects on cultural resources. Activities of the archaeological/cultural monitoring personnel are described in Attachment H to the Final QAPP Addendum.

The archaeological/cultural monitors visually examined all proposed sampling areas in advance of sampling and all samples to determine if evident or likely artifacts were present or if other deposits were present that are likely to be a cultural resource. The archaeological/cultural monitor representatives did not make physical contact with the sample unless artifacts or other cultural deposits were present. If artifacts or likely archaeological deposits were present, the archaeologist or Tribal representative recorded the location of the materials and photographed the materials in place in such a manner to provide information on provenience. The artifacts and other archaeological materials were then re-deposited at their original location. The archaeological monitor and/or Tribal representative documented

their observations on a daily basis, including field notes and photographs that recorded the location, character of the sampling or other ground-disturbing activity, any archaeological discoveries made, and any decisions made within the provisions of the Final QAPP Addendum by the archaeological monitor and Tribal representative in response to any archaeological discoveries. Observations and findings of the archaeological/cultural monitors will be reported separately.

3.3 Sample Collection

This section describes the sampling procedures followed during the collection of soil, and quality assurance and quality control (QA/QC) samples. Sample collection activities followed the field sampling procedures and method presented the Final QAPP Addendum. Deviations or modifications, and the associated justification for making changes, are presented in **Section 3.8**.

3.3.1 IC Soil Sample Collection

The locations and extent of sampling DUs at each residence were determined based on property-specific information and according to procedures described in the Final FRP. As needed, modifications to accommodate site-specific conditions identified during the sampling phase were made and documented as part of the field sampling phase. Specific sampling procedures, protocols, and methodologies are presented in the Final QAPP Addendum. Deviations to the Final QAPP Addendum are presented in **Section 3.8**.

Collection and processing of IC samples was conducted in accordance with the Final QAPP Addendum and the Interstate Technology and Regulatory Council (ITRC) incremental sampling guidance document (ITRC 2012). Each IC sample consisted of 30 increments or subsamples located within the boundary of a DU. Triplicate IC samples were collected with a frequency of 20 percent of DUs or a minimum of one DU per property sampled. The increment locations were pre-selected and modified as necessary in the field to accommodate any site-specific conditions. The Final QAPP Addendum, FSP, includes SOP-2 that describes sample positioning procedures, and SOP-3 which discusses the field determination of IC sample locations.

The field sampling team leader demarcated the 30 increment locations using a hand-held GPS unit (with x, y, z coordinates) and pin flags. The sampling team started at the first increment location, collected the subsample minimum volume using hand tools, including decontaminated Multi-Incremental Sampling Tool (MIST™) tools and EZ-Probe™ sampling devices, and placed the soil in a clear plastic bag for inspection by the Tribal cultural resource monitor. After inspection and approval, the soil was transferred from the plastic bag to a decontaminated plastic bucket as an increment contributing to the IC sample, and the pin flag was removed from the ground to signify the sample had been collected. To minimize the sample activity impact, store-purchased clean potting soil was used to backfill increment sample holes and the grass root plug was returned to the surface in areas where deemed necessary such as well-kept lawns and gardens. This procedure was followed at each of the 30 increment locations to obtain one IC sample (minimum of 1,000 grams). Digital photographs were taken to document each DU sampled. Sample collection depths corresponded to land uses as prescribed in the Final QAPP Addendum, except as modified (see Section 3.8). IC samples collected from each residence are summarized in **Table 3**.

3.3.2 Discrete Sample Collection

Discrete samples were obtained from each residence at five random locations within a selected subset of DUs where the IC sample depth was 0 to 1 inch below ground surface (bgs). Locations were designated A through E. These discrete samples were obtained from the 0 to 1 inch and 1 to 6 inches bgs intervals at each location within the designated DU. The discrete soil sample locations were separate from the IC subsample locations in the DU. One field duplicate discrete sample was collected from one of the five discrete sample locations in each DU. The discrete duplicate samples were collected at the location of each discrete sample E. The purpose of the duplicate sample was to assess the potential variation of field sample collection procedure by duplicating the sample procedure entirely and collecting a separate collocated sample. In some cases field teams collected double the volume of soil the primary sample

required from the same location E and then, after review of the total sample volume by the cultural resource monitor, the sample was transferred into two separate sample jars for analyses. In these cases, the duplicate sample is more representative of a field split rather than a collocated field duplicate. Further discussion of this deviation is presented in **Section 3.8**.

The DUs where discrete samples were collected are listed in **Table 3**. The individual samples were collected using decontaminated stainless steel hand trowels and placed in a clear plastic bag for inspection by the Tribal cultural resource monitor. After inspection and approval the samples were transferred to a laboratory-supplied 16oz jar in the field as indicated in FSP SOP-5. As with the incremental sample collection procedure, store-purchased clean potting soil was used to backfill increment sample holes and the grass root plug was returned to the surface in areas where deemed necessary to minimize the sample activity impact in areas such as well-kept lawns and gardens.

Discrete samples were collected using protocols identified in the Final QAPP Addendum. The Final QAPP, FSP, includes the SOP for discrete soil sample collection (SOP-5, Attachment 2) which provides more details about discrete soil sample collection procedures including adjustment of locations.

3.3.3 QA/QC Sample Collection

This section describes the collection and submittal of QA/QC samples for analysis. The purpose and intent of the QA/QC samples are described in the Final QAPP Addendum. A summary of the QA/QC samples collected is presented in **Table 4.**

The equipment rinsate samples consisted of laboratory supplied ASTM Type II water being poured over or through the specific decontaminated sampling device used for collecting soil samples from a specific DU, for example; if the MIST™ sampler was being used to collect the 0-1 inch IC samples from a house DU, then the rinsate sample water was poured over and through the sample barrel portion of the sampler that was in contact with the soil included in the IC composite sample. The rinsate water was collected in a pre-preserved, laboratory-supplied sample container that was labelled to identify the residence and DU it was associated with (**Table 4**). Equipment rinsate blanks were collected for each type of non-disposable sampling equipment used during the sampling event at an interval of one per day. The samples were collected from one sample team each day on a randomly selected DU equipment set. Equipment rinsate blank samples were maintained in the field and in storage according to proper sample handling protocol.

3.4 Decontamination and Investigation-Derived Waste

Sampling equipment was decontaminated to ensure the quality of the samples collected were not contaminated from one sample location to the next. Non-disposal and reusable equipment that came into contact with sampled soil underwent a thorough decontamination between each discrete soil sample location, each DU (IC sample set) and between each residence. Temporary decontamination stations, including a potable water rinse, a Liquinox™ scrub, laboratory supplied deionized water rinse, and related containment, were established near the work area at each DU. Procedures contained in SOP-8 of the Final QAPP Addendum were followed. Disposable sampling equipment was placed in plastic trash bags for disposal as solid waste.

The sampling activities generated limited quantities of investigation-derived waste that required handling and disposal as described below:

- Field sampling activities were conducted in Level D personal protective equipment (PPE) and/or modified Level D PPE. Used PPE (primarily nitrile gloves) were containerized in heavy-duty trash bags and transported and disposed of in an off-site licensed waste facility (i.e., active Municipal Solid Waste Landfill operated under Chapter 173-351 of the Washington Administrative Code).
- Equipment decontamination took place in the individual DUs and discrete sample locations. The field sampling teams containerized all decontamination liquids which were stored in a secure plastic tank located at the sample processing facility in Northport, Washington. At the completion

of the sampling, the water was characterized and appropriately disposed at a liquid waste disposal facility operated under Chapter 173-351 of the Washington Administrative Code.

3.5 Sample Management and Shipping

This section presents the sample management procedures that were followed during the collection of the samples in the field and before transfer to the laboratory. Procedures for sample storage, packaging, and shipping are detailed in the Final QAPP Addendum, FSP, SOP-6; Sample custody procedures are detailed in SOP-7; Sample volume, container, preservative, and holding time requirements are listed in the Final QAPP Addendum, Table-D3.

3.5.1 Sample Identification

In accordance with the Final QAPP Addendum, each IC, discrete, and QA/QC sample were assigned a unique sample identification number that includes the study name, medium, sample location (i.e., Residence number), DU type, sample type, and sample type number. The unique sample number was entered in the field notebook, field tracking sheets, chain-of-custody forms. To ensure the samples were correctly identified, the field sample handling manager conducted a review of the samples that were delivered to the field sample handling office by the field teams, and then the chain-of-custody (COC) record and specific sample collection matrices were signed and prepared for shipment.

3.5.2 Chain-of-Custody Procedures

COC procedures outlined in the Final QAPP Addendum FSP were followed to document sample possession. Copies of the final COCs are presented in **Appendix C.**

The field sampler maintained custody of the samples until they were transferred to the sample handing manager located in the sample handling and storage facility in Northport, WA. Once the sample collection was complete, the field teams labelled and sealed each sample container according to the FSP SOP-6, then samples were transported to the field sample handling facility.

At the sample handling facility, the samples were inspected and identification was cross referenced to the residence matrices and field modification forms where necessary as part of the sample handling QA/QC. The sample information was used to generate the COC. Samples were then accompanied by a COC record at all times. When transferring samples, the individuals relinquishing and receiving the samples signed, dated, and noted the time on the record. The COC record documents custody transfer from the sample manager to courier, and to sample receiving staff at the laboratory.

Once the courier had assumed custody, the samples were securely packed and secured and dispatched to ALS laboratory based in Kelso, WA for analysis with a unique COC record accompanying each shipment. All shipments were delivered to ALS laboratory by CNI, who were contracted to courier all project samples. Courier names and information were entered in the “Received by” section of the COC record.

The field sample handling manager and TAI Analytical Chemistry Laboratory Coordinator were the primary liaison with the sample testing laboratory manager at ALS. The field team sample handling manager generated labels, chains of custody, and tracking forms for all sample shipments. The original record COC copy accompanied the shipment to the laboratory, the signed COCs from ALS laboratory sample receiving were retained by the sample manager.

ALS laboratory sample receiving custodians accepted custody of the shipped samples from CNI and verified that the sample numbers matched those on the COC records.

3.6 Documentation

This section provides information regarding field documentation procedures followed during the field sampling. Copies of the field data collected during sampling are included in **Appendix D**. Field notes recorded by EPA are presented in **Appendix E**.

3.6.1 Field Forms

Sampling method and identification data were documented on residence-specific sample matrix forms, included in **Appendix D**. These matrices were used to direct the field teams as to which DUs were to be sampled at the residence, and where QA/QC and discrete samples were to be collected. Once sampling was complete on each residence, the matrix was updated according to actual field sampling activities. The matrix would then accompany the sample containers to the field sample handling facility where the information was used to develop the sample COCs and the daily summary tables.

3.6.2 Field Logbook

Daily field activities were documented through journal entries in a bound field logbook, which was dedicated to each field team for the sampling effort. The field logbook contained all pertinent information about sampling activities, agency and owner communications and requests, site conditions, field methods used, general observations, and other pertinent technical information. Field logbooks will be maintained as a part of the permanent project record.

The field team leader was responsible for the daily maintenance of all field records. Each page of each of the field logbooks were sequentially numbered, dated, and signed by the field team lead. Copies of these logbooks are included in **Appendix D**.

3.6.3 Digital Photos

Georeferenced digital photographs of DUs and associated discrete sample locations were taken using the GPS tablet. In most instances, a dry-erase white board, bearing the residence location and sample identification, date, and time, was held by a field team member for its inclusion in the photograph. These photos are included in **Appendix D.**

3.6.4 Communications

On behalf of EPA, the field team leaders provided property owners with a sample collection receipt detailing the samples collected on the property. Receipts were mailed to owners who were not present during sample collection.

3.7 Permits and Authorizations

Two agency land use authorizations were obtained in advance of sampling including:

- Land Use Approval (Other) from The Colville Confederated Tribes of the Colville Reservation Planning Department.
- Permission from the Washington State Department of Natural Resources to access State of Washington shoreline property adjacent to private property.

Copies of these authorizations are presented in **Appendix F**. Sampling teams complied with conditions of each authorization.

3.8 Modifications and Deviations During the Field Sampling Phase

The 2016 Residential Soil Sampling was conducted in accordance to the Final QAPP Addendum. Field modifications and deviations were identified based on site-specific conditions and recorded in the field notebooks and communicated with EPA for approval.

The field teams often encountered site conditions that required minor adjustments to a DU boundary, identification of increment locations, or a sample collection depth amendment. Modifications were documented in the Field Modification Form. The Field Modification Form was completed by the field team leads after discussion with the EPA oversight and cultural resource monitoring personnel. The form included the Residence ID, the DU, the description of site conditions and the oversight approved reason for the modification. Field Modification Forms are provided in **Appendix D** and summarized in **Table 3**.

The DU boundary adjustments were collected via GPS or on field notes, as appropriate. The final DU boundaries mapbook is presented in **Appendix B.** Additional field modifications and deviations included:

- The target depth for garden DUs was 0-12 inches bgs, although in many cases refusal was encountered using the EZ-Probe™ sampling tool before reaching 12 inches bgs. The TAI and EPA approved approach in this case was to probe around the garden DUs prior to sampling to establish the minimum depth of the sample across the DU and apply this as the target depth to assure that each IC aliquot contained similar mass. The Field Modification Forms were used to record the actual sample depth attained at garden DUs if different than the 12-inch target depth. These forms were signed by EPA team oversight or representatives.
- The sampling teams used the Final FRP DU location maps and GPS information to mark out the sample collection points although, in many cases minor relocations of individual sample points were necessary due to new residence development or features, obstructions such as boulders or boundary restrictions identified at the time of sampling. These changes were identified and discussed with technical oversight in the field, and communicated to the field Supervisor where necessary. These minor adjustments were made once the sampling team and oversight were in agreement of the change, the residence specific modification form was then completed to note this change and technical oversight signed the form, although in some cases a modification form was not completed in the field even though the change was always discussed and approved. Table 3 summarizes field samples collected at each DU including a brief description of all approved modifications.
- At many of the residences, target sample depths of multiple DUs were 0-1 inch. The sampling tool specific to collecting the 0-1 inch soil was the MIST™ sampling tool. Because each field sampling team only had one MIST™ sampling tool, the EZ-Probe™ sampling tool was also used to collect the 0-1 inch soil sample. Both sampling tools were stainless steel and decontaminated prior to every sample set, but the sample barrel diameter of the of the MIST™ sampling tool was 4 centimeter (cm) compared to the EZ-Probe™ which had a sample barrel diameter of 2 cm. This difference in barrel diameter resulted in a difference in sample volume between the two sampling tools when driven to 1-inch bgs. To account for the reduced volume produced by the EZ-Probe™, duplicate adjacent soil punches to 1 inch bgs were collected when using this tool. Before this technique was used, comparative samples were collected to inspect and weigh the soil between the tools which established the samples were comparable. Only one tool was used to collect increments in a DU, as sample volumes did vary slightly between each tool. This approach which was approved by TAI and EPA Project Managers and representatives.
- The Final QAPP Addendum described the frequency of QA/QC duplicate sample collection at the discrete sampling locations. During the field sampling, one team collected the discrete duplicate samples by repeating the sample collection for the 0-1 inch sample and 1-6 inches sample in an adjacent hole using the same technique and approach as the normal sample with a decontaminated stainless steel trowel. The two remaining teams collected the duplicate samples by collecting double the 0-1 inch and 1-6 inches volume from the same hole as the normal sample, then mixed the soil from each interval before dividing the sample into normal and duplicate sample jars, therefore technically collecting a field split. The inconsistency was identified on September 14, 2016. Thereafter all three teams collected the discrete duplicate samples by repeating the sample collection for the 0-1 inch sample and 1-6 inches sample in an adjacent hole using the same technique and approach as the normal sample with a decontaminated stainless steel trowel. EPA and TAI concurred that rather than resample the inconsistent duplicate discrete samples, those samples would be referred to as field splits. The discrete split samples were collected for 0-1-inch & 1-6-inch intervals at Residences 082, 101, 102, 118, 124, 129, 133, 147, 158, 169, 174, 178, 182, 187, 203, 806 and 808.
- Equipment decontamination took place adjacent to the individual DUs where samples were collected. Although the Final QAPP Addendum stated that any liquids that collect during the

decontamination process would be discharged to the ground in the area in which the samples were collected, the field sampling teams containerized all decontamination liquids which were stored in a secure tank located at the sample processing facility in Northport. At the completion of the field sampling program the decontamination liquid was characterized and disposed to a liquid waste disposal facility operated under Chapter 173-351 of the Washington Administrative Code. A total of 221 gallons of liquid were disposed.

4.0 SUMMARY

The 2016 Residential Soil Study consisted of two phases, the field reconnaissance phase, and the field sampling phase.

The reconnaissance phase was completed in the spring of 2016: April 25 to May 18, 2016, and consisted of visiting each property where landowners agreed to participate in the study. The purpose of the field reconnaissance phase was to determine the locations for sampling DUs by observing land use and property features and through interviewing the landowner or resident. Leading up to and during the field reconnaissance, 260 individual properties were evaluated to determine if the property was eligible for the 2016 residential sampling program. Using data collected during the field reconnaissance, individual residential property sample design was completed specifying residence DUs to be sampled based on past, current, and future property use.

In consultation with EPA, the approved Final QAPP Addendum summarized a final list of discrete samples and DUs to be sampled, which encompassed 141 residences within the study area. The 2016 field sampling phase was completed August 1 to September 26, 2016. Field activities consisted of collecting IC samples and discrete samples at the 141 residences identified in the Final QAPP Addendum. Six residences were added following completion of the Final QAPP Addendum. However, three residences were eliminated (at the owner's request) during the field sampling phase resulting in sampling a total of 144 residences (452 DUs). Specifically, there were:

- 138 "House" DUs;
- 122 "Other" DUs;
- 108 "Garden" DUs;
- 31 "Livestock/Other" DUs;
- 26 "Agricultural" DUs;
- 11 "Play Area" DUs;
- 9 "Dripline" DUs and,
- 7 "Beach" DUs sampled.

Across these 452 DUs, 740 IC samples (which included triplicate samples) were collected. Twenty-nine residences were selected for discrete sampling where 348 discrete samples (including duplicates) were collected. Six appendices to this report contain specific and detailed information for each residence evaluated and each DU and discrete sample collected.

5.0 REFERENCES

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Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
075	075-A1	Agriculture Area	3.654	0-1	1			
075	075-B1	Beach	0.210	0-1	1			Beach DU sampled at a later date from associated Residence 075 DUs
075	075-H1	House	0.107	0-1, 0-1, 0-1	3			
075	075-O1	Other	1.148	0-1	1			
076	076-D1	Lead-Based Paint Concern	0.013	0-1	1			IC sample locations adjusted to avoid plants
076	076-G1	Garden	0.025	0-3	1			DU boundary modified to encompass complete garden, IC sample depth adjusted due to refusal
076	076-G2	Garden	0.110	0-4.5	1			IC sample depth adjusted due to refusal
076	076-H1	House	0.277	0-1	1			
076	076-H2	House	0.487	0-1, 0-1, 0-1	3			
076	076-N1	Animal/ Livestock	0.125	0-3	1			IC sample collected using EZ Probe method
077	077-A1	Agriculture Area	0.273	0-1	1			
077	077-A2	Agriculture Area	0.129	0-1	1			
077	077-D1	Lead-Based Paint Concern	0.018	0-1	1			IC sample collected using EZ Probe method
077	077-G1	Garden	0.810	0-12	1			
077	077-H1	House	1.181	0-1, 0-1, 0-1	3			
077	077-H2	House	0.436	0-1	1			
077	077-N1	Animal/ Livestock	0.394	0-3	1			
078	078-G1	Garden	0.040	0-12	1			
078	078-H1	House	0.316	0-1, 0-1, 0-1	3	0-1, 1-6	5, 5	
078	078-N1	Animal/ Livestock	0.048	0-3	1			
078	078-O1	Other	0.004	0-1	1			DU boundary modified, IC samples adjusted to new area
079	079-H1	House	0.315	0-1	1			DU boundary modified, IC samples adjusted to new area
079	079-H2	House	0.062	0-1, 0-1, 0-1	3			

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
080	080-H1	House	0.015	0-1, 0-1, 0-1	3			Triplicate sampling moved to this DU from 080-O1, DU boundary modified, IC samples adjusted to new area, IC sample collected using hand trowel
080	080-O1	Other	0.123	NA	0			DU not sampled due to imported gravel surface
081	081-A1	Agriculture Area	0.031	0-1	1			IC sample locations adjusted to avoid plants
081	081-D1	Lead-Based Paint Concern	0.012	0-1	1			DU boundary modified to include dripline, IC samples adjusted to new area
081	081-H1	House	0.197	0-1, 0-1, 0-1	3			DU boundary modified to avoid driveway, IC samples adjusted to new area
081	081-O1	Other	0.011	0-1	1			
082	082-G1	Garden	0.016	0-9	1			IC sample locations moved to raised beds, IC sample method adjusted due to refusal
082	082-G2	Garden	0.050	0-10	1			IC sample depth adjusted due to refusal
082	082-H1	House	0.364	0-1, 0-1, 0-1	3	0-1, 1-6	5, 5	Triplicate and discrete sampling moved to this DU from 082-O1; Discrete field duplicate collected as a split
082	082-N1	Animal/ Livestock	0.572	0-1	1			IC samples adjusted to new area, IC sample depth adjusted due to refusal
082	082-N2	Animal/ Livestock	0.015	0-1	1			IC sample depth adjusted due to refusal
082	082-O1	Other	0.097	NA	0			DU not sampled at owners request
083	083-G1	Garden	0.047	0-8	1			IC sample depth adjusted due to refusal
083	083-G2	Garden	0.032	0-11.5	1			IC sample depth/ method adjusted
083	083-H1	House	0.078	0-1, 0-1, 0-1	3			
084	084-D1	Lead-Based Paint Concern	0.010	0-1	1			
084	084-H1	House	0.519	0-1, 0-1, 0-1	3			

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
085	085-D1	Lead-Based Paint Concern	0.010	0-1	1			DU boundary modified, IC samples adjusted to new area
085	085-H1	House	0.164	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
85	085-H2	House	0.016		0			DU not sampled due to debris
085	085-O1	Other	0.025	0-1	1			DU boundary modified, IC samples adjusted to new area
085	085-P1	Play Area	0.061	0-1	1			DU type changed from H2 to P1, DU boundary modified, IC samples adjusted to new area
086	086-G1	Garden	0.030	0-8/10, 0-8/10, 0-8/10	3			DU boundary modified, IC samples adjusted to new area, IC sample depth/method adjusted
086	086-H1	House	0.383	0-1	1			
086	086-H2	House	0.618	0-1	1			
087	087-H1	House Under Construction	0.380	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
087	087-O1	Other	0.195	0-1	1			New DU added to Residence ID 087
088	088-D1	Lead-Based Paint Concern	0.015	0-1	1			DU boundary modified, IC samples adjusted to new area
088	088-H1	House	0.232	0-1	1			DU boundary modified, IC samples adjusted to new area
088	088-H2	House	0.180	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
088	088-O1	Other	0.215	0-1	1			
089	089-A1	Agriculture Area	0.155	0-4	1			IC sample depth adjusted due to refusal
089	089-H1	House	0.534	0-1	1			DU boundary modified, IC samples adjusted to new area
089	089-O1	Other	0.222	0-1, 0-1, 0-1	3			
090	090-H1	House	0.135	0-1, 0-1, 0-1	3			
090	090-O1	Other	0.066	NA	0			DU not sampled, originally mapped as exclusion area
090	090-O2	Other	0.020	0-1	1			New DU added to existing residence

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
091	091-G1	Garden	0.007	0-12	1			DU boundary modified, IC samples adjusted to new area,
091	091-H1	House	0.246	0-1, 0-1, 0-1	3			
092	092-O1	Other	0.284	0-1, 0-1, 0-1	3			
092	092-O2	Other	0.204	0-1	1			
093	093-H1	House Under Construction	0.217	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
094	094-H1	House	0.372	0-1, 0-1, 0-1	3			
094	094-P1	Play Area	0.222	0-1	1			
095	095-A1	Agriculture Area	2.748	0-1	1			
095	095-H1	House	0.348	0-1	1			DU boundary modified, IC samples adjusted to new area
095	095-O1	Other	0.514	0-1, 0-1, 0-1	3			
095	095-O2	Other	0.197	0-1	1			
096	096-H1	House	0.405	0-1	1			IC sample locations adjusted to avoid driveway
096	096-O1	Other	0.539	0-1, 0-1, 0-1	3			
097	097-H1	House	0.257	0-1	1			DU boundary modified, IC samples adjusted to new area
097	097-H2	House	0.188	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
098	098-B1	Beach	0.023	0-4	1			New DU added to existing Residence, IC sample depth adjusted due to refusal
098	098-G1	Garden	0.089	0-6, 0-6, 0-6	3			DU boundary modified, IC samples adjusted to new area, IC sample depth/method adjusted
098	098-H1	House	0.169	0-1	1			DU boundary modified, IC samples adjusted to new area
098	098-O1	Other	0.078	0-1	1			
099	099-A1	Agriculture Area	0.068	0-1	1			
99	099-G1	Garden	0.002	NA	0			DU area included in 099-H1
099	099-G2	Garden	0.010	0-12	1			

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
099	099-H1	House	0.093	0-1, 0-1, 0-1	3			DU boundary combined with 099-G1, IC samples adjusted to new area
099	099-O1	Other	0.039	0-1	1			DU boundary modified, IC samples adjusted to new area
100	100-G1	Garden	0.003	0-8	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
100	100-H1	House	0.114	0-1	1			DU boundary modified, IC samples adjusted to new area
100	100-N1	Animal/ Livestock	0.163	0-3	1			DU boundary modified, IC samples adjusted to new area
100	100-N2	Animal/ Livestock	0.010	0-3	1			
100	100-O1	Other	0.104	0-1, 0-1, 0-1	3			
101	101-G1	Garden	0.023	0-3	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
101	101-H1	House	0.380	0-1, 0-1, 0-1	3			
101	101-O1	Other	0.084	0-1	1	0-1, 1-6	5, 5	Discrete field duplicate collected as a split
102	102-G1	Garden	0.006	0-6	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
102	102-H1	House	0.043	0-1, 0-1, 0-1	3	0-1, 1-6	5, 5	DU boundary modified, IC samples adjusted to new area Discrete field duplicate collected as a split
103	103-H1	House	0.236	0-1	1			DU boundary modified, IC samples adjusted to new area
103	103-O1	Other	0.416	0-1, 0-1, 0-1	3			
104	104-H1	House	0.050	0-1	1			
104	104-H2	House	0.293	0-1	1			DU boundary modified, IC samples adjusted to new area

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
104	104-N1	Animal/ Livestock	0.478	0-3, 0-3, 0-3	3			DU boundary modified, IC samples adjusted to new area
105	105-H1	House	0.177	0-1	1			
105	105-P1	Play Area	0.255	0-1, 0-1, 0-1	3			
106	106-G1	Garden	0.071	0-6	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
106	106-G2	Garden	0.180	0-6	1			IC sample depth adjusted due to refusal
106	106-H1	House	0.039	0-1	1			
106	106-O1	Other	0.051	0-1, 0-1, 0-1	3			
107	107-H1	House	0.238	0-1, 0-1, 0-1	3			
108	108-H1	House	0.275	0-1	1			New DU added to Residence 108
108	108-O1	Other	1.586	0-1	1			
108	108-O2	Proposed Future House Location	0.503	0-1, 0-1, 0-1	3			
109	109-H1	House	0.105	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
110	110-A1	Agriculture Area	0.142	0-1	1	0-1, 1-6	5, 5	
110	110-G1	Garden	0.010	0-8	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
110	110-G2	Garden	0.010	0-5	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
110	110-H1	House	0.931	0-1	1			Triplicate sampling moved from this DU to 110-O1
110	110-O1	Other	4.250	0-1, 0-1, 0-1	3			Triplicate sampling moved to this DU from 110-H1
110	110-O2	Other	0.267	0-1	1			DU boundary modified, IC samples chosen in the field

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
111	111-H1	House Under Construction	0.037	0-1, 0-1, 0-1	3	0-1, 1-6	5, 5	IC sample locations chosen from map, not GPS due to new structure
112	112-G1	Garden	0.011	0-12	1			
112	112-H1	House	0.478	0-1	1			
112	112-O1	Other	0.280	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
113	113-G1	Garden	0.008	0-8	1			IC sample depth adjusted due to refusal
113	113-G2	Garden	0.010	0-8	1			IC sample depth adjusted due to refusal
113	113-G3	Garden	0.216	0-6	1			IC sample depth adjusted due to refusal
113	113-O1	Other	0.171	0-1, 0-1, 0-1	3			
114	114-G1	Garden	0.015	0-1	1			DU boundary modified, IC samples adjusted to new area. IC sample depth adjusted due to refusal
114	114-H1	House	0.325	0-1	1			
114	114-O1	Other	0.352	0-1, 0-1, 0-1	3			
115	115-O1	Other	0.311	0-1, 0-1, 0-1	3			
116	116-O1	Other	0.244	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
117	117-O1	Other	0.245	0-1, 0-1, 0-1	3			
118	118-G1	Garden	0.229	0-6	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
118	118-G2	Garden	0.040	0-12, 0-12, 0-12	3			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
118	118-H1	House	0.510	0-1	1	0-1, 1-6	5, 5	Discrete field duplicate collected as a split
118	118-N1	Animal/ Livestock	0.213	0-1	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted at EPA request
118	118-N2	Animal/ Livestock	0.018	0-3	1			

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
119	119-P1	Play Area	0.998	0-1, 0-1, 0-1	3	0-1, 1-6	5, 5	
120	120-A1	Agriculture Area	0.258	0-1	1			
120	120-D1	Lead-Based Paint Concern	0.017	NA	0			DU not sampled due to debris
120	120-G1	Garden	0.359	0-10, 0-10, 0-10	3			IC sample depth adjusted due to refusal
120	120-H1	House	0.197	0-1	1			DU boundary modified, IC samples adjusted to new area
120	120-O1	Other	0.647	0-1	1			
121	121-G1	Garden	0.001	0-6	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
121	121-H1	House	1.011	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
121	121-N1	Animal/ Livestock	1.058	0-3	1			DU boundary modified, IC samples adjusted to new area
121	121-N2	Animal/ Livestock	0.516	0-3	1			
122	122-G1	Garden	0.095	0-7	1			IC sample depth adjusted due to refusal
122	122-G2	Garden	0.081	0-6	1			IC sample locations adjusted, IC sample depth adjusted due to refusal
122	122-H1	House	0.175	0-1	1			
122	122-H2	House	1.078	0-1	1			
122	122-O1	Other	0.152	0-1, 0-1, 0-1	3			
122	122-O2	Other	0.086	0-1	1			
122	122-P1	Play Area	0.763	0-1	1			
123	123-G1	Garden	0.166	0-7.5	1			IC sample locations adjusted, IC sample depth adjusted due to refusal
123	123-G2	Garden	0.198	0-5.5, 0-5.5, 0-5.5	3			IC sample depth adjusted due to refusal
123	123-H1	House	0.095	0-1	1			
123	123-O1	Other	0.024	0-1	1			
123	123-O2	Other	0.259	0-1	1			

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
124	124-B1	Beach	0.278	0-3	1			DU boundary modified, IC samples adjusted to new area, IC sample depth/method adjusted
124	124-G1	Garden	0.008	0-8	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
124	124-G2	Garden	0.031	0-3, 0-3, 0-3	3			IC sample locations adjusted, IC sample depth adjusted due to refusal
124	124-H1	House	0.073	0-1	1			
124	124-N1	Animal/ Livestock	0.035	0-1	1			IC sample collected using spoon
124	124-N2	Animal/ Livestock	0.048	0-3	1			DU boundary modified, IC samples adjusted to new area
124	124-O1	Other	0.283	0-1	1	0-1, 1-6	5, 5	DU boundary modified, IC samples adjusted to new area Discrete field duplicate collected as a split
125	125-O1	Other	0.036	0-1, 0-1, 0-1	3			
126	126-A1	Agriculture Area	0.565	0-1	1			
126	126-G1	Garden	0.300	0-8	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
126	126-G2	Garden	0.009	0-11	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
126	126-H1	House	0.175	0-1	1			IC sample locations adjusted
126	126-O1	Other	1.789	0-1	1			
126	126-O2	Other	0.079	0-1	1			
126	126-O3	Other	0.620	0-1	1			
126	126-P1	Play Area	0.358	0-1, 0-1, 0-1	3			IC sample locations adjusted
127	127-A1	Agriculture Area	5.536	0-11	1			IC sample depth adjusted due to refusal

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
127	127-G1	Garden	0.153	0-6.5	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
127	127-G2	Garden	0.054	0-6	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
127	127-H1	House	0.506	0-1	1			IC sample locations adjusted
127	127-H2	House	0.695	0-1	1			
127	127-N1	Animal/ Livestock	0.335	0-3, 0-3, 0-3	3			DU boundary modified, IC samples adjusted to new area
127	127-O1	Other	0.397	NA	0			DU not sampled at owners request
128	128-G1	Garden	0.003	0-6	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
128	128-G2	Garden	0.063	0-12, 0-12, 0-12	3			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
128	128-G3	Garden	0.125	0-4	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
128	128-H1	House	0.097	NA	0			DU not sampled as mainly driveway and buildings
128	128-H2	House Under Construction	0.021	NA	0			DU not sampled due to debris
128	128-N1	Animal/ Livestock	0.066	0-3	1			DU boundary modified, IC samples adjusted to new area
128	128-O1	Other	0.458	0-1	1			
129	129-H1	House	0.248	0-1	1			
129	129-H2	House	0.182	0-1, 0-1, 0-1	3	0-1, 1-6	5, 5	Discrete field duplicate collected as a split
130	130-G1	Garden	0.325	0-6, 0-6, 0-6	3			IC sample depth adjusted due to refusal
130	130-H1	House	0.102	0-1	1			
130	130-H2	House	0.829	0-1	1			

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
131	131-B1	Beach	0.116	0-5, 0-5, 0-5	3			DU boundary modified, IC samples adjusted to new area, collect IC sample using EZ Probe
131	131-H1	House	0.204	0-1	1			
132	132-G1	Garden	0.010	0-2	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
132	132-G2	Garden	0.013	0-1	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
132	132-H1	House	0.098	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
132	132-O1	Other	0.086	0-1	1			DU boundary modified, IC samples adjusted to new area, collected IC sample using EZ Probe
133	133-G1	Garden	0.044	0-7.5	1			Triplicate sampling moved from this DU to 133-H1, IC sample depth adjusted due to refusal
133	133-H1	House	0.055	0-1, 0-1, 0-1	3	0-1, 1-6	5, 5	Triplicate sampling moved to this DU from 133-G1 Discrete field duplicate collected as a split
134	134-O1	Proposed Future House Location	1.111	0-1, 0-1, 0-1	3			
135	135-G1	Garden	0.151	0-6, 0-6, 0-6	3			IC sample depth adjusted due to refusal
135	135-H1	House	0.615	0-1	1			
135	135-O1	Other	0.110	0-1	1			
136	136-A1	Agriculture Area	0.609	0-1	1			
136	136-G1	Garden	0.070	0-4	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
136	136-H1	House	0.418	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
136	136-O1	Other	1.718	0-1	1	0-1, 1-6	5, 5	

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
137	137-O1	Other	0.490	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
137	137-O2	Other	0.325	0-1	1			New DU added to existing Residence
138	138-G1	Garden	0.117	0-5	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
138	138-G2	Garden	1.361	0-4	1			IC sample depth adjusted due to refusal,
138	138-H1	House	1.205	0-1	1			
138	138-O1	Other	0.355	0-1	1			DU boundary modified, IC samples adjusted to new area
138	138-O2	Other	0.700	0-1, 0-1, 0-1	3			
139	139-G1	Garden	0.014	0-4	1			IC sample depth adjusted due to refusal
139	139-G2	Garden	0.012	0-6	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
139	139-H1	House	0.628	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
139	139-N1	Animal/ Livestock	0.465	0-3	1			
140	140-G1	Garden	0.008	0-12	1			
140	140-H1	House	0.077	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
140	140-O1	Other	0.024	0-1	1			
140	140-O2	Other	0.054	0-1	1			
141	141-A1	Agriculture Area	0.205	0-1	1			
141	141-H1	House	0.193	0-1, 0-1, 0-1	3			
141	141-H2	House	0.022	0-1	1			DU boundary modified, IC samples adjusted to new area
141	141-H3	House	0.172	0-1	1			DU boundary modified, IC samples adjusted to new area
141	141-N1	Animal/ Livestock	0.156	0-1	1			IC sample depth adjusted due to refusal, collected using MIST sampler

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
141	141-N2	Animal/ Livestock	0.796	0-3	1			DU boundary modified, IC samples adjusted to new area
141	141-N3	Animal/ Livestock	0.082	0-1	1			IC sample depth adjusted due to refusal
141	141-N4	Animal/ Livestock	0.474	0-1	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal, collected using MIST sampler
141	141-O1	Other	0.271	0-1	1			
141	141-O2	Other	0.058	NA	0			DU not sampled as outside of property boundary
142	142-H1	House Under Construction	0.162	0-1, 0-1, 0-1	3			
142	142-O1	Other	0.272	0-1	1			IC sample collected using EZ Probe
143	143-A1	Agriculture Area	0.083	0-1	1			
143	143-G1	Garden	0.262	0-3, 0-3, 0-3	3			IC sample depth adjusted due to refusal
143	143-G2	Garden	0.013	0-3	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
143	143-H1	House	0.599	0-1	1			DU boundary modified, IC samples adjusted to new area
144	144-G1	Garden	0.610	0-7, 0-7, 0-7	3			IC sample depth adjusted due to refusal
144	144-H1	House	1.191	0-1	1			
145	145-A1	Agriculture Area	0.138	0-1, 0-1, 0-1	3	0-1, 1-6	5, 5	
145	145-H1	House	0.717	0-1	1			DU boundary modified, IC samples adjusted to new area
146	146-H1	House	0.247	0-1, 0-1, 0-1	3			
147	147-G1	Garden	0.059	0-6, 0-6, 0-6	3			IC sample depth adjusted due to refusal
147	147-G2	Garden	0.204	0-8	1			IC sample depth adjusted due to refusal
147	147-H1	House	0.908	0-1	1	0-1, 1-6	5, 5	IC sample locations adjusted Discrete field duplicate collected as a split

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
148	148-H1	House	0.462	0-1, 0-1, 0-1	3			Triplicate sampling moved to this DU
148	148-O1	Other	0.246	0-1	1			
148	148-O2	Other	0.022		0			DU not sampled as mainly road surface
148	148-O3	Other	0.095	0-1	1			IC sample locations adjusted
149	149-A1	Agriculture Area	0.287	0-1, 0-1, 0-1	3			
149	149-D1	Lead-Based Paint Concern	0.021	0-1	1			
149	149-G1	Garden	0.110	0-4	1			IC sample depth adjusted due to refusal
149	149-G2	Garden	0.017	0-2	1			IC sample depth adjusted due to refusal
149	149-H1	House	0.303	0-1	1			
149	149-N1	Animal/ Livestock	0.077	0-3	1			
150	150-G1	Garden	0.155	0-6	1			IC sample locations adjusted, IC sample depth adjusted due to refusal
150	150-H1	House	0.064	0-1, 0-1, 0-1	3	0-1, 1-6	5, 5	
151	151-H1	House	0.284	0-1, 0-1, 0-1	3	0-1, 1-6	5, 5	
152	152-G1	Garden	0.038	0-4	1			IC sample depth adjusted due to refusal
152	152-H1	House	0.185	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
152	152-O1	Other	0.053	NA	0			DU not sampled as mainly imported gravel and fire pit
153	153-G1	Garden	0.149	0-12	1			IC sample depth adjusted due to refusal
153	153-G2	Garden	0.012	NA	0			DU not sampled at owners request
153	153-H1	House	0.680	0-1	1			
153	153-O1	Other	0.378	0-1, 0-1, 0-1	3			
153	153-O2	Other	0.236	0-1	1			
153	153-O3	Other	0.739	0-1	1			IC sample collected using EZ Probe
153	153-O4	Other	0.043	NA	0			DU not sampled at owners request
153	153-O5	Other	0.055	0-1	1			
153	153-O6	Other	0.111	0-1	1			
153	153-O7	Other	0.780	0-1	1			

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
153	153-P1	Play Area	0.154	0-1	1			DU boundary modified, IC samples adjusted to new area
154	154-G1	Garden	0.006	0-6	1			IC sample depth adjusted due to refusal
154	154-H1	House	0.171	0-1, 0-1, 0-1	3			
155	155-G1	Garden	0.201	0-5	1			IC sample locations adjusted, IC sample depth adjusted due to refusal
155	155-G2	Garden	0.014	0-6	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
155	155-H1	House	0.044	0-1	1	0-1, 1-6	5, 5	DU boundary modified, IC samples adjusted to new area, discrete samples moved to this DU from 155-H2
155	155-H2	House	0.018	0-1	1			DU boundary modified, IC samples adjusted to new area, discrete samples moved from this DU to 155-H1
155	155-O1	Other	0.055	NA	0			DU not sampled as used as vehicle/fuel storage
155	155-O2	Other	0.699	0-1, 0-1, 0-1	3			
156	156-H1	House	0.082	0-1	1			IC sample collected using EZ Probe
156	156-O1	Other	0.235	0-1, 0-1, 0-1	3			
157	157-B1	Beach	0.101	0-1	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
157	157-B2	Beach	0.026	0-1	1			IC sample depth adjusted due to refusal
157	157-G1	Garden	0.105	0-6	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
157	157-H1	House	0.135	0-1	1			DU boundary modified, IC samples adjusted to new area

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
157	157-H2	House	0.177	0-1	1			DU boundary modified, IC samples adjusted to new area
157	157-O1	Other	0.311	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
158	158-H1	House	0.288	0-1, 0-1, 0-1	3			
158	158-O1	Other	0.173	0-1	1	0-1, 1-6	5, 5	IC sample locations adjusted Discrete field duplicate collected as a split
159	159-G1	Garden	0.157	0-5	1			IC sample depth adjusted due to refusal
159	159-H1	House	0.306	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
159	159-H2	House Under Construction	0.148	0-1	1			
159	159-O1	Other	0.852	0-1	1			DU boundary modified, IC samples adjusted to new area
159	159-O2	Other	0.767	0-1	1			
160	160-G1	Garden	0.346	0-6, 0-6, 0-6	3			Originally 160-O1, DU type changed, triplicate moved to this DU, IC sample depth adjusted due to refusal
160	160-H1	House	0.566	0-1	1			
160	160-H2	House	0.009	0-1	1			Originally 160-G1, DU type changed, IC sample locations adjusted
161	161-D1	Lead-Based Paint Concern	0.006	0-1	1			DU boundary modified based on GPS, IC samples adjusted to new area
161	161-H1	House	0.351	0-1	1			
161	161-N1	Animal/ Livestock	0.319	0-3, 0-3, 0-3	3			
162	162-H1	House	0.418	0-1, 0-1, 0-1	3			
163	163-G1	Garden	0.071	0-8, 0-8, 0-8	3			IC sample depth adjusted due to refusal
163	163-H1	House	0.130	NA	0			DU not sampled due to recent topsoil removal
163	163-O1	Other	0.279	0-1	1			
164	164-H1	House	0.090	0-1, 0-1, 0-1	3			

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
165	165-H1	House	0.154	0-1, 0-1, 0-1	3			
165	165-O1	Other	0.478	0-1	1			IC sample locations adjusted
166	166-O1	Proposed Future House Location	1.280	0-1, 0-1, 0-1	3			
167	167-O1	Proposed Future House Location	0.579	0-1	1			DU boundary modified, IC samples adjusted to new area
167	167-O2	Proposed Future House Location	0.305	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
167	167-O3	Proposed Future House Location	0.222	0-1	1			DU boundary modified, IC samples adjusted to new area
167	167-O4	Proposed Future House Location	0.312	0-1	1			DU boundary modified, IC samples adjusted to new area
167	167-O5	Proposed Future House Location	0.107	0-1	1			Original DU not sampled, replaced by new DU with same name (different location)
167	167-O5 (Original)	Proposed Future House Location	0.704		0			Original 167-O5 not sampled, new DU added with same DU number.
167	167-O6	Other	0.097	0-1	1			New DU added to existing Residence
167	167-O7	Other	0.116	0-1	1			New DU added to existing Residence
167	167-O8	Other	0.094	0-1	1			New DU added to existing Residence
167	167-O9	Other	0.118	0-1	1			New DU added to existing Residence
168	168-D1	Lead-Based Paint Concern	0.016	0-1	1			DU boundary modified, IC samples adjusted to new area
168	168-G1	Garden	0.067	0-6	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
168	168-G2	Garden	0.007	0-4	1			IC sample depth adjusted due to refusal

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
168	168-H1	House	0.046	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
168	168-N1	Animal/ Livestock	0.197	0-3	1			
168	168-O1	Other	62.827	0-1	1			New DU added to existing Residence
169	169-G1	Garden	0.005	NA	0			DU not sampled at owners request
169	169-G2	Garden	0.613	0-12	1			
169	169-G3	Garden	0.564	0-5	1			IC sample locations adjusted, IC sample depth adjusted due to refusal
169	169-G4	Garden	0.043	0-4	1			Triplicate sampling moved from this DU, IC sample depth adjusted due to refusal
169	169-H1	House	1.137	0-1, 0-1, 0-1	3	0-1, 1-6	5, 5	Triplicate sampling moved to this DU Discrete field duplicate collected as a split
170	170-G1	Garden	0.117	0-8	1			IC sample depth adjusted due to refusal
170	170-G2	Garden	0.380	0-1	1			IC sample depth adjusted due to refusal
170	170-H1	House	0.074	0-1, 0-1, 0-1	3			
171	171-A1	Agriculture Area	1.822	0-1	1			New DU added to existing Residence
171	171-B1	Beach	0.383	0-6, 0-6, 0-6	3			DU boundary modified, IC samples adjusted to new area
171	171-G1	Garden	0.071	0-1	1			IC sample depth adjusted due to refusal
171	171-H1	House	0.156	0-1	1			DU boundary modified, IC samples adjusted to new area, IC sample collected using trowel
172	172-O1	Other	0.061	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
173	173-G1	Garden	0.010	0-5.5	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
173	173-G2	Garden	0.035	0-4	1			IC sample depth adjusted due to refusal
173	173-G3	Garden	0.039	0-4	1			IC sample depth adjusted due to refusal

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
173	173-G4	Garden	0.016	0-4	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
173	173-G5	Garden	0.003	0-5	1			DU boundary combined with 173-G6, IC samples adjusted to new area, IC sample depth adjusted due to refusal
173	173-H1	House	0.363	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
173	173-P1	Play Area	0.446	0-1	1			DU boundary modified, IC samples adjusted to new area
174	174-A1	Agriculture Area	0.160	0-1	1	0-1, 1-6	5, 5	
174	174-G1	Garden	0.041	0-6	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
174	174-H1	House	0.163	0-1, 0-1, 0-1	3			
175	175-G1	Garden	0.014	0-6	1			IC sample locations adjusted
175	175-G2	Garden	0.096	0-6, 0-6, 0-6	3			IC sample locations adjusted
175	175-H1	House	0.306	0-1	1			
176	176-A1	Agriculture Area	0.398	0-1, 0-1, 0-1	3			
176	176-H1	House	0.710	0-1	1			
176	176-H2	House	0.155	0-1	1			
176	176-P1	Play Area	0.213	0-1	1			
177	177-G1	Garden	0.008	NA	0			DU not sampled at owners request
177	177-H1	House	0.189	NA	0			DU not sampled at owners request
178	178-H1	House	0.051	0-1, 0-1, 0-1	3	0-1, 1-6	5, 5	IC sample collected using trowel Discrete field duplicate collected as a split
179	179-H1	House	0.036	0-1, 0-1, 0-1	3			
180	180-H1	House	0.111	0-1	1			
180	180-H2	House	0.094	0-1	1			New DU added to existing Residence

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
180	180-O1	Other	0.076	0-1, 0-1, 0-1	3			IC sample locations adjusted
181	181-A1	Agriculture Area	0.116	0-1	1			
181	181-G1	Garden	0.007	0-5	1			IC sample locations adjusted, IC sample depth adjusted due to refusal
181	181-G2	Garden	0.025	0-2, 0-2, 0-2	3			IC sample locations adjusted, IC sample depth adjusted due to refusal
181	181-H1	House	0.053	0-1	1			IC sample locations adjusted
181	181-H2	House	0.021	0-1	1			DU boundary modified, IC samples adjusted to new area
181	181-N1	Animal/ Livestock	0.091	0-3	1			
181	181-N2	Animal/ Livestock	0.519	0-2.5	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
181	181-O1	Other	0.084	0-1	1			DU boundary modified, IC samples adjusted to new area
182	182-G1	Garden	0.015	0-1	1			IC sample depth adjusted due to refusal
182	182-G2	Garden	0.305	0-3.5	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
182	182-H1	House	0.464	0-1	1			IC sample locations adjusted
182	182-H2	House	0.198	0-1	1			IC sample locations adjusted
182	182-O1	Other	0.118	0-1	1			IC sample collected using EZ Probe
182	182-O2	Other	0.204	0-1	1	0-1, 1-6	5, 5	IC sample collected using EZ Probe Discrete field duplicate collected as a split
182	182-O3	Other	1.103	0-1, 0-1, 0-1	3			
183	183-O1	Proposed Future House Location	0.026	NA	0			DU not sampled at owners request

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
184	184-H1	House	0.588	0-1, 0-1, 0-1	3			
185	185-A1	Agriculture Area	0.066	0-1, 0-1, 0-1	3			
185	185-G1	Garden	0.001	NA	0			DU not sampled as area too small and surrounded by railroad ties
185	185-H1	House	0.052	0-1	1			
186	186-O1	Other	1.481	0-1, 0-1, 0-1	3			
187	187-H1	House	0.143	0-1, 0-1, 0-1	3	0-1, 1-6	5, 5	Discrete field duplicate collected as a split
188	188-A1	Agriculture Area	1.418	0-1	1			
188	188-G1	Garden	0.282	0-6	1			IC sample depth adjusted due to refusal
188	188-G2	Garden	0.092	0-10	1			IC sample depth adjusted due to refusal
188	188-G3	Garden	0.247	0-6	1			IC sample depth adjusted due to refusal
188	188-H1	House	0.017	0-1	1			
188	188-P1	Play Area	0.674	0-1, 0-1, 0-1	3			
189	189-G1	Garden	0.007	0-4	1			IC sample depth adjusted due to refusal
189	189-H1	House	0.130	0-1, 0-1, 0-1	3			
189	189-H2	House	0.056	0-1	1			
189	189-O1	Other	0.034	0-1	1			
190	190-G1	Garden	0.049	0-4	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
190	190-H1	House	1.121	0-1, 0-1, 0-1	3			
190	190-N1	Animal/ Livestock	0.188	0-3	1			
190	190-N2	Animal/ Livestock	0.374	0-2	1			IC sample depth adjusted due to refusal
190	190-N3	Animal/ Livestock	0.311	0-2	1			IC sample depth adjusted due to refusal
190	190-O1	Other	0.412	0-1	1			
191	191-H1	House	0.220	0-1, 0-1, 0-1	3	0-1, 1-6	5, 5	IC sample locations adjusted, Discrete sample locations adjusted
192	192-A1	Agriculture Area	0.095	0-1	1			

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
192	192-G1	Garden	0.009	0-2	1			IC sample depth adjusted due to refusal
192	192-H1	House	0.478	0-1, 0-1, 0-1	3			
193	193-G1	Garden	0.109	0-12	1			Triplicate moved from this DU to 193-H1
193	193-H1	House	1.264	0-1, 0-1, 0-1	3			Triplicate moved to this DU from 193-G1
194	194-H1	House	0.258	0-1, 0-1, 0-1	3			
194	194-N1	Animal/ Livestock	0.148	0-3	1			
195	195-G1	Garden	0.022	0-8	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
195	195-G2	Garden	0.041	0-7	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
195	195-O1	Proposed Future House Location	0.188	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
196	196-A1	Agriculture Area	2.724	0-1	1			IC sample locations adjusted
196	196-A2	Agriculture Area	1.662	0-1	1			
196	196-G1	Garden	0.032	0-7	1			IC sample depth adjusted due to refusal
196	196-O1	Other	0.449	0-1, 0-1, 0-1	3			
197	197-H1	House	0.174	0-1, 0-1, 0-1	3			
198	198-G1	Garden	0.047	0-4, 0-4, 0-4	3			IC sample depth adjusted due to refusal
198	198-H1	House	0.446	0-1	1			
199	199-G1	Garden	0.026	0-5	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
199	199-O1	Other	0.111	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
200	200-G1	Garden	0.011	0-3	1			DU boundary modified, IC samples adjusted to new area, IC sample depth adjusted due to refusal
200	200-H1	House	0.317	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
200	200-O1	Other	0.016	0-1	1			DU boundary modified, IC samples adjusted to new area, IC sample collected using EZ Probe
201	201-O1	Other	0.182	0-1, 0-1, 0-1	3			
202	202-H1	House	0.182	0-1, 0-1, 0-1	3			DU boundary modified, IC samples adjusted to new area
202	202-N1	Animal/ Livestock	0.004	0-3	1			
202	202-O1	Other	0.292	0-1	1	0-1, 1-6	5, 5	
203	203-H1	House	0.269	0-1	1			IC sample collected using EZ Probe
203	203-O1	Other	0.814	0-1, 0-1, 0-1	3	0-1, 1-6	5, 5	Discrete field duplicate collected as a split
203	203-O2	Other	0.224	0-1	1			IC sample collected using EZ Probe
204	204-A1	Agriculture Area	0.076	NA	0			DU not sampled at owners request
204	204-G1	Garden	0.281	NA	0			DU not sampled at owners request
204	204-H1	House	0.928	NA	0			DU not sampled at owners request
205	205-O1	Proposed Future House Location	1.419	0-1, 0-1, 0-1	3			
206	206-A1	Agriculture Area	0.183	0-1	1			IC sample depth adjusted due to refusal
206	206-G1	Garden	0.093	0-4	1			IC sample depth adjusted due to refusal
206	206-H1	House	0.097	0-1, 0-1, 0-1	3			
206	206-H2	House	0.125	0-1	1			
206	206-O1	Other	0.136	0-1	1			
207	207-O1	Other	0.534	0-1, 0-1, 0-1	3	0-1, 1-6	5, 5	DU boundary modified, IC samples adjusted to new area
208	208-H1	House	0.077	0-1, 0-1, 0-1	3			New Residence, DUs added during sampling event

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
209	209-G1	Garden	0.139	0-1, 0-1, 0-1	3			New Residence, DUs added during sampling event, IC sample depth adjusted due to refusal
209	209-H1	House	0.082	0-1	1			New Residence, DUs added during sampling event
209	209-P1	Play Area	0.119	0-1	1			New Residence, DUs added during sampling event
210	210-H1	House	0.197	0-1	1			New Residence, DUs added during sampling event
210	210-O1	Other	0.076	0-1, 0-1, 0-1	3			New Residence, DUs added during sampling event
211	211-A1	Garden	0.120	0-1	1			DU boundary modified to include 211-G3
211	211-G1	Garden	0.020	0-8	1			New Residence, DUs added during sampling event, depths adjusted due to refusal
211	211-G2	Garden	0.050	0-8	1			New Residence, DUs added during sampling event, depths adjusted due to refusal
211	211-H1	House	0.310	0-1	1			New Residence, DUs added during sampling event
211	211-O1	Other	0.089	0-1, 0-1, 0-1	3			New Residence, DUs added during sampling event
212	212-H1	House	0.171	0-1	1			New Residence, DUs added during sampling event
212	212-H2	House	0.121	0-1, 0-1, 0-1	3			New Residence, DUs added during sampling event
213	213-O1	Other	0.075	0-1	1			New Residence, DUs added during sampling event
213	213-O2	Other	0.114	0-1, 0-1, 0-1	3			New Residence, DUs added during sampling event
213	213-O3	Other	0.074	0-1	1			New Residence, DUs added during sampling event
801	801-O1	Other	0.150	0-1, 0-1, 0-1	3			
801	801-O2	Other	0.077	0-1	1			IC sample collected using trowel

Table 3. Field Sample Summary Table

Residential Property	DU	Rationale for Sampling[1]	DU Size (acres)	Incremental Composite Sample[2]		Discrete Core Samples[2]		Modifications[4]
				Sample Depth (in.)	No. of Samples	Sample Depths (in.)	No. of Samples[3]	
801	801-O3	Other	1.525	0-1	1			
802	802-O1	Other	0.353	0-1, 0-1, 0-1	3			
803	803-O1	Other	0.525	0-1, 0-1, 0-1	3			
803	803-O2	Other	0.238	0-1	1			
803	803-O3	Other	0.279	0-1	1			
804	804-O1	Other	0.425	0-1, 0-1, 0-1	3			
804	804-O2	Other	1.266	0-1	1			
805	805-O1	Other	0.195	0-1	1			
805	805-O2	Other	0.387	0-1, 0-1, 0-1	3			
806	806-O1	Other	0.850	0-1	1			
806	806-O2	Other	0.368	0-1	1			
806	806-O3	Other	0.033	0-1	1			Discrete samples moved from this DU to 806-O4
806	806-O4	Other	0.315	0-1, 0-1, 0-1	3	0-1, 1-6	5, 5	Discrete samples moved to this DU from 806-O3 Discrete field duplicate collected as a split
806	806-O5	Other	0.125	0-1	1			
807	807-O1	Other	0.062	0-1, 0-1, 0-1	3			IC sample collected using trowel
808	808-O1	Other	0.519	0-1, 0-1, 0-1	3			
808	808-O2	Other	0.169	0-1	1	0-1, 1-6	5, 5	Discrete field duplicate collected as a split

Notes

[1] Refer to Final Field Reconnaissance Plan (Ramboll Environ 2016a) for specific DU rationale

[2] See Section 3.3 for sampling methodology

[3] Number of samples *n*, *n* refers to upper interval, lower interval respectively of primary discrete samples A through E. A field duplicate sample was also collected at discrete location E.

[4] Modifications are further described in residence ID Field Modification Forms, Appendix D

Table 4. Quality Assurance / Quality Control Samples

Sample ID	Sample Date	Sample Time	Lab Code
Equipment Blanks (Rinsate Samples)			
16R-EB-147-H1-IC-SO	8/2/2016	1615	K1609126-001
16R-EB-077-A1-IC-SO	8/3/2016	1011	K1609126-002
16R-EB-153-O1-IC-SO	8/4/2016	0950	K1609126-003
16R-EB-084-D1-IC-SO	8/5/2016	1412	K1609126-004
16R-EB-107-H1-IC-SO	8/6/2016	1250	K1609126-005
16R-EB-100-N1-IC-SO	8/7/2016	1203	K1609126-006
16R-EB-122-G2-IC-SO	8/8/2016	1053	K1609126-007
16R-EB-106-O1-IC-SO	8/9/2016	0945	K1609126-008
16R-EB-104-H1-IC-SO	8/16/2016	1016	K1609126-009
16R-EB-133-H1-D6A-SO	8/17/2016	1422	K1609126-010
16R-EB-110-H1-IC-SO	8/18/2016	0932	K1609126-011
16R-EB-118-D6B-SO	8/19/2016	1100	K1609126-012
16R-EB-188-P1-IC-SO	8/20/2016	1005	K1609126-013
16R-EB-203-O1-IC-SO	8/21/2016	1421	K1609126-014
16R-EB-167-O3-IC-SO	8/22/2016	1525	K1609126-015
16R-EB-167-O6-IC-SO	8/23/2016	0930	K1609126-016
16R-EB-135-G1-IC-01	9/7/2016	0925	K1611053-001
16R-EB-803-O1-IC-02	9/8/2016	1005	K1611053-002
16R-EB-806-O3-IC-01	9/9/2016	0855	K1611053-003
16R-EB-149-A1-IC-03	9/10/2016	0943	K1611053-004
16R-EB-174-A1-DIA	9/11/2016	1430	K1611053-005
16R-EB-802-O1-IC-01	9/12/2016	1435	K1611053-006
16R-EB-197-H1-IC-01	9/13/2016	1410	K1611053-007
16R-EB-191-H1-DIA	9/14/2016	1105	K1611053-008
16R-EB-205-O1-IC-03	9/21/2016	1125	K1611053-009
16R-EB-175-G1-IC-01	9/22/2016	0920	K1611053-010
16R-EB-141-H1-IC-01	9/23/2016	0850	K1611053-011
16R-EB-211-G2-IC-01	9/24/2016	1040	K1611053-012
16R-EB-213-O1-IC-01	9/25/2016	0850	K1611053-013
16R-IDW-01	9/25/2016	1200	K1611053-014

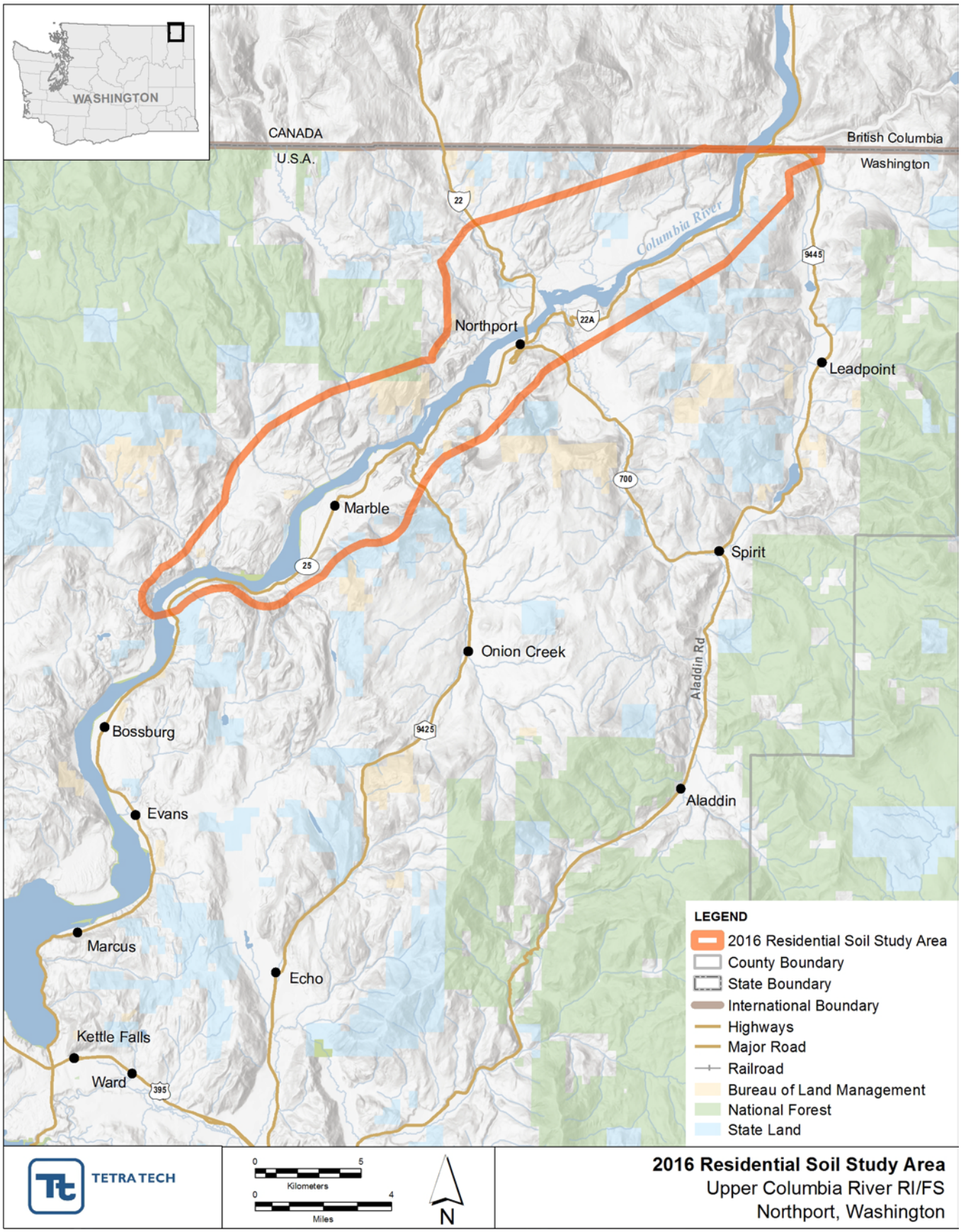

Figure 1. 2016 Residential Soil Study Area

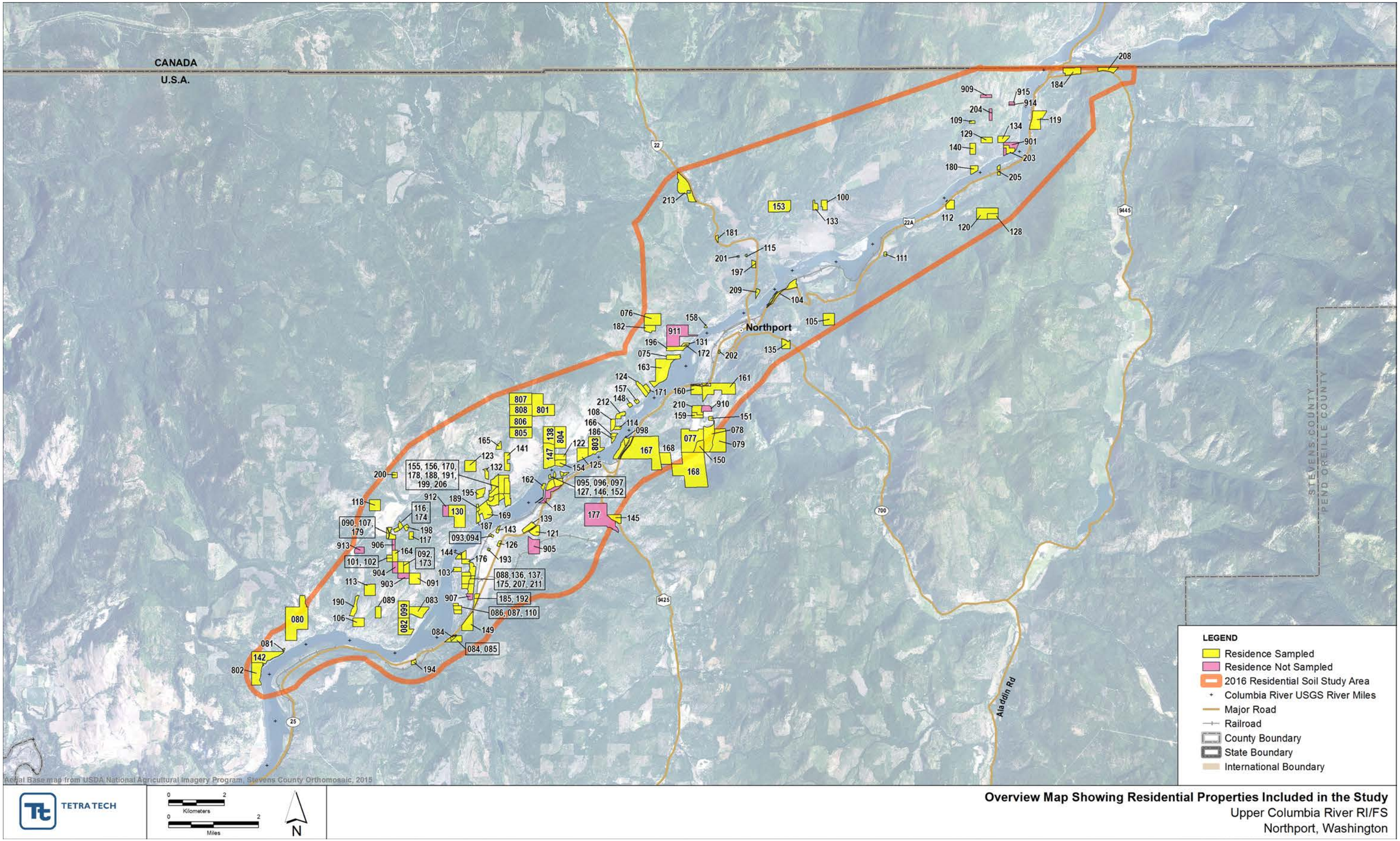

Figure 2. Overview Map Showing Residential Properties Included in the Study