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DEPARTMENT OF ENERGY
Environmental Management Los Alamos Field Office (EM-LA)
Los Alamos, New Mexico 87544

EMLA-2021-BF161-02-001

September 21, 2021

Mr. Ricardo Maestas
Acting Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6313

Subject: Submittal of the Phase II Investigation Work Plan for Potrillo and Fence Canyons Aggregate Area

Dear Mr. Maestas:

Enclosed please find two hard copies with electronic files of the "Phase II Investigation Work Plan for Potrillo and Fence Canyons Aggregate Area." This Phase II investigation work plan presents the proposed sampling and analyses needed to define the vertical and/or lateral extent of one or more contaminants at seven sites recommended for additional investigation in the "Supplemental Investigation Report for Potrillo and Fence Canyons Aggregate Area, Revision 1" approved by the New Mexico Environment Department (NMED) on October 16, 2020. Soil removal activities and confirmation sampling and analyses are presented for three sites that pose a potential unacceptable risk under the industrial scenario or a potential unacceptable ecological risk. This Phase II investigation work plan is being submitted to fulfill a proposed fiscal year 2021 milestone in Appendix B of the 2016 Compliance Order on Consent.

Pre-submission meetings were held with NMED, the U.S. Department of Energy Environmental Management Field Office Los Alamos (EM-LA), and Newport News Nuclear BWXT-Los Alamos, LLC (N3B) on June 24, 2021, and August 19, 2021.

If you have any questions, please contact Brenda Bowlby at (360) 930-4353 (brenda.bowlby@em-la.doe.gov) or Cheryl Rodriguez at (505) 414-0450 (cheryl.rodriguez@em.doe.gov).

Sincerely,

ARTURO DURAN

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Arturo Q. Duran
Compliance and Permitting Manager
Environmental Management
Los Alamos Field Office

Enclosure(s):

1. Two hard copies with electronic files:
   Phase II Investigation Work Plan for Potrillo and Fence Canyons Aggregate Area
   (EM2021-0341)

cc (letter with hard-copy enclosure[s]):
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September 2021
EM2021-0341

Phase II Investigation Work Plan for Potrillo and Fence Canyons Aggregate Area

N3B Los Alamos

EM2021-0341

Phase II Investigation Work Plan for Potrillo and Fence Canyons Aggregate Area

September 2021

Responsible program director:

Michael O. Erickson		Program Director	RCRA Remediation Program	9/9/2021
Printed Name	Signature	Title	Organization	Date

Responsible N3B representative:

Troy Thomson		Acting Program Manager	N3B Environmental Remediation Program	9/9/2021
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Responsible DOE EM-LA representative:

Arturo Q. Duran	ARTURO DURAN Digitally signed by ARTURO DURAN Date: 2021.09.20 12:57:37 -06'00'	Compliance and Permitting Manager	Office of Quality and Regulatory Compliance	
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EXECUTIVE SUMMARY

The Potrillo and Fence Canyons Aggregate Area is located in Technical Areas 15 and 36 of Los Alamos National Laboratory and includes a total of 42 solid waste management units and areas of concern. Of these 42 sites, 15 have been previously investigated and/or remediated and have been approved for no further action. The remaining 27 sites were investigated in 2010, and the results were reported in the approved investigation report, “Investigation Report for Potrillo and Fence Canyons Aggregate Area, Revision 1,” dated November 2011, and the approved supplemental investigation report, “Supplemental Investigation Report for Potrillo and Fence Canyons Aggregate Area, Revision 1,” dated July 2019, for the Potrillo and Fence Canyons Aggregate Area. Of these 27 sites, 9 require additional sampling to define extent of contamination, and 3 of these sites require soil removal. This Phase II investigation work plan presents the proposed sampling and analyses needed to define the vertical and/or lateral extent of one or more contaminants at 9 sites. Soil removal activities and confirmation sampling and analyses are presented for 3 sites that pose a potentially unacceptable risk under the industrial and/or construction worker scenario or a potentially unacceptable ecological risk. The results of the Phase II investigation activities will be reported in a Phase II investigation report.

CONTENTS

Figures

Tables

Appendixes

Plates

1.0 INTRODUCTION

Los Alamos National Laboratory (LANL or the Laboratory) is a multidisciplinary research facility owned by the U.S. Department of Energy (DOE). The Laboratory is located in north-central New Mexico approximately 60 mi northeast of Albuquerque and 20 mi northwest of Santa Fe. The Laboratory site covers 36 mi^2 of the Pajarito Plateau, which consists of a series of fingerlike mesas separated by deep canyons containing perennial and intermittent streams running from west to east. Mesa tops range in elevation from approximately 6200 to 7800 ft above mean sea level. The location of the Potrillo and Fence Canyons Aggregate Area with respect to the Laboratory technical areas is shown in Figure 1.0-1.

The Laboratory has been a participant in a national effort by DOE to clean up sites and facilities formerly involved in weapons research and development. The goal of this effort is to ensure past operations do not threaten human or environmental health and safety in and around Los Alamos County, New Mexico. To achieve this goal, the Laboratory has investigated sites potentially contaminated by past Laboratory operations. These sites are designated as either solid waste management units (SWMUs) or areas of concern (AOCs).

This Phase II investigation work plan (IWP) addresses SWMUs and AOCs within the Potrillo and Fence Canyons Aggregate Area at the Laboratory. These sites are potentially contaminated with hazardous chemicals and radionuclides. Corrective actions at the Laboratory are subject to a Compliance Order on Consent (the Consent Order). The Consent Order was issued pursuant to the New Mexico Hazardous Waste Act, New Mexico Statutes Annotated (NMSA) 1978 Section 74-4-10, and the New Mexico Solid Waste Act, NMSA 1978, Section 74 9 36(D). The New Mexico Environment Department (NMED), pursuant to the New Mexico Hazardous Waste Act, regulates cleanup of hazardous wastes and hazardous constituents. DOE regulates cleanup of radioactive contamination, pursuant to DOE Order 458.1, Administrative Change 4, “Radiation Protection of the Public and the Environment,” and DOE Order 435.1, “Radioactive Waste Management.” Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to NMED in accordance with DOE policy.

1.1 General Site Information

The Potrillo and Fence Canyons Aggregate Area includes a total of 42 SWMUs and AOCs located in Technical Area 15 (TA-15), TA-36, and TA-71 at the Laboratory (Plate 1). TA-71 is a buffer area and has not been used for Laboratory operations. Of these 42 sites, 15 have been previously investigated and/or remediated and have been approved for no further action. The remaining 27 SWMUs and AOCs were addressed in the approved IWP for the Potrillo and Fence Canyons Aggregate Area (LANL 2009, 106657.8; NMED 2009, 106677). These sites were investigated in 2010 and the results documented in the approved investigation report for Potrillo and Fence Canyons Aggregate Area (LANL 2011, 208336; NMED 2011, 208825). Of the 27 sites addressed during the 2010 investigation, the nature and extent of contamination were not defined for 16 SWMUs or AOCs, where additional sampling to define extent was required per the approved investigation report. One site was a duplicate of another site and was not investigated. Complete investigations were not conducted at 10 of the sites that were (1) deferred per Table IV-2 of the 2005 Consent Order, (2) delayed because they are located within 1 of the deferred sites, or (3) delayed because of ongoing open detonation (OD) activities at the site. Sampling was conducted at these sites only to determine if contaminants are migrating off-site. At one additional site, sampling was conducted for planning remediation activities, and excavation and removal activities were suspended at one other site because of health and safety concerns.

After the investigation report was approved, NMED and DOE entered into a framework agreement for the realignment of environmental priorities at the Laboratory. Under the framework agreement, NMED and DOE agreed to review characterization efforts undertaken to date pursuant to the Consent Order to identify those sites where the nature and extent of contamination have been adequately characterized. Pursuant to the framework agreement, the Laboratory reviewed its data evaluation process with respect to U.S. Environmental Protection Agency (EPA) guidance and the framework agreement principles and concluded that the process could be revised to complete site characterization more efficiently, while providing full protection of human health and the environment. Specifically, the process for evaluating data to define extent of contamination was revised to provide a greater emphasis on risk reduction, consistent with EPA guidance.

The revised process was used to evaluate the 2010 data and previous decision-level investigation data for the 16 sites identified as requiring additional sampling to define extent in the approved investigation report for Potrillo and Fence Canyons Aggregate Area (LANL 2011, 208336; NMED 2011, 208825). Based on the evaluation of investigation results using the revised process documented in the approved supplemental investigation report (SIR) (N3B 2019, 700523; NMED 2020, 701070), the extent of contamination has been defined (or a determination has been made that no further sampling for extent is warranted) at 9 sites, and additional sampling for extent is necessary at 7 sites (N3B 2019, 700523). Human health and ecological risk assessments were performed for all 16 sites. Five sites were found to have potential unacceptable human health risks or doses under one or more scenarios. Two sites were found to have potential ecological risks (N3B 2019, 700523).

1.2 Work Plan Overview

This Phase II IWP presents the proposed sampling and analyses needed to define the vertical and/or lateral extent of one or more contaminants at seven sites. Soil removal activities and confirmation sampling and analyses is presented for three sites that pose a potential unacceptable risk under the industrial and/or the construction worker scenarios or a potential unacceptable ecological risk. Table 1.2-1 presents a brief description of the nine sites and the proposed activities for each site.

Section 2 of this Phase II IWP presents the background and conceptual site model of the Potrillo and Fence Canyons Aggregate Area. Section 3 presents site conditions, and section 4 summarizes previous investigations and data collected and presents the scope of proposed activities for each site. Section 5 describes investigation methods for proposed field activities. Ongoing monitoring and sampling programs in the Potrillo and Fence Canyons Aggregate Area are presented in section 6. Section 7 is an overview of the anticipated schedule of the Phase II investigation and reporting activities. The references cited and the map data sources are provided in section 8. Appendix A of this work plan includes a list of acronyms and abbreviations, a metric conversion table, and a data qualifier definitions table. Appendix B describes management of waste generated during implementation of the work plan. Radiological surveys proposed for the Phase II investigation are included in Appendix C.

1.3 Work Plan Objectives

The objective of the Phase II IWP is to complete characterization and corrective actions recommended in the Potrillo and Fence Canyons Aggregate SIR (N3B 2019, 700523) to define the extent of contamination and/or removal of contaminated soil to reduce risk.

To accomplish this objective, the Phase II IWP

- presents historical and background information on the sites;

- summarizes existing information on the nature and extent of contamination and risk;
- describes the rationale for proposed data collection activities;
- identifies and proposes appropriate methods and protocols for collecting, analyzing, and evaluating data to characterize these sites; and
- identifies proposed appropriate methods and protocols for remediating select sites.

2.0 BACKGROUND

2.1 General Site Information

TA-15, also known as R-Site, occupies portions of Threemile Mesa on the Pajarito Plateau near the southwestern boundary of the Laboratory in a roughly rectangular area approximately 1.3 mi wide by 1.5 mi long. TA-15 occupies approximately 1200 acres and is bounded by TA-66 and TA-67 to the north, TA-14, TA-16, TA-37, and TA-49 to the west and south, and TA-36 to the east. The eastern portion of TA-15 is located within the Potrillo and Fence Canyons Aggregate Area; Potrillo Canyon intersects the eastern half of TA-15 (Figure 2.1-1 and Plate 1).

TA-36, also known as Kappa Site, is located in the Potrillo and Fence Canyons in a remote area near the eastern boundary of the Laboratory (Plate 1). TA-36 occupies approximately 3.7 mi^2 in the central-south-central portion of the Laboratory and is bounded to the west and northwest by TA-15, to the east by TA-71 and the town of White Rock, and to the south by TA-39 and TA-68. TA-68 and TA-71 are buffer areas and have not been used for Laboratory operations. Potrillo Canyon intersects TA-36 and Fence Canyon parallels the southern boundary of TA-36 (Figure 2.1-2 and Plate 1).

2.2 Operational History

TA-15 has been used from the mid-1940s to the present for explosives experiments. In that capacity, test explosions were conducted with volumes of high explosives (HE) ranging from a few kilograms to as much as 1100 kg (2500 lb). These experiments used natural uranium metal, depleted uranium (DU) metal, lesser quantities of beryllium, and other metals. In most cases, the tests were carried out aboveground, which resulted in the test materials being scattered over areas. Based on Laboratory records, it is estimated that some 75 metric tons of natural uranium and DU have been expended at the TA-15 firing sites since the mid-1940s (LANL 1993, 020946, pp. E2, E9). TA-15 was used for HE research, development, and testing, primarily through hydrodynamic testing and dynamic experimentation. TA-15 contains the Pulsed High-Energy Radiographic Machine Emitting X-rays (PHERMEX) facility, the Dual-Axis Radiographic Hydrodynamic Test (DARHT) facility, and building 15-206, all of which are or were formerly used for testing weapons under development. Other activities at TA-15 include the investigation of weapons functioning and systems behavior in nonnuclear testing.

TA-36 consists of a series of firing sites that have been used to support explosives experiments from the 1950s to the present. The firing sites and facilities at TA-36 accommodate the shipping, receiving, transporting, and testing of HE. Over 30,000 test shots using an estimated 1000 to 2000 kg (2200 to 4400 lb) of DU have been fired at Kappa Site. Initially, the Kappa Site consisted of group offices; four firing sites named Eenie, Meenie, Minie, and Lower Slobbovia; and a storage magazine. In 1983, the boundary of TA-36 was expanded to incorporate the I-J Firing Site, previously located in TA-15 (LANL 1993, 015313, p. 2-2). Sites investigated at TA-36 include a landfill, a septic system, a surface disposal area, a storage area, the location of a former shot-containment-vessel, a project test area, former burn pits, and an inactive firing site.

2.3 Conceptual Site Model

The sampling proposed in this Phase II IWP uses a conceptual site model to predict areas of potential contamination and to allow adequate characterization of these areas. A conceptual site model describes potential contaminant sources, transport mechanisms, and receptors.

2.3.1 Potential Contaminant Sources

Releases at the sites within the Potrillo and Fence Canyons Aggregate Area may have occurred as a result of firing site and open burn activities; potential leaks from septic systems, sumps, and associated drainlines; discharges from outfalls; and contamination from surface disposal sites, storage areas, and landfills. Previous sampling results indicate contamination from HE, inorganic chemicals, organic chemicals, and radionuclides (N3B 2019, 700523).

2.3.2 Potential Contaminant Transport Mechanisms

Current potential transport mechanisms that may lead to exposure include

- dissolution and/or particulate transport of surface contaminants during precipitation and runoff events,
- airborne transport of contaminated surface soil,
- continued dissolution and advective/dispersive transport of chemical contaminants contained in subsurface soil and tuff as a result of past operations,
- disturbance of contaminants in shallow soil and subsurface tuff by Laboratory operations, and
- disturbance and uptake of contaminants in shallow soil by plants and animals.

2.3.3 Potential Receptors

Potential receptors at one or more of the sites may include

- Laboratory workers,
- construction workers, and
- plants and animals both on-site and in areas immediately surrounding the sites.

Laboratory and construction workers could potentially be exposed to contaminants in soil, tuff, and sediment by direct contact, ingestion, or inhalation. Ecological receptors may also be exposed to contaminants in soil and sediment.

2.3.4 Cleanup Levels

As specified in the Consent Order, soil screening levels (SSLs) for inorganic and organic chemicals (NMED 2019, 700550) may be used as soil cleanup levels unless they are determined to be impracticable or values do not exist for the current and reasonably foreseeable future land uses. Screening action levels (SALs) may be used as soil cleanup levels for radionuclides (LANL 2015, 600929). Screening assessments compare chemical of potential concern (COPC) concentrations for each site with industrial, residential, and construction worker SSLs and SALs.

The human-health cleanup goals specified in Section IX of the Consent Order are a target risk of 1×10^{-5} for carcinogens or a hazard index of 1 for noncarcinogens. For radionuclides, the release requirements in DOE Order 458.1 will be met.

As specified in the Consent Order, ecological cleanup levels may be developed using a methodology and values approved by NMED. LANL created a methodology for developing ecological preliminary remediation goals (EcoPRGs) (LANL 2018, 602891) that was reviewed and approved by NMED (NMED 2018, 602908). The EcoPRGs may be used as cleanup levels for mitigating unacceptable ecological risk.

2.4 Data Overview

This Phase II IWP summarizes the available decision-level data and presents the conclusions of the Potrillo and Fence Canyons Aggregate Area SIR regarding the nature and extent of contamination at each site (N3B 2019, 700523). In addition, this work plan proposes sampling and analyses for those sites at which the extent of contamination has not been defined. The data collected during this investigation, along with existing decision-level data, will be used to define nature and extent and perform risk-screening assessments.

Analytical samples described in this work plan have undergone analyses at off-site laboratories. Because analytical practices and documentation of analyses vary in quality and completeness, analytical data presented are of either screening-level or decision-level data. Screening-level data are appropriate for applications that only require determination of gross contamination areas and/or for site characterization. Screening-level data are also used to specify areas where samples should be collected. Decision-level data are used to quantify the nature and extent of releases and to perform risk assessments. Decision-level data presented in this work plan have been validated for such use and provide supporting information for the investigation activities proposed in the work plan.

3.0 SITE CONDITIONS

Surface and subsurface features and geologic characteristics of the Potrillo and Fence Canyons Aggregate Area are described in detail in the SIR (N3B 2019, 700523). Conditions at the sites addressed in this Phase II IWP are predominantly influenced by

- a semiarid climate with low precipitation and a high evapotranspiration rate that limits the extent of subsurface moisture percolation and, therefore, the amount of moisture available to transport radionuclides or hazardous waste constituents in the subsurface, and
- a thick, relatively dry, unsaturated (vadose) zone that greatly restricts or prevents downward migration of contaminants to the regional aquifer.

These and other elements of the environmental setting in the Potrillo and Fence Canyons Aggregate Area are considered when the investigation data are evaluated with respect to the fate and transport of contaminants.

4.0 SITE DESCRIPTIONS AND PROPOSED INVESTIGATION ACTIVITIES

4.1 SWMU 15-002, Former Burn Pits

4.1.1 Site Description and Operational History

SWMU 15-002 is described in the 1990 SWMU report as an inactive burn pit west of E-F Firing Site at TA-15 (LANL 1990, 007512, p. 88) (Figure 4.1-1). This burn pit (south pit) was surrounded on three sides by a 3-ft-high, 10-ft-diameter earthen berm (LANL 1993, 020946, p. 8-28). A review of engineering drawings and aerial photographs demonstrates that SWMU 15-002 actually consists of three former burn pits. The burn pit originally identified in the 1990 SWMU report is located south of building 15-534. The second burn pit (north pit) is an approximate 5- to 10-ft rectangular area located east of former buildings 15-1 and 15-23. The third burn pit is an approximate 5- to 10-ft rectangular area is located directly east of former building 15-23. By 1958, the third pit had been filled in.

The originally identified south pit is shown on a 1948 engineering drawing (ENG C-15208) and aerial photographs taken between 1946 and 1974 (SNL 1946, 015400; LASL 1948, 105275; USAF 1958, 015826; LASL 1974, 017204). The 1948 aerial photograph shows a bermed area surrounding the pit on three sides (north, west, and south). A small dirt road led to this bermed area. Aerial photographs taken in 1958 still show the bermed area; however, in the photograph the road appears not to have been used for some time and is overgrown with vegetation, indicating the burn site was no longer used (USAF 1958, 015825). Although former employees were not able to provide the exact location for this burn pit, they described it as a site used to burn oil/uranium mixtures and HE (DOE 1986, 036409, p. TA15-7).

Engineering drawings ENG-C 1481 and SK-1301 show the north burn pits east of former buildings 15-1 and 15-23 (LASL 1951, 105277; LASL 1951, 105278).

4.1.2 Summary of Previous Investigations

An aerial radiological survey conducted in 1982 by EG&G Energy Measurements detected no radionuclides at levels above background at the burn pit south of building 15-534 (LANL 1993, 020946, p. 8-28).

During the 1995 and 1996 Phase I Resource Conservation and Recovery Act (RCRA) facility investigations (RFIs) conducted at the burn pit south of building 15-534, a radiological survey was conducted at the site and samples were collected from depths of 0.0–0.5 ft and 1.5–2.0 ft below ground surface (bgs) at each of two locations from within the pit (LANL 1996, 054977, pp. 5-6–5-8). All four samples were submitted for analysis of target analyte list (TAL) metals and semivolatile organic compounds (SVOCs); the two subsurface samples were also analyzed for volatile organic compounds (VOCs). Data from the Phase I RFI are screening-level data and are presented in Appendix B of the historical investigation report (HIR) (LANL 2009, 105251). Screening-level data showed inorganic chemicals detected above background values (BVs), detected VOCs, and isotopic thorium detected above the BVs.

During the 2010 investigation, a total of 30 samples were collected from 10 locations (5 locations each at the southern and northern-most former burn pits) from 0.0–1.0 ft, 3.0–4.0 ft, and 6.0–7.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrate, perchlorate, dioxins/furans, VOCs, SVOCs, total petroleum hydrocarbon (TPH)-diesel range organics (DRO), TPH-gasoline range organics (GRO), explosive compounds, isotopic uranium, and isotopic thorium.

4.1.3 Nature and Extent of Contamination and Risk

Based on the sampling results presented in the approved SIR (N3B 2019, 700523; NMED 2020, 701070), the nature and extent of contamination is defined at the north burn pit and south burn pit. The third burn pit was not investigated in 2010, and the nature and extent of potential contamination is not defined.

Based on the risk-screening assessment results presented in the approved SIR (N3B 2019, 700523; NMED 2020, 701070), the north burn pit at SWMU 15-002 does not pose potential unacceptable risks for the industrial, construction worker, and residential scenarios. The approved SIR concluded no potential ecological risks exist at the north burn pit at SWMU 15-002 (N3B 2019, 700523; NMED 2020, 701070). Therefore, no soil removal activities are required at the north burn pit.

Based on the risk screening assessment results presented in the approved SIR (N3B 2019, 700523; NMED 2020, 701070), the south burn pit at SWMU 15-002 does not pose potential unacceptable carcinogenic risks for the industrial and residential scenarios. No carcinogenic COPCs were identified for the construction worker scenario. SWMU 15-002 south burn pit does pose potential unacceptable noncarcinogenic risks under the industrial, construction worker, and residential scenarios primarily due to barium and mercury (N3B 2019, 700523) (Figure 4.1-2 and Table 4.1-1). The SIR concluded there is the potential for adverse effects to the American robin (all feeding guilds), earthworm, and plant at SWMU 15-002 south burn pit (N3B 2019, 700523). These risks are primarily due to barium and mercury.

4.1.4 Proposed Activities at SWMU 15-002

The third burn pit will be sampled to define the nature and extent of potential contamination. Fifteen samples will be collected from five locations, one in the center of the pit and four step-out locations (locations 2-1 through 2-5 shown in Figure 4.1-3). Samples will be collected from the depth intervals of 0.0–1.0 ft, 3.0–4.0 ft, and 6.0–7.0 ft bgs, corresponding to the depth intervals sampled during the 2010 investigation. Samples will be analyzed for TAL metals, cyanide, nitrate, perchlorate, VOCs, SVOCs, explosive compounds, PCBs, TPH, dioxins/furans, isotopic uranium, isotopic plutonium, and gamma-emitting radionuclides.

The north burn pit will be sampled to define the nature and extent of potential contamination adjacent to the burn pit. Sampling locations during the 2010 investigation where placed 20-ft away from the pit location. Fifteen samples will be collected from five locations, one in the center of the pit and four step-out locations (locations 2-6 through 2-10 shown in Figure 4.1-3). Samples will be collected from the depth intervals of 0.0–1.0 ft, 3.0–4.0 ft, and 6.0–7.0 ft bgs, corresponding to the depth intervals sampled during the 2010 investigation. Samples will be analyzed for TAL metals, cyanide, nitrate, perchlorate, VOCs, SVOCs, explosive compounds, PCBs, TPH, dioxins/furans, isotopic uranium, isotopic plutonium, and gamma-emitting radionuclides.

Corrective actions at the SWMU 15-002 south burn pit to address potential unacceptable ecological risk and human health risk will be performed by removing soil with elevated barium and mercury concentrations. The size of the excavation will be defined by the collection of additional bounding confirmation samples before excavation activities begin. A 15-ft grid will be placed over the burn pit and will extend downgradient to the south and east to collect additional samples to define the extent of contamination for an additional 38 locations (locations 2-11 through 2-48 in Figure 4.1-4). Samples will be collected from the depth intervals of 0.0–1.0 ft, 3.0–4.0 ft, and 6.0–7.0 ft bgs, corresponding to the depth intervals sampled during the 2010 investigation. Samples will be analyzed for TAL metals, cyanide, nitrate, perchlorate, VOCs, SVOCs, explosive compounds, polychlorinated biphenyls (PCBs), TPH, dioxins/furans, isotopic uranium, isotopic plutonium, and gamma-emitting radionuclides.

The proposed sampling and analyses at the SWMU 15-002 south burn pit, north burn pit, and third burn pit are presented in Table 4.1-2, and the proposed sampling locations are shown in Figure 4.1-3 and Figure 4.1-4.

4.2 SWMUs 15-004(b) and 15-004(c), Firing Sites A and B

4.2.1 Site Description and Operational History

SWMU 15-004(b) is inactive Firing Site A, located approximately 450 ft southeast of building 15-183, and SWMU 15-004(c) is inactive Firing Site B, located approximately 525 ft southeast of building 15-183, at TA-15 (Figure 4.2-1). Firing Sites A and B are located approximately 75 ft apart. Firing Site A was among the first firing sites to be used at the Laboratory, and it operated from 1945 to 1953. Aerial photographs taken in 1958 show that the areas of land cleared of vegetation and affected by explosives at these two firing sites were relatively small and located approximately 400 ft south of the bunker (former structure 15-14) and control building (former building 15-74) associated with Firing Sites A and B (USAF 1958, 015826). Both firing sites and associated structures were removed and the ground surface was regraded in 1967. Before they were removed, the bunker and the control building were surveyed and were found to contain no detectable levels of HE or radionuclides (Buckland 1965, 005305; Courtright 1965, 005282).

Information is limited concerning the materials used in tests at Firing Site A, SWMU 15-004(b). Most of the experiments conducted at SWMU 15-004(b) involved small amounts of HE (i.e., up to 23 kg [50 lb]). Tests involving larger quantities of HE were conducted at Firing Site B, SWMU 15-004(c) (LANL 1995, 050294, p. 4-3). Other materials used at Firing Sites A and B included natural uranium, beryllium, lead, mercury, and HE. The amount of uranium used in any one test was a few kilograms (LANL 1993, 020946, p. 8-5).

4.2.2 Summary of Previous Investigations

Past environmental surveys at this site include an aerial radiological survey conducted in 1982 that identified background levels of radiation (LANL 1993, 020946, p. 8-5).

Because of their close proximity, SWMUs 15-004(b) and 15-004(c) were investigated as a combined area during the 1995 Phase I RFI (LANL 1995, 050294, pp. 4-3–4-12). Four samples were collected from two depths (0.0–0.5 ft and 1.5–2.0 ft bgs) at two locations at SWMU 15-004(b) and four samples were collected from two depths (0.0–0.5 ft and 1.5–2.0 ft bgs) at two locations at SWMU 15-004(c); the samples were submitted for analysis of TAL metals. Based on the analytical results, the RFI report recommended that an expedited cleanup be implemented at SWMU 15-004(b) to remove lead contamination (LANL 1996, 054977, p. 4-12). Data from the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed inorganic chemicals detected above BVs and cesium-137 and europium-152 detected or detected above the fallout values (FVs).

A voluntary corrective action (VCA) was conducted at SWMU 15-004(b) in 1996 to determine the extent of lead contamination at the site and to remove soil with lead above the Laboratory-adopted lead preliminary remediation goal (PRG) of 1000 mg/kg (LANL 1996, 055046). A photograph discovered after the Operable Unit (OU) 1086 RFI work plan was prepared indicated the firing site was located farther west than the location described in the work plan; VCA sampling locations were adjusted to reflect the revised site location (LANL 1993, 020946, p. 8-6). The VCA consisted of x-ray fluorescence (XRF) sampling to determine the extent of lead contamination and HE spot testing. Based upon these and the Phase I RFI results, soil was removed until the lead concentrations met the 1000 mg/kg PRG. Five

confirmation soil samples were collected and submitted for analysis of TAL metals, HE, and isotopic uranium; one sample also was analyzed for toxicity characteristic leaching procedure (TCLP) metals for waste characterization purposes (LANL 1996, 055046, p. 8). However, review of historical aerial photographs during the preparation of the HIR and IWP revealed that the locations of Firing Sites A and B [SWMUs 15-004(b) and 15-004(c)] are south of the areas investigated during the 1995 RFI and the 1996 VCA (LANL 2009, 105251). The RFI and VCA were conducted near the former control building (former building 15-74) and former bunker (former structure 15-14), approximately 400 ft north of the actual locations of the two former firing sites. The data from samples collected during the 1996 VCA are not representative of the former firing site locations but are located within the proposed sampling grid in the approved IWP (LANL 2009, 106657.8; NMED 2009, 106677) and therefore are included in this work plan.

During the 2010 investigation, a grid (100 ft × 100 ft) was established over the entire area around the former control building and bunker locations and south to include the 2 firing points and the area around the firing points to the mesa edge. A total of 162 field-screening samples were collected at 81 grid locations from 0.0–1.0 ft and 3.0–4.0 ft bgs and screened for organic vapors; gross-alpha, -beta, and -gamma radioactivity; explosive compounds [2,4,6-trinitrotoluene (TNT) and Royal Demolition Explosive (hexahydro-1,3,5-trinitro-1,3,5-triazine) (RDX)]; and metals (barium, copper, lead, and uranium). A total of 14 samples were collected from 7 locations from 0.0–1.0 ft and 3.0–4.0 ft bgs based on elevated metals field-screening results. A total of 24 samples were collected from 12 random locations across the site; 22 samples were collected from 11 locations from 0.0–1.0 ft and 3.0–4.0 ft bgs and 2 samples were collected from 1 location from 0.0–1.0 ft and 1.0–2.0 ft bgs. Two samples were collected at 1 location from SWMU 15-004(b) from 0.0–1.0 ft and 3.0–4.0 ft bgs. Two samples were collected at 1 location from SWMU 15-004(c) from 0.0–1.0 ft and 3.0–4.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, cyanide, perchlorate, nitrate, VOCs, SVOCs, explosive compounds, americium-241, isotopic uranium, and gamma-emitting radionuclides. Two of the samples were analyzed for dioxins/furans and PCBs. The sampling locations for the dioxin/furan and PCB analyses were selected based on their proximity to the potential contaminant source.

4.2.3 Nature and Extent of Contamination and Risk

Based on the sampling results presented in the approved SIR (N3B 2019, 700523; NMED 2020, 701070), the nature and extent of contamination have been defined or no further sampling for extent is warranted at SWMUs 15-004(b) and 15-004(c), except for the following:

- Vertical extent of thallium at locations 15-613330, 15-613341, and 15-613351 (Plate 2 and Table 4.2-1)

Based on the risk-screening assessment results presented in the approved SIR (N3B 2019, 700523; NMED 2020, 701070), SWMUs 15-004(b) and 15-004(c) do not pose potential unacceptable risks or dose for the industrial, construction worker, and residential scenarios. The SIR concluded no potential for ecological risk exists at SWMUs 15-004(b) and 15-004(c) (N3B 2019, 700523; NMED 2020, 701070).

4.2.4 Proposed Activities at SWMUs 15-004(b) and 15-004(c)

Samples will be collected from locations 15-613330, 15-613341, and 15-613351 at depth intervals of 5.0–6.0 ft and 8.0–9.0 ft bgs to define the vertical extent of thallium. Samples will be analyzed for thallium. The proposed sampling and analyses at SWMUs 15-004(b) and 15-004(c) are presented in Table 4.2-2, and the proposed sampling locations are shown in Figure 4.2-2.

4.3 SWMU 15-004(f), E-F Firing Site

4.3.1 Site Description and Operational History

SWMU 15-004(f) is an inactive firing site, E-F Firing Site, that consists of three inactive firing points (D, E, and F) covering a total area of approximately 60 acres at TA-15 (Figure 4.3-1). E-F Firing Site began operating in 1946 and was last used in 1981. It was operated extensively from 1947 to 1973 and was the largest firing site at the Laboratory (LANL 1993, 020946, p. 7-3).

Originally, E-F Firing Site consisted of a single firing point (D) that was built in 1946 and that ceased to operate in 1949 (LANL 1990, 007512, p. 69). In 1947, the firing area was expanded to include Firing Point E, which was used for large-scale shots containing up to 1100 kg (2500 lb) of HE, and Firing Point F, which was used for smaller-scale shots. Firing Points E and F were approximately 650 ft apart and were wired to an underground control bunker (structure 15-27). Tests at the two firing points were conducted on the ground and created depressions in the ground. After test shots, the firing points were either regraded or backfilled with gravel to fill in the depressions. Eventually, nearby soil was mounded on the north and south sides of Firing Point E to protect structures at TA-15 from shrapnel (LANL 1993, 020946, pp. 7-3–7-5). Tests at E-F Firing Site involved HE, uranium, beryllium, lead, and mercury (LANL 1993, 020946, p. 7-8).

4.3.2 Summary of Previous Investigations

The site was surveyed in 1982 by EG&G Energy Measurements with radiological detectors mounted in a helicopter as part of a survey of the entire Laboratory. Results of this effort identified elevated levels of radiation at the site (LANL 1993, 020946, p. 7-3).

During the 1994 Phase I RFI conducted at SWMU 15-004(f), a 200-ft grid was established over the site. Surface samples (0.0–0.5 ft bgs) were collected from 85 locations from selected grid points, and subsurface samples (1.5–2.0 ft bgs) were collected from a subset of 35 of the sampling locations (LANL 1995, 050294, pp. 4-23–4-57). Samples were field-screened for radioactivity, metals, and HE. Based on the field-screening results, 43 surface samples and 17 subsurface samples collected from 53 locations were submitted for analysis of radionuclides and TAL metals (LANL 1995, 050294, pp. 4-23–4-57).

In 1999, the Laboratory submitted a plan for a technology feasibility demonstration project at SWMU 15-004(f) to NMED (LANL 1999, 063100). An environmental pilot treatment study was conducted in 2001 at E-F Firing Site. The process was designed to selectively remove uranium by precipitation. The soil was sluiced to separate large uranium aggregates, heaped into containers, and leached with a sodium bicarbonate solution. The soil was then placed on a drying tray and the leachate was pumped into a settling tank, where its pH was adjusted to 6.5 using phosphoric acid, followed by passage through a container of apatite mineral (DOE 2001, 070068, p. 6). Although the pilot treatment study was implemented, a report was never produced.

The objective of the SWMU 15-004(f) 2010 investigation was not to determine the nature and extent of contamination but rather to identify areas and depths of soil requiring corrective actions. Samples were collected at the previous 1994 RFI grid sampling locations and at the two earthen mounds to characterize the site to support corrective actions and determine if residual contamination poses an unacceptable risk based on an industrial scenario. In addition, the two earthen mounds were characterized to determine waste disposition requirements and if any portion of the soil could be spread over the site as part of site restoration following corrective actions (LANL 2009, 106657.8; NMED 2009, 106677).

Samples were also collected from sediment catchment areas in the drainages downgradient of the site to determine if contaminants are migrating from the site.

During the 2010 investigation, the 1994 RFI grid sampling locations were reestablished across the site at 42 locations where screening- and decision-level data from previous investigations showed inorganic chemicals detected above BVs and/or radionuclides detected or detected above BVs/FVs and at 51 locations where no inorganic chemicals or radionuclides were detected above BVs or BVs/FVs during previous investigations.

A total of 42 samples were collected at 42 grid sampling locations from 2 depth intervals (3.0–3.5 ft or 3.0–4.0 ft bgs). Specifically, 33 samples were collected from 3.0–4.0 ft bgs, and 9 samples were collected from 3.0–3.5 ft bgs. All 42 samples were analyzed for TAL metals, explosive compounds, and isotopic uranium. One of the 42 samples was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.

A total of 57 samples were collected from 18 locations within the earthen mounds at Firing Point E. All samples were field-screened for metals (barium, copper, lead, and uranium) using an XRF, and additional samples collected if field-screening results were elevated. Samples were collected from depths of 0.0–1.0 ft, 6.0–7.0 ft, and 9.0–10.0 ft bgs or deeper, based on field-screening results. Refusal was encountered at the base of several boreholes within the earthen mounds; therefore, it was not possible to collect samples from the bottommost sampling depth interval at some locations. All mound samples were analyzed for TAL metals, explosive compounds, and isotopic uranium. One of the 57 mound samples was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.

Twelve sediment samples were collected from 6 drainage locations downgradient of the site from 2 depth intervals (0.0–0.5 ft or 0.0–1.0 ft bgs and 0.5–1.0 ft, 1.0–1.5 ft, 1.0–2.0 ft, or 2.0-3.0 ft bgs) at each location. All sediment samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, explosive compounds, and isotopic uranium. One of the 12 samples was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.

4.3.3 Nature and Extent of Contamination and Risk

Based on the sampling results presented in the approved SIR (N3B 2019, 700523; NMED 2020, 701070), nature and extent of contamination have been defined or no further sampling for extent is warranted at SWMU 15-004(f), except for the following:

- Vertical extent of copper at locations 15-613366 and 15-613374 (Plate 3 and Table 4.3-1)
- Vertical extent of uranium was not evaluated
- Vertical extent of uranium-234 at locations 15-613370, 15-613374, 15-613380, and 15-613386 (Plate 4 and Table 4.3-2)
- Vertical extent of uranium-235/236 at locations 15-613370, 15-613374, 15-613380, and 15-613386 (Plate 4 and Table 4.3-2)
- Vertical extent of uranium-238 at locations 15-613370, 15-613374, 15-613380, 15-613386, and 15-613389 (Plate 4 and Table 4.3-2)

Based on the risk-screening assessment results presented in the approved SIR (N3B 2019, 700523; NMED 2020, 701070), SWMU 15-004(f) does not pose potential unacceptable risks or dose for the

industrial scenario and does not pose potential unacceptable dose for the construction worker scenario. SWMU 15-004(f) does pose potential unacceptable risks for the construction worker and residential scenarios, and poses potential unacceptable dose for the residential scenario from the soil and tuff. The risks are driven by copper, manganese, and uranium.

The SIR concluded there is the potential for adverse effects to the American robin (all feeding guilds), deer mouse, montane shrew, earthworm, and plant at SWMU 15-004(f) from copper, lead, mercury, and uranium (N3B 2019, 700523; NMED 2020, 701070).

4.3.4 Proposed Activities at SWMU 15-004(f)

Corrective actions to address potential unacceptable human health risk and ecological risk at Firing Point E will be performed by removing the material from the two mounds and to the top of the tuff. This will reduce elevated concentrations of copper, manganese, uranium-234, uranium-235/236, and uranium-238. Confirmatory samples will be collected from 0.0–1.0 ft and 3.0-4.0 ft beneath the excavation at six locations (4f-1, 4f-2, 4f-3, 4f-4, 4f-5, and 4f-6, shown in Plate 5). The size of the excavation will be defined by collection of bounding confirmation samples before excavation activities begin. Twenty locations (4f-7 through 4f-26, shown on Plate 5) will be placed every 50 ft outside the proposed excavation boundary of the Firing Point E mounds to define the lateral extent of contamination. Samples will be collected from 0.0–1.0 ft and 3.0-4.0 ft bgs, corresponding to the depth intervals sampled during the 2010 investigation. Samples will be analyzed for TAL metals, explosive compounds, isotopic uranium, and total uranium.

Corrective actions to address potential unacceptable human health dose from uranium-234, uranium-235/236, and uranium-238 at location 15-02155 will be performed by removing contaminated material to a depth of 3 ft bgs. The size of the excavation will be determined by collection of bounding confirmation samples before excavation activities begin. Eight locations (4f-27 through 4f-34, shown on Plate 5) will be placed outside the proposed excavation boundary of existing location 15-02155 to define the lateral extent of uranium-234, uranium-235/236, and uranium-238. Samples will be collected from 0.0–1.0 ft and 3.0-4.0 ft bgs, corresponding to the depth intervals sampled during the 2010 investigation. Samples will be analyzed for isotopic uranium.

Corrective actions to address potential unacceptable human health risk from manganese at location 15-02162 will be performed by removing contaminated material to a depth of 3 ft bgs. The size of the excavation will be determined by collection of bounding confirmation samples before excavation activities begin. Eight locations (4f-35 through 4f-42, shown on Plate 5) will be placed outside the proposed excavation boundary of existing location 15-02162 to define the lateral extent of manganese. Samples will be collected from 0.0–1.0 ft and 3.0-4.0 ft bgs, corresponding to the depth intervals sampled during the 2010 investigation. This excavation will be conducted with the excavation for location 15-02228, which is described below. Samples will be analyzed for lead, manganese, and total uranium.

Corrective actions to address potential unacceptable ecological risk from lead and potential unacceptable human health risk from total uranium at location 15-02228 will be performed by removing contaminated material to a depth of 3 ft bgs. This excavation will be conducted with the excavation for location 15-02162 and will use the same bounding confirmation samples. The size of the excavation will be determined by collection of bounding confirmation samples before excavation activities begin. Eight locations (4f-35 through 4f-42, shown on Plate 5) will be placed outside the proposed excavation boundary of existing location 15-02228 to define the lateral extent of lead and total uranium. Samples will be collected from 0.0–1.0 ft and 3.0-4.0 ft bgs, corresponding to the depth intervals sampled during the 2010 investigation. Samples will be analyzed for lead, manganese, and total uranium.

Corrective actions to address potential unacceptable ecological risk from lead at locations 15-02277 and 15-02278 will be performed by removing contaminated material to a depth of 3 ft bgs. The size of the excavation will be determined by collection of bounding confirmation samples before excavation activities begin. Eight locations (4f-43 through 4f-50, shown on Plate 5) will be placed outside the proposed excavation boundary of existing locations 15-02277 and 15-02278 to define the lateral extent of lead. Samples will be collected from 0.0–1.0 ft and 3.0-4.0 ft bgs, corresponding to the depth intervals sampled during the 2010 investigation. Samples will be analyzed for lead.

Samples will be collected from location 15-613386 at depth intervals of 2.0–3.0 ft and 4.0-5.0 ft bgs to define the vertical extent of uranium-234, uranium-235/236, and uranium-238.

Samples will be collected from location 15-613389 at depth intervals of 1.0–2.0 ft and 3.0-4.0 ft bgs to define the vertical extent of uranium-234, uranium-235/236, and uranium-238.

Additional samples will be collected to the west of E-F Firing Site to define the lateral extent of potential contamination to the west of location 15-02155. Three locations (4f-51, 4f-52, and 4f-53, shown on Plate 5) will be placed 50 ft west of existing locations 15-02144, 15-02155, and 15-02166. Samples will be collected from 0.0–1.0 ft and 3.0-4.0 ft bgs, corresponding to the depth intervals sampled during the 2010 investigation. Samples will be analyzed for TAL metals, explosive compounds, isotopic uranium, isotopic plutonium, and gamma-emitting radionuclides.

A new Field Instrument for Detection of Low-Energy Radiation (FIDLER) or similar instrument will be used over the 60-acre site to evaluate current conditions. Samples will be collected at locations with radiological readings greater than twice background to determine if contamination exists. Samples will be collected from 0.0–1.0 ft and 3.0-4.0 ft bgs, corresponding to the depth intervals sampled during the 2010 investigation. Samples will be analyzed for TAL metals, explosive compounds, isotopic uranium, isotopic plutonium, and gamma-emitting radionuclides.

The proposed sampling and analyses at SWMU 15-004(f) are presented in Table 4.3-3, and the proposed sampling locations are shown on Plate 5.

4.4 SWMU 15-008(a), Two Surface Disposal Areas at E-F Firing Site

4.4.1 Site Description and Operational History

SWMU 15-008(a) consists of two small surface disposal areas located on the edge of Potrillo Canyon, one south and one east of E-F Firing Site [SWMU 15-004(f)], at TA-15 (Figure 4.4-1). The disposal areas are located within approximately 350 ft of each other, with each disposal area having dimensions of approximately 8 ft in diameter × 2 ft high. Both areas were used to dispose of debris from tests conducted at the E-F Firing Site, including soil, rock, pebbles, metal fragments, plastic, electrical cable, and electrical accessories. The exact period of operation of the surface disposal areas is not known but probably falls within the period of operation for E-F Firing Site (1946 to 1981) (LANL 1993, 020946, p. 7-20). Debris was removed from both surface disposal areas during the 2010 investigation.

4.4.2 Summary of Previous Investigations

An aerial radiological survey conducted in 1982 identified no areas of elevated levels of radioactivity at SWMU 15-008(a) (LANL 1993, 020946, p. 7-3).

During the 1994 Phase I RFI conducted at SWMU 15-008(a), three surface samples (0.0–0.5 ft bgs) were collected from each of the two debris piles and four surface samples (0.0–0.5 ft bgs) were collected from nearby drainages (LANL 1995, 050294, pp. 4-23–4-57). The samples were field-screened for

radioactivity, metals, and HE and submitted for analysis of radionuclides and TAL metals (LANL 1995, 050294, pp. 4-23–4-57).

During the 2010 investigation, a total of 24 samples were collected from 12 locations within the surface debris piles and around the boundaries of the surface debris piles. At each location, samples were collected from 2 depths. All samples were analyzed at off-site fixed laboratories for TAL metals, cyanide, perchlorate, nitrate, VOCs, SVOCs, explosive compounds, PCBs, and isotopic uranium. Two samples were analyzed for dioxins/furans. The sampling locations for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.

4.4.3 Nature and Extent of Contamination and Risk

Based on the sampling results presented in the approved SIR (N3B 2019, 700523; NMED 2020, 701070), nature and extent of contamination have been defined or no further sampling for extent is warranted at SWMU 15-008(a), except for the following:

- Extent of total uranium was not evaluated because the samples collected in 2010 were analyzed for uranium isotopes rather than total uranium (Figure 4.4-2, Plate 6, and Tables 4.4-1 and 4.4-2).

Based on the risk-screening assessment results presented in the approved SIR (N3B 2019, 700523; NMED 2020, 701070), no potential unacceptable cancer risks exist for the industrial, construction worker, and residential scenarios at SWMU 15-008(a). No potential unacceptable noncancer risk exists for the industrial scenario, and no potential unacceptable doses exist for the industrial and construction worker scenarios. However, potential unacceptable noncancer risks exist from uranium under the construction worker and residential scenarios, and a potential unacceptable dose exists from isotopic uranium under the residential scenario. The SIR concluded no potential ecological risks exists at SWMU 15-008(a) (N3B 2019, 700523; NMED 2020, 701070).

4.4.4 Proposed Activities at SWMU 15-008(a)

Corrective actions to address potential unacceptable human health risk from total uranium at location 15-02242 will be performed by removing contaminated material to a depth of 3 ft bgs. The size of the excavation will be determined by collection of bounding samples before excavation activities begin. A 20-ft sampling grid will be placed over the northeastern disposal pit and will extend downgradient to the south and east. A total of 60 samples will be collected from 30 locations to define the extent of uranium contamination (Figure 4.4-3). Samples will be collected from the depth intervals of 0.0–1.0 ft and 3.0–4.0 ft bgs, corresponding to the depth intervals sampled during the 1994 and 2010 investigations.

All samples will be analyzed for total uranium and isotopic uranium. The proposed sampling and analyses at SWMU 15-008(a) are presented in Table 4.4-3, and the proposed sampling locations are shown in Figure 4.4-3.

4.5 SWMU 15-009(e), Septic Tank

4.5.1 Site Description and Operational History

SWMU 15-009(e) is a decommissioned 1500-gal. septic tank (structure 15-72) at E-F Firing Site [SWMU 15-004(f)] at TA-15 (Figure 4.5-1). The septic tank was constructed in 1947 and received sanitary waste from the E-F Firing Site control building (15-27), located approximately 175 ft northeast of the tank. The septic tank is constructed of 4- to 6-in. reinforced concrete and is 9 ft long × 7 ft deep × 5 ft wide (LANL 1993, 020946, pp. 7-21, 10-20). The septic tank was used until 1981 when E-F Firing Site last

operated. Discharges from the septic tank flowed through a vitrified clay pipe to an outfall located approximately 40 ft southwest of the decommissioned septic tank to the edge of Potrillo Canyon (LANL 1997, 074091, p. 1).

4.5.2 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 15-009(e), two samples of the septic tank contents were collected and submitted for analysis of radionuclides, TAL metals, VOCs, and SVOCs (LANL 1995, 050294, pp. 4-23–4-57). Data from the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed inorganic chemicals detected above BVs.

Based on the results of the Phase I RFI, a VCA was conducted at SWMU 15-009(e) in 1997 to remove the contents of the septic tank, pressure-wash the interior of the septic tank, collect concrete-chip samples from the interior of the tank to demonstrate the adequacy of the corrective action, and collect a rinsate sample for waste characterization purposes (LANL 1997, 074091, p. 15). Twelve soil samples were collected beneath the septic tank inlet and outlet, next to and below the septic tank, and from the outfall area and drainage channel downgradient of the outfall (LANL 1997, 074091, pp. 1–3). The samples were submitted for analysis of HE and TAL metals; a subset of the samples was also analyzed for VOCs and SVOCs. The tank and drainlines were filled and plugged with expandable concrete and left in place.

During the 2010 investigation, a total of six samples were collected from three locations at the outfall and within the drainage. At each location, samples were collected from two depths. All samples were analyzed at off-site fixed laboratories for TAL metals, cyanide, perchlorate, nitrate, VOCs, SVOCs, explosive compounds, and isotopic uranium. One sample was analyzed for dioxins/furans and PCBs.

4.5.3 Nature and Extent of Contamination and Risk

The nature and extent of contamination have not been defined because samples were inadvertently collected from 0.0–1.0 ft and 3.0–4.0 ft bgs, not below the septic tank and drainlines.

4.5.4 Proposed Activities at SWMU 15-009(e)

Samples will be collected from existing locations 15-02514, 15-02515, and 15-02516 at depth intervals of 0.0–1.0 ft and 3.0–4.0 ft below the septic tank inlet, the septic tank, and the septic tank outlet. Four locations (9e-1, 9e-2, 9e-3, and 9e-4, shown in Figure 4.5-2) will be placed beneath the drainline at the outlet from the building, halfway between the building and the septic tank, next to the septic tank on the east side, and between the septic tank and the outfall to define the extent of potential contamination. Samples will be collected from the depth intervals of 0.0–1.0 ft and 3.0–4.0 ft below the drainline.

One location (9e-5, shown in Figure 4.5-2) will be placed at the outfall to define the extent of potential contamination. Samples will be collected from the depth intervals of 0.0–1.0 ft and 3.0–4.0 ft bgs. Two locations (9e-6 and 9e-7, shown in Figure 4.5-2) will be placed 10 ft and 20 ft downgradient of the outfall to define the extent of potential contamination. Samples will be collected from the depth intervals of 0.0–1.0 ft and 3.0–4.0 ft bgs.

All samples will be analyzed for TAL metals, cyanide, nitrate, perchlorate, pH, VOCs, SVOCs, explosive compounds, and isotopic uranium. The proposed sampling and analyses at SWMU 15-009(e) are presented in Table 4.5-1, and the proposed sampling locations are shown in Figure 4.5-2.

4.6 SWMU 36-001, Material Disposal Area AA

4.6.1 Site Description and Operational History

SWMU 36-001 consists of Material Disposal Area (MDA) AA, a landfill located approximately 240 ft southwest of a control bunker (building 36-120) and 100 ft southwest of the x-ray device building (building 36-86) at TA-36 (Figure 4.6-1). MDA AA consists of three disposal trenches and a disposal pit that contain burned debris from test shots conducted at the Lower Slobbovia Firing Site (LANL 2011, 208336). The dimensions of the north and middle disposal trenches are approximately 20 ft wide × 70 ft long × 5.5 ft deep, and the southern trench dimensions are approximately 20 ft wide × 130 ft long × 5 ft deep (LANL 2011, 208336). The disposal pit is located south of the trenches and is approximately 30 ft in diameter × 5.3 feet deep. The debris, including metal, wood, and sand contaminated with barium, uranium, other inorganic chemicals, plastics, and HE, was transported by truck from the Lower Slobbovia Firing Site, placed in the trenches, and burned. Once a trench was filled, it was covered with approximately 4 ft of soil. MDA AA was constructed in the mid-1960s, and the site was closed in 1989 (LANL 2019, 700523).

4.6.2 Summary of Previous Investigations

Phase I RFI activities were conducted at SWMU 36-001 from 1993 to 1996 (LANL 1996, 054733, pp. 5.1–5.9). Initial RFI activities consisted of geophysical surveys using electromagnetic (EM), magnetometer/gradiometer, and ground-penetrating radar (GPR) techniques to define the trenches. Geophysical survey results showed the presence of buried debris but did not delineate the boundaries of discrete disposal trenches. As a result, an exploratory drilling program was conducted to define the extent of buried materials. Approximately 88 boreholes were drilled, and ash and/or debris were found at 21 borehole locations, which helped delineate 2 disposal trenches. Once the trenches had been delineated, samples were collected from borehole locations with elevated field-screening results. Five boreholes were advanced into the north trench and 4 boreholes were advanced into the south trench. Samples were collected at 3 depth intervals in each borehole. Two of the depth intervals were in the ash/debris zone, and 1 was approximately 2.0 ft below the bottom of each trench. In addition, samples of fill/cover material were collected at 3 of the borehole locations, field-screened for organic vapors, radioactivity, and HE, and submitted for analysis of TAL metals, isotopic uranium, VOCs, SVOCs, and HE (LANL 1996, 054733, pp. 5-1–5-9). The data collected from 7 of the 9 sampling locations during the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed inorganic chemicals detected above BVs, detected organic chemicals, and uranium isotopes detected above BVs.

In addition to the Phase I RFI, interim action activities were conducted in 1996 to implement erosion-control measures around SWMU 36-001 (LANL 1996, 054449, pp. 1–7). During the interim action, erosion gullies were stabilized near SWMU 36-001 to prevent encroachment onto the site and erosion of the soil cover over the trenches.

The 2009 IWP for Potrillo and Fence Canyons Aggregate Area (LANL 2009, 106657.8) called for the excavation of the disposal trenches and removal and disposal of waste. These activities were initiated during the 2010 investigation but were suspended shortly thereafter because of potential health and safety concerns. Specifically, higher than expected radiation levels and the potential presence of beryllium were encountered during the initial stages of waste removal at SWMU 36-001. The Laboratory notified NMED of these conditions and proposed halting waste removal activities and conducting additional investigations to collect data needed to address potential health and safety concerns (LANL 2010, 111304). NMED agreed with this approach and indicated the Laboratory should conduct this

additional characterization and use the data to develop a plan for future actions at SWMU 36-001 (NMED 2010, 111464).

During the 2010 investigation, geophysical surveys using EM, magnetometer/gradiometer, GPR, and resistivity and induced polarization techniques were performed to delineate the trench boundaries within the landfill. Survey results at SWMU 36-001 showed three distinct landfill trenches and a pit containing significant buried metal. Using the geophysical survey results, a total of 22 samples were collected from 7 locations within the landfill boundaries and the pit. A total of 18 samples were collected from 6 locations and 3 depths within the trench boundaries. Four samples were collected from 1 location and 4 depths at the pit location. All samples were analyzed at off-site fixed laboratories for TAL metals, cyanide, perchlorate, nitrate, VOCs, SVOCs, explosive compounds, dioxins/furans, PCBs, americium-241, isotopic plutonium, isotopic thorium, isotopic uranium, strontium-90, total uranium, tritium, and gamma-emitting radionuclides (LANL 2011, 208336).

4.6.3 Nature and Extent of Contamination and Risk

Based on the sampling results presented in the approved SIR (N3B 2019, 700523; NMED 2020, 701070), nature and extent of contamination have been defined or no further sampling for extent is warranted at SWMU 36-001, except for lateral extent of potential contamination around the periphery of the landfill because no samples were collected in these areas during the 2010 investigation.

Based on the risk-screening assessment results, the SIR (N3B 2019, 700523; NMED 2020, 701070) concluded that no potential unacceptable risks or doses exist for the industrial and construction worker scenarios at SWMU 36-001. There is no potential unacceptable risk for the residential scenario at SWMU 36-001; however, there is a potential unacceptable dose under the residential scenario from uranium-238 (Plates 7 and 8). The SIR concluded that no potential ecological risks for any receptor exist at SWMU 36-001 (N3B 2019, 700523; NMED 2020, 701070).

4.6.4 Proposed Activities at SWMU 36-001

A 25-ft sampling grid will be placed over SWMU 36-001 to define the lateral extent of potential contamination around the periphery of the landfill and in areas not previously sampled within the landfill. A total of 135 samples will be collected from 45 locations (locations 1-1 to 1-45, shown in Figure 4.6-2). Samples will be collected from depth intervals 0–1.0 ft, 4.0–5.0 ft, and 9.0–10.0 ft bgs and will be analyzed for TAL metals, cyanide, nitrate, perchlorate, pH, VOCs, SVOCs, explosive compounds, dioxins/furans, PCBs, isotopic plutonium, isotopic thorium, and isotopic uranium. The proposed sampling and analyses at SWMU 36-001 are presented in Table 4.6-1 and sampling locations are shown in Figure 4.6-2.

4.7 SWMU 36-003(b), Septic System, I-J Site

4.7.1 Site Description and Operational History

SWMU 36-003(b) is a decommissioned septic system located at the west end of TA-36 (Figure 4.7-1). The septic system served building 36-55, the control bunker for the I-J Firing Site, and consists of a septic tank (structure 36-61) and its associated drainlines and outfall. The septic tank sits near the edge of Mesita del Potrillo, approximately 100 ft southeast of building 36-55 (LANL 1993, 015313, p. 5-24). The control bunker housed the electronics and instrumentation used in the operation of the I-J Firing Site [AOC 36-004(e)] and also contained a toilet, sink, and water fountain, all of which were connected to the septic tank via a 4-in.-diameter clay-tile pipe (LASL 1949, 105276). The septic tank is constructed of reinforced concrete and measures 7 ft long × 3.5 ft wide × 5.73 ft deep with a capacity of 420 gal. The

tank has a buried overflow pipe that previously discharged near the north rim of Potrillo Canyon. The overflow pipe was capped in 1989. After the overflow pipe was capped, the septic tank continued to be used and its contents were periodically removed and taken to a sanitary wastewater treatment plant for treatment and disposal (LANL 1993, 015313, p. 5-24). The septic system was taken out of service in the early 1990s.

4.7.2 Summary of Previous Investigations

The contents of the SWMU 36-003(b) septic tank were sampled in 1981; analytical data confirmed HE was not present (LANL 1993, 015313, p. 5-27). During the 1994 Phase I RFI conducted at SWMU 36-003(b), two samples of the liquid were collected from one location within the tank and four sludge samples were collected from three locations within the tank (LANL 1995, 053985, pp. 5-4–5-12). In addition, five surface samples (0.0–0.5 ft bgs) were collected from four locations in the drainage channel downgradient of the outfall. The samples were field-screened for organic vapors, radioactivity, and HE and submitted for analysis of TAL metals, HE, VOCs, and SVOCs (LANL 1995, 053985, p. 1-15). Data from the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed inorganic chemicals detected above BVs and detected HE.

The 1996 VCA implemented at SWMU 36-003(b) included removing the septic tank contents, pressure-washing the tank, and filling the tank with expanding cement. The contents of the tank were disposed of as low-level radioactive waste at Area G at TA-54 and at the TA-50 Radioactive Liquid Waste Treatment Facility. No confirmation samples were collected (LANL 1996, 055072, pp. 1–4).

During the 2010 investigation, a total of 16 samples were collected from 8 locations. At each location, samples were collected at the surface and from 2 subsurface depths. All samples were analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrate, perchlorate, VOCs, SVOCs, explosive compounds, and isotopic uranium. In addition, 1 sample was analyzed for dioxins/furans and PCBs.

4.7.3 Nature and Extent of Contamination and Risk

The nature and extent of contamination have not been defined because samples were inadvertently collected from 0.0–1.0 ft and 3.0–4.0 ft bgs, and not below the septic tank and drainlines.

4.7.4 Proposed Activities at SWMU 36-003(b)

Six locations (3b-1, 3b-2, 3b-3, 3b-4, 3b-5, and 3b-6, shown in Figure 4.7-2) will be placed beneath the drainline downgradient of the edge of the concrete pad that is outside the building, halfway between the building and the septic tank, under the inlet to the septic tank, under the septic tank, under the outlet from the septic tank, and halfway between the septic tank and the outfall to define the extent of potential contamination. Samples will be collected from the depth intervals of 0.0–1.0 ft and 3.0–4.0 ft below the structures. All samples will be analyzed for TAL metals, cyanide, nitrate, perchlorate, pH, VOCs, SVOCs, explosive compounds, PCBs, dioxins/furans, and isotopic uranium. The proposed sampling and analyses at SWMU 36-003(b) are presented in Table 4.7-1, and the proposed sampling locations are shown in Figure 4.7-2.

4.8 SWMU 36-005, Storage Area

4.8.1 Site Description and Operational History

SWMU 36-005 consists of a former storage area (known as the "Boneyard") located near the head of Fence Canyon between the Meenie and Minie Firing Sites [AOCs 36-004(b) and 36-004(c), respectively] at TA-36 (Figure 4.8-1 and Plate 1). The approximately 260-ft × 300-ft storage area is undeveloped and largely covered with grass and ponderosa pine. From the 1950s to the late 1970s, the Boneyard was used as a parking lot for trailers and a storage area for large non-waste items. From the late 1970s to the late 1980s, the site was used to store large waste items exposed to explosives tests (Kelkar 1992, 012470), including metal drums, cans, cylinders, and scrap metals such as lead sheets, copper, uranium-contaminated steel, and iron (LANL 1993, 020946, p. 5-53).

In the late 1980s, a major cleanup was conducted at the site. Cans labeled isopentane, uranium-contaminated iron and steel, drums, and cylinders were removed during this cleanup effort (LANL 1993, 020946, p. 5-53).

4.8.2 Summary of Previous Investigations

Previous environmental investigations at SWMU 36-005 include a radiological survey and sampling performed by the DOE environmental survey in 1988. This effort involved collecting six grab samples from four locations showing elevated radiation levels and six grab samples from locations showing visible staining or debris (LANL 1993, 015313, pp. 5-55–5-56).

The Phase I RFI conducted at SWMU 36-005 in 1994 included land, geomorphic, and radiological surveys (LANL 1995, 053985, pp. 4-12–4-13). The radiological survey identified no areas of elevated radiation. Thirty-one surface soil samples (0.0–0.5 ft bgs) were collected from 27 locations. Nine of these locations were within the current active storage area; 9 were in the drainage channel downgradient of the site; and 9 were from random locations, including 3 locations outside the Boneyard. The samples were field-screened for VOCs, radioactivity, and HE and submitted for analysis of TAL metals, isotopic uranium, and VOCs. Data collected during the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed inorganic chemicals detected above BVs, detected organic chemicals, and uranium-235 detected above the BV.

Based on Phase I RFI results, a Phase II RFI was conducted in 1997 involving the collection of subsurface samples at locations where the maximum concentrations of organic chemicals were detected in Phase I RFI samples. Four subsurface soil samples were collected from three locations from depths ranging from 1.0–3.3 ft bgs. The samples were submitted for analysis of VOCs.

During the 2010 investigation, cultural resource issues were raised by Laboratory archaeologists, causing work activities to be suspended. The Laboratory was aware of cultural resources located at SWMU 36-005; however, additional archaeological sites were discovered during a site visit by Laboratory archaeologists in 2010. It was determined that full clearance by the State Historical Preservation Office to collect samples (and remove debris) may not be possible and the review process to reach this determination would extend beyond the due date of the investigation report. An alternate sampling approach was proposed that included 3 transects across the slope downgradient of the site. A total of 28 samples were collected from 10 locations in the drainage downgradient of the site. At each location, samples were collected at the surface and from the subsurface. All samples were analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrate, perchlorate, VOCs, SVOCs, explosive compounds, and isotopic uranium. In addition, 1 sample was analyzed for dioxins/furans and 3 samples were analyzed for PCBs.

4.8.3 Nature and Extent of Contamination and Risk

Based on the sampling results presented in the approved SIR (N3B 2019, 700523; NMED 2020, 701070), nature and extent of contamination have not been defined at SWMU 36-005. Samples were not collected from within the SWMU boundary because of cultural resource issues associated with additional archaeological sites being discovered.

4.8.4 Proposed Activities at SWMU 36-005

SWMU 36-005 is partially within a cultural resource site. A majority of the samples proposed for the 2010 investigation could not be collected because of cultural resource site restrictions. Before implementing the planned investigation, all proposed sample locations will require clearance from the State Historical Preservation Office. A 100-ft grid will be placed over the former storage area to collect samples to define the vertical and lateral extent of potential contamination from 25 sampling locations (locations 5-1 through 5-25, shown in Figure 4.8-2). Samples will be collected from 3 depths (0.0–1.0 ft, 2.0–3.0 ft, and 4.0–5.0 ft bgs), and will be analyzed for TAL metals, cyanide, nitrate, perchlorate, pH, VOCs, SVOCs, explosive compounds, PCBs, dioxins/furans, and isotopic uranium. The proposed sampling and analyses at SWMU 36-003(b) are presented in Table 4.8-1, and the proposed sampling locations are shown in Figure 4.8-2.

5.0 INVESTIGATION METHODS

A summary of investigation methods to be implemented is presented in Table 5.0-1. Summaries of the field investigation methods are provided below.

Chemical and radiological analyses will be performed in accordance with the Newport News Nuclear BWXT-Los Alamos, LLC (N3B) Exhibit D, “Scope of Work and Technical Specifications for Off-Site Analytical Laboratory Services.” Accredited off-site contract analytical laboratories will use the most recent EPA and industry-accepted extraction and analytical methods for chemical analyses of analytical suites.

5.1 Establishing Sampling Locations

Proposed sampling locations are identified for each site based on engineering drawings, surveyed locations of existing structures, previous sampling locations, and topography or other features identified in the field. The coordinates of proposed locations will be obtained by georeferencing the points from the proposed sampling maps. The coordinates will be used to locate flags or other markers in the field using a differential global positioning system (GPS) unit. If any proposed sampling locations are moved because of field conditions, utilities, or other unexpected circumstances, the new locations will be surveyed immediately following sample collection as described in section 5.2.

5.2 Geodetic Surveys

Geodetic surveys will be conducted to locate historical structures and to document field activities such as sampling and excavation locations. The surveyors will use a Trimble GeoXT handheld GPS, or equivalent, for the surveys. The coordinate values will be expressed in the New Mexico State Plane Coordinate System (transverse Mercator), Central Zone, North American Datum 1983. Elevations will be reported per the National Geodetic Vertical Datum of 1929.

5.3 Sampling

Soil, sediment, and rock samples will be collected by the most efficient, least invasive method practicable. The methods will be determined by the field team based on site conditions such as topography, the nature of the material to be sampled, the depth intervals sampled, and accessibility. Typically, samples will be collected using spade-and-scoop, hand-auger, or hollow-stem auger drilling methods. For all methods, samples for VOC analysis will be transferred immediately from the sampling tool to the sample container to minimize the loss of subsurface VOCs during the sample collection process. Containers for VOC samples will be filled as completely as possible, leaving no or minimal headspace, and sealed with a Teflon-lined cap.

5.3.1 Surface Samples

Surface and shallow subsurface samples will be collected in accordance with standard operating procedure (SOP) N3B-SOP-ER-2001, “Soil, Tuff, and Sediment Sampling.” Stainless-steel shovels, spades, scoops, and bowls will be used for ease of decontamination. If the surface location is at bedrock, an axe or hammer and chisel may be used to collect samples.

5.3.2 Sediment Samples

Sediment samples will be collected from areas of sediment accumulation that include sediment judged to be representative of the historical period of Laboratory operations (i.e., post-1943). Sediment samples will be collected using spade-and-scoop (see section 5.3.1) and/or hand-auger (see section 5.3.3.1) methods. Actual sediment sampling locations will be selected in the field based on geomorphic relationships in areas likely to have been affected by discharges from the SWMU. Because sediment is dynamic and subject to redistribution by runoff events, locations may need to be adjusted when this work plan is implemented. In the course of collecting sediment samples, it may be determined, based on field conditions, that the selected location is not appropriate (e.g., the sediment is much shallower than anticipated, the sediment is predominantly coarse grained, or the sediment shows evidence of being older than the target age). Sediment sampling locations will be adjusted as appropriate based on geomorphic verification to ensure sampling locations are in the drainage(s) downgradient of the site. Any revised locations will be surveyed and the updated coordinates will be submitted for inclusion in the appropriate database.

5.3.3 Subsurface Samples

Subsurface sampling is proposed that may include surface soil and fill, sediment, and tuff. Subsurface samples will be collected using hand- or hollow-stem auger methods, depending on the depth of the samples and the material being sampled. A brief description of these methods is provided below.

5.3.3.1 Hand Auger

Hand augers or power-assisted augers may be used to drill shallow holes at locations that can be sampled without the use of a drill rig and at locations inaccessible by a drill rig. The hand auger is advanced by turning the auger into the soil or tuff until the barrel is filled. The auger is removed and the sample is placed in a stainless-steel bowl. Hand-auger samples will be collected in accordance with N3B-SOP-ER-2001, “Soil, Tuff, and Sediment Sampling.”

5.3.3.2 Hollow-Stem Auger

A drill rig equipped with a hollow-stem auger may be used to drill deeper holes at locations that cannot be sampled using a hand-auger or power-assisted augers. The hollow-stem auger consists of a hollow steel shaft with a continuous spiraled steel flight welded onto the exterior of the stem. The stem is connected to an auger bit; when it is rotated, it transports cuttings to the surface. The hollow stem of the auger allows insertion of drill rods, split-spoon core barrels, Shelby tubes, and other samplers through the center of the auger so samples may be retrieved during drilling operations.

A bottom plug or pilot bit can be fastened onto the bottom of the auger to keep out most of the soil and/or water that tends to clog the bottom of augers during drilling. Drilling without a center plug is acceptable if the soil plug, formed in the bottom of the auger, is removed before sampling or installing a well casing. The soil plug can be removed by washing out the plug using a side-discharge rotary bit or by auguring out the plug with a solid-stem auger bit sized to fit inside the hollow-stem auger.

During sampling, the auger will be advanced to just above the desired sampling interval. The sample will be collected by driving a split-spoon sampler into undisturbed soil/tuff to the desired depth. Samples will be collected in accordance with N3B-SOP-ER-2001, “Soil, Tuff, and Sediment Sampling.”

Field documentation will include detailed borehole logs for each borehole drilled using the hollow-stem auger method. The borehole logs will document the matrix material in detail and will include the results of all field screening; fractures and matrix samples will be assigned unique identifiers.

5.4 Borehole Abandonment

All hollow-stem auger boreholes will be properly abandoned in accordance with N3B-SOP-ER-6005, “Monitoring Well and Borehole Abandonment.” All boreholes are expected to have a total depth of 20 ft or less and will be abandoned by filling the borehole with bentonite chips and then hydrating the chips in 1- to 2-ft lifts. The borehole will be visually inspected while the bentonite chips are added to ensure bridging does not occur.

The use of backfill materials, such as bentonite and grout, will be documented in a field logbook with regard to volume (calculated and actual), intervals of placement, and additives used to enhance backfilling. All borehole abandonment information will be provided in the Phase II IR.

5.5 Field-Screening Methods

The primary field-screening methods to be used on samples include radiological screening and organic vapor screening using a photoionization detector (PID). Field screening for HE may also be required by the facility operator.

Field screening will be used primarily for health and safety purposes and for determining transportability of samples from the field sites to the Sample Management Office (SMO) and from the SMO to the analytical laboratories. Field-screening results may be used at the discretion of the field personnel to identify the need to collect additional samples beyond those planned or to extend the depth of sampling as required. Field changes to sampling plans will be approved by the subcontractor technical representative and will be documented on field paperwork and in the Phase II IR.

5.5.1 Radiological Screening

Based on the results of past sampling, field screening for radioactivity will be conducted primarily to ensure worker health and safety and to meet U.S. Department of Transportation shipping requirements, rather than to direct sampling. Radiological screening will target gross-alpha, -beta, and -gamma radiation. Field screening for alpha, beta, and gamma radiation will be conducted on soil and core material using appropriate field instruments. Instruments will be calibrated in accordance with N3B Radiation Protection Program requirements. All instrument calibration activities will be documented daily in the field logbooks.

5.5.2 Organic Vapor Field Screening

Based on 2010 investigation results, significant VOC contamination is not expected to be encountered, and screening will be conducted for health and safety purposes.

Vapor screening of soil, sediment, and subsurface core will be conducted using a PID equipped with an 11.7-electronvolt lamp and capable of measuring quantities as low as 1.0 ppm. All samples will be screened for organic vapors in headspace gas.

The PID will be calibrated daily to the manufacturer's standard for instrument operation, and the daily calibration results will be documented in the field logbooks. All instrument background checks, background ranges, and calibration procedures will be documented daily in the field logbooks.

5.6 Requesting Samples through the Sample Management Office

Sample collection and analyses shall be coordinated with the N3B SMO. Per N3B-SOP-SDM-1101, "Sample Control and Field Documentation," to notify the SMO, knowledgeable sampling personnel must complete Sample Request Module training, obtain sample plan requestor permission within the N3B Environmental Information Management (EIM) database, and submit a sample plan request at least 5 days prior to the sampling event. Once the sample plan request is submitted, a summarized copy will be available for download. The sample plan requestor will be notified by the SMO if the plan is rejected, accepted, or if changes are necessary, and when the sampling paperwork is available. Sampling paperwork will consist of sample collection logs, container labels, and a shipping classification determination checklist.

5.7 Chain of Custody for Samples

The collection, screening, and transport of samples will be documented on standard forms generated by the SMO. These include sample collection logs, chain-of-custody forms, and sample container labels. Sample collection logs will be completed at the time of sample collection and signed by the sampler and a reviewer who will verify the logs for completeness and accuracy. Corresponding labels will be initialed and applied to each sample container, and custody seals will be placed around container lids or openings. Chain-of-custody forms will be completed and signed to verify that sample custody has been maintained throughout the sample life cycle.

5.8 Quality Assurance/Quality Control Samples

Quality assurance (QA) and quality control (QC) samples will include field duplicates, field rinsate samples, and field trip blanks. Field duplicates and equipment rinsate blanks will be collected at an overall frequency of at least 1 for every 10 regular samples at each SWMU/AOC, or as directed by the current

version of N3B-SOP-SDM-1100, “Sample Containers, Preservation, and Field Quality Control.” Field trip blanks will be collected at a rate of at least 1 per day on days when VOC samples are collected.

5.9 Radiological Surveys

Radiological surveys will be performed to identify areas of elevated radioactivity. The radiological surveys to be employed include FIDLER and the Ludlum Measurement, Inc., Model 44-10 2-in. × 2-in. sodium iodide (NaI) scintillator detector. Details on radiological survey instrumentation, sensitivity, and site application are provided in Appendix C.

5.10 Cleanup Activities

SWMUs 15-002, 15-004(f), and 15-008(a) are proposed for remediation under this Phase II IWP. Excavation of contaminated media, waste disposition, and confirmation sampling will be completed at these sites. Excavations will be completed using a track excavator, backhoe, or by hand. The general sequence of activities for excavation, transportation, disposal, and confirmation sampling is summarized below. Specific details are provided in sections 4.1.4, 4.3.4, and 4.4.4.

5.10.1 Confirmation Sampling

Confirmation sampling will be performed at all sites requiring remediation before excavation to define excavation boundaries (sections 4.1.4, 4.3.4, and 4.4.4).

5.10.2 Removal of Contaminated Soil

- Mobilization
    - ❖ Prepare staging area
    - ❖ Determine boundaries of contamination after surveying and staking coordinates of the area to be excavate, as identified in this Phase II IWP
    - ❖ Identify underground utilities
    - ❖ Mobilize heavy equipment to site
- Site preparation
    - ❖ Install fencing
    - ❖ Install storm water controls
    - ❖ Conduct pre-excavation survey
- Removal of contaminated soil
    - ❖ Excavate contaminated soil
    - ❖ Stockpile and load rolloff container
    - ❖ Survey boundaries of excavation
    - ❖ Characterize waste for dispositioning
    - ❖ Transport waste to off-site disposal facility

- Backfill
    - ❖ Backfill and compact
    - ❖ Vegetate surface
    - ❖ Survey finished surface
- Demobilize

5.10.3 Waste Management and Disposal

Management of all investigation waste, including waste generated during cleanup, is described in Appendix B.

5.11 Laboratory Analytical Methods

Analytical suites for samples to be collected include TAL metals, nitrate, perchlorate, total cyanide, SVOCs, VOCs, PCBs, explosive compounds, dioxins/furans, total uranium, americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, isotopic thorium, and tritium. Analytical methods are summarized in Table 5.11-1. Sample collection and analysis will be coordinated with the SMO.

Analytical results meet the N3B minimum data quality objectives (DQOs) as outlined in N3B-PLN-SDM-1000, "Sample and Data Management Plan." N3B-PLN-SDM-1000 sets the validation frequency criteria at 100% Level 1 examination and Level 2 verification of data, and at 10% minimum Level 3 validation of data. A Level 1 examination assesses the completeness of the data as delivered from the analytical laboratory, identifies any reporting errors, and checks the usability of the data based on the analytical laboratory's evaluation of the data. A Level 2 verification evaluates the data to determine the extent to which the laboratory met the analytical method and the contract-specific quality control and reporting requirements. A Level 3 validation includes Levels 1 and 2 criteria and determines the effect of potential anomalies encountered during analysis and possible effects on data quality and usability. A Level 3 validation is performed manually with method-specific data validation procedures. Laboratory analytical data are validated by N3B personnel as outlined in N3B-PLN-SDM-1000; N3B-AP-SDM-3000, "General Guidelines for Data Validation"; N3B-AP-SDM-3014, "Examination and Verification of Analytical Data"; and additional method-specific analytical data validation procedures. All associated validation procedures have been developed, where applicable, from the EPA QA/G-8 Guidance on Environmental Data Verification and Data Validation, the Department of Defense/Department of Energy Consolidated Quality Systems Manual for Environmental Laboratories, the EPA National Functional Guidelines for Data Validation, and the American National Standards Institute/American Nuclear Society 41.5, "Verification and Validation of Radiological Data."

5.12 Health and Safety

The field investigations described in this Phase II IWP will comply with all applicable requirements pertaining to worker health and safety. An integrated work control document and a site-specific health and safety plan will be in place before fieldwork is conducted.

5.13 Equipment Decontamination

Equipment for drilling and sampling will be decontaminated before and after sampling activities to minimize the potential for cross-contamination. Dry decontamination methods will be used whenever

possible to minimize waste and avoid generating liquid waste. Dry decontamination uses disposable paper towels and over-the-counter cleaner, such as Fantastik or equivalent. All sampling equipment will be decontaminated in accordance with N3B-SOP-ER-2002, “Field Decontamination of Equipment.”

Dry decontamination may be followed by wet decontamination, if necessary. Wet decontamination may include washing with a nonphosphate detergent and water, followed by a water rinse and a second rinse with deionized water. Alternatively, drilling/exploration equipment that may come in contact with a borehole will be decontaminated by steam cleaning, by hot water pressure-washing, or by another method before each borehole is drilled. The equipment will be pressure-washed on a high-density polyethylene liner at a temporary decontamination pad. Cleaning solutions and wash water will be collected and contained for proper disposal. Decontamination solutions will be sampled and analyzed to determine the final disposition of the wastewater and the effectiveness of the decontamination procedures.

5.14 Waste Management

Waste generated during field-investigation activities may include, but is not limited to, drill cuttings; contaminated soil; contaminated personal protective equipment (PPE), sampling supplies, and plastic; fluids from the decontamination of PPE and sampling equipment; and all other waste that has potentially come into contact with contaminants.

All waste generated during field-investigation activities will be managed in accordance with N3B-AP-TRU-2150, “Waste Characterization Strategy Form,” applicable EPA and NMED regulations, and DOE orders. Appendix B presents the waste management plan.

6.0 MONITORING PROGRAMS

Groundwater, sediment, and surface-water monitoring are conducted in the Potrillo and Fence Canyons Aggregate Area as part of other environmental activities. This monitoring is summarized below.

6.1 Groundwater

Groundwater monitoring is not performed to specifically monitor potential releases from any of the sites addressed in this Phase II IWP. Monitoring of alluvial, perched-intermediate, and regional groundwater within the Pajarito Canyon watershed and Water Canyon watershed is performed under the Consent Order as described for the General Surveillance monitoring group and the TA-16 260 monitoring group, respectively in the Interim Facility-Wide Groundwater Monitoring Plan (e.g., N3B 2020, 701041).

6.2 Storm Water

Six SWMUs and seven AOCs (Plate 1) are subject to the storm water monitoring requirements of a National Pollutant Discharge Elimination System Individual Permit (IP) for storm water discharges from SWMUs and AOCs. Monitoring under the IP is performed using site monitoring areas (SMAs) that monitor storm water runoff from individual SWMUs and AOCs or groups of SWMUs and AOCs. The SMAs in the Potrillo and Fence Canyons Aggregate Area monitored under the IP and the corresponding sites are

- F-SMA-2: AOC 36-004(c)
- PT-SMA-0.5: SWMU 15-009(e) and AOC C-15-004
- PT-SMA-1: SWMUs 15-004(f) and 15-008(a)

- PT-SMA-2: SWMU 36-003(b) and AOCs 15-008(f) and 36-004(e)
- PT-SMA-2.01: AOCs C-36-001 and C-36-006(e)
- PT-SMA-3: SWMU 36-006 and AOC 36-004(a)
- PT-SMA-4.2: SWMU 36-004(d)

The monitoring results are reported to EPA annually.

7.0 SCHEDULE

Following approval of this work plan, the work will be implemented in accordance with milestones or targets for the Southern External Boundary Campaign established under the 2016 Consent Order.

8.0 REFERENCES AND MAP DATA SOURCES

8.1 References

The following reference list includes documents cited in this plan. Parenthetical information following each reference provides the author(s), publication date, and ERID, ESHID, or EMID. This information is also included in text citations. ERIDs were assigned by the Laboratory's Associate Directorate for Environmental Management (IDs through 599999); ESHIDs were assigned by the Laboratory's Associate Directorate for Environment, Safety, and Health (IDs 600000 through 699999); and EMIDs are assigned by N3B (IDs 700000 and above). IDs are used to locate documents in N3B's Records Management System and in the Master Reference Set. The NMED Hazardous Waste Bureau and N3B maintain copies of the Master Reference Set. The set ensures that NMED has the references to review documents. The set is updated when new references are cited in documents.

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8.2 Map Data Sources

Map data sources used in original figures and/or plates created for this report are described below and identified by legend title.

Legend Item	Data Source
LANL Technical Areas	Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 04 December 2008.
Paved roads	Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
Paved parking	Paved Parking; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
Dirt roads	Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
LANL structures	Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
LANL fence lines	Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
LANL communications lines	Communication Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 08 August 2002; as published 28 May 2009.
LANL electric lines	Primary Electric Grid; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
LANL gas lines	Primary Gas Distribution Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
LANL sewer lines	Sewer Line System; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
LANL steam lines	Steam Line Distribution System; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 15 January 2009.
LANL water lines	Water Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
LANL industrial waste lines	Primary Industrial Waste Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 15 October 2008.
LANL historical sampling locations	Point Feature Locations of the Environmental Restoration Project Database; Los Alamos National Laboratory, Waste and Environmental Services Division, 5 June 2010.
LANL PRS boundaries	Potential Release Sites; Los Alamos National Laboratory, Waste and Environmental Services Division, Environmental Data and Analysis Group, EP2009-0137; 1:2,500 Scale Data; 25 January 2010.
Contours	Hypsography, 2, 10, 20, and 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.

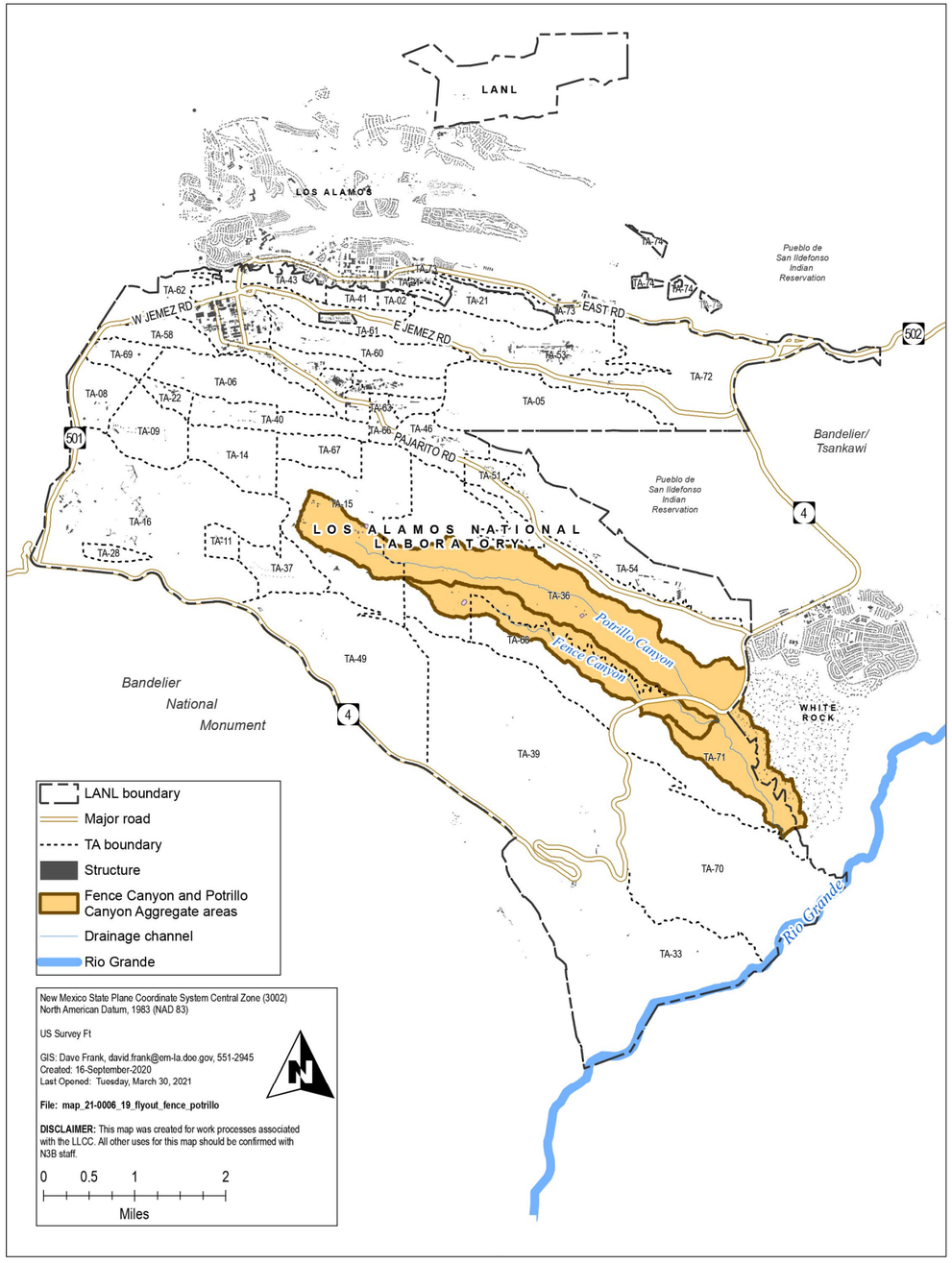


Figure 1.0-1 Location of Potrillo and Fence Canyons Aggregate Area with respect to Laboratory technical areas

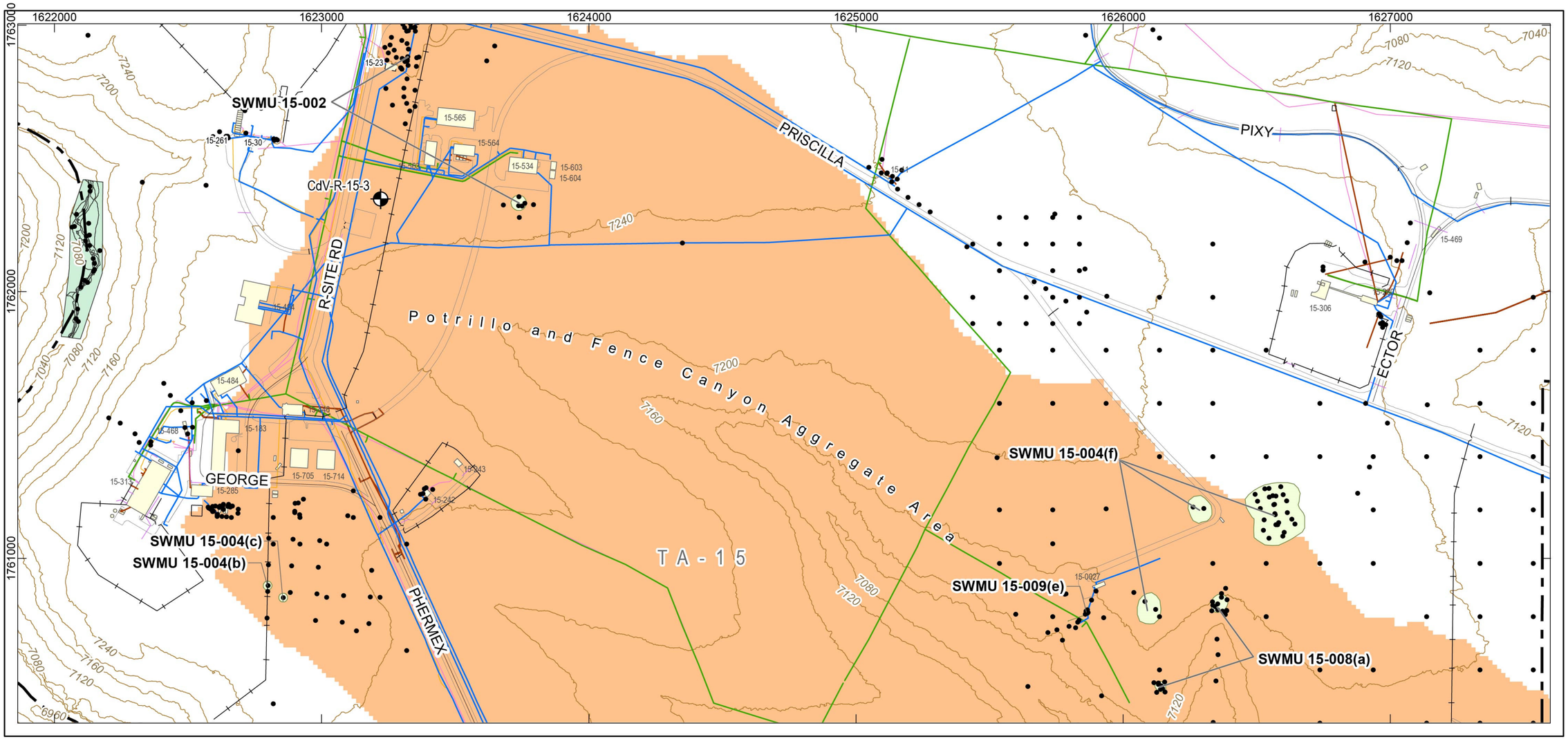


Figure 2.1-1 TA-15 SWMUs within Potrillo and Fence Canyons Aggregate Area

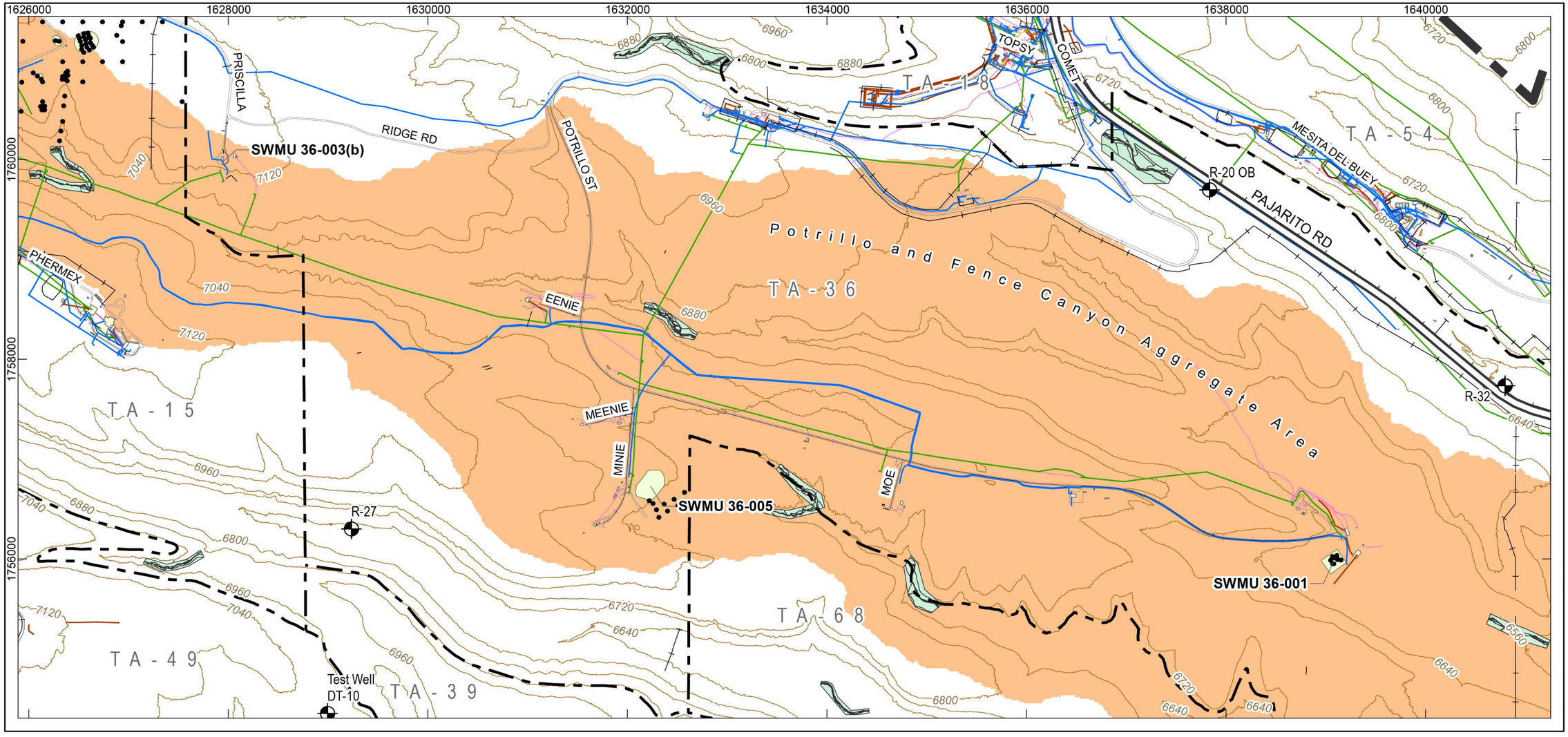


Figure 2.1-2 TA-36 SWMUs within Potrillo and Fence Canyons Aggregate Area

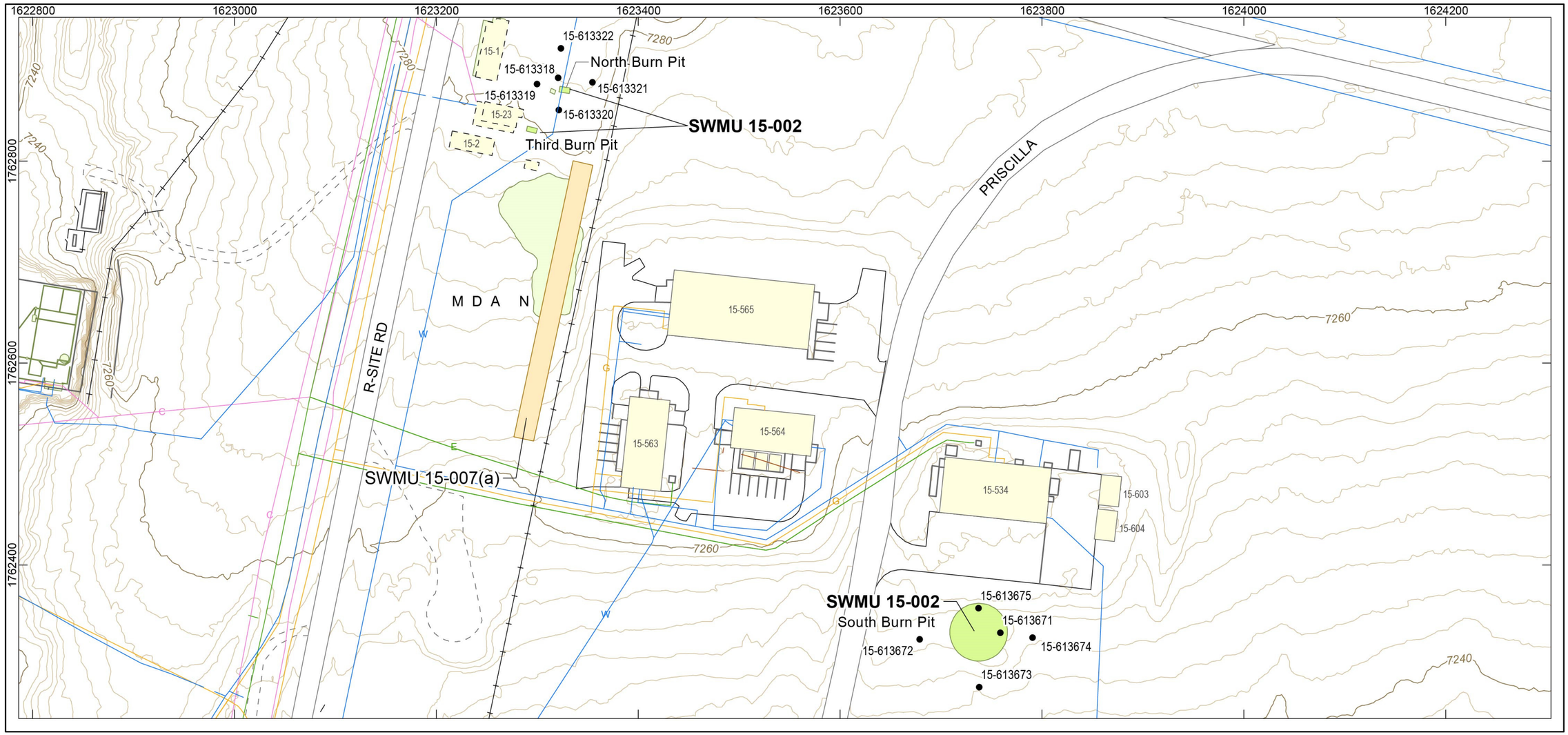


Figure 4.1-1 Site map and sampling locations at SWMU 15-002

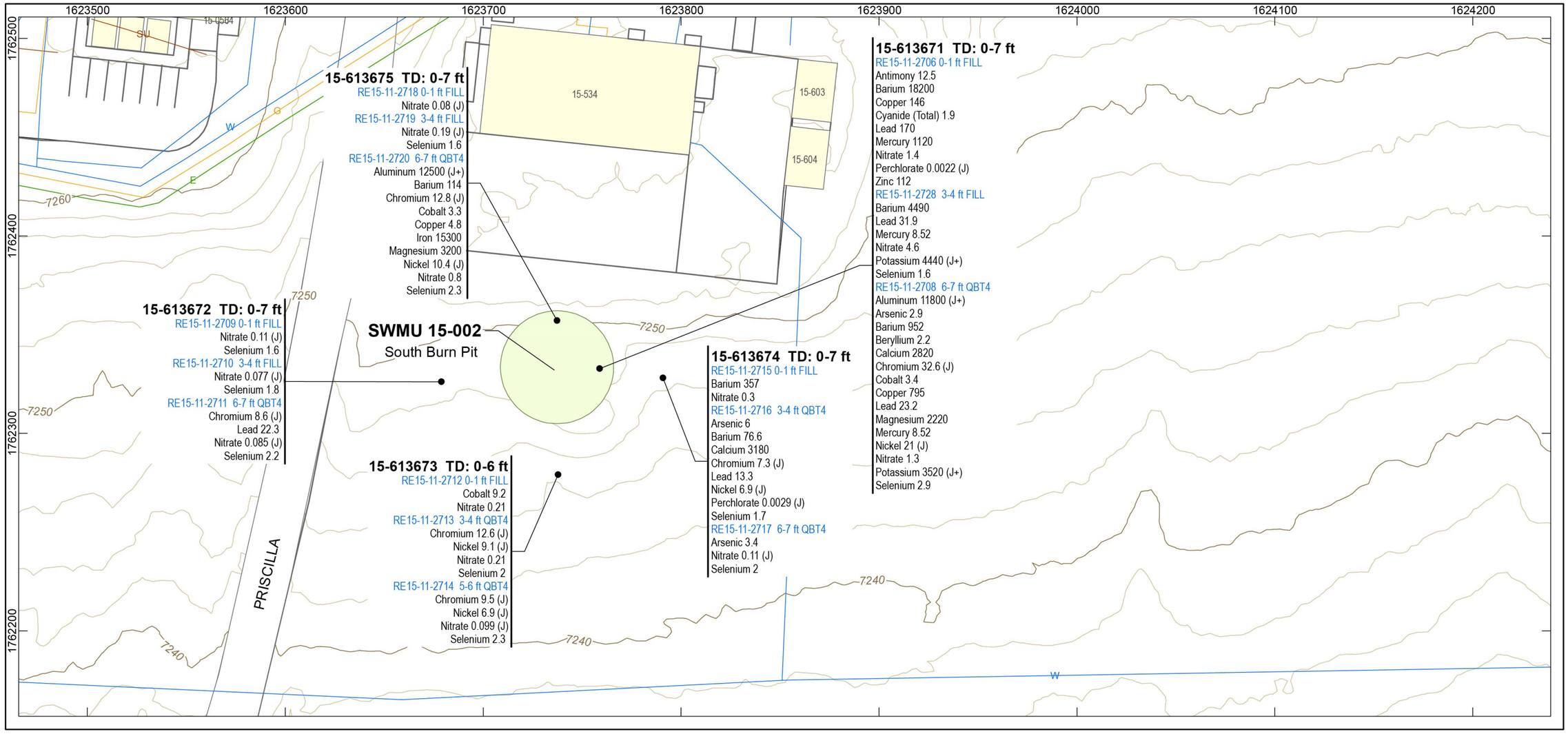


Figure 4.1-2 Inorganic chemicals detected or detected above BVs at the SWMU 15-002 south burn pit

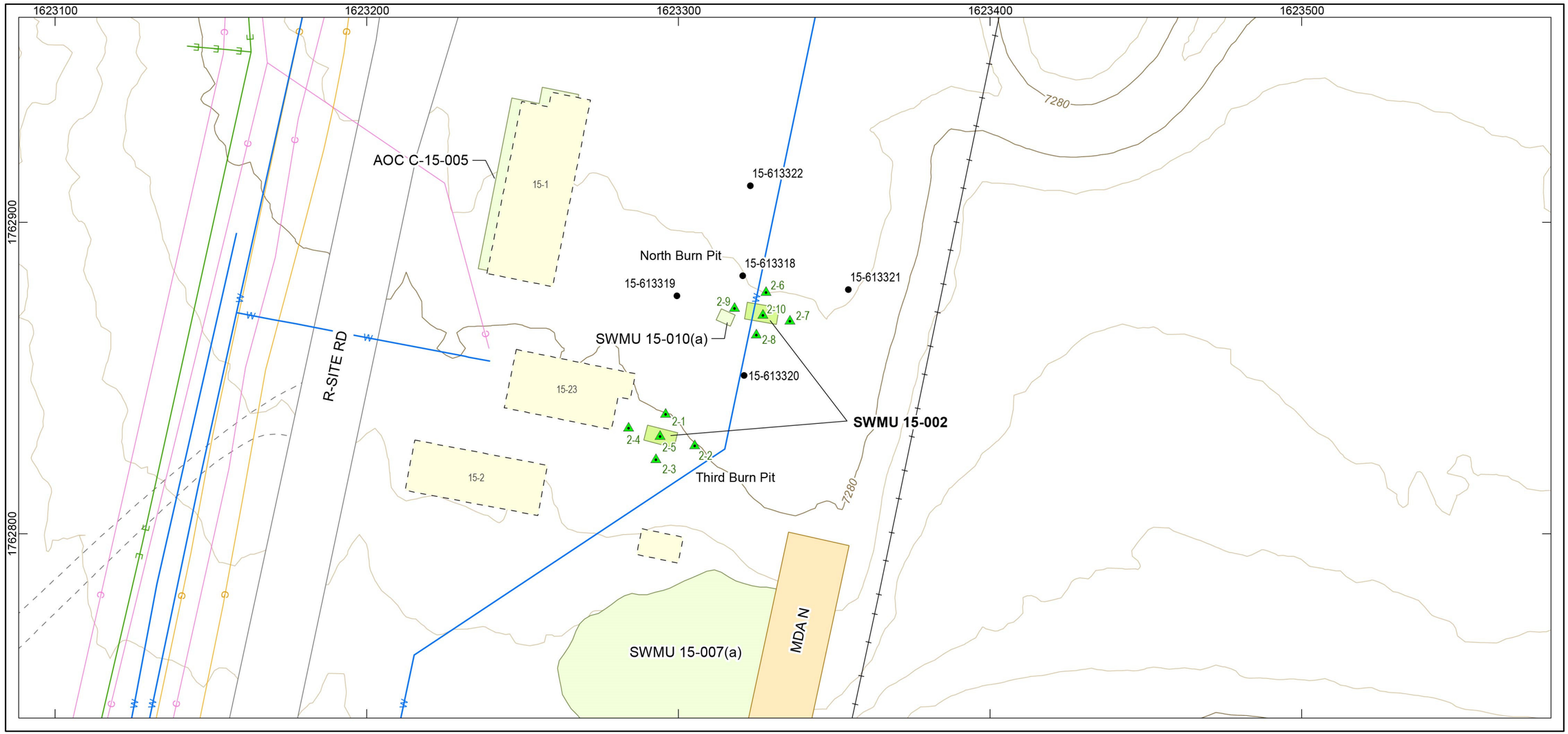


Figure 4.1-3 Proposed sampling locations at the SWMU 15-002 third burn pit and the north burn pit

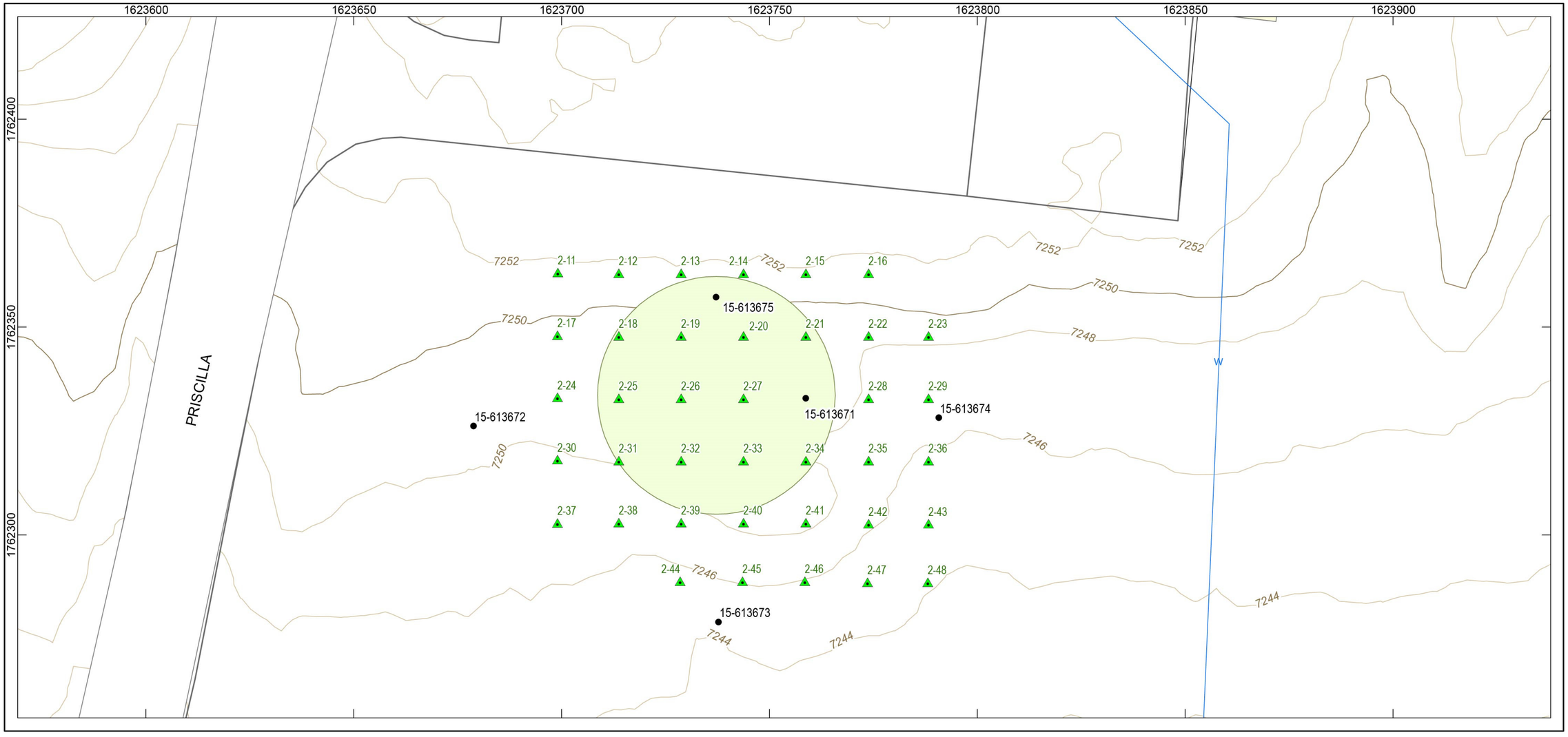


Figure 4.1-4 Proposed sampling locations at the SWMU 15-002 south burn pit

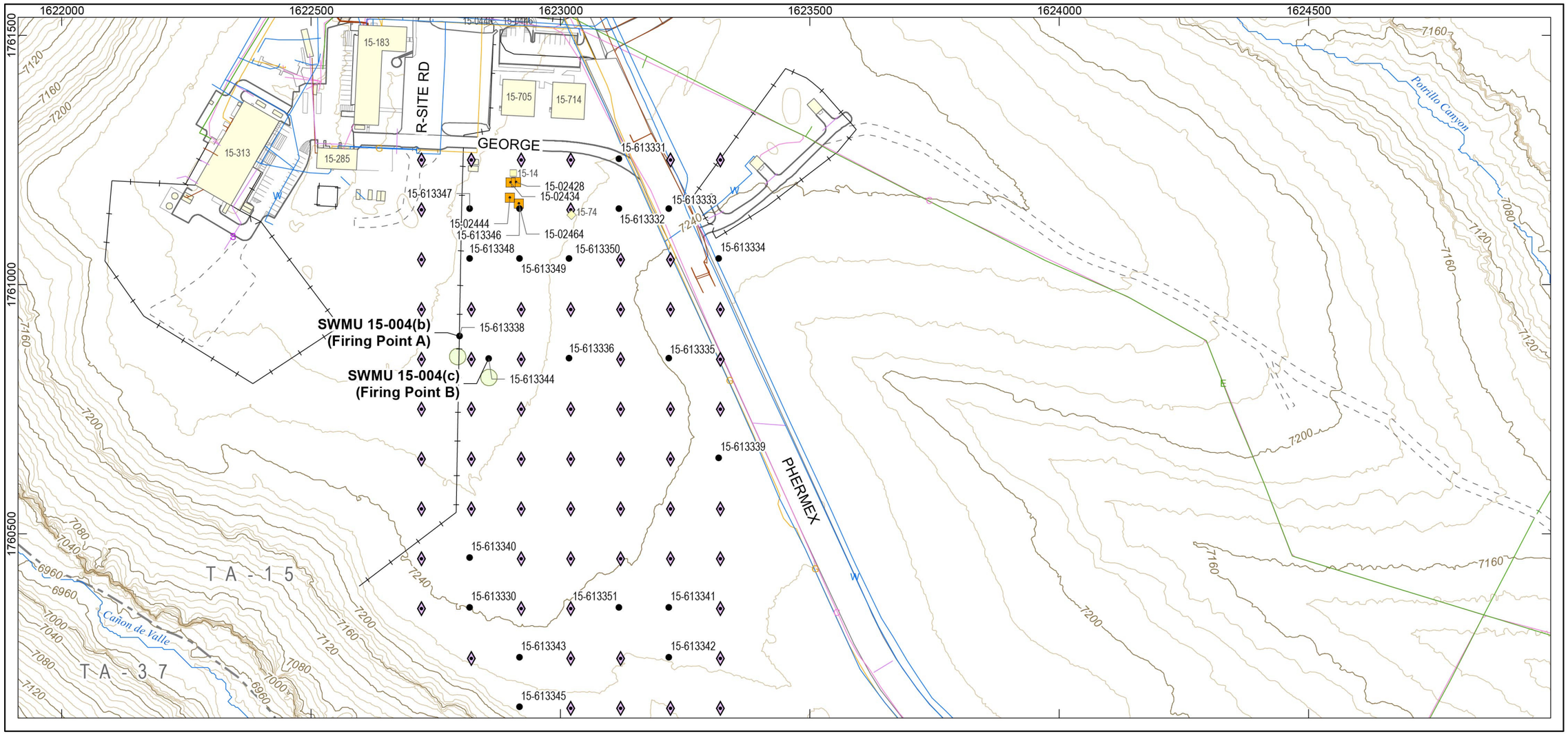


Figure 4.2-1 Site map and sampling locations at SWMUs 15-004(b) and 15-004(c)

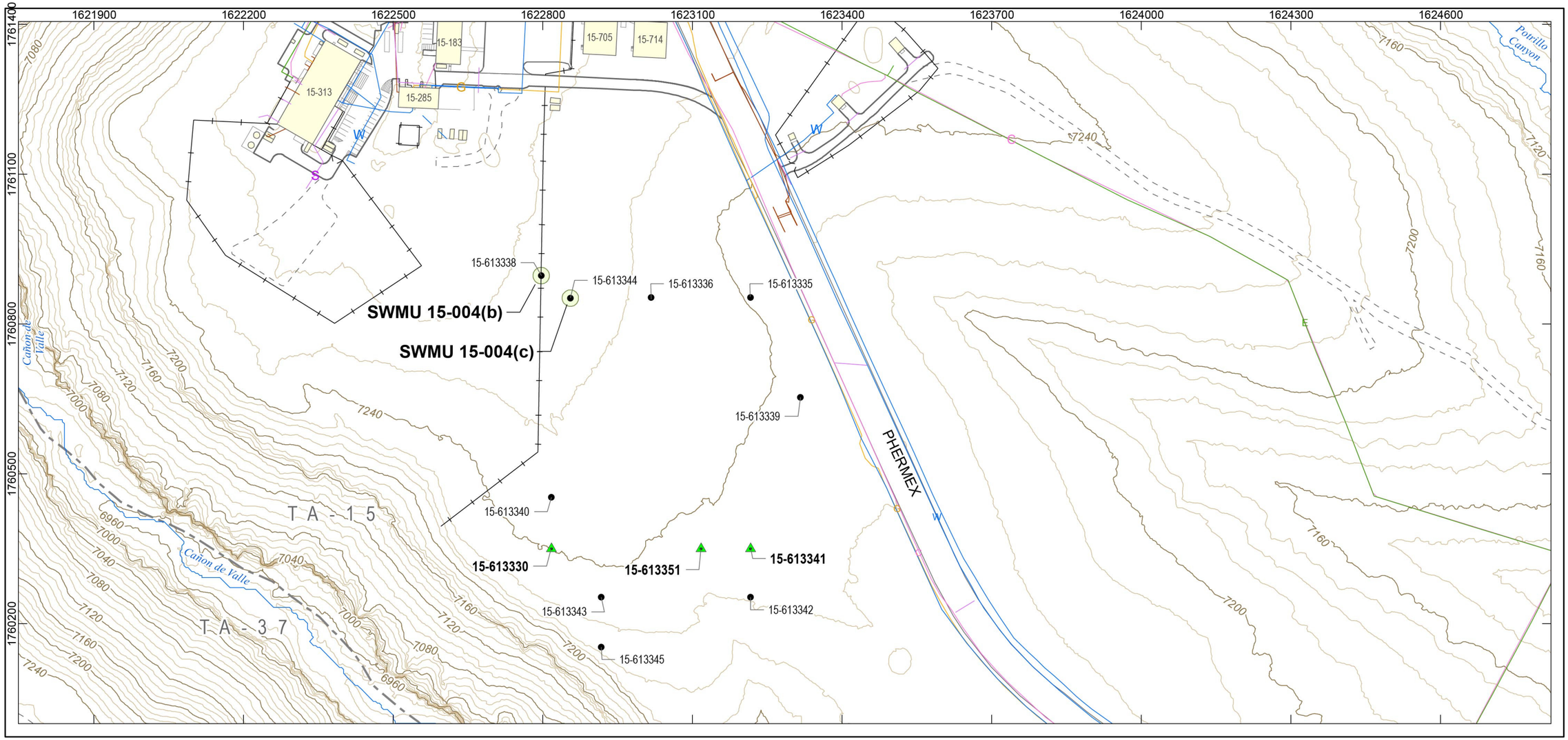


Figure 4.2-2 Proposed sampling locations at SWMUs 15-004(b) and 15-004(c)

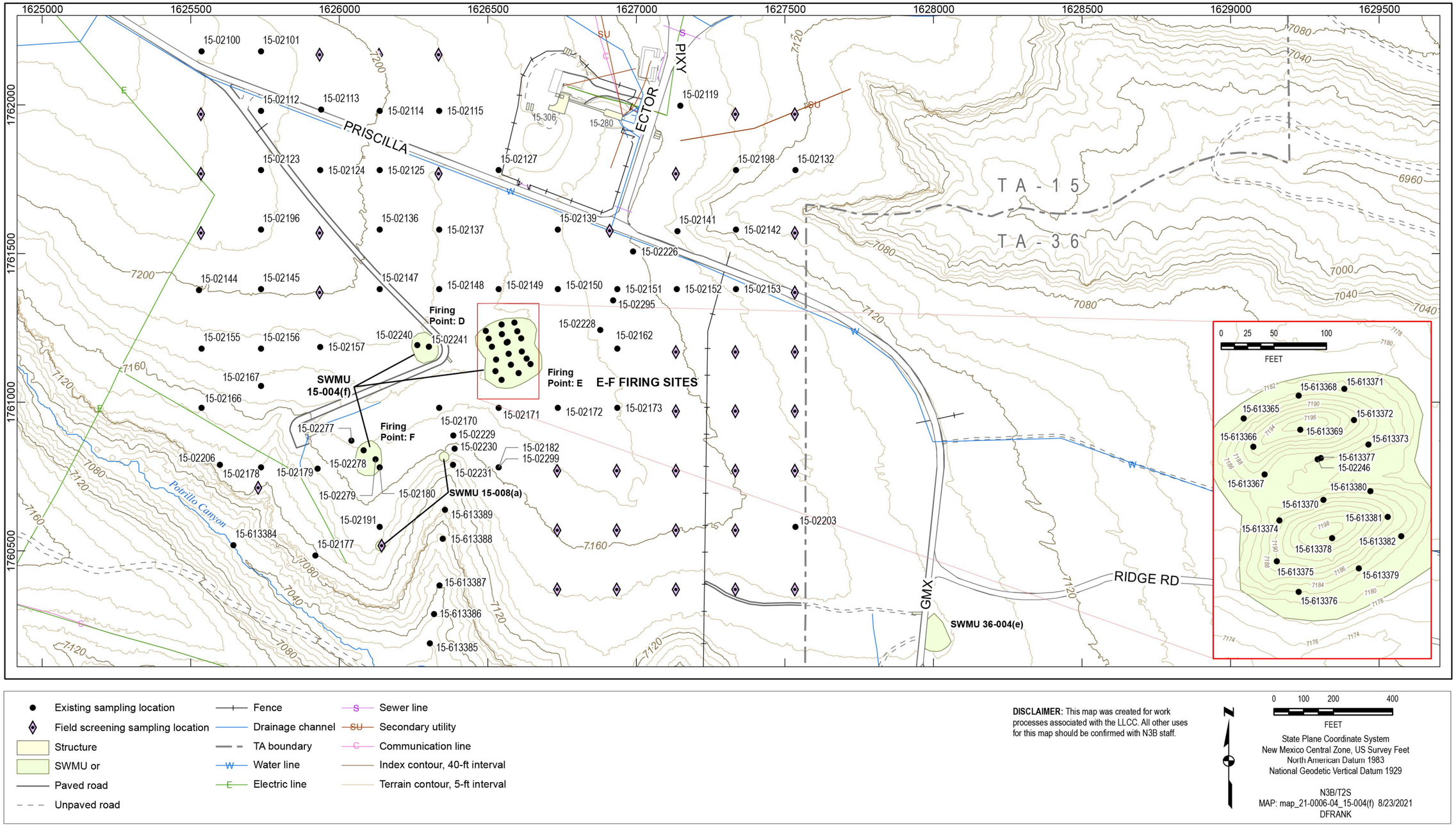


Figure 4.3-1 Site map and sampling locations at SWMU 15-004(f)

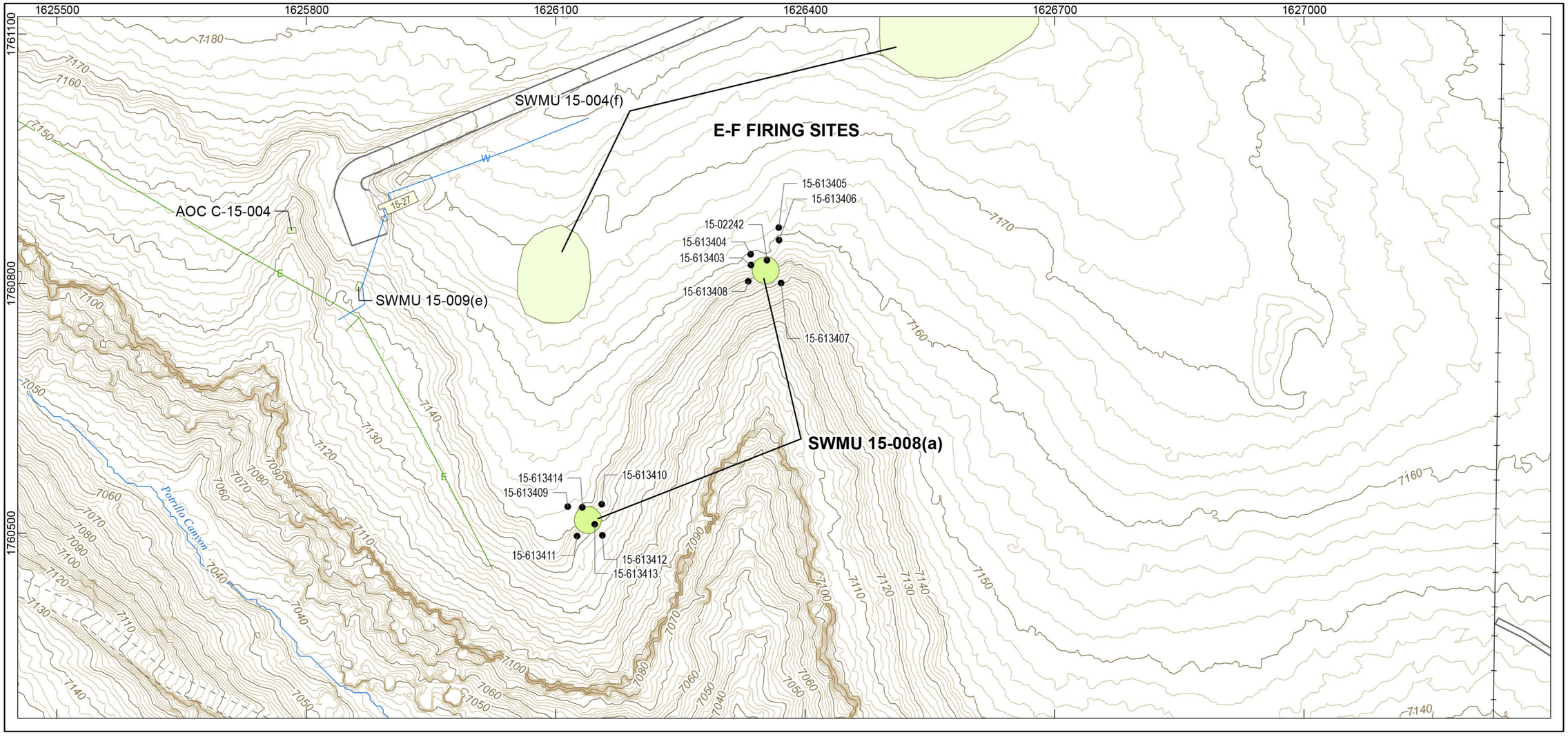


Figure 4.4-1 Site map and sampling locations at SWMU 15-008(a)

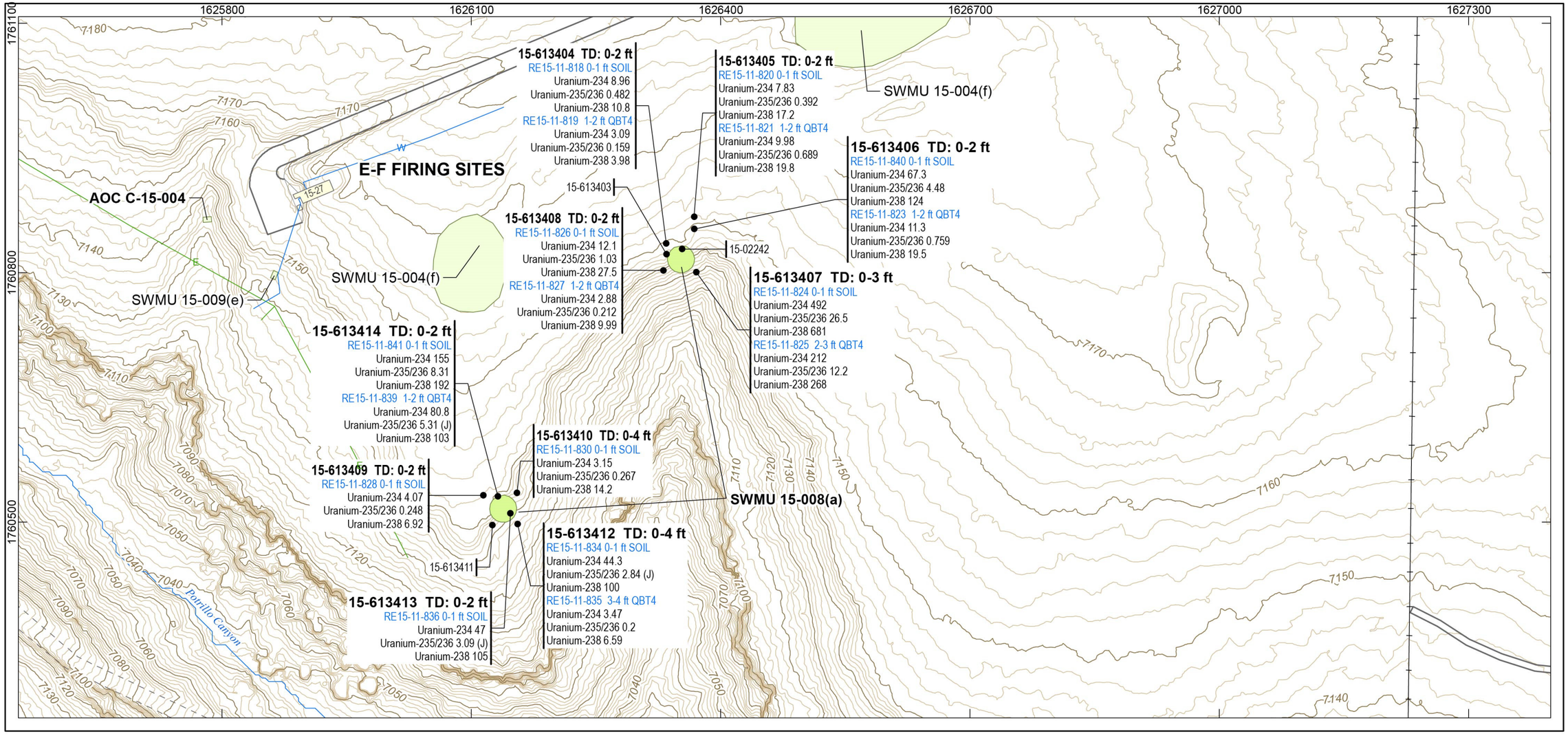


Figure 4.4-2 Radionclides detected or detected above FVs/BVs at SWMU 15-008(a)

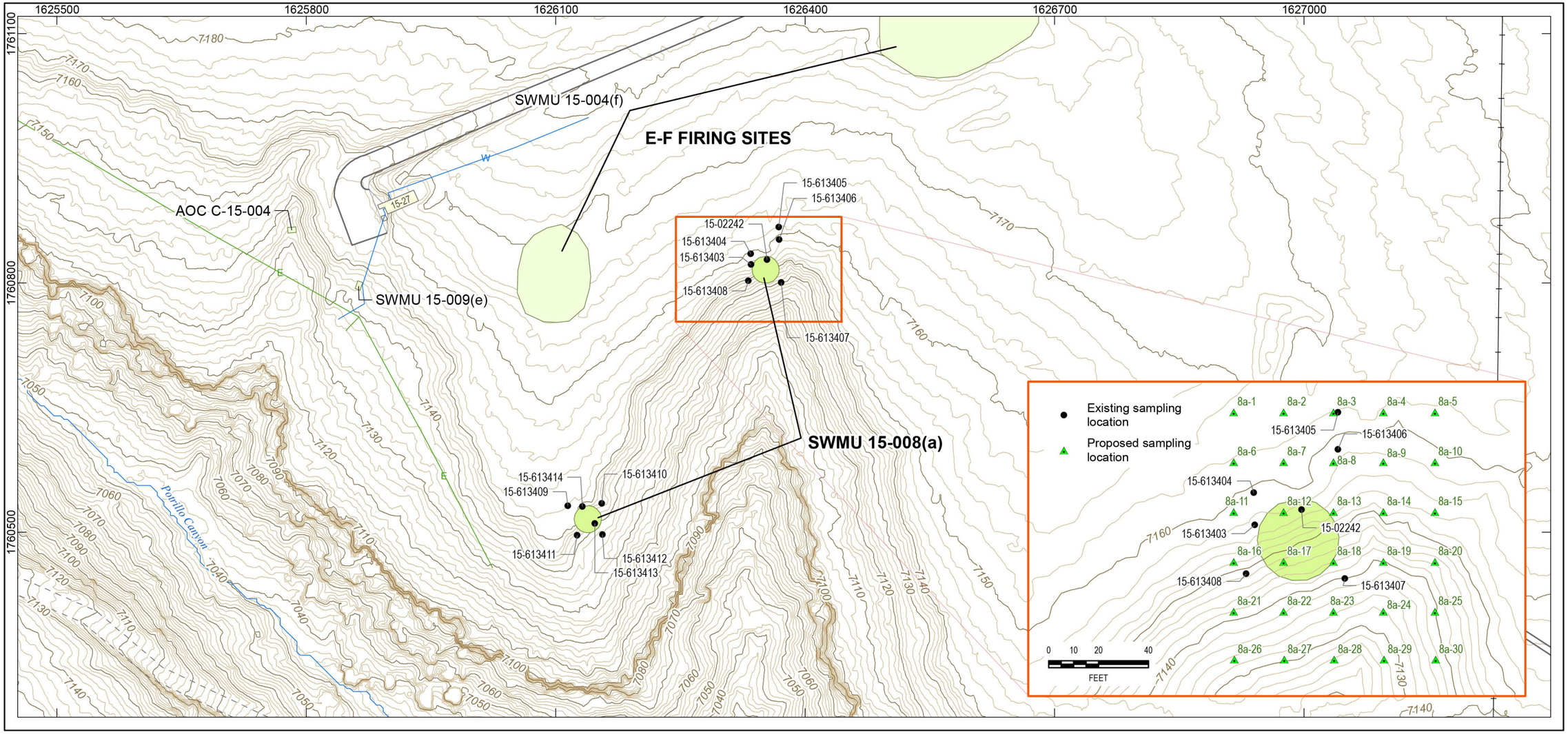


Figure 4.4-3 Proposed sampling locations at SWMU 15-008(a)

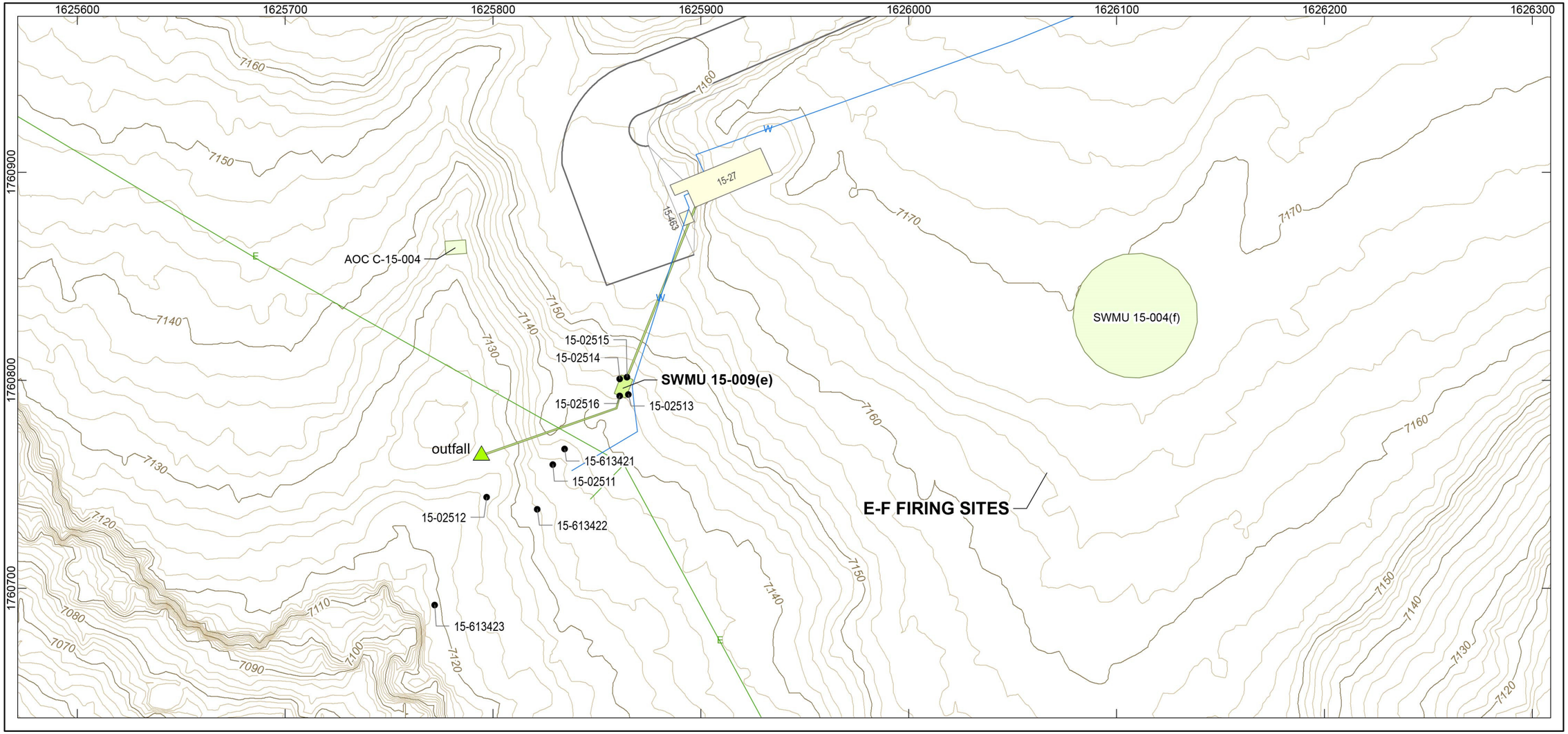
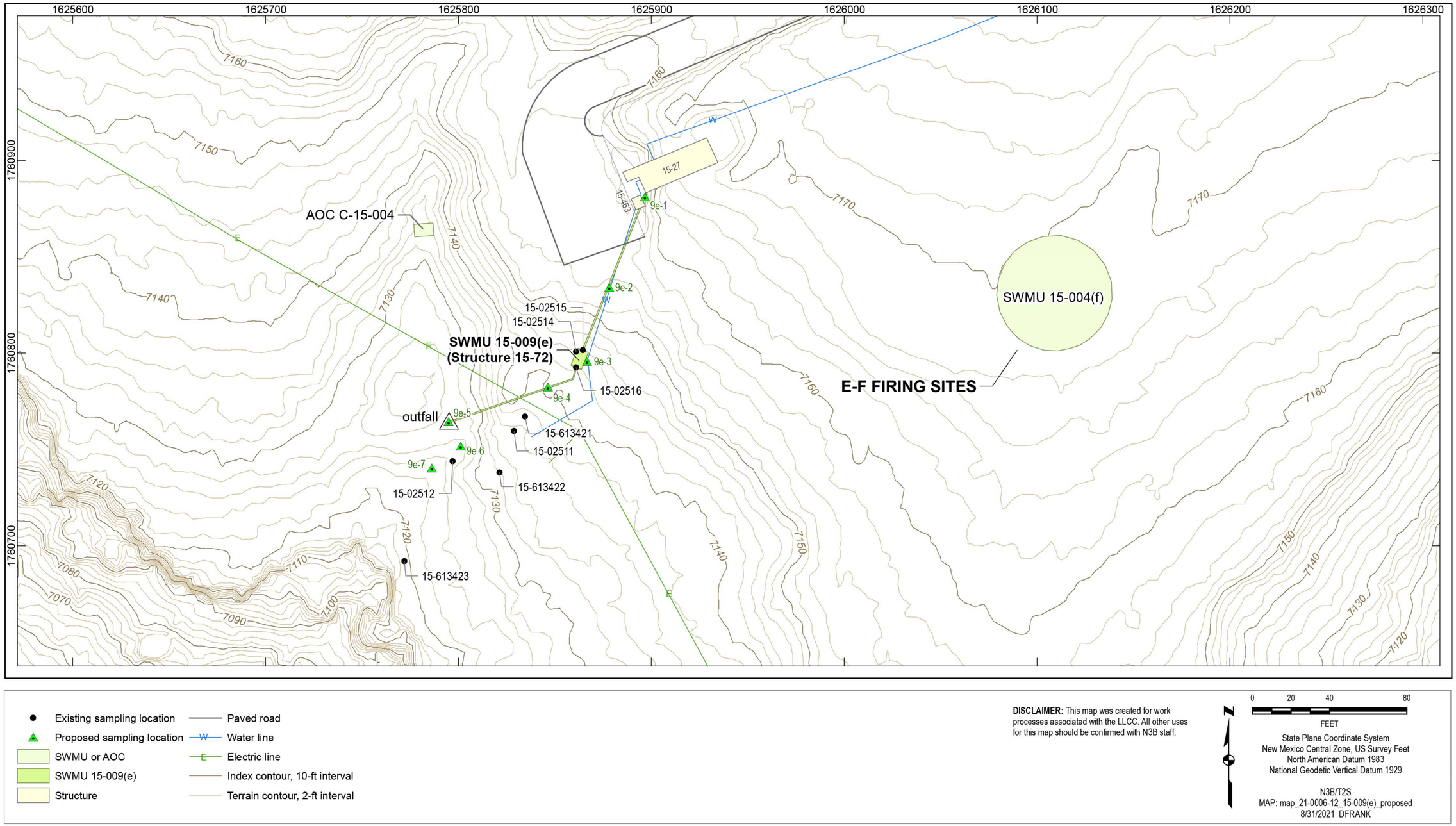


Figure 4.5-1 Site map and sampling locations at SWMU 15-009(e)



Existing sampling location
Proposed sampling location
SWMU or AOC
SWMU 15-009(e)
Structure
Paved road
Water line
Electric line
Index contour, 10-ft interval
Terrain contour, 2-ft interval

DISCLAIMER: This map was created for work processes associated with the LLCC. All other uses for this map should be confirmed with N3B staff.

0 20 40 80
FEET

State Plane Coordinate System
New Mexico Central Zone, US Survey Feet
North American Datum 1983
National Geodetic Vertical Datum 1929

N3B/T2S
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8/31/2021 DFRANK

Figure 4.5-2 Proposed sampling locations at SWMU 15-009(e)

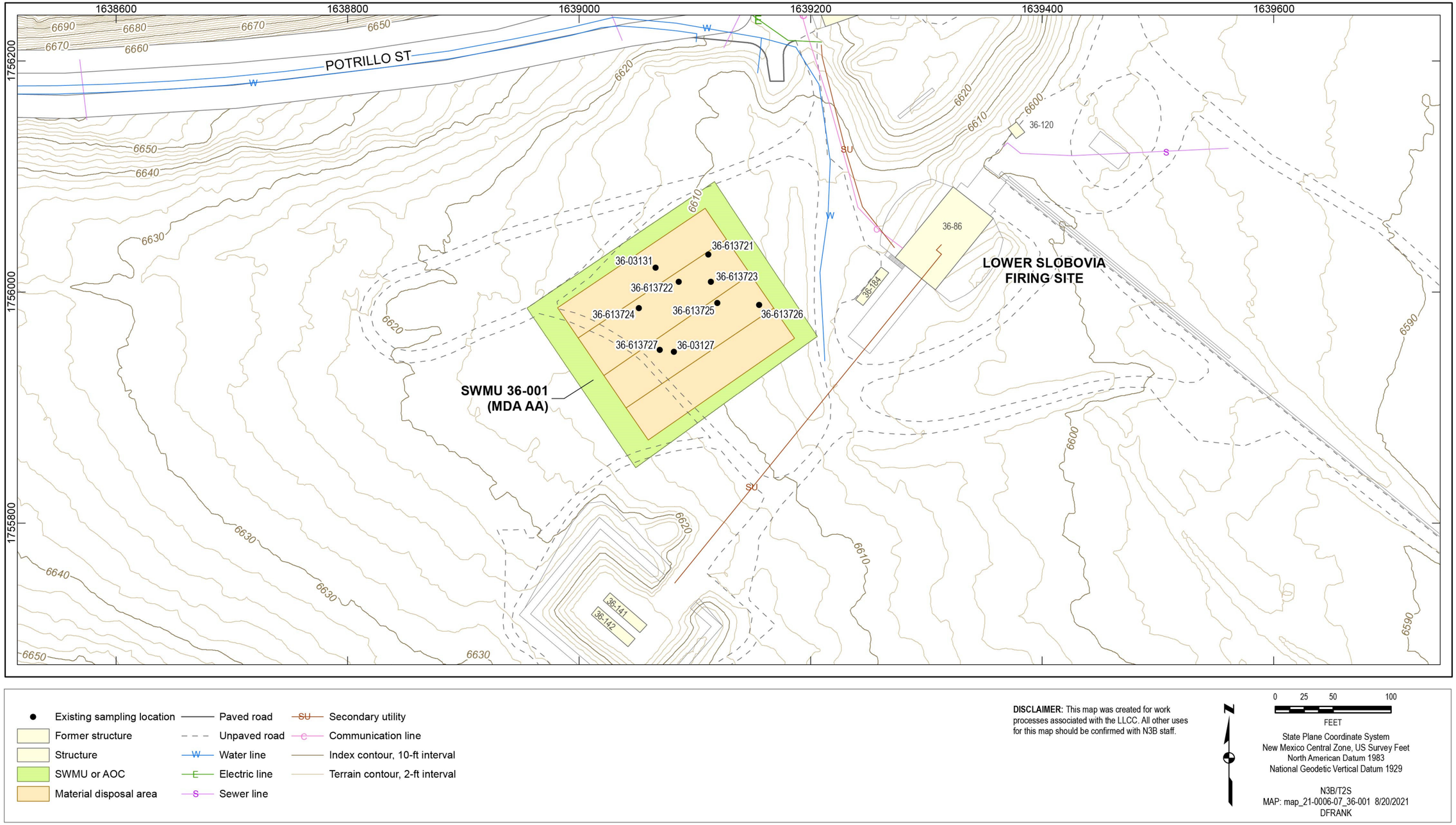

Figure 4.6-1 Site map and sampling locations at SWMU 36-001

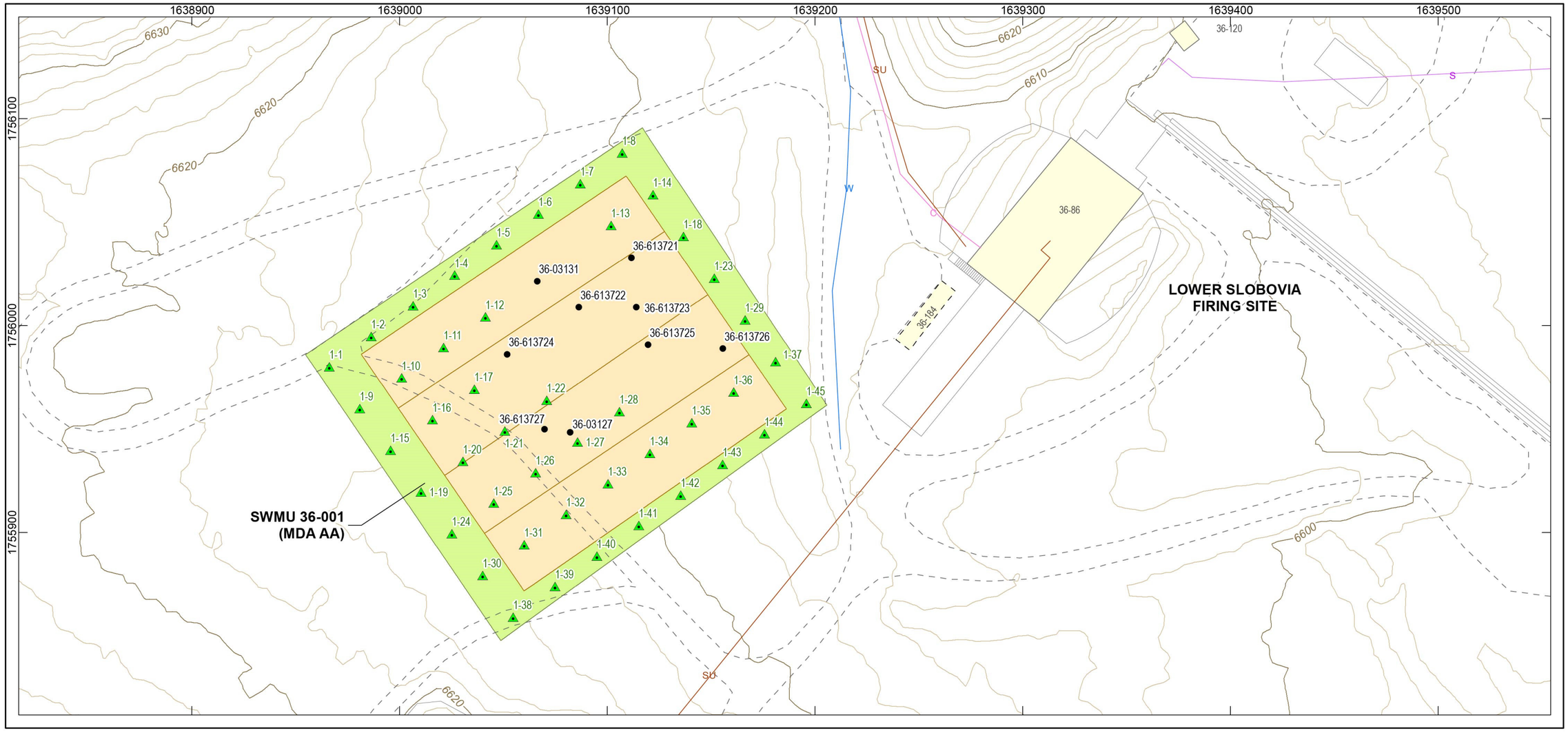

Figure 4.6-2 Proposed sampling locations at SWMU 36-001

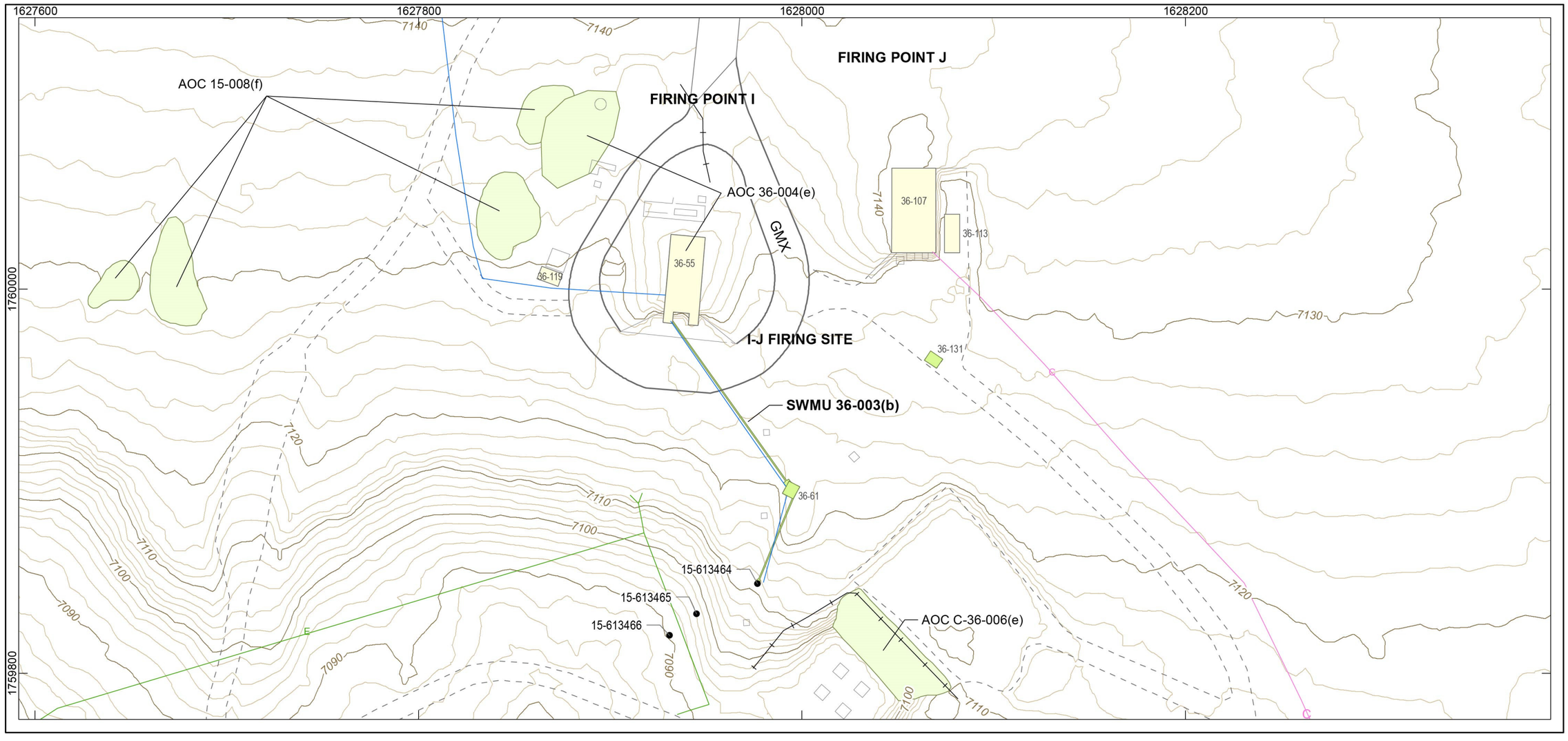

Figure 4.7-1 Site map and sampling locations at SWMU 36-003(b)

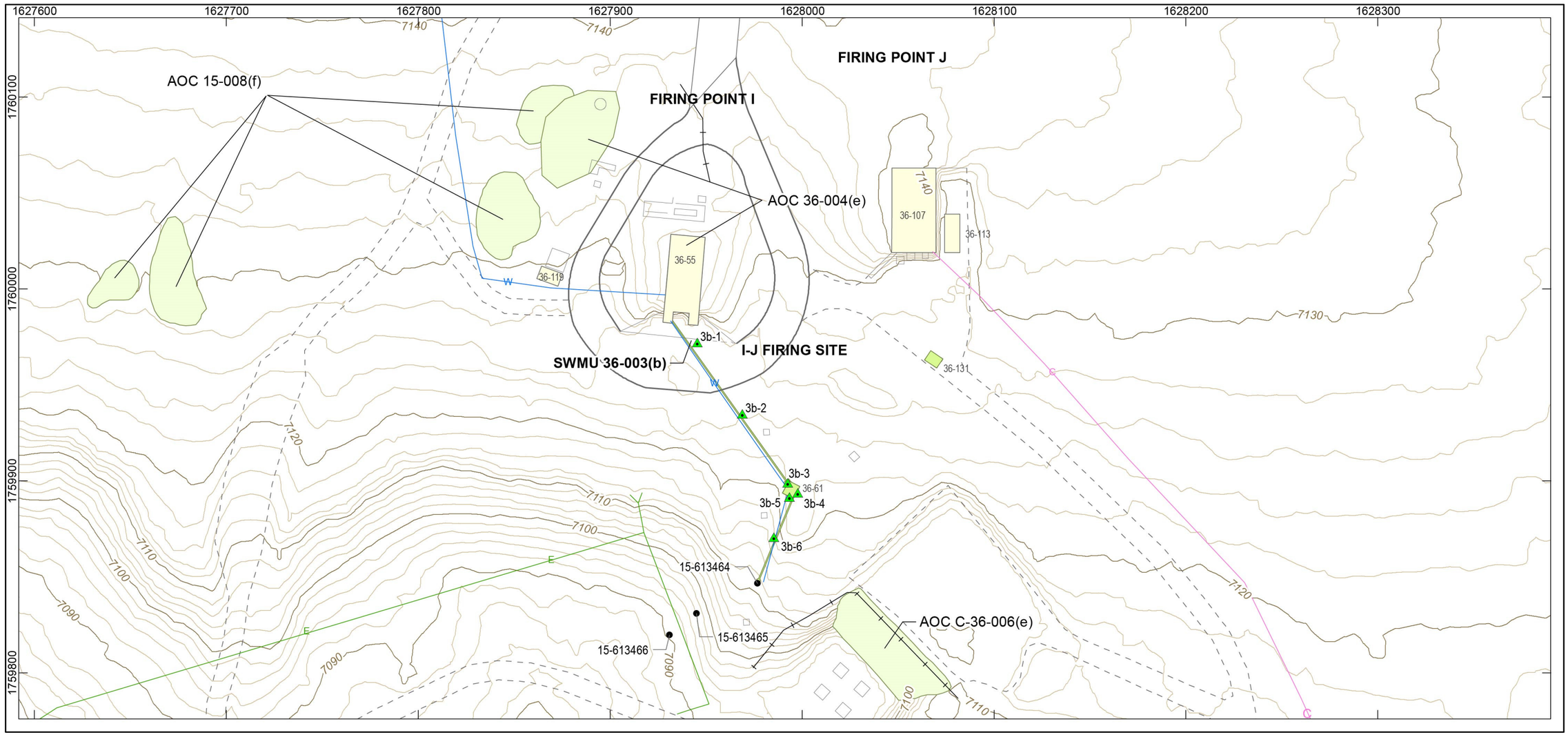

Figure 4.7-2 Proposed sampling locations at SWMU 36-003(b)

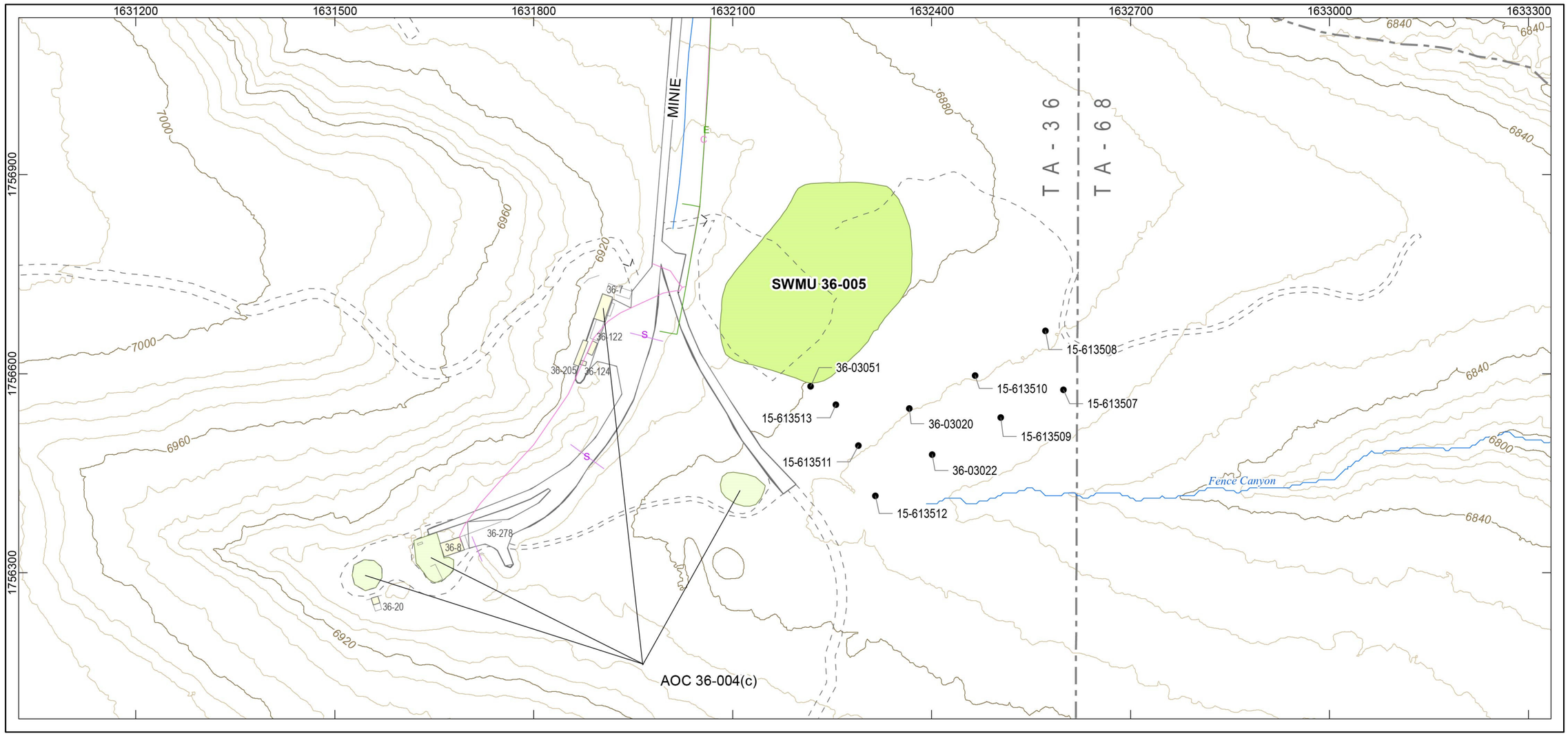

Figure 4.8-1 Site map and sampling locations at SWMU 36-005

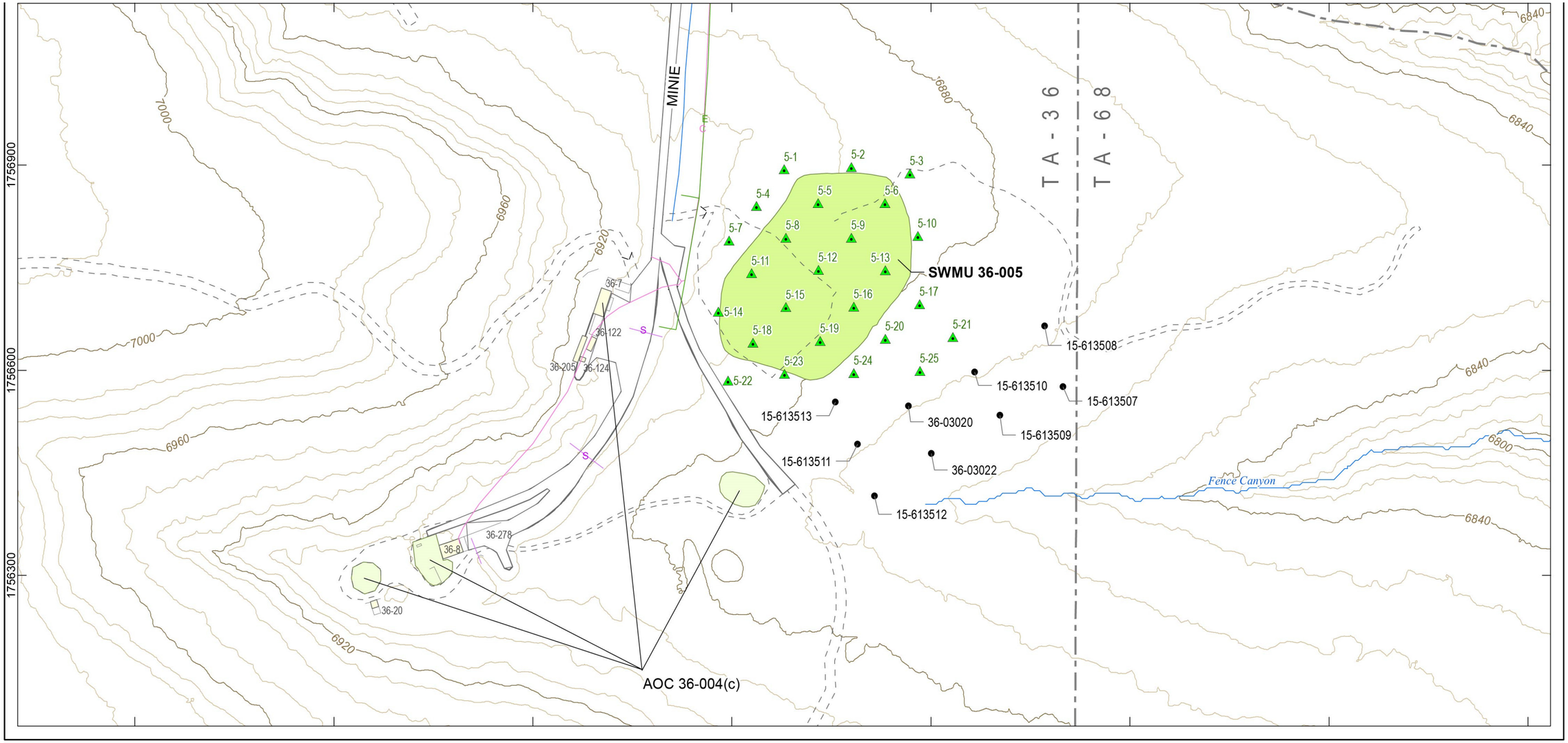

Figure 4.8-2 Proposed sampling locations at SWMU 36-005

Table 1.2-1
Sites under Phase II Investigation in the Potrillo and Fence Canyons Aggregate Area

SWMU/AOC	Brief Description	2019 Supplemental Investigation Results	Proposed Activities
SWMU 15-002	Former Burn Pits	Potential unacceptable (industrial, construction worker, and residential scenarios) human health risk from barium and mercury at the south burn pit. Potential unacceptable ecological risk due to barium and mercury at the south burn pit.	Extent sampling at the third burn pit. Soil removal and additional extent sampling at the south burn pit.
SWMU 15-004(b)	Former Firing Site A	Vertical extent of thallium not defined at three locations.	Additional extent sampling
SWMU 15-004(c)	Former Firing Site B	Vertical extent of thallium not defined at three locations.	Additional extent sampling
SWMU 15-004(f)	Former Firing Site E-F	Vertical extent of copper not defined at two locations. Vertical extent of uranium-234 and uranium-235/236 not defined at four locations. Vertical extent of uranium-238 not defined at five locations. Potential unacceptable (construction worker and residential scenarios) human health risk from copper, manganese, and uranium. Potential unacceptable dose for the residential scenario. Potential unacceptable ecological risk due to copper, lead, mercury, selenium, and uranium.	Soil removal and additional extent sampling. New FIDLER survey and additional sampling based on results.
SWMU 15-008(a)	Two Surface Disposal Areas	Potential unacceptable (construction worker and residential scenarios) human health risk from uranium. Potential unacceptable (residential scenario) human health dose from uranium. Potential unacceptable ecological risk due to copper and uranium.	Soil removal and additional extent sampling
SWMU 15-009(e)	Septic System	Vertical extent not defined under the structures.	Additional extent sampling
SWMU 36-001	MDA AA	Lateral extent not defined within the periphery. Potential unacceptable (residential scenario) human health risk and dose due to uranium.	Additional extent sampling
SWMU 36-003(b)	Firing Site	Vertical extent not defined under the structures.	Additional extent sampling
SWMU 36-005	Firing Sites	Lateral and vertical extent not defined within the SWMU boundary.	Additional extent sampling

Table 4.1-1
Inorganic Chemicals above BVs at SWMU 15-002 South Burn Pit

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Mercury	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Zinc
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14500**	**11.2**	**1690**	**0.1**	**6.58**	**na[b]**	**na**	**3500**	**0.3**	**63.5**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21500**	**22.3**	**4610**	**0.1**	**15.4**	**na**	**na**	**3460**	**1.52**	**48.8**
Construction Worker SSL[c]				**41400**	**142**	**41.2**	**4390**	**148**	**8850000**	**134[d]**	**36.7**	**14200**	**12.1**	**248000**	**800**	**1550000**	**77.1**	**753**	**566000**	**248**	**20800000**	**1750**	**106000**
Industrial SSL[c]				**1290000**	**519**	**35.9**	**255000**	**2580**	**32400000**	**505[d]**	**388**	**51900**	**63.3**	**908000**	**800**	**5680000**	**389**	**25700**	**2080000**	**908**	**76200000**	**6490**	**389000**
Residential SSL[c]				**78000**	**31.3**	**7.07**	**15600**	**156**	**13000000**	**96.6[d]**	**23.4**	**3130**	**11.2**	**54800**	**400**	**339000**	**23.5**	**1560**	**125000**	**54.8**	**15600000**	**391**	**23500**
RE15-11-2706	15-613671	0–1	Fill	—[e]	12.5	—	18200	—	—	—	—	146	1.9	—	170	—	1120	—	1.4	0.0022 (J)	—	—	112
RE15-11-2728	15-613671	3–4	Fill	—	—	—	4490	—	—	—	—	—	—	—	31.9	—	8.52	—	4.6	—	4440 (J+)	1.6	—
RE15-11-2708	15-613671	6–7	Qbt 4	11800 (J+)	0.68 (U)	2.9	952	2.2	2820	32.6 (J)	3.4	795	—	—	23.2	2220	8.52	21 (J)	1.3	—	3520 (J+)	2.9	—
RE15-11-2709	15-613672	0–1	Fill	—	—	—	—	—	—	—	—	—	0.54 (U)	—	—	—	—	—	0.11 (J)	—	—	1.6	—
RE15-11-2710	15-613672	3–4	Fill	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	0.077 (J)	—	—	1.8	—
RE15-11-2711	15-613672	6–7	Qbt 4	—	—	—	—	—	—	8.6 (J)	—	—	0.53 (U)	—	22.3	—	—	—	0.085 (J)	—	—	2.2	—
RE15-11-2712	15-613673	0–1	Fill	—	—	—	—	—	—	—	9.2	—	0.53 (U)	—	—	—	—	—	0.21	—	—	—	—
RE15-11-2713	15-613673	3–4	Qbt 4	—	—	—	—	—	—	12.6 (J)	—	—	0.51 (U)	—	—	—	—	9.1 (J)	0.21	—	—	2	—
RE15-11-2714	15-613673	5–6	Qbt 4	—	—	—	—	—	—	9.5 (J)	—	—	0.51 (U)	—	—	—	—	6.9 (J)	0.099 (J)	—	—	2.3	—
RE15-11-2715	15-613674	0–1	Fill	—	—	—	357	—	—	—	—	—	0.53 (U)	—	—	—	—	—	0.3	—	—	—	—
RE15-11-2716	15-613674	3–4	Qbt 4	—	—	6	76.6	—	3180	7.3 (J)	—	—	0.62 (U)	—	13.3	—	—	6.9 (J)	—	0.0029 (J)	—	1.7	—
RE15-11-2717	15-613674	6–7	Qbt 4	—	—	3.4	—	—	—	—	—	—	0.6 (U)	—	—	—	—	—	0.11 (J)	—	—	2	—
RE15-11-2718	15-613675	0–1	Fill	—	—	—	—	—	—	—	—	—	0.56 (U)	—	—	—	—	—	0.08 (J)	—	—	—	—
RE15-11-2719	15-613675	3–4	Fill	—	—	—	—	—	—	—	—	—	0.62 (U)	—	—	—	—	—	0.19 (J)	NA[f]	—	1.6	—
RE15-11-2720	15-613675	6–7	Qbt 4	12500 (J+)	—	—	114	—	—	12.8 (J)	3.3	4.8	0.68 (U)	15300	—	3200	—	10.4 (J)	0.8	—	—	2.3	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2019, 700500) unless otherwise noted.

[d] SSL for total chromium.

[e] — = Not detected or not detected above BV.

[f] NA = Not analyzed.

Table 4.1-2
Proposed Sampling and Analysis at SWMU 15-002

Sampling Objective	Location Numbers	Location Description	Depth[a] (ft)	TAL Metals (SW-846:6010D[b]/6020B[b]/7471A[b])	Cyanide (SW-846:9012A[b])	Nitrate (SW-846:9056A[b])	Perchlorate (SW-846:6850)	pH (SW-846-9045D[b])	VOCs (SW846:8260D[b])	SVOCs (SW-846:8270C[b])	Explosive Compounds (SW-846:8330B[b])	PCBs (SW-846:8082A[b])	TPH (SW-846:8015M[b])	Dioxins/Furans (SW-846:8280B[b])	Isotopic Uranium (HASL-300)	Isotopic Plutonium (HASL-300)	Gamma-Emitting Radionuclides (EPA 901.1)
Define nature and extent of contamination at the third burn pit	Locations 2-1 to 2-5	One location in the center of burn pit and four step-out locations	0.0–1.0, 3.0–4.0 6.0–7.0	X[c]	X	X	X	X	X	X	X	X	X	X	X	X	X
Define nature and extent of contamination at the north burn pit	Locations 2-6 to 2-10	One location in the center of burn pit and four step-out locations	0.0–1.0, 3.0–4.0 6.0–7.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Define nature and extent of contamination of the south burn pit	Locations 2-11 to 2-49	Grid spacing every 15 ft over SWMU 15-002 south burn pit and extending downgradient to the east and south	0.0–1.0, 3.0–4.0 6.0–7.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] Depths are below ground surface.

[b] Most recent promulgated, certified, and appropriate method will be used during field investigations.

[c] X = Analysis will be performed.

Table 4.2-1
Inorganic Chemicals above BVs at SWMUs 15-004(b) and 15-004(c)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Nitrate	Selenium
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**na**[b]	**0.3**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**na**	**1.52**
Construction Worker SSL[c]				**41400**	**142**	**41.2**	**4390**	**148**	**72.1**	**8850000**	**134**[d]	**36.7**	**14200**	**12.1**	**248000**	**800**	**1550000**	**464**	**77.1**	**753**	**566000**	**1750**
Industrial SSL[c]				**1290000**	**519**	**35.9**	**255000**	**2580**	**1110**	**32400000**	**505**[d]	**388**	**51900**	**63.3**	**908000**	**800**	**5680000**	**160000**	**389**	**25700**	**2080000**	**6490**
Residential SSL[c]				**78000**	**31.3**	**7.07**	**15600**	**156**	**70.5**	**13000000**	**96.6**[d]	**23.4**	**3130**	**11.2**	**54800**	**400**	**15600000**	**10500**	**23.5**	**1560**	**125000**	**391**
0215-96-0106	15-02428	0.67–1.17	Soil	—[e]	11 (UJ)	—	—	—	0.53 (U)	—	—	—	—	NA[f]	—	50	—	—	NA	—	NA	—
0215-96-0105	15-02434	0.67–1.17	Soil	—	11 (U)	—	310	—	1.3	—	—	—	20	NA	—	88	—	—	0.11 (U)	—	NA	—
0215-96-0104	15-02444	0.83–1.17	Soil	—	11 (UJ)	—	510	—	0.66	—	—	—	700	NA	—	100	—	—	0.11 (U)	—	NA	—
0215-96-0116	15-02444	1–1.08	Soil	—	12 (U)	—	920	—	3.7	—	—	8.7	180	NA	—	370	—	—	0.12 (U)	—	NA	—
0215-96-0117	15-02464	2.75–2.92	Soil	—	11 (U)	—	—	—	0.53 (U)	—	—	—	—	NA	—	—	—	—	0.11 (U)	—	NA	—
RE15-11-440	15-613330	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.56 (U)	—	—	—	—	—	—	1.8	—
RE15-11-441	15-613330	3–4	Qbt 4	10400	—	5.3	131	—	—	—	10.3	—	—	0.55 (U)	—	51.3	2280 (J+)	—	—	7.8	0.23	2.2
RE15-11-442	15-613331	0–1	Fill	—	—	—	—	—	—	—	—	—	—	0.56 (U)	—	—	—	—	—	—	1.3	—
RE15-11-443	15-613331	3–4	Fill	—	—	—	—	—	—	—	—	—	—	0.6 (U)	—	—	—	—	—	—	0.092 (J)	—
RE15-11-444	15-613332	0–1	Fill	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	22.9	—	—	0.575	—	2.4	—
RE15-11-445	15-613332	3–4	Fill	—	—	—	—	—	—	—	—	—	—	0.54 (U)	—	—	—	—	—	—	0.98	—
RE15-11-446	15-613333	0–1	Fill	—	—	—	—	—	—	—	—	—	—	0.54 (U)	—	—	—	—	—	—	0.08 (J)	—
RE15-11-447	15-613333	3–4	Fill	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.27	—
RE15-11-448	15-613334	0–1	Fill	—	—	—	—	—	—	—	—	—	—	0.58 (U)	—	—	—	—	—	—	1.2	—
RE15-11-449	15-613334	3–4	Fill	—	—	—	—	—	—	—	—	—	—	0.58 (U)	—	—	—	—	—	—	0.088 (J)	2.1
RE15-11-450	15-613335	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.61 (U)	—	—	—	—	—	—	0.28	—
RE15-11-451	15-613335	3–4	Fill	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.087 (J)	—
RE15-11-452	15-613336	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.56 (U)	—	—	—	—	—	—	0.54	—
RE15-11-453	15-613336	3–4	Fill	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.26	—
RE15-11-456	15-613338	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.54 (U)	—	—	—	—	—	—	0.37	—
RE15-11-457	15-613338	3–4	Soil	—	—	—	—	—	—	—	—	—	—	0.56 (U)	—	—	—	—	—	—	0.1 (J)	1.7
RE15-11-458	15-613339	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.39	—
RE15-11-459	15-613339	3–4	Fill	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.21 (J)	—
RE15-11-460	15-613340	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.57 (U)	—	—	—	—	—	—	0.34	—
RE15-11-461	15-613340	3–4	Soil	—	—	—	—	—	—	8140	—	—	—	0.56 (U)	—	—	—	—	—	—	0.11 (J)	—
RE15-11-462	15-613341	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.54 (U)	—	—	—	—	—	—	0.83	—
RE15-11-463	15-613341	3–4	Fill	—	—	—	482 (J+)	1.9	—	—	—	—	—	0.58 (U)	—	26.2	—	—	—	—	1.8	2.3
RE15-11-469	15-613342	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.85	1.9
RE15-11-464	15-613342	3–4	Qbt 4	—	0.51 (U)	—	—	—	—	—	—	—	—	0.51 (U)	—	—	—	—	—	—	0.14 (J)	1.5

Table 4.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Nitrate	Selenium
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**na[b]**	**0.3**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**na**	**1.52**
Construction Worker SSL[c]				**41400**	**142**	**41.2**	**4390**	**148**	**72.1**	**8850000**	**134[d]**	**36.7**	**14200**	**12.1**	**248000**	**800**	**1550000**	**464**	**77.1**	**753**	**566000**	**1750**
Industrial SSL[c]				**1290000**	**519**	**35.9**	**255000**	**2580**	**1110**	**32400000**	**505[d]**	**388**	**51900**	**63.3**	**908000**	**800**	**5680000**	**160000**	**389**	**25700**	**2080000**	**6490**
Residential SSL[c]				**78000**	**31.3**	**7.07**	**15600**	**156**	**70.5**	**13000000**	**96.6[d]**	**23.4**	**3130**	**11.2**	**54800**	**400**	**339000**	**10500**	**23.5**	**1560**	**125000**	**391**
RE15-11-466	15-613343	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.2 (J)	—
RE15-11-467	15-613343	3–4	Qbt 4	—	0.51 (U)	—	—	—	—	—	8.4	—	—	0.51 (U)	—	—	—	—	—	—	0.1 (J)	1.4
RE15-11-468	15-613344	0–1	Soil	—	—	—	—	—	—	—	—	8.9	—	0.56 (U)	—	—	—	699 (J-)	—	—	1.3	—
RE15-11-454	15-613344	3–4	Fill	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.5	—
RE15-11-470	15-613345	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.4	—
RE15-11-471	15-613345	1–2	Qbt 4	—	0.51 (U)	—	—	—	—	—	—	—	—	0.51 (U)	—	—	—	—	—	—	0.12 (J)	1.3
RE15-11-472	15-613346	0–1	Fill	—	—	—	1000	—	8.5	—	—	—	46.6 (J-)	—	—	645	—	—	0.175	—	0.57	—
RE15-11-473	15-613346	3–4	Fill	—	—	—	379	—	1.5	—	—	—	22.6 (J-)	0.55 (U)	—	117	—	—	—	—	0.12 (J)	—
RE15-11-474	15-613347	0–1	Fill	—	—	—	708	—	4.4	—	—	14.8	89 (J-)	0.53 (U)	—	383	—	—	0.342	—	0.2 (J)	—
RE15-11-475	15-613347	3–4	Soil	—	—	—	—	—	—	—	—	12.3	19.6 (J-)	0.56 (U)	—	57.5	—	—	—	16.7	0.15 (J)	—
RE15-11-476	15-613348	0–1	Soil	—	—	—	322	—	0.42	—	—	9.8	18.3 (J-)	0.53 (U)	—	70.8	—	—	—	—	1.2	1.6
RE15-11-477	15-613348	3–4	Soil	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	24.6	—	—	—	—	0.68	1.9
RE15-11-478	15-613349	0–1	Soil	—	—	—	890	—	87	—	—	—	59 (J-)	0.55 (U)	—	1520	—	—	—	—	0.98	1.9
RE15-11-479	15-613349	3–4	Fill	—	—	—	—	—	1.1	—	—	—	—	0.6 (U)	—	52.7	—	—	—	—	0.4	1.8
RE15-11-480	15-613350	0–1	Soil	—	—	—	324	—	—	—	—	10.4	27.2 (J-)	0.54 (U)	—	330	—	—	—	—	1.6	1.7
RE15-11-481	15-613350	3–4	Fill	—	—	—	—	—	—	—	23	9	16.2 (J-)	0.55 (U)	—	48.6	—	—	—	15.5	0.8	1.6
RE15-11-482	15-613351	0–1	Soil	—	—	—	—	—	—	—	—	9.5	—	0.55 (U)	—	33.8	—	—	—	—	0.82	1.7
RE15-11-483	15-613351	3–4	Qbt4	16600	0.55 (U)	5.5	169	—	—	5580 (J+)	30.1	3.7	10.7 (J-)	0.55 (U)	16500	124	3560 (J+)	—	—	18.9	0.25	2.8

Table 4.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Silver	Sodium	Thallium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**1**	**2770**	**1.1**	**17**	**63.5**
Soil BV[a]				**1**	**915**	**0.73**	**39.6**	**48.8**
Construction Worker SSL[c]				**1770**	**10200000**	**3.54**	**614**	**106000**
Industrial SSL[c]				**6490**	**35700000**	**13**	**6530**	**389000**
Residential SSL[c]				**391**	**7820000**	**0.782**	**394**	**23500**
0215-96-0106	15-02428	0.67–1.17	Soil	2.1 (U)	—	1.3 (U)	—	—
0215-96-0105	15-02434	0.67–1.17	Soil	2.1 (U)	—	1.3 (U)	—	—
0215-96-0104	15-02444	0.83–1.17	Soil	2.2 (U)	—	1.3 (U)	—	49 (J-)
0215-96-0116	15-02444	1–1.08	Soil	2.4 (U)	—	1.2 (U)	—	—
0215-96-0117	15-02464	2.75–2.92	Soil	2.1 (U)	—	1.1 (U)	—	49
RE15-11-440	15-613330	0–1	Soil	—	—	1.7	—	—
RE15-11-441	15-613330	3–4	Qbt 4	—	—	5	—	—
RE15-11-442	15-613331	0–1	Fill	—	—	—	—	—
RE15-11-443	15-613331	3–4	Fill	—	—	—	—	—
RE15-11-444	15-613332	0–1	Fill	—	—	—	—	—
RE15-11-445	15-613332	3–4	Fill	—	—	—	—	—
RE15-11-446	15-613333	0–1	Fill	—	—	—	—	—
RE15-11-447	15-613333	3–4	Fill	—	—	—	—	—
RE15-11-448	15-613334	0–1	Fill	—	—	—	—	—
RE15-11-449	15-613334	3–4	Fill	—	—	—	—	—
RE15-11-450	15-613335	0–1	Soil	—	—	—	—	—
RE15-11-451	15-613335	3–4	Fill	—	—	—	—	—
RE15-11-452	15-613336	0–1	Soil	—	—	—	—	—
RE15-11-453	15-613336	3–4	Fill	—	—	—	—	—
RE15-11-456	15-613338	0–1	Soil	—	—	—	—	—
RE15-11-457	15-613338	3–4	Soil	—	—	—	—	—
RE15-11-458	15-613339	0–1	Soil	—	—	—	—	—
RE15-11-459	15-613339	3–4	Fill	—	—	—	—	—
RE15-11-460	15-613340	0–1	Soil	—	—	—	—	—
RE15-11-461	15-613340	3–4	Soil	—	1010	—	—	—
RE15-11-462	15-613341	0–1	Soil	—	—	—	—	—
RE15-11-463	15-613341	3–4	Fill	—	922	0.94 (J)	—	—
RE15-11-469	15-613342	0–1	Soil	—	—	—	—	—
RE15-11-464	15-613342	3–4	Qbt 4	—	—	—	—	—
RE15-11-466	15-613343	0–1	Soil	—	—	—	—	—

Table 4.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Silver	Sodium	Thallium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**1**	**2770**	**1.1**	**17**	**63.5**
Soil BV[a]				**1**	**915**	**0.73**	**39.6**	**48.8**
Construction Worker SSL[c]				**1770**	**10200000**	**3.54**	**614**	**106000**
Industrial SSL[c]				**6490**	**35700000**	**13**	**6530**	**389000**
Residential SSL[c]				**391**	**7820000**	**0.782**	**394**	**23500**
RE15-11-467	15-613343	3–4	Qbt 4	—	—	—	—	—
RE15-11-468	15-613344	0–1	Soil	—	—	—	—	—
RE15-11-454	15-613344	3–4	Fill	—	—	—	—	—
RE15-11-470	15-613345	0–1	Soil	—	—	—	—	—
RE15-11-471	15-613345	1–2	Qbt 4	—	—	—	—	—
RE15-11-472	15-613346	0–1	Fill	—	—	—	—	54.2
RE15-11-473	15-613346	3–4	Fill	—	—	—	—	51.2
RE15-11-474	15-613347	0–1	Fill	—	—	—	—	—
RE15-11-475	15-613347	3–4	Soil	—	—	—	—	—
RE15-11-476	15-613348	0–1	Soil	—	—	—	—	—
RE15-11-477	15-613348	3–4	Soil	—	—	—	—	—
RE15-11-478	15-613349	0–1	Soil	—	—	—	—	78.5
RE15-11-479	15-613349	3–4	Fill	—	—	—	—	—
RE15-11-480	15-613350	0–1	Soil	—	—	—	—	—
RE15-11-481	15-613350	3–4	Fill	—	—	—	—	—
RE15-11-482	15-613351	0–1	Soil	—	—	—	—	—
RE15-11-483	15-613351	3–4	Qbt 4	—	—	2	21.4	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2019, 700500) unless otherwise noted.

[d] SSL for total chromium.

[e] — = Not detected or not detected above BV.

[f] NA = Not analyzed.

Table 4.2-2
Proposed Sampling and Analysis at SWMUs 15-004(b) and 15-004(c)

Sampling Objective	Location Number	Location Description	Depth[a] (ft)	Thallium (SW-846:7840[b], SW-846:7841[b])
Define vertical extent of thallium at locations 15-613330, 15-613341, and 15-613351	15-613330, 15-613341, and 15-613351	Locations 15-613330, 15-613341, and 15-613351	5.0–6.0, 8.0–9.0	X[c]

[a] Depths are below ground surface, unless specified otherwise.

[b] Most recent promulgated, certified, and appropriate method will be used during field investigations.

[c] X = Analysis will be performed.

Table 4.3-1
Inorganic Chemicals above BVs at SWMU 15-004(f)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14500**	**11.2**	**1690**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13800**	**19.7**	**2370**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21500**	**22.3**	**4610**
Construction Worker SSL[b]				**41400**	**142**	**41.2**	**4390**	**148**	**72.1**	**8850000**	**134[c]**	**36.7**	**14200**	**248000**	**800**	**1550000**
Industrial SSL[b]				**1290000**	**519**	**35.9**	**255000**	**2580**	**1110**	**32400000**	**505[c]**	**388**	**51900**	**908000**	**800**	**5680000**
Residential SSL[b]				**78000**	**31.3**	**7.07**	**15600**	**156**	**70.5**	**13000000**	**96.6[c]**	**23.4**	**3130**	**54800**	**400**	**339000**
AAB3333	15-02100	0–1	Soil	—[d]	—	—	—	—	—	—	—	—	15.4 (J)	—	—	—
AAB3451	15-02100	1.5–2	Soil	—	3.9 (U)	—	—	—	1 (U)	—	—	—	—	—	—	—
RE15-11-543	15-02100	3–4	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
AAB3317	15-02101	0–0.5	Soil	NA[e]	—	—	—	—	—	—	—	NA	—	—	—	NA
RE15-11-542	15-02101	3–4	Soil	—	—	—	—	—	—	6750	—	—	—	—	—	—
AAB3461	15-02112	0–0.5	Soil	—	3.8 (U)	—	—	—	0.96 (U)	—	—	—	49.4	—	48.5	—
RE15-11-576	15-02113	0–1	Soil	—	—	—	—	—	—	—	—	—	16.2	—	—	—
RE15-11-577	15-02113	3–4	Qbt 4	—	—	—	83.8	—	—	2500	—	—	—	—	—	—
AAB3476	15-02114	0–0.5	Soil	—	3.7 (U)	—	702	—	1.1	—	—	—	17.3	—	—	—
AAB3487	15-02114	1.5–2	Soil	—	—	—	604	—	1.4 (j)	—	30	—	17	—	—	—
RE15-11-541	15-02114	3–4	Qbt 4	11200	—	3.5	209 (J+)	—	—	—	15.6	7.2	6.2	—	13.2	2290 (J+)
AAB3306	15-02115	0–0.5	Soil	NA	4 (U)	—	578	—	3 (U)	—		NA	31	—	26	NA
AAB3484	15-02119	0–0.25	Soil	NA	4 (U)	—	654	—	3 (U)	—	25	NA	33	—	29	NA
AAB3471	15-02119	1.5–2	Soil	NA	4 (U)	—	708	NA	3 (U)	—	27	NA	23	—	—	NA
RE15-11-555	15-02119	3–4	Qbt 4	—	—	—	89.8 (J+)	—	—	—	—	—	—	—	—	1720 (J+)
AAB3521	15-02123	0–0.5	Soil	—	—	—	714.6	—	—	—	33.4	—	—	—	—	—
RE15-11-546	15-02123	3–4	Qbt 4	11600	—	3	102 (J+)	—	—	2720	8.2	3.2	5.2	15100	11.3	2450 (J+)
AAB3301	15-02124	0–0.5	Soil	NA	5	—	674	NA	3 (U)	—	30	NA	21	—	23	NA
AAB3319	15-02124	1.5–2	Soil	NA	4 (U)	—	575	NA	3 (U)	—	36	NA	—	—	23	NA
AAB3339	15-02125	0–0.5	Soil	NA	5	—	660	—	3 (U)	—	33	NA	29	—	—	NA
RE15-11-539	15-02125	3–4	Qbt 4	—	0.51 (U)	2.9	52.5 (J+)	—	—	—	10.2	—	—	—	—	—
AAB3340	15-02127	1.5–2	Soil	—	4 (U)	—	703	—	1 (U)	—	—	—	—	—	28	—
AAB3488	15-02132	0–0.5	Soil	NA	4	—	559	NA	3 (U)	—	—	NA	—	—	24	NA
RE15-11-593	15-02132	1–2	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—
AAB3337	15-2136	1.5–2	Soil	NA	4 (U)	—	644	NA	3 (U)	—	—	NA	17	—	—	NA
AAB3332	15-02137	1.5–2	Soil	30700	4 (U)	—	650	—	1 (U)	10000	—	11.1 (U)	—	—	—	—
RE15-11-538	15-02137	3–4	Qbt 4	—	0.52 (U)	—	115	—	—	—	11.9	—	—	—	—	—
AAB3312	15-02139	1.42–1.92	Soil	—	—	—	—	—	—	6620 (j)	—	—	23.8 (J)	—	—	—
RE15-11-557	15-02139	3–4	Qbt 4	—	0.51 (U)	—	—	—	—	—	—	—	—	—	—	—
AAB3515	15-02141	0–0.33	Soil	—	—	—	—	—	1.8 (J)	—	—	—	93.8	—	42.3	—
RE15-11-554	15-02141	3–3.5	Qbt 4	—	0.52 (U)	—	—	—	—	—	—	—	—	—	—	—

Table 4.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14500**	**11.2**	**1690**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13800**	**19.7**	**2370**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21500**	**22.3**	**4610**
Construction Worker SSL[b]				**41400**	**142**	**41.2**	**4390**	**148**	**72.1**	**8850000**	**134[c]**	**36.7**	**14200**	**248000**	**800**	**1550000**
Industrial SSL[b]				**1290000**	**519**	**35.9**	**255000**	**2580**	**1110**	**32400000**	**505[c]**	**388**	**51900**	**908000**	**800**	**5680000**
Residential SSL[b]				**78000**	**31.3**	**7.07**	**15600**	**156**	**70.5**	**13000000**	**96.6[c]**	**23.4**	**3130**	**54800**	**400**	**339000**
AAB3308	15-02142	0–0.42	Soil	NA	4 (U)	—	330	NA	3 (U)	—	—	NA	—	—	—	NA
RE15-11-596	15-02142	1–2	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—
AAB3341	15-02144	0–0.5	Soil	NA	4 (U)	—	686	—	3(U)	—	—	NA	21	—	28	NA
RE15-11-550	15-02144	3–4	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
AAB3342	15-02145	0–0.5	Soil	—	5 (U)	—	681	—	—	—	32		29	—	29	—
AAB3343	15-02147	1.5–2	Soil	—	—	—	838	—	—	18700 (J)	—	—	—	—	—	—
RE15-11-575	15-02148	3–4	Qbt 4	—	—	—	67.4	—	—	3450	—	—	—	—	—	—
AAB3327	15-02149	0.25–0.75	Soil	—	—	—	—	—	—	—	—	—	89.1 (J)	—	51.7	—
RE15-11-529	15-02149	3–4	Qbt 4	—	0.55 (U)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-582	15-02150	0–1	Soil	—	—	—	—	—	—	—	—	—	17.5	—	—	—
RE15-11-583	15-02150	3–4	Qbt 4	11600 (J+)	—	3.5	113	—	—	7320	12.5	—	5.6	14900	—	2420
AAB3466	15-02151	1.5–2	Soil	—	—	—	—	—	—	—	—	—	14.9 (J)	—	—	—
AAB3458	15-02152	0–0.42	Soil	—	5	—	525	—	1.5 (J)	—	50	—	44.3 (J)	—	34	—
AAB3467	15-02152	1.5–2	Soil	NA	4 (U)	—	543	NA	3 (U)	—	32	NA	—	—	—	NA
RE15-11-536	15-02152	3–4	Qbt 4	—	0.51 (U)	—	53.6	—	—	8860 (J)	14.7	—	—	—	—	—
AAB3344	15-02153	0–0.42	Soil	—	—	—	576	—	—	—	—	—	15	—	—	—
AAB3304	15-02153	1–1	Soil	—	3.9 (U)	—	543	—	0.79 (U)	—	31	—	—	—	29	—
RE15-11-558	15-02153	3–4	Qbt 4	—	0.51 (U)	—	—	—	—	—	—	—	—	—	—	—
AAB3475	15-02155	0–0.33	Soil	NA	—	—	—	—	—	—	—	NA	—	—	—	NA
RE15-11-551	15-02155	3–3.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
AAB3303	15-02156	0–0.5	Soil	NA	4 (U)	—	715	NA	3 (U)	—	31	NA	16	—	26	NA
AAB3338	15-02156	1.5–2	Soil	NA	4 (U)	—	675	NA	3 (U)	—	23	NA	20	—	—	NA
RE15-11-587	15-02156	3–4	Qbt 4	7950	—	—	104 (J+)	—	—	5340	20.7	—	5.5	—	—	2030 (J+)
AAB3307	15-02157	1.5–2	Soil	—	5	—	698	—	—	—	—	—	—	—	—	—
RE15-11-549	15-02157	3–4	Soil	—	—	—	—	—	—	7160	—	—	—	—	—	—
RE15-11-580	15-02162	0–1	Soil	—	—	—	—	—	—	—	—	10.8	—	22200	23.1	—
RE15-11-581	15-02162	3–4	Qbt 4	—	—	—	63.1	—	—	2770	—	—	—	—	—	—
AAB3342	15-02166	0–0.33	Soil	—	4 (U)	—	496	—	0.68 (U)	—	—	—	20	—	28	—
RE15-11-552	15-02166	3–3.5	Qbt 4	—	0.51 (U)	—	—	—	—	—	35.5	—	—	—	—	—
AAB3300	15-02167	0–0.5	Soil	NA	5	—	671	—	3 (U)	—	21	NA	—	—	25	NA
AAB3297	15-02167	1–2	Soil	NA	4 (U)	—	530	NA	3 (U)	—	32	NA	18	—	—	NA
RE15-11-553	15-02167	3–3.5	Qbt 4	—	—	—	51.4 (J+)	—	—	—	—	—	—	—	—	1710 (J+)
AAB3323	15-02170	1.5–2	Soil	—	—	—	434 (J)	—	1.4 (J)	—	—	—	16.4 (J)	—	—	—

Table 4.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14500**	**11.2**	**1690**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13800**	**19.7**	**2370**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21500**	**22.3**	**4610**
Construction Worker SSL[b]				**41400**	**142**	**41.2**	**4390**	**148**	**72.1**	**8850000**	**134[c]**	**36.7**	**14200**	**248000**	**800**	**1550000**
Industrial SSL[b]				**1290000**	**519**	**35.9**	**255000**	**2580**	**1110**	**32400000**	**505[c]**	**388**	**51900**	**908000**	**800**	**5680000**
Residential SSL[b]				**78000**	**31.3**	**7.07**	**15600**	**156**	**70.5**	**13000000**	**96.6[c]**	**23.4**	**3130**	**54800**	**400**	**339000**
RE15-11-526	15-02170	3–4	Qbt 4	—	0.53 (U)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-578	15-02171	0–1	Soil	—	—	—	307	—	—	—	—	—	18.8	—	—	—
RE15-11-579	15-02171	1–2	Qbt 4	—	—	—	47	—	—	—	—	—	—	—	—	—
AAB3477	15-02172	1.5–2	Soil	—	4.3 (U)	—	—	—	1 (U)	—	—	—	—	—	—	—
RE15-11-528	15-02172	3–4	Qbt 4	—	0.54 (U)	—	75.5	—	—	—	—	—	—	—	—	—
AAB3324	15-02173	1.5–2	Soil	—	—	—	—	—	—	8270 (J)	—	—	—	—	—	—
RE15-11-532	15-02173	3–4	Qbt 4	—	0.54 (U)	—	70.5	—	—	—	9	—	—	—	—	—
AAB3318	15-02177	0–0.5	Soil	—	4	—	—	—	—	—	—	—	20	—	33	—
RE15-11-560	15-02177	3–3.5	Qbt 3	—	0.51 (U)	—	—	—	—	—	21.8	—	—	—	—	—
AAB3336	15-02178	0–0.5	Soil	—	3.7 (U)	—	—	—	0.6 (U)	—	—	—	—	—	—	—
RE15-11-559	15-02178	3–3.5	Qbt 3	—	0.51 (U)	—	—	—	—	—	—	—	—	—	—	—
AAB3472	15-02179	0–0.33	Soil	—	—	—	—	—	—	—	—	—	17 (J)	—	26.5	—
RE15-11-561	15-02179	3–3.5	Qbt 4	—	0.53 (U)	—	154	—	—	6640	—	—	—	—	—	—
AAB3520	15-02180	0.5–1	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-524	15-02180	3–4	Qbt 4	—	—	—	67.8	—	—	13300 (J)	10.1	—	—	—	—	—
AAB3470	15-02182	1.5–2	Soil	—	4 (U)	—	387	—	1.2	—	—	—	—	—	—	—
AAB3527	15-02191	0–0.5	Soil	—	—	—	359 (J)	—	—	—	—	—	1150 (J)	—	23.1	—
RE15-11-523	15-02191	3–4	Qbt 4	—	—	—	—	—	—	—	9.7	—	—	—	—	—
AAB3485	15-02198	0–0.5	Soil	—	6	—	508	—	0.87 (U)	—	—	—	—	—	38	—
RE15-11-594	15-02203	3–4	Qbt 4	—	—	—	—	—	—	—	9.8	—	—	—	—	—
AAB3295	15-02206	0–0.33	Soil	—	3.7 (U)	—	—	—	0.78 (U)	—	—	—	—	—	24	—
RE15-11-562	15-02206	3–3.5	Qbt 3	—	0.51 (U)	—	—	—	—	—	27.8	—	—	—	—	—
AAB3478	15-02226	0–0.5	Soil	—	3.9 (U)	—	—	—	2.4	—	—	—	50.1	—	34	—
RE15-11-537	15-02226	3–4	Qbt 4	—	0.52 (U)	—	—	—	—	—	9.9	—	—	—	—	—
AAB3320	15-02228	0–0.5	Soil	—	3.8 (U)	—	546	7.9	3.2	—	—	—	526	—	155	—
RE15-11-533	15-02228	3–4	Qbt 4	—	—	—	—	—	—	—	—	—	4.7	—	—	—
RE15-11-588	15-02229	0–1	Soil	—	—	—	—	—	—	—	—	—	62.1	—	—	—
RE15-11-589	15-02229	1–2	Qbt 4	—	—	—	—	—	—	—	—	—	4.8	—	—	—
RE15-11-597	15-02230	0–0.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-598	15-02230	0.5–1	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
AAB3328	15-02231	0–0.42	Soil	—	3.9 (U)	—	—	2.3	1.8	—	—	—	223	—	31.5	—
RE15-11-527	15-02231	3–4	Soil	—	—	—	—	—	—	—	22.2	—	—	—	—	—
AAB3298	15-02240	0–0.5	Soil	—	3.9 (U)	—	—	—	0.76 (U)	—	—	—	53.1	—	—	—

Table 4.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14500**	**11.2**	**1690**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13800**	**19.7**	**2370**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21500**	**22.3**	**4610**
Construction Worker SSL[b]				**41400**	**142**	**41.2**	**4390**	**148**	**72.1**	**8850000**	**134[c]**	**36.7**	**14200**	**248000**	**800**	**1550000**
Industrial SSL[b]				**1290000**	**519**	**35.9**	**255000**	**2580**	**1110**	**32400000**	**505[c]**	**388**	**51900**	**908000**	**800**	**5680000**
Residential SSL[b]				**78000**	**31.3**	**7.07**	**15600**	**156**	**70.5**	**13000000**	**96.6[c]**	**23.4**	**3130**	**54800**	**400**	**339000**
RE15-11-531	15-02240	3–4	Fill	—	—	—	—	—	—	7090 (J)	—	—	—	—	—	—
AAB3330	15-02241	0–0.5	Soil	—	—	—	397 (J)	—	—	—	—	—	46.8 (J)	—	—	—
RE15-11-530	15-02241	3–4	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
AAB3445	15-02246	0–0.5	Soil	—	3.9 (U)	—	585	2.5	0.43 (U)	—	23	—	81	—	30	—
AAC0339	15-02246	1.83–2.33	Soil	—	—	—	717	—	4.69	—	43.9	—	94.7	—	45.9	—
AAC0340	15-02246	3.67–4.17	Soil	NA	4 (U)	—	566	NA	4 (U)	—	50.7	NA	84.5	—	—	NA
AAB3321	15-02277	0–0.42	Soil	—	3.8 (U)	—	—	—	3.2	—	—	—	43.9	—	91.2	—
RE15-11-565	15-02277	3–3.5	Qbt 4	—	0.51 (U)	—	—	—	—	—	—	—	—	—	—	—
AAB3294	15-02278	0–0.5	Soil	—	—	—	314 (J)	—	5.7 (J)	—	—	—	22.7 (J)	—	167	—
RE15-11-525	15-02278	3–4	Qbt 4	—	0.52 (U)	—	—	—	—	—	—	—	—	—	—	—
AAB3525	15-02279	0–0.42	Soil	—	3.7 (U)	—	—	—	1.4	—	—	—	22.2	—	30.1	—
RE15-11-585	15-02279	3–4	Qbt 4	—	—	—	—	—	—	—	15.7	—	—	—	—	—
AAB3325	15-02295	0–0.5	Soil	—	3.7 (U)	—	—	—	1 (U)	—	—	—	40.9	—	—	—
RE15-11-534	15-02295	3–4	Qbt 4	—	0.53 (U)	—	92.1	—	—	5840 (J)	7.9	—	—	—	—	—
AAB3480	15-02299	1.5–2	Soil	—	4 (U)	—	315	—	0.98 (U)	—	—	—	—	—	—	—
RE15-11-563	15-02299	3–4	Qbt 4	—	0.52 (U)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-671	15-613365	0–1	Fill	—	5.4	—	755	7.9	3.8	—	31.2	—	8250	—	177	—
RE15-11-672	15-613365	6–7	Qbt 4	—	0.54 (U)	—	—	1.7	—	—	—	—	95.8	—	—	—
RE15-11-673	15-613365	9–10	Qbt 4	—	0.54 (U)	4.4	51.9	—	—	—	8.2	—	27.7	—	—	2170 (J+)
RE15-11-604	15-613365	10.5–11	Qbt 4	—	1.2 (J)	—	82.5 (J+)	1.8	—	—	8.5	8.6	485	—	13.2	—
RE15-11-674	15-613366	0–1	Fill	—	—	—	—	—	—	—	—	9.6	40.9	—	—	—
RE15-11-675	15-613366	6–7	Fill	—	—	—	307 (J+)	—	0.43	—	—	9.4	88.4	—	23.3	—
RE15-11-676	15-613366	9–10	Fill	—	—	—	—	—	0.82	—	—	9.4	3540	—	22.5	—
RE15-11-677	15-613367	0–1	Fill	—	10.4	—	296 (J+)	42.1	12.9	—	—	—	8140	—	375	—
RE15-11-678	15-613367	2–3	Fill	—	6.6	—	344 (J+)	18.9	9.9	6140	—	—	1250	—	140	—
RE15-11-680	15-613368	0–1	Fill	—	17.5	—	365	18.7	1.2	—	—	—	423	—	43.2	—
RE15-11-681	15-613368	6–7	Fill	—	—	—	—	—	—	7030 (J)	—	—	20.6	—	—	—
RE15-11-682	15-613368	9–10	Qbt 4	—	0.6	—	—	—	—	—	—	—	16.2	—	—	—
RE15-11-683	15-613369	0–1	Fill	—	—	—	296 (J+)	—	—	—	—	—	24	—	—	—
RE15-11-684	15-613369	6–7	Fill	—	—	—	—	—	0.51	—	—	8.9	49.1	—	23.3	—
RE15-11-685	15-613369	9–10	Fill	—	—	—	—	—	0.84	—	—	—	92.9	—	23.3	—
RE15-11-600	15-613369	11–12	Fill	—	—	—	—	—	—	—	—	16.8	26.7	—	22.5	—
RE15-11-686	15-613370	0–1	Fill	—	—	—	—	—	—	—	—	—	37.6	—	—	—

Table 4.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14500**	**11.2**	**1690**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13800**	**19.7**	**2370**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21500**	**22.3**	**4610**
Construction Worker SSL[b]				**41400**	**142**	**41.2**	**4390**	**148**	**72.1**	**8850000**	**134[c]**	**36.7**	**14200**	**248000**	**800**	**1550000**
Industrial SSL[b]				**1290000**	**519**	**35.9**	**255000**	**2580**	**1110**	**32400000**	**505[c]**	**388**	**51900**	**908000**	**800**	**5680000**
Residential SSL[b]				**78000**	**31.3**	**7.07**	**15600**	**156**	**70.5**	**13000000**	**96.6[c]**	**23.4**	**3130**	**54800**	**400**	**339000**
RE15-11-687	15-613370	6–7	Fill	—	—	—	471 (J+)	—	1.7	—	—	—	108000	—	25.7	—
RE15-11-688	15-613370	8–8.5	Fill	—	—	—	675 (J+)	—	3.5	—	21.2	9	637	—	51.6	—
RE15-11-689	15-613371	0–1	Fill	—	2.2	—	379	20.4	1.2	—	—	—	281	—	48.5	—
RE15-11-690	15-613371	6–7	Qbt 4	—	0.52 (U)	—	57	—	—	—	—	—	284	—	—	—
RE15-11-691	15-613371	9–10	Qbt 4	—	0.51 (U)	—	—	—	—	—	—	—	6.6	—	—	—
RE15-11-692	15-613372	0–1	Fill	—	—	—	—	—	—	—	—	—	42.6	—	—	—
RE15-11-693	15-613372	6–7	Fill	—	—	—	297 (J+)	—	0.42	—	—	9	61.3	—	—	—
RE15-11-694	15-613372	9–10	Fill	—	—	—	311 (J+)	—	0.45	—	—	8.8	49.7	—	25.7	—
RE15-11-603	15-613372	10.9–11.1	Fill	—	—	—	—	—	0.87	—	—	—	79.8	—	—	—
RE15-11-695	15-613373	0–1	Fill	—	—	—	—	—	—	—	—	—	47.3 (J-)	—	—	—
RE15-11-696	15-613373	6–6.25	Fill	—	—	—	375	—	0.55	—	—	—	119 (J-)	—	88.9	—
RE15-11-698	15-613374	0–1	Fill	—	—	—	339 (J+)	—	—	—	—	—	313	—	—	—
RE15-11-699	15-613374	6–7	Fill	—	—	—	—	—	—	—	—	—	112	—	—	—
RE15-11-700	15-613374	8–8.5	Fill	—	—	—	857 (J+)	—	44.9	—	—	—	3970	—	87.8	—
RE15-11-701	15-613375	0–1	Fill	—	—	—	—	—	—	—	—	—	106	—	—	—
RE15-11-702	15-613375	6–7	Fill	—	—	—	409 (J+)	—	—	—	—	—	—	—	—	—
RE15-11-703	15-613375	9–10	Fill	—	—	—	390 (J+)	—	0.43	—	—	—	69.2	—	23.7	—
RE15-11-599	15-613375	11–12	Fill	—	—	—	—	—	0.57	—	—	—	39.2	—	—	—
RE15-11-704	15-613376	0–1	Fill	—	1 (J)	—	439 (J+)	2	1.1	—	—	—	626	—	30.9	—
RE15-11-705	15-613376	6–7	Fill	—	—	—	—	—	—	—	—	—	35.2 (J)	—	—	—
RE15-11-706	15-613376	8.25–9.25	Qbt 4	11600	0.54	2.8	195	—	—	2260	13.6	5	526 (J)	—	15.7	1870
RE15-11-601	15-613376	10–11	Qbt 4	—	—	—	79.1 (J+)	—	—	—	9	—	189	—	—	—
RE15-11-707	15-613377	0–1	Fill	—	—	—	337 (J+)	—	0.45	—	—	—	119	—	25.5	—
RE15-11-708	15-613377	3–3.5	Fill	—	—	—	—	—	0.51	—	26.6	9.7	113	—	41.9	—
RE15-11-710	15-613378	0–1	Fill	—	—	—	—	—	—	—	—	—	41.8 (J)	—	—	—
RE15-11-711	15-613378	6–7	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-713	15-613379	0–1	Fill	—	1.3	—	—	2	0.58	—	—	—	94.9 (J)	—	28.9	—
RE15-11-714	15-613379	6–7	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-715	15-613379	9–10	Qbt 4	9040	0.52 (U)	3.8	78.7	—	—	2370	7.5	—	4.7 (J)	—	—	2350
RE15-11-716	15-613380	0–1	Fill	—	0.89	—	—	3.7	0.97	—	—	—	141 (J-)	—	33.5	—
RE15-11-717	15-613380	6–7	Fill	—	—	—	308	—	0.59	—	20.6	9.6	160 (J-)	—	25.1	—
RE15-11-718	15-613380	9–9.5	Fill	—	—	—	658	—	2.1	—	23.9	—	255 (J-)	—	112	—
RE15-11-725	15-613381	0–1	Fill	—	2.1 (J)	—	537 (J+)	2.4	0.68	—	—	—	356	—	50.1	—

Table 4.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14500**	**11.2**	**1690**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13800**	**19.7**	**2370**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21500**	**22.3**	**4610**
Construction Worker SSL[b]				**41400**	**142**	**41.2**	**4390**	**148**	**72.1**	**8850000**	**134[c]**	**36.7**	**14200**	**248000**	**800**	**1550000**
Industrial SSL[b]				**1290000**	**519**	**35.9**	**255000**	**2580**	**1110**	**32400000**	**505[c]**	**388**	**51900**	**908000**	**800**	**5680000**
Residential SSL[b]				**78000**	**31.3**	**7.07**	**15600**	**156**	**70.5**	**13000000**	**96.6[c]**	**23.4**	**3130**	**54800**	**400**	**339000**
RE15-11-720	15-613381	6–7	Fill	—	—	—	—	—	—	—	—	—	137	—	—	—
RE15-11-721	15-613381	9–10	Fill	—	—	—	359 (J+)	—	0.79	—	—	9	168	—	89.8	—
RE15-11-602	15-613381	11–12	Fill	—	—	—	—	—	—	—	—	9.8	—	—	—	—
RE15-11-722	15-613382	0–1	Fill	—	—	—	550	—	0.87	—	—	—	135 (J)	—	26.8	—
RE15-11-723	15-613382	6–7	Fill	—	—	—	327	—	—	6180	—	9.1	15.6 (J)	—	—	—
RE15-11-724	15-613382	9–10	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-728	15-613384	0–0.5	Sed	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-729	15-613384	0.5–1	Sed	—	—	—	—	—	—	—	—	—	14.4	—	—	—
RE15-11-730	15-613385	0–1	Sed	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-731	15-613385	1–1.5	Sed	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-732	15-613386	0–1	Sed	—	—	—	160	—	—	—	—	—	51.5	—	—	—
RE15-11-733	15-613386	1–2	Sed	—	—	—	—	—	—	—	—	—	39.2	—	—	—
RE15-11-734	15-613387	0–1	Sed	—	—	—	158	—	—	—	—	6.2	12.1	—	—	—
RE15-11-735	15-613387	2–3	Sed	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-736	15-613388	0–1	Sed	—	—	—	150	—	—	—	—	6.2	19.6	—	—	—
RE15-11-737	15-613388	1–1.5	Sed	—	—	—	149	—	—	—	—	5.7	—	—	—	—
RE15-11-740	15-613389	0–0.5	Sed	—	—	—	—	—	—	—	—	—	587	—	—	—
RE15-11-739	15-613389	0.5–1	Sed	—	—	—	154	1.9	0.48	—	—	—	177	—	—	—

Table 4.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Manganese	Mercury	Nickel	Nitrate	Potassium	Selenium	Silver	Sodium	Thallium	Thorium	Titanium	Uranium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**482**	**0.1**	**6.58**	**na[f]**	**3500**	**0.3**	**1**	**2770**	**1.1**	**10.8**	**Na**	**2.4**	**17**	**63.5**
Sediment BV[a]				**543**	**0.1**	**9.38**	**na**	**2690**	**0.3**	**1**	**1470**	**0.73**	**14.6**	**Na**	**na**	**19.7**	**60.2**
Soil BV[a]				**671**	**0.1**	**15.4**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**14.6**	**na**	**1.82**	**39.6**	**48.8**
Construction Worker SSL[b]				**464**	**77.1**	**753**	**566000**	**20800000**	**1750**	**1770**	**10200000**	**3.54**	**na**	**na**	**277**	**614**	**106000**
Industrial SSL[b]				**160000**	**389**	**25700**	**2080000**	**76200000**	**6490**	**6490**	**35700000**	**13**	**na**	**Na**	**3880**	**6530**	**389000**
Residential SSL[b]				**10500**	**23.5**	**1560**	**125000**	**15600000**	**391**	**391**	**7820000**	**0.782**	**na**	**na**	**234**	**394**	**23500**
AAB3333	15-02100	0–1	Soil	—	—	—	NA	—	—	—	—	—	NA	NA	23.6	—	—
AAB3451	15-02100	1.5–2	Soil	—	0.11 (U)	—	NA	—	—	—	—	—	NA	NA	3.17	—	—
RE15-11-543	15-02100	3–4	Soil	—	—	—	NA	—	2	—	—	—	NA	NA	NA	—	—
AAB3317	15-02101	0–0.5	Soil	—	—	—	NA	—	—	NA	NA	NA	—	—	45.6 (J)	NA	—
RE15-11-542	15-02101	3–4	Soil	—	—	—	NA	—	—	—	—	—	NA	NA	NA	—	—
AAB3461	15-02112	0–0.5	Soil	—	0.27 (J)	—	NA	—	—	—	—	—	NA	NA	66.3	—	—
RE15-11-576	15-02113	0–1	Soil	—	2.3	—	NA	—	—	—	—	—	NA	NA	NA	—	—
RE15-11-577	15-02113	3–4	Qbt 4	—	—	—	NA	—	1.6	—	—	—	NA	NA	NA	—	—
AAB3476	15-02114	0–0.5	Soil	—	0.65 (J)	—	NA	—	—	—	—	—	—	4472	26	—	—
AAB3487	15-02114	1.5–2	Soil	—	0.11 (J)	—	NA	—	—	—	—	1 (U)	—	4509	2.75	—	54
RE15-11-541	15-02114	3–4	Qbt 4	—	—	9.9	NA	—	1.2	—	—	—	NA	NA	NA	22.8	—
AAB3306	15-02115	0–0.5	Soil	—	—	20	NA	—	4 (U)	NA	NA	NA	17	4029	43	NA	—
AAB3484	15-02119	0–0.25	Soil	—	—	—	NA	—	4 (U)	NA	NA	NA	16	4090	32	NA	—
AAB3471	15-02119	1.5–2	Soil	—	5 (U)	—	NA	—	4 (U)	NA	NA	NA	—	4182	8 (U)	NA	—
RE15-11-555	15-02119	3–4	Qbt 4	—	—	—	NA	—	2	—	—	—	NA	NA	NA	—	—
AAB3521	15-02123	0–0.5	Soil	—	0.14 (J)	—	NA	—	—	—	—	1 (U)	18.4	4841.8	14	—	—
RE15-11-546	15-02123	3–4	Qbt 4	—	—	9.5	NA	—	2.3	—	—	—	NA	NA	NA	—	—
AAB3301	15-02124	0–0.5	Soil	—	5 (U)	—	NA	—	4 (U)	NA	NA	NA	—	4392	39	NA	—
AAB3319	15-02124	1.5–2	Soil	—	5 (U)	—	NA	—	4 (U)	NA	NA	NA	23	4445	8 (U)	NA	66
AAB3339	15-02125	0–0.5	Soil	—	—	—	NA	—	4 (U)	NA	NA	NA	—	4437	65	NA	53
RE15-11-539	15-02125	3–4	Qbt 4	—	—	7.4	NA	—	2.6	—	—	—	NA	NA	NA	—	—
AAB3340	15-02127	1.5–2	Soil	—	—	—	NA	—	—	—	—	—	25	3967	3.93	—	52
AAB3488	15-02132	0–0.5	Soil	—	5 (U)	—	NA	—	4 (U)	NA	NA	NA	—	3545	20	NA	—
RE15-11-593	15-02132	1–2	Qbt 3	—	—	—	NA	—	1.7	—	—	—	NA	NA	NA	—	—
AAB3337	15-02136	1.5–2	Soil	—	5 (U)	—	NA	—	4 (U)	NA	NA	NA	—	4380	8 (U)	NA	—
AAB3332	15-02137	1.5–2	Soil	—	0.14 (J)	—	NA	—	—	—	1340 (J)	—	NA	NA	6.47	—	—
RE15-11-538	15-02137	3–4	Qbt 4	—	—	8.5	NA	—	2.1	—	—	—	NA	NA	NA	—	—
AAB3312	15-02139	1.42–1.92	Soil	—	—	—	NA	—	—	—	1290	0.94 (U)	NA	NA	26.9	—	—
RE15-11-557	15-02139	3–4	Qbt 4	—	—	—	NA	—	1.5	—	—	—	NA	NA	NA	—	—
AAB3515	15-02141	0–0.33	Soil	—	—	—	NA	—	—	—	—	1.4 (U)	—	—	173	—	66.4 (J)
RE15-11-554	15-02141	3–3.5	Qbt 4	—	—	—	NA	—	2.7	—	—	—	NA	NA	NA	—	—
AAB3308	15-02142	0–0.42	Soil	—	5 (U)	—	NA	—	4 (U)	NA	NA	NA	—	2586	8	NA	—
RE15-11-596	15-02142	1–2	Qbt 3	—	—	—	NA	—	1.4	—	—	—	NA	NA	NA	—	—

Table 4.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Manganese	Mercury	Nickel	Nitrate	Potassium	Selenium	Silver	Sodium	Thallium	Thorium	Titanium	Uranium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**482**	**0.1**	**6.58**	**na[f]**	**3500**	**0.3**	**1**	**2770**	**1.1**	**10.8**	**Na**	**2.4**	**17**	**63.5**
Sediment BV[a]				**543**	**0.1**	**9.38**	**na**	**2690**	**0.3**	**1**	**1470**	**0.73**	**14.6**	**Na**	**na**	**19.7**	**60.2**
Soil BV[a]				**671**	**0.1**	**15.4**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**14.6**	**na**	**1.82**	**39.6**	**48.8**
Construction Worker SSL[b]				**464**	**77.1**	**753**	**566000**	**20800000**	**1750**	**1770**	**10200000**	**3.54**	**na**	**na**	**277**	**614**	**106000**
Industrial SSL[b]				**160000**	**389**	**25700**	**2080000**	**76200000**	**6490**	**6490**	**35700000**	**13**	**na**	**Na**	**3880**	**6530**	**389000**
Residential SSL[b]				**10500**	**23.5**	**1560**	**125000**	**15600000**	**391**	**391**	**7820000**	**0.782**	**na**	**na**	**234**	**394**	**23500**
AAB3341	15-02144	0–0.5	Soil	—	—	—	NA	—	4 (U)	NA	NA	NA	—	4456	29	NA	—
RE15-11-550	15-02144	3–4	Soil	—	—	—	NA	—	2.2	—	—	—	NA	NA	NA	—	—
AAB3342	15-02145	0–0.5	Soil	—	0.16 (J)	—	NA	—	—	—	—	1.1 (U)	18	3928	200	—	—
AAB3343	15-02147	1.5–2	Soil	—	—	—	NA	—	—	—	—	0.99 (U)	—	3917	13	—	—
RE15-11-575	15-02148	3–4	Qbt 4	—	—	7 (J)	NA	—	1.3	—	—	—	NA	NA	NA	—	—
AAB3327	15-02149	0.25–0.75	Soil	—	0.11 (U)	—	NA	—	—	—	—	—	NA	NA	131	—	—
RE15-11-529	15-02149	3–4	Qbt 4	—	—	—	NA	—	3.6	—	—	—	NA	NA	NA	—	—
RE15-11-582	15-02150	0–1	Soil	—	—	—	NA	—	—	—	—	—	NA	NA	NA	—	—
RE15-11-583	15-02150	3–4	Qbt 4	—	—	10.7	NA	—	1.1	—	—	—	NA	NA	NA	—	—
AAB3466	15-02151	1.5–2	Soil	—	—	—	NA	—	—	—	—	1.1 (U)	NA	NA	9	—	—
AAB3458	15-02152	0–0.42	Soil	—	0.25 (J)	—	NA	—	—	—	—	0.84 (U)	18	4240	169	—	68
AAB3467	15-02152	1.5–2	Soil	—	5 (U)	—	NA	—	4 (U)	NA	NA	NA	18	4322	8 (U)	NA	—
RE15-11-536	15-02152	3–4	Qbt 4	—	—	9.6	NA	—	2	—	—	—	NA	NA	NA	—	—
AAB3344	15-02153	0–0.42	Soil	—	—	—	NA	—	—	—	—	0.74 (U)	—	4223	533	—	—
AAB3304	15-02153	1–1	Soil	—	0.28 (J)	—	NA	—	—	—	—	—	22	3800	8	—	52
RE15-11-558	15-02153	3–4	Qbt 4	—	—	—	NA	—	1.2	—	—	—	NA	NA	NA	—	—
AAB3475	15-02155	0–0.33	Soil	—	—	—	NA	—	—	NA	NA	NA	—	—	—	NA	—
RE15-11-551	15-02155	3–3.5	Qbt 4	—	—	—	NA	—	2.2	—	—	—	NA	NA	NA	—	—
AAB3303	15-02156	0–0.5	Soil	—	5 (U)	—	NA	—	4 (U)	NA	NA	NA	21	4077	21	NA	—
AAB3338	15-02156	1.5–2	Soil	—	5 (U)	—	NA	—	4 (U)	NA	NA	NA	18	4305	8 (U)	NA	—
RE15-11-587	15-02156	3–4	Qbt 4	—	—	13.1	NA	—	1.6	—	—	—	NA	NA	NA	—	—
AAB3307	15-02157	1.5–2	Soil	—	0.11 (U)	—	NA	—	—	—	—	0.97 (U)	—	4160	4.34	—	—
RE15-11-549	15-02157	3–4	Soil	—	—	—	NA	—	2.4	—	—	—	NA	NA	NA	—	—
RE15-11-580	15-02162	0–1	Soil	824	—	—	NA	—	1.8	—	—	—	NA	NA	NA	—	—
RE15-11-581	15-02162	3–4	Qbt 4	—	—	—	NA	—	1.3	—	—	—	NA	NA	NA	—	—
AAB3342	15-02166	0–0.33	Soil	—	—	—	NA	—	—	—	—	—	24	3439	59	—	52
RE15-11-552	15-02166	3–3.5	Qbt 4	—	—	18.8	NA	—	3.1	—	—	—	NA	NA	NA	—	—
AAB3300	15-02167	0–0.5	Soil	—	—	—	NA	—	4 (U)	NA	NA	NA	19	4613	27	NA	—
AAB3297	15-02167	1–2	Soil	—	5 (U)	—	NA	—	4 (U)	NA	NA	NA	—	3732	18	NA	60
RE15-11-553	15-02167	3–3.5	Qbt 4	—	—	6.9	NA	—	1.7	—	—	—	NA	NA	NA	—	—
AAB3323	15-02170	1.5–2	Soil	—	—	—	NA	3860	—	—	—	1 (U)	NA	NA	5.77	—	—
RE15-11-526	15-02170	3–4	Qbt 4	—	0.561	—	NA	—	1.5	—	—	—	NA	NA	NA	—	—

Table 4.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Manganese	Mercury	Nickel	Nitrate	Potassium	Selenium	Silver	Sodium	Thallium	Thorium	Titanium	Uranium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**482**	**0.1**	**6.58**	**na[f]**	**3500**	**0.3**	**1**	**2770**	**1.1**	**10.8**	**Na**	**2.4**	**17**	**63.5**
Sediment BV[a]				**543**	**0.1**	**9.38**	**na**	**2690**	**0.3**	**1**	**1470**	**0.73**	**14.6**	**Na**	**na**	**19.7**	**60.2**
Soil BV[a]				**671**	**0.1**	**15.4**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**14.6**	**na**	**1.82**	**39.6**	**48.8**
Construction Worker SSL[b]				**464**	**77.1**	**753**	**566000**	**20800000**	**1750**	**1770**	**10200000**	**3.54**	**na**	**na**	**277**	**614**	**106000**
Industrial SSL[b]				**160000**	**389**	**25700**	**2080000**	**76200000**	**6490**	**6490**	**35700000**	**13**	**na**	**Na**	**3880**	**6530**	**389000**
Residential SSL[b]				**10500**	**23.5**	**1560**	**125000**	**15600000**	**391**	**391**	**7820000**	**0.782**	**na**	**na**	**234**	**394**	**23500**
RE15-11-578	15-02171	0–1	Soil	—	0.182	—	NA	—	—	—	1030	—	NA	NA	NA	—	—
RE15-11-579	15-02171	1–2	Qbt 4	—	—	—	NA	—	1.3	—	—	—	NA	NA	NA	—	—
AAB3477	15-02172	1.5–2	Soil	—	0.11 (U)	—	NA	—	—	—	1240 (J)	0.75 (U)	NA	NA	10.3	—	—
RE15-11-528	15-02172	3–4	Qbt 4	—	—	—	NA	—	2.5	—	—	—	NA	NA	NA	—	—
AAB3324	15-02173	1.5–2	Soil	—	0.2 (J)	—	NA	—	—	—	—	2 (U)	NA	NA	7.6	—	—
RE15-11-532	15-02173	3–4	Qbt 4	—	—	8.3	NA	—	1.8	—	—	—	NA	NA	NA	—	—
AAB3318	15-02177	0–0.5	Soil	—	—	—	NA	—	—	—	—	—	16	2118	154	—	55
RE15-11-560	15-02177	3–3.5	Qbt 3	—	—	10.9	NA	—	1.8	—	—	—	NA	NA	NA	—	—
AAB3336	15-02178	0–0.5	Soil	—	0.53 (J)	—	NA	—	—	—	—	—	—	2626	55	—	65
RE15-11-559	15-02178	3–3.5	Qbt 3	—	—	—	NA	—	1.6	—	—	—	NA	NA	NA	—	—
AAB3472	15-02179	0–0.33	Soil	—	0.11 (U)	—	NA	—	—	—	—	0.89 (U)	NA	NA	34.8	—	—
RE15-11-561	15-02179	3–3.5	Qbt 4	—	—	—	NA	—	1.1	—	—	—	NA	NA	NA	—	—
AAB3520	15-02180	0.5–1	Soil	—	0.18 (J)	—	NA	—	—	—	—	1.1 (U)	NA	NA	23.7	—	—
RE15-11-524	15-02180	3–4	Qbt 4	—	0.664	7.7	NA	—	1.1	—	—	—	NA	NA	NA	—	—
AAB3470	15-02182	1.5–2	Soil	—	1.8 (J)	—	NA	3940	—	—	1290 (J)	—	NA	NA	15.2	—	—
AAB3527	15-02191	0–0.5	Soil	—	0.14 (J)	—	NA	—	—	—	—	—	NA	NA	535	—	217 (J)
RE15-11-523	15-02191	3–4	Qbt 4	—	—	—	NA	—	1.6	—	—	—	NA	NA	NA	—	—
AAB3485	15-02198	0–0.5	Soil	—	—	—	NA	—	—	—	—	—	—	3853	26	—	52
RE15-11-594	15-02203	3–4	Qbt 4	—	—	—	NA	—	1.1	—	—	—	NA	NA	NA	—	—
AAB3295	15-02206	0–0.33	Soil	—	0.11 (J)	—	NA	—	—	—	—	—	19	2058	25	—	—
RE15-11-562	15-02206	3–3.5	Qbt 3	—	—	13.4	NA	—	1.7	—	—	—	NA	NA	NA	—	—
AAB3478	15-02226	0–0.5	Soil	—	—	—	NA	—	—	—	—	—	NA	NA	170	—	—
RE15-11-537	15-02226	3–4	Qbt 4	—	—	—	NA	—	1.8	—	—	—	NA	NA	NA	—	—
AAB3320	15-02228	0–0.5	Soil	—	—	—	NA	—		8.2	—	—	NA	NA	1720	—	130
RE15-11-533	15-02228	3–4	Qbt 4	—	—	—	NA	—	1.8	—	—	1.3	NA	NA	NA	—	—
RE15-11-588	15-02229	0–1	Soil	—	—	—	NA	—	—	—	—	—	NA	NA	NA	—	—
RE15-11-589	15-02229	1–2	Qbt 4	—	—	—	NA	—	1.1	—	—	—	NA	NA	NA	—	—
RE15-11-597	15-02230	0–0.5	Qbt 4	—	—	—	NA	—	1.4	—	—	—	NA	NA	NA	—	—
RE15-11-598	15-02230	0.5–1	Qbt 4	—	—	—	NA	—	1.8	—	—	—	NA	NA	NA	—	—
AAB3328	15-02231	0–0.42	Soil	—	—	—	NA	—	—	—	—	—	NA	NA	691	—	78

Table 4.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Manganese	Mercury	Nickel	Nitrate	Potassium	Selenium	Silver	Sodium	Thallium	Thorium	Titanium	Uranium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**482**	**0.1**	**6.58**	**na[f]**	**3500**	**0.3**	**1**	**2770**	**1.1**	**10.8**	**Na**	**2.4**	**17**	**63.5**
Sediment BV[a]				**543**	**0.1**	**9.38**	**na**	**2690**	**0.3**	**1**	**1470**	**0.73**	**14.6**	**Na**	**na**	**19.7**	**60.2**
Soil BV[a]				**671**	**0.1**	**15.4**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**14.6**	**na**	**1.82**	**39.6**	**48.8**
Construction Worker SSL[b]				**464**	**77.1**	**753**	**566000**	**20800000**	**1750**	**1770**	**10200000**	**3.54**	**na**	**na**	**277**	**614**	**106000**
Industrial SSL[b]				**160000**	**389**	**25700**	**2080000**	**76200000**	**6490**	**6490**	**35700000**	**13**	**na**	**Na**	**3880**	**6530**	**389000**
Residential SSL[b]				**10500**	**23.5**	**1560**	**125000**	**15600000**	**391**	**391**	**7820000**	**0.782**	**na**	**na**	**234**	**394**	**23500**
RE15-11-527	15-02231	3–4	Soil	—	—	—	NA	—	1.6	—	—	—	—	—	NA	—	—
AAB3298	15-02240	0–0.5	Soil	—	0.21 (J)	—	NA	—	—	—	—	—	—	—	47.5	—	—
RE15-11-531	15-02240	3–4	Fill	—	0.101	—	NA	—	—	—	—	—	—	—	NA	—	—
AAB3330	15-02241	0–0.5	Soil	—	—	—	NA	—	—	—	—	0.9 (U)	NA	NA	34.4	—	—
RE15-11-530	15-02241	3–4	Fill	—	0.722	—	NA	—	—	—	—	—	NA	NA	NA	—	—
AAB3445	15-02246	0–0.5	Soil	—	0.11 (U)	—	NA	—	—	—	—	—	—	4543	2763	—	63
AAC0339	15-02246	1.83–2.33	Soil	—	—	—	NA	—	—	—	—	0.75 (U)	20.1	3174	37.7 (J)	—	99.9
AAC0340	15-02246	3.67–4.17	Soil	—	5 (U)	—	NA	—	4 (U)	NA	NA	NA	—	3513	30.7	NA	51.9
AAB3321	15-02277	0–0.42	Soil	—	0.11 (U)	—	NA	—	—	—	—	—	NA	NA	41.1	—	—
RE15-11-565	15-02277	3–3.5	Qbt 4	—	—	—	NA	—	1.2	—	—	—	NA	NA	NA	—	—
AAB3294	15-02278	0–0.5	Soil	—	—	—	NA	—	—	—	—	—	NA	NA	10.1	—	—
RE15-11-525	15-02278	3–4	Qbt 4	—	—	—	NA	—	1.3	—	—	—	NA	NA	NA	—	—
AAB3525	15-02279	0–0.42	Soil	—	—	—	NA	—	—	—	—	—	NA	NA	39.1	—	—
RE15-11-585	15-02279	3–4	Qbt 4	—	—	8.4	NA	—	1	—	—	—	NA	NA	NA	—	—
AAB3325	15-02295	0–0.5	Soil	—	—	—	NA	—	—	4.1 (J)	—	—	NA	NA	190	—	—
RE15-11-534	15-02295	3–4	Qbt 4	—	—	7.4	NA	—	1.8	—	—	—	NA	NA	NA	—	—
AAB3480	15-02299	1.5–2	Soil	—	0.11 (U)	—	NA	—	—	—	1160 (J)	—	NA	NA	12.7	—	—
RE15-11-563	15-02299	3–4	Qbt 4	—	—	—	NA	—	1.4	—	—	—	NA	NA	NA	—	—
RE15-11-671	15-613365	0–1	Fill	—	—	27.5	NA	—	—	8.4	—	—	NA	NA	NA	—	520
RE15-11-672	15-613365	6–7	Qbt 4	—	—	—	NA	—	1.7	—	—	—	NA	NA	NA	—	—
RE15-11-673	15-613365	9–10	Qbt 4	—	—	9.6	NA	—	2.6	—	—	—	NA	NA	NA	—	—
RE15-11-604	15-613365	10.5–11	Qbt 4	—	—	8.6	NA	—	1.5	2.9	—	—	NA	NA	NA	—	—
RE15-11-674	15-613366	0–1	Fill	—	—	—	NA	—	1.8	—	—	—	NA	NA	NA	—	49.9
RE15-11-675	15-613366	6–7	Fill	—	—	—	NA	—	2	—	—	—	NA	NA	NA	—	—
RE15-11-676	15-613366	9–10	Fill	—	—	—	NA	—	1.6	—	—	—	NA	NA	NA	—	51.6
RE15-11-677	15-613367	0–1	Fill	—	—	18.1	NA	—	—	25.5	—	—	NA	NA	NA	—	716
RE15-11-678	15-613367	2–3	Fill	—	—	15.5	NA	—	—	13.8	—	—	NA	NA	NA	—	173
RE15-11-680	15-613368	0–1	Fill	—	—	—	NA	—	1.8	1.3	—	—	NA	NA	NA	—	75.9
RE15-11-681	15-613368	6–7	Fill	—	—	—	NA	—	1.9	—	—	—	NA	NA	NA	—	—
RE15-11-682	15-613368	9–10	Qbt 4	—	—	—	NA	—	1.5	—	—	—	NA	NA	NA	—	—

Table 4.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Manganese	Mercury	Nickel	Nitrate	Potassium	Selenium	Silver	Sodium	Thallium	Thorium	Titanium	Uranium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**482**	**0.1**	**6.58**	**na[f]**	**3500**	**0.3**	**1**	**2770**	**1.1**	**10.8**	**Na**	**2.4**	**17**	**63.5**
Sediment BV[a]				**543**	**0.1**	**9.38**	**na**	**2690**	**0.3**	**1**	**1470**	**0.73**	**14.6**	**Na**	**na**	**19.7**	**60.2**
Soil BV[a]				**671**	**0.1**	**15.4**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**14.6**	**na**	**1.82**	**39.6**	**48.8**
Construction Worker SSL[b]				**464**	**77.1**	**753**	**566000**	**20800000**	**1750**	**1770**	**10200000**	**3.54**	**na**	**na**	**277**	**614**	**106000**
Industrial SSL[b]				**160000**	**389**	**25700**	**2080000**	**76200000**	**6490**	**6490**	**35700000**	**13**	**na**	**Na**	**3880**	**6530**	**389000**
Residential SSL[b]				**10500**	**23.5**	**1560**	**125000**	**15600000**	**391**	**391**	**7820000**	**0.782**	**na**	**na**	**234**	**394**	**23500**
RE15-11-683	15-613369	0–1	Fill	—	—	—	NA	—	1.6	—	—	—	NA	NA	NA	—	—
RE15-11-684	15-613369	6–7	Fill	—	—	—	NA	—	1.8	—	—	—	NA	NA	NA	—	52.7
RE15-11-685	15-613369	9–10	Fill	—	—	—	NA	—	1.9	—	—	—	NA	NA	NA	—	53.1
RE15-11-600	15-613369	11–12	Fill	893	—	—	NA	—	—	—	—	—	NA	NA	NA	—	—
RE15-11-686	15-613370	0–1	Fill	—	—	—	NA	—	—	—	—	—	NA	NA	NA	—	—
RE15-11-687	15-613370	6–7	Fill	—	—	—	NA	—	—	8.4	—	—	NA	NA	NA	—	55.8
RE15-11-688	15-613370	8–8.5	Fill	726	—	15.6	NA	—	1.7	—	—	—	NA	NA	NA	—	114
RE15-11-689	15-613371	0–1	Fill	—	—	17.7	NA	—	—	—	—	—	NA	NA	NA	—	80.1
RE15-11-690	15-613371	6–7	Qbt 4	—	—	—	NA	—	1.9	—	—	—	NA	NA	NA	—	—
RE15-11-691	15-613371	9–10	Qbt 4	—	—	—	NA	—	2	—	—	—	NA	NA	NA	—	—
RE15-11-692	15-613372	0–1	Fill	—	—	—	NA	—	1.8	—	—	—	NA	NA	NA	—	—
RE15-11-693	15-613372	6–7	Fill	—	—	—	NA	—	2	—	—	—	NA	NA	NA	—	49.1
RE15-11-694	15-613372	9–10	Fill	—	—	—	NA	—	2	—	—	—	NA	NA	NA	—	—
RE15-11-603	15-613372	10.9–11.1	Fill	—	—	—	NA	—	1.8	—	—	—	NA	NA	NA	—	—
RE15-11-695	15-613373	0–1	Fill	—	—	—	NA	—	1.9	—	—	—	NA	NA	NA	—	—
RE15-11-696	15-613373	6–6.25	Fill	—	—	—	NA	—	2.2	—	—	—	NA	NA	NA	—	56.1
RE15-11-698	15-613374	0–1	Fill	—	—	—	NA	—	—	—	—	—	NA	NA	NA	—	51.2
RE15-11-699	15-613374	6–7	Fill	—	—	—	NA	—	1.6	—	—	—	NA	NA	NA	—	—
RE15-11-700	15-613374	8–8.5	Fill	—	—	—	NA	—	—	—	—	—	NA	NA	NA	—	349
RE15-11-701	15-613375	0–1	Fill	—	—	—	NA	—	—	—	—	—	NA	NA	NA	—	—
RE15-11-702	15-613375	6–7	Fill	—	—	—	NA	—	1.6	—	—	—	NA	NA	NA	—	—
RE15-11-703	15-613375	9–10	Fill	—	0.342	—	NA	—	1.6	—	—	—	NA	NA	NA	—	—
RE15-11-599	15-613375	11–12	Fill	—	—	—	NA	—	—	—	—	—	NA	NA	NA	—	—
RE15-11-704	15-613376	0–1	Fill	—	—	—	NA	—	1.7	—	—	—	NA	NA	NA	—	71.9
RE15-11-705	15-613376	6–7	Fill	—	—	—	NA	—	1.9 (J)	—	—	—	NA	NA	NA	—	—
RE15-11-706	15-613376	8.25–9.25	Qbt 4	—	—	10.1	NA	—	1.8 (J)	—	—	—	NA	NA	NA	20.8	—
RE15-11-601	15-613376	10–11	Qbt 4	—	—	—	NA	—	1.5	—	—	—	NA	NA	NA	—	—
RE15-11-707	15-613377	0–1	Fill	—	—	—	NA	—	1.6	—	—	—	NA	NA	NA	—	—
RE15-11-708	15-613377	3–3.5	Fill	—	—	18.2	NA	—	—	—	—	—	NA	NA	NA	—	—
RE15-11-710	15-613378	0–1	Fill	—	—	—	NA	—	1.9 (J)	—	—	—	NA	NA	NA	—	—

Table 4.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Manganese	Mercury	Nickel	Nitrate	Potassium	Selenium	Silver	Sodium	Thallium	Thorium	Titanium	Uranium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**482**	**0.1**	**6.58**	**na[f]**	**3500**	**0.3**	**1**	**2770**	**1.1**	**10.8**	**Na**	**2.4**	**17**	**63.5**
Sediment BV[a]				**543**	**0.1**	**9.38**	**na**	**2690**	**0.3**	**1**	**1470**	**0.73**	**14.6**	**Na**	**na**	**19.7**	**60.2**
Soil BV[a]				**671**	**0.1**	**15.4**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**14.6**	**na**	**1.82**	**39.6**	**48.8**
Construction Worker SSL[b]				**464**	**77.1**	**753**	**566000**	**20800000**	**1750**	**1770**	**10200000**	**3.54**	**na**	**na**	**277**	**614**	**106000**
Industrial SSL[b]				**160000**	**389**	**25700**	**2080000**	**76200000**	**6490**	**6490**	**35700000**	**13**	**na**	**Na**	**3880**	**6530**	**389000**
Residential SSL[b]				**10500**	**23.5**	**1560**	**125000**	**15600000**	**391**	**391**	**7820000**	**0.782**	**na**	**na**	**234**	**394**	**23500**
RE15-11-711	15-613378	6–7	Fill	—	—	—	NA	—	1.8 (J)	—	—	—	NA	NA	NA	—	—
RE15-11-713	15-613379	0–1	Fill	—	—	—	NA	—	1.8 (J)	—	—	—	NA	NA	NA	—	59.6
RE15-11-714	15-613379	6–7	Fill	—	—	—	NA	—	1.9 (J)	—	—	—	NA	NA	NA	—	—
RE15-11-715	15-613379	9–10	Qbt 4	—	—	9.2	NA	—	4.2 (J)	—	—	2.3	NA	NA	NA	—	—
RE15-11-716	15-613380	0–1	Fill	—	—	—	NA	—	1.8	—	—	—	NA	NA	NA	—	69.3
RE15-11-717	15-613380	6–7	Fill	—	—	15.7	NA	—	2.7	—	—	—	NA	NA	NA	—	50.2
RE15-11-718	15-613380	9–9.5	Fill	—	—	16	NA	—	1.8	—	—	—	NA	NA	NA	—	87.9
RE15-11-725	15-613381	0–1	Fill	—	—	—	NA	—	1.7	1.5	—	—	NA	NA	NA	—	75.7
RE15-11-720	15-613381	6–7	Fill	—	—	—	NA	—	—	—	—	—	NA	NA	NA	—	—
RE15-11-721	15-613381	9–10	Fill	—	—	—	NA	—	1.9	—	—	—	NA	NA	NA	—	93.9
RE15-11-602	15-613381	11–12	Fill	—	—	—	NA	—	—	—	—	—	NA	NA	NA	—	—
RE15-11-722	15-613382	0–1	Fill	—	—	—	NA	—	1.9 (J)	—	—	—	NA	NA	NA	—	66
RE15-11-723	15-613382	6–7	Fill	—	—	—	NA	—	1.8 (J)	—	—	—	NA	NA	NA	—	—
RE15-11-724	15-613382	9–10	Fill	—	—	—	NA	—	2.1 (J)	—	—	—	NA	NA	NA	—	—
RE15-11-728	15-613384	0–0.5	Sed	—	—	—	—	—	0.74	—	—	—	NA	NA	NA	—	—
RE15-11-729	15-613384	0.5–1	Sed	—	—	—	0.074 (J)	—	0.95	—	—	—	NA	NA	NA	—	—
RE15-11-730	15-613385	0–1	Sed	—	—	—	—	—	1.1	—	—	—	NA	NA	NA	—	—
RE15-11-731	15-613385	1–1.5	Sed	—	—	—	0.074 (J)	—	1.1	—	—	—	NA	NA	NA	—	—
RE15-11-732	15-613386	0–1	Sed	—	—	—	0.073 (J)	—	0.87	—	—	—	NA	NA	NA	—	—
RE15-11-733	15-613386	1–2	Sed	—	—	—	0.073 (J)	—	1.7	—	—	—	NA	NA	NA	—	—
RE15-11-734	15-613387	0–1	Sed	—	—	—	0.4	—	1.6	—	—	—	NA	NA	NA	—	—
RE15-11-735	15-613387	2–3	Sed	—	—	—	0.12 (J)	—	1.7	—	—	—	NA	NA	NA	—	—
RE15-11-736	15-613388	0–1	Sed	—	—	—	0.5	—	1.1	—	—	—	NA	NA	NA	19.9	—
RE15-11-737	15-613388	1–1.5	Sed	—	—	—	0.52	—	1.5	—	—	—	NA	NA	NA	—	—
RE15-11-740	15-613389	0–0.5	Sed	—	—	—	0.07 (J)	—	0.93	—	—	—	NA	NA	NA	—	—
RE15-11-739	15-613389	0.5–1	Sed	—	—	—	—	—	1.2	—	—	—	NA	NA	NA	—	70.4 (J+)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] SSLs from NMED (2019, 700500) unless otherwise noted.

[c] SSL for total chromium.

[d] — = Not detected or not detected above BV.

[e] NA = Not analyzed.

[f] na = Not available.

Table 4.3-2
Radionuclides Detected or Detected above BVs/FVs at SWMU 15-004(f)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2, 3, 4 BV[a]				**na**[b]	**1.98**	**0.09**	**1.93**
Sediment BV[a]				**0.9**	**2.59**	**0.2**	**2.29**
Soil BV[a]				**1.65**	**2.59**	**0.2**	**2.29**
Construction Worker SAL[c]				**37**	**1000**	**130**	**470**
Industrial SAL[c]				**41**	**3100**	**160**	**710**
Residential SAL[c]				**12**	**290**	**42**	**150**
AAB3317	15-02101	0–0.5	Soil	—[d]	NA[e]	0.4029	NA
RE15-11-576	15-02113	0–1	Soil	NA	4.7	0.253	6.71
AAB3306	15-02115	0–0.5	SOIL	—	NA	0.6634	NA
RE15-11-572	15-02124	0–1	Soil	NA	6.02	0.349	7.88
AAB3339	15-02125	0–0.5	SOIL	—	NA	0.7885	NA
RE15-11-592	15-02132	0–1	Soil	NA	39 (J)	2.35 (J)	40.4 (J)
RE15-11-593	15-02132	1–2	Qbt 3	NA	13.5	0.55	13.3
RE15-11-568	15-02136	0–1	Soil	NA	15.4	0.844	16.5
AAB3312	15-02139	1.42–1.92	SOIL	0.079	NA	NA	NA
RE15-11-595	15-02142	0–1	Soil	NA	3.77	0.249	5.5
RE15-11-590	15-02145	0–1	Soil	NA	6.08	0.397	17.4
RE15-11-574	15-02148	0–1	Soil	NA	7.59	0.472	13.7
RE15-11-529	15-02149	3–4	Qbt 4	NA	—	0.109	2.96
RE15-11-582	15-02150	0–1	Soil	NA	7.53	0.399	15
RE15-11-583	15-02150	3–4	Qbt 4	NA	—	0.12	2.81
RE15-11-536	15-02152	3–4	Qbt 4	NA	—	0.11	3.26
AAB3475	15-02155	0–0.33	SOIL	—	1652.33	86.59	1687.3
RE15-11-586	15-02156	0–1	Soil	NA	3.92	0.222	6.62
RE15-11-580	15-02162	0–1	Soil	NA	5.98	0.374	11.1
AAB3300	15-02167	0–0.5	SOIL	NA	NA	0.5598	NA
RE15-11-578	15-02171	0–1	Soil	NA	12.8 (J)	1.76 (J)	90.6 (J)
AAB3470	15-02182	1.5–2	Soil	0.13	NA	NA	NA
AAB3470	15-02182	1.5–2	SOIL	0.13	NA	NA	NA
RE15-11-670	15-02203	0–1	Soil	NA	5.93	0.323	6.61
AAB3478	15-02226	0–0.5	SOIL	NA	NA	2.17	NA
AAB3320	15-02228	0–0.5	SOIL	NA	NA	18.89	NA
RE15-11-533	15-02228	3–4	Qbt 4	NA	—	—	2.97
RE15-11-588	15-02229	0–1	Soil	NA	32.9 (J)	1.86 (J)	57.5 (J)
RE15-11-589	15-02229	1–2	Qbt 4	NA	2.03	0.166	2.79
AAB3328	15-02231	0–0.42	SOIL	—	NA	11.05	NA
RE15-11-531	15-02240	3–4	Fill	NA	—	—	3.17
AAC0339	15-02246	1.83–2.33	SOIL	—	NA	4.91	NA
RE15-11-584	15-02279	0–1	Soil	NA	5.17	0.281	9.57

Table 4.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2, 3, 4 BV[a]				**na[b]**	**1.98**	**0.09**	**1.93**
Sediment BV[a]				**0.9**	**2.59**	**0.2**	**2.29**
Soil BV[a]				**1.65**	**2.59**	**0.2**	**2.29**
Construction Worker SAL[c]				**37**	**1000**	**130**	**470**
Industrial SAL[c]				**41**	**3100**	**160**	**710**
Residential SAL[c]				**12**	**290**	**42**	**150**
AAB3480	15-02299	1.5–2	Soil	0.06	NA	NA	NA
RE15-11-671	15-613365	0–1	Fill	NA	327 (J)	22.4 (J)	709 (J)
RE15-11-672	15-613365	6–7	Qbt 4	NA	3.29	0.205	8.84
RE15-11-673	15-613365	9–10	Qbt 4	NA	4.69	0.376	14.9
RE15-11-604	15-613365	10.5–11	Qbt 4	NA	37.9	3.52	129 (J)
RE15-11-674	15-613366	0–1	Fill	NA	15.7	1.17	45.3 (J)
RE15-11-675	15-613366	6–7	Fill	NA	14.8	0.678	14.9 (J)
RE15-11-676	15-613366	9–10	Fill	NA	14	0.83	15.4 (J)
RE15-11-677	15-613367	0–1	Fill	NA	523 (J+)	73 (J+)	3140 (J+)
RE15-11-678	15-613367	2–3	Fill	NA	335 (J+)	33.1 (J+)	1850 (J+)
RE15-11-680	15-613368	0–1	Fill	NA	65.1 (J)	3.77 (J)	130 (J)
RE15-11-681	15-613368	6–7	Fill	NA	2.94	—	4.5
RE15-11-683	15-613369	0–1	Fill	NA	7.9	0.656	16.3 (J)
RE15-11-684	15-613369	6–7	Fill	NA	8.9	0.41	9.35 (J)
RE15-11-685	15-613369	9–10	Fill	NA	15.5	0.79	15.8 (J)
RE15-11-600	15-613369	11–12	Fill	NA	5.88	0.298	6.52 (J)
RE15-11-686	15-613370	0–1	Fill	NA	38.1	3.67	123 (J)
RE15-11-687	15-613370	6–7	Fill	NA	27.3	1.17	31.8 (J)
RE15-11-688	15-613370	8–8.5	Fill	NA	404	21.3	404 (J)
RE15-11-689	15-613371	0–1	Fill	NA	70.6 (J)	4.2 (J)	113 (J)
RE15-11-690	15-613371	6–7	Qbt 4	NA	3.29	0.187	4.58
RE15-11-691	15-613371	9–10	Qbt 4	NA	—	—	1.96
RE15-11-692	15-613372	0–1	Fill	NA	22.5	1.56	43.6 (J)
RE15-11-693	15-613372	6–7	Fill	NA	17.7	0.83	18.9 (J)
RE15-11-694	15-613372	9–10	Fill	NA	13	0.685	13.2 (J)
RE15-11-603	15-613372	10.9–11.1	Fill	NA	28	1.43	41.5 (J)
RE15-11-695	15-613373	0–1	Fill	NA	58.6 (J)	3.12 (J)	70.6 (J)
RE15-11-696	15-613373	6–6.25	Fill	NA	53.7 (J)	2.43 (J)	61.1 (J)
RE15-11-698	15-613374	0–1	Fill	NA	120	5.92	120 (J)

Table 4.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2, 3, 4 BV[a]				**na[b]**	**1.98**	**0.09**	**1.93**
Sediment BV[a]				**0.9**	**2.59**	**0.2**	**2.29**
Soil BV[a]				**1.65**	**2.59**	**0.2**	**2.29**
Construction Worker SAL[c]				**37**	**1000**	**130**	**470**
Industrial SAL[c]				**41**	**3100**	**160**	**710**
Residential SAL[c]				**12**	**290**	**42**	**150**
RE15-11-699	15-613374	6–7	Fill	NA	25.1	1.32	25.4 (J)
RE15-11-700	15-613374	8–8.5	Fill	NA	221	12.1	222 (J)
RE15-11-701	15-613375	0–1	Fill	NA	65.6	3.71	86.7 (J)
RE15-11-702	15-613375	6–7	Fill	NA	3.18	—	3.61 (J)
RE15-11-703	15-613375	9–10	Fill	NA	14	0.389	13.6 (J)
RE15-11-599	15-613375	11–12	Fill	NA	10.5	0.48	11.5 (J)
RE15-11-704	15-613376	0–1	Fill	NA	102	5.61	138 (J)
RE15-11-705	15-613376	6–7	Fill	NA	25.2 (J)	1.1 (J)	28.4 (J)
RE15-11-706	15-613376	8.25–9.25	Qbt 4	NA	54 (J)	2.59 (J)	63.8 (J)
RE15-11-601	15-613376	10–11	Qbt 4	NA	36	1.87	42.3 (J)
RE15-11-707	15-613377	0–1	Fill	NA	56.2	3.37	93.5 (J)
RE15-11-708	15-613377	3–3.5	Fill	NA	22.1	1.66	50.7 (J)
RE15-11-710	15-613378	0–1	Fill	NA	13.2	0.879	27.4
RE15-11-711	15-613378	6–7	Fill	NA	—	—	2.52
RE15-11-712	15-613378	9–10	Fill	NA	3.09	—	3.09
RE15-11-713	15-613379	0–1	Fill	NA	57.6 (J)	3.78 (J)	115 (J)
RE15-11-714	15-613379	6–7	Fill	NA	—	—	3.29
RE15-11-716	15-613380	0–1	Fill	NA	38.5 (J)	2.66 (J)	108 (J)
RE15-11-717	15-613380	6–7	Fill	NA	18.4	1.03	22
RE15-11-718	15-613380	9–9.5	Fill	NA	145 (J)	6.99 (J)	169 (J)
RE15-11-725	15-613381	0–1	Fill	NA	169	8.98	222 (J)
RE15-11-720	15-613381	6–7	Fill	NA	3.9	0.27	5.03 (J)
RE15-11-721	15-613381	9–10	Fill	NA	40.9	1.94	42.6 (J)
RE15-11-602	15-613381	11–12	Fill	NA	3.44	—	4.2 (J)
RE15-11-722	15-613382	0–1	Fill	NA	212 (J)	10.8 (J)	228 (J)
RE15-11-723	15-613382	6–7	Fill	NA	6.91	0.391	7.5
RE15-11-724	15-613382	9–10	Fill	NA	3.79	—	3.97
RE15-11-728	15-613384	0–0.5	Sed	NA	—	—	3.18
RE15-11-729	15-613384	0.5–1	Sed	NA	3.02	—	3.37
RE15-11-732	15-613386	0–1	Sed	NA	35.8	1.98	54.6 (J)

Table 4.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2, 3, 4 BV[a]				**na[b]**	**1.98**	**0.09**	**1.93**
Sediment BV[a]				**0.9**	**2.59**	**0.2**	**2.29**
Soil BV[a]				**1.65**	**2.59**	**0.2**	**2.29**
Construction Worker SAL[c]				**37**	**1000**	**130**	**470**
Industrial SAL[c]				**41**	**3100**	**160**	**710**
Residential SAL[c]				**12**	**290**	**42**	**150**
RE15-11-733	15-613386	1–2	Sed	NA	68.1	4	93.8 (J)
RE15-11-734	15-613387	0–1	Sed	NA	3.24	—	4.76
RE15-11-736	15-613388	0–1	Sed	NA	9.28	0.551	17.4
RE15-11-737	15-613388	1–1.5	Sed	NA	2.86	—	5.18
RE15-11-740	15-613389	0–0.5	Sed	NA	108 (J)	6.5 (J)	177 (J)
RE15-11-739	15-613389	0.5–1	Sed	NA	110 (J)	6.64 (J)	184 (J)

Note: All activities are in pCi/g.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SALs from LANL (2015, 600929).

[d] — = Not detected or not detected above BV/FV.

[e] NA = Not analyzed.

Table 4.3-3
Proposed Sampling and Analysis at SWMU 15-004(f)

Sampling Objective	Location Numbers	Location Description	Depth[a] (ft)	TAL Metals (SW-846:6010D[b]/6020B[b]/7471A[b])	Manganese SW-846:6010C[b]	Lead (SW-846:6010C[b])	pH (SW-846-9045D[b])	Explosive Compounds (SW-846:8330B[b])	Total Uranium (ASTM:C1345-08mod)	Isotopic Uranium (HASL-300)	Isotopic Plutonium (HASL-300)	Gamma-Emitting Radionuclides (EPA 901.1)
Define nature and extent of contamination beneath the excavation at Firing Point E	Locations 4f-1 to 4f-6	Beneath the excavation of the SWMU 15-004(f) firing site mounds	0.0–1.0 beneath excavation, 3.0–4.0 beneath excavation	X[c]	—[d]	—	X	X	X	X	—	—
Define lateral extent of contamination adjacent to the excavation at Firing Point E	Locations 4f-7 to 4f-26	Adjacent to the excavation of the SWMU 15-004(f) firing site mounds	0.0–1.0, 3.0–4.0	X	—	—	X	X	X	X	—	—
Define lateral extent of contamination at location 15-02155	Locations 4f-27 to 4f-34	Adjacent to the excavation at location 15-02155	0.0–1.0, 3.0–4.0	—	—	—	—	—	—	X	—	—
Define lateral extent of contamination at location 15-02162	Locations 4f-35 to 4f-42	Adjacent to the excavation at locations 15-02162 and 15-02228	0.0–1.0, 3.0–4.0	—	X	X	—	—	X	—	—	—
Define lateral extent of contamination at location 15-02228	Locations 4f-35 to 4f-42	Adjacent to the excavation at locations 15-02162 and 15-02228	0.0–1.0, 3.0–4.0	—	X	X	—	—	X	—	—	—
Define lateral extent of contamination at locations 15-02277 and 15-02278	Locations 4f-43 to 4f-50	Adjacent to the excavation at locations 15-02277 and 15-02278	0.0–1.0, 3.0–4.0	—	—	X	—	—	—	—	—	—
Define vertical extent of uranium-234, uranium-235/236, and uranium-238 at location 15-613386	Location 15-613386	Location 15-613386	2.0–3.0, 4.0–5.0	—	—	—	—	—	—	X	—	—
Define vertical extent of uranium-234, uranium-235/236, and uranium-238 at location 15-613389	Location 15-613389	Location 15-613389	1.0–2.0, 3.0–4.0	—	—	—	—	—	—	X	—	—
Define lateral extent of contamination to the west of locations 15-02144, 15-02155, and 15-02166	Locations 4f-51 to 4f-53	50 ft west of locations 15-02144, 15-02155, and 15-02166	0.0–1.0, 3.0–4.0	X	—	—	X	X	—	X	X	X
Define nature of contamination at twice background readings conducted by the FIDLER survey	To Be Determined	To Be Determined	0.0–1.0, 3.0–4.0	X	—	—	X	X	—	X	X	X

[a] Depths are below ground surface.

[b] Most recent promulgated, certified, and appropriate method will be used during field investigations.

[c] X = Analysis will be performed.

[d] — = Analysis will not be performed.

Table 4.4-1
Inorganic Chemicals above BVs at SWMU 15-008(a)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Uranium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14500**	**11.2**	**1690**	**0.1**	**6.58**	**na[b]**	**na**	**0.3**	**1**	**2.4**	**17**	**63.5**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21500**	**22.3**	**4610**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**1.82**	**39.6**	**48.8**
Construction Worker SSL[c]				**41400**	**142**	**41.2**	**4390**	**148**	**72.1**	**8850000**	**134[d]**	**36.7**	**14200**	**12.1**	**248000**	**800**	**1550000**	**77.1**	**753**	**566000**	**248**	**1750**	**1770**	**277**	**614**	**106000**
Industrial SSL[c]				**1290000**	**519**	**35.9**	**255000**	**2580**	**1110**	**32400000**	**505[d]**	**388**	**51900**	**63.3**	**908000**	**800**	**5680000**	**389**	**25700**	**2080000**	**908**	**6490**	**6490**	**3880**	**6530**	**389000**
Residential SSL[c]				**78000**	**31.3**	**7.07**	**15600**	**156**	**70.5**	**13000000**	**96.6[d]**	**23.4**	**3130**	**11.2**	**54800**	**400**	**339000**	**23.5**	**1560**	**125000**	**54.8**	**391**	**391**	**234**	**394**	**23500**
AAB3473	15-02242	0–1	Soil	—[e]	3.8 (U)	—	834	—	0.59 (U)	—	—	—	7720	NA[f]	—	58.2	—	1.4 (J)	57.3	NA	NA	—	—	2820	—	309
RE15-11-816	15-613403	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.53 (U)	—	—	—	0.154	—	0.19 (J)	—	—	—	NA	—	—
RE15-11-817	15-613403	1–2	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.51 (U)	—	—	—	0.129	—	—	—	1.3	—	NA	—	—
RE15-11-818	15-613404	0–1	Soil	—	—	—	—	—	0.42	—	—	—	35.7	0.55 (U)	—	—	—	0.173	—	0.21 (J)	—	—	—	NA	—	—
RE15-11-819	15-613404	1–2	Qbt 4	—	—	—	47.8	—	—	—	—	—	7.4	0.53 (U)	—	—	—	0.138	—	0.2 (J)	—	1.2	—	NA	—	—
RE15-11-820	15-613405	0–1	Soil	—	1.3	—	—	—	1.1	—	—	—	441	0.53 (U)	—	—	—	0.2	—	0.41	0.0044 (J)	—	—	NA	—	—
RE15-11-821	15-613405	1–2	Qbt 4	10500	0.81 (U)	2.8	140	—	—	2400	11.3	4.5	88.3	0.53 (U)	—	21.1	1760	0.22	8.8	0.31	0.0026 (J-)	1.4	3.1	NA	18.6	—
RE15-11-840	15-613406	0–1	Soil	—	2.5 (J)	—	—	—	0.74 (J)	—	—	—	242 (J-)	—	—	24.2	—	—	—	0.59	0.0024 (J)	—	—	NA	—	58.1
RE15-11-823	15-613406	1–2	Qbt 4	15100	1.2	3.6	263	—	—	—	9.5	3.4	139	0.57 (U)	15800	17.4	1980	0.195	6.7	0.13 (J)	0.0026 (J)	1.4	—	NA	20.8	—
RE15-11-824	15-613407	0–1	Soil	—	—	—	509 (J-)	2.8	1.1	—	—	—	437	—	—	30.4	—	—	—	0.86	—	2.7	—	NA	—	163
RE15-11-825	15-613407	2–3	Qbt 4	8570	—	—	228 (J-)	1.5	—	2320	8.5	4	136	0.53 (U)	—	15	—	—	8.9	4.2	—	3	—	NA	—	74.1
RE15-11-826	15-613408	0–1	Soil	—	—	—	—	—	—	—	—	—	49.9	—	—	—	—	0.186	—	1.7	0.0024 (J)	—	—	NA	—	—
RE15-11-827	15-613408	1–2	Qbt 4	8630	—	—	101	—	—	2570	11	3.3	9.6	0.53 (U)	—	—	—	0.24	7.5	0.88	—	1.9	—	NA	—	—
RE15-11-828	15-613409	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.51 (U)	—	—	—	0.194	—	0.43	—	—	—	NA	—	—
RE15-11-829	15-613409	1–2	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.53 (U)	—	—	—	0.143	—	0.19 (J)	0.0049 (J)	1.6	—	NA	—	—
RE15-11-830	15-613410	0–1	Soil	—	—	—	—	2.9	—	—	—	—	—	—	—	—	—	0.199	—	0.18 (J)	—	1.6	—	NA	—	—
RE15-11-831	15-613410	3–4	Qbt 4	—	—	—	—	1.8	—	2980	18	—	—	0.52 (U)	—	—	—	0.132	11	0.073 (J)	—	2	—	NA	—	—
RE15-11-832	15-613411	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.51 (U)	—	—	—	0.146	—	0.2	0.0036 (J)	—	—	NA	—	—
RE15-11-833	15-613411	3–4	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.51 (U)	—	—	—	0.119	—	0.08 (J)	—	1.2	—	NA	—	—
RE15-11-834	15-613412	0–1	Soil	—	2.2	—	—	—	0.44	—	—	—	219	0.52 (U)	—	55.1	—	0.237	—	0.12 (J)	—	—	—	NA	—	60.6
RE15-11-835	15-613412	3–4	Qbt 4	—	—	—	—	—	—	—	8.3	—	15.7	0.51 (U)	—	—	—	0.128	—	0.09 (J)	0.0027 (J)	0.48 (J)	—	NA	—	—
RE15-11-836	15-613413	0–1	Soil	—	1.7	—	—	—	—	—	—	—	86.9	0.51 (U)	—	31.2	—	0.168	—	0.1 (J)	—	—	—	NA	—	—
RE15-11-837	15-613413	1–2	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.51 (U)	—	—	—	0.117	—	—	—	1.9	—	NA	—	—
RE15-11-841	15-613414	0–1	Soil	—	1.1 (U)	—	327 (J-)	—	0.61 (J)	—	—	—	260 (J-)	—	—	29.2	—	—	—	—	—	—	—	NA	—	104
RE15-11-839	15-613414	1–2	Qbt 4	—	—	—	78.3	—	—	—	—	—	58	0.52 (U)	—	—	—	0.138	—	0.088 (J)	0.0022 (J)	1.3	—	NA	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2019, 700500) unless otherwise noted.

[d] SSL for total chromium.

[e] — = Not detected or not detected above BV.

[f] NA = Not analyzed.

Table 4.4-2
Radionuclides Detected above BVs at SWMU 15-008(a)

Sample ID	Location ID	Depth (ft)	Media	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2, 3, 4 BV[a]				**1.98**	**0.09**	**1.93**
Soil BV[a]				**2.59**	**0.2**	**2.29**
Construction Worker SAL[b]				**1000**	**130**	**470**
Industrial SAL[b]				**3100**	**160**	**710**
Residential SAL[b]				**290**	**42**	**150**
RE15-11-818	15-613404	0–1	Soil	8.96	0.482	10.8
RE15-11-819	15-613404	1–2	Qbt 4	3.09	0.159	3.98
RE15-11-820	15-613405	0–1	Soil	7.83	0.392	17.2
RE15-11-821	15-613405	1–2	Qbt 4	9.98	0.689	19.8
RE15-11-840	15-613406	0–1	Soil	67.3	4.48	124
RE15-11-823	15-613406	1–2	Qbt 4	11.3	0.759	19.5
RE15-11-824	15-613407	0–1	Soil	492	26.5	681
RE15-11-825	15-613407	2–3	Qbt 4	212	12.2	268
RE15-11-826	15-613408	0–1	Soil	12.1	1.03	27.5
RE15-11-827	15-613408	1–2	Qbt 4	2.88	0.212	9.99
RE15-11-828	15-613409	0–1	Soil	4.07	0.248	6.92
RE15-11-830	15-613410	0–1	Soil	3.15	0.267	14.2
RE15-11-834	15-613412	0–1	Soil	44.3	2.84 (J)	100
RE15-11-835	15-613412	3–4	Qbt 4	3.47	0.2	6.59
RE15-11-836	15-613413	0–1	Soil	47	3.09 (J)	105
RE15-11-841	15-613414	0–1	Soil	155	8.31	192
RE15-11-839	15-613414	1–2	Qbt 4	80.8	5.31 (J)	103

Note: All activities are in pCi/g. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] SALs from LANL (2015, 600929).

Table 4.4-3
Proposed Sampling and Analysis at SWMU 15-008(a)

Sampling Objective	Location Number	Location Description	Depth[a] (ft)	Total Uranium (ASTM:C1345-08mod)	Isotopic Uranium (HASL-300)
Define lateral extent of total uranium	8a-1 to 8a-30	Grid spacing every 20-ft at northeastern surface disposal area	0.0–1.0, 1.0–2.0	X[b]	X

[a] Depths are below ground surface, unless specified otherwise.

[b] X = Analysis will be performed.

Table 4.5-1
Proposed Sampling and Analysis at SWMU 15-009(e)

Sampling Objective	Location Number	Location Description	Depth (ft)	TAL Metals (SW-846:6010D[a]/6020B[a]/7471A[a])	Cyanide (SW-846:9012A[a])	Nitrate (SW-846:9056A[a])	Perchlorate (SW-846:6850)	pH (SW-846-9045D[a])	VOCs (SW-846:8260D[a])	SVOCs (SW-846:8270C[a])	Explosive Compounds (SW-846:8330B[a])	Isotopic Uranium (HASL-300)
Define vertical extent beneath the septic tank, the tank inlet, and the tank outlet	15-02514, 15-02515, 15-02516, and 9e-3	Locations 15-01514, 15-02515, 15-012516, and 9e-3 (east side of septic tank)	0.0–1.0 and 3.0–4.0 below bottom of tank and tank inlet and outlet	X[b]	X	X	X	X	X	X	X	X
Define vertical extent of drainline to the septic tank	9e-1 and 9e-2	Drainline exit from building and 40 ft south of building	0.0–1.0 and 3.0–4.0 below drainlines	X	X	X	X	X	X	X	X	X
Define vertical extent of drainline from the septic tank	9e-4	20 ft southwest of septic tank	0.0–1.0 and 3.0–4.0 below drainlines	X	X	X	X	X	X	X	X	X
Define extent at drainline outfall	9e-5	Dranline outfall	0.0–1.0 and 2.0–3.0 bgs	X	X	X	X	X	X	X	X	X
Define lateral extent in the drainage	9e-6 and 9e-7	Drainage below outfall	0.0–1.0 and 2.0–3.0 bgs	X	X	X	X	X	X	X	X	X

[a] Most recent promulgated, certified, and appropriate method will be used during field investigations.

[b] X = Analysis will be performed.

Table 4.6-1
Proposed Sampling and Analysis at SWMU 36-001

Sampling Objective	Location Number	Location Description	Depth[a] (ft)	TAL Metals (SW-846:6010D[b]/6020B[b]/7471A[b])	Cyanide (SW-846:9012A[b])	Nitrate (SW-846:9056A[b])	Perchlorate (SW-846:6850)	pH (SW-846-9045D[b])	VOCs (SW-846:8260D[b])	SVOCs (SW-846:8270C[b])	Explosive Compounds (SW-846:8330B[b])	Dioxins/Furans (SW-846:8280B[b])	PCBs (SW-846:8082A[b])	Isotopic Plutonium (HASL-300)	Isotopic Uranium (HASL-300)	Isotopic Thorium (HASL-300)
Define lateral extent around the periphery of the landfill and areas not previously sampled within the landfill	1-1 through 1-45	Grid spacing every 25 ft over MDA AA boundary	0.0–1.0, 4.0–5.0, 9.0–10.0	X[c]	X	X	X	X	Y[d]	X	X	X	X	X	X	X

[a] Depths are below ground surface, unless specified otherwise.

[b] Most recent promulgated, certified, and appropriate method will be used during field investigations.

[c] X = Analysis will be performed.

[d] Y = VOC analysis in subsurface samples only.

Table 4.7-1
Proposed Sampling and Analysis at SWMU 36-003(b)

Sampling Objective	Location Number	Location Description	Depth (ft)	TAL Metals (SW-846:6010D[a]/6020B[a]/7471A[a])	Cyanide (SW-846:9012A[a])	Nitrate (SW-846:9056A[a])	Perchlorate (SW-846:6850)	pH (SW-846-9045D[a])	VOCs (SW-846:8260D[a])	SVOCs (SW-846:8270C[a])	Explosive Compounds (SW-846:8330B[a])	Dioxins/Furans (SW-846:8280)	PCBs (SW-846:8082A[a])	Isotopic Uranium (HASL-300)
Define vertical extent of drainline to the septic tank	3b-1 and 3b-2	Drainline exit from building and 50 ft south of building	0.0–1.0 and 3.0–4.0 below drainlines	X[b]	X	X	X	X	X	X	X	X	X	X
Define vertical extent beneath the septic tank, the tank inlet, and the tank outlet	3b-3, 3b-4, 3b-5	Septic tank, tank inlet, and tank outlet	0.0–1.0 and 3.0–4.0 below bottom of tank and tank inlet and outlet	X	X	X	X	X	X	X	X	X	X	X
Define vertical extent of drainline from the septic tank	3b-6	30 ft south of septic tank	0.0–1.0 and 3.0–4.0 below drainlines	X	X	X	X	X	X	X	X	X	X	X

[a] Most recent promulgated, certified, and appropriate method will be used during field investigations.

[b] X = Analysis will be performed.

Table 4.8-1
Proposed Sampling and Analysis at SWMU 36-005

Sampling Objective	Location Number	Location Description	Depth[a] (ft)	TAL Metals (SW-846:6010D[b]/6020B[b]/7471A[b])	Cyanide (SW-846:9012B[b])	Nitrate (SW-846:9056A[b])	Perchlorate (SW-846:6850)	pH (SW-846-9045D[b])	VOCs (SW-846:8260D[b])	SVOCs (SW-846:8270D[b])	Explosive Compounds (SW-846:8330B[a])	Dioxins/Furans (SW-846:8280)	PCBs (SW-846:8082A[b])	Isotopic Uranium (HASL-300)
Define nature and extent of contamination of the storage area	5-1 through 5-25	Grid spacing every 100 ft over SWMU 36-005	0.0–1.0, 2.0–3.0, 4.0–5.0	X[c]	X	X	X	X	Y[d]	X	X	X	X	X

[a] Depths are below ground surface.

[b] Most recent promulgated, certified, and appropriate method will be used during field investigations.

[c] X = Analysis will be performed.

[d] Y = VOC analysis in subsurface samples only.

Table 5.0-1
Summary of Investigation Methods

Method	Summary
Spade-and-Scoop Collection of Soil Samples	This method is typically used to collect shallow (e.g., approximately 0–12 in.) soil or sediment samples. The spade-and-scoop method involves digging a hole to the desired depth, as prescribed in the sampling and analysis plan, and collecting a discrete grab sample. The sample for VOC analysis is transferred immediately from the sampler to the sample container to minimize the loss of VOCs during the sample collection process. Containers for VOC samples are filled as completely as possible, leaving no or minimal headspace, and sealed with a Teflon-lined cap. The remaining sample material is typically placed in a clean stainless-steel bowl for transfer into various sample containers.
Hand-Auger Sampling	This method is typically used for sampling soil or sediment at depths of less than 10–15 ft but may in some cases be used for collecting samples of weathered or nonwelded tuff. The method involves hand-turning a stainless-steel bucket auger (typically 3–4 in. inside diameter), creating a vertical hole that can be advanced to the desired sampling depth. When the desired depth is reached, the auger is decontaminated before the hole is advanced to the sampling depth. The sample for VOC analysis is transferred immediately from the sampler to the sample container to minimize the loss of VOCs during the sample collection process. Containers for VOC samples are filled as completely as possible, leaving no or minimal headspace, and sealed with a Teflon-lined cap. The remaining sample material is transferred from the auger bucket to a stainless-steel sampling bowl before the various required sample containers are filled.
Hollow-Stem Auger Drilling Methods	In this method, hollow-stem augers (sections of seamless pipe with auger flights welded to the pipe) act as a screw conveyor to bring cuttings of sediment, soil, and/or rock to the surface. Auger sections are typically 5 ft in length and have outside diameters of 4.25 to 14 in. Drill rods, split-spoon core barrels, Shelby tubes, and other samplers can pass through the center of the hollow-stem auger sections for collection of discrete samples from desired depths. Hollow-stem augers are used as temporary casings when setting wells to prevent cave-ins of the borehole walls. If samples are to be collected for VOC analysis, the sampler will collect the VOC first before homogenization. Material will then be field screened, visually inspected, and placed in a stainless-steel bowl. Samples for the remaining analysis will then be transferred to appropriate sample containers, depending on the analytical method requirement.
Handling, Packaging, and Shipping of Samples	Field team members seal and label samples before packing and ensure that the sample containers and the containers used for transport are free of external contamination. Field team members package all samples so as to minimize the possibility of breakage during transportation. N3B radiological control technicians perform and document a free release survey of the exterior of the sample containers, and perform a U.S. Department of Transportation shipping survey. After all environmental samples are collected, packaged, preserved, and surveyed, a field team member transports the samples either to the SMO or to an SMO-approved radiation screening laboratory under chain of custody (COC). The SMO arranges to ship samples to the analytical laboratories. The field team member must inform the SMO and/or the radiation screening laboratory coordinator when levels of radioactivity are in the action-level or limited-quantity ranges. The SMO will coordinate with the Contact-Handled Transuranic (Waste) (CH-TRU) Program to ship any limited quantity or above samples.

Table 5.0-1 (continued)

Method	Summary
Sample Control and Field Documentation	The collection, screening, and transport of samples are documented on standard forms generated by the SMO. These include sample container labels and combined sample collection log (SCL)/COC forms. Sample collection portions of the combined forms will be completed at the time of sample collection and signed by the sampler and a reviewer who will verify the logs for completeness and accuracy. The COC portions of the combined forms will be completed and signed to verify the samples are not left unattended. Corresponding labels will be applied to each sample container, and custody seals will be placed around container lids or openings. Site attributes (e.g., former and proposed soil sampling locations, sediment sampling locations) are located by using a GPS. Horizontal locations will be measured to the nearest 0.5 ft. The survey results for this field event will be presented as part of the investigation report. Sample coordinates will be uploaded into the Sample Management Database.
Field Quality-Control Samples	Field QC samples are collected as follows. *Field duplicate*: At a frequency of 10%; collected at the same time as a regular sample and submitted for the same analyses. *Field rinsates*: At a frequency of 10%; collected by rinsing sampling equipment with deionized water, which is collected in a sample container and submitted for laboratory analysis. *Field Trip blanks (FTBs)*: Required for all field events that include the collection of samples for VOC analysis. FTBs are containers of certified clean sand that are opened and kept with the other sample containers during the sampling process. FTBs are collected at a frequency of one per day when samples are collected for VOC analysis.
Field Decontamination of Drilling and Sampling Equipment	Dry decontamination is the preferred method to minimize generating liquid waste. Dry decontamination may include using a wire brush or other tool to remove soil or other material adhering to the sampling equipment, followed by using a commercial cleaning agent (nonacid, waxless cleaner) and paper wipes. Dry decontamination may be followed by wet decontamination if necessary. Wet decontamination may include washing with a nonphosphate detergent and water, followed by a water rinse and a second rinse with deionized water. Alternatively, steam-cleaning may be used.
Containers and Preservation of Samples	Specific requirements/processes for sample containers, preservation techniques, and holding times are based on EPA guidance for environmental sampling, preservation, and QA. Specific requirements for each sample are printed on the SCLs provided by the SMO (size and type of container [glass, amber glass], polyethylene, preservative, etc.). All samples are preserved by placing them in insulated containers with ice to maintain a temperature of ≤6°C. Other requirements such as nitric acid or other preservatives may apply to different media or analytical requests.
Management, Characterization, and Storage of Waste	Waste is managed, characterized, and stored in accordance with an approved waste characterization strategy form that documents site history, field activities, and the characterization approach for each waste stream managed. Waste characterization complies with on-site or off-site waste acceptance criteria. All stored waste will be marked with appropriate signage and labels, as appropriate. Drummed waste will be stored on pallets to prevent deterioration of the containers. Waste generators are required to reduce the volume of waste generated as much as technically and economically feasible. Means of storing, controlling, and transporting each potential waste type and classification shall be determined before waste-generating field operations begin. A waste storage area will be established before waste is generated. Waste storage areas located in controlled areas of the Laboratory will be controlled as needed to prevent inadvertent addition or management of wastes by unauthorized personnel. Each container of waste generated will be individually labeled as to waste classification, item identification number, and radioactivity (if applicable), immediately following containerization. All waste shall be segregated by classification and compatibility to prevent cross-contamination. Appendix B describes waste management.

Table 5.0-1 (continued)

Method	Summary
Geodetic Surveys	This method describes the procedure for coordinating and evaluating geodetic surveys and establishing QA and QC for geodetic survey data. The procedure covers evaluating geodetic survey requirements, preparing to perform a geodetic survey, performing geodetic survey field activities, preparing geodetic survey data for QA review, performing QA review of geodetic survey data, and submitting geodetic survey data.
Radiological Surveys	The proposed radiological surveys are described in detail in Appendix C. The FIDLER and Ludlum NaI detectors will be used to determine areas with elevated radioactivity.

Table 5.11-1
Summary of Analytical Methods

Analyte	Analytical Method
TAL metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, zinc)	SW-846:6010D; SW-846:6020B; SW-846:7471A (mercury)
Total cyanide	SW-846:9012B
Perchlorate	SW-846:6850
Nitrate	SW-846:9056A
PCBs	SW-846:8082A
SVOCs	SW-846:8270D
VOCs	SW-846:8260D
Total uranium	ASTM:C1345-08mod
Gamma-emitting radionuclides	EPA:901.1
Isotopic plutonium	HASL-300:ISOPU
Isotopic uranium	HASL-300:ISOU
Isotopic thorium	HASL-300:ISOTH
pH	SW-846:9045D
Explosive compounds	SW-846:8330B
TPH	SW-846:8015B
Dioxins/furans	SW-846:8280M

Appendix A

Acronyms and Abbreviations,
Metric Conversion Table, and Data Qualifier Definitions

A-1.0 ACRONYMS AND ABBREVIATIONS

AK	acceptable knowledge
AOC	area of concern
bgs	below ground surface
BV	background value
CH-TRU	contact-handled transuranic (waste)
CME	corrective measures evaluation
COC	chain of custody
Consent Order	Compliance Order on Consent
COPC	chemical of potential concern
DARHT	Dual-Axis Radiographic Hydrodynamic Test
DOE	Department of Energy (U.S.)
DQO	data quality objective
DRO	diesel range organics
DU	depleted uranium
EcoPRG	ecological preliminary remediation goal
EIM	environmental information management
EM	electromagnetic
EPA	Environmental Protection Agency (U.S.)
FIDLER	Field Instrument for Detection of Low-Energy Radiation
FTB	field trip blanks
FV	fallout value
GPR	ground-penetrating radar
GPS	global positioning system
GRO	gasoline range organics
HE	high explosives
HIR	historical investigation report
IDW	investigation-derived waste
IP	individual permit
IWP	investigation work plan
IR	investigation report
LANL	Los Alamos National Laboratory
LLW	low-level waste

MDA	material disposal area
MLLW	mixed low-level waste
N3B	Newport News Nuclear BWXT-Los Alamos, LLC
NaI	sodium iodide
NMED	New Mexico Environment Department
OD	open detonation
OU	Operable Unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PHERMEX	Pulsed High-Energy Radiographic Machine Emitting X-rays
PID	photoionization detector
PPE	personal protective equipment
PRG	preliminary remediation goal
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RDX	Royal Demolition Explosive (hexahydro-1,3,5-trinitro-1,3,5-triazine)
RFI	RCRA facility investigation
SAL	screening action level
SCL	sample collection log
SIR	supplemental investigation report
SMA	site monitoring area
SMO	Sample Management Office
SOP	standard operating procedure
SSL	soil screening level
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TA	technical area
TAL	target analyte list
TCLP	toxicity characteristic leaching procedure
TNT	2,4,6-trinitrotoluene
TPH	total petroleum hydrocarbon
VCA	voluntary corrective action
VOC	volatile organic compound

WAC	waste acceptance criteria
WCSF	waste characterization strategy form
XRF	x-ray fluorescence

A-2.0 METRIC CONVERSION TABLE

Multiply SI (Metric) Unit	by	To Obtain U.S. Customary Unit
kilometers (km)	0.622	miles (mi)
kilometers (km)	3281	feet (ft)
meters (m)	3.281	feet (ft)
meters (m)	39.37	inches (in.)
centimeters (cm)	0.03281	feet (ft)
centimeters (cm)	0.394	inches (in.)
millimeters (mm)	0.0394	inches (in.)
micrometers or microns (µm)	0.0000394	inches (in.)
square kilometers (km^2)	0.3861	square miles (mi^2)
hectares (ha)	2.5	acres
square meters (m^2)	10.764	square feet (ft^2)
cubic meters (m^3)	35.31	cubic feet (ft^3)
kilograms (kg)	2.2046	pounds (lb)
grams (g)	0.0353	ounces (oz)
grams per cubic centimeter (g/cm^3)	62.422	pounds per cubic foot (lb/ft^3)
milligrams per kilogram (mg/kg)	1	parts per million (ppm)
micrograms per gram (µg/g)	1	parts per million (ppm)
liters (L)	0.26	gallons (gal.)
milligrams per liter (mg/L)	1	parts per million (ppm)
degrees Celsius (°C)	9/5 + 32	degrees Fahrenheit (°F)

A-3.0 DATA QUALIFIER DEFINITIONS

Data Qualifier	Definition
U	The analyte was analyzed for but not detected.
J	The analyte was positively identified, and the associated numerical value is estimated to be more uncertain than would normally be expected for that analysis.
J+	The analyte was positively identified, and the result is likely to be biased high.
J-	The analyte was positively identified, and the result is likely to be biased low.
UJ	The analyte was not positively identified in the sample, and the associated value is an estimate of the sample-specific detection or quantitation limit.
R	The data are rejected as a result of major problems with quality assurance/quality control (QA/QC) parameters.

Appendix B

Waste Management Plan

B-1.0 INTRODUCTION

This appendix describes how waste generated during the Potrillo and Fence Canyons Aggregate Area investigation will be managed. Waste may include, but is not limited to, drill cuttings, excavated media, excavated man-made debris, contact waste, decontamination fluids, and all other waste that potentially has come into contact with contaminants.

B-2.0 WASTE MANAGEMENT

All waste generated during investigation activities will be managed in accordance with the current version of the standard operating procedure (SOP) N3B-AP-TRU-2150, "Waste Characterization Strategy Form." This SOP incorporates the requirements of all applicable U.S. Environmental Protection Agency (EPA) and New Mexico Environment Department (NMED) regulations, and U.S. Department of Energy orders.

A waste characterization strategy form (WCSF) will be prepared and approved per requirements of N3B-AP-TRU-2150, "Waste Characterization Strategy Form." The WCSF will provide detailed information on waste characterization methods, management, containerization, and potential volumes. Waste characterization is completed through review of sampling data and/or documentation, or by direct sampling of the waste or the media being investigated (e.g., surface soil, subsurface soil, etc.). Waste characterization may include a review of historical information and process knowledge to identify whether listed hazardous waste may be present (i.e., due diligence reviews). If low levels of listed hazardous waste are identified, a "contained in" determination may be submitted for approval to NMED. Data currently available for the sites addressed in this work plan do not identify polychlorinated biphenyl (PCB) concentrations greater than 50 mg/kg. However, if this investigation identifies PCB concentrations of greater than 50 mg/kg, N3B may submit a request to EPA (with a copy to NMED) to manage the waste as PCB remediation waste.

Considerable amounts of material will be excavated during the remediation of Solid Waste Management Units (SWMUs) 15-002, 15-004(f), and 15-008(a). To facilitate the staging and segregation of the remediation waste, N3B will submit area of contamination designation requests for these SWMUs to the NMED for approval. The request will specify the boundaries of the proposed areas of contamination and will describe the activities to be conducted within the boundaries.

Wastes will be containerized and placed in clearly marked and appropriately constructed waste accumulation areas. Waste accumulation area postings, regulated storage duration, and inspection requirements will be based on the type of IDW and its classification. Container and storage requirements will be detailed in the WCSF and approved before the waste is generated. Table B-2.0-1 summarizes how waste will be managed.

The waste streams that are anticipated to be generated during work plan implementation are described below.

B-2.1 Drill Cuttings

This waste stream consists of soil and rock chips generated by the drilling of boreholes for the intent of sampling. Drill cuttings include excess core sample not submitted for analysis and any returned samples sent for analysis. Drill cuttings will be containerized in 20 yd^3 rolloff containers, 55-gal. drums, B-12 containers, or other appropriate containers at the point of generation. If drilling is conducted within the boundary of an area of contamination, the drill cuttings will be managed within those boundaries. If

drilling occurs outside the area of contamination boundaries, the initial management of the cuttings will rely on the data from previous investigations and/or process knowledge. Drill cuttings will be managed in secure, designated areas appropriate to the type of the waste. If new analytical data changes the expected waste category, the waste will be managed in accumulation areas appropriate to the final waste determination. This waste stream will be characterized based either on direct sampling of the waste or on the results from core samples collected during drilling. If directly sampled, the following analyses will be performed: volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), explosive compounds (if screening indicates the presence of high explosives [HE]), radionuclides, total metals, and if needed, toxicity characteristic metals. If process knowledge, odors, or staining indicate the cuttings may be contaminated with petroleum products, the materials will also be analyzed for total petroleum hydrocarbons (TPH) and polychlorinated biphenyls (PCBs). Other constituents may be analyzed as necessary to meet the waste acceptance criteria (WAC) for a receiving facility.

Cuttings will be land-applied if they meet the criteria in the NMED-approved "Notice of Intent Decision Tree for Land Application of Investigation-Derived Waste Solids from Construction of Wells and Boreholes." N3B expects that cuttings will be land-applied or disposed of in accordance with the approved WCSF. Table B-2.0-1 presents the characterization and management methods, and expected disposition of this waste stream.

B-2.2 Excavated Environmental Media

Layback and overburden spoils (including environmental media mixed with buried debris) will consist of soil and rock removed from within or adjacent to (e.g., from benching to stabilize a trench) the SWMUs to be excavated. This material is expected to be contaminated because of the proximity of active and inactive firing sites to the sites to be remediated. This material will be field screened for radioactivity and VOCs during the excavation process. If contamination is not detected during screening, the spoils will be stored either in rolloff bins, other suitable containers, or on the ground surface with appropriate best management practices. If field screening indicates the potential for contamination, the layback and overburden spoils will be placed in rolloff bins or other suitable containers. The spoils will remain within the area of contamination boundary of the SWMU from which they were excavated, awaiting analytical results. Samples of the spoils will be collected as the spoils are excavated and composited, if appropriate (one composite sample for every 100 yd^3, depending on the homogeneity of spoils). The samples will be analyzed for VOCs; target analyte list (TAL) metals; explosive compounds, if screening indicates the presence of HE; radionuclides; and toxicity characteristic metals, as needed. Other constituents may be analyzed as necessary to meet the WAC for a receiving facility. If process knowledge, odors, or staining indicate the soils may be contaminated with petroleum products, the materials will also be analyzed for TPH and PCBs. If the spoils are determined to be suitable for reuse (i.e., meets industrial cleanup standards as determined using NMED's and DOE's soil screening guidance), N3B will segregate any man-made debris from the soil and will use this soil to backfill the excavated SWMUs. If the spoils do not meet industrial cleanup standards, they will be treated/disposed of at an authorized facility appropriate for the waste regulatory classification. Based on existing data, N3B expects spoils that cannot be reused to be designated as low-level waste (LLW).

B-2.3 Excavated Man-Made Debris

Excavated man-made debris will be generated from the removal of two former disposal areas. Debris will be segregated as it is excavated based on factors such as the type of debris, the type of alternative treatment technology that would be used to treat the debris, field screening, process knowledge, and/or staining or odors. Where practicable, this waste stream will be characterized by direct sampling of the waste (e.g., concrete). Direct samples will be analyzed for VOCs, SVOCs, explosive compounds,

radionuclides, total metals, and, if needed, toxicity characteristic metals. Other constituents may be analyzed as necessary to meet the WAC for a receiving facility or if process knowledge or visual observations indicate other contaminants may be present (e.g., PCBs or asbestos). For debris that is difficult to characterize; acceptable knowledge (AK) will be used whenever possible, supplemented by sampling as needed. Sampling methods will often have to be identified on a case-by-case basis by qualified sampling personnel and all decisions documented in the field activity notebook.

Waste minimization will be implemented, where practicable, through segregation of waste materials. Nonhazardous materials that can be shown to have no detectable activity for radionuclides or that can be decontaminated to meet this criterion, will be recycled, if practicable.

The types of debris expected to be excavated from each SWMU are identified in the following subsections B-2.3.1 through B-2.3.3. The SWMUs are grouped by location. It is likely that three separate areas of contamination will be requested, one for each of the groupings described below.

B-2.3.1 Excavated Waste from SWMU 15-002

This waste stream will consist of soil and tuff from a former burn pit that was contaminated. The contaminated material will be removed and the area leveled.

The excavated materials will be placed initially in containers (e.g., rolloff bins) within the boundaries of an area of contamination. N3B expects most of this waste to be designated as industrial waste that will be disposed of at an authorized off-site treatment/disposal facility or as LLW that will be disposed of at an approved off-site facility

B-2.3.2 Excavated Waste from SWMU 15-004(f)

This waste stream will consist of contaminated material from the firing operations and may include soil, tuff, and debris. The contaminated material will be managed within the area of contamination boundaries for this site.

The excavated materials will be placed initially in containers (e.g., rolloff bins) and managed within the boundary of an area of contamination. N3B expects most of this waste to be designated as LLW or mixed low-level waste (MLLW) that will be disposed of at an authorized off-site treatment/disposal facility.

B-2.3.3 Excavated Waste from SWMU 15-008(a)

This waste stream will consist of soil, tuff, and debris from small surface disposal areas at the southern edge of E-F Firing Site [SWMU 15-008(a)]. The surface disposal areas were used to dispose of debris from tests conducted at E-F Firing Site, including soil, rock, pebbles, metal fragments, plastic, electrical cable, electrical accessories, etc. The site is associated with E-F Firing Site.

The excavated materials will be placed initially in containers (e.g., rolloff bins) and managed within the boundary of an area of contamination. N3B expects most of this waste to be designated as industrial waste that will be disposed of at an authorized off-site treatment/disposal facility or as LLW that will be disposed of at an approved off-site facility.

B-2.3 Contact Waste

The contact waste stream consists of potentially contaminated materials that “contacted” waste during sampling and excavation. This waste stream consists primarily of, but is not limited, to personal protective

equipment such as gloves, decontamination wastes such as paper wipes, and disposable sampling supplies. Characterization of this waste stream will use AK of the waste materials, the methods of generation, and analysis of the material contacted (e.g., drill cuttings, soil, etc.). Initially, contact waste generated within an area of contamination will be placed in containers and managed within the area. If contact waste is generated at a location that is not within the area of contamination, the initial management of waste will rely on the data from previous investigations and/or process knowledge. Contact waste will be managed in secure, designated areas appropriate to the type of the waste. If new analytical data changes the expected waste category, the waste will be managed in accumulation areas appropriate to the final waste determination. N3B expects most of the contact waste to be designated as nonhazardous, nonradioactive waste or LLW that will be disposed of at an authorized facility.

B-2.4 Decontamination Fluids

The decontamination fluids waste stream will consist of liquid wastes from decontamination activities (i.e., decontamination solutions and rinse waters). Consistent with waste minimization practices, the Laboratory employs dry decontamination methods to the extent possible. If dry decontamination cannot be performed, liquid decontamination wastes will be collected in containers at the point of generation. The decontamination fluids will be characterized through AK of the waste materials, the levels of contamination measured in the environmental media (e.g., the results of the associated drill cuttings) and, if necessary, direct sampling of the containerized waste. If directly sampled, the following analyses will be performed: VOCs, SVOCs, radionuclides, explosive compounds, total metals, and, if needed, toxicity characteristic metals. N3B expects most of these wastes to be nonhazardous liquid waste or radioactive liquid waste that will be disposed of at an approved off-site facility.

Table B-2.0-1
Summary of Estimated Waste Generation and Management

Waste Stream	Expected Waste Type	Expected Disposition
Drill cuttings	Land applied or LLW	Land application or disposed off-site
Excavated environmental media	LLW or MLLW	Reused as fill at the excavation location or disposed of at an approved off-site disposal facility
Excavated man-made debris	Nonhazardous, industrial, or LLW	Disposal at an approved off-site disposal facility
Contact waste	Industrial or LLW	Disposal at an approved off-site disposal facility
Decontamination fluids	Industrial or LLW	Disposal at an approved off-site disposal facility

Appendix C

Radiological Surveys

C-1.0 RADIOLOIGICAL WALKOVER SURVEY OVERVIEW

Radiological surveys are proposed at Solid Waste Management Unit (SWMU) 15-004(f) to identify areas with elevated radioactivity. The global positioning system– (GPS-) based radiological surveys to be performed include the

- Field Instrument for Detection of Low-Energy Radiation (FIDLER) lower-energy gamma detector and
- Sodium iodide (NaI) scintillator detector for high-energy gamma radiation.

C-1.1 Gamma/X-ray Sensitive Scintillation Detectors

The GPS-based radiological survey systems proposed for the radiological survey at SWMU 15-004(f) consist of a gamma/x-ray sensitive scintillator detector. The detectors will be paired with a digital ratemeter/scaler meter, which is connected with a mapping-grade GPS and datalogger. The detector(s) will be held at approximately 6 in. above the ground surface by the surveyor. The initial survey will be performed using the FIDLER detector, and a second survey will be performed using a NaI detector. The digital ratemeter/scaler will report 1-s ratemeter counts (cps) and a 1-min scalar count (cpm) rate based on the 1-s ratemeter count. Each measurement will be logged with an associated coordinate and spatial statistics related to GPS accuracy. Both surveys will be performed with a transect spacing of approximately 0.5 m (where possible), and a survey scan speed of approximately 0.5-m/s.