LA-UR-08-4798
EP2008-0388

Investigation Work Plan for Upper Sandia Canyon Aggregate Area, Revision 1

July 2008

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EXECUTIVE SUMMARY

The Upper Sandia Canyon Aggregate Area is located in Technical Area 03 (TA-03), TA-60, and TA-61 at Los Alamos National Laboratory. The Upper Sandia Canyon Aggregate Area consists of 180 solid waste management units (SWMUs) and areas of concern (AOCs). TA-03 contains 153 SWMUs and AOCs; 75 sites have been approved for no further action (NFA) or have received a certificate of completion, and 78 sites will be investigated as part of this work plan. TA-60 contains 18 SWMUs and AOCs; 11 sites have been approved for NFA, and 7 sites will be investigated as part of this work plan. TA-61 contains 9 SWMUs and AOCs; 5 sites have been approved for NFA, and 4 sites will be investigated as part of this work plan. This investigation work plan identifies and describes the activities needed to complete the investigation of the remaining 89 SWMUs and AOCs. Details of previous investigations and analytical results for the 89 sites included in this work plan are provided in the historical investigation report for Upper Sandia Canyon Aggregate Area.

The sampling strategy proposed in this work plan will be integrated with the data results of the Sandia Canyons investigations to assess potential contaminant migration from sites within the Upper Sandia Canyon Aggregate Area. Additional data collected in Sandia Canyon under the Federal Facility Compliance Agreement/Administrative Order, Multi-Sector General Permit, and the Interim Facility-Wide Groundwater Monitoring Plan also will be used in assessing potential contaminant migration from the Upper Sandia Canyon Aggregate Area sites. All integrated results relevant to Upper Sandia Canyon Aggregate Area sites will be included in the report to be submitted following execution of this work plan.

The objective of this work plan is to evaluate the historical data and, based on that evaluation, to propose additional sampling as necessary to define the nature and extent of contamination associated with the SWMUs and AOCs within the Upper Sandia Canyon Aggregate Area.

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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) and managed by Los Alamos National Security, LLC. 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 40 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 and 7800 ft above mean sea level. The Upper Sandia Canyon Aggregate Area is shown in Plate 1.

The solid waste management units (SWMUs), areas of concern (AOCs), and consolidated units addressed in this investigation work plan are potentially contaminated with both hazardous and radioactive components. 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 5400.5, "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.

Corrective actions at the Laboratory are subject to the March 1, 2005, Compliance Order on Consent (the Consent Order). This work plan describes work activities that will be executed and completed in accordance with the Consent Order.

1.1 Work Plan Overview

The Upper Sandia Canyon Aggregate Area SWMUs and AOCs are located in Technical Area 03 (TA-03), TA-60 and TA-61 of the Laboratory with a total of 180 sites (Plate 1). Historical details of previous investigations and data for these sites are provided in the historical investigation report (HIR) for Upper Sandia Canyon Aggregate Area (LANL 2008, 100693). TA-03 contains 153 SWMUs and AOCs; 75 sites have been approved for no further action (NFA) or have received a certificate of completion, and 78 sites will be investigated as part of this work plan. TA-60 contains 18 SWMUs and AOCs; 11 sites have been approved for NFA, and 7 sites will be investigated as part of this work plan. TA-61 contains 9 SWMUs and AOCs; 5 sites have been approved for NFA, and 4 sites will be investigated as part of this work plan (Table 1.1-1). Of the 180 sites, 91 have been investigated and/or remediated and approved for NFA status (NFA-approval documents are referenced in Table 1.1-1); these 91 sites are described in the HIR and are not discussed further in this work plan. This work plan addresses the remaining 89 sites using the information from previous field investigations or removal actions to evaluate current conditions at each site.

Section 2 presents the general site information, operational history, and the preliminary conceptual site model of the Upper Sandia Canyon Aggregate Area. General site conditions are presented in section 3. Section 4 provides summaries of previous investigations and data collected and presents the scope of proposed activities for each site. The sites within the Upper Sandia Canyon Aggregate Area are widespread; therefore, they are organized by TA. Each TA subsection includes background information on operational history; summary of releases; and current site use, and status of the sites in the TAs. Section 5 provides investigation methods for proposed field activities. Ongoing monitoring and sampling programs in the Upper Sandia Canyon Aggregate Area are presented in section 6. Section 7 is an overview of the anticipated schedule of the investigation and reporting activities. The references cited in this report and the map data sources are provided in section 8. Appendix A of this work plan includes a list of acronyms and abbreviations, a glossary, and metric conversion and data qualifier definitions tables. Appendix B describes the management of investigation-derived waste (IDW).

To simplify the discussion of this complex site, the Upper Sandia Canyon Aggregate Area figures were divided into smaller areas. Figure 1.1-1 presents an overview of the Upper Sandia Canyon Aggregate Area and provides a key for the specific areas covered by each of the figures.

1.2 Work Plan Objectives

The objective of this work plan is to determine the nature and extent of releases from the 89 sites.

To accomplish this objective, this work plan

- presents historical and background information on the sites;
- describes the rationale for proposed data collection activities; and
- identifies and proposes appropriate methods and protocols for collecting, analyzing, and evaluating data to characterize these sites.

2.0 BACKGROUND

2.1 General Site Information

TA-03 occupies a large area located near the western end of South Mesa between Los Alamos Canyon to the north and Twomile Canyon to the south. Sandia and Mortandad Canyons originate within TA-03 and divide the eastern two-thirds of the area into finger-like projections. The middle mesa where most of TA-03 is located is called Sigma Mesa (LANL 1999, 064617, p. 2-11). TA-03 contains most of the Laboratory's administrative buildings and public and corporate access facilities. In addition, TA-03 houses several Laboratory activities such as experimental sciences, special nuclear materials, theoretical/computations, and physical support operations.

TA-60, also known as Sigma Mesa Site, was created from the eastern portion of TA-03 and lies on the finger-like mesa, Sigma Mesa, between Sandia and Mortandad Canyons. All buildings at TA-60 are located on the western end of the mesa and contain Laboratory support and maintenance operations and subcontractor-service facilities. The Nevada Test Site (NTS) Test Fabrication Facility; the NTS test tower (buildings 60-0017 and 60-0018); several small abandoned experimental areas including a solar pond and a test drill hole, and storage sites for pesticides, topsoil, and recyclable asphalt are also located at TA-60 (LANL 1999, 064617, p. 2-25).

TA-61 was also created from a portion of TA-03 and is bounded on the north by Los Alamos Canyon and on the south by Sandia Canyon (LANL 1999, 064617, p. 2-27). TA-61 contains physical support and infrastructure facilities, including the Los Alamos County landfill, sewer pump stations, a radio shop, general storage sheds, a blower house, a private batch concrete batch plant, a Laboratory-operated asphalt batch plant, and general warehouse storage for maintenance activities. A small parcel of private property, the Royal Crest Manufactured Home Community, is surrounded by TA-61. The Los Alamos County landfill occupies most of TA-61. The landfill was created in 1974 when large trenches and disposal areas were excavated from the north wall of Sandia Canyon.

2.2 Operational History

In the early 1950s, operational facilities from TA-01 (located in the Los Alamos townsite) were relocated to TA-03. Early TA-03 facilities included the Van de Graaff accelerator building, a laboratory and support structures; the communications building; the Chemistry and Metallurgy Research Building; the general and chemical warehouses; the cryogenics laboratory; the administration building; the Sigma Building, a fire house, and the physics building. Additional new building construction continued through the 1960s and 1970s, when storage areas, shops, office buildings, a wastewater treatment plant (WWTP), a cement batch plant, and other transportable structures were added.

A solar pond was built in the 1970s on the eastern end of Sigma Mesa to test the feasibility of reducing the volume of low-level radioactive wastewater from TA-50. The experiment was unsuccessful, and the pond was abandoned. A mobile equipment repair shop and warehouse were built at TA-03 in 1972. Support structures for these facilities included automotive repair, a gas station, and a steam-cleaning facility surrounding the repair shop and warehouse. The Oppenheimer Study Center was constructed in 1977, and an annex was added to the administration building in 1981. In 1979, a geothermal test well was drilled at the eastern end of Sigma Mesa. The site was not suitable for geothermal development, and the experiment was terminated. A small pesticide storage shed was assembled in 1984 just east of the test rack assembly enclosure, and other areas on the mesa were historically designated as storage sites (LANL 1999, 064617, p. 2-25). A test rack facility was built in 1985 to assemble racks for use in underground testing of nuclear devices at NTS. A computer laboratory and several centers for various scientific activities were built during the 1990s (LANL 1999, 064617, p. 2-11), and very recently the National Security Sciences Building and the Strategic Computing Complex were built at TA-03.

TA-60 and TA-61 were created in 1989 when the Laboratory redefined its technical areas. As part of this effort, a portion of TA-03 was redesignated to TA-60, and a portion of TA-00 was redesignated to TA-61. TA-60 and TA-61 are relatively small sites that house physical support and maintenance operations structures. In addition, TA-61 contains the Los Alamos County landfill, which accepts nonhazardous waste from County residents and the Laboratory. This landfill is currently being closed under Resource Conservation and Recovery Act (RCRA) Subtitle D but some active cells continue to accept waste.

2.3 Conceptual Site Model

The sampling proposed in this plan uses a conceptual site model to predict areas of potential contamination and allow for 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 sites within Upper Sandia Canyon Aggregate Area may have occurred as a result of air emissions or effluent discharges. Previous sampling results indicate contamination from inorganic chemicals, organic chemicals, and radionuclides (LANL 2007, 098955). Additional sampling is needed to determine the nature and extent of contamination.

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 and Pathways

Potential receptors and pathways may include

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

2.3.4 Cleanup Standards

As specified in Section VII.B.1 of the Consent Order, screening levels will be used as soil cleanup levels unless they are determined to be impracticable or unless values do not exist for the current and reasonably foreseeable future land use. Soil screening levels for an industrial worker scenario are presented in Table 2.3-1 for previously detected inorganic and organic chemicals. The screening action levels for industrial worker scenario are also provided in Table 2.3-1 for previously detected radionuclides.

2.4 Data Overview

Samples from previous investigations were analyzed for inorganic chemicals, organic chemicals, and/or radionuclides either by the Chemical Sciences and Technology (CST) Division at the Laboratory, by off-site fixed laboratories, or by both. Data obtained at CST Division laboratories are screening-level-quality data and are used only to select sampling locations and analytical suites. Data obtained from off-site fixed laboratories (i.e., decision-level data) are discussed for each site where data are available.

Concentrations of inorganic chemicals are compared with background values (BVs) and ranges of background concentrations (LANL 1998, 059730). Concentrations of detected organic chemicals are presented. Activities of detected radionuclides are compared with BVs or fallout values (FVs) and the ranges of the background/fallout activities for radionuclides (LANL 1998, 059730). These data are summarized in the HIR (LANL 2007, 098955).

This work plan summarizes the available data to determine whether the nature and extent of contamination are defined for each site. In addition, this work plan proposes sampling activities and analytical suites for those sites at which the nature and extent of contamination have not been defined. Sampling intervals are described for all proposed samples, but the volume of sample material collected is not defined because it depends on the type of material being sampled, recovery, and amount of material required for the analyses requested.

3.0 SITE CONDITIONS

3.1 Surface Conditions

3.1.1 Soil

Soil on the Pajarito Plateau was initially mapped and described by Nyhan et al. (1978, 005702). The soil on the slopes between the mesa tops and canyon floors was mapped as mostly steep rock outcrops consisting of approximately 90% bedrock outcrop and patches of shallow, weakly developed colluvial soil. South-facing canyon walls generally are steep and usually have shallow soil in limited, isolated patches between rock outcrops. In contrast, the north-facing canyon walls generally have more extensive areas of shallow, dark-colored soil under thicker forest vegetation. The canyon floors generally contain poorly developed, deep, well-drained soil on floodplain terraces or small alluvial fans (Nyhan et al. 1978, 005702).

The soil on the mesa top in the Upper Sandia Canyon Aggregate Area belongs generally to the Hackroy series and the Carjo series (Nyhan et al. 1978, 005702). Hackroy soil consists of very shallow to shallow, well-drained, and moderately developed soil with an A-B horizon sequence. Soil textures can range from sandy loams to clay loams. The Carjo series consists of moderately deep, well-drained, and moderately developed soil with an A-B-C horizon sequence. The soil textures of the Carjo series can be very fine sandy loams. The parent material of the soil may range from Bandelier Tuff to sequences of alluvium/colluvium interstratified with moderately developed to well-developed buried soil. Typical profiles of the soil found at the Upper Sandia Canyon Aggregate Area are shown in Figure 3.1-1.

A majority of the natural mesa-top surface soil has been altered by anthropogenic activities. Excavation and fill, paved roads, parking lots, landscaped areas, and buildings have changed the natural soil landscape considerably.

3.1.2 Surface Water

Most surface water in the Los Alamos area occurs as ephemeral, intermittent, or interrupted streams in canyons cut into the Pajarito Plateau. Springs on the flanks of the Jemez Mountains, west of the Laboratory's western boundary, supply flow to the upper reaches of Cañon de Valle and to Guaje, Los Alamos, Pajarito, and Water Canyons (Purtymun 1975, 011787; Stoker 1993, 056021). These springs discharge water perched in the Bandelier Tuff and Tschicoma Formation at rates from 2 to 135 gal./min (Abeele et al. 1981, 006273). The volume of flow from the springs maintains natural perennial reaches of varying lengths in each of the canyons.

The mesa-top portion of the Upper Sandia Canyon Aggregate Area is currently an industrially developed area. Perennial stream flow and saturated alluvial aquifer conditions occur in the upper and middle portions of the canyon system. A wetland of approximately 7 acres has developed as a result of effluent discharge. The only known perennial spring in the watershed, Sandia Spring, is located in lower Sandia Canyon near the Rio Grande (LANL 2007, 096665).

3.1.3 Land Use

Currently, land use of the Upper Sandia Canyon Aggregate Area is industrial. The TAs comprise the core operational and administrative complex of the Laboratory. The area is highly developed with numerous office and Laboratory buildings, utilities, parking facilities, roads, and other paved areas. Most of TA-03 is located on the mesa top west of Sandia Canyon and most of TA-60 and TA-61 are located on the mesa top east of Sandia Canyon (Plate 1).

3.2 Subsurface Conditions

3.2.1 Anticipated Stratigraphic Units

The stratigraphy of the Upper Sandia Canyon Aggregate Area is summarized in this section. Additional information on the geologic setting of the area and information on the Pajarito Plateau can be found in the Laboratory's Hydrogeologic Workplan (LANL 1998, 059599).

The bedrock at or near the surface of the mesa top is the Bandelier Tuff. There are approximately 1250 ft of volcanic and sedimentary materials between any potential contaminant-bearing units at the mesa surface and the regional aquifer. The stratigraphic units that may be encountered during investigation of the Upper Sandia Canyon Aggregate Area are described briefly in the following sections. The descriptions begin with the oldest (deepest) and proceed to the youngest (topmost).

The Bandelier Tuff

The Bandelier Tuff consists of the Otowi and Tshirege Members, which are stratigraphically separated in many places by the tephras and volcaniclastic sediment of the Cerro Toledo interval. The Bandelier Tuff was emplaced during cataclysmic eruptions of the Valles Caldera between 1.61 and 1.22 million yr ago. The tuff is composed of pumice, minor rock fragments, and crystals supported in an ashy matrix. It is a prominent cliff-forming unit because of its generally strong consolidation (Broxton and Reneau 1995, 049726).

Otowi Member. Griggs and Hem (1964, 092516), Smith and Bailey (1966, 021584), Bailey et al. (1969, 021498), and Smith et al. (1970, 009752) describe the Otowi Member. It consists of moderately consolidated (indurated), porous, and nonwelded vitric tuff (ignimbrite) that forms gentle colluvium-covered slopes along the base of canyon walls. The Otowi ignimbrites contain light gray to orange pumice that is supported in a white to tan ash matrix (Broxton et al. 1995, 050121; Broxton et al. 1995, 050119; Goff 1995, 049682). The ash matrix consists of glass shards, broken pumice, and crystal fragments, and fragments of perlite.

The Guaje Pumice Bed. The Guaje Pumice Bed occurs at the base of the Otowi Member, making a significant and extensive marker horizon. The Guaje Pumice Bed (Bailey et al. 1969, 021498; Self et al. 1986, 021579) contains well-sorted pumice fragments whose mean size varies between 0.8 and 1.6 in. Its thickness averages approximately 28 ft below most of the plateau, with local areas of thickening and thinning. Its distinctive white color and texture make it easily identifiable in borehole cuttings and core, and it is an important marker bed for the base of the Bandelier Tuff.

Tephras and Volcaniclastic Sediment of the Cerro Toledo Interval. The Cerro Toledo interval is an informal name given to a sequence of volcaniclastic sediment and tephra of mixed provenance that separates the Otowi and Tshirege Members of the Bandelier Tuff (Broxton et al. 1995, 050121; Goff 1995, 049682; Broxton and Reneau 1995, 049726). Although it is located between the two members of the Bandelier Tuff, it is not considered part of that formation (Bailey et al. 1969, 021498). Outcrops of the Cerro Toledo interval generally occur wherever the top of the Otowi Member appears in Sandia Canyon and in canyons to the north. The unit contains primary volcanic deposits described by Smith et al. (1970, 009752) as well as reworked volcaniclastic sediment. The occurrence of the Cerro Toledo interval is widespread; however, its thickness is variable, ranging between several feet and more than 100 ft.

The predominant rock types in the Cerro Toledo interval are rhyolitic tuffaceous sediment and tephra (Heiken et al. 1986, 048638; Stix et al. 1988, 049680; Broxton et al. 1995, 050121; Goff 1995, 049682).

The tuffaceous sediment is the reworked equivalents of Cerro Toledo rhyolite tephra. Oxidation and clay-rich horizons indicate that at least two periods of soil development occurred within the Cerro Toledo deposits. Because the soil is rich in clay, it may act as a barrier to the movement of vadose zone moisture. Some of the deposits contain both crystal-poor and crystal-rich varieties of pumice. The pumice deposits tend to form porous and permeable horizons within the Cerro Toledo interval, and locally, may provide important pathways for moisture transport in the vadose zone. A subordinate lithology within the Cerro Toledo interval includes clast-supported gravel, cobble, and boulder deposits derived from the Tschicoma Formation (Broxton et al. 1995, 050121; Goff 1995, 049682; Broxton and Reneau 1996, 055429).

Tshirege Member. The Tshirege Member is the upper member of the Bandelier Tuff and is the most widely exposed bedrock unit of the Pajarito Plateau (Griggs and Hem 1964, 092516; Smith and Bailey 1966, 021584; Bailey et al. 1969, 021498; Smith et al. 1970, 009752). Emplacement of this unit occurred during eruptions of the Valles Caldera approximately 1.2 million yr ago (Izett and Obradovich 1994, 048817; Spell et al. 1996, 055542). The Tshirege Member is a multiple-flow, ash-and-pumice sheet that forms the prominent cliffs in most of the canyons on the Pajarito Plateau. It is a chemical cooling unit whose physical properties vary vertically and laterally. The consolidation in this member is largely from compaction and welding at high temperatures after the tuff was emplaced. Its light brown, orange-brown, purplish, and white cliffs have numerous, mostly vertical fractures that may extend from several feet up to several tens of feet. The Tshirege Member includes thin but distinctive layers of bedded, sand-sized particles called surge deposits that demark separate flow units within the tuff. The Tshirege Member is generally over 200 ft thick.

The Tshirege Member differs from the Otowi Member most notably in its generally greater degree of welding and compaction. Time breaks between the successive emplacement of flow units caused the tuff to cool as several distinct cooling units. For this reason, the Tshirege Member consists of at least four cooling subunits that display variable physical properties vertically and horizontally (Smith and Bailey 1966, 021584; Crowe et al. 1978, 005720; Broxton et al. 1995, 050121). The welding and crystallization variability in the Tshirege Member produce recognizable vertical variations in its properties, such as density, porosity, hardness, composition, color, and surface-weathering patterns. The subunits are mappable based on a combination of hydrologic properties and lithologic characteristics.

Broxton et al. (1995, 050121) provide extensive descriptions of the Tshirege Member cooling units. The following paragraphs describe, in ascending order, subunits of the Tshirege Member.

The Tsankawi Pumice Bed forms the base of the Tshirege Member. Where exposed, it is commonly 20 to 30 in. thick. This pumice-fall deposit contains moderately well-sorted pumice lapilli (diameters reaching about 2.5 in.) in a crystal-rich matrix. Several thin ash beds are interbedded with the pumice-fall deposits.

Subunit Qbt 1g is the lowermost tuff subunit of the Tshirege Member. It consists of porous, nonwelded, and poorly sorted ash-flow tuff. This unit is poorly indurated but nonetheless forms steep cliffs because of a resistant bench near the top of the unit; the bench forms a harder, protective cap over the softer underlying tuff. A thin (4 to 10 in.), pumice-poor surge deposit commonly occurs at the base of this unit.

Subunit Qbt 1v forms alternating cliff-like and sloping outcrops composed of porous, nonwelded, crystallized tuff. The base of this unit is a thin, horizontal zone of preferential weathering that marks the abrupt transition from glassy tuff below (in Unit Qbt 1g) to the crystallized tuff above. This feature forms a widespread marker horizon (locally termed the vapor-phase notch) throughout the Pajarito Plateau that is readily visible in canyon walls in parts of Sandia Canyon. The lower part of Qbt 1v is orange-brown, resistant to weathering, and has distinctive columnar (vertical) joints; hence, the term “colonnade tuff” is appropriate for its description. A distinctive white band of alternating cliff- and slope-forming tuffs overlies the colonnade tuff. The tuff of Qbt 1v is commonly nonwelded (pumices and shards retain their initial equant shapes) and have an open, porous structure.

Subunit Qbt 2 forms a distinctive, medium-brown, vertical cliff that stands out in marked contrast to the slope-forming, lighter-colored tuff above and below. It displays the greatest degree of welding in the Tshirege Member. A series of surge beds commonly mark its base. It typically has low porosity and permeability relative to the other units of the Tshirege Member.

Subunit Qbt 3 is a nonwelded to partially welded, vapor-phase altered tuff that forms the upper cliffs in Sandia Canyon. Its base consists of a purple-gray, unconsolidated, porous, and crystal-rich nonwelded tuff that forms a broad, gently sloping bench developed on top of Qbt 2. Abundant fractures extend through the upper units of the Bandelier Tuff, including the ignimbrite of the unit 3 of the Tshirege. The origin of the fractures has not been fully determined, but the most probable cause is brittle failure of the tuff caused by cooling contraction soon after initial emplacement (Vaniman 1991, 009995.1; Wohletz 1995, 054404).

3.2.2 Hydrogeology

The hydrogeology of the Pajarito Plateau is generally separable in terms of mesas and canyons forming the plateau. Mesas are generally devoid of water, both on the surface and within the rock forming the mesa. Canyons range from wet to relatively dry; the wettest canyons contain continuous streams and contain perennial groundwater in the canyon-bottom alluvium. Dry canyons have only occasional streamflow and may lack alluvial groundwater. Intermediate perched groundwater has been found at certain locations on the plateau at depths ranging between 100 and 400 ft. The regional aquifer is found at depths of about 600 to 1200 ft.

The hydrogeologic conceptual site model for the Laboratory (LANL 1998, 059599) shows that, under natural conditions, relatively small volumes of water move beneath mesa tops because of low rainfall, high evaporation, and efficient water use by vegetation. Atmospheric evaporation may extend into mesas, further inhibiting downward flow.

3.2.2.1 Groundwater

In the Los Alamos area, groundwater occurs as (1) water in shallow alluvium in some of the larger canyons, (2) intermediate perched groundwater (a perched groundwater body lies above a less permeable layer and is separated from the underlying aquifer by an unsaturated zone), and (3) the regional aquifer. Numerous wells have been installed at the Laboratory and in the surrounding area to investigate the presence of groundwater in these zones and to monitor groundwater quality. The locations of the existing wells within the vicinity of the Upper Sandia Canyon Aggregate Area are shown in Plate 1.

The Laboratory formulated a comprehensive groundwater protection plan (LANL 1995, 050124) for an enhanced set of characterization and monitoring activities. The approved Hydrogeologic Workplan (LANL 1998, 059599) details the implementation of extensive groundwater characterization across the Pajarito Plateau within an area potentially affected by past and present Laboratory operations.

Alluvial Groundwater

Intermittent and ephemeral streamflow in the canyons of the Pajarito Plateau have deposited alluvium that can be as thick as 100 ft. The alluvium in canyons of the Jemez Mountains is generally composed of sand, gravel, pebbles, cobbles, and boulders derived from the Tschicoma Formation and Bandelier Tuff.

The alluvium in canyons is finer grained, consisting of clay, silt, sand, and gravel derived from the Bandelier Tuff.

In contrast to the underlying volcanic tuff and sediment, alluvium is relatively permeable. Ephemeral runoff in some canyons infiltrates the alluvium until downward movement is impeded by the less permeable tuff and sediment, which results in the buildup of a shallow alluvial groundwater body. Depletion by evapotranspiration and movement into the underlying rock limit the horizontal and vertical extent of the alluvial water (Purtymun et al. 1977, 011846). The limited saturated thickness and extent of the alluvial groundwater preclude its use as a viable source of water for municipal and industrial needs. Lateral flow of the alluvial perched groundwater is in an easterly, downcanyon direction (Purtymun et al. 1977, 011846).

Regional Aquifer

The regional aquifer is the only aquifer capable of large-scale municipal water supply in the Los Alamos area (Purtymun 1984, 006513). The surface of the regional aquifer rises westward from the Rio Grande within the Santa Fe Group into the lower part of the Puye Formation beneath the central and western part of the Pajarito Plateau. The depths to groundwater below the mesa tops range between about 1200 ft along the western margin of the plateau and about 600 ft at the eastern margin. The location of wells and generalized water-level contours on top of the regional aquifer are described in the 2007 General Facility Information report (LANL 2007, 095364). The regional aquifer is typically separated from the alluvial groundwater and intermediate perched zone groundwater by 350 to 620 ft of tuff, basalt, and sediments (LANL 1993, 023249).

Groundwater in the regional aquifer flows east-southeast, toward the Rio Grande. The velocity of groundwater flow ranges from about 20 to 250 ft/yr (LANL 1998, 058841, p. 2-7). Details of depths to the regional aquifer, flow directions and rates, and well locations are presented in various Laboratory documents (Purtymun 1995, 045344; LANL 1997, 055622; LANL 2000, 066802).

3.2.2.2 Vadose Zone

The unsaturated zone from the mesa surface to the top of the regional aquifer is referred to as the vadose zone. The source of moisture for the vadose zone is precipitation, but much of it runs off, evaporates, or is absorbed by plants. The subsurface vertical movement of water is influenced by properties and conditions of the materials that make up the vadose zone.

Although water moves slowly through the unsaturated tuff matrix, it can move rapidly through fractures if saturated conditions exist (Hollis et al. 1997, 063131). Fractures may provide conduits for fluid flow but probably only in discrete, disconnected intervals of the subsurface. Because they are open to the passage of both air and water, fractures can have both wetting and drying effects, depending on the relative abundance of water in the fractures and the tuff matrix.

The Bandelier Tuff is very dry and does not readily transmit moisture. Most of the pore spaces in the tuff are of capillary size and have a strong tendency to hold water against gravity by surface-tension forces. Vegetation is very effective at removing moisture near the surface. During the summer rainy season when rainfall is highest, near-surface moisture content is variable because of higher rates of evaporation and of transpiration by vegetation, which flourishes during this time.

The various units of the Bandelier Tuff tend to have relatively high porosities. Porosity ranges between 30% and 60% by volume, generally decreasing for more highly welded tuff. Permeability varies for each cooling unit of the Bandelier Tuff. The moisture content of native tuff is low, generally less than 5% by volume throughout the profile (Kearl et al. 1986, 015368; Purtymun and Stoker 1990, 007508).

4.0 SITE DESCRIPTIONS AND PROPOSED INVESTIGATION ACTIVITIES

The following sections present site descriptions, summaries of previous investigation activities, proposed sampling activities, and proposed remedial activities. Table 4.0-1 summarizes the investigation strategy for each SWMU or AOC, and Table 4.0-2 provides analytical methods for the site characterization activities proposed in this work plan.

The Upper Sandia Canyon Aggregate Area has been disturbed as a result of many years of new construction and demolition of former structures. Before sampling is conducted, geodetic and geophysical methods will be used to verify specific SWMU and AOC boundaries. The sampling locations proposed in this work plan may be relocated as a result of these surveys; however, the overall sampling strategy will remain the same.

4.1 TA-03

TA-03 is located on the western end of South Mesa and is almost completely developed. The core operational facilities for the Laboratory are located at TA-03, including the principal administration buildings, the library, the Chemistry and Metallurgy Research Building, the Beryllium Technology Facility, a gas-fired electrical generating plant, and a former sanitary wastewater treatment plant. Roads and large paved parking areas surround the buildings. Several building complexes are fenced for controlled access.

Transport mechanisms include airborne surface soil, infiltration through the vadose zone, continued dissolution and advective/dispersive transport of chemical and radiological contaminants contained in subsurface soil and bedrock, and disturbance and uptake of contaminants by plants and animals. Potential receptors include laboratory workers and ecological receptors in the undeveloped areas.

No natural surface-water bodies are present within TA-03. During summer thunderstorms and spring snowmelt, runoff from the mesa top flows into storm drains, down hillsides, and into both Sandia and Mortandad Canyons. Surface-water runoff and erosion of contaminated surface soil could lead to contamination of bench areas on the hillside and surface water off-site. Surface water may also access subsurface contaminants exposed by soil erosion. Groundwater sampling for Upper Sandia Canyon is addressed in the Sandia Canyon investigation report (LANL 2006, 094161). This work plan only addresses the collection of soil and tuff samples.

Samples collected for TA-03 and analyses requested for decision-level data are presented in Table 4.1-1; for screening-level data in Table 4.1-2. Decision-level data are presented in Tables 4.1-3 to 4.1-10; screening-level data in Tables 4.1-11 to 4.1-15. All laboratory analytical data (both decision-level and screening-level) are also provided in Appendix B of the HIR (LANL 2008, 100693). Figures 4.1-1 to 4.1-57 include base maps, maps showing inorganic chemicals and radionuclides detected above BVs/FVs and detected organic chemicals, and maps showing the proposed sampling locations for TA-03 sites.

4.1.1 SWMU 03-002(c), Former Storage Area

Site Description

SWMU 03-002(c) is the site of a former 19-ft × 15-ft wooden storage shed (former structure 03-1494) located 100 ft west of the former Johnson Controls, Inc., administrative office (former building 03-0070)

(Figure 4.1-1). From the early 1960s to 1984, the shed was used to store containers of liquid and powdered pesticides and herbicides. The shed was removed in 1989 and the floor was disposed of as hazardous waste (LANL 1993, 020947). Between 1994 and 1996, the original concrete pad beneath the shed was surrounded by a new concrete pad that covered the site (LANL 1996, 052930, p. 41). The eastern portion of the concrete pad was paved over with asphalt in 2003 as part of the construction of an access road and parking lot (LANL 2008, 099214).

Previous Investigations

A Phase I RFI was conducted at SWMU 03-002(c) in 1994 to determine if there had been a release of pesticides from the storage shed (LANL 1996, 052930, p. 41). Six soil samples, including one duplicate, were collected from five locations. At four locations under the concrete pad, samples were collected from a depth of 0 to 0.5 ft below ground surface (bgs). At the fifth location, downgradient of the bermed pad, a sample was collected from a depth of 0 to 0.25 ft bgs. All samples were submitted for laboratory analyses of inorganic chemicals, semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, herbicides, gross-alpha, -beta, and -gamma radiation, and tritium. One sample collected from the 0- to 0.5-ft interval was also submitted for laboratory analysis of volatile organic compounds (VOCs) (LANL 1996, 052930, p. 44). Requested analyses are presented in Table 4.1-2.

Screening-level data are presented in Table 4.1-11. Sampling locations are shown in Figures 4.1-2, 4.1-3, and 4.1-4. Cadmium, manganese, mercury, and silver were each detected in one sample above BVs; zinc and calcium were each detected above BVs in two and three samples, respectively. Organic chemicals and radionuclides were not detected.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Therefore, eight surface and subsurface soil samples will be collected from four locations to confirm the results of the previous investigation (Figure 4.1-5). The samples will be collected from two depths (0 to 1 ft and at the soil/tuff interface) and analyzed for inorganic chemicals, VOCs, SVOCs, PCBs, pesticides, and cyanide. No high explosives (HE) or radionuclides are associated with this SWMU; therefore, no samples will be analyzed for nitrate, perchlorate, or radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.2 SWMU 03-003(c), Equipment Storage Area—PCB Site

Site Description

SWMU 03-003(c) was a temporary equipment storage area for used dielectric fluids and capacitors located on the south side of former building 03-0287 (LANL 1993, 020947, p. 6-24) (Figure 4.1-6). Building 03-0287 was constructed between 1966 and 1968 to house a magnetic confinement experiment for the heating and confinement of hot plasmas. The experiment, known as the Scyllac Project, operated from 1972 to 1978. The experiment was energized by a capacitor bank housing 3300 sealed non-PCB capacitors. The sealed capacitors contained a non-PCB dielectric oil, and each of the associated spark-gap switches required approximately 2 qt of non-PCB mineral oil for electrical insulation (LANL 1995, 057590, p. 6-69). Before this experiment was decommissioning in the mid-1980s, oil samples from spark gap switches and swipe samples from numerous surfaces within the room where the equipment was housed were analyzed for PCBs. Results showed PCB concentrations of less than 2 parts per million (ppm). During the decommissioning of the experiment, some of the capacitors were temporarily stored outside the building at SWMU 03-003(c). Swipe samples collected from the pavement were found to be free of PCBs (LANL 1995, 051878, p. 2-15). Before the remodeling of building 03-0287 in late 1992 and early 1993, a single surface soil sample was collected from the south side of building 03-0287 to supplement the previous PCB survey of the building's interior. No PCBs were detected (LANL 1993, 020947, p. 6-24).

Previous Investigations

In 2001 (before decontamination and decommissioning [D&D] of building 03-0287), three asphalt samples were collected from three locations at SWMU 03-003(c), and three fill samples were collected from beneath the asphalt at a depth of 0 to 0.5 ft bgs (LANL 2001–2002, 100703, p. 13). Observations recorded by field personnel during sample collection activities indicated no staining or odors. Samples were submitted for laboratory analysis of PCBs (LANL 2005, 100704, p. 3). Requested analyses are presented in Table 4.1-1.

In 2003 and 2004, building 03-0287 underwent D&D activities to make way for the National Security Science Building (NSSB). Following the removal of building 03-0287 and all surrounding asphalt, including the location of SWMU 03-003(c), approximately 10 ft of clean fill was placed over the entire site to accommodate the NSSB (LANL 2008, 099214).

Decision-level data are presented in Tables 4.1-6 and 4.1-9. Sampling locations and detected results are shown in Figure 4.1-7. Aroclor-1254 was detected at 14 mg/kg in asphalt sample RC03-01-0013 (location 03-14455) and 0.043 mg/kg in fill sample RC03-01-0016 (location 03-14458) directly beneath asphalt sample RC03-01-0013. Aroclor-1254 was detected at 0.64 mg/kg in asphalt sample RC03-01-0016 (location 03-14456) and was not detected in fill sample RC03-01-0017 (location 03-14459) directly beneath asphalt sample RC03-01-0014. At sampling location 03-14454, Aroclor-1254 was not detected in asphalt sample RC-3-01-0012 but was detected at 0.054 mg/kg in fill sample RC03-01-0015 directly beneath the asphalt.

Proposed Activities

No sampling is proposed for this SWMU because previous investigation results have determined the nature and extent of contamination. The area was excavated and buried under 10 ft of fill in preparation for the construction of the NSSB.

4.1.3 AOC 03-003(d), Transformer Pad—PCB Only Site

Site Description

AOC 03-003(d) is a concrete pad located east of building 03-0141 where two former PCB-containing transformers, structures 03-0146 and 03-0176, were located (Figure 4.1-8). These transformers (PCB identification numbers 5008 and 5009) contained PCB concentrations greater than 500 ppm and were removed in 1991 and 1992, respectively, in accordance with the DOE/Albuquerque Operations Office Environmental Restoration and Waste Management Five-Year Plan (LANL 1995, 057590). Because no stains were visible on the concrete pad after the transformers were removed, the area was considered free of contamination and new non-PCB transformers were relocated on the same concrete pad. Additional concrete was added to extend the existing pad in 1993 (LANL 1995, 057590, p. 6-63).

Previous Investigations

Samples have not been collected at this AOC.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Therefore, five concrete chip samples will be collected from the surface of the old pad to determine if PCBs are present. Four soil samples will be collected from two locations at two depths (0 to 1 ft and 1 to 2 ft) under the concrete pad, and six soil samples will be collected around the concrete pad from three locations at two depths (0 to 1 ft and 1 to 2 ft) to determine if PCBs have migrated from the concrete pad (Figure 4.1-12). Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.4 AOC 03-003(f), Transformer Area—PCB Only Site

Site Description

AOC 03-003(f) is an area in the basement of the Sigma building (building 03-0066) where nine PCB-containing transformers were formerly located (Figure 4.1-13). The transformers were removed in 1991 in accordance with the DOE/Albuquerque Operations Office Environmental Restoration and Waste Management Five-Year Plan (LANL 1995, 057590). Under this plan, any evidence of a release was sampled and cleaned up in accordance with Toxic Substances Control Act (TSCA) requirements (40 Code of Federal Regulations [CFR] 761). Leaks were observed under the transformers, the stained areas were double washed and rinsed, and postcleanup sampling was done to verify the completion of cleanup as required by TSCA PCB spill cleanup requirements (40 CFR 761.130). For all but one of the PCB-containing transformers, samples collected following their removal indicated that PCB concentrations were less than 10 ppm, the U.S. Environmental Protection Agency (EPA) TSCA cleanup standard. Stained concrete slabs for all the transformers were removed in 1992 and taken to TA-54, Area G. Soil and gravel samples collected from beneath the excavated concrete pads in building 03-0066 indicated PCB concentrations less than 1.6 ppm.

During the removal efforts, approximately three gallons of PCB-containing dielectric fluid were spilled from a 1500-kV transformer located in the J-3 wing of the Building 03-0066 basement. When the transformer was placed on its side for removal from the building, fluid leaked onto the plastic liner inside a containment basin. Approximately 1 qt of fluid leaked from the containment basin onto the concrete basement floor and was subsequently cleaned up in accordance with TSCA PCB spill clean up requirements. After several double wash/double rinse efforts, a pigmented epoxy sealer “plasite” was applied to the spill area (LANL 1995, 057590, pp. 6-65, 6-66).

Previous Investigations

On March 17, 1995, confirmatory swipes were collected from four location of the concrete basement floor of building 03-0066 and analyzed for PCBs. The results showed PCB concentrations in all four samples to be below 2.5 µg/100 cm^2, which is less than the EPA TSCA cleanup standard of 10 µg/100 cm^2 (LANL 1995, 057590, p. 6-66).

Proposed Activities

A concrete pad was poured over the old concrete in 1992; this site is located within a building that is an active nuclear facility and cannot be safely or practicably investigated at this time. The investigation and, if necessary, remediation of AOC 03-003(f) will be deferred until some future time when the Sigma Building (03-0066) undergoes D&D.

4.1.5 AOC 03-003(g), Transformer Area—PCB Only Site

Site Description

AOC 03-003(g) is the location of a former PCB-containing transformer located in the basement of building 03-0035 (Figure 4.1-13). The transformer contained dielectric fluid with PCB concentrations greater than 500 ppm. In 1984, the transformer was replaced with a non-PCB transformer in accordance with the DOE/Albuquerque Operations Office Environmental Restoration and Waste Management Five-Year Plan (LANL 1995, 057590). Oil staining was not present on the concrete upon removal of the transformer. Archival research revealed no record of releases (LANL 1995, 057590, p. 6-65).

Previous Investigations

Samples have not been collected from this AOC.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Therefore, three swipe samples will be collected from the surface of the concrete pad and analyzed for PCBs to determine if PCBs are present (Figure 4.1-17). Table 4.0-1 provides a summary of the proposed sampling locations, and analytical suites.

4.1.6 AOC 03-003(o), Former Non-PCB Capacitor Bank

Site Description

AOC 03-003(o) is the location of a former 60-kV capacitor bank in former building 03-0287 (Figure 4.1-6) used as part of an experiment for the Scyllac Project (LANL 1995, 057590, p. 6-69). The Scyllac experiment was energized by a capacitor bank housing 3300 sealed non-PCB capacitors. The sealed capacitors contained a non-PCB dielectric fluid oil and each of the associated spark-gap switches required approximately 2 qt of non-PCB mineral oil for electrical insulation (LANL 1995, 057590, p. 6-69). Before this experiment was decommissioned in the mid-1980s, oil samples from spark gap switches and swipe samples from numerous surfaces within the room where the equipment was housed were analyzed for PCBs. The results showed PCB concentrations of less than 2 ppm.

During the decommissioning of building 03-0287, the capacitors were temporarily stored south of the building at AOC 03-003(o). Swipe samples were collected from the pavement at AOC 03-003(o) and were free of PCB contamination (LANL 1995, 057590, p. 6-69).

Previous Investigations

No RFI activities have been conducted at this SWMU. However, historical data from the site and data from AOC 03-003(c) confirm that nature and extent have been determined (see section 4.1.2).

Proposed Activities

No sampling is proposed for this site because it has been characterized and no analytes were detected. Building 03-0287 underwent D&D activities in 2003 and 2004 to make way for the NSSB. Following the removal of building 03-0287 [including AOC-03-003(o)], approximately 10 ft of clean fill was placed over the entire site before the NSSB was constructed.

4.1.7 Consolidated Unit 03-009(a)-00

Consolidated Unit 03-009(a)-00 includes SWMUs 03-009(a), 03-028, 03-029, 03-036(a), 03-036(c), 03-036(d), and 03-045(g), and AOCs 03-043(b), 03-043(d), and 03-043(h) (Figure 4.1-1). All these sites are associated with the former asphalt batch plant operations. AOCs 03-043(d) and 03-043(h) are duplicates of SWMU 03-036(a) [SWMU 03-036(a) consists of two former asphalt emulsion tanks; the structure numbers of each duplicate AOC tank corresponds to the structure numbers of the SWMU 03-036(a) tanks] (LANL 1995, 057590, p. 6-19).

The disposal sites within this consolidated units contained items such as concrete, cured asphalt, and soil. Components of these materials include asphalt, petroleum hydrocarbons, water, and light distillates (LANL 1995, 057590, p. 6-15).

Each of the SWMUs and AOCs in this consolidated unit is discussed individually in sections 4.1.7.1 to 4.1.7.10. Proposed sampling for this consolidated unit is provided in the following sections.

4.1.7.1 SWMU 03-009(a), Surface Disposal (Soil Fill)

Site Description

SWMU 03-009(a) is a 30-ft × 300-ft fill area located on the rim of a small tributary of Sandia Canyon south of the former TA-03 asphalt batch plant (LANL 1993, 020947, p. 6-16) (Figure 4.1-1). The fill was generated by asphalt plant operations and contained small amounts of concrete, fill, crushed tuff, and asphalt road-construction debris. A 20-ft section of asbestos pipe was observed at SWMU 03-009(a) in 1990; however, the pipe was not found during a 1992 site visit (LANL 1993, 020947, p. 6-17).

Previous Investigations

A Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) was conducted at SWMU 03-009(a) in 2003 (LANL 2003, 079747). Three boreholes were advanced to a depth of 20 ft bgs and every 5-ft length of core was field screened for total petroleum hydrocarbons (TPH) diesel range organic (DRO) to guide sample collection. Borehole logs confirm fill materials to be present to a depth of approximately 16 ft bgs at the south end of the site and to a depth of approximately 4 ft bgs at the north end of the site. Samples were submitted for laboratory analyses of inorganic chemicals, VOCs, SVOCs, and TPH. Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3 and 4.1-4. Sampling locations and detected results are shown in Figures 4.1-2, 4.1-3 and 4.1-4. Selenium was detected above BV in two tuff samples, methylene chloride was detected in the fill sample and two tuff samples, and tetrachloroethene (PCE) was detected in the fill sample. SVOCs and TPH were not detected.

Proposed Activities

The extent of contamination has not been defined at this site. Twelve subsurface soil samples will be collected from three boreholes to define the vertical extent of contamination (Figure 4.1-5). The samples will be collected from four depths (soil/tuff interface, 9 to 10 ft, 14 to 15 ft, and 19 to 20 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, and cyanide. Four additional soil samples will be collected downgradient of the site from two locations at two depths (0 to 1 ft and 1 to 2 ft) to define the lateral extent of contamination. These samples will be analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, and cyanide. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

Samples will also be collected from the drainage downgradient of this site as part of the Sandia Canyon and Cañada del Buey investigation work plan (LANL 1999, 064617). Section 6.3 provides additional information about the reach investigations to be conducted in Sandia Canyon. Reach boundaries and canyon sediment sampling locations have been added to Figure 4.1-5. Data from the canyon sampling locations will be assessed in the Upper Sandia Canyon Aggregate Area investigation report to confirm the nature and extent of contamination have been determined for SWMU 03-009(a).

4.1.7.2 SWMU 03-028, Surface Impoundment

Site Description

SWMU 03-028 is a former 12-ft × 15-ft × 6-ft-deep concrete holding pond at the northeast corner of the former asphalt batch plant (Figure 4.1-1). The site was used as a settling pond for mineral dust and particulates from gravel captured by scrubber water from the asphalt batch plant (former structure 03-0073). Scrubber water from the holding pond was not directly discharged to the SWMU 03-045(g) outfall. The pond had an overflow pipe that discharged onto the ground surface. The surface drainage then flowed to a culvert inlet pipe that was connected to the SWMU 03-045(g) outfall. Water from the pond was recycled to the scrubber system and was replenished with potable water.

Sediment from the gravel used in the asphalt batch plant was periodically removed from the bottom of the holding pond and disposed of in the former landfill area located southeast of the plant [SWMU 03-009(a)]. The operating group, LANL Roads and Grounds, removed all sediment and water from the pond in early August 2003 during decommissioning of the asphalt batch plant. The empty pond was photographed and surveyed on August 19, 2003, and the pond was filled with clean soil and gravel on August 20, 2003, to allow a crane to be placed on the site to dismantle the batch plant (former structure 03-0073). The surface of the site was paved with asphalt for use as a parking lot (LANL 2008, 099214).

Previous Investigations

RFI activities were performed during 2003 (LANL 2003, 079741). One soil and three tuff samples were collected from two boreholes (sampling locations 03-22523 and 03-22524) drilled next to the south and west (downgradient) sides of the former holding pond. The soil sample and one tuff sample were collected from one borehole at depths of 5 to 5.5 ft bgs and 19 to 19.5 ft bgs; the remaining two tuff samples were collected from the second borehole at depths of 7.5 to 8 ft bgs and 19.5 to 20 ft bgs. Samples were submitted for laboratory analyses of inorganic chemicals, SVOCs, VOCs, and TPH (Shaw Environmental Inc. 2003, 085517, pp. 10, 26). Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3, 4.1-4 and 4.1-5. Sampling locations and detected results are shown in Figures 4.1-2, 4.1-3 and 4.1-4. Aluminum, arsenic, barium, calcium, copper, lead, magnesium, and nickel were detected above BVs in one tuff sample. Selenium was detected above BV in all three tuff samples. Acetone and methylene chloride were detected in two tuff samples; bis(2-ethylhexyl)phthalate was detected in the soil sample; and benzoic acid was detected in one soil and one tuff sample. TPH was not detected.

Proposed Activities

No sampling is proposed for this site based on historical sampling. Previous sampling detected several inorganic chemicals at concentrations less than 2 times their respective BVs. The detected organic chemicals decrease in concentration with depth and are below the estimated quantitation limits (EQLs). Therefore, the nature and extent of contamination at this site have been defined.

4.1.7.3 SWMU 03-029, Landfill

Site Description

SWMU 03-029 is a 30-ft × 70-ft former landfill located approximately 300 ft south of building 03-0271 near the rim of Sandia Canyon (LANL 1999, 064617, p. 2-17) (Figure 4.1-18). Historically, this landfill received excess asphalt from the batch plant and was subsequently covered with sand. The fill raised and leveled the surface areas at the mesa rim. NMED issued a notice of violation to the Laboratory in November 1990 concerning pieces of asphalt, and an oily sheen found in the Sandia Canyon watercourse below building 03-0073 (LANL 1995, 057590, p. 6-23). The Laboratory completed a required corrective action at SWMU 03-029 in early 1993 to remove the asphalt within the drainage and on the associated slope, regrade the watercourse and slope to support vegetation, extend the drainage, and construct a concrete berm to prevent additional exposure of asphalt buried in the fill. Dense grass cover was seeded and maintained on all fill slopes and disturbed areas (LANL 1995, 057590, p. 6-24). Water samples collected from the storm drain indicated that oil, grease, or other chemicals typically associated with asphalt plant operations were not present (LANL 1995, 057590 p. 6-24).

An accelerated corrective action (ACA) was proposed for completing the investigation and remediation of SWMU 03-029 in 2004 to accommodate the Laboratory's security perimeter project. SWMU 03-029 was situated in the proposed location for the security perimeter road (LANL 2004, 087474, p. 1). In May 2005, a ground-penetrating radar (GPR) and electromagnetic (EM) survey were conducted at SWMU 03-029. The survey results identified two possible locations for buried waste, which were further investigated by trenching. In July 2005, a total of 12 trenches were excavated to the top of bedrock, approximately 2 to 4 ft bgs, and varied in length from 20 ft to greater than 100 ft. Buried waste was not encountered in any of the trenches (LANL 2005, 091150, p. 10). Because buried waste was not encountered, the remaining proposed ACA activities for SWMU 03-029 were not completed (LANL 2005, 091150, p. 29).

Previous Investigations

Samples have not been collected at this SWMU.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Geophysical surveys will be performed before sample collection to determine the location of potential buried debris (Figure 4.1-22). After the debris is located, at least six samples will be collected from two locations from three depths (at the soil/tuff interface, 4 to 5 ft, and 9 to 10 ft) to define the nature and extent of contamination potentially associated with the landfill. In addition, four samples will be collected from two locations from two depths (0 to 1 ft and 1 to 2 ft bgs) between the canyon edge and canyon bottom on the slope below SWMU 03-029 and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, and cyanide. If geophysical surveys do not locate the debris, samples will be collected from locations based on the historical description of the SWMU. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

Samples will also be collected from the drainage downgradient of this site as part of the Sandia Canyon and Cañada del Buey investigation work plan (LANL 1999, 064617); the data will be provided in an investigation report to be submitted to NMED in December 2008. Section 6.3 provides additional information about the reach investigations to be conducted in Sandia Canyon. Reach boundaries and canyon sediment sampling locations have been added to Figure 4.1-22. Data from the canyon sampling locations will be assessed in the Upper Sandia Canyon Aggregate Area investigation report to confirm the nature and extent of contamination have been determined for SWMU 03-029.

4.1.7.4 SWMU 03-036(a), Aboveground Tanks

Site Description

SWMU 03-036(a) is the location of two former asphalt emulsion product tanks (structures 03-0075 and 03-0076), located at the former asphalt batch plant (Figure 4.1-1). The tanks were approximately 25 to 30 ft in diameter and 8 to 12 ft high, with a capacity of 30,000 to 50,000 gal. (LANL 1993, 020947, p. 6-30). The tanks were located within a soil-bermed secondary containment area approximately 225 ft southwest of building 03-0070 (LANL 1995, 057590, p. 6-19). Plant operations resulted in some small spills that were contained within the berms. In 1987, structure 03-0075 ruptured near its base and released 1500 gal. of asphalt emulsion. The spill was contained within the berm, mixed with sand, and disposed of at the Los Alamos County landfill. Between October 1988 and April 1989, both tanks were removed, cut up, and disposed of in the Los Alamos County landfill. All soil around and beneath the tanks was also removed, mixed with sand, hardened, and deposited at the Los Alamos County landfill (LANL 1993, 020947, p. 6-30). The area was then used to store and prepare crack-sealing machines until batch plant operations ceased in 2002. The surface of the site was paved with asphalt for use as a parking lot in 2003 (LANL 2008, 099214).

Previous Investigations

Before paving the site, sampling activities were conducted in 2003 to characterize the impact of the paving to several SWMUs in the vicinity (LANL 2003, 080912, p. 1). During the investigation, one shallow borehole was drilled at SWMU 03-036(a), and two tuff samples were collected at depths of 8.0 to 8.5 ft and 19.5 to 20 ft bgs. Samples were submitted for laboratory analyses of inorganic chemicals, VOCs, SVOCs, TPH-DRO, and TPH-gasoline range organic (GRO) (Shaw Environmental Inc., 2003, 085517, pp. 10, 26). Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3, 4.1-4, and 4.1-5. Sampling locations and detected results are shown in Figures 4.1-2, 4.1-3, and 4.1-4. Selenium was detected in one sample above BV. Acetone, PCE, and benzoic acid were also detected. TPH was not detected.

Proposed Activities

No sampling is proposed because the nature of contamination has been defined at this site. Previous sampling detected selenium above BV. However, the selenium concentrations decreased with depth. Organic chemicals were detected at concentrations below the EQLs. Also, at the same sampling location, acetone and PCE concentrations decreased with depth. Currently, SWMU 03-036(a) is overlain with an asphalt parking lot.

4.1.7.5 SWMU 03-036(c), Aboveground Tanks

Site Description

SWMU 03-036(c) is the location of two former asphalt emulsion storage tanks (Figure 4.1-1). The tanks were located approximately 100 ft northeast of former structure 03-0073. While in use, the tanks were partially buried with sand and gravel-packed around the base. The tanks were removed, cut apart, and disposed of at the Los Alamos County landfill. An inspection determined the tanks had not leaked (LANL

1995, 057590, p. 6-19). The former tanks were used to store aggregate and to mix feed for the asphalt batch plant until the plant was decommissioned in 2002. In 2003, the surface of the site was paved with asphalt for use as a parking lot (LANL 2008, 099214).

Previous Investigations

Before the site was paved, it was sampled in 2003 to characterize the impact of several SWMUs in the vicinity (LANL 2003, 080912, p. 1). During the investigation, one shallow borehole was drilled at SWMU 03-036(c), and two tuff samples were collected at depths of 3 to 4 ft and 19.5 to 20 ft bgs. Samples were submitted for laboratory analyses of inorganic chemicals, VOCs, SVOCs, TPH-DRO, and TPH-GRO (Shaw Environmental Inc., 2003, 085517, pp. 10, 26). Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3 and 4.1-4. Sampling locations and detected results are shown Figures 4.1-2, 4.1-3, and 4.1-4. Arsenic and selenium were detected above BVs in one sample. Acetone was detected in one sample.

Proposed Activities

No additional sampling is proposed for this site because the nature and extent of contamination have been defined. The 2003 investigation analytical results showed detected inorganic chemicals decreased in concentration with depth. The only detected organic chemical (acetone) was detected at 20 ft at a concentration below EQL. Acetone was not detected in shallower samples. In addition, SWMU 03-036(c) is overlain with an asphalt parking lot.

4.1.7.6 SWMU 03-036(d), Aboveground Tanks

Site Description

SWMU 03-036(d) is the location of two former asphalt emulsion storage tanks (Figure 4.1-1). The tanks were located approximately 100 ft northeast of former structure 03-0073. While in use, the tanks were partially buried with sand and gravel-packed around the base. The tanks were removed, cut apart, and disposed of at the Los Alamos County landfill. An inspection determined the tanks had not leaked (LANL 1995, 057590, p. 6-19). The former tanks were used to store aggregate and to mix feed for the asphalt batch plant until the plant was decommissioned in 2002. In 2003, the surface of the site was paved with asphalt for use as a parking lot (LANL 2008, 099214).

Previous Investigations

Before the site was paved, it was sampled in 2003 to characterize the impact of several SWMUs in the vicinity (LANL 2003, 080912, p. 1). During the investigation, one shallow borehole was drilled at SWMU 03-036(d), and one tuff sample was collected at a depth of 4.5 to 5 ft bgs. The sample was submitted for laboratory analyses of inorganic chemicals, VOCs, SVOCs, TPH-DRO, and TPH-GRO (Shaw Environmental Inc., 2003, 085517, pp. 10, 26). Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3, 4.1-4, and 4.1-6. The sampling location and detected results are shown in Figures 4.1-2, 4.1-3, and 4.1-4. Lead and selenium were detected above BVs in one sample, and PCE and TPH-GRO were detected in one sample. SVOCs and TPH-DRO were not detected.

Proposed Activities

No sampling is proposed because the nature and extent of contamination have been defined. Previous sampling detected selenium and lead at concentrations less than 2 times their respective BVs. PCE was detected at a concentration below EQL, and TPH-DRO was detected. TPH results were compared with, and found to be below, NMED's TPH screening guidelines for industrial and residential land uses (NMED 2006, 094614). Based on the analytical results, the nature and extent of contamination are defined at this site.

4.1.7.7 AOC 03-043(b), Aboveground Tank

Site Description

AOC 03-043(b) is the location of a former 10,000-gal. asphalt emulsion storage tank, structure 03-0077, installed in 1948 (Figure 4.1-1). Sand and gravel were packed around the base of the tank for insulation and stability. In 1980, the tank was cleaned out, removed, cut up, and disposed of at the Los Alamos County landfill. Stained soil beneath and around the tank was excavated and taken to the landfill (LANL 1995, 057590, p. 6-18). The former tank location was used to store aggregate and to mix feed for the asphalt batch plant until it was decommissioned in 2002. In 2003, the surface of the site was paved with asphalt for use as a parking lot (LANL 2008, 099214).

Previous Investigations

Before the site was paved, it was sampled in 2003 to characterize the impact of several SWMUs in the vicinity (LANL 2003, 080912, p. 1). During the investigation, one shallow borehole was drilled at AOC 03-043(b). Three tuff samples were collected at depths of 9.5 to 10 ft bgs, 14.5 to 15 ft bgs, and 19.5 to 20 ft bgs. Samples were submitted for laboratory analyses of inorganic chemicals, VOCs, SVOCs, TPH-DRO, and TPH-GRO (Shaw Environmental Inc., 2003, 085517, pp. 10, 26). Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3 and 4.1-4. The sampling location and detected results are shown in Figures 4.1-2, 4.1-3, and 4.1-4. Aluminum, arsenic, barium, chromium, iron, lead, magnesium, nickel, and zinc were detected above BVs in one sample. Selenium was detected above BV in two samples. Acetone was detected in one sample. SVOCs and TPH were not detected.

Proposed Activities

No sampling is proposed for this site because the nature and extent of contamination have been defined. Inorganic chemicals decrease in concentration with depth. Acetone was detected below the EQL. In addition, the tank was removed, and the area is overlain with an asphalt parking lot.

4.1.7.8 AOC 03-043(d), Aboveground Tank

Site Description

The 1990 SWMU report (LANL 1990, 007511) lists SWMU 03-036(a) as an area of potential soil contamination from two aboveground asphalt storage tanks (structures 03-0075 and 03-0076), located at the former asphalt batch plant. The SWMU report also lists these same two tanks under the heading of decommissioned product tanks, designating one tank (03-0076) as AOC 03-043(d). Tank 03-0076 was cleaned out, removed, and disposed of at the Los Alamos County landfill. Because the tank was removed, the AOC is no longer the tank itself, but the area of potential soil contamination associated with the tank. However, SWMU 03-036(a) has already been designated at the area of potential soil contamination from tank 03-0076. Therefore, AOCs 03-043(d) is a duplicate of SWMU 03-036(a).

4.1.7.9 AOC 03-043(h), Aboveground Tank

Site Description

The 1990 SWMU report (LANL 1990, 007511) lists SWMU 03-036(a) as an area of potential soil contamination from two aboveground asphalt storage tanks (structures 03-0075 and 03-0076), located at the former asphalt batch plant. The SWMU report also lists these same two tanks under the heading of decommissioned product tanks, designating one tank (03-0075) as AOC 03-043(h). Tank 03-0075 has been cleaned out, removed, and disposed of at the Los Alamos County landfill. Because the tank was removed, the AOC is no longer the tank itself but rather is the area of potential soil contamination associated with the former tank. However, SWMU 03-036(a) has already been designated at the area of potential soil contamination from tank 03-0075. Therefore, AOCs 03-043(h) is a duplicate of SWMU 03-036(a).

4.1.7.10 SWMU 03-045(g), Storm Drain

Site Description

SWMU 03-045(g) consists of a closed and locked storm drain that connected to an outfall, formerly permitted under the EPA National Pollutant Discharge Elimination System (NPDES) as EPA 04A109 (LANL 1993, 020947, p. 6-12). The outfall discharged to a tributary of Sandia Canyon directly south of the former asphalt batch plant (Figure 4.1-1). The storm drain has been closed and locked since late 1990. Outfall 04A109 had been permitted for the discharge of noncontact cooling water and was removed from the NPDES permit in 1994 (LANL 1999, 064617, p. 2-7). Since 1987, the only discharges from the asphalt plant to the outfall were scrubber water used to collect dust from batching operations diverted to wash vehicles and equipment and from stormwater from the western portion of the batch plant area. . Stormwater from parking lots, roads, and roof drains located west of the former asphalt batch plant also discharged to the outfall.

Previous Investigations

In 2003, four sediment samples were collected within the catch basin of the closed storm drain (located approximately 150 ft north of the outfall). The four sediment samples were collected from two locations at depths of 0 to 0.5 ft bgs and 1.5 to 2 ft bgs using a hand auger. Samples were submitted for laboratory analyses of inorganic chemicals, VOCs, SVOCs, TPH-DRO, and TPH-GRO (Shaw Environmental Inc., 2003, 085517, pp. 10, 26). Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3, 4.1-4, 4.1-5, and 4.1-6. Sampling locations and detected results are shown in Figures 4.1-2 and 4.1-3. Arsenic and lead were detected above BVs in one sample. Cadmium, cobalt, iron, manganese, potassium, and sodium were detected above BVs in two samples. Barium, copper, vanadium, and zinc were detected above BVs in three samples. Calcium, chromium, magnesium, and nickel were detected above BVs in all four samples. Butylbenzene(n-), isopropyltoluene(4-), trichloroethene (TCE), trimethylbenzene(1,2,4-), and trimethylbenzene(1,3,5-), and TPH-GRO were detected in one sample. Benzo(g,h,i)perylene was detected in two samples. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, and phenanthrene were detected in three samples. Methylene chloride, bis(2-ethylhexyl)phthalate, fluoranthene, and pyrene were detected in all four samples. TPH-DRO was not detected.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Therefore, two samples will be collected from historical location 03-22536, and two samples will be collected from one location above the inlet at 1 to 2 ft and 4 to 5 ft (Figure 4.1-5). Four soil samples will also be collected from two locations downgradient of the outfall within the drainage to determine the lateral extent of contamination (Figure 4.1-5). The downgradient samples will be collected from two depths (0 to 1 ft and 1 to 2 ft). All samples will be analyzed for inorganic chemicals, VOCs, SVOCs, TPH-GRO and cyanide. No HE or radionuclides are associated with this SWMU; therefore, no samples will be analyzed for nitrate, perchlorate or radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

Additional samples will be collected further downgradient of SWMU 03-045(g) as part of the investigation of SWMU 03-045(e). Section 4.1.30 provides further details. Data from downgradient canyon sampling locations will also be used to confirm the nature and extent of contamination have been determined for SWMU 03-045(g).

4.1.8 SWMU 03-009(i), Surface Disposal Site

Site Description

SWMU 03-009(i) is an inactive surface disposal site located east of the liquid and compressed gas facility (building 03-0170) (Figure 4.1-25). This site consists of construction debris including crushed tuff, pieces of concrete, rock, and piles of fill. This surface disposal site ceased to be used in 1980 (LANL 1995, 057590, p. 6-4).

Previous Investigations

Samples have not been collected at this SWMU.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Therefore, four test pits will be excavated, and two grab samples will be collected within each pit at depths of 5 ft and 10 ft to characterize the material (Figure 4.1-28). Two additional locations will be sampled downgradient of the disposal site. Four samples will be collected from these two locations at two depths (0 to 1 ft and 1 to 2 ft) to define lateral extent. Samples will be analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, and cyanide. No HE or radionuclides are associated with this SWMU; therefore, no samples will be analyzed for nitrate, perchlorate, or radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.9 Consolidated Unit 03-012(b)-00, Power Plant

Consolidated Unit 03-012(b)-00 consists of a holding tank [SWMUs 03-014(q)] and two permitted outfalls [03-045(c) and 03-012(b)] and 03-045(b) (Figure 4.1-29). SWMU 03-045(b) is a duplicate of 03-012(b). The SWMUs within this consolidated unit are associated with the TA-03 power plant (building 03-0022) operations. SWMU 03-014(q) is a cooling-water holding tank; SWMUs 03-045(c), 03-012(b), and

03-045(b) are outfalls that discharge into a small tributary of Sandia Canyon directly south of the steam power (LANL 1996, 052930, p. 57). A gas turbine generator was installed on the eastern side of the power plant within the boundary of Consolidated Unit 03-012(b)-00 in 2007 (LANL 2008, 099214). Each SWMU is discussed individually in sections 4.1.9.1 to 4.1.9.4.

SWMUs 03-012(b) and 03-045(b) are the same discharge point for a permitted outfall associated with the TA-03 steam plant (building 03-0022). Discharge from a permitted outfall at the TA-46 Sanitary Wastewater Systems Consolidation (SWSC) plant is pumped to the TA-03 steam plant for reuse and is released to the SWMUs 03-012(b)/03-045(b) outfall. The outfall received effluent from two cooling towers (structures 03-0025 and -0058) and from the chlorine building (03-0024). Cooling tower 03-0025 was demolished in 1990, but the concrete foundation remains. Stormwater that collects in the concrete foundation of former cooling tower 03-0025 also flows to this outfall from pipe valves that previously were connected to the cooling system. Cooling tower 03-0058 remains and is inactive. From 1951 to 1985, treated effluent from the former TA-03 wastewater treatment plant (WWTP) was used in the two former cooling towers (03-0025 and 03-0058). Previously, chromates were used to treat cooling tower piping systems to inhibit corrosion; this practice ceased in the late 1970s. Cooling tower 03-0285 serves buildings 03-0132 and 03-1498. A new cooling tower (structure 03-0592) was constructed on the concrete pad of former cooling tower 03-0025 and although cooling tower 03-0058 was replaced, the new cooling tower was given the same structure number.

SWMU 03-014(q) is a holding tank, which receives blowdown from the boilers and wastewater from the water treatment area. Effluent is treated in the holding tank to adjust pH and hinder bacterial growth. Sulfuric acid or sodium hydroxide (as appropriate) is used to maintain a pH of 6 to 9. Effluent is dechlorinated before it is discharged into Sandia Canyon. Three uncontrolled releases of acidic wastewater to this outfall occurred on May 20 to May 21, 1990. Low potential of hydrogen (pH) values were observed in a 2.5-mi section of the watercourse below the outfall. Soda ash was added manually to the length of the watercourse, and a May 23, 1990, pH survey detected no pH measurements below 6.9. In compliance with the NPDES permits, the outfall effluent is monitored periodically for TSS, pH, and total chlorine.

SWMU 03-045(c) is a permitted outfall, located about 55 ft east of SWMU 03-012(b)/03-045(b). SWMU 03-045(c) receives effluent from a cooling tower (structure 03-0285), which serves the generators that power the Laboratory’s computer system. This outfall may have received chromate-treated water.

In 2002, soil samples were collected around the mesa-top structures of Consolidated Unit 03-012(b)-00 to characterize site conditions and waste before a gas turbine generator and associated utilities were installed. The sampling objective was to determine if any releases to the mesa-top soil occurred from the cooling towers. Sampling was conducted within the anticipated footprint of the proposed utility corridor for the new gas turbine cooling towers (Caporuscio 2003, 088444, pp. 1-2). Twenty-eight fill samples were collected from 14 locations at depths of 0 to 0.5 ft and 0.5 to 1 ft; 4 fill samples were collected at four locations from a depth of 0.5 to 1 ft. The samples were analyzed for metals and hexavalent chromium. Requested analyses are presented in Table 4.1-1.

The 2002 decision-level data are presented in Table 4.1-3. Sampling locations and detected results are shown in Figures 4.1-30, 4.1-31, and 4.1-32. Mercury was detected above BV in 1 fill sample; copper was detected above BV in 2 fill samples; cadmium was detected above BV in 3 samples; chromium, silver, and zinc were detected above BVs in 6, 5, and 10 fill samples, respectively. Hexavalent chromium was detected in 17 fill samples. Detection limits for antimony, cadmium, silver, and thallium were greater than BVs in one fill sample.

In 2004, 18 soil samples were collected from nine locations at the planned location of a new utility trench for the gas turbine generator. The sampling activities included the collection of surface and subsurface soil samples from the mesa top directly north and east of a former cooling tower (structure 03-0025). Sixteen samples were collected from eight locations at depths of 0 to 0.5 ft and 3.5 to 4 ft bgs; two samples were collected from a ninth location at depths of 0.8 to 1.3 ft and 1.8 to 2.8 ft bgs. All samples were analyzed for metals and hexavalent chromium. Four surface soil samples were also analyzed for PCBs (LANL 2003, 080102; LANL 2003, 100705, pp. 2–20). Requested analyses are presented in Table 4.1-1.

The 2004 decision-level data are presented in Tables 4.1-3 and 4.1-6. Sampling locations and detected results are shown in Figures 4.1-30, 4.1-31, and 4.1-32. Zinc was detected above BV in three samples. Chromium and silver were detected above BVs in four and five samples, respectively. Hexavalent chromium was detected in five samples. The detection limit for cadmium was greater than BV in numerous samples. Aroclor-1254 and Aroclor-1260 were detected in three and four samples, respectively.

Proposed sampling for this consolidated unit is provided in the following sections.

4.1.9.1 SWMU 03-012(b), Operational Release and Outfall

Site Description

SWMU 03-012(b) is the outfall associated with the TA-03 power plant, building 03-0022 (Figure 4.1-29). From 1951 to 1985, SWMU 03-012(b) discharged cooling water originating from treated effluent generated by the TA-03 WWTP (Consolidated Unit 03-014(a)-99). In the past, water from the WWTP was treated with chromates before it was used as cooling water at the power plant. The NPDES permit number for the outfall was previously identified as EPA 01A001, but is currently permitted as 001 on the 2007 NPDES authorization permit (EPA 2007, 099009). The outfall is currently authorized to discharge power plant wastewater from cooling towers, boiler blowdown drains, demineralizer backwash, floor and sink drains, and treated sanitary reuse to Sandia Canyon (EPA 2007, 099009, p. 1).The outfall discharges onto sand and gravel southeast of building 03-0022 and into a small tributary of Sandia Canyon. Discharge from another permitted outfall (13S) at the TA-46 SWSC plant is pumped to the TA-03 power plant for reuse and eventually discharges to SWMU 03-012(b). The outfall received effluent from two power plant cooling towers (structures 03-0025 and 03-0058) and the chlorine building (structure 03-0024). One cooling tower (structure 03-0025) was demolished in 1990, but until 1998, when a new cooling tower (structure 03-0592) was constructed at the same location (LANL 2008, 099214), the concrete foundation of structure 03-0025 collected stormwater that discharged to the outfall (LANL 1996, 052930, p. 56). The two cooling tower structures (03-0058 and 03-0592) are currently in operation and continue to discharge to SWMU 03-012(b) (LANL 2008, 099214).

A one-time release of sulfuric acid to the SWMU 03-012(b) outfall from the power plant holding tank, structure 03-0336 [SWMU 03-014(q)], occurred in 1990 (LANL 1995, 057590, p. 5-27-1). Low pH values were observed in a 2.5-mi section of the watercourse below the outfall. Soda ash was added along the watercourse to raise the pH. A subsequent survey detected no measurements below pH 6.9 (LANL 1996, 052930, p. 56).

Previous Investigations

RFI activities were conducted at SWMU 03-012(b) in 1994. Eleven soil and sediment samples were collected from five locations at a depth of 0 to 0.5 ft bgs. Four of the samples were collected from two locations (three from one location and one from another) near the outfall. Seven samples were collected from three downstream locations (three samples each from two locations and one from a third) to characterize the sediment in the outfall channel. All samples were submitted for laboratory analyses of PCBs, gross-alpha, -beta, and -gamma radiation, and tritium; eight samples were submitted for laboratory analysis of herbicides; five samples were submitted for laboratory analyses of inorganic chemicals, VOCs, SVOCs, pesticides, and gamma spectroscopy; one sample was submitted for laboratory analyses of isotopic plutonium, uranium, and strontium-90 (LANL 1996, 052930, pp. 57–60). Requested analyses are presented in Table 4.1-2.

Screening-level data are presented in Tables 4.1-11, 4.1-13, 4.1-14, and 4.1-15. Sampling locations are shown in Figures 4.1-30, 4.1-31, and 4.1-32 Arsenic, cadmium, lead, and nickel were detected in one sample above BVs. Chromium and silver were detected in two samples above BVs. Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, and total PCBs were detected in one sample. Fluoranthene was detected in two samples. Aroclor-1260 was detected in three samples. Plutonium-238, plutonium-239/240, uranium-234, uranium-235, and uranium-236 were detected above BVs/FVs in one sample. Tritium was detected in three samples.

Proposed Activities

The nature and extent of contamination have not been defined at this site because it is an active outfall. During the investigation, sampling will be conducted to identify if any contaminants are present below the outfall. Four sediment and soil samples will be collected from two locations at the outfalls for SWMUs 03-045(c) and 03-012(b) (Figure 4.1-33). Samples will be collected at two depths (0 to 1 ft and 1 to 2 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, cyanide, and PCBs. Sampling locations will be biased toward areas of sediment accumulation. No HE or radionuclides are associated with this SWMU; therefore, no samples will be analyzed for nitrate, perchlorate, or radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

In addition, samples will be collected upgradient of this SWMU as part of the investigation for SWMU 03-045(a). Samples will also be collected from the drainage upgradient and downgradient of this site as part of the Sandia Canyon and Cañada del Buey investigation work plan (LANL 1999, 064617). Section 6.3 provides additional information about the reach investigations to be conducted in Sandia Canyon. Data from the canyon reach sediment sampling locations will be assessed in the Upper Sandia Canyon Aggregate Area investigation report to confirm the nature and extent of contamination have been determined for this site.

4.1.9.2 SWMU 03-014(q), Holding Tank

Site Description

SWMU 03-014(q) (Figure 4.1-29) is the former effluent sewage storage tank (structure 03-0336) for the power plant (building 03-0022) (LANL 1990, 007511, p. 3-014). Between 1951 and 1985, the tank received and stored effluent from the former WWTP for use as cooling water for the power plant cooling towers (structures 03-0025 and 03-0058). The effluent was pumped to the holding tank and treated to hinder bacteria growth. In the past, chromates were used to treat the effluent (LANL 1993, 020947, p. 5-48).

Previous Investigations

Although samples have not been collected at this SWMU, soil and fill samples were collected within the vicinity of the SWMU during the 2002 and 2004 sampling activities for Consolidated Unit 03-012(b)-00, discussed in section 4.1.9. Requested analyses for sampling at Consolidated Unit 03-012(b)-00 are presented in Table 4.1-1. Data for Consolidated Unit 03-012(b)-00 are presented in Tables 4.1-3 and 4.1-6. Sampling locations and detected results for Consolidated Unit 03-012(b)-00 are shown in Figures 4.1-30, 4.1-31, and 4.1-32.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Therefore, six samples will be collected from three locations upgradient and downgradient of the holding tank at two depths (0 to 1 ft and 1 to 2 ft) and analyzed for inorganic chemicals and PCBs to confirm previous sampling results and characterize the site (Figure 4.1-33). Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.9.3 SWMU 03-045(b), Operational Release

SWMU 03-045(b) is a duplicate of SWMU 03-012(b). Section 4.1.9.1 provides further details.

4.1.9.4 SWMU 03-045(c), Outfall

Site Description

SWMU 03-045(c) is an NPDES-permitted outfall (EPA 03A027), located approximately 55 ft east of SWMU 03-012(b) (LANL 1996, 052930, p. 56) (Figure 4.1-29). SWMU 03-045(c) receives effluent from a cooling tower (structure 03-0285), which serves the generators that power The Laboratory’s computer system. SWMU 03-045(c) may have received chromate-treated water (LANL 1996, 052930, pp. 56–57). Outfall 03A027 is currently permitted for the discharge of cooling tower blowdown water and other wastewater from structure 03-0285 (EPA 2007, 099009).

Previous Investigations

Sampling has not been conducted at SWMU 03-045(c).

Proposed Activities

The nature and extent of contamination have not been defined at this site because it is an active outfall. Within this investigation sampling will be conducted to identify if any contaminants are present below the outfall. Eight sediment and soil samples will be collected from four locations along the drainage for SWMUs 03-045(c) and 03-012(b) (Figure 4.1-33). Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites. Section 4.1.9.1 provides further details on the proposed sampling.

In addition, samples will be collected both upgradient and downgradient of this SWMU as part of the investigation for SWMUs 03-045(a), 03-012(b), and 03-045(f). Sections 4.1.9.1, 4.1.29, and 4.1.31 provide further details. Samples will also be collected from the drainage downgradient of this site as part of the Sandia Canyon and Cañada del Buey investigation work plan (LANL 1999, 064617). Section 6.3 provides additional information about the reach investigations to be conducted in Sandia Canyon.

To complete the characterization of this site, additional sampling will be conducted when operations cease and the outfall becomes inactive.

4.1.10 Consolidated Unit 03-013(a)-00

Consolidated Unit 03-013(a)-00 consists of SWMUs 03-013(a) and 03-052(f) (Figure 4.1-35). SWMU 03-013(a) is a storm drain that served building 03-0038 (Figure 4.1-34); SWMU 03-052(f) is the associated outfall located northeast of building 03-0207 (Figure 4.1-35) that ultimately discharged into Sandia Canyon (LANL 1996, 052930, p. 73). SWMU 03-013(b) (building 03-0038 floor drains, discussed in section 4.11) formerly drained into SWMU 03-052(f) but was rerouted to the sanitary sewer system in 1987 (LANL 1995, 057590, p. 5-25-1).

Proposed sampling for this consolidated unit is provided in the following sections.

4.1.10.1 SWMU 03-013(a), Storm Drain

Site Description

SWMU 03-013(a) is a 1500-ft long corrugated metal pipe storm drain that served building 03-0038 (LANL 1996, 052930, p. 73) (Figures 4.1-34 and 4.1-35). The storm drain ran underground around building 03-0038, east along the south side of the Otowi Building (building 03-0261), and connected to four other storm drains before daylighting 100 ft east of the Otowi Building where it became an open concrete and rock-lined ditch (LANL 1993, 020947, p. 5 92). The open drain continued past transportable office buildings (buildings 03-1616 and 03-1617) and passed beneath streets and sidewalks to a point northeast of the Oppenheimer Study Center (structure 03-0207) where it discharged to former NPDES-permitted outfall EPA 03A023 [SWMU 03-052(f)] (Figure 4.1-35) before draining into Sandia Canyon (LANL 1993, 020947, p. 5-92).

Most of SWMU 03-013(a) was removed in 2004 to accommodate the construction of the NSSB and a new parking structure (LANL 2008, 099214). The corrugated metal pipe was managed as nonhazardous/nonradioactive industrial waste. Inspection of the drainline trench showed no evidence of a release from the drainpipe. A new storm drainline was installed west of SWMU 03-052(f) to manage stormwater runoff from the new NSSB parking structure.

Previous Investigations

RFI activities were conducted for SWMU 03-013(a) in the summer of 1994 as part of the RFI for Consolidated Unit 03-013(a)-00. Seven sediment samples (five samples plus one field duplicate and one collocated sample) were collected from five locations (at depths ranging from 0 to 0.6 ft) along the sides and within the SWMU 03-052(f) outfall channel 10 to 50 ft downstream from the outfall pipe (LANL 1995, 057590, p. 5-25-3). Sampling locations were biased to areas where sediment could be collected (LANL 1996, 052930, p. 75). Samples were field-screened and analyzed for gross-alpha, -beta, and -gamma radiation, tritium, inorganic chemicals, PCBs, VOCs, and SVOCs. Requested analyses are presented in Table 4.1-2.

Screening-level data are presented in Tables 4.1-11 and 4.1-14. Sampling locations are shown in Figures 4.1-36, 4.1-37, and 4.1-38. Chromium, copper, and mercury were detected above BVs in one sample. Lead was detected above BVs in three samples and zinc in six samples. Aroclor-1254 and total PCBs were detected in one sample. VOCs, SVOCs, and radionuclides were not detected.

The investigation also found low-level concentrations of polycyclic aromatic hydrocarbons (PAHs), which were attributed to runoff from the adjacent parking lot (LANL 1996, 052930, p. 82).

Proposed Activities

No sampling is proposed for SWMU 03-013(a) because most of this SWMU was excavated to accommodate the construction of the NSSB. Although the remaining portion of this drainline is inaccessible, SWMU 03-013(a) discharged to an associated storm drainage [SWMU 03-052(f)], which will investigated, as described in section 4.1.10.2.

4.1.10.2 SWMU 03-052(f), Outfall

Site Description

SWMU 03-052(f) is a formerly NPDES-permitted outfall (EPA 03A023) (Figure 4.1-35) that received wastewater from floor drains [AOC 03-013(b)], sinks, water fountains and a storm drain [SWMU 03-013(a)] that served building 03-0038 (Figure 4.1-34) until 1987 when the drains in building 03-0038 were rerouted to the TA-03 sanitary sewer system. Stoddard solvents, dry acid, and caustic materials from the maintenance shop were discarded through sinks and floor drains to this outfall. Spent paint solvents and cutting oils contaminated with machined beryllium particles may also have been released to the floor drains during the 1960s and 1970s. In addition, cooling water for welding torches was discharged directly to the drains. The first spill was approximately 200 gal. of water/waste oil mixture that was discharged when an automatic compressor blowdown mechanism failed. A second spill from a ruptured air-compressor oil line resulted in the release of approximately 1 qt of compressor oil to the drain. This spill produced an oily sheen on the surface of the water at the outfall (LANL 1995, 057590, p. 5-25-1). A third spill occurred when approximately 15 gal. of diesel fuel was released from a ruptured truck fuel line into the utilities construction trench between buildings 03-1793 and 03-1794. On the same day, a clay sewer pipe in the utility trench broke, releasing approximately 2000 gal. of wastewater into the excavation. A sump was used to remove the wastewater from the excavation and the wastewater was discharged to SWMU 03-052(f). The diesel-contaminated asphalt and soil was removed and disposed of at Sigma Mesa. Runoff from parking lots and the surrounding areas also discharge to the outfall (LANL 1995, 057590, p. 5-25-2). Outfall 03A023 was removed from the NPDES permit on July 11, 1997.

Previous Investigations

RFI activities conducted at SWMU 03-052(f) are the same activities conducted for SWMU 03-013(a), which was part of the 1994 RFI for Consolidated Unit 03-013(a)-00 (LANL 1996, 052930, pp. 73–74, 77). Sampling conducted for SWMU 03-013(a) is reported in section 4.1.10.1. Requested analyses are presented in Table 4.1-2. Data are presented in Tables 4.1-11 and 4.1-14. Sampling locations are shown in Figures 4.1-36, 4.1-37, and 4.1-38.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Fourteen sediment and soil samples will be collected at seven locations along the storm drainage to confirm previous sampling results and to define nature and extent of contamination (Figure 4.1-39). The samples will be collected at two depths (0 to 1 ft and 1 to 2 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, and radionuclides. No HE is associated with this SWMU; therefore, no samples will be analyzed for nitrate. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.11 AOC 03-013(b), Floor Drains

Site Description

AOC 03-013(b) consists of floor drains located in the basement of building 03-0038 (LANL 1993, 020947, p. 5-92) (Figure 4.1-35). The floor drains were located in the plasma-burning machine area, the metals-cutting room, and the pipe-fabrication shop. Until 1987, the floor drains emptied into a storm drain [SWMU 03-013(a)] (LANL 1993, 020947, p. 5-93). SWMU 03-013(b) ultimately discharged to the outfall at SWMU 03-052(f) (Figures 4.1-34 and 4.1-35) (LANL 1996, 052930, pp. 73–74). The piping for SWMU 03-013(b) was rerouted to the sanitary sewer line in 1987. During the 1960s and 1970s, spent paint solvents and cutting oils contaminated with machined beryllium particles may have been released to the floor drains.

Previous Investigations

RFI activities conducted at AOC 03-013(b) are the same activities conducted for SWMU 03-013(a), which was part of the 1994 RFI for Consolidated Unit 03-013(a)-00 (LANL 1996, 052930, pp. 73–74, 77). Sampling conducted for SWMU 03-013(a) is discussed in section 4.1.10.1. Requested analyses are presented in Table 4.1-2. Data are presented in Tables 4.1-11 and 4.1-14. Sampling locations are shown in Figures 4.1-36, 4.1-37, and 4.1-38.

Proposed Activities

No sampling is proposed for SWMU 03-013(b) because it was removed during the construction of the NSSB. SWMU 03-013(b) discharged to associated storm drainage [SWMU 03-052(f)] as described in section 4.1.10.2.

4.1.12 SWMU 03-013(i), Operational Release

Site Description

SWMU 03-013(i) is an area soil and gravel contamination from historical releases of hydraulic oil at buildings 03-0246 and 03-0247 (Figure 4.1-40). These buildings housed operations that involved testing the tensile strength of various steel cables used in conjunction with underground nuclear test assemblies. The cable control building (building 03-0246) and the cable stress building (building 03-0247) were collectively referred to as the Pull Test Facility. The facility was constructed before 1967 and operated until the mid-1980s when a replacement facility was constructed on Sigma Mesa. Building 03-0246 was constructed on a concrete slab that contained a hydraulic oil compressor and storage tank. Building 03-0247 was constructed on a concrete curb surrounding a gravel floor that contained two hydraulic rams used to perform the tensile strength testing. Hydraulic oil was provided to the rams through underground pipes between the buildings (LANL 2005, 091540, pp. 1-2).

Hydraulic oil is likely to have been released to the concrete slab floor inside building 03-0246 and subsequently flowed beneath the building walls and onto the soil surrounding the building. Soil staining was evident along the north side of the building and along the northeast and northwest corners. The gravel floor inside building 03-0247 was visibly stained with oil in several locations beneath the hydraulic ram assembly (LANL 2004, 087406, p. 1). Building 03-0247 and its contents were demolished and removed in 2005. The contents and the concrete slab of building 03-0246 were also demolished and removed in 2005. Following the demolition and removal of the concrete slab, approximately 144 ft^2 of contaminated soil was excavated from the footprint of building 03-0246. Following the demolition and removal of building 03-0247 and its gravel floor, an 8-in. concrete slab was exposed that was connected to the building foundation on the north and west sides. The slab was removed, and stained soil and debris were also removed from SWMU 03-013(i). Confirmation samples were collected at both locations after demolition and removal, and the excavation was backfilled and graded (LANL 2005, 091540, pp. 1-4).

Previous Investigations

Eight fill samples were collected from four locations following the excavation of the footprint of building 03-0246 from depths of 0 to 0.5 ft and at 1.5 ft bgs. Four confirmatory fill samples were also collected from two locations downgradient of former building 03-0246 at depths of 0 to 0.5 ft and at 1.5 ft bgs. Four additional fill samples were collected at two locations within the footprint of building 03-0247 at depths of 0 to 0.5 ft and at 1.5 ft bgs (LANL 2005, 091540, pp. 4–5). A total of 16 samples were submitted for laboratory analyses of inorganic chemicals, SVOCs, PCBs, TPH-DRO, and TPH-GRO. Each of the samples collected from 1.5 ft bgs were also submitted for VOCs. Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3, 4.1-4, 4.1-5, and 4.1-6. Sampling locations are shown in Figures 4.1-41 and 4.1-42. Barium, copper, and nickel were detected above BVs; antimony, lead, and zinc were detected above BVs in three, seven, and eight samples, respectively; cadmium was detected above BV in eight samples. The detection limits for cadmium were greater than BVs in three samples and the detection limit for selenium was greater that BV in most samples. Acenaphthene and butanone(2-) were detected in one sample. Acenaphthylene, anthracene, isopropyltoluene(4-), and methylnaphthalene(2-) were detected in two samples. Benzoic acid, bis(2-ethylhexly)phathalate, fluorene, and pyrene were detected in three samples. Acetone, fluoranthene, and phenanthrene were detected in four samples. Aroclor-1260 and Aroclor-1254 were detected in 10 and 12 samples, respectively. TPH-GRO and TPH-DRO were detected in 10 and 16 samples, respectively.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Thirty-two soil samples will be collected from 16 locations from two depths (0 to 1 ft and 4 to 5 ft) to define the extent of contamination (Figure 4.1-43). Samples will be submitted for analyses of inorganic chemicals, VOCs, SVOCs, TPH-DRO, cyanide, and PCBs. No HE or radionuclides are associated with this SWMU; therefore, no samples will be analyzed for nitrate, perchlorate, or radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.13 Consolidated Unit 03-014(a)-99

Consolidated Unit 03-014(a)-99 consists of 20 of the 30 SWMUs and AOCs associated with the former WWTP that operated at TA-03 from 1951 to 1992, until the Laboratory's SWSC Plant became active in 1992 (LANL 1993, 020947, p. 5-46). The former WWTP is adjacent to and east of the utilities control center (building 03-0223) on the southern rim near the head of Sandia Canyon. The WWTP served TA-03, TA-43, TA-59, and TA-60, the trailer park on West Jemez Road, and holding tank and septic system wastes throughout the Laboratory. The WWTP also began treating sanitary wastes from TA-02 and TA-41 in 1990 and TA-21 in 1992. The WWTP had two parallel systems, the north plant (Plant 1) built in 1951, and the south plant (Plant 2) built in 1964. Each system consisted of entrance works, Imhoff tanks, dosing siphons, trickling filters, and final clarifying tanks. The plants were different in some physical dimensions but essentially functioned identically. The WWTP was designed with a 750,000 gal./d combined capacity (LANL 1993, 020947, p. 5-45). Although no longer operational, many of the structures associated with the SWMUs and AOCs of Consolidated Unit 03-014(a)-99 are still present, the locations of which are shown in Figure 4.1-44.

Upon entering each plant, raw sewage was first metered at a splitter box (structure 03-0677), where the flow was diverted to either Plant 1 or Plant 2. The water passed through a comminutor that shredded large solid material. Manually cleaned bar racks were available for both plants when the comminutors were down for repair. Effluent flow was approximately 150,000 gal./d (LANL 1993, 020947, pp. 5-45–5-47). The splitter box, comminutor, and bar racks are collectively identified as SWMU 03-014(i) (LANL 1993, 020947, p. 5-46).

Water passed from the entrance works directly to the Imhoff tanks, structures 03-0049 and 03-0192 [SWMUs 03-014(a) and 03-014(e)], which functioned as settling/digestion tanks. Effluent water flowed from the Imhoff tanks to dosing siphons, structures 03-0048 and 03-0193 [SWMUs 03-014(b) and 03-014(f)], then to the trickling filters, structures 03-0047 and 03-0194 [SWMUs 03-014(c) and 03-014(g)], where organic waste was biologically digested through bacterial growth on rock media (LANL 1993, 020947, p. 5-47). Material sloughed from the trickling filter media settled in final clarifying tanks, structures 03-0046 and 03-0195 [SWMUs 03-014(d) and 03-014(h)]; the resulting sludge was then recirculated back to the head of the plant to allow solids to settle out in the Imhoff tanks (LANL 1993, 020947, p. 5-47).

Sludge collected in the Imhoff tanks was ultimately siphoned to four sludge drying beds, structures 03-0196, 03-0197, 03-0198, and 03-0199 [SWMUs 03-014(k), 03-014(l), 03-014(m), and 03-014(n)] located immediately north of the Imhoff tanks. Three of the four beds were used for sludge drying, while the fourth was used as a skimmer bed. Overflow sludge was directed to three additional sludge drying beds, structure 03-1871 [SWMU 03-014(o)], located north and downslope of the four sludge drying beds, and west of the chlorine contact chamber [SWMU 03-014(j)] (LANL 1993, 020947, p. 5-47). The four sludge drying beds, constructed in 1965, are referred to as the “upper beds,” while the other three sludge drying beds, constructed in 1987, are referred to as the “lower beds” (LANL 1993, 020947, p. 5-46; LANL 1997, 056660.4, p. 57).

Effluent from the sludge beds flowed from a subsurface drain system to a holding tank, structure 03-1901 [SWMU 03-014(u)]. The contents of the tank were recirculated by truck to the head of the plant for additional treatment. From the late 1950s to the late 1970s, dried sludge was added to the soil around the entrance works as a soil amendment (LANL 1993, 020947, p. 5-47).

Additional AOCs and SWMUs addressed as part of Consolidated Unit 03-014(a)-99 include AOCs 03-014(b2) and 03-014(c2), historical outfalls associated with the former WWTP; SWMU 03-014(p), a lift station associated with the former WWTP; and SWMU 03-056(d), a drum storage area located on the north side and adjacent to SWMU 03-14(c) trickling filter (structure 03-0047).

RFI activities were performed at the former WWTP in 1994 and 1997. In 1994, the area around the Imhoff tanks and the two historical outfalls were sampled. The Imhoff tanks were sampled because treated sludge was directly applied to the soil in the grassy areas around the tanks. The historical outfalls [AOC 03-014(b2) and AOC 03-014(c2)] were sampled because AOC 03-014(b2) was an active outfall for the WWTP, and AOC 03-014(c2) was believed to be an out-of-service outfall trench but was subsequently identified as a storm drain trench and overflow outlet pipe outfall (LANL 1996, 052930, p. 83). In 1997, the sludge drying beds [SWMUs 03-014(k), 03-014(l), 03-014(m), and 03-014(o)] were sampled. SWMU 03-014(n) was scheduled for sampling; however, oil was discovered in the bed, which was subsequently remediated in early September 1997 (LANL 1997, 056660.4, p. 60). RFI activities for SWMUs and AOCs in Consolidated Unit 03-014(a)-99 are discussed in more detail in sections 4.1.13.1 to 4.1.13.20.

Proposed sampling for this consolidated unit is provided in the following sections. Samples will be collected beneath existing structures associated with SWMUs 03-014(a,b,c,d,e,g,h,i,p) following D&D.

4.1.13.1 SWMU 03-014(a), Structure Associated with Former WTTP

Site Description

SWMU 03-014(a) is the Imhoff tank (structure 03-0049) for Plant 1 of the former WWTP (Figure 4.1-44). Water and effluent passed from the entrance works directly to the Imhoff tank, which functioned as a settling/digestion tank (LANL 1993, 020947, p. 5-47).

Previous Investigations

A Phase I RFI was performed at SWMUs 03-014(a) and 03-014(e) (section 4.1.13.7) in 1994. The area around these SWMUs (structures 03-0049 and 03-0192) was sampled to determine whether contaminants were released as a result of the application of sludge to the soil or from tank overflow (LANL 1996, 052930, p. 85).

Twelve soil samples (including two duplicates) were collected from five locations between and downgradient of the SWMUs. Two samples were collected from each location at depths of 0 to 1 ft bgs and 1 to 1.5 ft bgs. Samples from the 0- to 1-ft interval were submitted for laboratory analyses of inorganic chemicals, SVOCs, PCBs, pesticides, herbicides, gross-alpha, -beta, and -gamma radiation, gamma spectroscopy, isotopic plutonium and uranium, and tritium. Samples from the 1- to 1.5-ft interval were submitted for laboratory analyses of cyanide, VOCs, gross-alpha, -beta, and -gamma radiation, and tritium (LANL1996, 052930, p. 85). Requested analyses are presented in Table 4.1-2.

Screening-level data are presented in Tables 4.1-11, 4.1-14, and 4.1-15. Sampling locations are shown in Figures 4.1-45, 4.1-46, and 4.1-47. Cyanide was detected above BV in three samples. Cadmium, chromium, copper, lead, mercury, silver, and zinc were each detected above BVs in five samples. Aroclor-1260 was detected in four samples at concentrations less than 1 ppm. Americium-241, uranium-235, and uranium-238 were detected above BVs/FVs in one sample. Uranium-234 was detected above BV/FV in four samples. Plutonium-239/240 and plutonium-238 and were detected above BVs/FVs in four and five samples, respectively. VOCs, SVOCs, pesticides, and herbicides were not detected.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Fifteen soil samples will be collected from five locations to confirm the results of previous sampling events and to define the extent of contamination for SWMUs 03-014(a), 03-014(b), 03-014(e), and 03-014(f) because of their close proximity (Figure 4.1-48). The samples will be collected from three depths (0 to 1 ft, 1 to 2 ft, and soil/tuff interface) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, nitrate, and radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.13.2 SWMU 03-014(b), Structure Associated with Former WWTP

Site Description

SWMU 03-014(b) is the dosing siphon (structure 03-0048) for Plant 1 of the former WWTP (Figure 4.1-44). Effluent from the Imhoff tank (structure 03-0049) flowed to the dosing siphon, which dispersed accumulated effluent water in an amount sufficient to run the trickling filter (structure 03-0047) rotary arms. The dosing siphon maintained the moisture throughout the trickling filter's rock media beds (LANL 1993, 020947, p. 5-47).

Previous Investigations

SWMU 03-014(b) was not specifically sampled as part of historical RFI activities, but soil samples collected as part of the 1994 RFI activities for SWMUs 03-014(a) and 03-014(e) were within the vicinity of SWMU 03-014(b). Samples for SWMU 03-014(a) are discussed in section 4.1.13.1. Requested analyses are presented in Table 4.1-2. Data are presented in Tables 4.1-11, 4.1-14, and 4.1-15. Sampling locations are shown in Figures 4.1-45, 4.1-46, and 4.1-47.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Fifteen soil samples will be collected from five locations to confirm the results of previous sampling events and to define the extent of contamination for SWMUs 03-014(a), 03-014(b), 03-014(e), and 03-014(f) because of their close proximity (Figure 4.1-48). Section 4.1.13.1 provides more detailed information regarding the proposed sampling for the four SWMUs. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.13.3 AOC 03-014(b2), Outfall

Site Description

AOC 03-014(b2) is a former NPDES-permitted outfall (EPA SSSO1S) for the former WWTP (Figures 4.1-45, 4.1-46, and 4.1-47). The outfall received treated effluent from a flow-measurement weir north of the WWTP chlorination system [SWMU 03-014(j), see section 4.1.13.12] dosing and contact chamber via a 1.5-ft-diameter × 300-ft-long corrugated metal pipe. The outfall discharged to a rocky outcrop at the edge of Sandia Canyon (LANL 1993, 020947, p. 5-49). Outfall SSS01S was permitted for the discharge of wastewater and was removed from the NPDES permit in 1994 (LANL 1999, 064617, p. 27).

AOC 03-014(b2) received effluent from the former WWTP from 1989 to 1992, when the WWTP was decommissioned. AOC 03-014(b2) received treated effluent from the SWSC plant at TA-46 from 1992 to 1998, when the effluent was switched to the outfall at the power plant, building 03-0027. AOC 03-014(b2) was monitored 3 times per month for biochemical oxygen demand, total suspended solids (TSS), pH, fecal coliform, total chlorine, and radioactive constituents. From 1989 to 1993, radioactive constituents were reported over the detection limits (LANL 1993, 020947, p. 5-49).

Previous Investigations

A Phase I RFI was conducted at AOC 03-014(b2) in 1994 to determine whether discharge to the outfall resulted in the release of any contaminants to the site. Twelve sediment samples were collected from four locations along the outfall channel and in the outfall flow path in areas where sediment accumulated. Samples were submitted for laboratory analyses of inorganic chemicals, VOCs, SVOCs, PCBs, pesticides, herbicides, gross-alpha, -beta, and -gamma radiation, gamma spectroscopy, and tritium (LANL 1996, 052930, pp. 95–98). Requested analyses are presented in Table 4.1-2.

Screening-level data are presented in Tables 4.1-11, 4.1-12, 4.1-13, and 4.1-15. Sampling locations are shown in Figures 4.1-45, 4.1-46, and 4.1-47. Chromium was detected above BV in one sample. Lead and silver were detected above BVs in two samples. The analytes 4-isopropyltoluene, toluene, and bis(2-ethylhexyl)phthalate were detected in one sample. Cesium-137 was detected above BV/FV in one sample. Cobalt-60 was detected in one sample. Gross-alpha and -beta radiation were detected in four samples.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Ten soil samples will be collected from five locations to confirm the results of previous sampling events and to define the extent of contamination between the AOC and the Sandia Canyon reach S-1 (Figure 4.1-48). The samples will be collected from two depths (0 to 1 ft and 1 to 2 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, nitrate, and radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

In addition, samples will be collected from the drainage downgradient of this site as part of the Sandia Canyon and Cañada del Buey investigation work plan (LANL 1999, 064617); data will be provided in an investigation report to be submitted to NMED in December 2008. Data from the sediment sampling locations will be assessed in the Upper Sandia Canyon Aggregate Area investigation report to confirm the nature and extent of contamination have been determined for SWMU 03-014(b2).

4.1.13.4 SWMU 03-014(c), Structure Associated with Former WWTP

Site Description

SWMU 03-014(c) is the trickling filter (structure 03-0047) for Plant 1 of the former WWTP (Figure 4.1-44). The trickling filter received effluent from the Imhoff tank (structure 03-0049) and dosing siphon (structure 03-0048) where organic waste was digested through bacterial growth on filter media. The filter bed is 72 ft in diameter × 6 ft deep with a design capacity of 325,000-gal./d (LANL 1993, 020947, p. 5-47).

Previous Investigations

SWMU 03-014(c) has not been sampled.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Three samples will be collected from one location between SWMUs 03-014(c) and 03-014(g) to characterize the site (Figure 4.1-48). The samples will be collected from three depths (at the base of the tank, at the soil/tuff interface, and 5 ft below the soil/tuff interface) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, nitrate, and radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.13.5 AOC 03-014(c2), Outfall

Site Description

AOC 03-014(c2) is an overflow outfall that formerly received treated effluent from the former WWTP from 1975 until the WWTP chlorination system [SWMU 03-014(j), see section 4.1.13.12] was constructed in

1985 (LANL 1993, 020947, pp. 5-48–5-49). The outfall was located on the north side of the chlorination system pump pit (structure 03-0166) (Figures 4.1-45, 4.1-46, and 4.1-47). Effluent for this outfall discharged as sheet flow onto a steep slope containing an erosion channel from stormwater runoff. The channel eventually trends northeast into Sandia Canyon. Soil and sediment were occasionally cleaned out of the channel with a backhoe and piled onto the upslope channel bank (LANL 1996, 052930, p. 103). Following the construction of the chlorination system, the outfall was rerouted underground from the pump pit (structure 03-0166) to the chlorination dosing and contact chamber where the final effluent discharged freely into Sandia Canyon from a flow measurement weir north of the contact chamber. This outfall was abandoned in 1988 or 1989, when the WWTP effluent was routed to a new outfall, AOC 03-014(b2) (section 4.1.13.3) (LANL 1993, 020947, p. 5-49).

An evaluation of the former WWTP blueprints during 1994 RFI activities identified the location of the original treated effluent outfall approximately 20 to 30 ft west of the original AOC 03-014(c2) outfall (LANL 1996, 052930, p. 116).

Previous Investigations

A Phase I RFI was conducted at AOC 03-014(c2) in 1994. The sampling strategy was designed to determine whether discharge from the pump pit (structure 03-0166) overflow pipe resulted in the release of contaminants. Twenty sediment samples (including one duplicate) were collected at nine locations from depths of 0 to 1 ft bgs and 1 to 1.5 ft bgs. Samples from the 0- to 1-ft interval were submitted for laboratory analyses of inorganic chemicals, SVOCs, PCBs, pesticides, herbicides, gross-alpha, -beta, and -gamma radiation, gamma spectroscopy, isotopic plutonium and uranium, strontium-90, and tritium. Samples from the 1- to 1.5-ft interval were submitted for laboratory analyses of cyanide, VOCs, gross-alpha, -beta, and -gamma radiation, and tritium (LANL 1996, 052930, p. 106). Requested analyses are presented in Table 4.1-2.

Screening-level data are presented in Tables 4.1-11, 4.1-13, 4.1-14, and 4.1-15. Sampling locations are shown in Figures 4.1-45, 4.1-46, and 4.1-47. Calcium and zinc were detected above BVs in one sample. Lead and nickel were detected above BVs in three samples. Cadmium, chromium, copper, cyanide, mercury, and silver were detected above BVs in six samples. Benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were detected in one sample. Aroclor-1260 was detected in eight samples below 1 ppm. Plutonium 239/240 and plutonium-238 were detected above BVs/FVs in one and six samples, respectively. Europium-152 and tritium were detected in two samples. VOCs, pesticides, and herbicides were not detected.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Ten samples will be collected from five locations to characterize the drainage, confirm the results of previous sampling event, and to define the extent of contamination (Figure 4.1-48). The samples will be collected from two depths (0 to 1 ft and 1 to 2 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, nitrate, and radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

In addition, six samples will be collected at three locations in the northern polygon and associated drainage to confirm the results of previous sampling event (Figure 4.1-48). Samples will be collected at two depths (0 to 1 ft and 2 to 3 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, nitrate, and radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

In addition, sediment samples will be collected from the drainage downgradient of this site as part of the Sandia Canyon and Cañada del Buey investigation work plan (LANL 1999, 064617); data will be provided in an investigation report to be submitted to NMED in December 2008. Section 6.3 provides additional information about the reach investigations to be conducted in Sandia Canyon. Data from the canyon sediment sampling locations will be assessed in the Upper Sandia Canyon Aggregate Area investigation report to confirm the nature and extent of contamination have been determined for SWMU 03-014(c2).

4.1.13.6 SWMU 03-014(d), Structure Associated with Former WWTP

Site Description

SWMU 03-014(d) is the secondary clarifier (structure 03-0046) for Plant 1 of the former WWTP (Figure 4.1-45). Material sloughed from the trickling filter media settled in the secondary clarifying tank. The resulting sludge was subsequently recirculated back to the head of the plant (LANL 1993, 020947, p. 5-47).

Previous Investigations

SWMU 03-014(d) has not been sampled.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Nine soil samples will be collected from three locations to characterize SWMUs 03-014(d) and 03-014(h) (Figure 4.1-48). The samples will be collected from three depths (at the base of the tank, at the soil/tuff interface, and 5 ft below the soil/tuff interface) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, nitrate, and radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.13.7 SWMU 03-014(e), Structure Associated with Former WWTP

Site Description

SWMU 03-014(e) is the Imhoff tank (structure 03-0192) for Plant 2 of the former WWTP (Figure 4.1-45). Water and effluent passed from the entrance works directly to the Imhoff tank, which functioned as a settling/digestion tank (LANL 1993, 020947, p. 5-47).

Previous Investigations

A Phase I RFI was performed at SWMUs 03-014(e) and 03-014(a) (section 4.1.13.1) in 1994. The area around the Imhoff tanks, structures 03-0192 and 03-0049, were sampled to determine whether contaminants were released to the environment as a result of applying sludge to the soil or from tank overflow (LANL 1996, 052930, p. 85).

The 1994 RFI sampling activities and results relevant to SWMU 03-014(e) are discussed in section 4.1.13.1. Requested analyses are presented in Table 4.1-2. Data are presented in Tables 4.1-11, 4.1-14, and 4.1-15. Sampling locations are shown in Figures 4.1-45, 4.1-46, and 4.1-47.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Fifteen soil samples will be collected from five locations to confirm the results of previous sampling events and to define the extent of contamination for SWMUs 03-014(a), 03-014(b), 03-014(e), and 03-014(f) because of their close proximity (Figure 4.1-48). Section 4.1.13.1 provides more detailed information regarding the proposed sampling for the four SWMUs. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.13.8 SWMU 03-014(f), Structure Associated with Former WWTP

Site Description

SWMU 03-014(f) is the dosing siphon (structure 03-0193) for Plant 2 of the former WWTP (Figure 4.1-44). Effluent from the Imhoff tank (structure 03-0192) flowed to the dosing siphon, which dispersed, accumulated effluent water in an amount sufficient to run the trickling filter (structure 03-0194) rotary arms. The dosing siphon maintained the moisture throughout the trickling filter's rock media beds (LANL 1993, 020947, p. 5-47).

Previous Investigations

SWMU 03-014(f) was not specifically sampled as part of historical RFI activities, but samples collected from SWMUs 03-014(a) (section 4.1.13.1) and 03-014(e) are within the vicinity of SWMU 03-014(f). Requested analyses for SWMU 03-014(a) are presented in Table 4.1-2. Data are presented in Tables 4.1-11, 4.1-14, and 4.1-15. Sampling locations are shown in Figures 4.1-45, 4.1-46, and 4.1-47.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Fifteen soil samples will be collected from five locations to confirm the results of previous sampling events and to define the extent of contamination for SWMUs 03-014(a), 03-014(b), 03-014(e), and 03-014(f) because of their close proximity (Figure 4.1-48). Section 4.1.13.1 provides more detailed information regarding the proposed sampling for the four SWMUs. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.13.9 SWMU 03-014(g), Structure Associated with Former WWTP

Site Description

SWMU 03-014(g) is the trickling filter (structure 03-0194) for Plant 2 of the former WWTP (Figure 4.1-44). The trickling filter received effluent from the Imhoff tank (structure 03-0192) and dosing siphon (structure 03-0193) where organic waste was digested through bacterial growth on filter media. The filter bed is 72 ft in diameter × 6 ft deep with a design capacity of 325,000-gal./d (LANL 1993, 020947, p. 5-47).

Previous Investigations

SWMU 03-014(g) has not been sampled.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Three soil samples will be collected from one location between SWMUs 03-014(c) and 03-014(g) to confirm that a release of contaminants did not occur (Figure 4.1-48). The samples will be collected from three depths (at the base of the tank, at soil/tuff interface, and 5 ft below interface) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, and radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.13.10 SWMU 03-014(h), Structure Associated with Former WWTP

Site Description

SWMU 03-014(h) is the secondary clarifier (structure 03-0195) for Plant 2 of the former WWTP (Figure 4.1-44). Material sloughed from the trickling filter media settled in the secondary clarifying tank where resulting sludge was subsequently recirculated back to the head of the plant (LANL 1993, 020947, p. 5-47).

Previous Investigations

SWMU 03-014(h) has not been sampled.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Nine soil samples will be collected from three locations to characterize SWMUs 03-014(d) and 03-014(h) (Figure 4.1-48). Section 4.1.13.6 provides more detailed information regarding the proposed sampling. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.13.11 SWMU 03-014(i), Structure Associated with Former WWTP

Site Description

SWMU 03-014(i) consists of three structures: a splitter box (structure 03-0677) where raw sewage is first metered and split between Plant 1 or Plant 2, a comminutor where large objects and material are shredded, and a bar screen. These structures were built in 1951 (LANL 1993, 020947, pp. 5-45–5-47) (Figure 4.1-44).

Previous Investigations

SWMU 03-014(i) has not been sampled.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Twelve soil samples will be collected from three locations to characterize the site (Figure 4.1-48). The samples will be collected from four depths (0 to 1 ft, at the base of the structure, at the soil/tuff interface, and 5 ft below the soil/tuff interface) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, nitrate, and radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.13.12 SWMU 03-014(j), Structure Associated with Former WWTP

Site Description

SWMU 03-014(j), the chlorination system for the former WWTP, consists of two structures: a pump pit, structure 03-2209 (formerly indentified as structure 03-0166), and a dosing and contact chamber. Both structures are located approximately 100 ft north of structure 03-0166 (Figure 4.1-44). The pump pit is a 9-ft × 11-ft × 10-ft-deep concrete pit that contains an effluent pump with a steel grating cover. The dosing and contact chamber is a 15-ft × 15-ft × 6-ft concrete pit with a concrete flow weir that is 225 ft^2 (LANL 1990, 007511, p. 3-014). When the chlorination system became active in 1985, SWMU 03-014(c2), the original WWTP outfall, was abandoned (LANL 1993, 020947, p. 5-49).

Previous Investigations

SWMU 03-014(j) has not been sampled.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Six samples will be collected from two locations to define nature and extent of contamination at the pump pit (Figure 4.1-48). The samples will be collected from three depths (at the base of the structure, at soil/tuff interface, and 5 ft below interface). An additional two samples will be collected from one location at the contact chamber to define nature of potential contamination. These samples will be collected from two depths (0 to 1 ft and at the soil/tuff interface) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, nitrate, and radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.13.13 SWMU 03-014(k), Structure Associated with Former WWTP

Site Description

SWMU 03-014(k), structure 03-0196, is one of four unlined sludge-drying beds [SWMUs 03-014(k), 03-014(l), 03-014(m), and 03-014(n)] located north of the Imhoff tanks (Figure 4.1-44). These beds received sludge siphoned from the Imhoff tanks. Three of the four beds were used for drying sludge, while the fourth bed, SWMU 03-014(n), was used as a skimmer bed (LANL 1993, 020947, pp. 5-46–5-47).

SWMU 03-014(k) consists of an unlined sludge-drying bed excavated into the tuff. The sludge bed measures 35 ft × 10 ft (LANL 1990, 007511, p. 3-014). A 3-ft-high soil berm covered with 2 in. of asphalt separates the upper beds. The asphalt is broken and cracked in various places, exposing the underlying soil/tuff (LANL 1997, 056660.4, p. 58).

Previous Investigations

A Phase I RFI was conducted in 1997 at SWMU 03-014(k). One sampling location was selected for SWMU 03-014(k) near the inlet pipes on the south side of the drying bed. Three samples were collected from three depths: one from filter (fill) material within the bed and two from successive 1-ft intervals (in tuff) beneath the bed. All samples were submitted for laboratory analyses of inorganic chemicals, SVOCs, PCBs, pesticides, herbicides, isotopic plutonium and uranium, strontium-90, and tritium. One tuff sample was also submitted for laboratory analysis of VOCs. Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Table 4.1-3. Sampling locations and detected results are shown in Figures 4.1-45, 4.1-46, and 4.1-47. Mercury and silver were detected above BVs in the fill sample; copper was detected above BV in one tuff sample; chromium, nickel, and zinc were detected above BVs in the two tuff samples. The detection limits for antimony and cadmium were greater than BVs in several samples. Organic chemicals and radionuclides were not detected.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Ten samples will be collected from historical sampling locations 03-03264, 03-03265, 03-03266, 03-03201, and 03-03202 to confirm the results of the previous sampling event and to define the vertical extent of contamination within and beneath the beds at SWMUs 03-014(k) to 03-014(n) (Figure 4.1-48). The samples will be collected from two depths (4 to 5 ft and 6 to 7 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, nitrate, tritium, and radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

An additional 16 soil samples will be collected from four locations around and downgradient of SWMUs 03-014(k) to 03-014(n) (Figure 4.1-48). The samples will be collected from four depths (0 to 1 ft bgs, 0 to 1 ft beneath the sand and gravel layer at the base of bed, at bed/tuff interface, and 5 ft below the bed/tuff interface) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, nitrate, tritium, and radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.13.14 SWMU 03-014(l), Structure Associated with Former WWTP

Site Description

SWMU 03-014(l), structure 03-0197, is one of four unlined sludge-drying beds [SWMUs 03-014(k), 03-014(l), 03-014(m), and 03-014(n)] located north of the Imhoff tanks (Figure 4.1-44) that received sludge siphoned from the Imhoff tanks (LANL 1993, 020947, pp. 5-46–5-47). SWMU 03-014(l) consists of an unlined sludge drying bed excavated into the tuff. The sludge bed measures 40 ft × 20 ft (LANL 1990, 007511, p. 3-014). A 3-ft-high soil berm covered with 2 in. of asphalt separates the upper beds. The asphalt is broken and cracked in various places exposing the underlying soil/tuff (LANL 1997, 056660.4, p. 58).

Previous Investigations

A Phase I RFI was conducted in 1997 at SWMU 03-014(l). One sampling location was selected from the middle of the drying bed SWMU 03-014(l). Three samples were collected from three depth intervals at the sampling location: one from filter (fill) material within the bed and two from successive 1-ft intervals (in tuff) beneath the bed. All samples were submitted for laboratory analyses of inorganic chemicals, SVOCs, PCBs, pesticides, herbicides, isotopic plutonium and uranium, strontium-90, and tritium. One tuff sample was also submitted for laboratory analysis of VOCs. Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3, 4.1-4, 4.1-6, and 4.1-7. Sampling locations and detected results are shown in Figures 4.1-45, 4.1-46, and 4.1-47. Copper, mercury, and silver were each detected above BVs in the fill sample; copper and nickel were detected above BVs in one tuff sample; chromium was detected above BV in the two tuff samples. The detection limits for antimony and cadmium were greater than BVs. Toluene was detected in one tuff sample and Aroclor-1254 was detected in the fill sample. Tritium was detected in one tuff sample. Pesticides herbicides, isotopic plutonium and uranium, and strontium-90 were not detected.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Ten samples will be collected from historical sampling locations 03-03264, 03-03265, 03-03266, 03-03201, and 03-03202 within and beneath the beds at SWMUs 03-014(k) to 03-014(n). An additional 16 soil samples will be collected from four locations around and downgradient of SWMUs 03-014(k) to 03-014(n) (Figure 4.1.48). Section 4.1.13.13 provides more detailed information regarding the proposed sampling. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.13.15 SWMU 03-014(m), Structure Associated with Former WWTP

Site Description

SWMU 03-014(m), structure 03-0198, is one of four unlined sludge-drying beds [SWMUs 03-014(k), 03-014(l), 03-014(m), and 03-014(n)] located north of the Imhoff tanks (Figure 4.1-44) (LANL 1993, 020947, pp. 5-46–5-47). SWMU 03-014(m) consists of an unlined sludge drying excavated into the tuff. The sludge bed measures 40 ft × 20 ft (LANL 1990, 007511, p. 3-014). A 3-ft-high soil berm covered with 2 in. of asphalt separates the upper beds. The asphalt is broken and cracked in various places, exposing the underlying soil/tuff (LANL 1997, 056660.4, p. 58).

Previous Investigations

A Phase I RFI was conducted in 1997 at SWMU 03-014(m). Ten samples were collected from three locations. At one location, one sample was collected from filter (fill) material within the bed, and two samples were collected from successive 1-ft intervals (in tuff) beneath the bed. All samples from this location were submitted for laboratory analyses of inorganic chemicals, SVOCs, PCBs, herbicides, pesticides, isotopic plutonium and uranium, strontium-90, and tritium. One tuff sample from this location was also submitted for laboratory analysis of VOCs. Filter material samples were collected from the second locations at three successive 0.5-ft intervals and submitted for laboratory analyses of SVOCs and PCBs. Filter material samples were collected from the final location at four successive 6-in. intervals and submitted for laboratory analyses of SVOCs and PCBs. Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3, 4.1-5, and 4.1-6. Sampling locations and detected results are shown in Figures 4.1-45, 4.1-46, and 4.1-47. Cadmium, chromium, copper, lead, mercury, silver, and zinc were detected above BVs in one fill sample; copper was detected above BV in one tuff sample; and chromium and nickel were detected above BVs in the two tuff samples. The detection limits for antimony were greater than BV in all samples. Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, carbazole, chrysene, dibenz(a,h)anthracene, dibenzofuran, dichlorobenzene(1,4-), fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, napthalene, phenanthrene, pyrene, and Aroclor-1254 were detected in one fill sample. Aroclor-1260 was detected in three fill samples. Herbicides, pesticides, isotopic plutonium and uranium, strontium-90, and tritium were not detected.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Ten samples will be collected from historical sampling locations 03-03264, 03-03265, 03-03266, 03-03201, and 03-03202 within and beneath the beds at SWMUs 03-014(k) to 03-014(n). An additional 16 soil samples will be collected from four locations around and downgradient of SWMUs 03-014(k) to 03-014(n) (Figure 4.1-48). Section 4.1.13.13 provides more detailed information regarding the proposed sampling. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.13.16 SWMU 03-014(n), Structure Associated with Former WWTP

Site Description

SWMU 03-014(n), structure 03-0199, is one of four unlined sludge-drying beds [SWMUs 03-014(k), 03-014(l), 03-014(m), and 03-014(n)] located north of the Imhoff tanks (Figure 4.1-44) (LANL 1993, 020947, pp. 5-46, 5-47). SWMU 03-014(n) consists of an unlined sludge drying bed excavated into the tuff. The bed measures 40 ft × 20 ft (LANL 1990, 007511, p. 3-014). A 3-ft-high soil berm covered with 2 in. of asphalt separates the upper beds. The asphalt is broken and cracked in various places, exposing the underlying soil/tuff (LANL 1997, 056660.4, p. 58).

Previous Investigations

During RFI sampling activities at SWMU 03-014(n), oil was discovered in the bed, which was subsequently remediated in September 1997 (LANL 1997, 056660.4, p. 60). Four samples were collected from two locations. At the first location, one sample was collected from the filter (fill) material within the bed, and two samples were collected from successive 1-ft intervals (in tuff) beneath the bed; each of these samples was submitted for laboratory analyses of inorganic chemicals, VOCs, SVOCs, PCBs, herbicides, pesticides, TPH-DRO, isotopic plutonium and uranium, strontium-90, and tritium. At the second location, one sample was collected from the filter material and submitted for laboratory analyses of inorganic chemicals, VOCs, SVOCs, herbicides, pesticides, and TPH-DRO, Four additional soil, fill, and sludge samples were collected from a depth of 0 to 0.5 ft bgs following remediation activities and submitted for analysis of TPH-DRO. Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3, 4.1-4, 4.1-5, 4.1-6, and 4.1-9. Sampling locations and detected results are shown in Figures 4.1-45, 4.1-46, and 4.1-47. Antimony, barium, cadmium, calcium, chromium, lead, and nickel were detected above BVs in one fill sample. Copper, mercury, silver, and zinc were detected above BVs in two fill samples. Chromium, mercury, nickel, and silver were detected above BVs in one tuff sample. Copper was detected above BV in two tuff samples. The detection limits for antimony and selenium were greater than BVs in the tuff samples. Acetone was detected in one fill and one tuff sample; butylbenzylphthalate was detected in one fill sample; and bis(2-ethylhexyl)phthalate was detected in on two fill samples and one tuff sample. TPH-DRO was detected in three fill samples and two tuff samples; and TPH-lubrication range organic (LRO) was detected in one soil, one sludge, and two fill samples. No radionuclides were detected.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Ten samples will be collected from historical sampling locations 03-03264, 03-03265, 03-03266, 03-03201, and 03-03202 within and beneath the beds at SWMUs 03-014(k) to 03-014(n) (Figure 4.1-48). An additional 16 soil samples will be collected from four locations around and downgradient of SWMUs 03-014(k) to 03-014(n).

Section 4.1.13.13 provides more detailed information regarding the proposed sampling. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.13.17 SWMU 03-014(o), Structure Associated with Former WWTP

Site Description

SWMU 03-014(o) consists of three polypropylene-lined sludge-drying beds (structure 03-1871) excavated into tuff. SWMU 03-014(o) is located north and downslope of the four upper sludge-drying beds [SWMUs 03-014(k), 03-014(l), 03-014(m), and 03-014(n)] (Figure 4.1-44). The drying beds were constructed in 1987, and each bed measures 22 ft × 60 ft and accommodated approximately 8000 gal. of liquid sludge (LANL 1993, 020947, pp. 5-46, 5-47). Berms separating the beds are covered with asphalt and the asphalt has not deteriorated (LANL 1997, 056660.4, p. 58).

Previous Investigations

A Phase I RFI was conducted at SWMU 03-014(o) in 1997. One sampling location was selected for each of the three beds at SWMU 03-014(o). Two locations were near the inlet pipes on the south side of the two outer beds, and the third location was near the center of the middle bed. Samples were collected from three depth intervals at each location: one from filter (fill) material within the bed and two from successive 1-ft intervals (in tuff) beneath the bed. Nine samples were collected from the three locations and submitted for laboratory analyses of inorganic chemicals, SVOCs, PCBs, pesticides, herbicides, isotopic plutonium and uranium, strontium-90, and tritium. Three tuff samples collected from the deepest interval at each location were also submitted for laboratory analysis of VOCs (LANL 1997, 056660.4, pp. 59–62). Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3, 4.1-4, 4.1-5, 4.1-6, and 4.1-7. Sampling locations and detected results are shown in Figures 4.1-45, 4.1-46, and 4.1-47. Lead was detected above BV in one fill sample; cadmium, chromium, and zinc were detected above BVs in two fill samples; and copper, mercury, and silver were detected above BVs in three fill samples. Copper was detected above BV in one tuff sample, silver was detected above BV in two tuff samples, nickel was detected above BV in three tuff samples, and chromium was detected above BV in five tuff samples. The detection limits for antimony and cadmium were greater than BVs in numerous samples. Acetone was detected in one tuff sample; acenaphthylene, anthracene, benzoic acid, carbazole, dibenz(a,h)anthracene, Aroclor-1260, methyl chlorophenoxy acetic acid (MCPA), and 2-(2-methyl-4-chlorophenoxy)propionic acid (MCPP) were each detected in one fill sample; benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were detected in two fill samples. Uranium-234 was detected above BV/FV in one fill sample; strontium-90 was detected above BVs/FVs in one fill and one tuff sample; and plutonium-239/240 was detected above BVs/FVs in one tuff and two fill samples. Tritium was detected in two fill samples.

Proposed Activities

The extent of contamination has not been defined at this site. Two soil samples will be collected from historical sampling location 03-03204 in the center bed to define the vertical extent of contamination. In addition, four samples will be collected from two locations from each of the other beds to confirm previous sampling results (Figure 4.1.48). The samples will be collected from two depths (4 to 5 ft and 6 to 7 ft) and analyzed for metals and cyanide. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

An additional 16 soil samples will be collected from four locations to define the lateral and vertical extent of contamination at SWMU 03-014(o) (Figure 4.1-48). The samples will be collected from four depths (0 to 1 ft bgs, 0 to 1 ft beneath the sand and gravel layer at the base of bed, at the bed/tuff interface, and 5 ft below the bed/tuff interface) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, nitrate, and radionuclides (tritium and strontium-90). Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.13.18 SWMU 03-014(p), Structure Associated with Former WWTP

Site Description

SWMU 03-014(p) is a sewage lift station (structure 03-0265) associated with the former WWTP and the SWSC (Figure 4.1-44). The lift station was constructed in 1966 of reinforced concrete built over a 42-in. diameter cast-iron basin. The structure measures 6 ft × 10 ft × 5 ft (LANL 1990, 007511, p. 3-014). SWMU 03-014(p) is active and currently associated with SWSC (LANL 2008, 099214).

Previous Investigations

SWMU 03-014(p) has not been sampled.

Proposed Activities

No sampling is proposed for this SWMU because it is an active lift station. Sanitary lift stations throughout the Laboratory, including those at TA-03, are equipped with alarms to prevent overflow, and to date no releases to the environment from the SWMU 03-014(p) lift station have been documented. Additional information to document the site conditions related to the potential for past releases will be collected during the investigation and presented in the investigation report.

4.1.13.19 SWMU 03-014(u), Structure Associated with Former WWTP

Site Description

SWMU 03-014(u) is the location of a former 1500-gal. holding tank (structure 03-1901) that collected effluent from the former WWTP sludge beds [SWMUs 03-014(k), 03-014(l), 03-014(m), 03-014(n), and 03-014(o)]. SWMU 03-014(u) is located approximately 50 ft northeast of the chlorination system dosing and contact chamber (Figure 4.1-44). The holding tank was installed in 1988 (LANL 1990, 007511, p. 3-014). Effluent from the sludge beds flowed through a subsurface drain system to the holding tank. The contents of the holding tank were recirculated by truck to the head of the plant for additional treatment (LANL 1993, 020947, p. 5-47). SWMU 03-014(u) was removed in 1992 following the decommissioning of the WWTP (LANL 2008, 099214).

Previous Investigations

SWMU 03-014(u) has not been sampled.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Six soil samples will be collected from three locations within and adjacent to the location of the former tank and drainline (Figure 4.1-48). The samples will be collected from two depths (0 to 1 ft and 3 to 4 ft). Eight samples will be collected from four locations in the drainage north of the site. The samples will be collected from two depths (0 to 1 ft and 1 to 2 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, nitrate, and radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.13.20 SWMU 03-056(d), Drum Storage

Site Description

SWMU 03-056(d) is a drum-storage area located on the northeast side of the Plant 1 trickling filter [SWMU 03-014(c)] (Figure 4.1-44). The area has been in use since about 1965 and consists of two bermed areas that measure 25 ft × 5 ft × 10 in. deep. The berms were constructed in 1989. Before 1989, only containers of lubricating oil were stored on pallets over bare soil. Active containers were mounted in racks with drip pans beneath. In 1993, lubricating oil and a partially full 55-gal. container of motor oil were stored at the site. Stains were noted within the bermed area, but none were observed outside the berm. The asphalt floor of the bermed area was covered with oil-absorbing material (LANL 1995, 057590, p. 6-48).

Previous Investigations

SWMU 03-056(d) has not been sampled.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Two soil samples will be collected from one location (Figure 4.1-48). The samples will be collected from two depths (0 to 1 ft and at the soil/tuff interface) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, and cyanide. No HE or radionuclides are associated with this SWMU; therefore, no samples will be analyzed for nitrate, perchlorate, or radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.14 SWMU 03-014(r), Lift Station Associated with Former WWTP

Site Description

SWMU 03-014(r) is a sewage lift station (structure 03-0693) located south of building 03-0271 (Figure 4.1-18) associated with the former WWTP. The lift station was built in the 1970s and consisted of two 7.5 horsepower pumps (LANL 1990, 007511, p. 3-014). SWMU 03-014(r) is active and currently associated with SWSC (LANL 2008, 099214).

Previous Investigations

SWMU 03-014(r) has not been sampled.

Proposed Activities

No sampling is proposed for this SWMU because it is an active lift station. Sanitary lift stations throughout the Laboratory, including those at TA-03, are equipped with alarms to prevent overflow, and to date no releases to the environment from the SWMU 03-014(r) lift station have been documented. Additional information to document the site conditions related to the potential for past releases will be collected during the investigation and presented in the investigation report.

4.1.15 SWMU 03-014(s), Lift Station Associated with Former WWTP

Site Description

SWMU 03-014(s) is a sewage lift station (structure 03-1693) associated with the former WWTP. The lift station was built in the 1970s and is located south of the university house (building 03-0443) (Figure 4.1-35). The lift station contains two pumps and measures 5 ft in diameter × 11 ft deep (LANL 1990, 007511, p. 3-014). SWMU 03-014(s) is active and pumps sanitary wastewater to SWSC (LANL 2008, 099214).

Previous Investigations

SWMU 03-014(s) has not been sampled.

Proposed Activities

No sampling is proposed for this SWMU because it is an active sanitary lift station. Sanitary lift stations throughout the Laboratory, including those at TA-03, are equipped with alarms to prevent overflow, and to date no releases to the environment from the SWMU 03-014(s) lift station have been documented. Additional information to document the site conditions related to the potential for past releases will be collected during the investigation and presented in the investigation report.

4.1.16 AOC 03-014(v), Drain Associated with Former WWTP

Site Description

AOC 03-014(v) was a floor drain within a former garage (building 03-0036) (Figure 4.1-49). The drain was connected to the sanitary sewer line, which flowed to the WWTP. The drain was installed in 1953 (LANL 1990, 007511, p. 3-014).

Building 03-0036 was removed in 1999 in preparation for construction of building 03-2327, the Nicholas C. Metropolis Computing Center. During the demolition of the gas station, three AOCs [03-014(v), 03-027, and C-03-015] were removed. Soil surrounding AOC C-03-015 (a former underground storage tank) and below the building footprint was excavated. Approximately 60 yd^3 of contaminated soil was removed during the demolition. Two fill samples were collected from one location at depths of 3 to 3.5 ft and 4 to 4.5 ft and submitted for laboratory analyses of inorganic chemicals, VOCs, PCBs, and TPH. Additional soil was subsequently excavated from the area to accommodate the foundation of building 03-2327. The area was excavated to a depth of approximately 15 ft belowgrade. The depth of the excavation was approximately 8 ft deeper than the two confirmation samples collected in 1999.

Previous Investigations

Analyses requested for the two fill samples collected in 1999 are summarized in Table 4.1-1. Decision-level data are presented in Tables 4.1-3 and 4.1-6. Sampling locations and detected results are shown in Figures 4.1-50 and 4.1-51. Cobalt was detected slightly above its BV in one sample, and TPH-DRO was detected in both samples.

Proposed Activities

No sampling is proposed for this site because it was remediated during the construction of the Computing Center Building (building 03-2327). Confirmation samples detected cobalt above BV but below 2 times the BV. TPH-DRO was detected at the base of the excavation and was removed in preparation for the new construction. Analytical results demonstrate nature and extent of contamination are defined at this site.

4.1.17 AOC 03-014(y), Drain Associated with Former WWTP

Site Description

AOC 03-014(y) is a floor drain in the basement of the press building (building 03-0035) (Figure 4.1-13) that formerly discharged to the sanitary sewer. The drain was installed in 1954 and became inactive in 1981 (LANL 1993, 020947, p. 5-46). Building 03-0035 was constructed in 1953 and housed operations to fabricate enriched uranium-loaded graphite and carbide fuel elements. Enriched uranium (uranium-235) was processed in an area located in the northern portion of the first floor of the building. The rest of the building was used to fabricate cable assemblies in support of the weapons program, rack mechanics, the Meson Physics Facility, and service programs.

Previous Investigations

AOC 03-014(y) has not been sampled.

Proposed Activities

No sampling is proposed for this AOC because it is an active part of the sanitary sewer system. Potential contamination beneath building 03-0035 will be investigated when the building undergoes D&D.

4.1.18 Consolidated Unit 03-015-00

Consolidated Unit 03-015-00 includes SWMU 03-015 and AOC 03-053 (Figure 4.1-8). SWMU 03-015 is a former NPDES-permitted outfall that received effluent from janitorial sinks and roof and floor drains from building 03-0141 until the lines to the outfall were decommissioned in early 1993 (LANL 1996, 052930, p. 121). AOC 03-053 is the basement of building 03-0141, which housed electrochemical and depleted uranium (DU) processing facilities. The floor drains in this area previously discharged to SWMU 03-015 and were rerouted to the TA-50 radioactive liquid waste (RLW) line before 1992 (LANL 1995, 057590, p. 5-24-1).

Proposed sampling for this consolidated unit is provided in the following sections.

4.1.18.1 SWMU 03-015, Outfall

Site Description

SWMU 03-015 is an outfall located between Eniwetok Drive and the security fence northeast of the building 03-0141 (Figure 4.1-8) (LANL 1996, 052930, p. 121). This SWMU is a formerly NPDES-permitted outfall EPA 04A140 that was removed from the permit in 1995 (LANL 1999, 064617, p. 2-7). The outfall historically received effluent from janitorial sinks as well as from floor and roof drains of building 03-0141. From 1962 to 1990, building 03-0141 housed electrochemical and DU-processing facilities. Powder characterization, plasma flame spray processing, beryllium processing, and DU-processing operations also took place. In 1992, the basement floor drains in building 03-0141 were rerouted to the TA-50 RLW line, and the roof drains were rerouted to an existing storm sewer outfall in Mortandad Canyon. Lines draining to SWMU 03-015 were decommissioned in 1993 (LANL 1995, 057590, p. 5-24-1).

Previous Investigations

RFI activities were conducted at SWMU 03-015 in 1994. Four surface soil samples and one sediment sample were collected from five locations downgradient of the outfall in the associated drainage channel. All samples were collected from a depth 0 to 1.5 ft bgs and analyzed for inorganic chemicals, SVOCs, gross-alpha, -beta, and -gamma radiation, gamma spectroscopy, isotopic plutonium and uranium, and tritium. The fourth soil sample was analyzed for inorganic chemicals, SVOCs, gross-alpha, -beta, and -gamma radiation, and tritium. The sediment sample was analyzed for inorganic chemicals, gross-alpha, -beta, and -gamma radiation, and tritium (LANL 1996, 052930, pp. 121–124). Requested analyses are presented in Tables 4.1-1 and 4.1-2.

Decision-level and screening-level data are presented in Tables 4.1-3, 4.1-11, 4.1-13, and 4.1-15. Sampling locations and detected results are shown in Figures 4.1-9, 4.1-10, and 4.1-11. Barium and lead were detected above BVs in the sediment sample; lead, mercury, nickel, and silver were detected above BVs in one soil sample. The detection limit for selenium was greater than BV in one sample. Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, and phenanthrene were detected in one soil sample; fluoranthene and pyrene were detected in two soil samples. Uranium-234, uranium-235, and uranium-238 were detected above BV/FV in one soil sample. Europium-152 and gross-alpha radiation were detected in one soil sample; gross-beta radiation was detected in two soil samples.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Twenty sediment and soil samples will be collected from 10 locations (including 1 location beneath the former drainline) to characterize SWMU 03-015 and AOC 03-053 (Figure 4.1-12). The samples will be collected from two depths (0 to 1 ft and 1 to 2 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, and radionuclides. Sampling locations will be biased in the outfall area and areas of sediment accumulation. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.18.2 AOC 03-053, Operational Facility

Site Description

AOC 03-053 (Figure 4.1-8) consists of floor drains in the basement area of building 03-0141. The floor drains historically discharged to SWMU 03-015 (section 4.1.18.1) but were rerouted to the TA-50 RLW line before 1992. From 1962 to 1990, building 03-0141 housed electrochemical and DU-processing facilities. Powder characterization, plasma flame spray processing, beryllium processing, and DU-processing operations also took place (LANL 1995, 057590, p. 5-24-1).

Previous Investigations

Samples collected from SWMU 03-015 during the 1994 RFI were used to evaluate potential contamination at AOC 03-053 (LANL 1996, 052930, p. 121). Sampling locations are shown in Figures 4.1-9, 4.1-10, and 4.1-11. Decision-level and screening-level data are presented in Tables 4.1-3, 4.1-11, 4.1-13, and 4.1-15

Proposed Activities

The nature and extent of contamination have not been defined at this site. Twenty sediment and soil samples will be collected from 10 locations to characterize AOC 03-053 and its outfall, SWMU 03-015 (Figure 4.1-12). Section 4.1.18.1 provides more details regarding the proposed sampling. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.19 AOC C-03-016, Oil Metal Bin

Site Description

AOC C-03-016 is a former oil cleanout bin located within the former asphalt batch plant (Figure 4.1-1). The bin was approximately 4 ft wide × 16 ft long × 3 ft deep, had a hinged lid, and was buried with the top flush with the ground surface. The bin was installed in the mid-1970s and contained used asphalt emulsion oil, which was applied to roads before laying asphalt. Photographs from the 1970s and 1980s show extensive stains in the immediate vicinity of the bin. In the late 1980s, the area surrounding the oil cleanout bin was excavated and new sand and gravel fill was put around the bin (LANL 1995, 057590, pp. 6-26–6-27). The bin and stained soil around the bin were removed in the late 1990s (LANL 2003, 080912, p. 4). The surface of the site was paved with asphalt for use as a parking lot in 2003 (LANL 2008, 099214).

Previous Investigations

Sampling was conducted at AOC C-03-016 in 2003 before the planned construction of a new parking structure; however, the parking structure was never built. Two shallow boreholes were drilled at AOC C-03-016. Two tuff samples were collected from one borehole at depths of 1 to 1.5 ft bgs and 16 to 16.5 ft bgs. Three tuff samples were collected from the second borehole at a depth of 4 to 5 ft bgs, 9.5 to 10 ft bgs, and 19.5 to 20 ft bgs. All samples were submitted for laboratory analyses of inorganic chemicals, VOCs, SVOCs, TPH-DRO, and TPH-GRO (Shaw Environmental Inc., 2003, 085517, pp. 1, 7–8, 10, 26–27). Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3 and 4.1-4. Sampling locations and detected results are shown in Figures 4.1-2 and 4.1-3. Aluminum, arsenic, beryllium, calcium, chromium, iron, magnesium, manganese, nickel, and vanadium were detected above BVs in one sample. Barium and copper were detected above BVs in two samples. Lead and selenium were detected above BVs in three and five samples, respectively. Bis(2-ethylhexly)phthalate was detected in two samples. TPH-DRO and TPH-GRO were also detected in two samples. VOCs were not detected.

Proposed Activities

The extent of vertical contamination has not been defined at this site. Previous sampling detected several inorganic chemicals above BVs and organic chemical concentrations increased with depth. Soil samples will be collected from historical sampling location 03-22533. Samples will be collected from three depths

(4 to 5 ft bgs, 10 to 11 ft bgs, and 19 to 20 ft bgs) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, TPH-GRO, and cyanide (Figure 4.1-5). Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.20 SWMU 03-021, Outfall

Site Description

SWMU 03-021 is an outfall and associated daylight channel located approximately 60 ft north of the north exterior wall of the liquid and compressed gas facility (building 03-0170) (Figure 4.1-25). The outfall is a formerly NPDES-permitted outfall (EPA 04A094) and was removed from the 1997 permit (LANL 1999, 064617, p. 2-7). The outfall discharged caustic wash and rinse water from compressed-gas cylinder cleaning operations from 1964 to 1976. Cylinders were washed and stripped of paint using a caustic soda solution before they were repainted. Washing and stripping were done in a below floor-grade pit in the northern part of building 03-0170. A 2-in.-diameter iron outfall pipe in an open ditch carried the caustic wash and rinse water from the pit. Discharge from the end of the outfall pipe was directed into a northeast-trending surface ditch that continued about 180 ft to the main north-south drainage ditch. Cylinders were screened for radioactive contamination and cleaned of any exterior oil, dirt, and grease before they were brought to building 03-0170, in the adjacent parking lot. The SWMU was not used after 1976, when the compressed gas suppliers assumed cylinder washing and painting responsibilities. The exact location of this SWMU is not known because of regrading and other construction work completed in preparation for nearby building 03-1650, the compressed-gas cylinder storage shed. Construction of building 03-1650 resulted in placement of 5 to 10 ft of fill material over the former outfall area. Potential contaminants at this SWMU are organic and inorganic chemicals (LANL 1995, 057590, pp. 5-14-1–5-14-3).

Previous Investigations

RFI activities were performed at this SWMU in 1997. One soil sample was collected from one location within the area of the former NPDES outfall area at a depth of 0 to 1 ft bgs. Ten soil samples were collected at five locations along two transects positioned across the former location of the channel (LANL 1997, 056660.4, pp. 79–82). Four samples were collected from two of the locations at depths of 2 to 3 ft bgs and 3 to 4 ft bgs; four samples were collected from two other locations at depths of 3 to 4 ft bgs and 4 to 5 ft bgs; two samples were collected from the fifth location at depths of 2.75 ft to 3.75 ft and 3.75 ft to 4.25 ft. All samples were analyzed for metals and SVOCs; one sample was also analyzed for VOCs Sample. Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Table 4.1-3 and 4.1-4. Sampling locations and detected results are shown in Figures 4.1-26 and 4.1-27. Cobalt, copper, iron, and nickel were detected above BVs in one sample. Chromium and thallium were detected above BVs in three samples; zinc was detected above BV in six samples; lead was detected above BV in nine samples. VOCs and SVOCs were not detected. The detection limit for antimony was greater than its BV in two samples

Proposed Activities

The extent of contamination has not been defined at this site. Four samples will be collected from historical sampling locations 03-03331and 03-03329 to define the vertical extent of contamination and confirm Phase I RFI results (Figure 4.1-28). The samples will be collected from two depths (4 to 5 ft and 6 to 7 ft) and analyzed for inorganic chemicals and cyanide. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

Twelve additional samples will be collected from six locations downgradient of the outfall and drainlines to define the extent of contamination in the drainage (Figures 4.1-28 and 4.1-48). The samples will be collected from two depths (0 to 1 ft and 1 to 2 ft, if possible) and analyzed for inorganic chemicals, VOCs, SVOCs, and cyanide. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.21 AOC 03-027, Lift Wells

Site Description

AOC 03-027 consists of two former concrete-block-lined lift wells located in the floor below the hydraulic lifts at a former garage, building 03-0036 (Figure 4.1-49). The lift wells collected wash water and residual oil from the floor of vehicle maintenance bays. Lift well contents were manually pumped to 55-gal. containers that were emptied into the station's oil/water separator before being discharged to the sanitary sewer. A bottle-washing operation was conducted in building 03-0036 from 1976 to 1980. New sample vial bottles were immersed in a 35% concentration nitric acid bath and triple-rinsed with deionized water. The rinse water was reused several times before it was discharged to floor drains. The floor drains eventually discharged to storm drains (LANL 1995, 057590, pp. 6-54–6-55).

Previous Investigations

Building 03-0036 was removed in 1999 in preparation for construction of building 03-2327, the Nicholas C. Metropolis Computing Center. During the task of demolishing the gas station, three AOCs [03-014(v), a floor drain, 03-027, and C-03-015, an underground storage tank] were removed as a presumptive remedy. Soil surrounding the underground storage tank and below the building footprint was excavated. Approximately 60 yd^3 of TPH-contaminated soil was removed during the demolition project. Additional soil was subsequently excavated from the area to a depth of approximately 15 ft belowgrade to accommodate the foundation of building 03-2327.

Following the demolition of building 03-0036 and before the foundation for building 03-2327 was excavated, nine fill and tuff samples were collected from six locations associated with the former lift wells (two fill samples from a depth of 7 to 7.5 ft bgs; four fill samples from a depth of 7.5 to 8 ft bgs; two tuff samples from a depth of 8.5 to 9 ft bgs; and one tuff sample from a depth of 9 to 9.5 ft bgs). The samples were submitted for laboratory analyses of inorganic chemicals, VOCs, PCBs, TPH-DRO, and TPH-GRO. Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3, 4.1-4, and 4.1-6. Sampling locations and detected results are shown in Figures 4.1-50 and 4.1-51. Aluminum, beryllium, iron, magnesium, nickel, and sodium were detected above BVs in one fill sample; zinc was detected above BV in two fill samples. The detection limit for antimony was above the BV in three samples. Butanone(2-), isopropylbenzene, and PCE were detected in one fill sample; butylbenzene(sec-), isopropyltoluene(4-), propylbenzene(1-) and xylene were detected in two fill samples; butylbenzene(n-), trimethylbenzene (1,3,5-), and TPH-GRO were detected in three fill samples; trimethylbenzene(1,2,4-) was detected in four fill samples; TPH-DRO was detected in five fill and three tuff samples. PCBs were not detected.

Proposed Activities

No sampling is proposed for this site because the nature and extent of contamination have been defined at this site. Confirmation samples detected several concentrations of inorganic chemicals above BVs but below 2 times BVs. Several organic chemicals were also detected. All detected analytes decrease in concentration with depth, except for TPH-DRO and TPH-GRO at the base of the excavation. Based on the analytical results, the nature and extent of contamination are defined at this site.

4.1.22 AOC 03-036(b), Former Aboveground Storage Tanks

Site Description

AOC 03-036(b) is the location of two former 25- to 50-gal. aboveground storage tanks that contained No. 2 diesel fuel. The tanks associated with the former asphalt batch plant were located 100 ft west of the plant (building 03-0073) and were surrounded by a 3-ft soil berm (Figure 4.1-1). To prevent sticking, diesel fuel from the tanks was applied to dump truck beds before they were loaded with asphalt. Residual fuel was collected in an aboveground metal catch basin on the east side of the berm. Before 1989, kerosene was stored in the tanks and used for the same purpose as the No. 2 diesel fuel. Periodic drips and splashes from the tanks stained the gravel (LANL 1995, 057590, p. 6-27). The tanks began operating in 1960 (LANL 2003, 080912, p. 3), and operations ceased in 2003. In 2002, the two tanks, soil berm, and stained soil were removed during the D&D of the former asphalt batch plant.

Previous Investigations

Sampling activities were conducted at AOC 03-036(b) in 2003 before the planned construction of a new parking structure (Shaw Environmental Inc., 2003, 085517, p. 1). As part of the sampling activities, two boreholes were drilled at the site. Three tuff samples were collected from one borehole at depths of 11 to 11.5 ft bgs, 14.5 to 15 ft bgs, and 19.5 to 20 ft bgs; one soil and two tuff samples were collected from the second borehole at depths of 10 to 11 ft bgs, 14.5 to 15 ft bgs, and 19.5 to 20 ft bgs. All samples were field screened for organic chemicals and submitted for laboratory analyses of inorganic chemicals, VOCs, SVOCs, TPH-DRO, and TPH-GRO. Field-screening results did not indicate elevated concentrations of organic chemicals; however, a strong odor was noted during drilling and sampling activities (Shaw Environmental Inc., 2003, 085517, pp. 7-8, 10, 27). Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3, 4.1-4, 4.1-5, and 4.1-6. Sampling locations and detected results are shown in Figures 4.1-2 and 4.1-3. Barium, beryllium, calcium, copper, and zinc were detected above BVs in one tuff sample. Lead and selenium were detected above BVs in three and five tuff samples, respectively. PCE and trimethylbenzene(1,2,4-) were detected in the single soil sample; acetone, and phenanthrene were detected in one tuff sample. Methylnaphthalene(2-) and TPH-DRO were detected in two tuff samples; TPH-GRO was detected in all six samples.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Six soil and tuff samples will be collected from two locations to define the extent of contamination (Figure 4.1-5). The samples will be collected from three depths (14 to 15 ft, 19 to 20 ft, and 24 to 25 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, cyanide, TPH-GRO, and TPH-DRO. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.23 SWMU 03-037, Underground Storage Tanks

Site Description

SWMU 03-037 is a belowgrade 9000-gal. concrete tank located in the basement of the Sigma Building, building 03-0066 (Figure 4.1-13) (LANL 1993, 020947, p. 6-11). The tank began operation in 1960

(LANL 1990, 007511, p. 3-037). The tank is divided into two 4500-gal. unlined sections that are fitted with separate covers. One section was used to store spent cyanide solution, while the other section stored nitric, sulfuric, and hydrochloric acid solutions from electroplating operations. Both sections discharged to the industrial waste line. In 1989, the waste line serving the cyanide tank collapsed and leaked. The leak was repaired, and two core samples collected along the route of the line were analyzed for potential contaminants.

Previous Investigations

In 1991, an interim action reconnaissance survey was performed. Samples screened for gross-alpha, -beta, and -gamma radiation were below background. Samples were also analyzed for total uranium. Analytes were below screening action levels (LANL 1993, 020947, pp. 6-11–6-12). Additional analytical samples have not been collected at this site.

Proposed Activities

No sampling is proposed for this SWMU because it is currently active, and regular inspections of the tank are performed by facility personnel to ensure no releases to the environment occur. This SWMU is located within an active nuclear facility, and it cannot be safely or practicably investigated at the current time.

4.1.24 AOC 03-038(c), Waste Lines

Site Description

AOC 03-038(c) is a 2-in. cast-iron drainline that formerly carried rinse solution from a copper electroplating bath in building 03-0028 (room 46) to the industrial waste line (Figure 4.1-52). The electroplating bath initially operated in the 1960s and was used to plate very small parts of printed circuit boards. By 1971 the operation was terminated and was moved to building 03-0040. During the electroplating process, water was sprayed through rows of holes in a manifold on either side of the rinse sink. Minute amounts of plating and acid solutions were washed off the circuit boards and down the drain. Spent plating baths and the spent acid-strip solutions were transported to TA-50 for treatment. These solutions contained cyanide, chromic sulfuric acid, and hydrochloric acid. The amounts and concentrations of contaminants are not known. The electroplating bath met EPA point-source category standards until it ceased operation in the early 1970s. The drainpipe was cut and capped inside the wall to make it inaccessible. According to the building manager, no releases from the drainpipe have occurred (LANL 1995, 057590, pp. 6-72, 6-73).

Previous Investigations

Samples have not been collected at this site.

Proposed Activities

The nature and extent of contamination has not been defined at this site. Four soil samples will be collected from two locations where the former drainline exited the building and two samples will be collected at the location where the former drainline discharged to the industrial waste line to characterize the site (Figure 4.1-53). The samples will be collected from two depths below the bottom of the drainline (0 to 1 ft and 1 to 2 ft) and analyzed for inorganic chemicals and cyanide. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.25 AOC 03-038(d), Waste Lines

Site Description

AOC 03-038(d) is an industrial waste line associated with the liquid waste treatment system. Between the 1950s and 1970s, the industrial drains from buildings 03-0032 (Center for Materials Science) and 03-0034 (Cryogenics Building "B") connected the two buildings to the old industrial waste line (Figure 4.1-54), which was replaced with a new line in 1986. The new line connected building 03-0034 to the RLW facility in TA-50, while the drains in building 03-0032 were connected to the sanitary sewer. The industrial waste line was completely removed between 1981 and 1986, and no releases were found (LANL 1995, 057590, p. 6-45).

Previous Investigations

Samples have not been collected at this site.

Proposed Activities

The nature and extent of contamination had not been defined at this site. Twelve soil samples will be collected from six locations to characterize the site (Figure 4.1-55). The samples will be collected from two depths (0 to 1 ft and 1 to 2 ft) to characterize the site. Samples will be analyzed for inorganic chemicals, VOCs, SVOCs, pesticides, PCBs, nitrate, cyanide, perchlorate, and radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.26 AOC 03-043(a), Aboveground Storage Tank

Site Description

AOC 03-043(a) is a former 20,000-gal. aboveground storage tank, structure 03-0074, installed in 1948 at the former asphalt batch plant for storing asphalt emulsion (Figure 4.1-1). The tank was removed in 1963, disassembled, disposed of at the Los Alamos County landfill, and replaced by another storage tank, structure 03-0178 [AOC 03-043(f)]. The area was used for aggregate (sand and gravel) storage and feed mixing for the former asphalt batch plant. No record of releases to the environment is associated with this AOC. Review of historical aerial photographs revealed no staining in the area of AOC 03-043(a) (LANL 1995, 057590, pp. 6-12, 6-18). In 2003, the surface of the site was paved with asphalt for use as a parking lot. Before paving, sampling was conducted to characterize the potential impact of several SWMUs in the vicinity (LANL 2003, 080912, p. 1).

Previous Investigations

Samples were collected within the vicinity of AOC 03-043(a) as part of sampling activities for SWMUs 03-036(c) and 03-36(d). Results of these sampling activities are discussed in sections 4.1.7.5 and 4.1.7.6. Decision-level data are presented in Tables 4.1-3, 4.1-4, and 4.1-6. Sampling locations and detected results are shown Figures 4.1-3 and 4.1-4.

Proposed Activities

No sampling is proposed for this AOC because the nature and extent of contamination have been defined at this site. Although previous sampling identified inorganic chemicals in the area, the contaminant concentrations decrease with depth. Organic chemicals were also detected but at concentrations less than EQLs. In addition, AOC 03-043(a) is now covered by an asphalt parking lot.

4.1.27 AOC 03-043(f), Aboveground Storage Tank

AOC 03-043(f) is a former aboveground storage tank (structure number 03-0178) located at the TA-03 former asphalt batch plant and used to store asphalt emulsion. The 1990 SWMU (LANL 1990, 007511) report lists AOC 03-043(f) under the heading of decommissioned product tanks. Before the asphalt batch plant was decommissioned in 2002, all tanks were removed, including AOC 03-043(f).

The 1990 SWMU report also separately lists areas of potential soil contamination associated with tanks (LANL 1990, 007511). The SWMU report associates three of these areas, SWMUs 03-036(a), 03-036(c), and 03-036(d), with asphalt storage tanks that were located at the former asphalt batch plant at TA-03. Five asphalt storage tanks occupied a relatively small area to the northeast of the main plant building (former structure 03-0073). The three southern asphalt storage tanks are associated with the area of potential soil contamination designated by the SWMU report as SWMU 03-036(a) (LANL 1990, 007511). The SWMU report provides no tank structure numbers for the two remaining areas of potential soil contamination [SWMUs 03-036(c) and 03-036(d)]. Although no tank structure numbers are provided, the SWMU report does describe each of these areas of potential soil contamination associated with asphalt batch plant storage tanks. Because the asphalt batch plant contained only five tanks and because the three southern tanks are known to be associated with the area of potential soil contamination designated as SWMU 03-036(a), the two remaining areas of soil contamination [SWMUs 03-036(c) and 03-036(d)] can only be associated with the two remaining tanks, that is, the northern tanks [AOCs 03-043(f) and 03-043(g)]. Because the northern tanks have been removed, each of these AOCs is no longer the tank itself but rather is the area of potential soil contamination associated with each former tank. However, the SWMU report has already designated SWMUs 03-036(c) and 03-036(d) as the areas of potential soil contamination from the two tanks (LANL 1990, 007511). Therefore, AOCs 03-043(f) and 03-043(g) are the same areas of soil contamination as SWMUs 03-036(c) and 03-036(d).

AOC 03-043(f) is a duplicate of SWMU 03-036(c). Sections 4.1.7.5 and 4.1.7.6 describe the proposed activities for SWMUs 03-036(c) and 03-036(d).

4.1.28 AOC 03-043(g), Aboveground Storage Tank

AOC 03-043(g) is a former aboveground storage tank (structure number 03-0335) located at the former asphalt batch plant at TA-03 and used to store asphalt emulsion. The 1990 SWMU report lists AOC 03-043(g) under the heading of decommissioned product tanks (LANL 1990, 007511). Before the asphalt batch plant was decommissioned in 2002, all tanks were removed, including AOC 03-043(g).

The 1990 SWMU report also lists separately areas of potential soil contamination associated with tanks. The SWMU report associates three of these areas, SWMUs 03-036(a), 03-036(c), and 03-036(d), with asphalt storage tanks that were located at the former asphalt batch plant (LANL 1990, 007511). Five asphalt storage tanks occupied a relatively small area to the northeast of the main plant building (former structure 03-0073). The three southern asphalt storage tanks are associated with the area of potential soil contamination designated by the SWMU report as SWMU 03-036(a) (LANL 1990, 007511). The SWMU report provides no tank structure numbers for the two remaining areas of potential soil contamination [SWMUs 03-036(c) and 03-036(d)]. Although no tank structure numbers are provided, the SWMU report does describe each of these areas of potential soil contamination to be associated with asphalt batch plant storage tanks(LANL 1990, 007511). Because the asphalt batch plant contained only five tanks and because the three southern tanks are known to be associated with the area of potential soil contamination designated as SWMU 03-036(a), the two remaining areas of soil contamination [SWMUs 03-036(c) and 03-036(d)] can only be associated with the two remaining tanks, that is, the northern tanks [AOCs 03-043(f) and 03-043(g)]. Because the northern tanks have been removed, each of these AOCs is no longer the tank itself but rather is the area of potential soil contamination associated with each former tank. However, the SWMU report has already designated SWMUs 03-036(c) and 03-036(d) as the areas of potential soil contamination from the two tanks. Therefore, AOCs 03-043(f) and 03-043(g) are the same areas of soil contamination as SWMUs 03-036(c) and 03-036(d).

Sections 4.1.7.5 and 4.1.7.6 describe the proposed activities for SWMUs 03-036(c) and 03-036(d).

4.1.29 SWMU 03-045(a), Outfall

Site Description

SWMU 03-045(a) is an outfall from the Laboratory's power plant (building 03-0022) which operated from the 1950s to 1993 (Figure 4.1-29). The primary outflow from the building to SWMU 03-045(a) was noncontact water from steam condensate. In addition, water from floor drains in the basement, first floor, mezzanine, heater floor, platform, and roof drains of the steam plant previously discharged to this outfall. In 1989, an oil/water separator was installed near the outfall to prevent oil from building operations reaching the outfall. In 1993, the separator was removed and the discharge pipe was capped (LANL 1995, 057590, p. 6-71). In mid-1991, a diesel fuel release of approximately 100 to 200 gal. occurred from the two aboveground diesel fuel tanks at building 03-0022. As the system was being pressurized, a faulty fitting on a fuel line to the diesel tanks caused the release (LANL 1995, 057590, p. 6-79). The release [SWMU 03-036(j)] occurred directly above SWMU 03-045(a) and flowed down the slope south of the steam plant into the drainage channel (LANL 1996, 055035, Attachment B, p. 1, Attachment D, p. 1). The spill was contained approximately 120 yd east of the leak. The drainage was blocked, and an extensive cleanup was performed to remove all diesel fuel and diesel-contaminated soil (LANL 1995, 057590, p. 6-79). The remediation included removing soil and sediment in and around SWMU 03-045(a) and replacing it with clean fill (LANL 1995, 057590, p. 6-71).

Previous Investigations

Samples have not been collected at this site.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Eight sediment and soil samples will be collected from four locations to confirm the previous sampling and to define nature and extent of contamination (Figure 4.1-33). The samples will be collected from two depths (0 to 1 ft and 1 to 2 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, TPH-LRO, cyanide, and PCBs. Sampling locations will be biased to the outfall area and areas of sediment accumulation. No HE or radionuclides are associated with this SWMU; therefore, no samples will be analyzed for nitrate, perchlorate, or radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

In addition, samples will be collected from the drainage downgradient of this site as part of the Sandia Canyon and Cañada del Buey investigation work plan (LANL 1999, 064617). Section 6.3 provides additional information about the reach investigations to be conducted in Sandia Canyon.

4.1.30 SWMU 03-045(e), Outfall

Site Description

SWMU 03-045(e) is an inactive outfall from a floor drain in an oil pump house (structure 03-0057) located at the TA-03 power plant, building 03-0022. One line from at each of two diesel storage tanks (structure 03-0026 and former structure 03-0027) passed through the pump house to the steam plant (Figure 4.1-23). Valves in the pump house operated each line and allowed diesel to flow from one or both storage tanks. The drain was in place to prevent the pump house from filling with diesel fuel if a valve junction should rupture or leak. The drain and associated piping were plugged in 1989. A concrete apron is located at the point where the drainline discharged to Sandia Canyon (LANL 1995, 057590, pp. 6-7–6-8).

Previous Investigations

Samples have not been collected at this site.

Proposed Activities

The nature and extent of contamination have not been defined at this site. The close proximity of the active diesel fuel storage tanks and associated fuel lines and other ancillary equipment for the steam plant make collecting samples not possible at this time. However, the Laboratory will investigate the drainline and area beneath the pump house following D&D.

Two soil samples will be collected from one location at the outfall to define nature and extent of potential contamination (Figure 4.1-24). The samples will be collected from two depths (0 to 1 ft and 1 to 2 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, cyanide, and TPH-DRO. No HE or radionuclides are associated with this SWMU; therefore, no samples will be analyzed for nitrate, perchlorate, or radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

In addition, samples will be collected from the drainage downgradient of this site as part of the Sandia Canyon and Cañada del Buey investigation work plan (LANL 1999, 064617); data will be provided in an investigation report to be submitted to NMED in December 2008. Data from the sediment sampling locations will be assessed in the Upper Sandia Canyon Aggregate Area investigation report to confirm the nature and extent of contamination have been determined for SWMU 03-045(e).

4.1.31 SWMU 03-045(f), Outfall

Site Description

SWMU 03-045(f) is an outfall from a sink drain that served the utilities control center (building 03-0223) from 1950 to the late 1980s (Figure 4.1-29). The outfall was located on the north side of the building and emptied into Sandia Canyon. The sink was used as a quench tank for welding and cutting. No known releases of hazardous wastes or constituents from the sink or from SWMU 03-045(f) occurred (LANL 1995, 057590, p. 6-8). The sink was removed in the late 1980s. In 1993, the outfall was vegetated. Visual inspection found no distinct erosion, indicating the outfall did not discharge large quantities of water (LANL 1996, 055035, Appendix A, p. 1).

Previous Investigations

Samples have not been collected at this site.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Four sediment and soil samples will be collected from two locations to define nature and extent of contamination (Figure 4.1-33). The samples will be collected from two depths (0 to 1 ft and 1 to 2 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, cyanide, nitrate, and PCBs. Sampling locations will be biased to the outfall and sediment accumulations. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

In addition, samples will be collected from the drainage downgradient of this site as part of the Sandia Canyon and Cañada del Buey investigation work plan (LANL 1999, 064617); data will be provided in an investigation report to be submitted to NMED in December 2008. Data from the sediment sampling locations will be assessed in the Upper Sandia Canyon Aggregate Area investigation report to confirm the nature and extent of contamination have been determined for SWMU 03-045(f).

4.1.32 SWMU 03-045(h), Outfall

Site Description

SWMU 03-045(h) is a former NPDES-permitted outfall (EPA 03A024) located in TA-03 at the north perimeter of the Sigma Complex security fence, approximately 50 ft north of a cooling tower (structure 03-0187) (Figure 4.1-13). The outfall was formerly permitted for the discharge of treated cooling water and stormwater. It served a former cooling tower that was replaced by a smaller cooling tower (structure 03-0187) between 1997 and 1998. The outfall was plugged in 1997 during the removal of the previous cooling tower and was removed from the NPDES permit in 2007 (EPA 2007, 099009). The cooling tower was constructed in 1953 and was inactive from the late 1980s to early 1995 when it was reactivated. The area at the outfall pipe is about 3-ft wide × 6-ft long. Effluent drained into a corrugated metal storm drainpipe that trended northeast and east of structure 03-0187 where it combined with more stormwater runoff from surrounding areas. The drainage continued south and joined a channel north of Eniwetok Drive that ultimately drained into Sandia Canyon. Routine water treatment began in 1968. Treatment included biocides and fungicides to reduce algae growth and chelating agents such as ethylenediaminetetraacetic acid to inhibit corrosion.

Previous Investigations

No sampling activities have been conducted at this SWMU; however, RFI sampling activities were conducted in 1997 at AOC 03-052(b), located northeast and downgradient from the corrugated metal storm drain pipe into which SWMU 03-045(h) discharged. RFI sampling activities for AOC 03-052(b) are discussed in section 4.1.37.

Proposed Activities

The nature and extent of contamination have not been defined at this site. This SWMU will be investigated as part of the Upper Mortandad Aggregate Area (LANL 2007, 098954). Figure 4.1-17 shows the Upper Mortandad Aggregate Area sampling location 45h-8 north of cooling tower 03-0187. Discharges from this SWMU that went underground and eventually daylighted and drained into

AOC 03-052(b) will be investigated (Figure 4.1-17). Section 4.1.37 and (Figure 4.1-17) provides more information regarding the proposed sampling at AOC 03-052(b).

4.1.33 SWMU 03-046, Aboveground Wastewater Treatment Tank

Site Description

SWMU 03-046 is an aboveground wastewater neutralization tank located within TA-03 approximately 60 ft southeast of the Laboratory's steam plant, building 03-0022. The Laboratory received a certificate of completion for this SWMU from NMED during the writing of this work plan (NMED 2008, 100116). Therefore, this SWMU will not be investigated as part of this work plan.

4.1.34 AOC 03-047(d), Storage Area

Site Description

AOC 03-047(d) is the location of a former container storage area located on the east side of the power plant building 03-0022 (Figure 4.1-29). The storage area consisted of an asphalt pad where drums of new motor oil, used oil, and Stoddard solvent were stored from 1954 to 1989. A new location for an upgraded materials storage area was selected in 1989. The asphalt pad was removed in 1989 when the storage area was decommissioned (LANL 1995, 057590, p. 6-83). A voluntary corrective action (VCA) was implemented at the site in 1995 that involved the characterization, excavation, and removal of soil. Approximately 6 yd^3 of soil were excavated to a depth of 4 to 6 in. from a 20 ft × 20 ft area that encompassed the AOC and adjacent soil directly north and east of the AOC boundary. The site was subsequently restored by backfilling and compacting the excavated area, followed by revegetation (LANL 2002, 073868.138, p. 5).

Previous Investigations

As part of the 1995 VCA, three soil samples were collected from the top 6 in. of the excavated area and analyzed for inorganic chemicals, VOCs, SVOCs, PCBs, and pesticides. Requested analyses are presented in Table 4.1-2.

In January 2002, soil was excavated within the boundary of AOC 03-047(d) before a concrete pad was installed for an emergency backup generator and transformer for the TA-03 steam plant. Shortly after the area had been excavated, a 6-in. main potable-water-supply line to the steam plant ruptured, releasing approximately 250,000 gal. of water. As a result, soil and fill along the entire eastern wall of building 03-0022, including soil and fill within and around the AOC boundary, was eroded. Soil that washed into the excavation was subsequently removed. The concrete support pad and an emergency generator and transformer were installed at the site during the spring and summer of 2002 (LANL 2002, 073868.138, p. 8).

Proposed Activities

The nature and extent of contamination have been defined at this site, and no additional sampling is proposed. The VCA conducted in 1995 characterized the site and demonstrated that contaminants pose no potential unacceptable risk to humans and ecological receptors (LANL 2002, 073868.138, p. 19).

4.1.35 AOC 03-047(g), Drum Storage

Site Description

AOC 03-047(g) is a drum storage area where drums of acetone, vacuum pump oil, and ethylene glycol were stored under a canopy on the north side of building 03-0141 (Figure 4.1-8). During a 1989 site reconnaissance survey, staining was found on the cement. During a site visit in September 1993, the building manager stated that the area had been used for approximately 20 yr to store product oil and occasionally solvents. Only one drum was on the pad when the site visit was conducted. The drum contained mineral oil and was used for vacuum pumps. As oil was dispensed, spills were known to occur. Stains were evident on the concrete around the barrel; however, the staining did not continue beyond the concrete, indicating that small oil spills did not migrate off the concrete pad (LANL 1995, 057590, p. 6-46).

Previous Investigations

Samples have not been collected at this site.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Eight samples will be collected from four locations (Figure 4.1-12). The samples will be collected from two depths (0 to 1 ft and 1 to 2 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, nitrate, and perchlorate. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.36 AOC 03-051(c), Soil Contamination—Vacuum Pump Leak

Site Description

AOC 03-051(c) consists of two areas of stained asphalt attributed to operational leaks vacuum pump oil (LANL 1995, 057590, p. 6-84). One area, measuring approximately 6 ft × 6 ft, was located on the east side of building 03-0141 (Figure 4.1-8). The second area, located at the northeast corner of the building, measured approximately 10 ft × 15 ft (LANL 1996, 053780, p. 15).

Previous Investigations

A VCA was performed at this AOC in August and September 1995. The stained areas of asphalt were removed, and soil was excavated until unstained soil was reached. The stained area adjacent to the east side of building 03-0141 was excavated to a depth of 18 to 24 in. bgs, and the stained area at the northeast corner of the building was excavated to a depth of 12 in. bgs. Soil samples were field-screened for radioactivity, PAH, TPH, x-ray fluorescence (XRF) inorganic chemicals, and VOCs. The first set of XRF samples showed elevated thallium levels. After the results from cleanup verification samples were received, cleanup activities resumed to remove an additional 2 to 3 in. of thallium-contaminated soil from both excavation locations. Two samples collected after soil excavation was completed showed no elevated thallium levels. The excavated areas were backfilled with soil and gravel and compacted (LANL 1996, 053780, pp. 14–16). Before the area was backfilled, four soil samples were collected from four locations (two samples at each excavation) at depths of 0 to 0.5 ft bgs (from the bottom of each excavation) to verify site cleanup. Samples were analyzed for inorganic chemicals, SVOCs, and pesticides. Requested analyses are presented in Table 4.1-2.

Screening-level data and are presented in Table 4.1-11. Sampling locations are shown in Figures 4.1-8, 4.1-9, and 4.1-10. Lead and zinc were both detected above BVs in one sample. Cadmium was detected above BV in four samples. SVOCs and pesticides were not detected

Proposed Activities

The nature and extent of contamination have not been defined at this site. Four samples will be collected from two locations to confirm the results of the VCA (Figure 4.1-12). The samples will be collected from two depths (2.5 to 3.5 ft and 4.5 to 5.5 ft) and analyzed for inorganic chemicals, SVOCs, PCBs, cyanide, nitrate, perchlorate, and TPH-DRO. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.37 AOC 03-052(b), Storm Drainage

Site Description

AOC 03-052(b) consists of five storm-drain-access areas located about 20 ft north and west of the Sigma Building, building 03-0066 (Figure 4.1-13). Surface runoff flows across the surrounding area into the system at two locations: the system on the northeast side of building 03-0066 discharges to a storm drain outlet just north of Eniwetok Drive and a single storm drain located on the northwest side of building 03-0066 discharges to a low-lying grassy area (LANL 1995, 057590, p. 5-15-1). This AOC was investigated with AOC 03-056(k), a container storage area and loading dock at building 03-0066 (see section 4.1.42). Contaminants associated with AOC 03-056(k) may have been released into the AOC 03-052(b) storm drain system. Potential contaminants are inorganic chemicals and DU (LANL 1995, 057590, pp. 5-15-3–5-15-4).

Previous Investigations

RFI activities were conducted at this AOC in 1997. Two soil and/or fill samples were collected from each of five locations and one from a fifth location corresponding to the storm drain access areas. Samples were collected from a depth of 0 to 1 ft bgs and from a depth ranging from 1 to 5 ft bgs. Two of the samples were collected at one collocated location. The samples were field screened for radioactivity and organic chemicals. Screening did not detect organic chemicals, and radioactivity was at or below background levels (LANL 1997, 056660.4, p. iv). All samples were analyzed for metals and isotopic uranium. One sample was also analyzed for VOCs. Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Table 4.1-3. Sampling locations and detected results are shown in Figures 4.1-14 and 4.1-15. Cadmium, manganese, and nickel were detected above BVs in one sample; cobalt, lead, and zinc were detected above BVs in two samples. Detection limits for antimony, cadmium, and silver were greater than BVs for most samples. Organic chemicals and radionuclides were not detected.

Proposed Activities

The nature and extent of contamination have not been defined at this site. All five areas of AOC 3-052(b) will be sampled along with the stormwater collection area to the northeast across Eniwetok Drive (Figure 4.1-17).

Four samples will be collected from historical locations 03-03291 and 03-03286 at two depths (7 to 8 ft and 10 to 11 ft). In addition, 20 additional samples will be collected from 10 locations (2 within each area).

These samples will be collected from two depths (1 to 2 ft and 4 to 5 ft) to define the extent of contamination (Figure 4.1-17). Samples will be analyzed for inorganic chemicals, VOCs, SVOCs, and cyanide. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

Six additional samples will be collected from three locations along the northern part of the drainage between the northwest and northeast polygons associated with this site. Four samples will be collected from two additional locations within the stormwater collection area to the northeast across Eniwetok Drive (Figure 4.1-17). The samples will be collected from two depths (3 to 4 ft and 5 to 6 ft) to ensure potential COPCs from historical site operations and runoff are sampled and analyzed for inorganic chemicals, VOCs, SVOCs, and cyanide. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.38 SWMU 03-054(c), Outfall

Site Description

SWMU 03-054(c) is a former cooling tower (structure 03-0156) and pump house (structure 03-0163) and an outfall that discharged to the storm sewer and ultimately to former NPDES-permitted outfall, EPA 03A023 [SWMU 03-052(f), see section 4.1.10.2]. The cooling tower and pump house were located southwest of the former Sherwood Complex (building 03-0105) and northwest of the former Syllac Building (building 03-0287) (Figure 4.1-56). Former structures 03-0156 and 03-0163 were used to cool an electromagnet formerly located in the Sherwood Complex. The outfall discharged to the storm sewer that was formerly located 25 ft east of the cooling tower.

Previous Investigations

The Laboratory’s former Environmental, Safety, and Health group collected two composite surface soil samples directly north of the cooling tower in 1992 and two samples from the cooling tower in 1993 to characterize the structure and surrounding soil before D&D of the structures. Samples were screened for gross-alpha, -beta, and -gamma radiation and submitted for laboratory analysis of total chromium. Chromium was not detected above the EPA action level (LANL 1995, 057590, pp. 6-71, 6-72). The cooling tower and pump house were dismantled and removed, leaving only the concrete pad of the former pump house at a depth of 10 ft bgs (LANL 2001, 071214).

The Syllac Building (building 03-0287) underwent D&D activities from 2003 to 2004, and the Sherwood Complex (building 03-0105) underwent D&D activities in 2001 (LANL 2002, 073868.4, Appendix B-7, p. 1). As part of the D&D of the Sherwood Complex in 2001, the former cooling tower (structure 03-0156), all associated piping and storm drainlines, fill material within the footprint of former building 03-0156, and the existing roadway were removed (LANL 2001, 071214). Seven confirmation soil/fill samples were collected from seven locations at the bottom of the SWMU 03-054(c) excavations ranging from depths of 2 to 8.5 ft bgs. One grab sample was also collected from drainline excavated material and analyzed for metals and hexavalent chromium (Tucker 2001, 100702, pp. 1–3, 13–22). Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Table 4.1-3. Sampling locations and detected results are shown in Figure 4.1-57. Calcium, lead, and zinc were each detected above BVs in one sample. The detection limit for antimony was greater than the BV in all samples. Hexavalent chromium was not detected.

In 2004, the location of the former cooling tower and pump house (structures 03-0156 and 03-0163) and former storm drain locations to the east were excavated during site preparation activities for the new

NSSB (building 03-1400). The pump house foundation and remaining sections of the SWMU 03-054(c) storm drainline north of the former Administration Building (building 03-0043) and east of the Otowi Building (building 03-0261) were removed. The corrugated metal storm drainlines were inspected and found to be intact and in good condition. No evidence of a release was observed in the soil around and beneath the storm drainline excavation. Four confirmation samples were collected from two locations beneath the former cooling tower footprint (former structure 03-0156) and 2001 confirmation sampling location depths, and two confirmation samples were collected from one location beneath the former pump house foundation (former structure 03-0163). The samples were collected at depths of 0.0 to 0.5 ft bgs and 1.5 to 2.0 ft bgs from the bottom of the new excavation and submitted for analysis of inorganic chemicals. Requested analyses are presented in Table 4.1-1. The 2004 sampling locations are shown in Figure 4.1-57; however, no inorganic chemicals were detected above BVs.

Proposed Activities

No additional sampling is proposed because the nature and extent of contamination have been defined at this site. The SWMU 03-054(c) outfall discharged to the storm sewer and ultimately to SWMU 03-052(f). Proposed investigation activities for SWMU 03-052(f) are described in section 4.1.10 of the work plan.

4.1.39 SWMU 03-056(a), Storage Area

Site Description

SWMU 03-056(a) is a used-oil accumulation facility built in 1986. The 12-ft × 45-ft structure is located approximately 15 ft north of building 03-0271 (Figure 4.1-18). The storage area has a concrete floor that slopes toward a sump and is surrounded by a concrete berm. The area is roofed, but the sides are open. No spills from the bermed area to the environment have occurred (LANL 1993, 020947, p. 6-36).

Previous Investigations

In 2001, samples were collected to determine the nature and extent of any residual TPH or lead contamination at the site. Four asphalt samples were collected adjacent to each side of the concrete storage pad, approximately 1 ft away from the edge of the pad. Soil samples were also collected directly beneath the asphalt (at depths of 0.5 to 1.0 ft bgs) at each of the four asphalt sampling locations for a total of eight samples (LANL 2001, 070937). All samples were submitted for laboratory analysis of metals; the soil samples were also submitted for analysis of TPH-DRO. Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3 and 4.1-8. Sampling locations and detected results are shown in Figures 4.1-19 and 4.1-20. Calcium was detected above BV in all four soil samples; silver and zinc were detected above BVs in one soil sample. TPH was not detected in any of the soil samples. Antimony, cadmium, and silver were detected in one asphalt sample; with the exception of selenium and thallium (which were not detected), all remaining inorganic chemicals were detected in all asphalt samples.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Eight soil samples will be collected from four locations adjacent to the concrete (one on each side of the concrete floor) (Figure 4.1-22). The samples will be collected from two depths (0 to 1 ft of soil beneath the concrete and

1 to 2 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, and cyanide. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.40 SWMU 03-056(c), Transformer Storage Area—PCB Site

Site Description

SWMU 03-056(c) is an inactive outdoor storage area located on the north side of a utilities shop, building 03-0223. The SWMU extends along the length of building 03-0223 to the south and is bounded by a security fence to the north (Figure 4.1-29) (Faulk 1995, 055741, p. 13). The outdoor storage area was used for storing electrical equipment, capacitors, and transformers with PCB-containing dielectric fluids. Waste solvents used for cleaning electrical equipment were also stored at this location in unmarked drums (LANL 1993, 020947, pp. 5-100–5-101). The types of solvents used at the site from 1967 to approximately 1981 are not known. Viking R30 (1,1,1-trichloroethane) was used from 1981 to 1990 (Faulk 1995, 055741, p. 13). Beginning in 1990 and continuing to 1992, a nonhazardous citrus-based solvent was used as a substitute for solvent-based cleaners. It is unknown whether the solvents used at the site were stored on-site. In addition, Transclene, which contains PCE, may have been stored at the site because it was used by an electrical equipment maintenance subcontractor to retrofill transformers in the field. It is believed that the maintenance crew disposed of all these waste materials at an approved waste-disposal facility. In 1991, the site's facility manager placed approximately 1 to 2 ft of clean fill on the area occupying the former storage area to elevate it and to reroute run-on drainage away from this site. In 1992, the storage area was decommissioned (LANL 2001, 071259, p. 6).

Previous Investigations

Previous investigation and cleanup activities were performed at SWMU 03-056(c) in 1994, 1995, and 1999. In 1994, a total of 21 soil samples, 19 confirmatory samples and 3 sample splits were collected from 18 locations (LANL 1994, 040397, pp. 1-49) at depths ranging from 0 to 3 ft belowgrade. Samples were analyzed for inorganic chemicals, SVOCs, PCB/pesticides, and VOCs. Samples were also screened for gross-alpha and -beta, -gamma, and tritium (LANL 2001, 071259, p. 10).

In 1995, the site was further characterized as part of an expedited cleanup to identify the lateral extent of soil containing residual PCBs. Ten samples were collected from the western slope area to better define the lateral extent of the PCB contamination. A 45-ft-diameter area was initially mapped to represent the area of suspected contamination. A 10-ft × 10-ft grid was placed over the area of suspected contamination and soil samples were collected within grid nodes. The results of the grid sampling effort were used to target areas for soil excavation. During soil excavation activities, the lateral extent of soil contamination was further defined to encompass an area approximately 130 ft long × 70 ft wide. The western slope excavation area was expanded in a northerly direction along the mesa edge. Additional site characterization samples were collected in the northern slope area of the site. PCB-contaminated soil was excavated from an area approximately 60 ft long × 70 ft wide. Also, three soil samples were collected from the ephemeral slope drainages, downslope from the north and west slope areas (LANL 2001, 071259, p. 10).

A VCA plan was developed in 1999 for removing PCB-contaminated soil from the western and northern slope areas and the ephemeral slope drainage areas. Because of the site’s proximity to a watercourse, the PCB cleanup targets were less than 1 ppm of PCBs in soil. The VCA plan was approved by NMED in 2000 (LANL 2001, 071259, p. 2).

The remedial activities at the site, as specified in the VCA plan, began in August 2000. SWMU 03-056(c) was characterized using field screening techniques, PCB EnSys Soil Test, to determine the extent of PCB contamination (LANL 2001, 071259, p. 12). After site characterization, the contaminated soil and unconsolidated tuff were excavated. Approximately 2400 yd^3 of contaminated soil was excavated from the SWMU. During the excavation activities, field screening was used to provide immediate confirmation that all PCB-contaminated soil and unconsolidated tuff in the excavated area had been removed to a cleanup level of less than 1 ppm. Excavation field-screening activities results determined that contamination extended beyond the original SWMU boundary (LANL 2001, 071259, p. 17-20).

Following excavation activities, 89 confirmation samples were collected from 79 locations. All samples were submitted for laboratory analysis of PCBs. Twenty-one of these samples were also analyzed for metals and VOCs (LANL 2001, 071259, p. 17). Thirteen inorganic chemicals were detected above BVs. Seven organic chemicals were detected. Aroclor-1260 was detected at the highest frequency. In March 2001, the areas with elevated PCB detections were excavated. In April 2001, additional confirmation sampling was conducted. One sample was collected from each excavated location. All samples were analyzed for PCBs, and three samples were also analyzed for VOCs and metals (LANL 2001, 071259, p. 17). Confirmation sample results indicated the site met the EPA cleanup criterion for less than 1 ppm (LANL 2001, 071259, pp. iii–iv, 58). Results of final VCA activities are discussed in the VCA report (LANL 2001, 071259).

The VCA report for SWMU 03-056(c) was approved by EPA in November 2001 (EPA 2001, 072810) and by NMED in September 2002 (NMED 2002, 073363).

Proposed Activities

No sampling is proposed because the nature and extent of contamination have been defined at this site.

4.1.41 AOC 03-056(h), Container Storage Area

Site Description

AOC 3-056(h) is described in the 1990 SWMU report (LANL 1990, 007511) as a container storage area near former buildings 03-0105 (the Sherwood Complex) and 03-0287 (the Syllac Building) (Figure 4.1-56) (LANL 1990, 007511, p. 3-056.2). Several areas of potential contamination were identified with this AOC. Areas near former building 03-0287 were addressed under SWMU 03-003(c) and AOC 03-003(o) (discussed in sections 4.1.2 and 4.1.6, respectively). Building 03-0105 underwent D&D activities in 2001 (LANL 2002, 073868.4, Appendix B-7, p. 1). The site is currently occupied by the NSSB (building 03-1400).

Beginning in the mid-1950s, former building 03-0105 housed magnetic fusion energy experiments. Before a 1992 cleanout, a number of swipe samples were collected on various surfaces throughout the building. Results revealed no PCB contamination. During the salvage cleanout of former building 03-0105, some non-PCB oil was spilled north of the building. Swipe samples collected in this area at the time of the spill revealed no PCB contamination. A cable shed, structure 03-0252, located west of building 03-0105 was also removed during the 1992 decommissioning. Swipe samples collected from oil stains on the plywood floor and from beneath the floor yielded no PCBs (LANL 1995, 057590, pp. 6-64, 6-67–6-68).

Another area of potential contamination was on the southeast side of former building 03-0105. During a site reconnaissance visit in 1989, two transformers were observed inside a fenced area at this location. No oil stains were present on the asphalt around the transformers (LANL 1995, 057590, pp. 6-67–6-68).

On the west side of former building 03-0105, PCB spills were reported in September 1991 and March 1993. In the 1991 leak, soil beneath a leaking spigot was excavated until unstained soil was reached. In the 1993 incident, an oil stain under a transformer was double-washed/double-rinsed. On a site visit in 1994, only one stain was noted in the vicinity. Swipe samples at the location revealed no PCB concentrations above 2.8 µg/100 cm^2 (LANL 1995, 057590, pp. 6-67, 6-68).

The PCB-containing transformers and capacitors described above have all been removed or replaced with non-PCB equipment in accordance with the DOE/Albuquerque Operations Office Environmental Restoration and Waste Management Five-Year Plan (LANL 1995, 057590). Under this plan, any evidence of a release was sampled and cleaned up in accordance with TSCA requirements (40 CFR 761). The documented releases of PCBs were remediated in accordance with the TSCA requirements found in 40 CFR 761 (LANL 1995, 057590, p. 6-67). In addition, approximately 10 ft of clean fill was placed over the entire site to accommodate the construction of the NSSB (LANL 2008, 099214).

Proposed Activities

The PCB-containing transformers and capacitors were removed or replaced with non-PCB equipment and documented releases of PCBs were remediated in accordance with the TSCA requirements in 40 CFR 761 (LANL 1995, 057590, p. 6-67). However, the former container storage areas were not investigated for inorganic chemicals, VOCs, and SVOCs. Because this site is inaccessible and currently located beneath the foundation of the NSSB (building 03-1400), the investigation of AOC 03-056(h) will occur after D&D of the NSSB.

4.1.42 AOC 03-056(k), Container Storage Area

Site Description

AOC 03-056(k) is a container storage area on the north side of a loading dock at the northwest corner of the Sigma Building, building 03-0066 (Figure 4.1-13). Waste oil, solvents, and radioactively contaminated graphite were kept in the storage area (LANL 1990, 007511, p. 3-056). Four documented releases of radiological materials to the environment may have contributed to contamination at this AOC. Potential contaminants were inorganic chemicals and DU (LANL 1995, 057590, pp. 5-15-1, 5-15-3–5-15-4).

Previous Investigations

RFI activities were conducted at this AOC in 1997. Ten soil and fill samples were collected from six locations at depths ranging from 0 to 4.5 ft bgs. Four asphalt samples were collected at four of the locations. Samples were field screened for organic chemicals and radioactivity. Screening did not detect organic chemicals, and radioactivity was at or below BVs (LANL 1997, 056660.4, pp. 101, 104). All samples were submitted for laboratory analysis of isotopic uranium; all soil and fill samples were submitted for laboratory analysis of metals. One asphalt sample and one fill sample were analyzed for gross-alpha and -beta radiation and by gamma spectroscopy. One fill sample was also analyzed for VOCs. Requested analyses are presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3, 4.1-4, 4.1-7, and 4.1-10. Sampling locations and detected results are shown in Figures 4.1-14, 4.1-15, and 4.1-16. Lead was detected above BV in one sample, and copper was detected above BV in two fill samples. Detection limits for antimony, cadmium, and silver were greater than BVs in the 10 soil and fill samples. Carbon disulfide and 2-butanone were detected in one sample. Gross-alpha and -beta radiation were detected in one fill sample; uranium-235 was detected above BV in one fill sample, and uranium-238 was detected above BV in three fill samples.

Uranium-234, uranium-235, and uranium-238 were detected in all asphalt samples; gross-alpha and -beta radiation, cesium-134, and cesium-137 were detected in one asphalt sample.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Two deeper samples (3 to 4 ft and 6 to 7 ft) will be collected at sampling location 03-03290, and nine samples will be collected from three new locations to the south, west, and northeast of the historical sampling locations to define the vertical and lateral extents of inorganic chemical contamination (Figure 4.1-17). These samples will be collected from three depths (0 to 1 ft, 3 to 4 ft, and 6 to 7 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, and cyanide, and radionuclides. No HE was associated with this AOC; therefore, no samples will be analyzed for nitrate or perchlorate. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

To define the extent of organic chemical contamination detected, two deeper samples (3 to 4 ft and 6 to 7 ft) will be collected from sampling location 03-03281 (Figure 4.1-17). To characterize the organic chemical contamination at the AOC, four new locations will be sampled at two depths (1 to 2 ft and 3 to 4 ft). These eight samples will be analyzed for VOCs and SVOCs only.

4.1.43 SWMU 03-056(l), Storage Area

Site Description

SWMU 03-056(l) (Figure 4.1-8) is an outdoor storage facility next to the east side of building 03-0141. Containers of disposable clothing contaminated with beryllium powder are staged in this area before disposal. Carboys used to store beryllium powder in water were also staged in this area. The carboys were usually in a tray that served as secondary containment. No known releases from the drums or carboys to the environment have occurred (LANL 1995, 057590, p. 6-11).

Previous Investigations

Samples were collected from this SWMU before the planned construction of a new beryllium storage vault. The collection of three asphalt samples and three surface soil samples from beneath the asphalt within the former staging area on the east side of building 03-0141 were proposed in the 2003 sample notification. The samples were to be submitted for total beryllium analysis (LANL 2003, 075992). In 2003, three asphalt samples were collected from three locations and three soil samples were collected from beneath the asphalt samples at depths of approximately 0.5 to 2.25 ft bgs (two samples) and 0.6 to 1.6 ft bgs (one sample). One soil sample was collected from a fourth location at a depth of 0 to 1.6 ft bgs. All samples were analyzed for metals rather than total beryllium. The requested analysis is presented in Table 4.1-1.

Decision-level data are presented in Tables 4.1-3 and 4.1-8. Sampling locations and detected results are shown in Figure 4.1-9. Manganese and zinc were detected above BVs in one soil sample. Calcium and copper were detected above BVs in two soil samples. Thallium and beryllium were detected in one and two asphalt samples, respectively. With the exception of antimony and silver (which were not detected in any asphalt samples), all remaining inorganic chemicals were detected in all three asphalt samples.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Five samples from the asphalt will be collected from five locations (Figure 4.1-12). In addition, five samples will be collected from the soil under the asphalt from the same locations as the asphalt samples. The samples will be collected from a depth of 2 to 3 ft below the asphalt to confirm the results from previous investigations. Samples will be analyzed for inorganic chemicals and cyanide. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites. Section 4.1.36 provides more information on the proposed sampling.

4.1.44 Consolidated Unit 03-059-00

Consolidated unit 03-059-00 consists of AOC 03-003(n) and SWMU 03-059. This consolidated unit is a former storage area adjacent to building 03-0271 (Figure 4.1-18). SWMU 03-059 was identified as the former salvage yard, and AOC 03-003(n) was the location of a one-time PCB spill in that salvage yard. SWMU 03-059 was used to store transformers, electrical equipment, batteries, and scrap metal pending sale or reuse. The spill area [AOC 03-003(n)] is identified as being approximately 20 ft south of the northwest corner of building 03-0271.

Proposed sampling for this consolidated unit is provided in the following sections.

4.1.44.1 AOC 03-003(n), One-Time Spill—PCB Site

Site Description

AOC 03-003(n) is the location of a one-time PCB spill in the salvage yard (SWMU 03-059) located next to the south side of building 03-0271. The perimeter is fenced, except for the part that abuts building 03-0271 (Figure 4.1-18). With the exception of two small portions of the area, most of the area is asphalt-paved. The salvage yard was used to store transformers, electrical equipment, batteries, and scrap metal pending sale or reuse. Small and weather-sensitive items were stored inside building 03-0271. All other items were placed in and around the former salvage yard. The spill area identified as AOC 03-003(n) is approximately 20 ft south of the northwest corner of building 03-0271. At that location, a transformer ruptured in 1977 and leaked an estimated 10 gal. of PCB-contaminated oil into the soil. It is unclear whether the spill was cleaned up or if confirmation sampling was conducted. The drainage pattern west of building 03-0271 was altered in 1991 when the parking lot was regraded and base course was applied. The entire area received additional base course at least once since 1991. The salvage operation and materials were moved to the building 60-0002 in 1993. The former salvage-yard area is used as a parking lot and storage area for empty containers (LANL 1995, 057590, pp. 5-19-1, 5-19-3).

Previous Investigations

In 1994, two soil samples were collected from two locations within the area of the PCB spill at depths of 0 to 0.8 ft bgs. The samples were analyzed for PCBs, gross-alpha, -beta, and -gamma radiation, and tritium. Requested analyses are presented in Table 4.1-2 (as part of Consolidated Unit 03-059-00 samples). Sampling locations are shown in Figures 4.1-20 and 4.1-21. Data were of screening-level quality and no analytes were detected.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Eight soil samples will be collected from four locations to confirm the effectiveness of previous remedial actions (Figure 4.1-22). The samples will be collected from two depths (0 to 1 ft and 1 to 2 ft) and analyzed for PCBs only. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.44.2 SWMU 03-059, Storage Area—PCB Site

Site Description

SWMU 03-059 is a former salvage yard consisting of two areas. The first area is about 250 ft × 115 ft and is located adjacent to the south side of building 03-0271 (Figure 4.1-18). The perimeter is fenced, except for the part that abuts building 03-0271. With the exception of two small portions of the area, most of the area is asphalt-paved. The second area is about 100 ft × 60 ft, asphalt-paved, and fenced. Paving over both areas occurred incrementally over a period of years. Equipment also was stored outside the fenced areas.

Previous Investigations

In 1994, 10 asphalt samples were collected from 10 locations within the salvage yard at depths of 0 to 0.5 ft bgs. Samples were analyzed for PCBs, gross-alpha, -beta, and -gamma radiation, and tritium. Requested analyses are presented in Table 4.1-2 (as part of Consolidated Unit 03-059-00 samples). Screening-level data are presented in Table 4.1-15. Sampling locations are shown in Figures 4.1-20 and 4.1-21. Tritium was detected in three samples. PCBs were not detected.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Thirty-four samples will be collected from 17 locations beneath the asphalt to define nature and extent of potential contamination (Figure 4.1-22). The samples will be collected from two depths (0 to 1 ft and 2 to 3 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, tritium, and nitrate. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.1.45 AOC C-03-022, Kerosene Tanker Trailer

Site Description

AOC C-03-022 is the location of a former tanker trailer used to store and distribute kerosene for former asphalt batch plant operations. The tanker trailer was located in a bermed materials storage area on a hill directly north of the asphalt batch plant (Figure 4.1-1). The tanker was in service for approximately 15 yr and supplied kerosene through a gravity-feed line that had a valve near the oil distributor tank, AOC C-03-016, located approximately 12 ft south (directly below the hill) of the tanker. The tanker and gravity-feed line were removed in 1989, and kerosene was replaced with diesel fuel No. 2. There is no record of release or source of contamination associated with this storage tanker.

Previous Investigations

AOC C-03-022 has not been sampled.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Eight samples will be collected from four sampling locations on each side of the former tanker site to define the nature and extent of potential contamination (Figure 4.1-5). Samples will be collected from two depths (1 to 2 ft and 4 to 5 ft bgs) and analyzed for inorganic chemicals and TPH-DRO. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.2 TA-60

TA-60, also known as Sigma Site, was created from the eastern portion of TA-03 and lies on Sigma Mesa between Sandia and Mortandad Canyons. The buildings at TA-60 are all located on the western end of the mesa and contain Laboratory support and maintenance operations and contractor service facilities. The NTS test fabrication facility (building 60-0017), the NTS test tower (building 60-0018), several small abandoned experimental areas, including a solar pond and a test drill hole, a new asphalt batch plant, and storage sites for pesticides, topsoil, and tuff are also located at TA-60 (LANL 1999, 064617, p. 2-25).

Transport mechanisms include airborne surface soil, infiltration through the vadose zone, continued dissolution and advective/dispersive transport of chemical and radiological contaminants contained in subsurface soil and bedrock, and disturbance and uptake of contaminants by plants and animals. Potential receptors include laboratory workers and ecological receptors in the undeveloped areas.

During summer thunderstorms and spring snowmelt, runoff from the mesa top flows into storm drains, down hillsides, and into both Sandia and Mortandad Canyons. Surface-water runoff and erosion of contaminated surface soil may lead to contamination of bench areas on the hillside and surface water off-site. Surface water may also access subsurface contaminants exposed by soil erosion. Groundwater sampling for Upper Sandia Canyon is discussed in the Sandia Canyon Phase I sediment investigations summary report (LANL 2006, 094161). This work plan only addresses the collection of soil and tuff samples.

Samples collected for TA-60 and analyses requested for decision-level data are presented in Table 4.2-1; for screening-level data in Table 4.2-2. Decision-level data are presented in Tables 4.2-3 and 4.2-4; screening-level data in Tables 4.2-5 to 4.2-7. All laboratory analytical data (both decision-level and screening-level) are also provided in Appendix B of the HIR (LANL 2008, 100693). Figures 4.2-1 to 4.2-19 include base maps; maps showing inorganic chemicals and radionuclides detected above BVs/FVs and detected organic chemicals; and maps showing the proposed sampling locations for TA-60 sites.

4.2.1 SWMU 60-002, Storage Area

Site Description

SWMU 60-002 consists of three former storage areas (designated as western, central, and eastern) on Sigma Mesa. The first area (western) measures approximately 200 ft × 300 ft and is located approximately 900 ft southeast of building 60-0002, on the north side of the unimproved road that traverses the mesa (Figure 4.2-1). Historically, piles of concrete blocks, wooden poles, tuff fill, and cables were stored at this location. A large mound of fill, with pieces of cured asphalt and concrete, was situated in the northern portion of the site. The second area (central) was located approximately 120 ft northwest of the pesticide storage facility (building 60-0029) and consisted of a 50-ft-diameter mound of fill approximately 10 ft high with construction debris including concrete fence post supports, pipe, metal strips, and wood (Figure 4.2-6). The third area (eastern) is on the south side of the unimproved road about 100 ft west of a surface impoundment [SWMU 60-005(a)] near the end of the mesa (Figure 4.2-10).

This area was used to stage piles of broken cured asphalt chunks removed from roadways and parking lots before if was recycled (LANL 2005, 100704). The eastern area is currently the site of an asphalt batch plant (Shaw Environmental Inc., 2003, 085517, p. 1).

Previous Investigations

Sampling was conducted at the central area of SWMU 60-002 in 2004. Six soil samples were collected from three locations at depths of 0 to 1 ft bgs and 1.5 to 2 ft bgs. Five samples were analyzed for inorganic chemicals, VOCs, SVOCs, PCBs, and TPH. One sample was analyzed only for VOCs, PCBs, and TPH (LANL 2005, 100704, p. 5). Requested analyses are presented in Table 4.2-1.

Decision-level data are presented in Tables 4.2-3 and 4.2-4. Sampling locations are shown in Figures 4.2-7 and 4.2-8. Manganese was detected above BV in one sample. Acenaphthene, Aroclor-1254, Aroclor-1260, and TPH-GRO were each detected in two samples.

In 2003, sampling was conducted at the eastern area of SWMU 60-002 (LANL 2003, 080912, p. 4) that included the drilling of six boreholes. Ten soil and tuff samples were collected from five boreholes at two depth intervals ranging from 3 to 6 ft bgs and 13.5 to 17 ft bgs. Three tuff samples were collected from the sixth borehole at depths of 4 to 4.5 ft bgs, 8.5 to 9 ft bgs, and 14.5 to 15 ft bgs. All samples were submitted for laboratory analyses of inorganic chemicals, VOCs, SVOCs, and TPH. Requested analyses are presented in Table 4.2-1.

Decision-level data are presented in Tables 4.2-3 and 4.2-4. Sampling locations and detected results are shown in Figures 4.2-11 and 4.2-12. Barium, cobalt, and zinc were each detected above BVs in one soil sample; calcium and nickel were detected above BVs in two soil samples. Beryllium, cobalt, copper, manganese, and selenium were each detected above BVs in one tuff sample; iron and lead were detected above BVs in two tuff samples; arsenic, barium, calcium, chromium, magnesium, nickel, and vanadium were detected above BVs in three tuff samples; aluminum was detected above BV in four tuff samples. Fluoranthene, fluorene, and pyrene were each detected in one soil sample; hexanone(2-), was detected in one tuff sample; acetone was detected in five tuff samples; TPH-DRO was detected in all samples. The detection limits for cadmium and selenium in numerous soil and tuff samples were higher than BVs.

Samples have not been collected at the western area of SWMU 60-002. Although there is no specific data for this area, the location of the SWMU in relation to other sampling locations is shown in Figures 4.2-2, 4.2-3, and 4.2-4.

Proposed Activities

The nature and extent of contamination have not been defined for SWMU 60-002 (west). Twelve soil samples will be collected from six sampling locations to define nature and extent of contamination (Figure 4.2-5). The samples will be collected from four depths (1 to 2 ft and 4 to 5 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, TPH-GRO, PCBs, and cyanide. No HE or radionuclides are associated with this SWMU; therefore, no samples will be analyzed for nitrate, perchlorate, or radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

No sampling is proposed at SWMU 60-002 (central) and SWMU 60-002 (east) because the nature and extent of contamination have been defined. Previous investigations at these sites detected TPH. TPH results were compared with, and found to be below, NMED’s TPH screening guidelines for industrial and residential land uses (NMED 2006, 094614).

4.2.2 AOC 60-004(b), Storage Area

Site Description

AOC 60-004(b) is a former staging area for 12 containers of diesel sludge removed from underground storage tanks at the power plant. The containers were stored at AOC 60-004(b) in 1988. The storage site is located northeast of the geothermal well mud pit at the east end of Sigma Mesa and is contained within the boundaries of AOC 60-004(d) (Figure 4.2-10). Potential contaminants were oil and petroleum products (LANL 1993, 020947, pp. 1-7, 5-70, 5-76).

Previous Investigations

RFI activities were performed at AOC 60-004(b) in 1994. Two soil samples were collected from two locations at depths of 0 to 1 ft bgs and submitted for laboratory analyses of inorganic chemicals, SVOCs, PCBs, and pesticides (LANL1996, 052930, pp. 149, 150). A third soil sample was collected south and adjacent to AOC 60-004(b) within the boundary of AOC 60-004(d). The sample was collected from a depth of 0 to 1 ft bgs and analyzed for VOCs and gross-alpha, -beta, and -gamma radiation. Requested analyses are presented in Table 4.2-2.

Screening-level data are presented in Tables 4.2-5 and 4.2-6. Sampling locations are shown in Figures 4.2-11, 4.2-12, and 4.2-13. Mercury was detected above BV in one sample. Bis(2-ethylhexyl)phthalate, phenol, and Aroclor-1254 were detected in one sample. VOCs and radionuclides were not detected.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Twenty-five soil samples will be collected from five boreholes around AOCs 60-004(b) and 60-004(d) (Figure 4.2-14). The samples will be collected from five depths (0 to 1 ft, 2 to 3 ft, 4 to 5 ft, 9 to 10 ft, and 14 to 15 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, cyanide, and TPH-DRO. No HE or radionuclides are associated with this SWMU; therefore, no samples will be analyzed for nitrate, perchlorate, or radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.2.3 AOC 60-004(d), Storage Area

Site Description

AOC 60-004(d) is an area formerly used to dismantle decommissioned underground storage tanks and to temporarily stage drums containing fluids removed from underground storage tanks. The site is located northeast of the geothermal well mud pit at the east end of Sigma Mesa (Figure 4.2-10). The area was first developed in 1979 during a drilling project for a geothermal well. The northern edge of the area was used to stage building rubble, concrete, and rebar. Potential contaminants were oil and petroleum products (LANL 1993, 020947, pp. 5-69, 5-70).

Previous Investigations

RFI activities conducted at AOC 60-004(d) in 1994 were the same as those for AOC 60-004(b), discussed in section 4.2.2. Requested analyses are presented in Table 4.2-2. Data are of screening-level quality and are presented in Tables 4.2-5 and 4.2-6. Sampling locations are shown in Figures 4.2-11, 4.2-12, and 4.2-13.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Twenty-five soil samples will be collected from five boreholes around AOCs 60-004(b) and 60-004(d) (Figure 4.2-14). The samples will be collected from five depths (0 to 1 ft, 2 to 3 ft, 4 to 5 ft, 9 to 10 ft, and 14 to 15 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, cyanide, and TPH-DRO. No HE or radionuclides are associated with this SWMU; therefore, no samples will be analyzed for nitrate, perchlorate, or radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.2.4 AOC 60-004(f), Storage Area

Site Description

AOC 60-004(f) consists of two unpaved, bermed pads, Pad 2 and Pad 3, formerly used for new-product storage. The pads were constructed in 1978 when the maintenance warehouse (building 60-0002) was built (Figure 4.2-1). The pads were located southeast of building 60-0002. Pad 2 was 12 ft × 65 ft and Pad 3 was 12 ft × 40 ft. Both pads stored 55-gal. containers that dispensed Stoddard solvent, antifreeze, motor oil, grease, transmission fluid, and window-washing fluid. In 1985, 6-in. asphalt berms were built at the open ends of both pads to mitigate rainfall run-on and runoff. In 1990, all containers were removed from the pads. Both pads were stained and had a petroleum odor (LANL 1993, 020947, pp. 5-15–5-16).

Previous Investigations

RFI activities were conducted at AOC 60-004(f) in 1994. Thirteen samples were collected from five locations at Pad 2, and 11 samples were collected from five locations at Pad 3. At Pad 2, four samples (one sediment, one soil, and two tuff) were collected from one location at depths ranging from 0 to 7 ft bgs; four samples (two soil and two tuff) were collected from a second location at depths ranging from 1 to 6 ft bgs; three soil samples were collected from three locations at depths ranging from 1 to 2 ft bgs; and two sediment samples were collected from two locations at depths of 0 to 1.5 ft bgs. At Pad 3, four samples (two soil and two tuff) were collected from depths ranging from 1 to 6.5 ft bgs; four samples (two soil and two tuff) were collected from a second location at depths ranging from 1 to 6 ft bgs; and three samples (two soil and one tuff) were collected at a third location at depths ranging from 2 to 6 ft bgs. All samples were analyzed for radionuclides. Approximately half the samples were submitted for laboratory analyses of inorganic chemicals, VOCs, SVOCs, PCBs, and pesticides (LANL 1996, 052930, pp. 167–169). Requested analyses are presented in Table 4.2-2.

Screening-level data are presented in Tables 4.2-5, 4.2-6, and 4.2-7. Sampling locations are shown in Figures 4.2-2, 4.2-3, and 4.2-4. Aluminum was detected above BV in four tuff samples; arsenic was detected above BVs in one sediment and one tuff sample; barium was detected above BVs in two sediment and five tuff samples; calcium was detected above BV in two tuff samples; chromium was detected above BV in four tuff samples; copper was detected above BVs in one sediment and one soil sample; lead was detected above BV in one tuff sample; magnesium was detected above BV in four tuff samples; manganese was detected above BV in one soil sample; mercury was detected above BV in four tuff samples; nickel was detected above BV in one tuff sample; zinc was detected above BVs in one sediment and three soil samples. Aroclor-1254 and Aroclor-1260 were detected in one tuff sample. Tritium was detected in one soil, one sediment, and eight tuff samples. VOCs, SVOCs, and pesticides were not detected.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Twenty soil samples will be collected from five boreholes at AOC 60-004(f) (Figure 4.2-5). The samples will be collected from four depths (0 to 1 ft, 2 to 3 ft, 4 to 5 ft, and 9 to 10 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, cyanide, TPH-DRO, and tritium. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.2.5 SWMU 60-006(a), Septic System

Site Description

SWMU 60-006(a) is a decommissioned septic system located on Sigma Mesa near the northeast corner of the fence surrounding buildings 60-0017 and 60-0019. This septic system formerly served buildings 60-0017 (NTS test rack fabrication facility) and 60-0019 (NTS test tower) (Figure 4.2-6). The septic system consists of a 1000-gal. septic tank and associated 4-ft-wide × 50-ft-deep seepage pit. No outfall is associated with this system. Building 60-0017 began operating in 1986 to fabricate equipment for testing activities carried out at NTS. From 1986 to 1989, wastewater generated from facility bathrooms and seven floor drains, including one in a paint booth, was discharged to the septic system. In 1989, building 60-0017 was connected to the sanitary sewer. Potential contaminants are inorganic chemicals and organic chemicals (LANL 1993, 020947, pp. 5-63, 5-64).

Previous Investigations

RFI activities were performed at SWMU 60-006(a) in 1994 to determine whether the septic tank had been drained and, if not, whether its contents were hazardous. The tank was found to be full, and two waste characterization samples were collected from the sludge in the tank (LANL1996, 052930, pp. 181, 182). The samples were analyzed for inorganic chemicals, SVOCs, gross-alpha, -beta, and -gamma radiation, and tritium (LANL 1996, 052930, pp. 183, 185). Requested analyses are presented in Table 4.2-2.

Screening-level data are presented in Tables 4.2-5 and 4.2-7. There are no BVs for any analytes in sludge; therefore, only inorganic chemicals and tritium are reported as detected in both samples. SVOCs were not detected.

Proposed Activities

Both the septic tank and the seepage pit will be removed. The septic tank and its contents, and seepage pit materials will be removed and disposed of at an appropriate waste facility (Figure 4.2-9). Nine confirmatory soil samples will be collected from three boreholes at and near the inlet and outlet areas of the tank’s former location to determine if a release to the environment has occurred. The samples will be collected from three depths (5 to 6 ft, 9 to 10 ft, and 14 to 15 ft) below the tank and analyzed for inorganic chemicals, VOCs, SVOCs, PCBs, cyanide, nitrate, perchlorate, and radionuclides. Additional excavation and sampling depends on the results of the initial analyses. Four soil samples will be collected from one borehole within the seepage to determine the nature and vertical extent of potential contamination (Figure 4.2-9). Samples will be collected from four depths (2 to 3 ft, 5 to 6 ft, 9 to 10 ft, and 14 to 15 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, cyanide, nitrate, perchlorate, and radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.2.6 SWMU 60-007(a), Release

Site Description

SWMU 60-007(a) is a 50-ft × 100-ft former storage area located near the east end of Sigma Mesa (Figure-4.2-10) that was used to store equipment for the drilling of a geothermal well. Oil, hydraulic fluid, and similar materials were released to the environment. In 1992, areas of stained soil were removed, placed in containers, and disposed of by the user group. The remediated areas were covered with gravel. No sampling was conducted by the user group to confirm removal of the contamination (LANL 1996, 052930, pp. 189–190).

Previous Investigations

RFI activities were conducted at SWMU 60-007(a) in 1994. Eleven soil samples were collected from eight locations and field screened for PCBs and organic chemicals. With the exception of one sample, field test kits did not detect PCBs. Organic chemicals were detected at elevated readings, but moisture interference was suspected as the reason (LANL1996, 052930, pp. 192–194). One fill and five soil samples were collected from five locations at depths of 0 to 1 ft bgs. Two samples were analyzed for inorganic chemicals, five were analyzed for VOCs, two were analyzed for SVOCs, and three were analyzed for PCBs. Five additional soil and fill samples were collected from four locations art depths of 0 to 1 ft bgs and analyzed for gross-alpha, -beta, and -gamma radiation. Requested analyses are presented in Tables 4.2-1 and 4.2-3.

Decision-level data are presented in Tables 4.2-3 and 4.2-4. Sampling locations and detected results are shown in Figures 4.2-11 and 4.2-12. Barium was detected above BV in one sample. Toluene was detected in one sample. SVOCs and PCBs were not detected.

Sampling was also performed at SWMU 60-007(a) in 2001 (LANL 2001, 070937, pp. 1, 4). Six fill samples were collected from six locations at depths of 0 to 0.25 ft bgs and 0 to 0.5 ft bgs. All samples were submitted for laboratory analyses of inorganic chemicals, PCBs, and TPH (LANL 2001–2002, 100703, pp. 2–3). Requested analyses are presented in Table 4.2-1.

Decision-level data are presented in Tables 4.2-3 and 4.2-4. Sampling locations and detected results are shown in Figures 4.2-11 and 4.2-12. Thallium was detected above BV in one sample. TPH-DRO and TPH-LRO were detected in two and three samples, respectively. No PCBs were detected.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Twelve soil samples will be collected from four locations to define the nature and extent of contamination (Figure 4.2-14). The samples will be collected from three depths (0 to 1 ft, 2 to 3 ft, and 4 to 5 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, cyanide, and PCBs. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

4.2.7 SWMU 60-007(b), Release

Site Description

SWMU 60-007(b) is a storm drainage ditch that starts approximately 600 ft from a paved area directly north of the motor pool building (building 60-0001) and extends to the bottom of Sandia Canyon (Figure 4.2-15). Two parking lots located east of building 60-0001 drain to a ditch that eventually joins the

SWMU 60-007(b) drainage ditch. Other former sources of potential contamination to the ditch are a steam-cleaning pad, a used-oil storage tank, and an oil/water separator. In addition, equipment that used PCB-containing oil was stored on an asphalt area east of building 60-0001 (LANL 1993, 020947, pp. 5-14–5-15). In 1986, the user group removed stained soil from the ditch (LANL 1996, 052930, p. 195).

Previous Investigations

In 1994, RFI activities were conducted at SWMU 60-007(b) to determine if any contamination remained in the sediment after the 1986 soil removal. Eight samples were collected from seven locations in the east/west drainage ditch north of building 60-0001 and field-tested for PCBs; PCBs were not detected. In the north/south drainage ditch east of building 60-0001, seven locations were field-screened for organic chemicals. No organic chemicals were detected. Six soil and sediment samples were collected from four locations at depths ranging from 0 to 1.5 ft bgs. Two sediment samples were analyzed for metals; one soil and one sediment sample were analyzed for VOCs; two sediment samples were analyzed for SVOCs; and two samples were analyzed for PCBs. All samples were analyzed for gross-alpha, -beta radiation, and tritium (LANL 1996, 052930, pp. 195–199). Requested analyses are presented in Table 4.2-2.

Screening-level data are presented in Tables 4.2-5, 4.2-6, and 4.2-7. Sampling locations are shown in Figures 4.2-16, 4.2-17, and 4.2-18. Calcium was detected above BV in one sample. Bis(2-ethylhexly)phthalate was detected in one sample. Tritium was detected in three samples. VOCs and PCBs were not detected.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Twenty-four sediment samples will be collected from 12 locations within the drainage (Figure 4.2-19). Samples will be collected from two depths (0 to 1 ft and 1 to 2 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, TPH-DRO, cyanide, and PCBs. No HE or radionuclides are associated with this SWMU; therefore, no samples will be analyzed for nitrate, perchlorate, or radionuclides. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

In addition, samples will be collected from the drainage downgradient of this site as part of the Sandia Canyon and Cañada del Buey investigation work plan (LANL 1999, 064617); data will be provided in an investigation report to be submitted to NMED in December 2008. Data from the sediment sampling locations will be assessed in the Upper Sandia Canyon Aggregate Area investigation report to confirm the nature and extent of contamination have been determined for SWMU 60-007(b).

4.3 TA-61

TA-61 was created from a portion of TA-03 and is bounded on the north by Los Alamos Canyon and on the south by Sandia Canyon (LANL 1999, 064617, p. 2-27).

Transport mechanisms include airborne surface soil, infiltration through the vadose zone, continued dissolution and advective/dispersive transport of chemical and radiological contaminants contained in subsurface soil and bedrock, and disturbance and uptake of contaminants by plants and animals. Potential receptors include laboratory workers, constructions workers, and ecological receptors in the undeveloped areas.

During summer thunderstorms and spring snowmelt, runoff from the mesa top flows into storm drains, down hillsides, and into both Sandia and Mortandad Canyons. Surface-water runoff and erosion of contaminated surface soil could lead to contamination of bench areas on the hillside and surface water off-site. Surface water may also access subsurface contaminants exposed by soil erosion. Groundwater sampling for Upper Sandia Canyon is addressed in the Sandia Canyon investigation report (LANL 2006, 094161).

TA-61 has not been previously sampled; therefore, no data tables are included and Figures 4.3-1 to 4.3-3 include only the base maps and proposed sampling locations.

4.3.1 SWMU 61-002, Transformer Storage Area—PCB Site

Site Description

SWMU 61-002 is a former storage area at TA-61, east of the Radio Repair Shop (building 61-0023, formerly building 03-0282) on East Jemez Road (Figure 4.3-1). This storage area is part of a fenced area that measures 81 ft × 91 ft. Historically, the area was used to store capacitors and transformers. In addition, the storage area contained several oil-filled containers and unmarked containers. Before 1985, containers of PCB-contaminated oil were stored in this area and were known to have leaked. In 1986, elevated PCB concentrations were detected in 32 soil samples collected at this area. The area was subsequently excavated, backfilled with clean soil, and paved over with asphalt. After the 1986 remediation, the east side of the storage area was used to store electrical equipment, some of which contained PCBs (LANL 1993, 020947, p. 5-101). All storage operations were discontinued in 1992. Staining was observed on the surface of the asphalt. Potential contaminants are PCBs and possibly lead (LANL1996, 052930, p. 201).

Previous Investigations

In the summer of 1994, RFI activities were conducted at SWMU 61-002 to determine if PCBs were present in the stains on the asphalt or in surface soil downgradient from the site. Sampling locations were selected using the stained areas and a minor drainage area as reference points. Eighteen soil samples were collected from 16 locations (0 to 6 in. bgs). Samples were field-screened for VOCs, and analyzed for SVOCs, PCBs, and metals. Zinc was detected above BV. Elevated PCB concentrations were found in two samples in the drainage pathway at the farthest downgradient locations sampled. The RFI report recommended further investigation at SWMU 61-002 to identify the extent of contamination (LANL 1996, 052930, pp. 204–205). In 1997, 42 samples (soil, fill, tuff, and asphalt) were collected from 19 locations (0 to 1.8 ft bgs) and submitted to an off-site analytical laboratory for analysis of PCBs. PCBs were detected in 38 samples. No report was written for this sampling event. In 2004, an accelerated corrective action (ACA) work plan was submitted to NMED for the investigation and remediation of SWMU 61-002 (LANL 2004, 087474, p. 6).

In 2005, NMED approved the ACA work plan with modifications (NMED 2005, 087835). During the 2005 investigation and remediation of residual PCB contamination, petroleum-hydrocarbon contamination was discovered in the subsurface. As a result, in August 2005, two underground product lines and a total of 424 yd^3 of soil were removed. The contaminated area was further characterized in 2006. The results of the 2005 and 2006 sampling and remediation activities were reported in a remedy completion report (LANL 2007, 097315). A revised remedy completion report was submitted to NMED in November 2007 (LANL 2007, 100722).

Proposed Activities

No sampling is proposed for this site because it has already been remediated (LANL 2007, 100722).

4.3.2 SWMU 61-005, Landfill

Site Description

SWMU 61-005 consists of the Los Alamos County landfill. The landfill was established in 1974 and is owned by DOE and operated by Los Alamos County for use by the public, the county, and the Laboratory. It has a permit to manage nonhazardous solid waste and is regulated by NMED (LANL 1993, 020947, p. 6-9).

The landfill is located in TA-61 on the rim of Sandia Canyon near East Jemez Road. It consists of 400-ft^2 pits excavated into tuff (Figure 4.3-3). The pits are designed so runoff does not enter the canyon. Waste is deposited into the active pit and daily covered with soil. When full, the pit is capped and a new pit is put into service.

Previous Investigations

Samples have not been collected from this site.

Proposed Activities

No sampling is proposed for this SWMU because it is an active unit regulated under RCRA Subtitle D. Although a few active cells continue to accept waste, this landfill is currently being closed under RCRA Subtitle D.

4.3.3 SWMU 61-006, Waste-Oil Tank

Site Description

SWMU 61-006 is an active oil recycling area located at the Los Alamos County landfill (SWMU 61-005) (Figure 4.3-1). The oil recycling area consists of an open, lined pit approximately 10 ft × 20 ft × 7 ft deep that contains a 2500-gal. holding tank. An 8-ft-long pipe leads to a filling bin at ground level. Historically, three underground tanks were in the pit; in 1989, two of the tanks were removed (LANL 1990, 007514, p. 61-006). The area where the former tanks were located was excavated as a disposal pit for use at the landfill (LANL 1993, 020947, p. 6-10). The third tank was moved to its current location in the open, lined pit. The pit was covered, a leak detection system was installed on the tank, and the pit was relined with an improved liner (LANL 1993, 020947, p. 6-10). Upgrades were completed in 2000.

Previous Investigations

Samples have not been collected from this site.

Proposed Activities

No sampling is proposed for this SWMU because it is an active RCRA-regulated unit under 40 CFR 279 and 20.4.1.1002 New Mexico Administrative Code, Standards for the Management of Used Oil. This SWMU has a leak detection system and a spill control and countermeasure plan that addresses releases to the environment.

4.3.4 AOC C-61-002, Subsurface Contamination

Site Description

AOC C-61-002 is an area of subsurface contamination that was encountered in 1995 during a drill rig test. The area is located in TA-61, approximately 15 ft north of building 61-0016, a former storage building (former structure 03-0326) (Figure 4.3-1). During the drilling test, an odor was noted, and contamination was encountered at 7 to 8 ft bgs. The contamination was suspected to be petroleum-based (e.g., diesel). A sample of the tuff was collected and the analysis showed the presence of diesel. Interviews conducted with personnel after the drilling was completed indicated that the source of the diesel may have been the previous road maintenance support work performed in the area (LANL 1995, 049550, p. 2).

Past Investigations

Samples have not been collected from this site.

Proposed Activities

The nature and extent of contamination have not been defined at this site. Thirty samples will be collected from five boreholes to define nature and extent of contamination (Figure 4.3-2). Samples will be collected from six depths (3 to 4 ft, 5 to 6 ft, 7 to 8 ft, 9 to 10 ft, 11 to 12 ft, and 14 to 15 ft) and analyzed for inorganic chemicals, VOCs, SVOCs, cyanide, and TPH-DRO. Table 4.0-1 provides a summary of the proposed sampling locations, depths, and analytical suites.

5.0 INVESTIGATION METHODS

A summary of investigation methods to be implemented is presented in Table 5.0-1. The standard operating procedures (SOPs) used to implement these methods are available at http://www.lanl.gov/environment/all/qa.shtml.

Summaries of the field-investigation methods are provided below. Additional procedures may be added as necessary to describe and document quality-affecting activities.

Chemical analyses will be performed in accordance with the analytical statement of work (LANL 2000, 071233). Accredited contract analytical laboratories will use the most recent EPA- and industry-accepted extraction and analytical methods for chemical analyses of analytical suites.

5.1 Field Surveys

The following sections describe the field surveys that will be conducted at the Upper Sandia Canyon Aggregate Area.

5.1.1 Geodetic Surveys

Geodetic surveys will be conducted by a land surveyor in accordance to the latest version of SOP-03.11, Coordinating and Evaluating Geodetic Surveys, to locate historical structures and to document field activities such as sampling and excavation locations. The surveyors will use a Trimble GeoXT hand-held global-positioning system (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 as per the National Geodetic Vertical Datum of 1929. All GPS equipment used will meet the accuracy requirements specified in the SOP.

5.1.2 Geophysical Surveys

Geophysical surveys will be performed at selected sites to verify the location, dimensions, total depth, base profile, topography, low-elevation point, and downslope end using as-built construction drawings and boring logs. The surveys will verify locations determined from engineering drawings, site reconnaissance, and geodetic surveys and refine assessments of the subsurface structures. Geophysical methods employed may include electromagnetic, gravity, and ground-penetrating radar, as appropriate, to effectively delineate the materials or feature being surveyed.

5.2 Subsurface Characterization

5.2.1 Drilling Methods for Boreholes

Boreholes will be drilled by hollow-stem auger or hand-auger methods, as indicated in section 4. A brief description of these methods is provided below. Boreholes will be drilled in accordance with SOP-04.01, Drilling Methods and Drill Site Management. Selected boreholes will be geophysically logged with caliper, camera, neutron, and natural gamma tools according to the current versions of SOP-04.04, Contract Geophysical Logging, and SOP-07.05, Subsurface Moisture Measurements Using a Neutron Probe.

5.2.1.1 Hollow-Stem Auger

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. The hollow stem also acts to case the borehole core temporarily so a well casing (riser) may be inserted down through the center of the auger once the desired depth is reached, thus minimizing the risk of possible collapse of the borehole. 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 the 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 auguring out the plug with a solid-stem auger bit sized to fit inside the hollow-stem auger.

5.2.1.2 Hand Auger

Hand augers may be used to bore shallow holes (0 to 15 ft). The hand auger is advanced by turning or pounding the auger into the soil until the barrel is filled. The auger is removed and the sample is dumped out. Motorized units for one or two operators may be used and can reach depths up to 30 ft under certain conditions.

5.2.1.3 Borehole Abandonment

All boreholes will be properly abandoned according to the most recent version of SOP-5.03, Monitoring Well and RFI Borehole Abandonment, except those identified for completion as vapor-monitoring wells, moisture-monitoring wells, or groundwater-monitoring wells, by one of the following methods.

- Shallow boreholes, with a total depth of 20 ft or less, will be abandoned by filling the borehole with bentonite chips and then hydrated. Chips will be hydrated in 1- to 2-ft lifts. The borehole will be visually inspected while the bentonite chips are being added to ensure that bridging does not occur.
- Boreholes greater than 20 ft in depth will be pressure-grouted from the bottom of the borehole to the surface using the tremie pipe method. Acceptable grout materials include cement or bentonite grout, neat cement, or concrete.

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 investigation report.

5.3 Sample Collection

5.3.1 Surface Samples

Surface and shallow subsurface soil and sediment samples will be collected during drilling activities, in accordance with SOP-06.09, Spade and Scoop Method for the Collection of Soil Samples. Stainless-steel shovels, spades, scoops, and bowls will be used for ease of decontamination. Decontamination will be completed using a dry decontamination method with disposable paper towels and an over-the-counter cleaner, such as Fantastik or an equivalent. Disposable tools made of polystyrene or Teflon will also be used, if necessary. In some cases, for deeper sample intervals, hand-augering tools, including power augers, will be used to collect shallow subsurface samples if geologic material conditions permit. The tools to be used and their applicability are described in the current version of SOP-06.10, Hand Auger and Thin-Wall Tube Sampling. If the surface location is at bedrock, an axe or hammer and chisel will be used to collect samples.

Quality assurance/quality control (QA/QC) samples will include field duplicate samples, equipment blanks, trip blanks, and reagent blanks. These samples will be collected following the current version of SOP-01.05, Field Quality Control Samples, and will comply with a frequency of 10% of total samples collected for field duplicates and rinsate blanks. Trip blanks will be supplied and remain with analytical samples when samples are collected for VOC analysis. QA/QC samples are used to monitor the validity of the sample collection procedures.

Soil and sediment samples will be field-screened as described in the following sections and placed in the appropriate sample container(s) as grab samples collected with hand augers, scoops, or chiseling devices in accordance with the sampling guidance document and appropriate SOPs (SOP-01.01 to SOP-01.08).

5.3.2 Subsurface Samples

Following the current version of SOP-06.24, Sample Collection from Split-Spoon Samplers and Shelby Tube Samplers, and SOP-06.26, Core Barrel Sampling for Subsurface Earth Materials, subsurface samples will be collected from core extracted in a split-spoon core barrel. Samples collected for chemical analysis will be placed in the appropriate sample containers depending on the analytical method requirement in accordance with the sampling guidance and appropriate SOPs listed in Table 5.0-1. The analytical suites for the samples from each borehole will vary according to the data requirements, as described in Table 4.0-1 and section 4 of this work plan.

QA/QC samples will include field duplicate samples, equipment blanks, trip blanks, and reagent blanks. These samples will be collected following the current version of SOP-01.05, Field Quality Control Samples, and will comply with a frequency of 10% of total samples collected for field duplicates and rinsate blanks. Trip blanks will be supplied and remain with analytical samples when samples are collected for VOC analysis. QA/QC samples are used to monitor the validity of the sample collection procedures.

Following the current version of SOP-12.01, field documentation of samples collected from fractures will include a detailed physical description of the fracture-fill material and rock matrix sampled. The volumes of fracture-fill and rock-matrix material included in the sample will be estimated from field measurements. Additional samples will be collected from the rock matrix adjacent to the fracture sample material to allow for comparison.

Field documentation will also include detailed borehole logs for each borehole drilled. 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. All field documentation will be completed in accordance with the current version of SOP-12.01.

5.3.3 Sediment Samples

Sediment samples will be collected from areas of sediment accumulation that include sediments considered to be representative of the historical period of Laboratory operations. The locations were selected based on geomorphic relationships in areas that have probably been affected by discharges from Laboratory operations. Sediment sampling locations have been selected and are shown in the figures depicting the proposed sampling locations. However, because sediment systems are dynamic and subject to redistribution by runoff events, some locations may need to be adjusted at the time this work plan is implemented. In the course of collecting sediment samples, it may be determined that a selected location is not appropriate because of conditions observed during excavation of the sediment (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 may be adjusted as appropriate. Any changes to sediment sampling locations will be documented as deviations from this investigation work plan.

5.3.4 Excavation

Excavations or text pits will be completed using a track excavator or backhoe at selected site(s). Excavated soil will be staged a minimum of 3 ft from the edge of the excavation, and excavations deeper than 4 ft bgs will be appropriately benched to allow access and egress, if necessary. After field screening, confirmation sampling, and any necessary overexcavation work are completed, the excavations and/or trenches will be backfilled with clean fill material. Excavators may also be used to collect grab samples for those locations where hand augers or power augers encounter refusal before the maximum proposed sampling depth.

5.4 Laboratory Analytical Methods

The analytical suites vary by area as specified in section 4 and summarized in Table 4.0-1. All analytical suites are presented in the statement of work for analytical laboratories (LANL 2000, 071233). Sample collection and analysis will be coordinated with the Sample Management Office.

5.5 Health and Safety

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

5.6 Equipment Decontamination

Equipment for drilling and sampling will be decontaminated before and after drilling and sampling activities (as well as between drilling boreholes) to minimize the potential for cross-contamination. Drilling/exploration equipment that may come in contact with the borehole will be decontaminated by steam-cleaning, by hot water pressure-washing, or by another method before each new borehole is drilled. All sampling and measuring equipment, including, but not limited to, stainless-steel sampling tools, split-barrel or core samplers, well-developing or purging equipment, groundwater-quality measurement instruments, and water-level measurement instruments, will be decontaminated in accordance with SOP-01.08, Field Decontamination of Drilling and Sampling Equipment. The equipment will be pressure-washed with a high-density polyethylene liner on 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. All parts of the drilling equipment, including the undercarriage, wheels, tracks, chassis, and cab, will be thoroughly cleaned. Air filters on equipment operating in the exclusion zone will be decontaminated, removed, and replaced before the equipment leaves the site. Sites identified as radiological control areas based upon surface radiological surveys will have all equipment surveyed by a Health and Safety Radiation Control Division technician before it is released from the site.

5.7 Investigation-Derived Waste

IDW 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 IDW generated during field-investigation activities will be managed in accordance with applicable SOPs. These SOPs incorporate the requirements of all applicable EPA and NMED regulations, DOE orders, and Laboratory implementation requirements. Appendix B presents the IDW management plan.

5.8 Cleanup Activities

Removal of the inactive components of SWMU 60-006(a) and septic tank are proposed for cleanup under this investigation work plan. Excavation of contaminated media, waste disposition, and confirmation sampling will be completed at this SWMU. This section summarizes proposed cleanup activities.

5.8.1 Description of Proposed Actions

The general sequence of activities for waste excavation, transportation, disposal, and confirmation sampling is summarized below. Specific details for the site are provided in section 4.2.5.

5.8.1.1 Removal of Septic Tank and Seepage Pit and Contaminated Soil

The general sequence of waste-removal activities is summarized below:

- Mobilization
    - ❖ Assemble construction documents
    - ❖ Conduct construction readiness assessment
    - ❖ Conduct preconstruction meeting
    - ❖ Construct access roads
    - ❖ Construct staging area
    - ❖ Install temporary field trailers
    - ❖ Determine limits of waste
    - ❖ Mobilize heavy equipment to site
    - ❖ Identify underground utilities
- Site preparation
    - ❖ Install fencing
    - ❖ Install stormwater controls
    - ❖ Abandon/relocate utilities
    - ❖ Conduct preexcavation survey
- Removal of waste
    - ❖ Excavate and evacuate waste
    - ❖ Stockpile and load drums and rolloff containers
    - ❖ Characterize for dispositioning
    - ❖ Transport to appropriate disposal facility
    - ❖ Survey limits of excavation
    - ❖ Perform confirmation sampling
    - ❖ Establish subgrade and survey
- Backfill
    - ❖ Backfill and compact
    - ❖ Vegetate surface
    - ❖ Survey finished surface
- Demobilization

5.8.1.2 Waste Management and Disposal

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

5.8.1.3 Transportation

All waste will be hauled in rolloff containers, drums, or other appropriate containers directly to the selected disposal facility.

5.8.1.4 Confirmation Sampling

Confirmation sampling will be performed as described in section 4.2.5.

5.8.1.5 Health and Safety

Applicable Laboratory procedures will be referenced.

6.0 MONITORING PROGRAMS

6.1 Groundwater

Section IV.B.5.b.iii of the Consent Order requires monitoring and sampling of all monitoring wells in Sandia Canyon. Alluvial monitoring and observation wells in Sandia Canyon include SCA-1, SCA-2, SCA-3, SCA-4, SCA-5, SCO-1, and SCO-2. Of these, only alluvial monitoring well SCA-1 is located within the Upper Sandia Canyon Aggregate Area (Plate 1). The remainder of the SCA-series wells and wells SCO-1 and SCO-2 are located in the lower portion of Sandia Canyon. All these wells are monitored as part of the Interim Facility-Wide Groundwater Monitoring Plan (IFWGMP) (LANL 2007, 096665). Regional aquifer wells R-10, R-10a, and R-11 are screened and monitored as described in the IFWGMP.

6.2 Air

The radiological air sampling network, AIRNET, measures environmental levels of airborne radionuclides, such as plutonium, americium, uranium, tritium, and some activation products that may be released from Laboratory operations. Air-sampling station 23 is located within TA-03 and air-sampling station 12 is located within TA-61. Particulate matter in the atmosphere is primarily caused by aerosolized soil. Each AIRNET sampler continuously collects particulate matter and water-vapor samples for approximately 2 wk per sampler. Neither sampler located within the Upper Sandia Canyon Aggregate Area exceeded action levels in 2006 sampling (LANL 2007, 098644). Continuous stack testing occurs throughout the Laboratory, and stack testing is conducted in TA-03; however, these stacks are not associated with buildings located within the Upper Sandia Canyon Aggregate Area.

Gamma and neutron radiation in the environment is also monitored through the use of 90 thermoluminescent dosimeter (TLD) stations located around the Laboratory. TLD station 23 is located within TA-03, and station 12 is located within TA-61. The Laboratory's annual environmental surveillance reports indicate dose equivalents at these stations are consistent with natural background radiation and with previous measurements (LANL 2007, 098644).

6.3 Sediment and Surface Water

Base-flow water samples are collected at two locations in the Upper Sandia Canyon Aggregate Area: gaging stations E121 and E123. The samples collected from these locations monitor persistent surface water where effluent discharges maintain stream flow. Eleven stormwater runoff/sampling monitoring stations are located within the Upper Sandia Canyon Aggregate Area: E122.3, E122.35, E122.5, E123, S-SMA-0.2, S-SMA-1 (E122/E122.2), S-SMA-2 (E121), S-SMA-3, S-SMA-3.5, S-SMA-3.6, and SCS-2. Some of these locations are used to monitor stormwater runoff from industrial activities under the NPDES Multi-Sector General Permit (MSGP) and from SWMUs and AOCs while others are exclusively used to monitor stormwater runoff from SWMUs and AOCs under the Federal Facilities Compliance Act (FFCA)/Administrative Order. One sediment sampling station, “Sandia below Wetland,” monitors contamination trends in sediment in the active channel (Plate 1).

Nine reaches in Sandia Canyon were selected for the first phase of sediment sampling in the work plan for Sandia Canyon and Cañada del Buey (LANL 1999, 064617); three of these reaches (S-1, S-2, and S-3) are located within the Upper Sandia Canyon Aggregate Area. This initial investigation collected sediment samples from 132 locations within the Upper Sandia Canyon Aggregate Area. These samples were submitted for full-suite analyses. The Phase 2 sediment investigation proposes collecting additional samples in two of the three reaches located within the Upper Sandia Canyon Aggregate Area: S-1 and S-3. Ten samples will be collected from three subreaches within S-1 and S-3: S-1N, S-1S, and S-3W. These samples will be analyzed for the chemicals of potential concern identified during the first phase of sampling and include metals; hexavalent chromium; perchlorate; nitrate; pesticides; PCBs; PAHs; SVOCs; VOCs; TPH; americium-241; radionuclides (by gamma spectroscopy); plutonium-238, -239/240; strontium-90; thorium-228, -230, and -232; tritium; and uranium-234, -235, and -238 (LANL 2007, 098127, p. 19).

The data results from the Sandia Canyon investigations will be combined with the data results of the sampling proposed in this work plan to assess potential contaminant migration from sites within the Upper Sandia Canyon Aggregate Area. Additional data collected in Sandia Canyon under the FFCA, MSGP, and the IFWGMP also will be used in assessing potential contaminant migration from the Upper Sandia Canyon Aggregate Area sites.

7.0 SCHEDULE

The investigation work plan will be submitted to NMED by March 31, 2008. The scheduled notice date for NMED to approve this investigation work plan is August 13, 2008. Preparation of investigation activities is scheduled to start by September 22, 2008. Fieldwork is expected to start in March 2009 and will take approximately 9 mo to complete, with a scheduled finish date of December 31, 2009. The investigation report will be delivered to NMED on or before May 30, 2010.

8.0 REFERENCES AND MAP DATA SOURCES

8.1 References

The following list includes all documents cited in this plan. Parenthetical information following each reference provides the author(s), publication date, and ER ID number. This information is also included in text citations. ER ID numbers are assigned by the Environmental Programs Directorate’s Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

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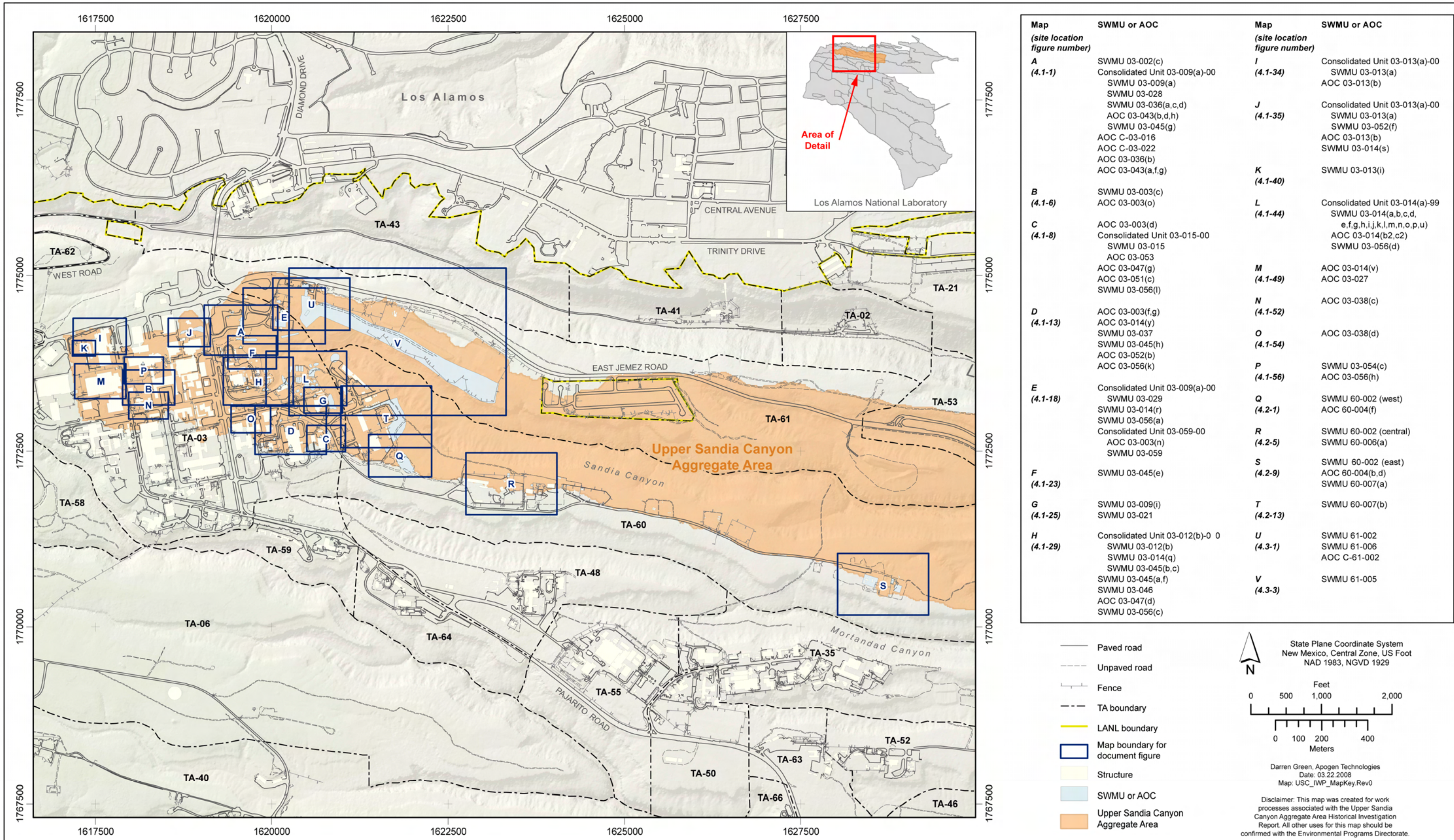
8.2 Map Data Sources

Legend Item	Data Source
2-ft elevation contour	Hypsography, 2-ft Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.
10-ft elevation contour	Hypsography, 10-ft Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.
20-ft elevation contour	Hypsography, 20-ft Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.
100-ft elevation contour	Hypsography, 100-ft Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.
Upper Sandia Canyon Aggregate Area	Aggregate Areas; Los Alamos National Laboratory, ENV Environmental Remediation & Surveillance Program, ER2005-0496; 1:2,500 Scale Data; 22 September 2005.
Fence	Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 27 April 2007.
Former Structure	Structures; Los Alamos National Laboratory, Facilities and Waste Operations Division; as published 20 March 2001.

Legend Item	Data Source
Structure	Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 10 September 2007.
SWMU or AOC Consolidated Unit 03-012(b)-00 boundary	Potential Release Sites; Los Alamos National Laboratory, RRES Remediation Services Project, ER2005-0403; 1:2,500 Scale Data; 21 June 2005. Change control requests pending.
Paved road	Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 27 April 2007.
Unpaved road	Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 27 April 2007.
TA boundary	Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Division; 21 December, 2006.
Canyon reach	Geomorphology and Related Spatial Features; Los Alamos National Laboratory, Waste and Environmental Services Division; 1:200; Work in progress.
Canyons sampling location	Point Feature Locations of the Environmental Restoration Project Database; Los Alamos National Laboratory, Waste and Environmental Services Division, EP2008-0284; 28 May 2008.
Communication line	Communication Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 08 August 2002; as published 04 March 2008.
Electric line	Primary Electric Grid; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 04 March 2008.
Gas line	Primary Gas Distribution Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 04 March 2008.
Industrial waste line	Primary Industrial Waste Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 04 January 2008.
Sewer line	Sewer Line System; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 04 March 2008.
Steam line	Steam Line Distribution System; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 04 March 2008.
Water line	Water Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 04 March 2008.

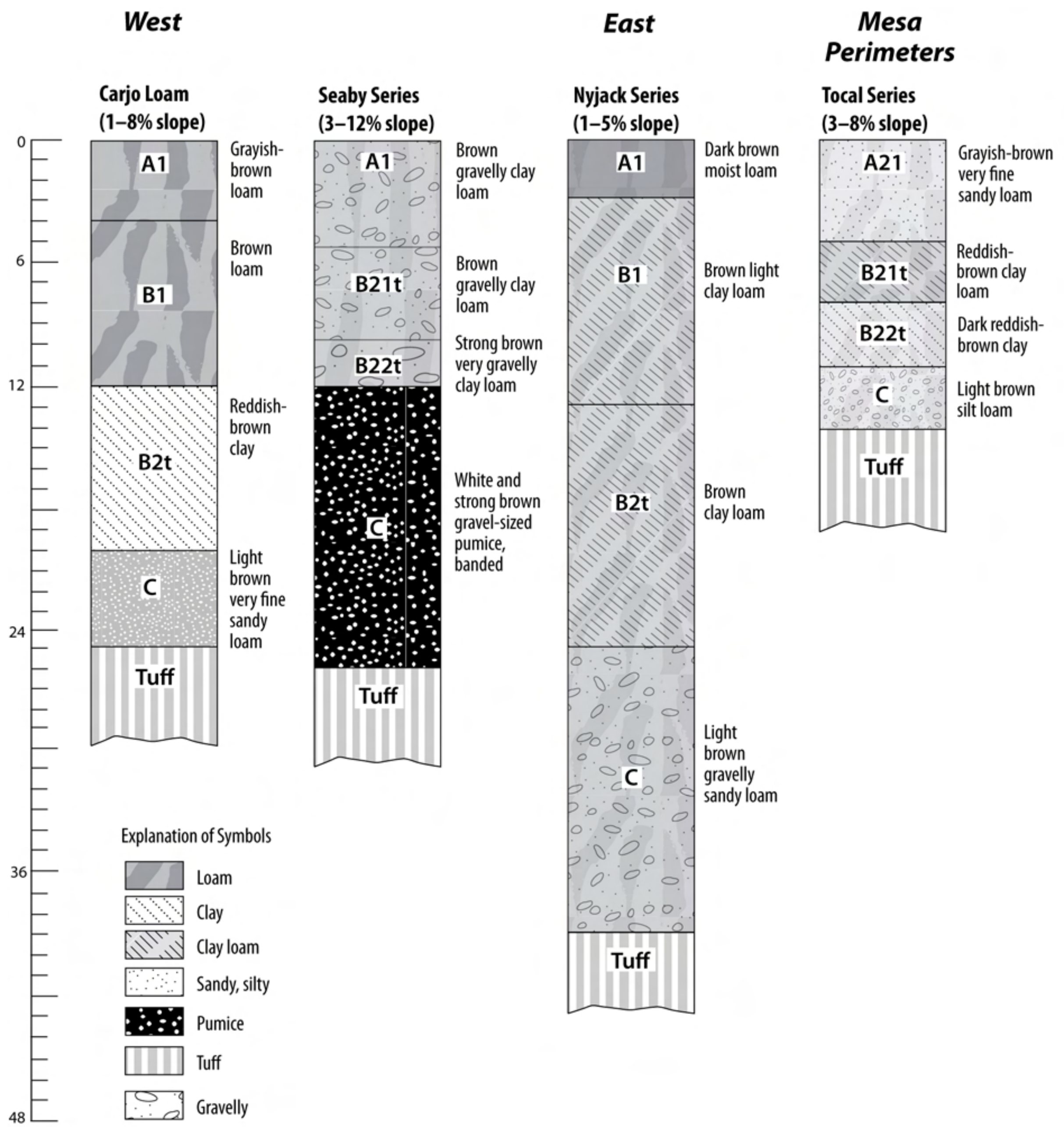


Map (site location figure number)	SWMU or AOC
A (4.1-1)	SWMU 03-002(c) Consolidated Unit 03-009(a)-00 SWMU 03-009(a) SWMU 03-028 SWMU 03-036(a,c,d) AOC 03-043(b,d,h) SWMU 03-045(g) AOC C-03-016 AOC C-03-022 AOC 03-036(b) AOC 03-043(a,f,g)
B (4.1-6)	SWMU 03-003(c) AOC 03-003(o)
C (4.1-8)	AOC 03-003(d) Consolidated Unit 03-015-00 SWMU 03-015 AOC 03-053 AOC 03-047(g) AOC 03-051(c) SWMU 03-056(l)
D (4.1-13)	AOC 03-003(f,g) AOC 03-014(y) SWMU 03-037 SWMU 03-045(h) AOC 03-052(b) AOC 03-056(k)
E (4.1-18)	Consolidated Unit 03-009(a)-00 SWMU 03-029 SWMU 03-014(r) SWMU 03-056(a) Consolidated Unit 03-059-00 AOC 03-003(n) SWMU 03-059
F (4.1-23)	SWMU 03-045(e)
G (4.1-25)	SWMU 03-009(i) SWMU 03-021

H (4.1-29)	Consolidated Unit 03-012(b)-0 0
	SWMU 03-012(b)
	SWMU 03-014(q)
	SWMU 03-045(b,c)
	SWMU 03-045(a,f)
	SWMU 03-046
	AOC 03-047(d)
	SWMU 03-056(c)

I (4.1-34)	Consolidated Unit 03-013(a)-00 SWMU 03-013(a) AOC 03-013(b)
J (4.1-35)	Consolidated Unit 03-013(a)-00 SWMU 03-013(a) SWMU 03-052(f) AOC 03-013(b) SWMU 03-014(s)
K (4.1-40)	SWMU 03-013(i)
L (4.1-44)	Consolidated Unit 03-014(a)-99 SWMU 03-014(a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,u) AOC 03-014(b2,c2) SWMU 03-056(d)
M (4.1-49)	AOC 03-014(v) AOC 03-027
N (4.1-52)	AOC 03-038(c)
O (4.1-54)	AOC 03-038(d)
P (4.1-56)	SWMU 03-054(c) AOC 03-056(h)
Q (4.2-1)	SWMU 60-002 (west) AOC 60-004(f)
R (4.2-5)	SWMU 60-002 (central) SWMU 60-006(a)
S (4.2-9)	SWMU 60-002 (east) AOC 60-004(b,d) SWMU 60-007(a)
T (4.2-13)	SWMU 60-007(b)
U (4.3-1)	SWMU 61-002 SWMU 61-006 AOC C-61-002
V (4.3-3)	SWMU 61-005

Figure 1.1-1 Upper Sandia Canyon Aggregate Area Map Key



Note: Source: Nyhan et al. 1978, 005702. Modified by NWI 03/21/08.

Figure 3.1-1 Typical profiles of common soils at OU 1114 Operable Unit.

Bandelier Tuff	Tshirege Member	Qbt 4	Ash-Flow Units
		Qbt 3	
		Qbt 2	
		Qbt 1v	
		Qbt 1g	
		Tsankawi Pumice Bed	
Cerro Toledo Interval		Volcaniclastic Sediments and Ash-Falls	
Bandelier Tuff	Otowi member	Ash-Flow Units	
		Guaje Pumice Bed	
Puye Formation	Fanglomerate	Fanglomerate Facies includes sand, gravel, conglomerate, and tuffaceous sediments	
	Basalt and Andesite	Cerros del Rio Basalts intercalated within the Puye Formation, includes up to four interlayered basaltic flows. Andesites of the Tschicoma Formation present in western part of plateau	
	Fanglomerate	Fanglomerate Facies includes sand, gravel, conglomerate, and tuffaceous sediments; includes "Old Alluvium"	
	Axial facies deposits of the ancestral Rio Grande	Totavi Lentil	
Santa Fe Group	Coarse Sediments	Coarse-Grained Upper Facies (formerly called the "Chaquehui Formation" by Purtymun 1995, 045344)	
	Basalt		
	Coarse Sediments		
	Basalt		
	Coarse Sediments		
	Basalt		
	Coarse Sediments		
	Arkosic clastic sedimentary deposits	Undivided Santa Fe Group (includes Chamita[?] and Tesuque Formations)	

Note: Source: LANL 1999, 064617. Modified by NWI 03/21/08.

Figure 3.2-1 Generalized stratigraphy of bedrock geologic units of the Pajarito Plateau.

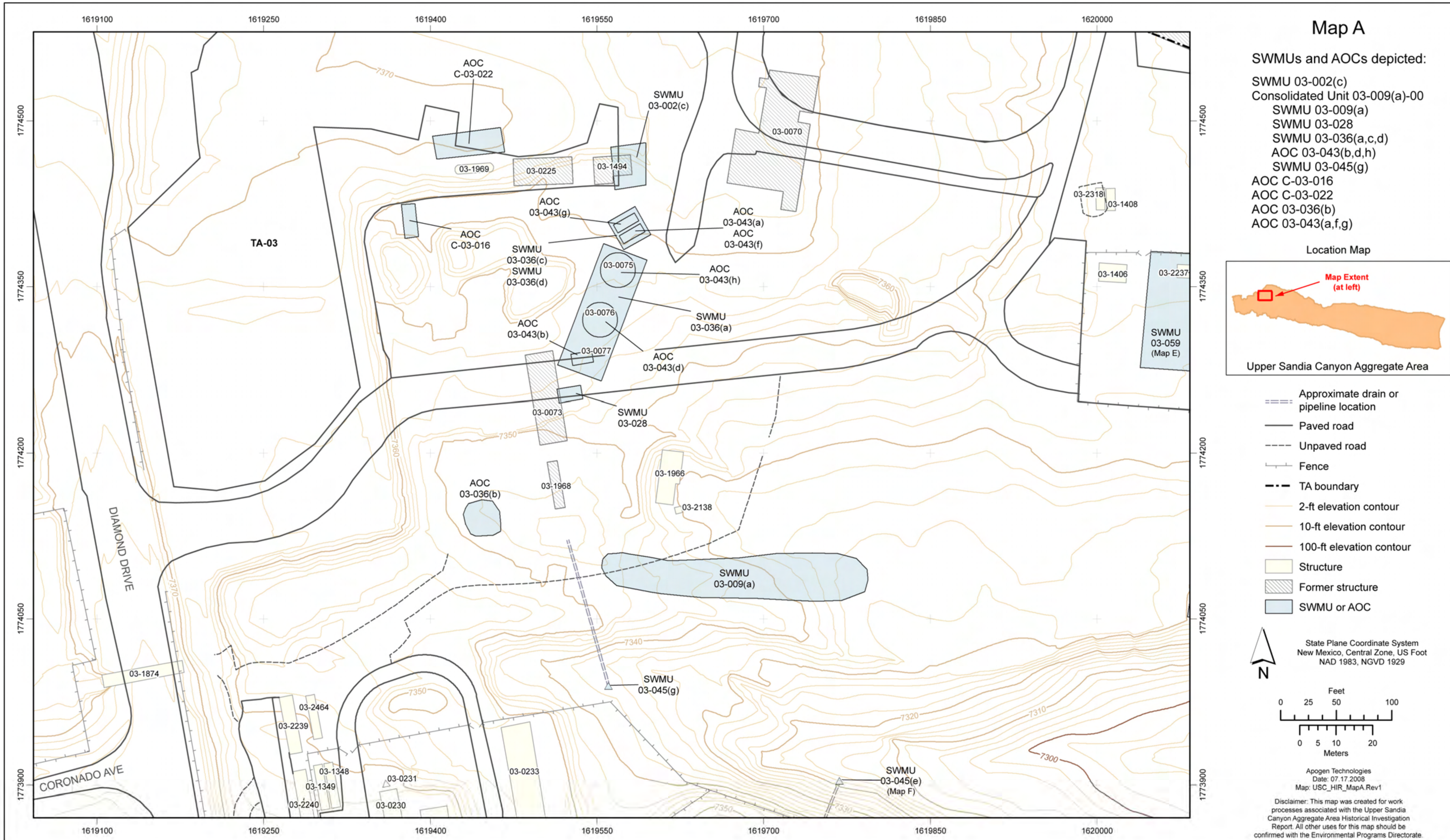


Figure 4.1-1 Map A site location

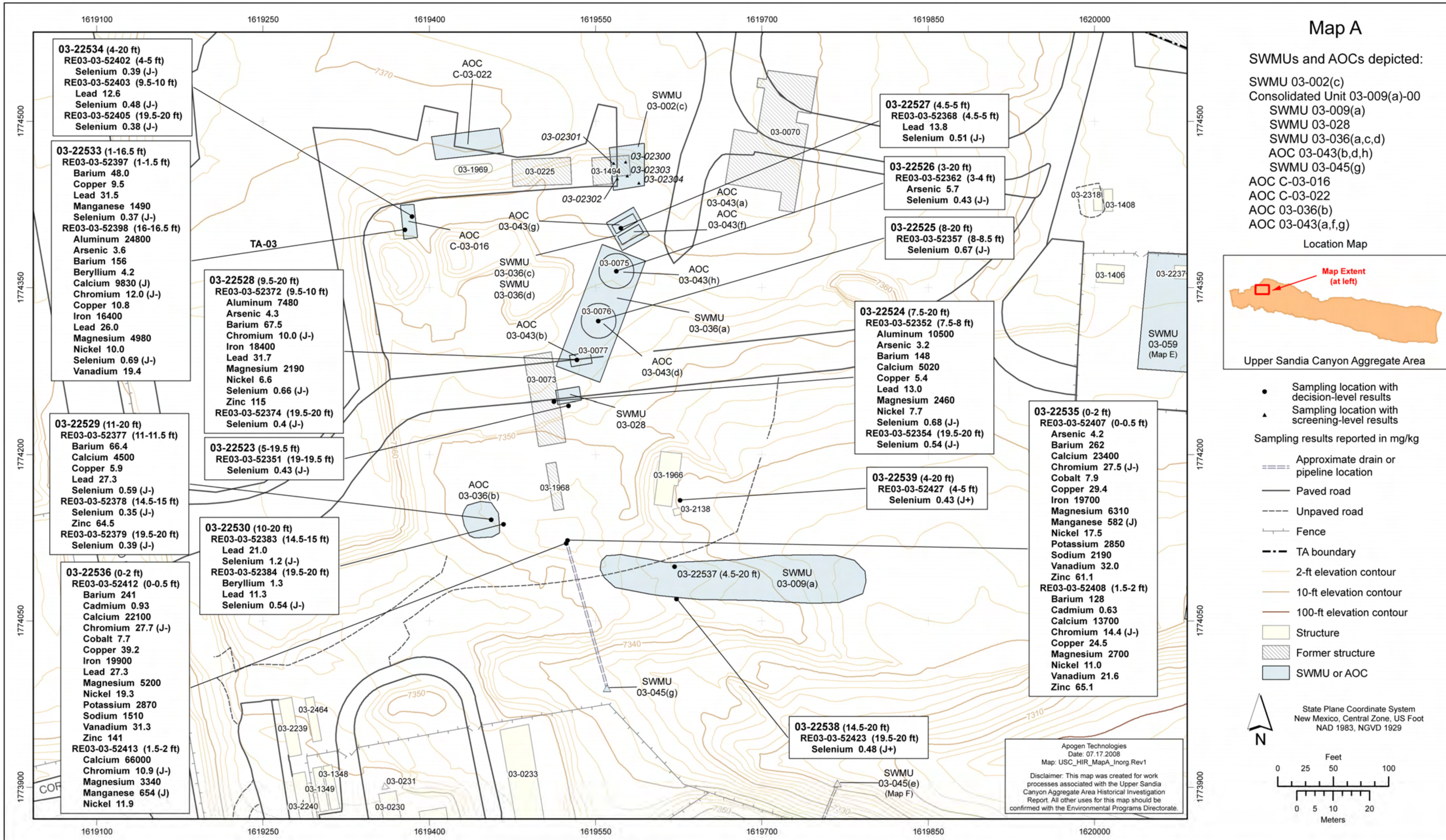


Figure 4.1-2 Map A inorganic chemical sampling locations and results detected above BVs

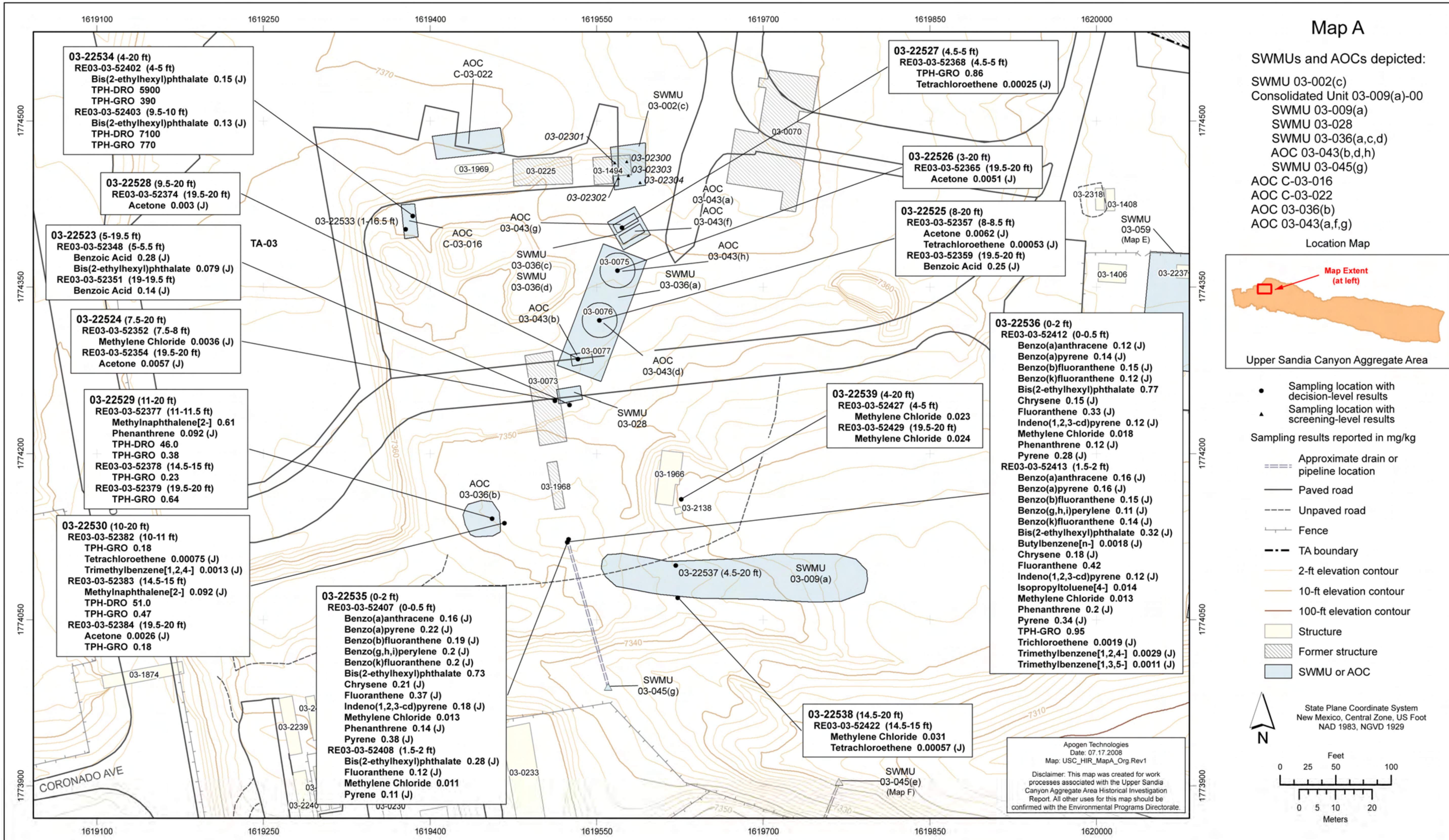


Figure 4.1-3 Map A organic chemical sampling locations and detected results

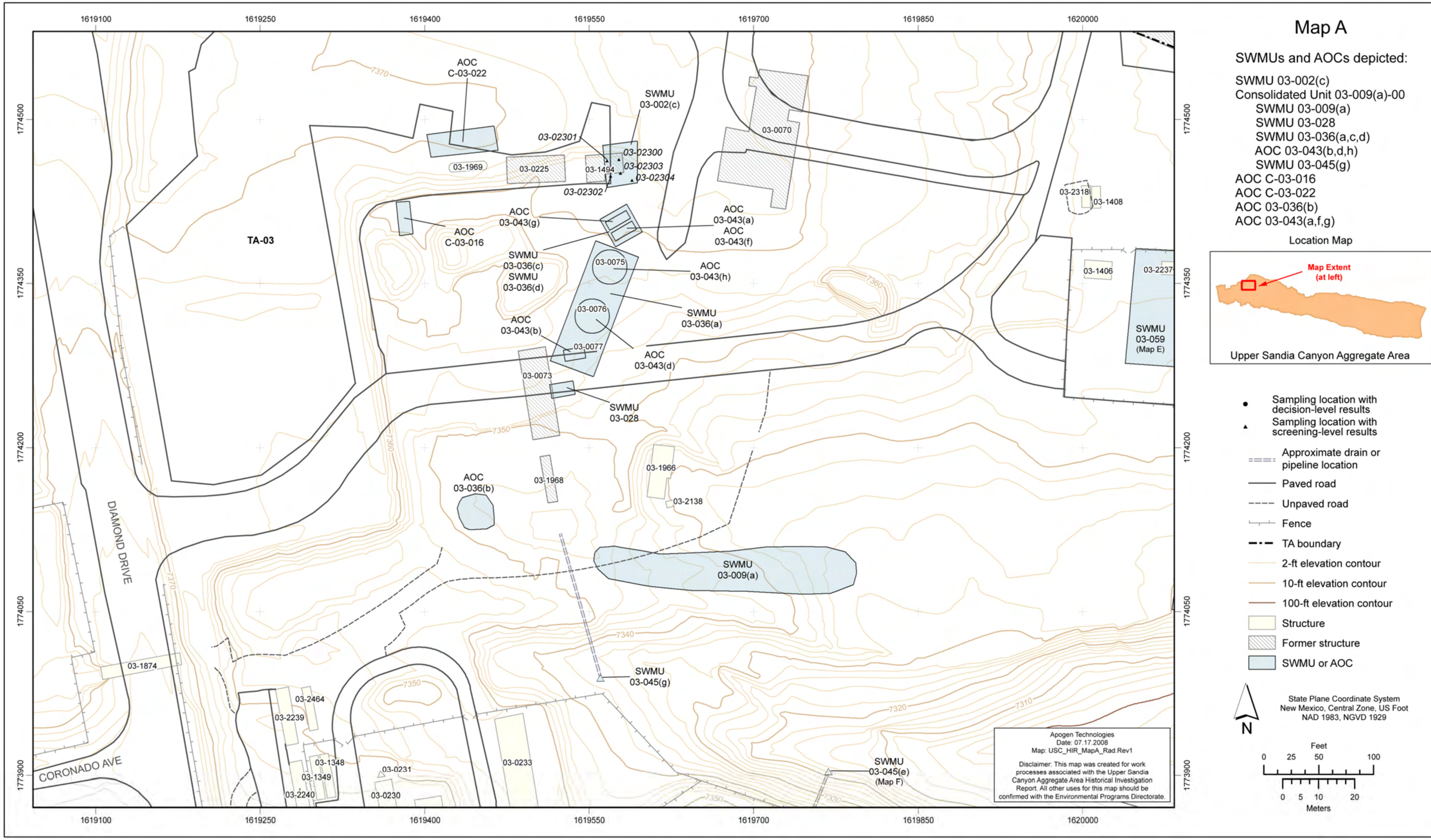


Figure 4.1-4 Map A radionuclide sampling locations

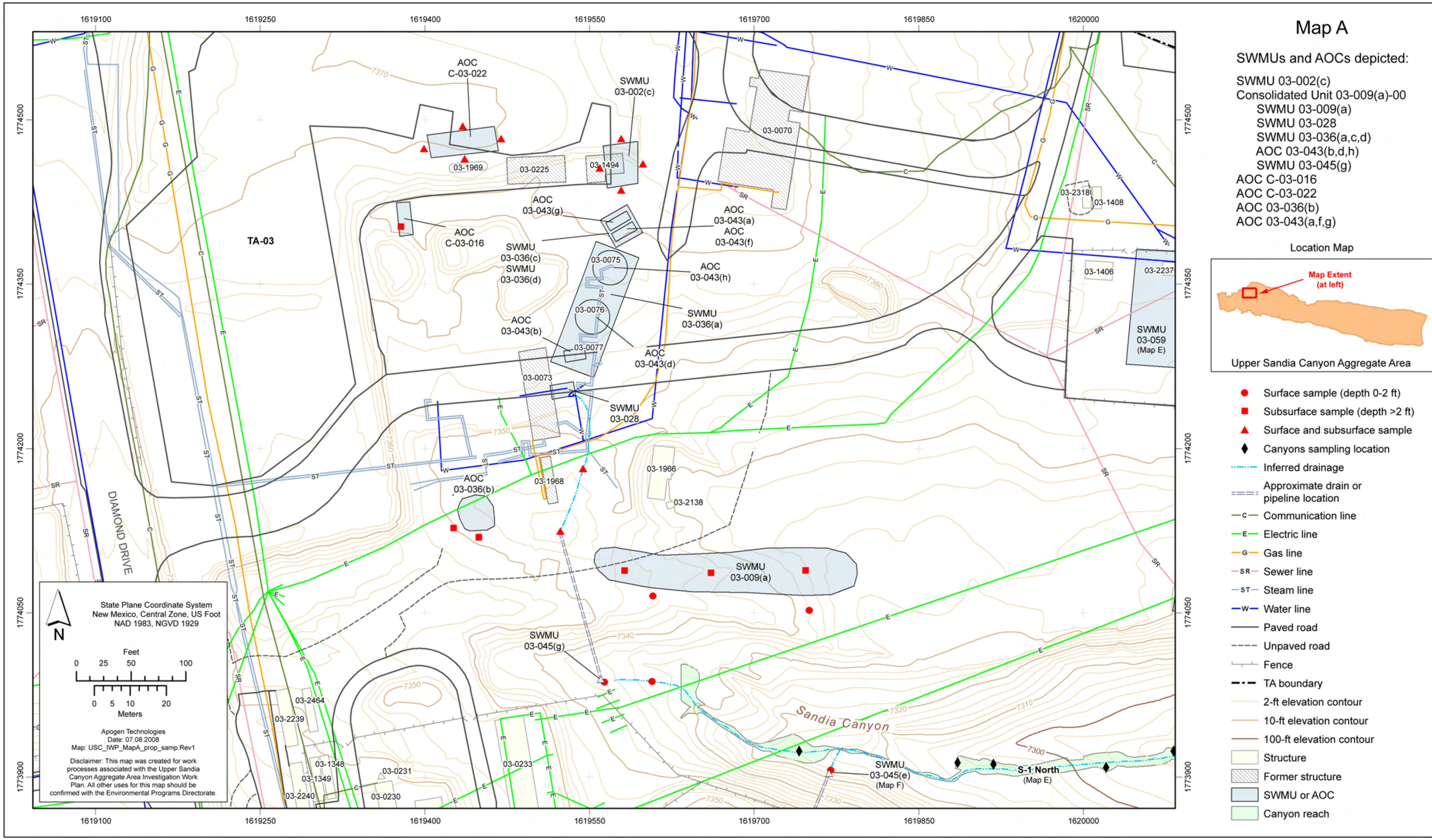


Figure 4.1-5 Map A proposed sampling locations

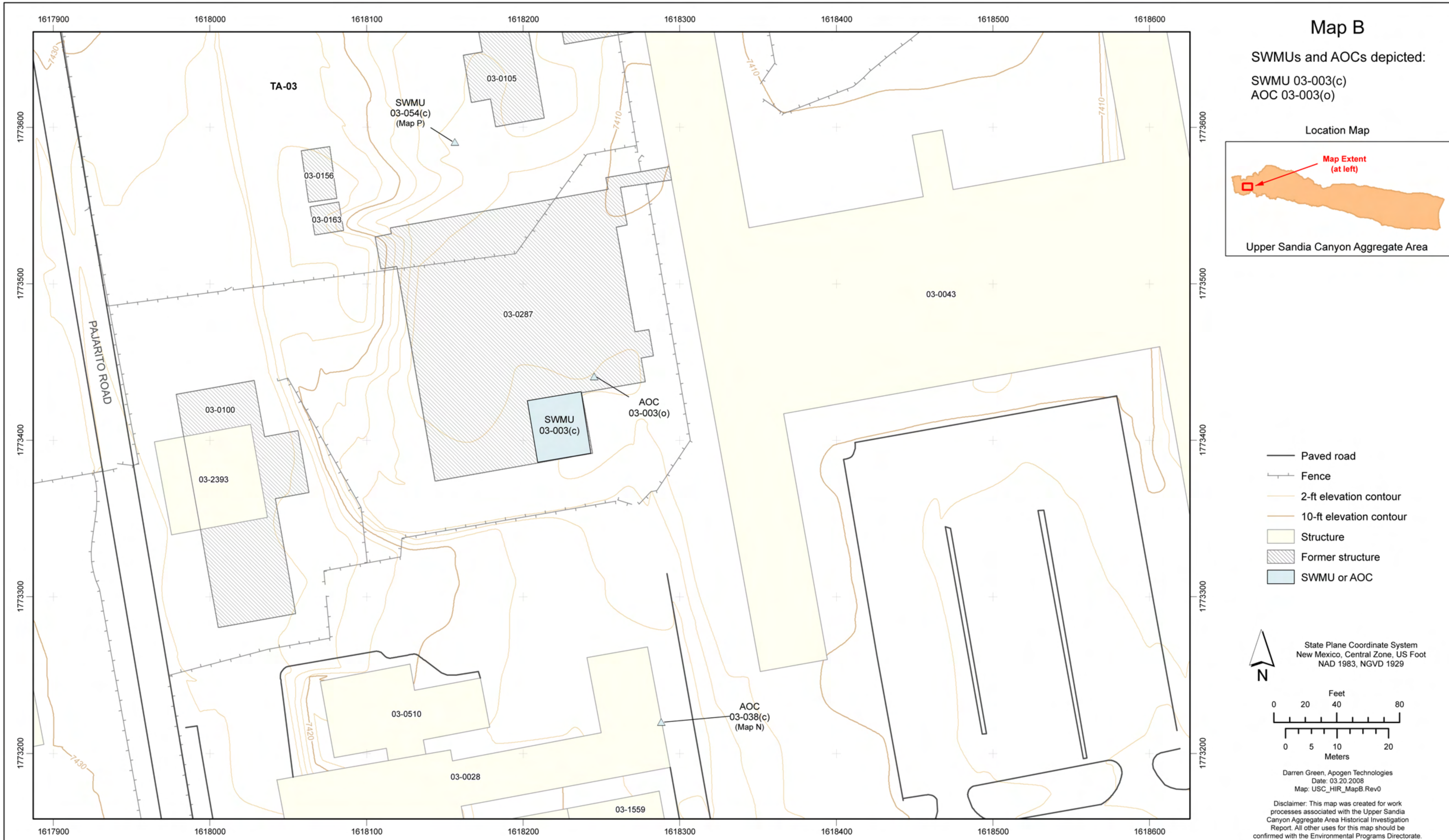


Figure 4.1-6 Map B site location

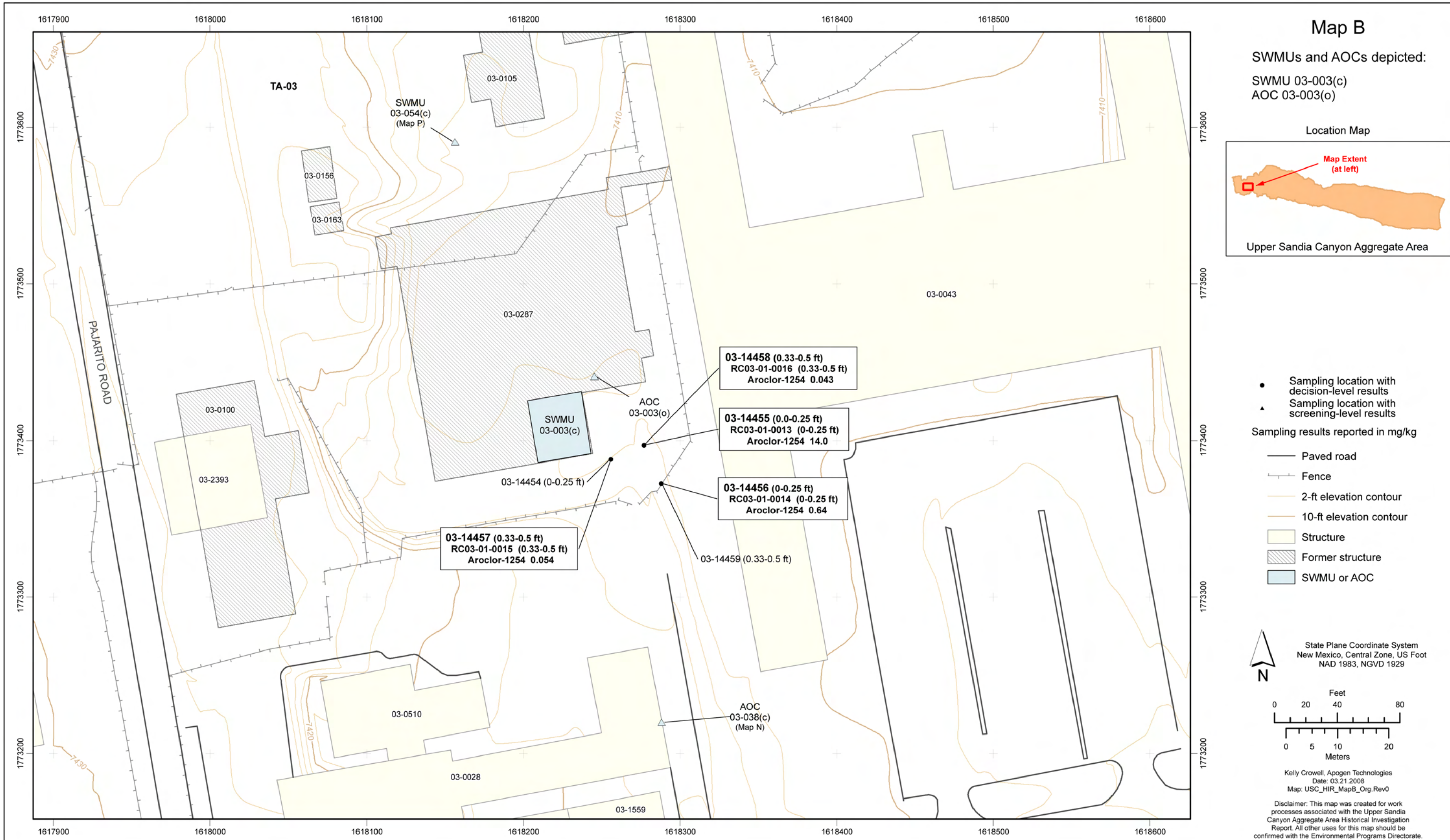


Figure 4.1-7 Map B organic chemical sampling locations and detected results

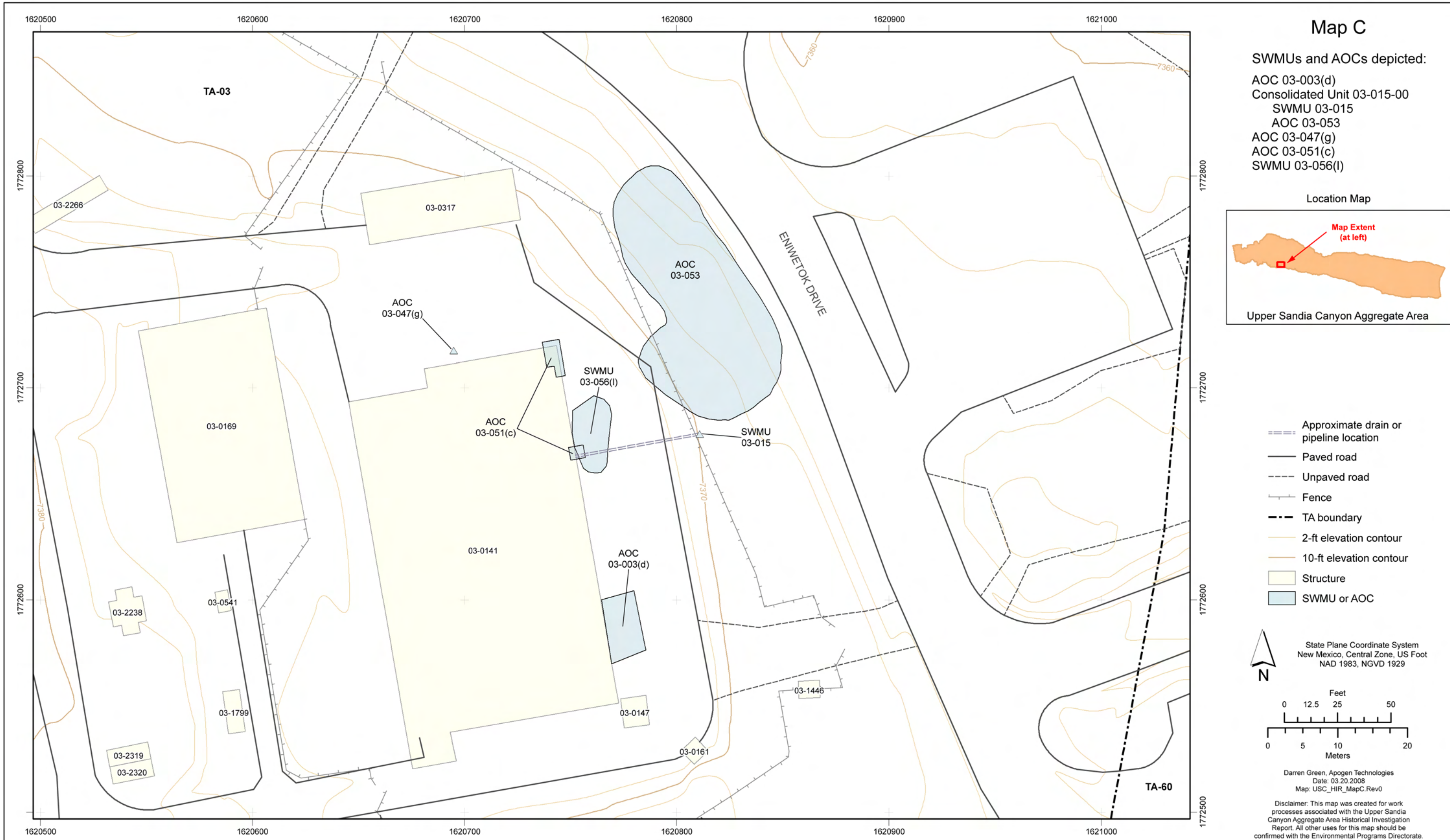


Figure 4.1-8 Map C site location

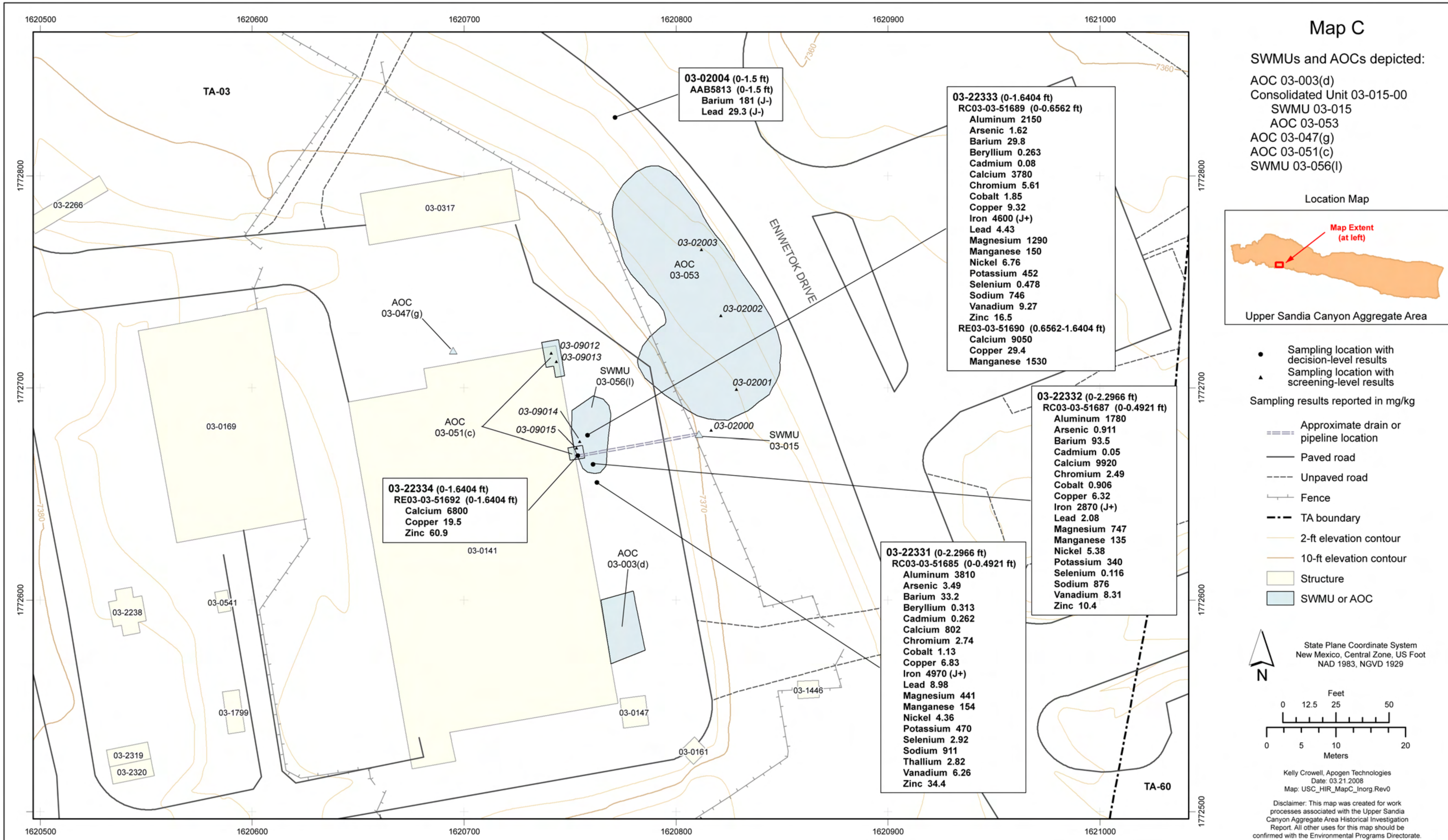


Figure 4.1-9 Map C inorganic chemical sampling locations and results detected above BVs

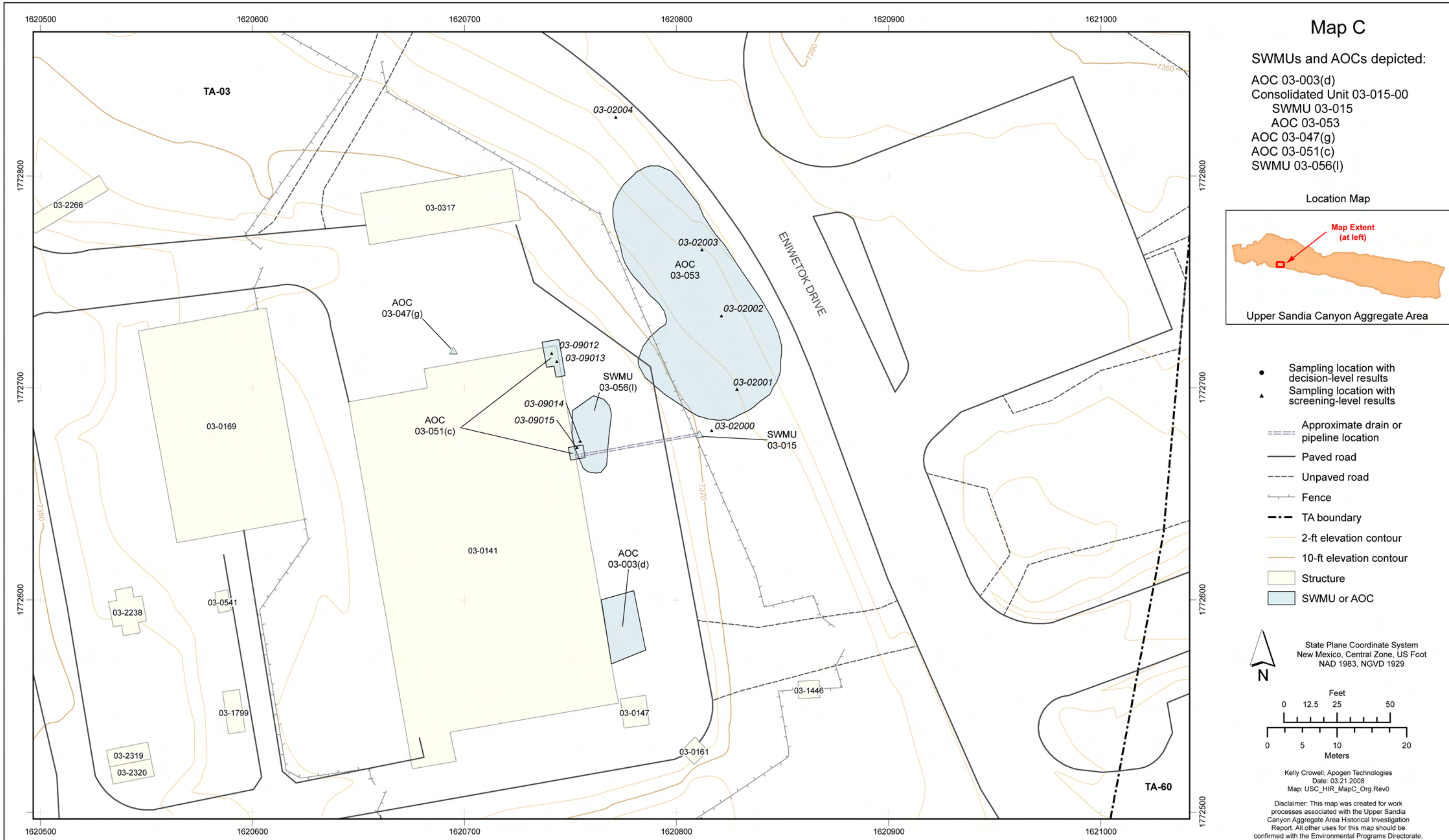


Figure 4.1-10 Map C organic chemical sampling locations

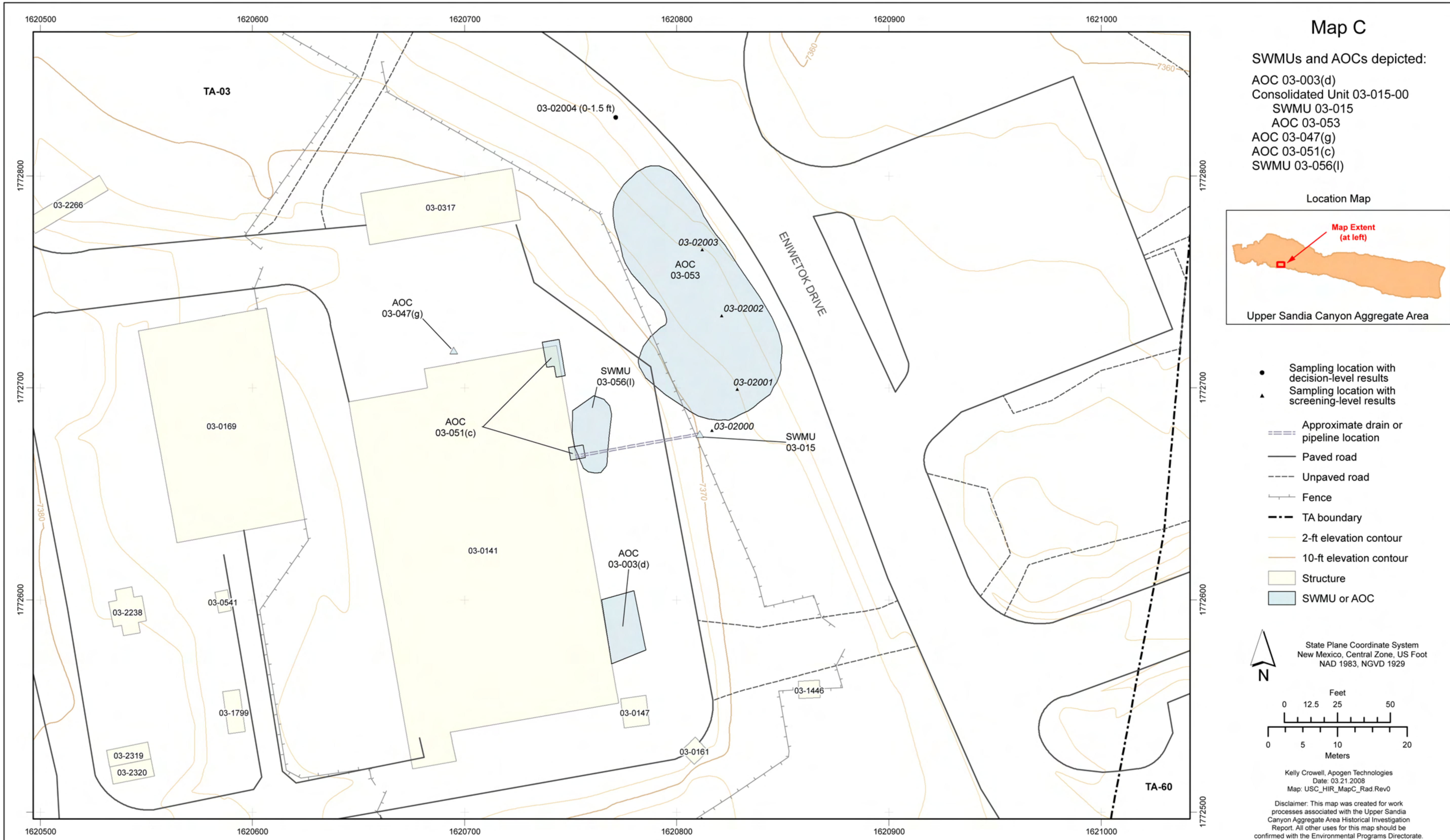


Figure 4.1-11 Map C radionuclide sampling locations

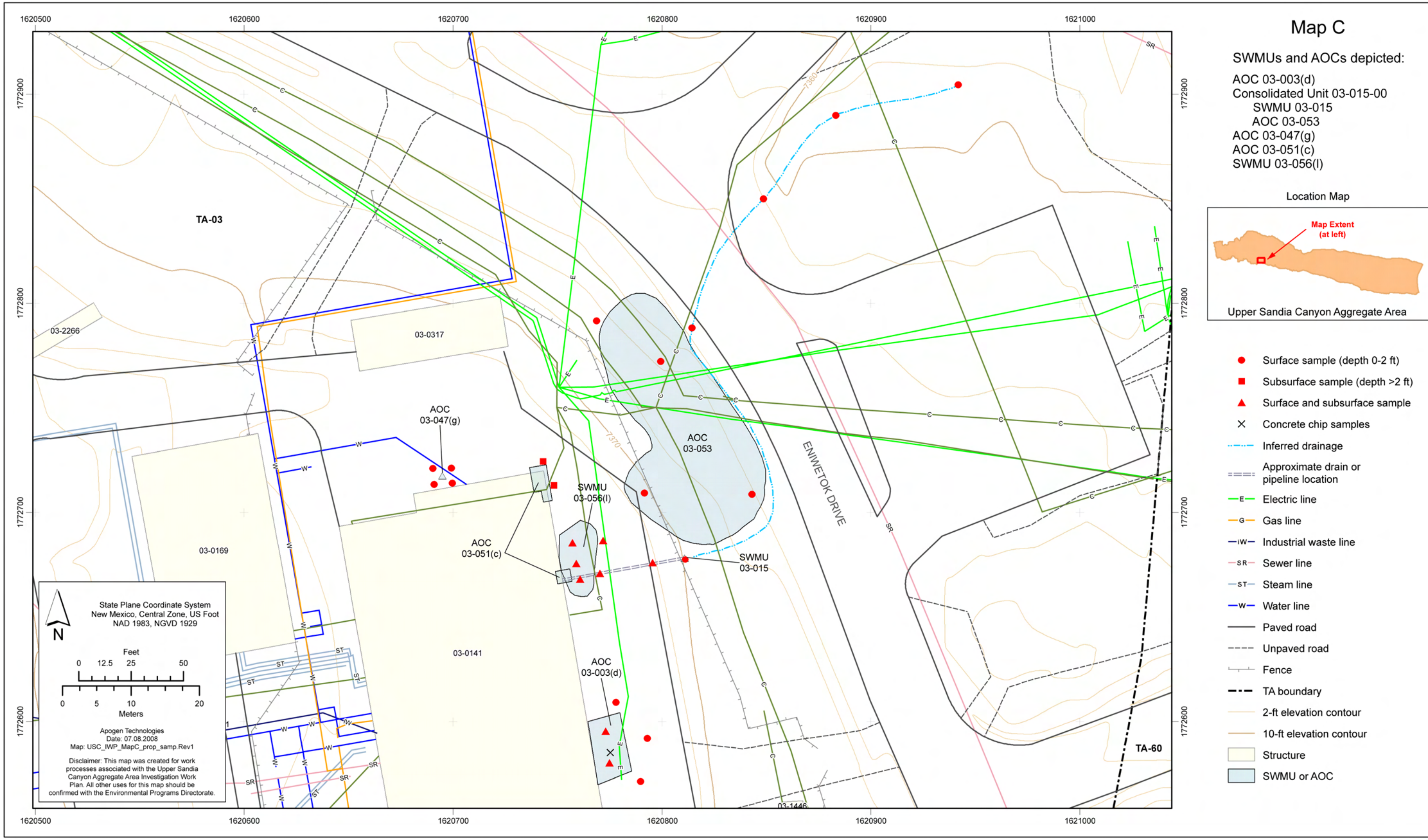


Figure 4.1-12 Map C proposed sampling locations

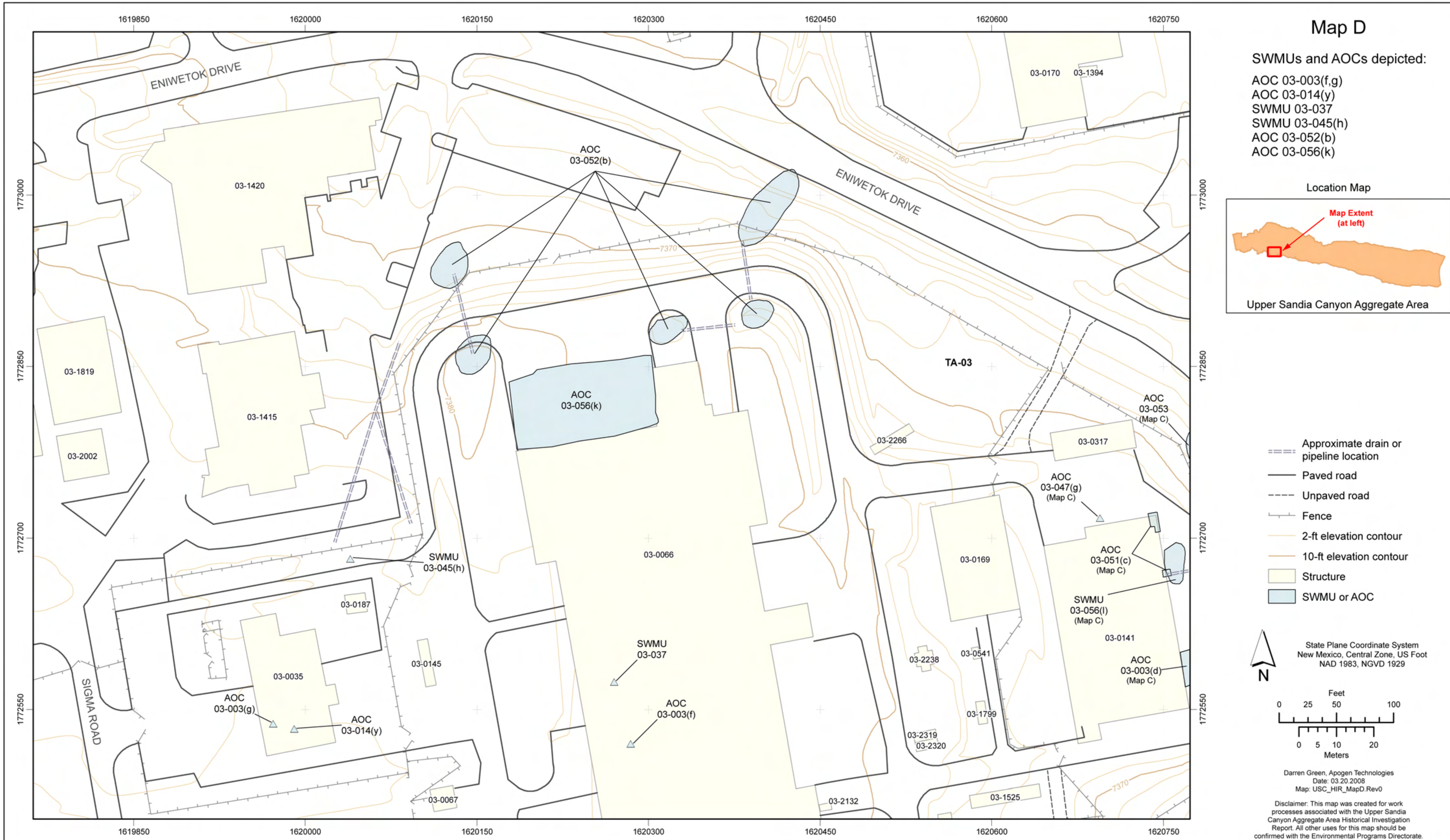


Figure 4.1-13 Map D site location

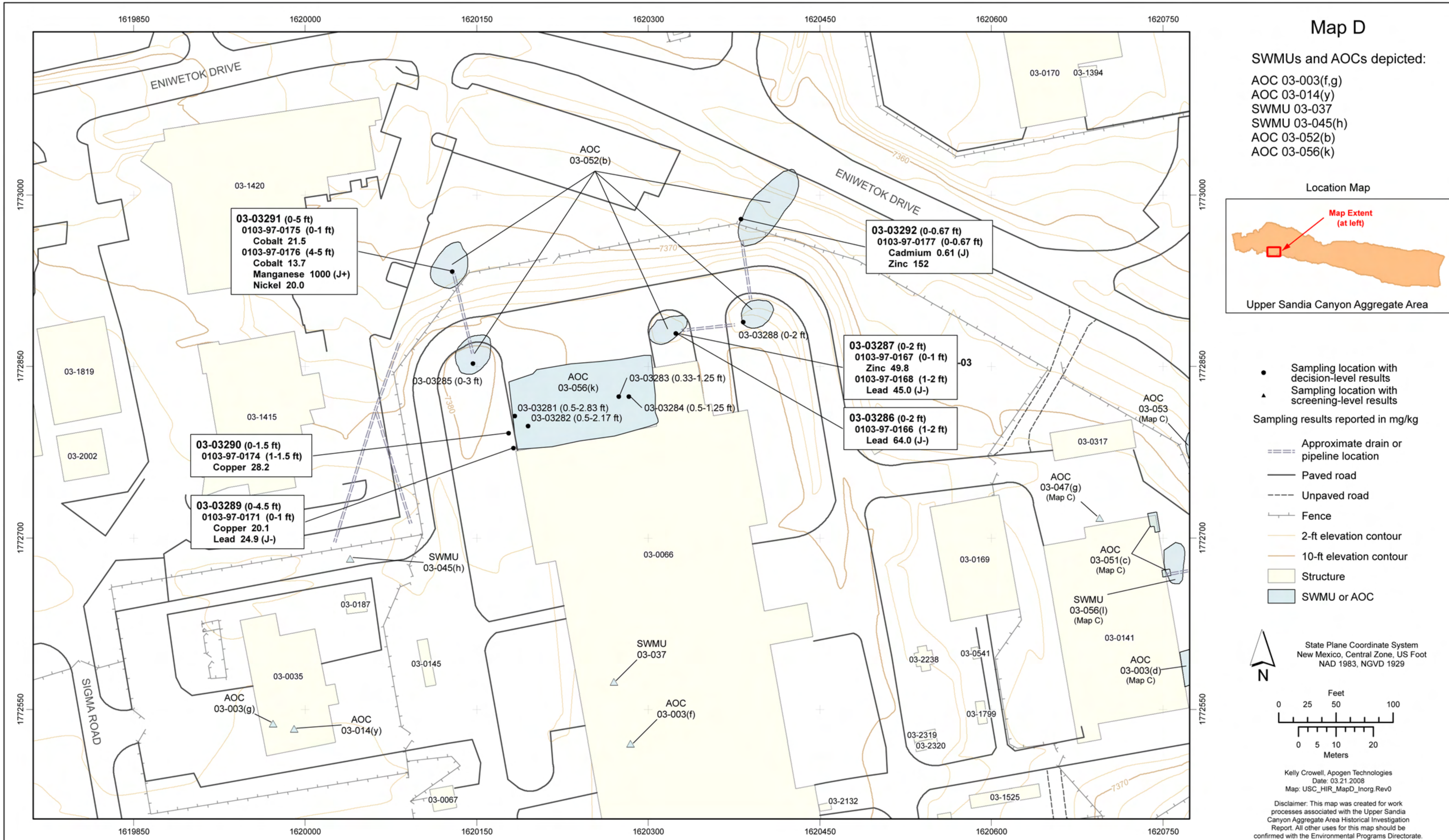


Figure 4.1-14 Map D inorganic chemical sampling locations and results detected above BVs

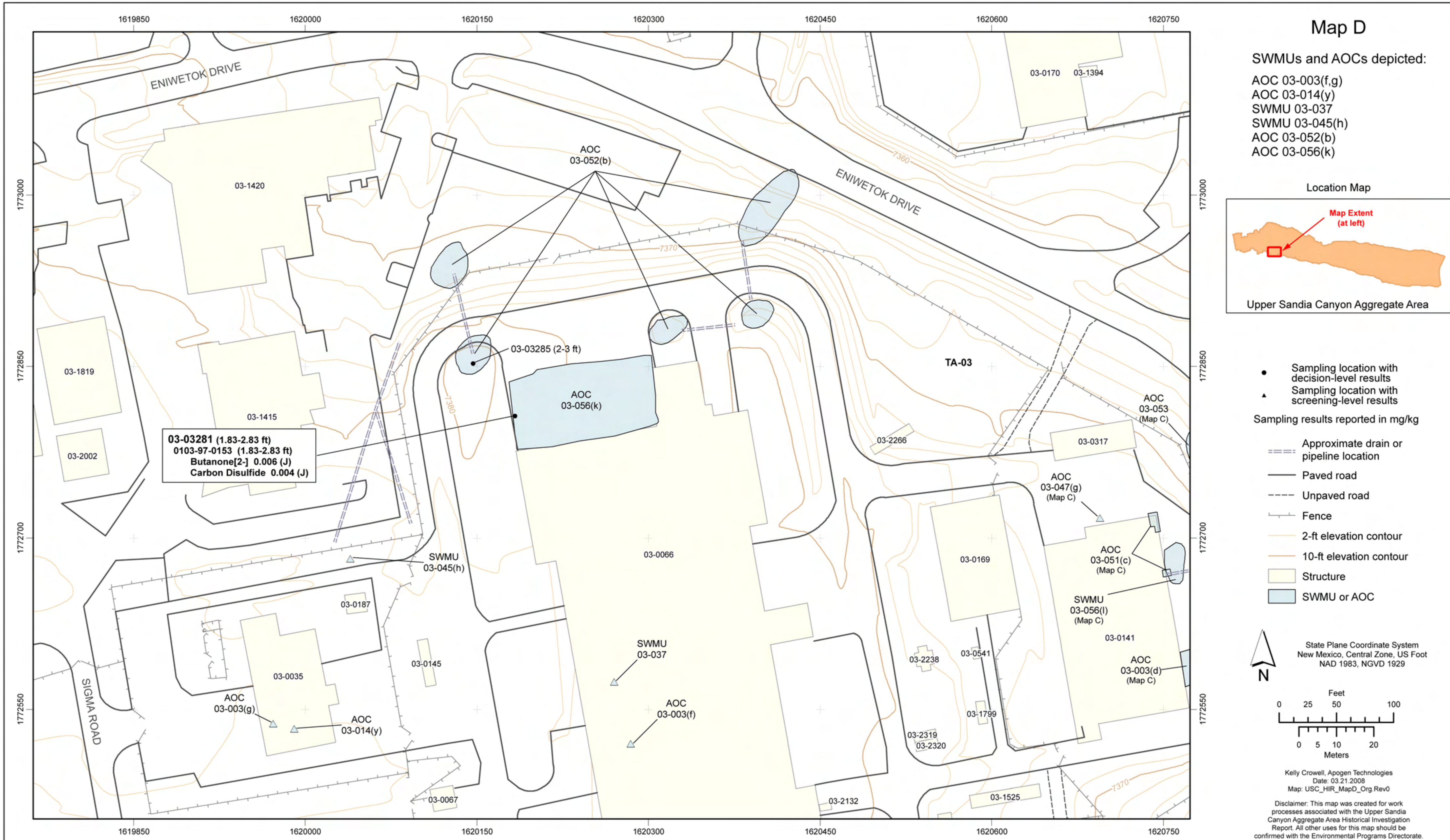


Figure 4.1-15 Map D organic chemical sampling locations and detected results

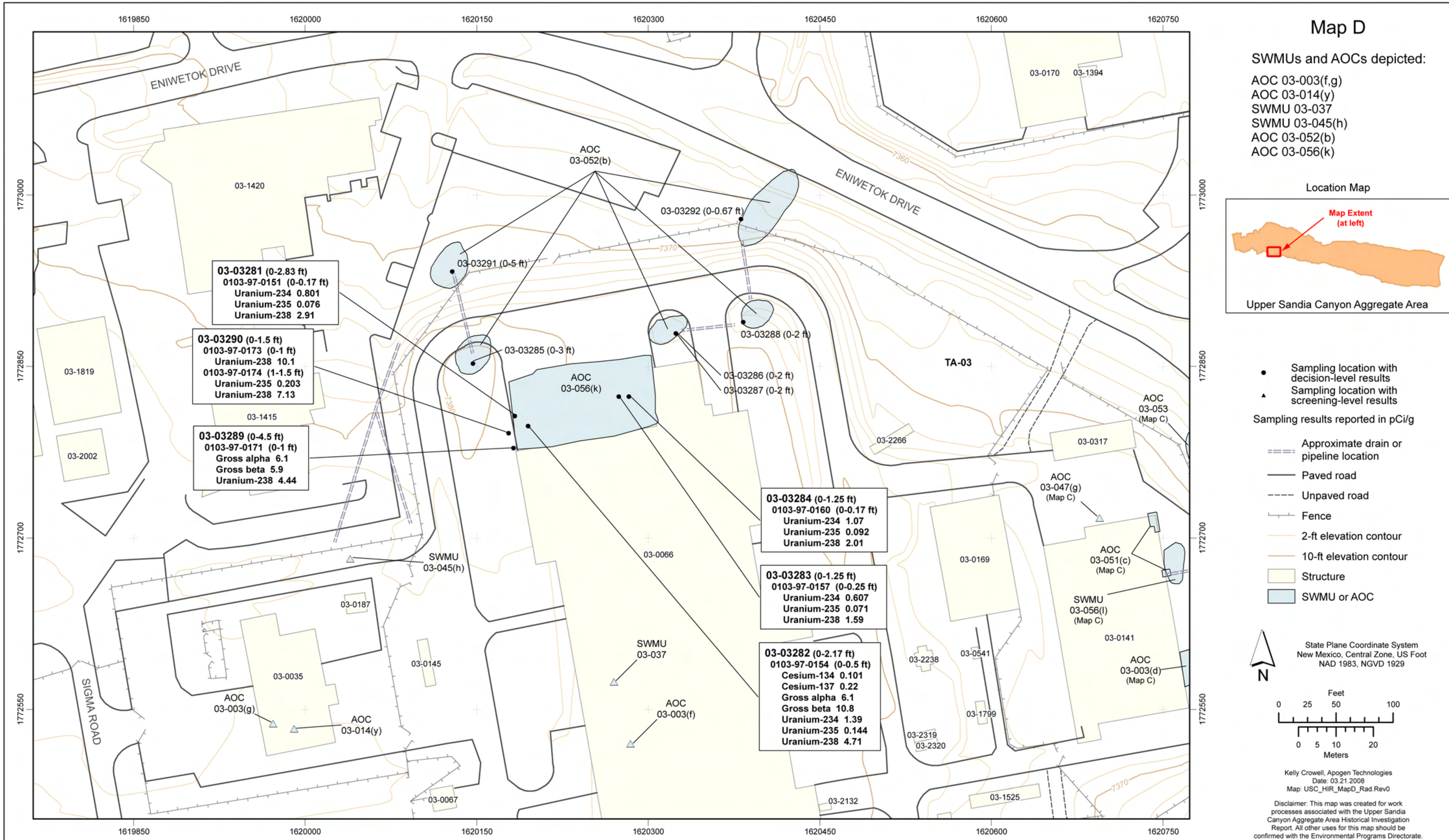


Figure 4.1-16 Map D radionuclide sampling locations and results detected above FVs/BVs

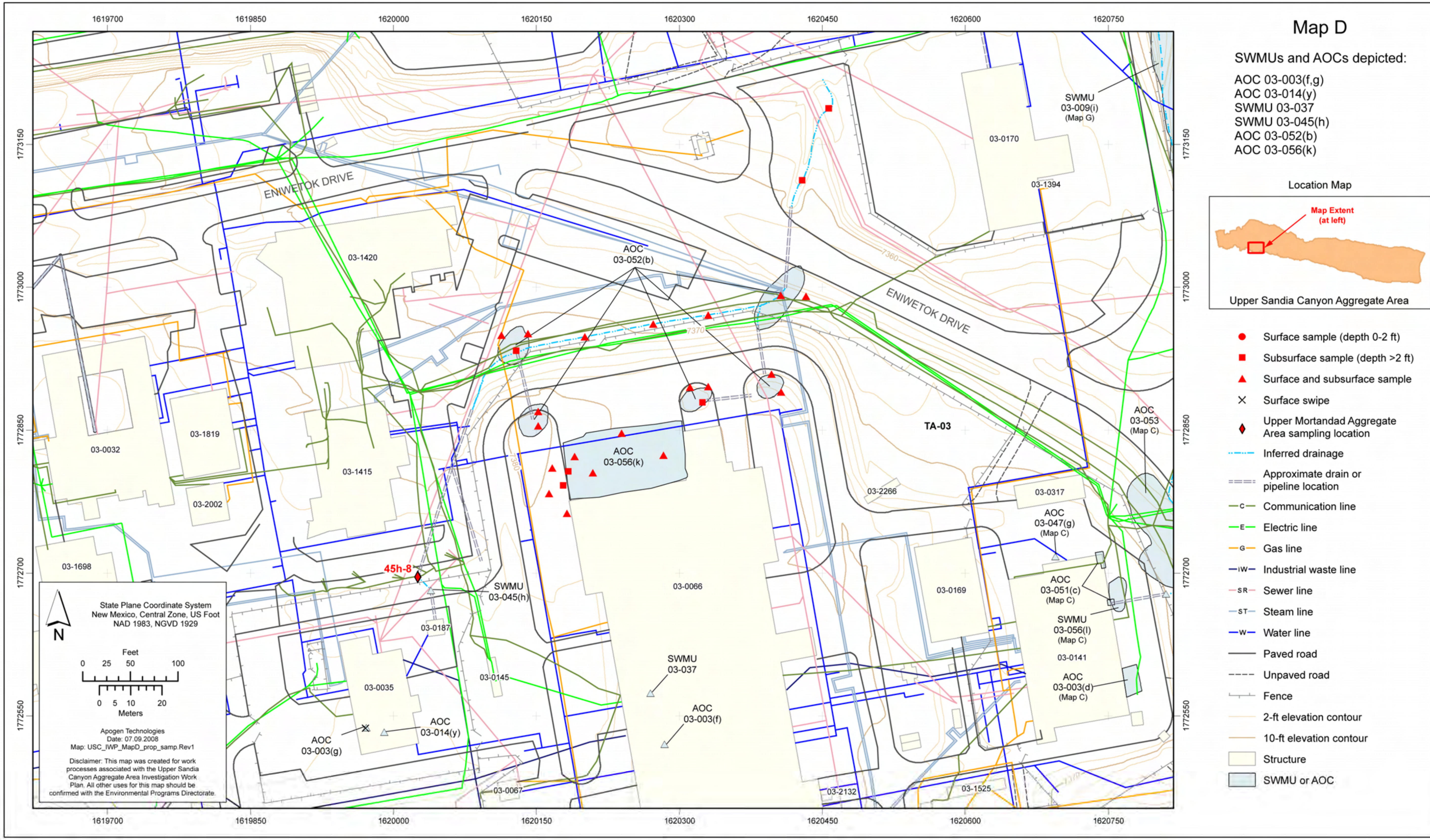


Figure 4.1-17 Map D proposed sampling locations

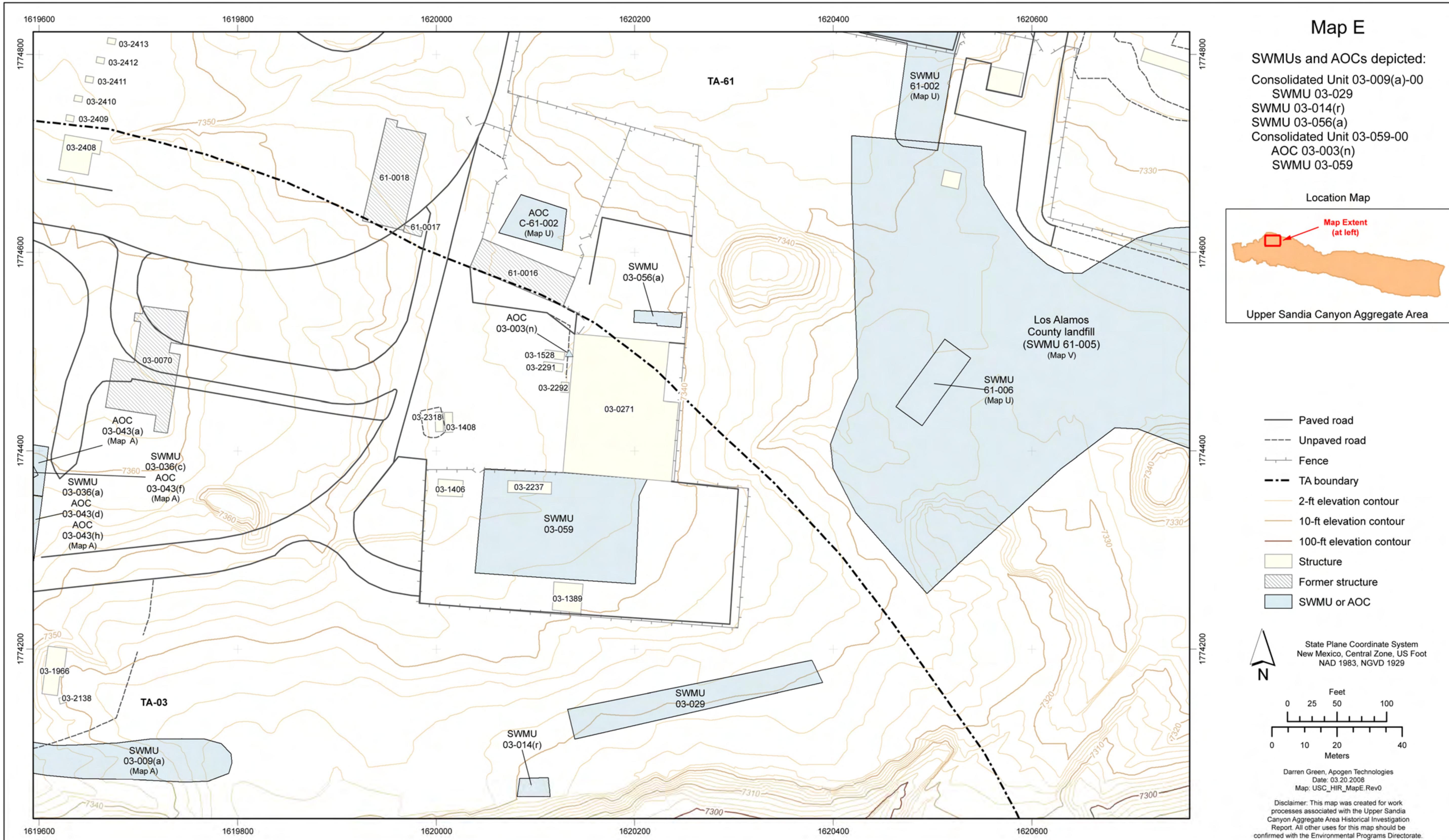


Figure 4.1-18 Map E site location

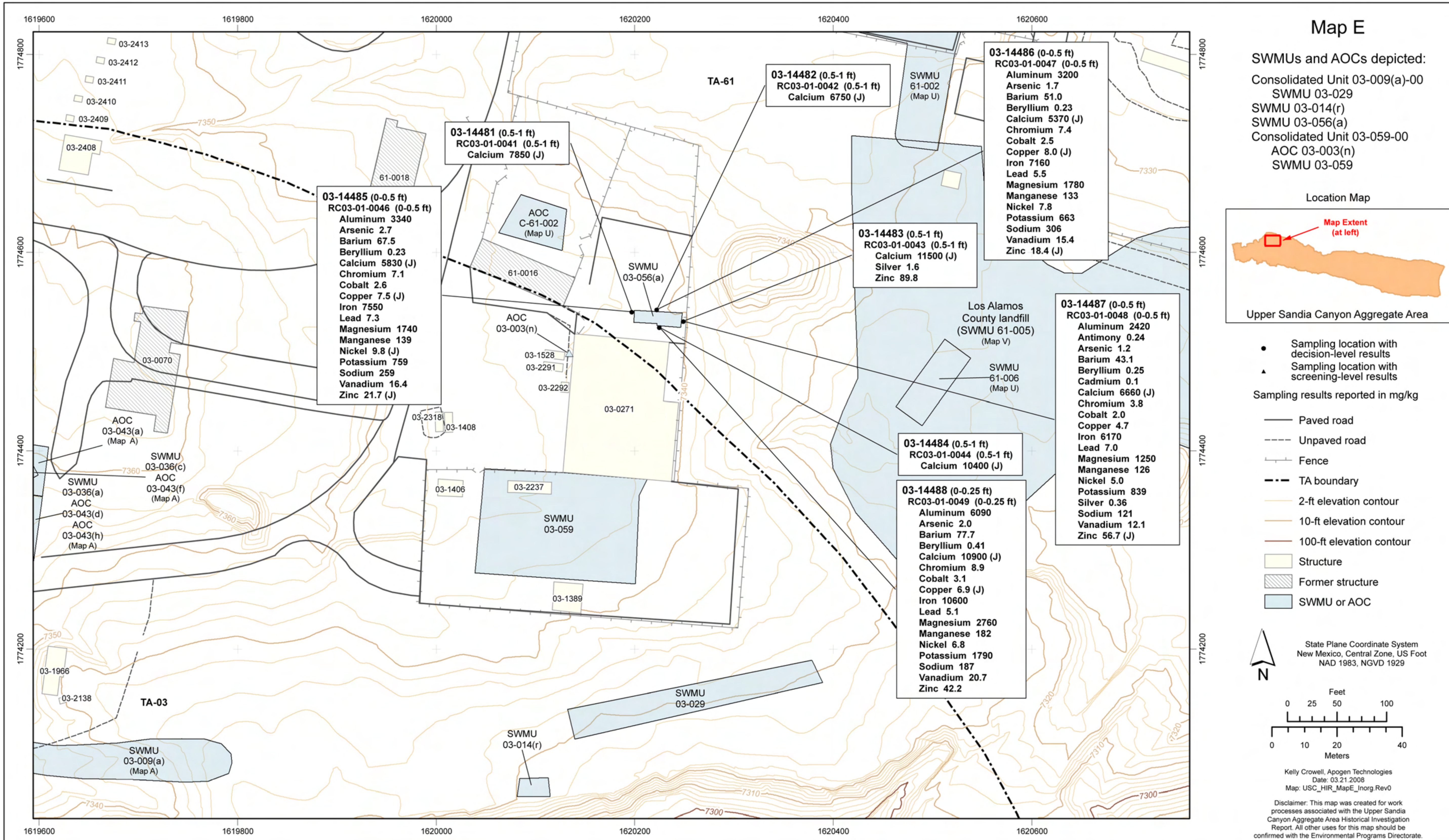


Figure 4.1-19 Map E inorganic chemical sampling locations and results detected above BVs

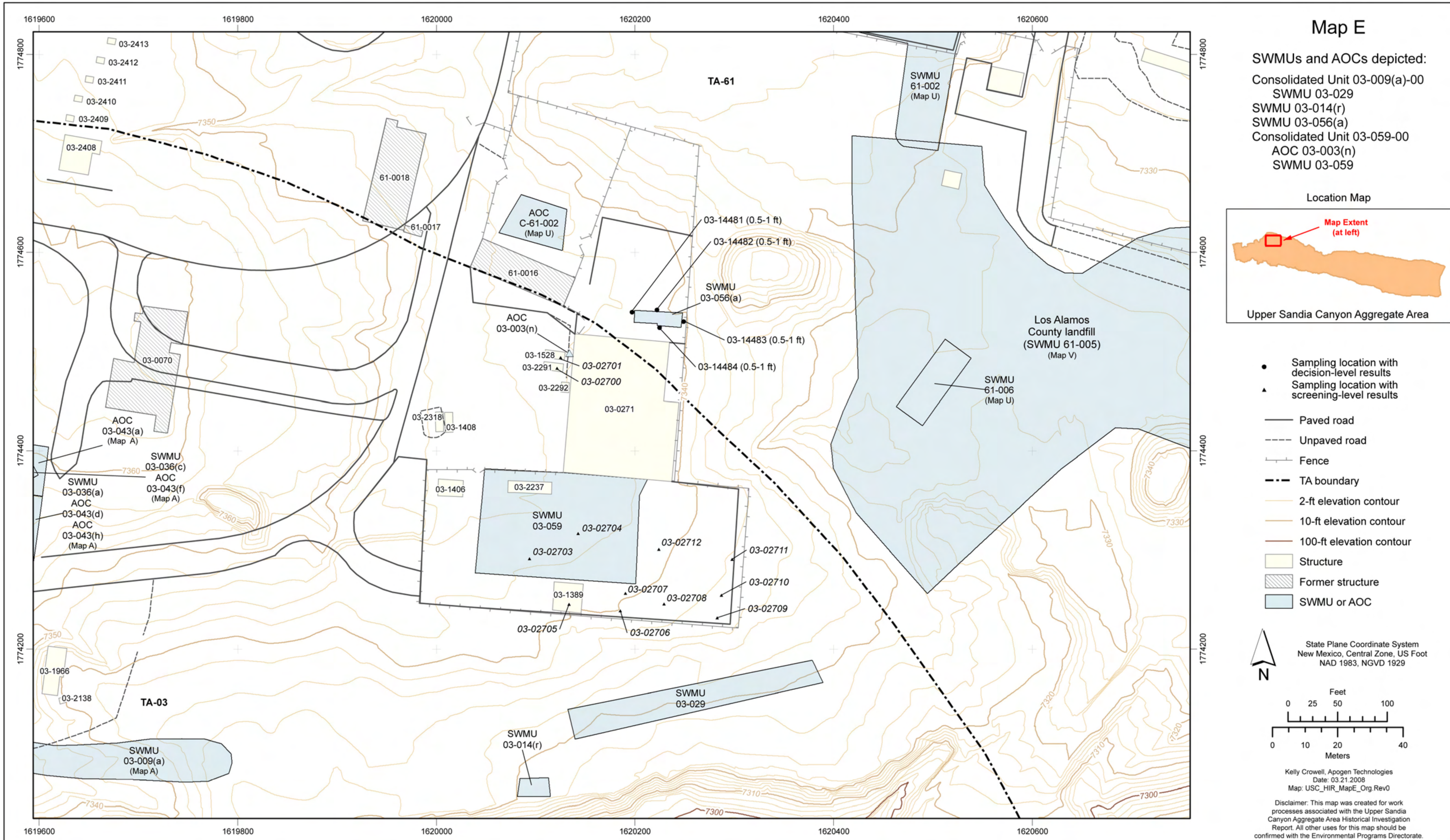


Figure 4.1-20   Map E organic chemical sampling locations

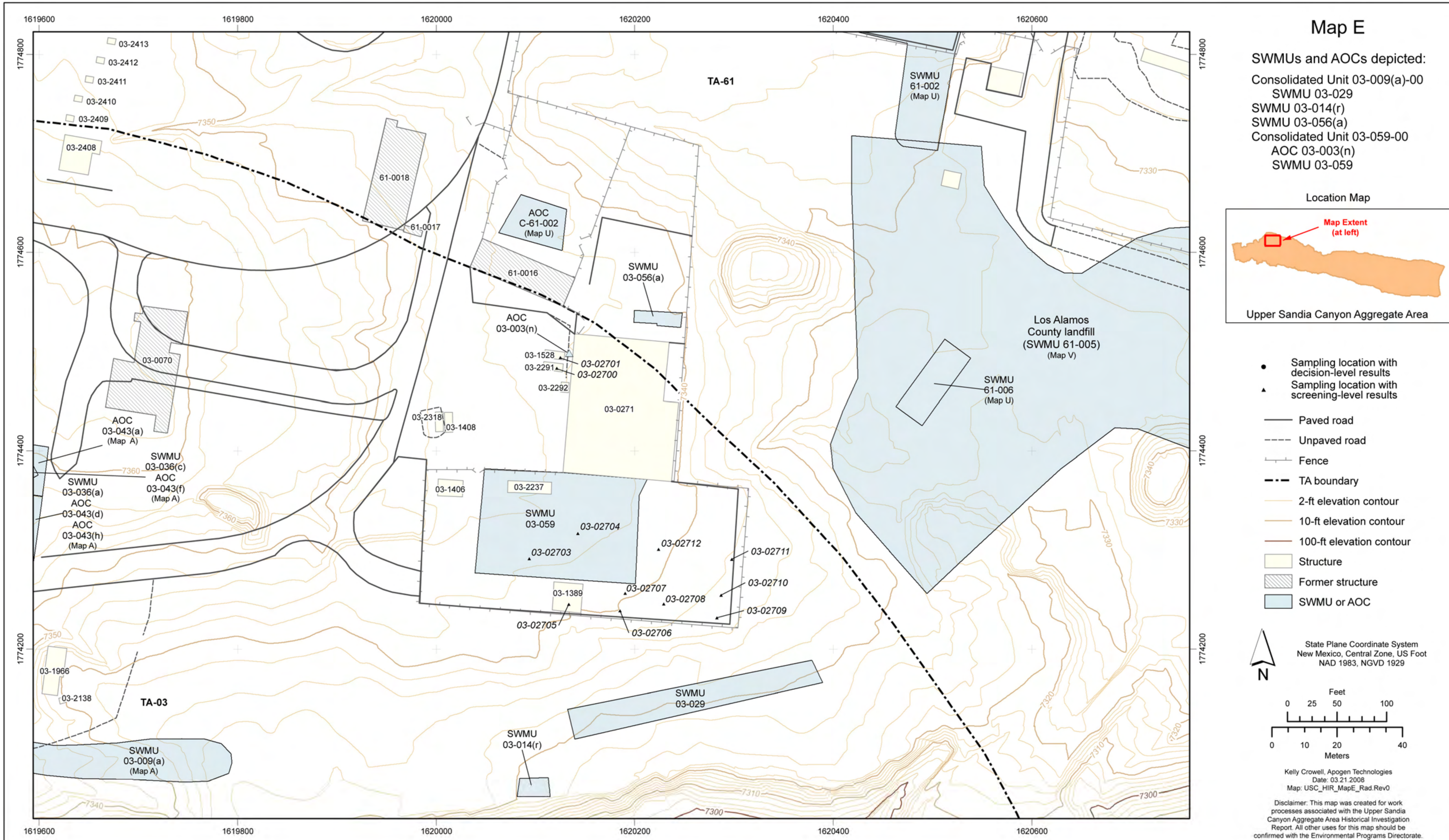


Figure 4.1-21 Map E radionuclide sampling locations

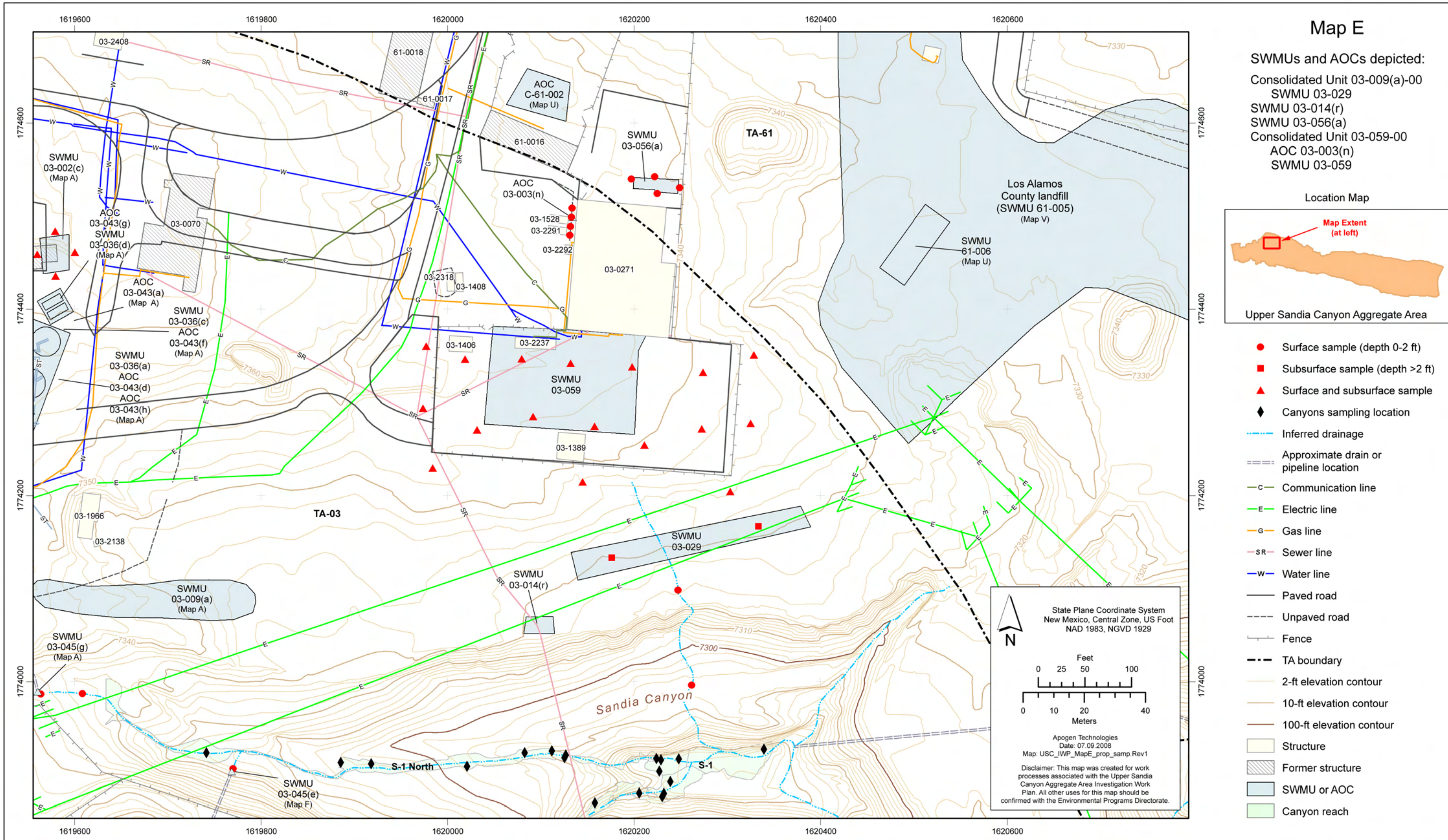


Figure 4.1-22 Map E proposed sampling locations

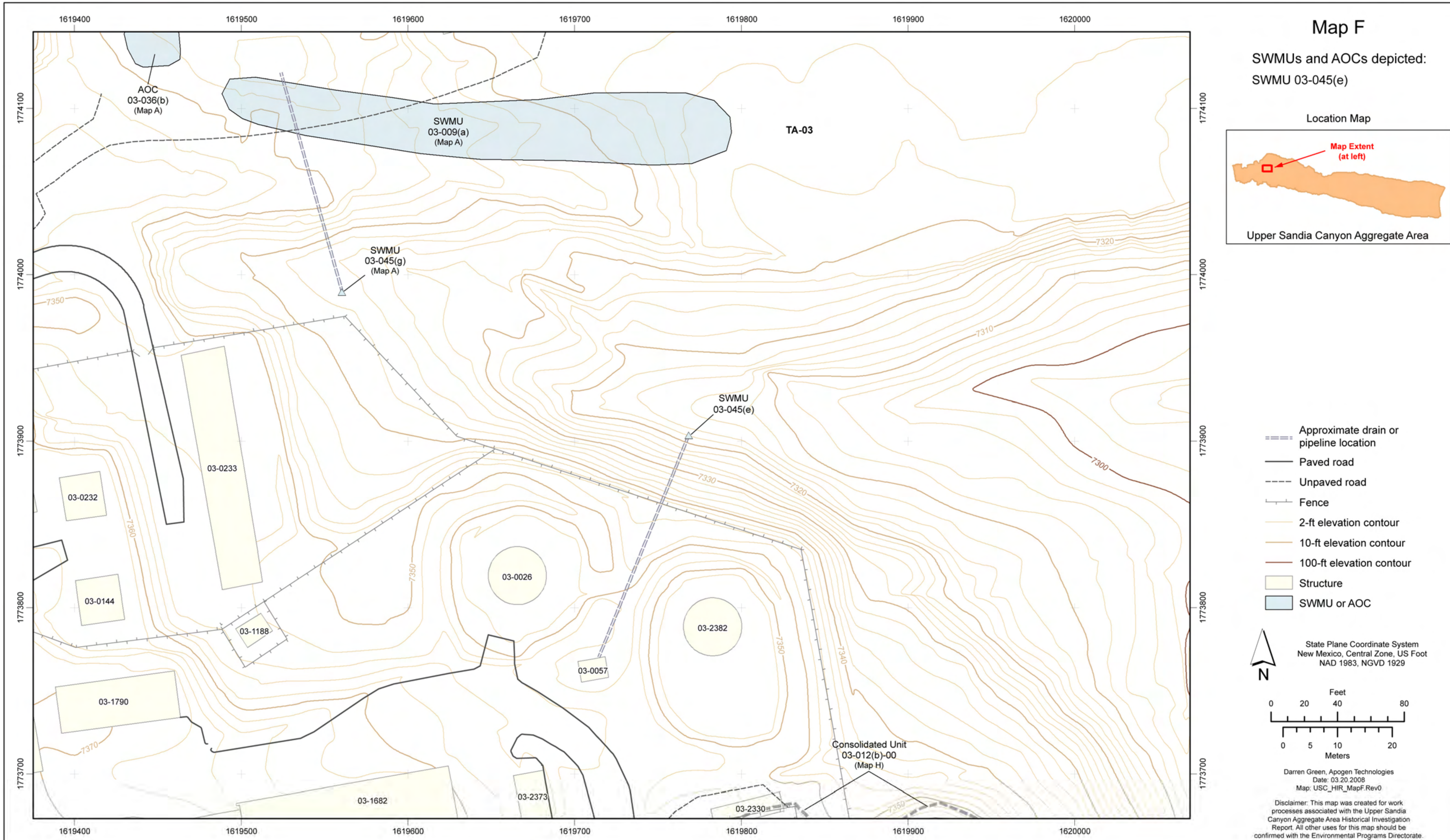


Figure 4.1-23 Map F site location

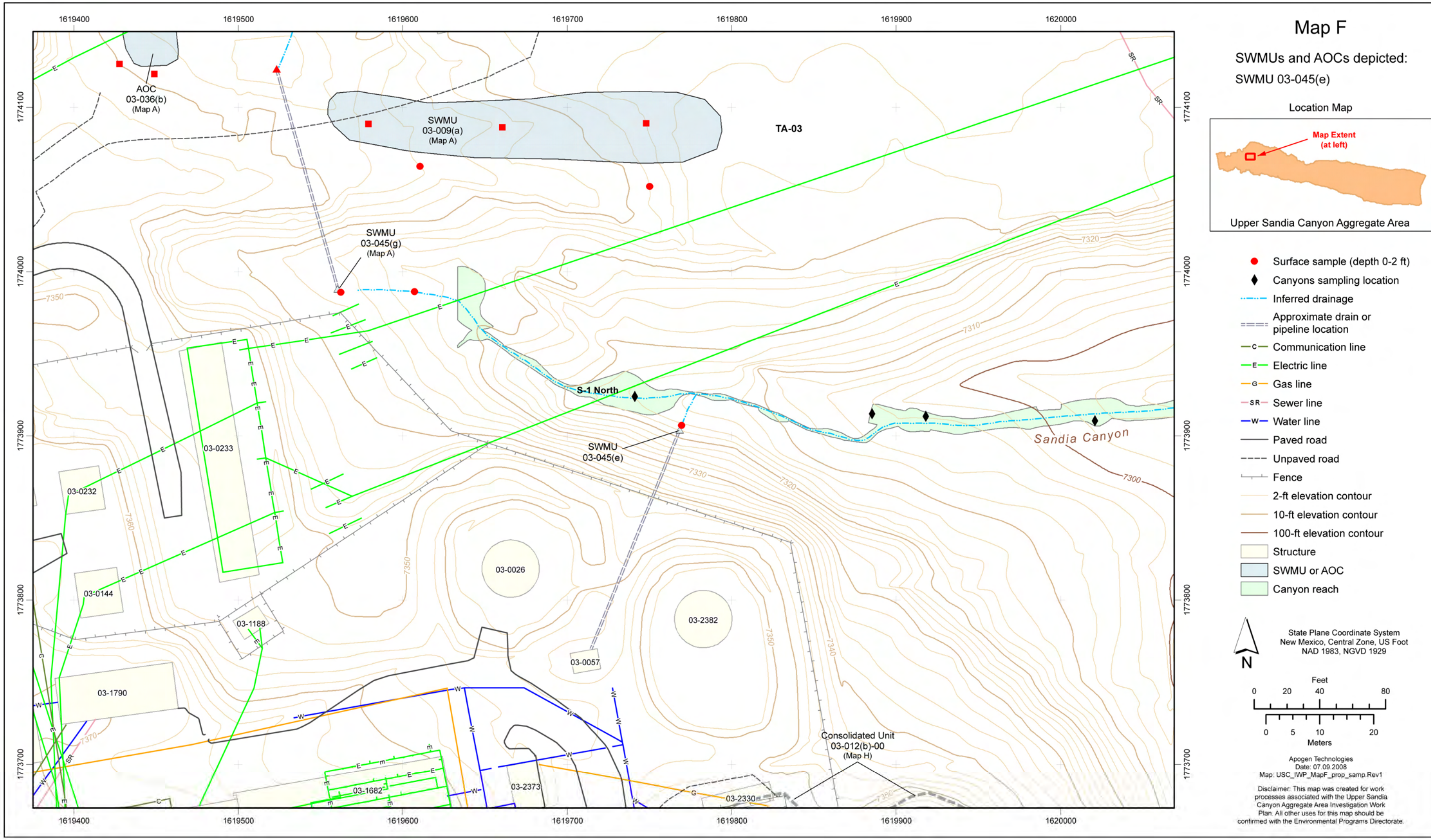


Figure 4.1-24 Map F proposed sampling locations

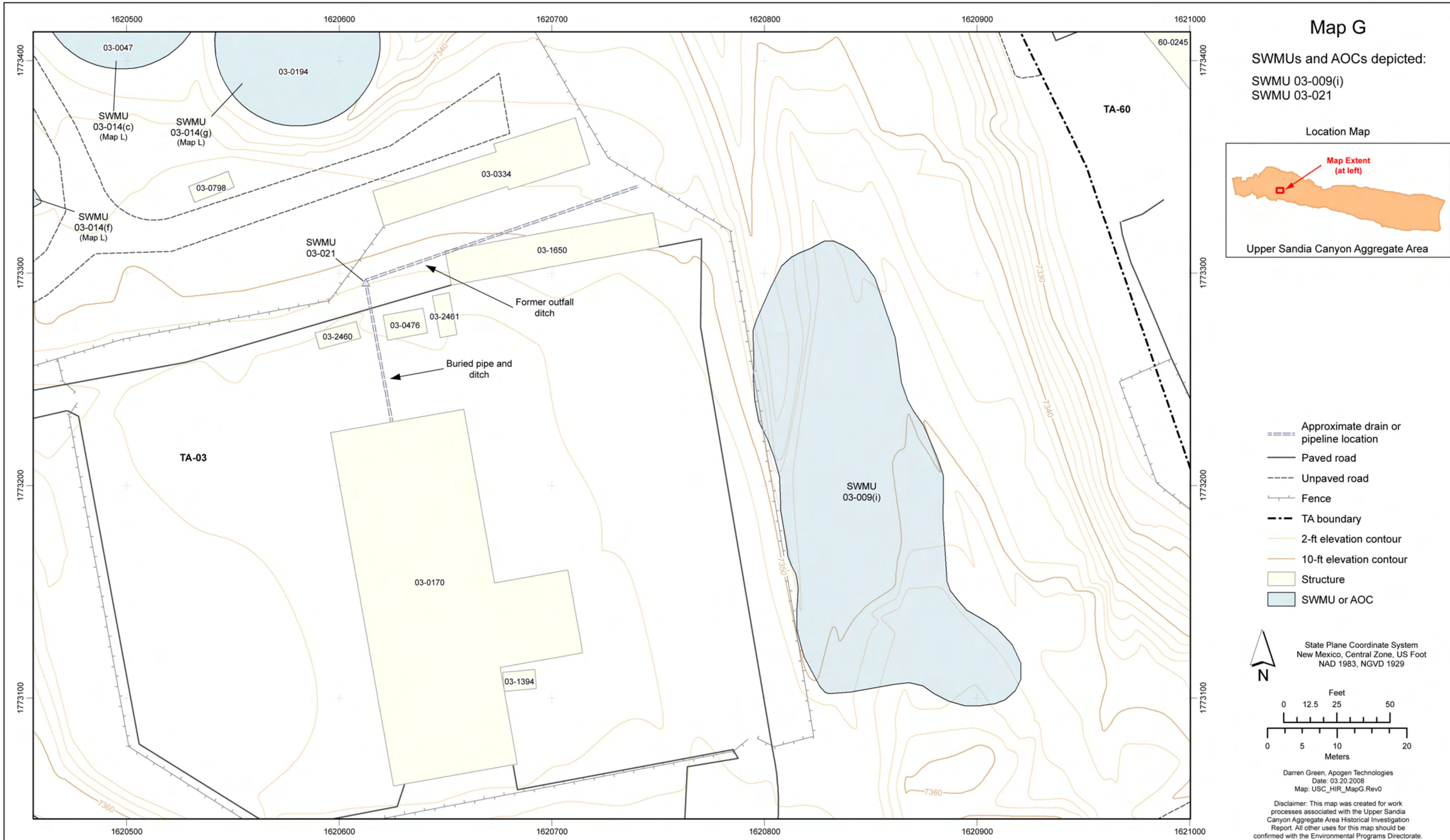


Figure 4.1-25 Map G site location

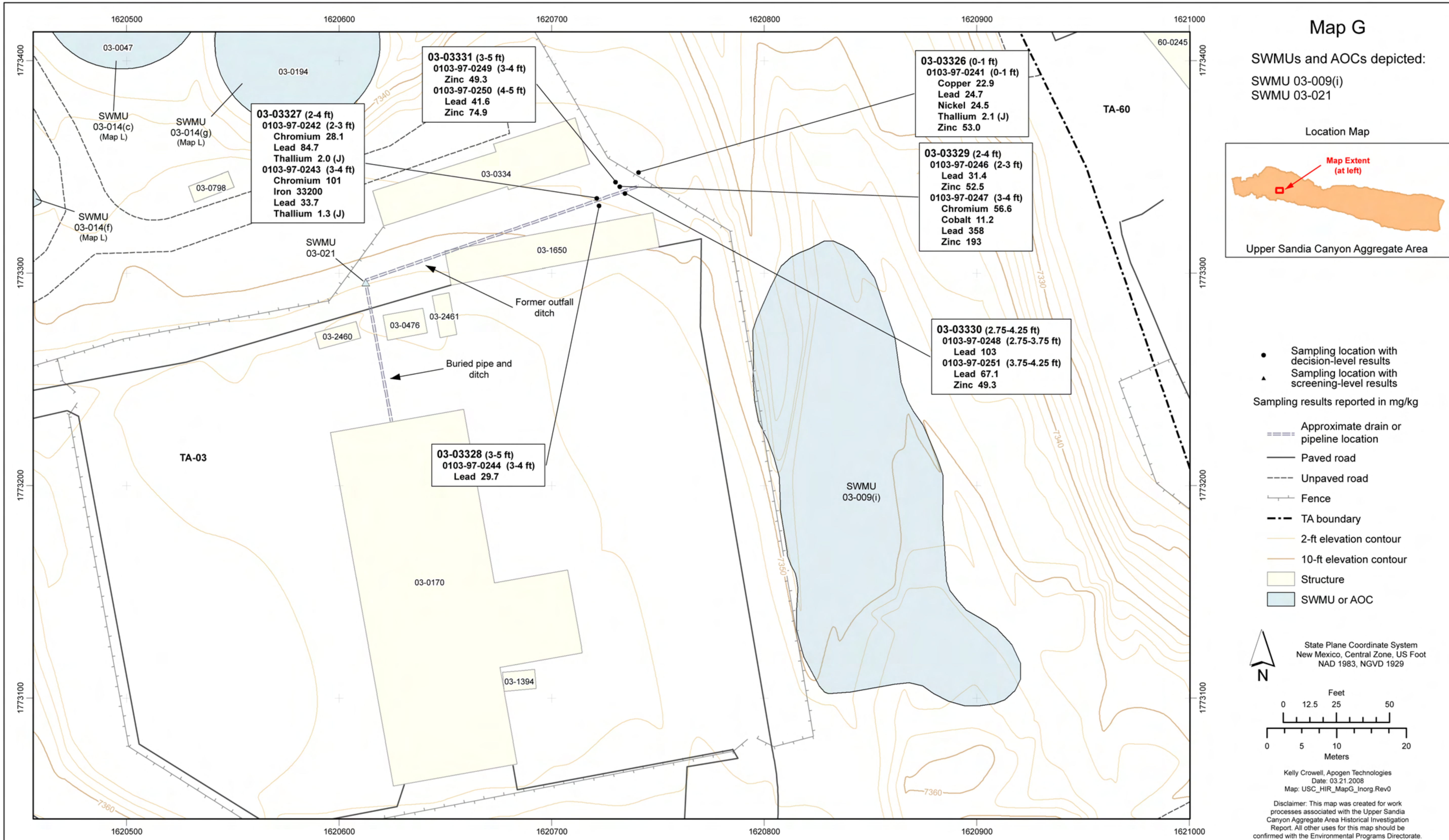


Figure 4.1-26 Map G inorganic chemical sampling locations and results detected above BVs

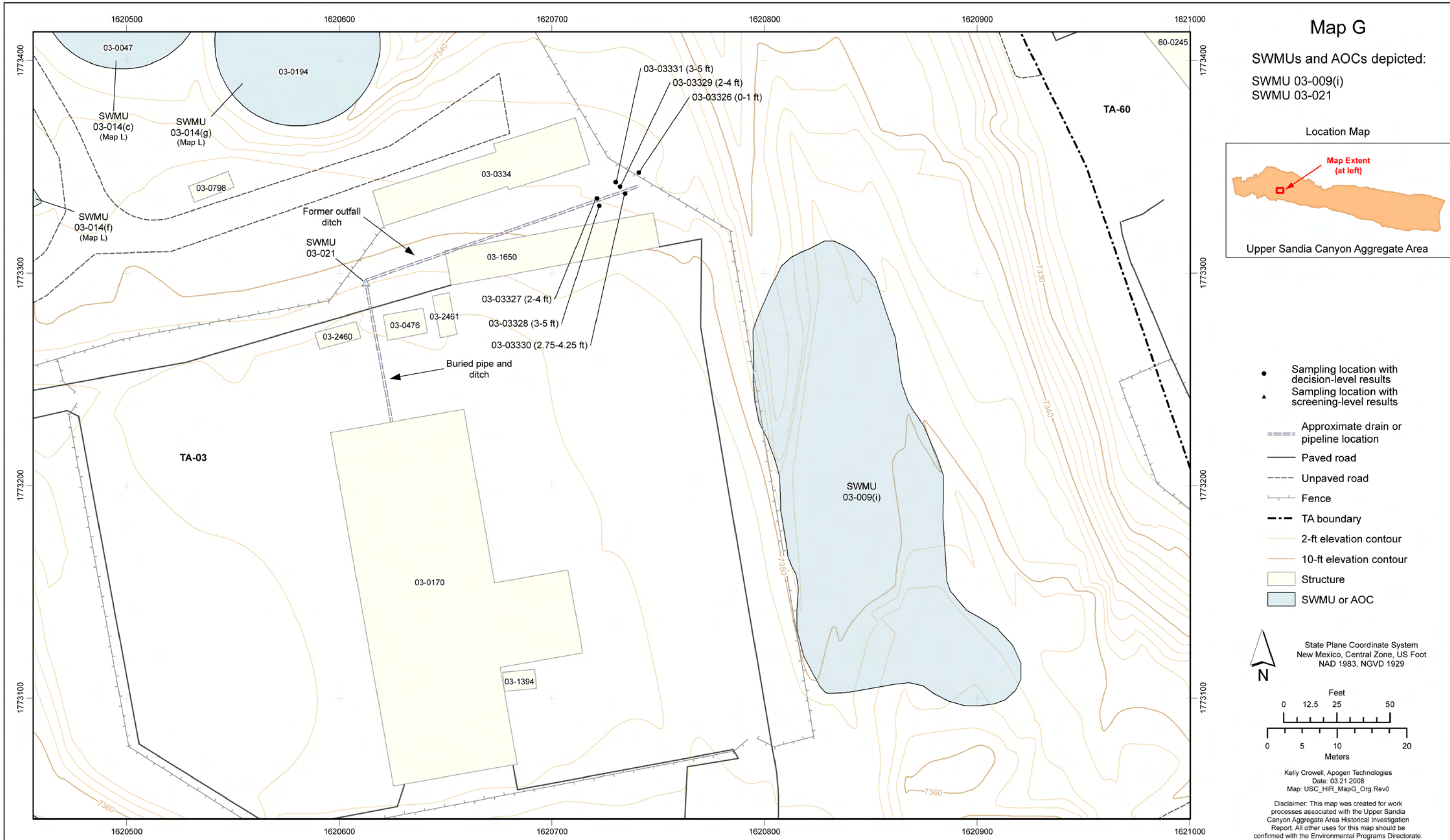


Figure 4.1-27 Map G organic chemical sampling locations

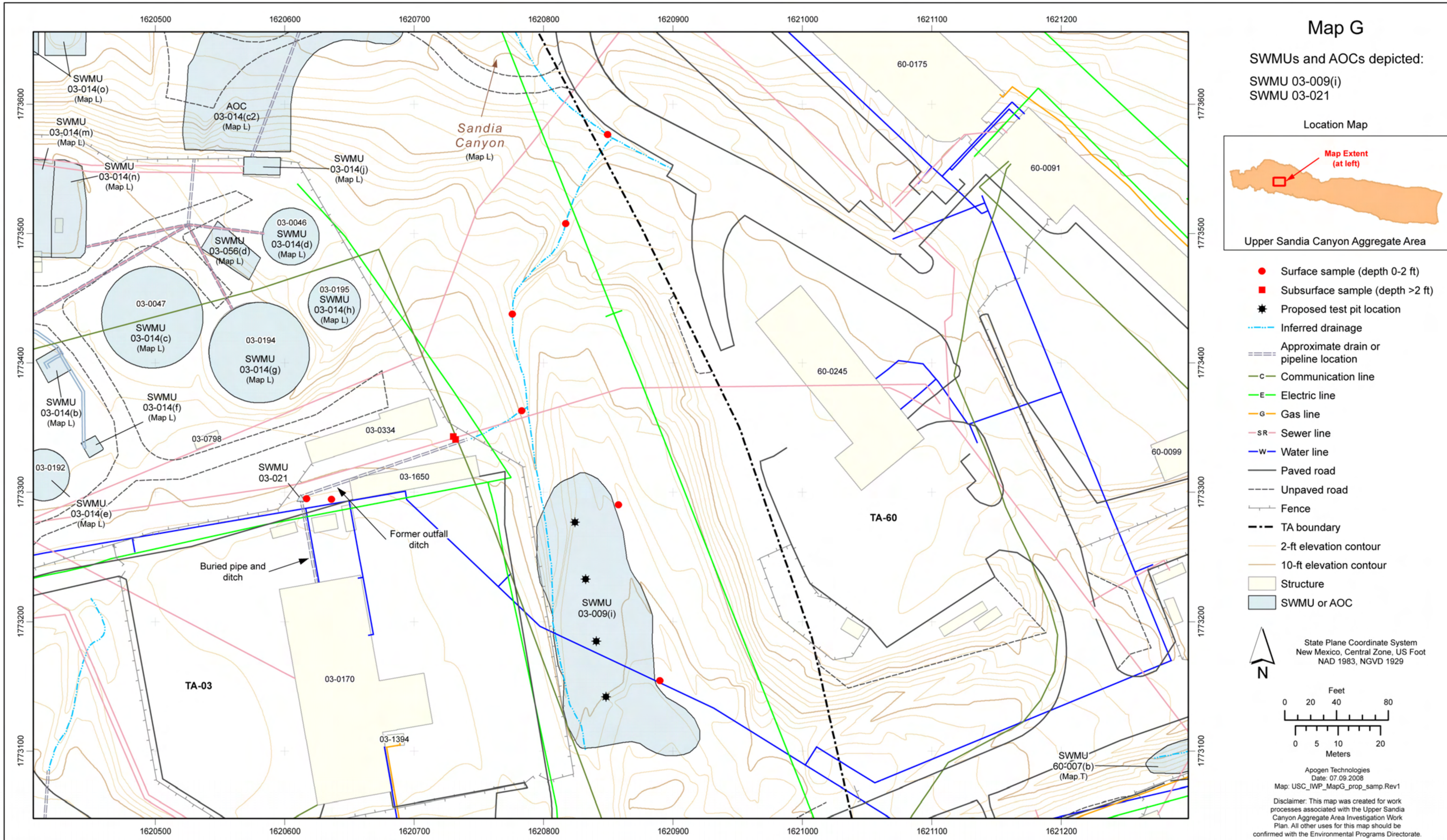


Figure 4.1-28 Map G proposed sampling locations

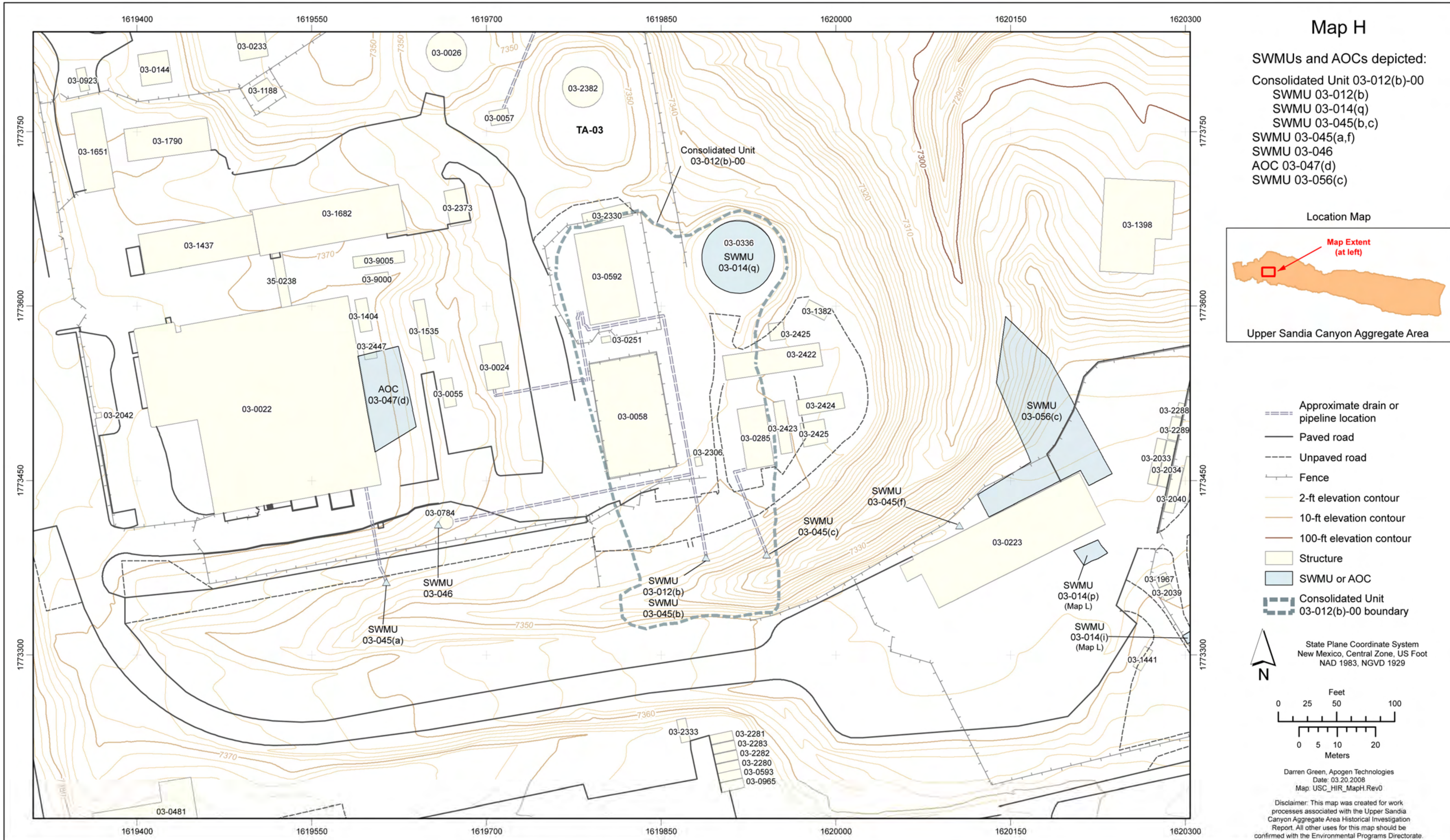


Figure 4.1-29 Map H site location

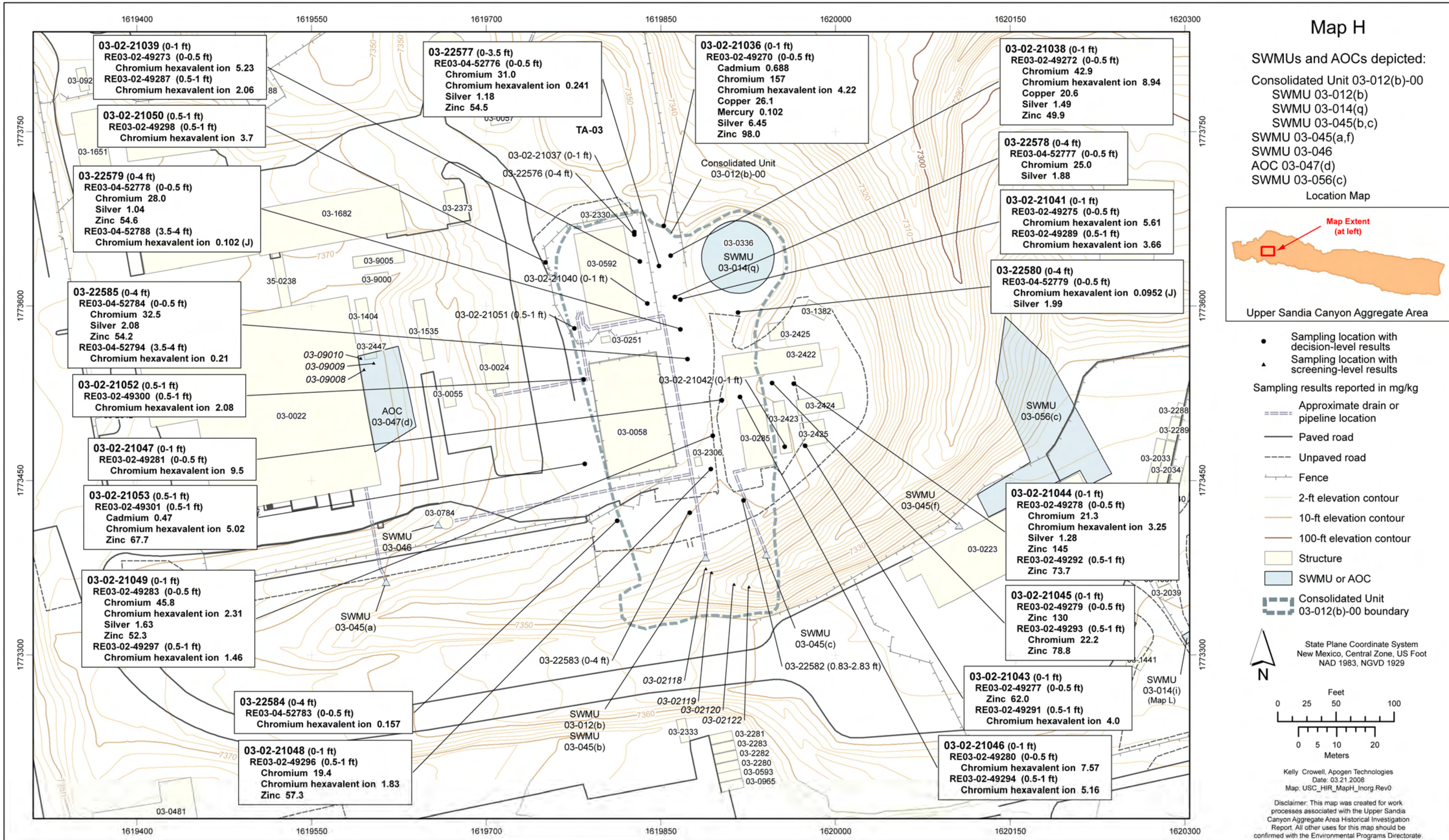


Figure 4.1-30 Map H inorganic chemical sampling locations and results detected above BVs

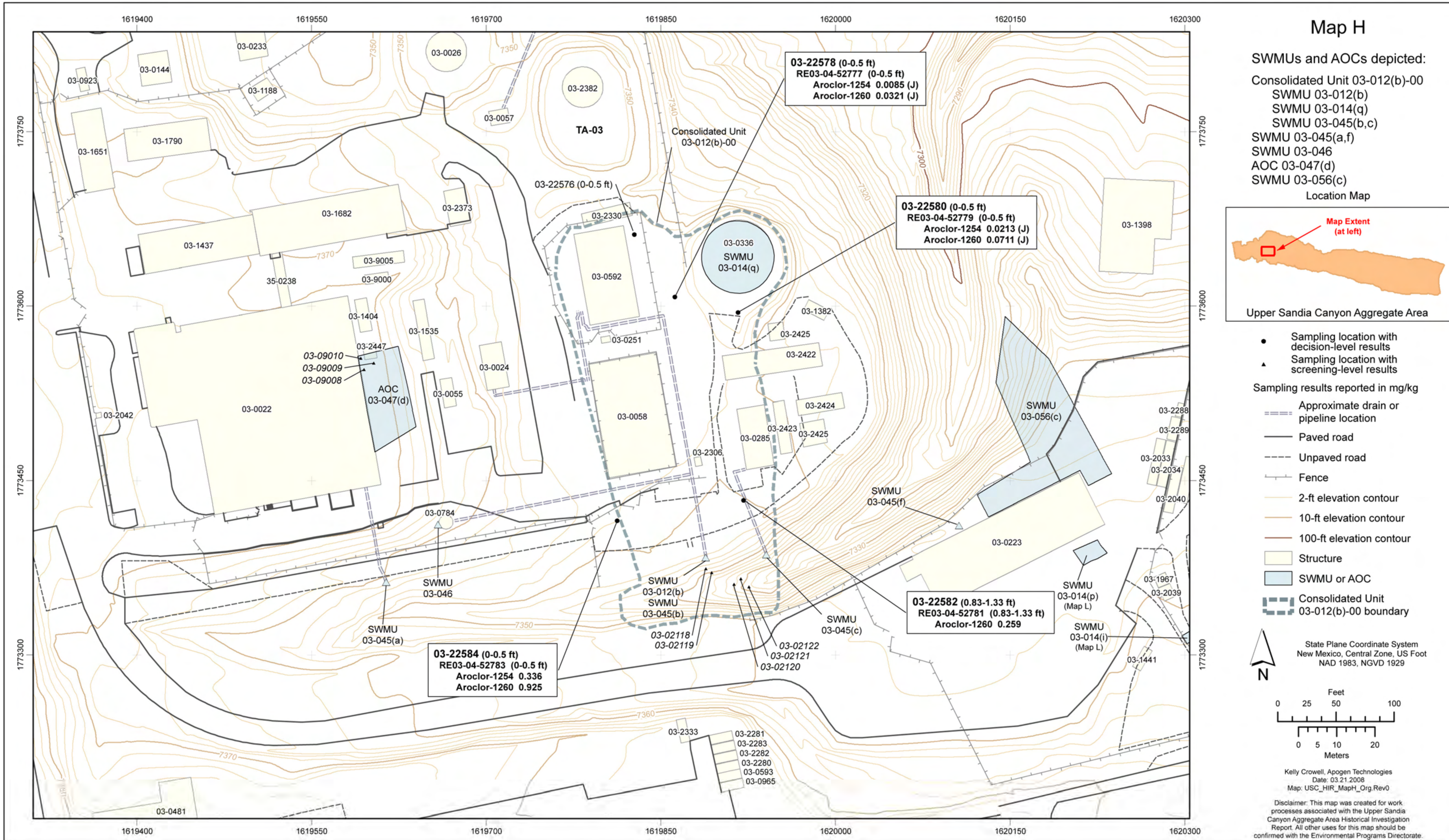


Figure 4.1-31 Map H organic chemical sampling locations and detected results

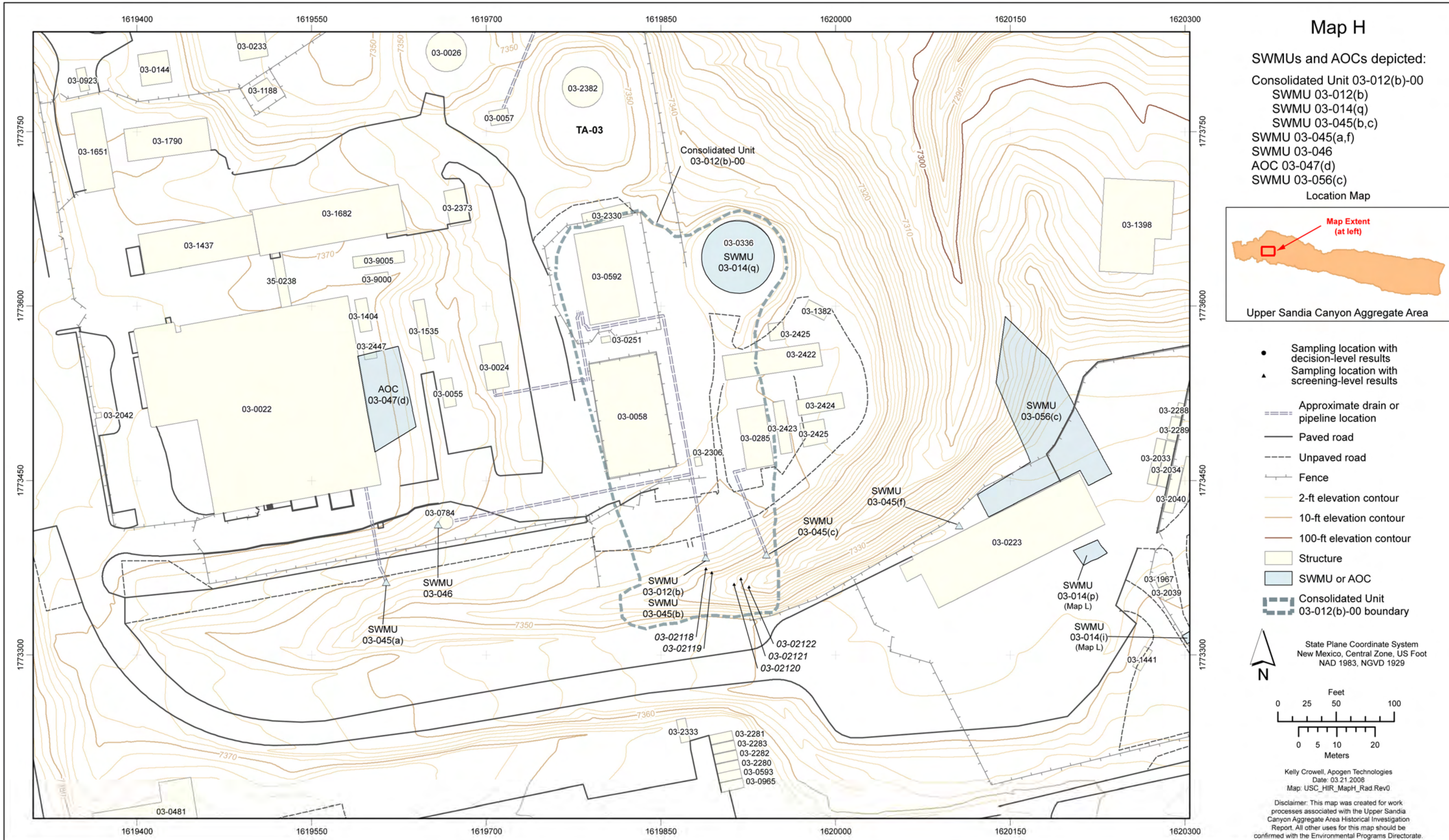


Figure 4.1-32 Map H radionuclide sampling locations

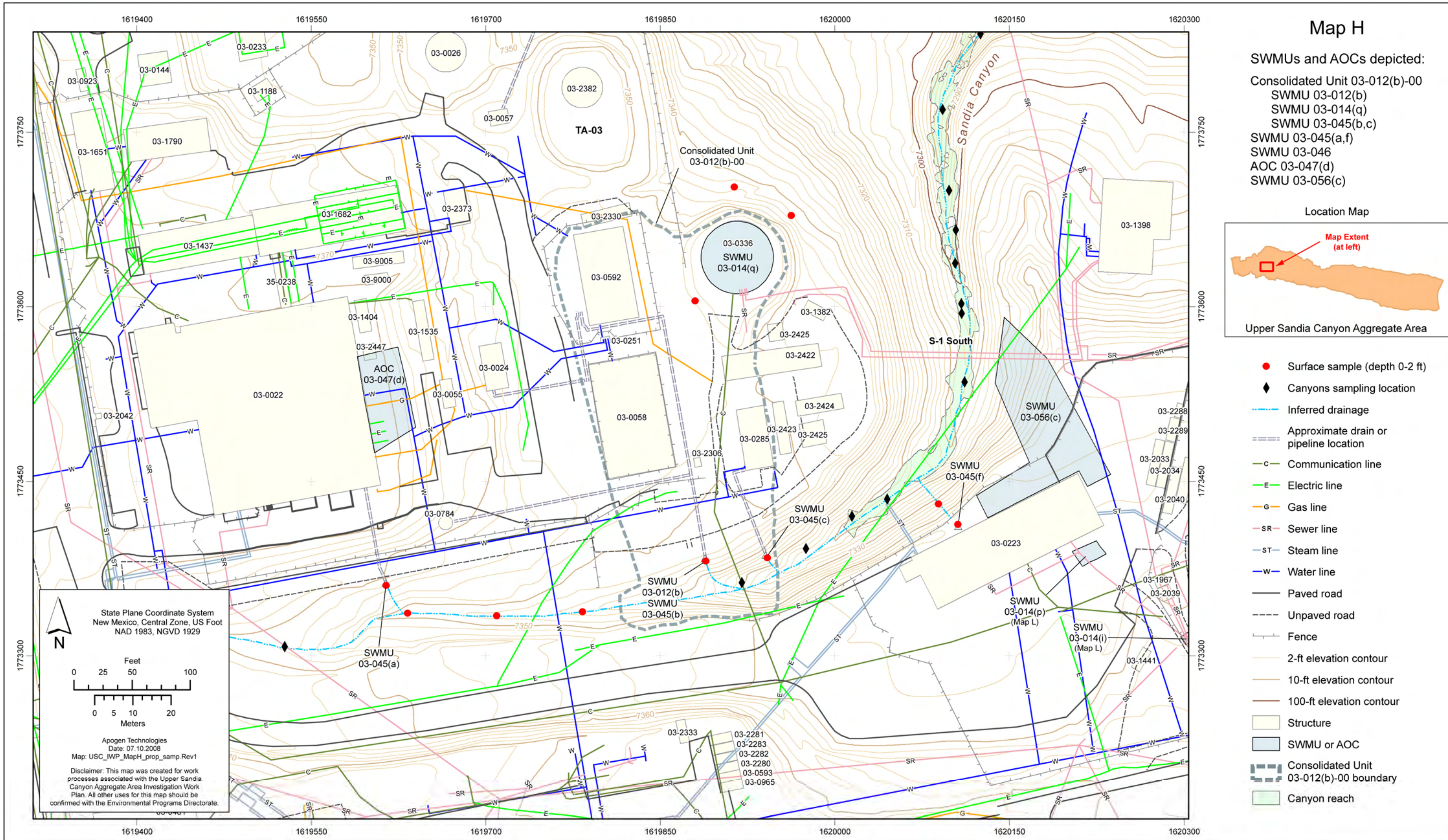


Figure 4.1-33 Map H proposed sampling locations

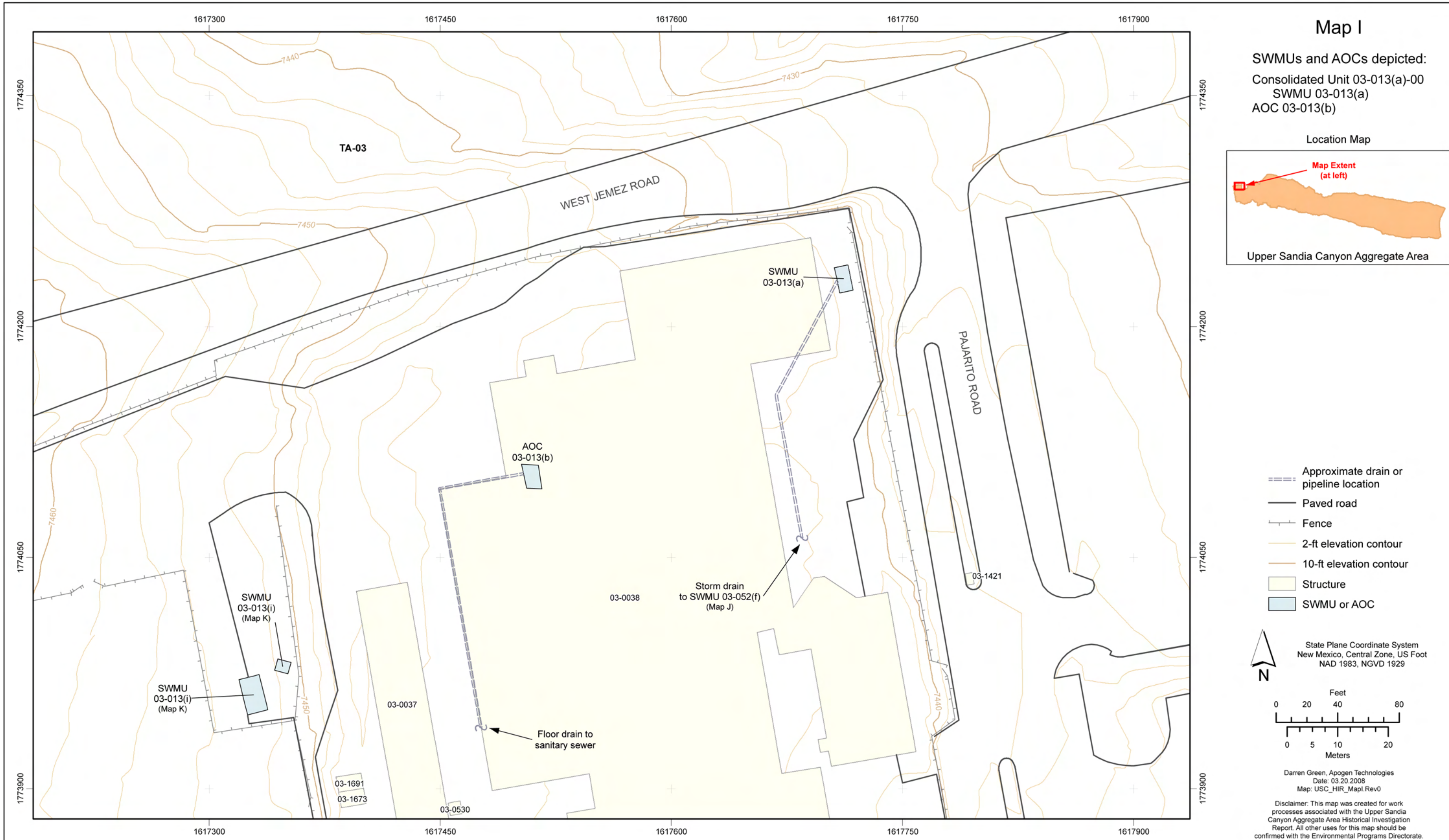


Figure 4.1-34 Map I site location

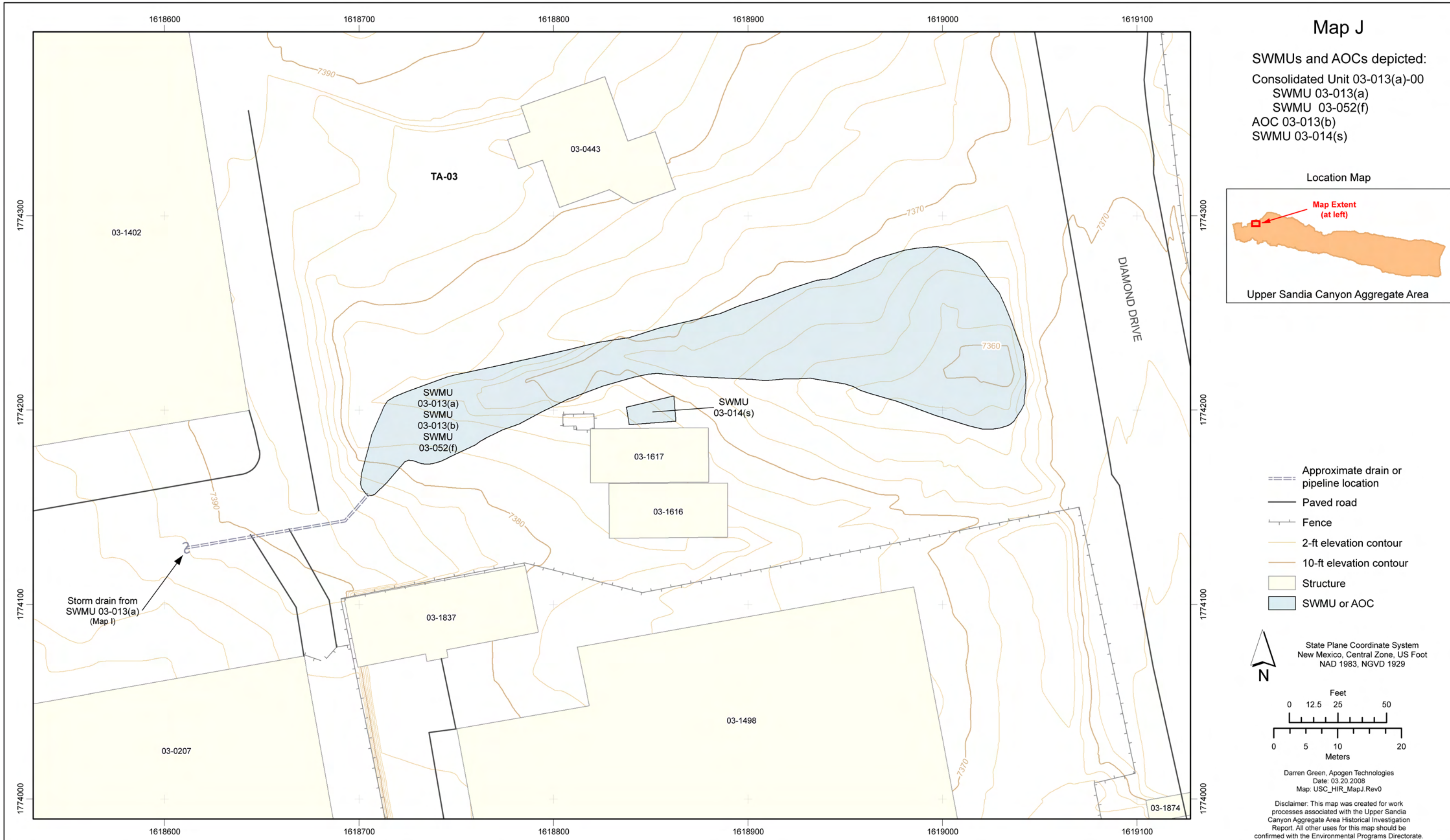


Figure 4.1-35 Map J site location

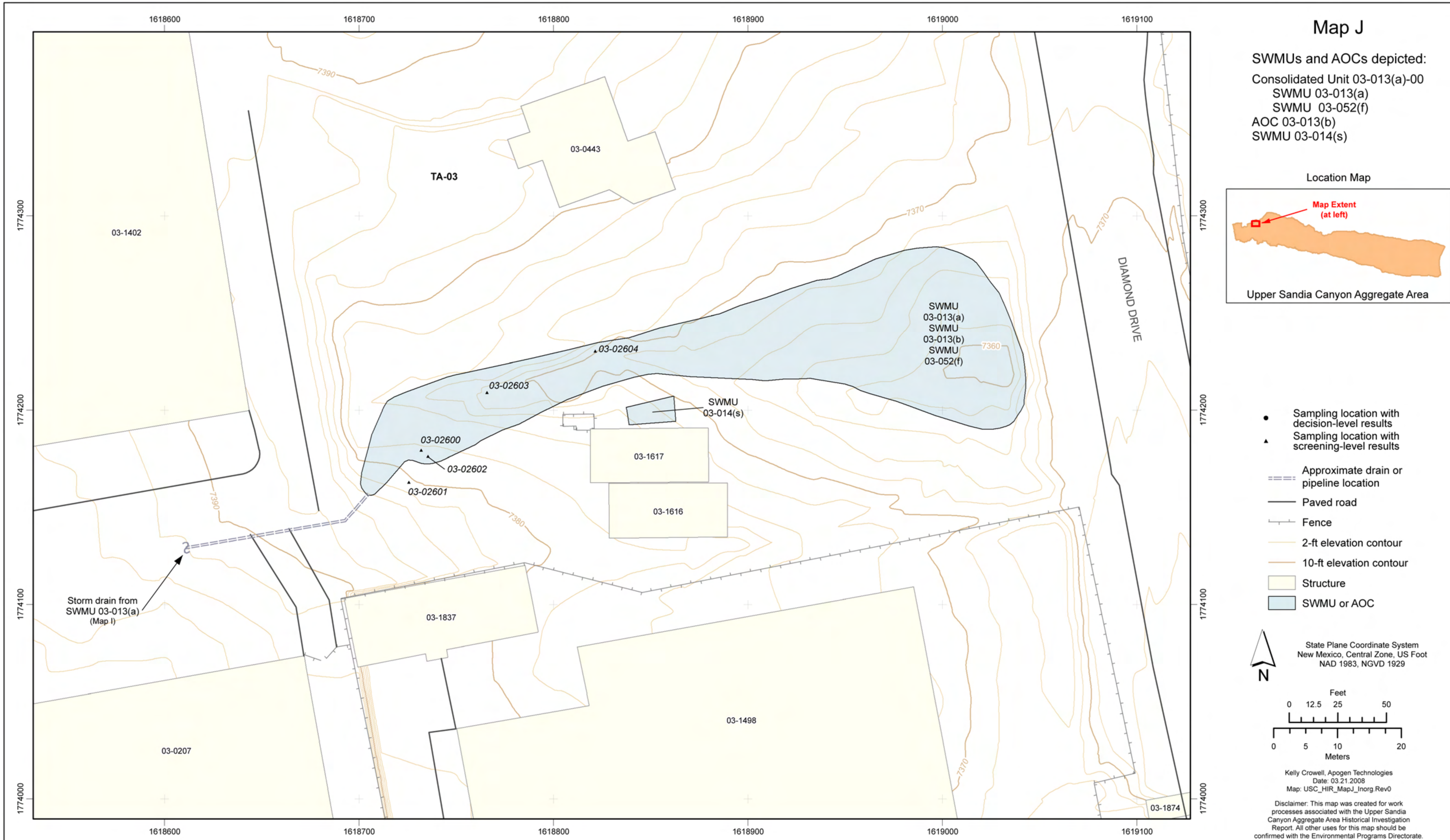


Figure 4.1-36 Map J inorganic chemical sampling locations

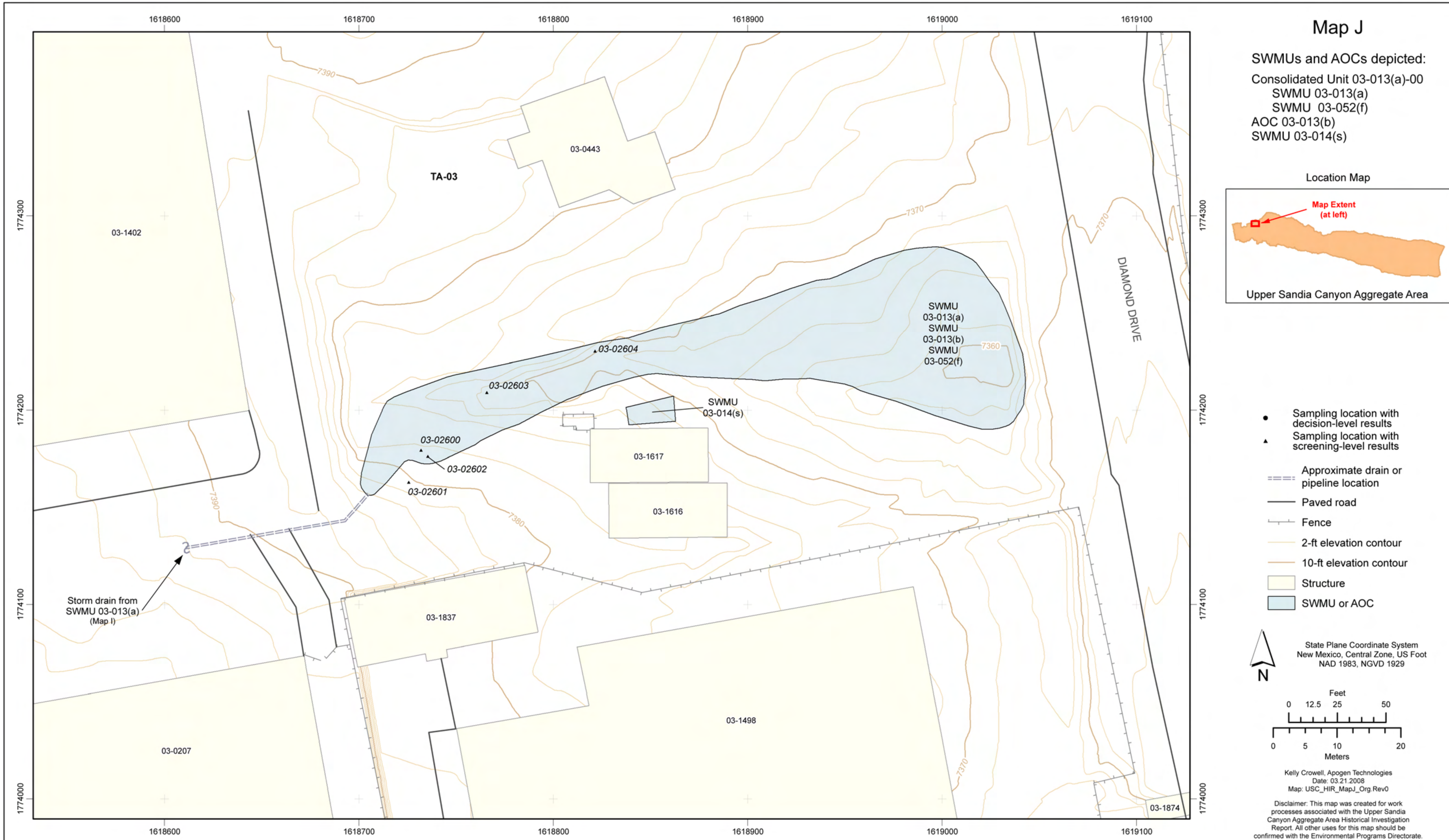


Figure 4.1-37 Map J organic chemical sampling locations

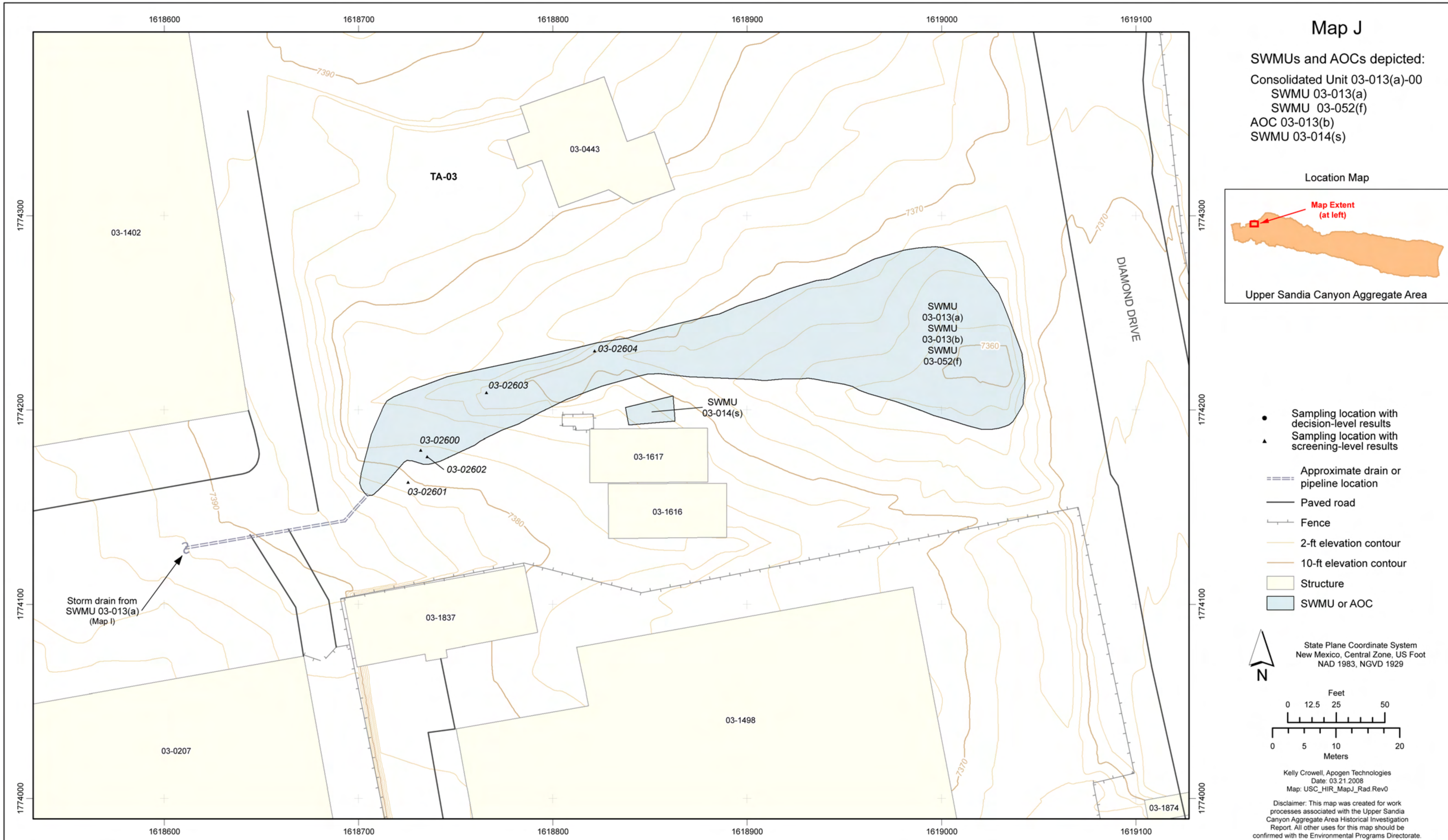


Figure 4.1-38 Map J radionuclide sampling locations

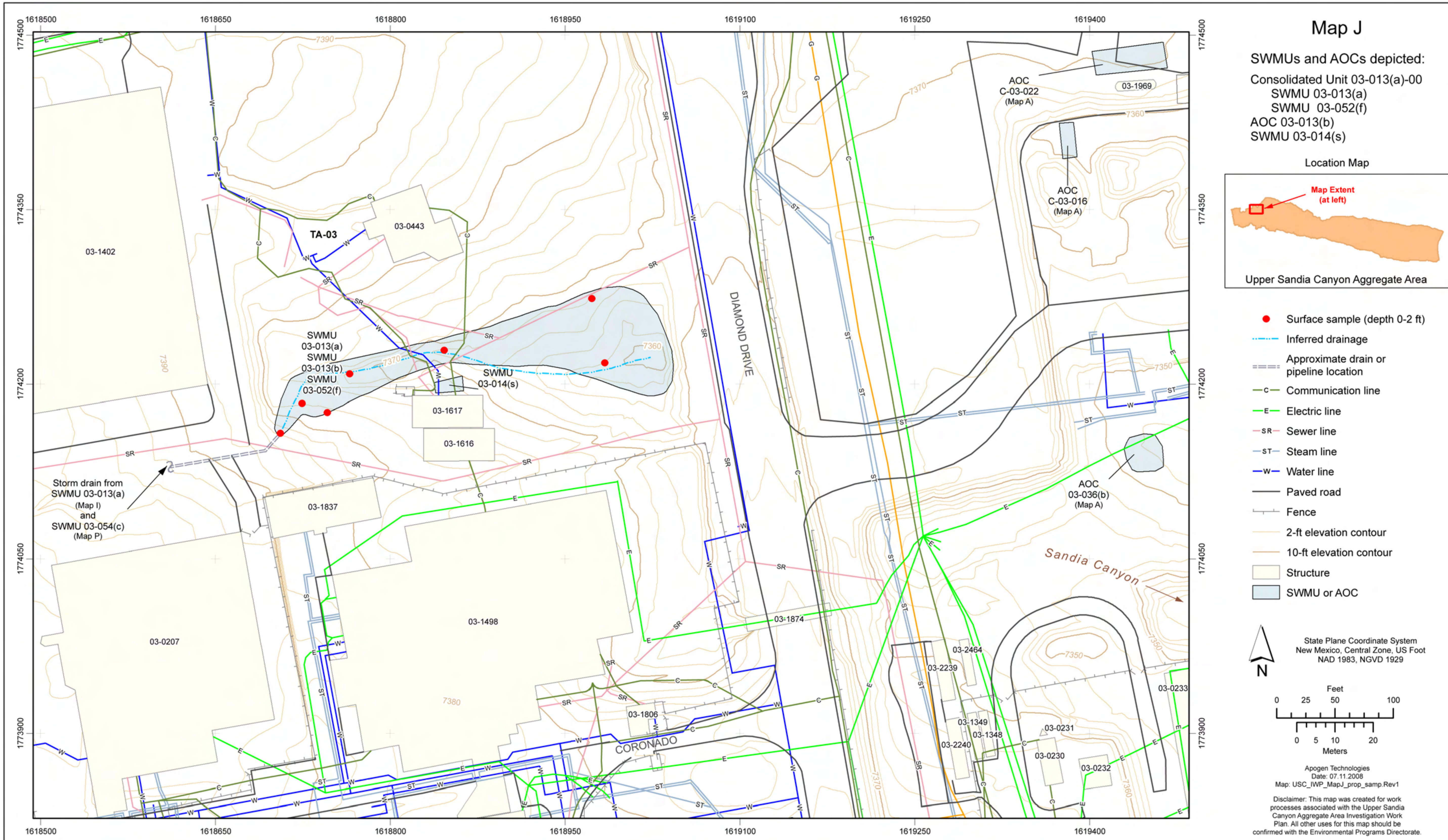


Figure 4.1-39 Map J proposed sampling locations

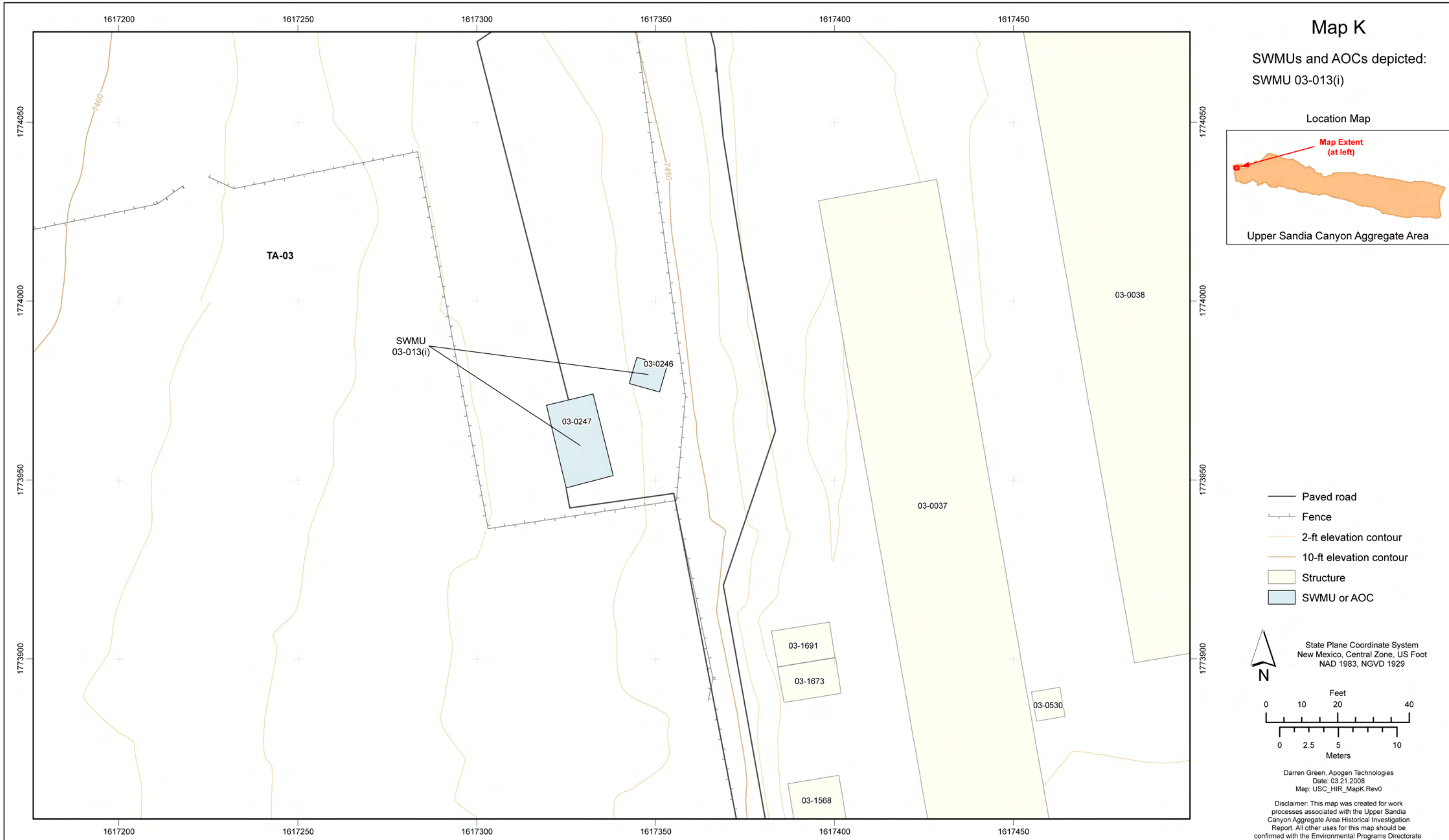


Figure 4.1-40 Map K site location

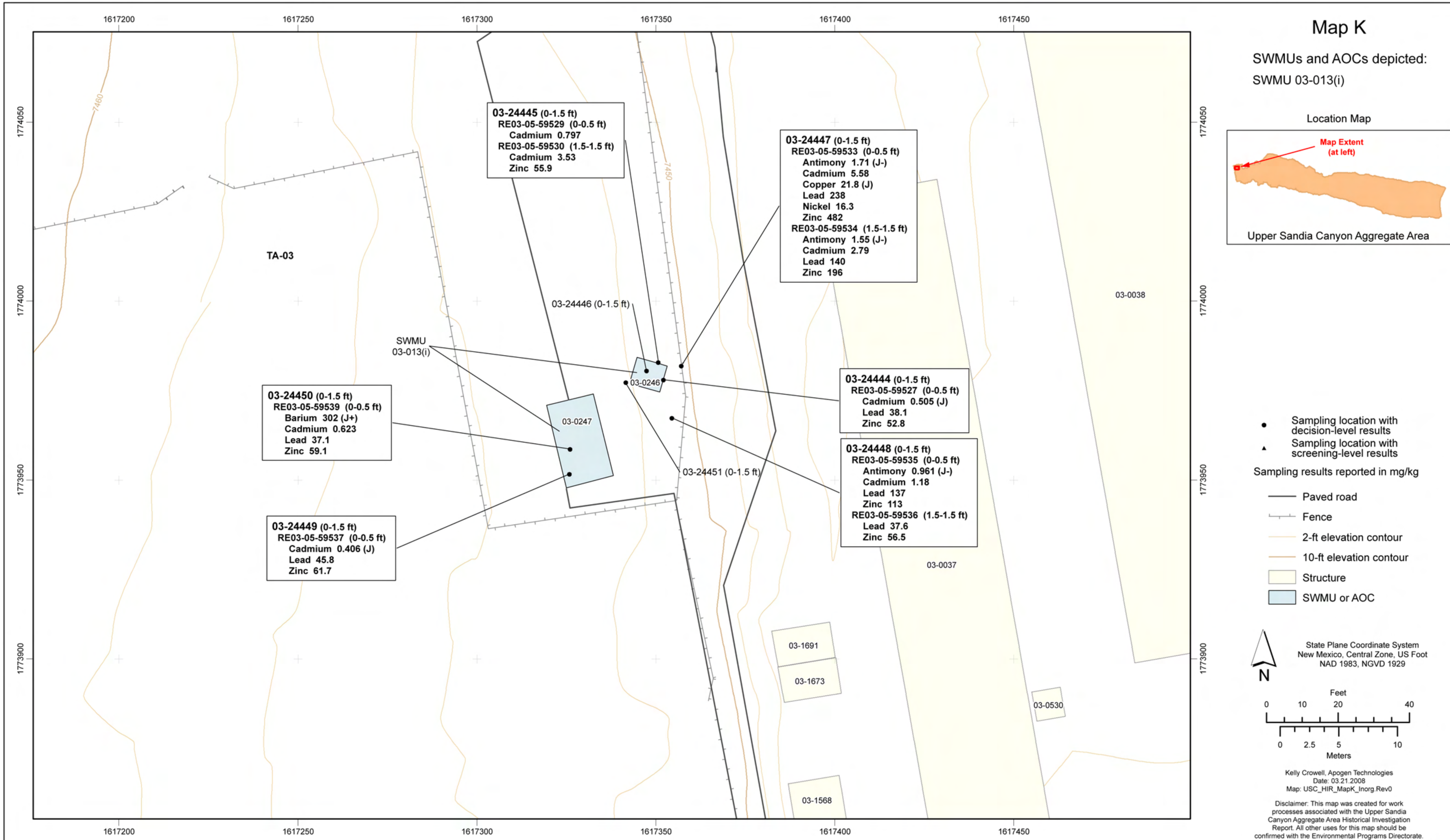


Figure 4.1-41 Map K inorganic chemical sampling locations and results detected above BVs

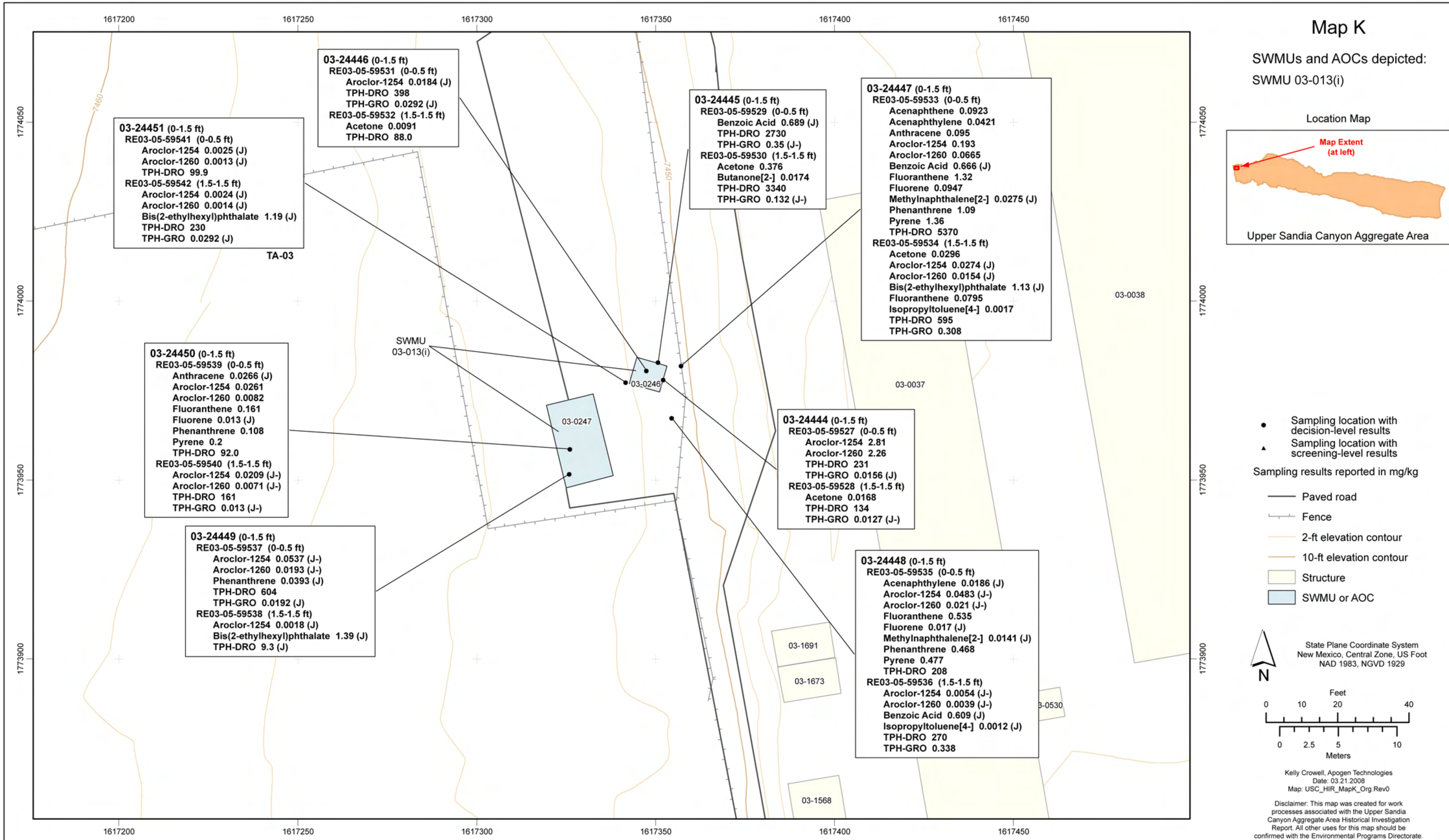


Figure 4.1-42 Map K organic chemical sampling locations and detected results

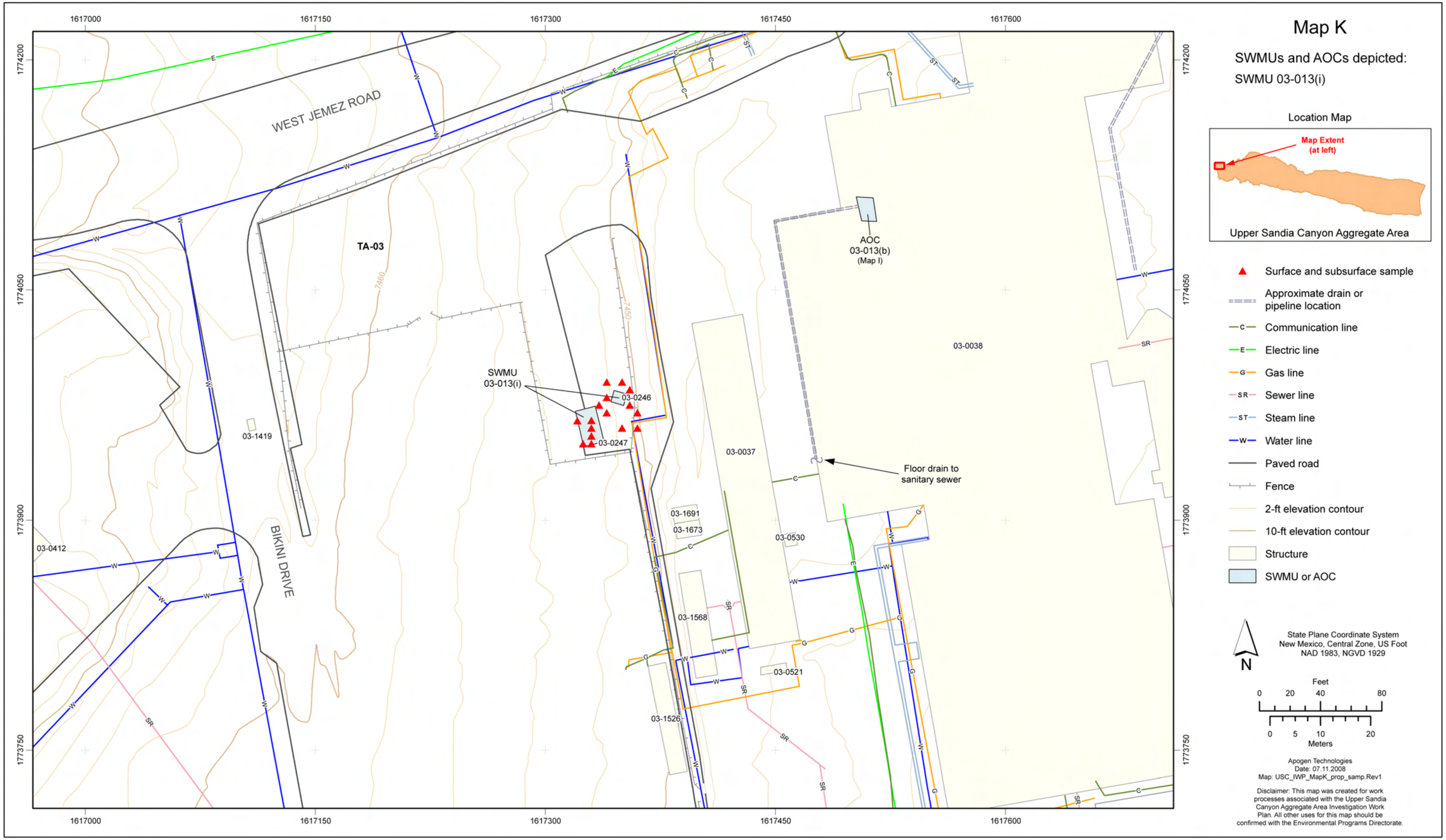


Figure 4.1-43 Map K proposed sampling locations

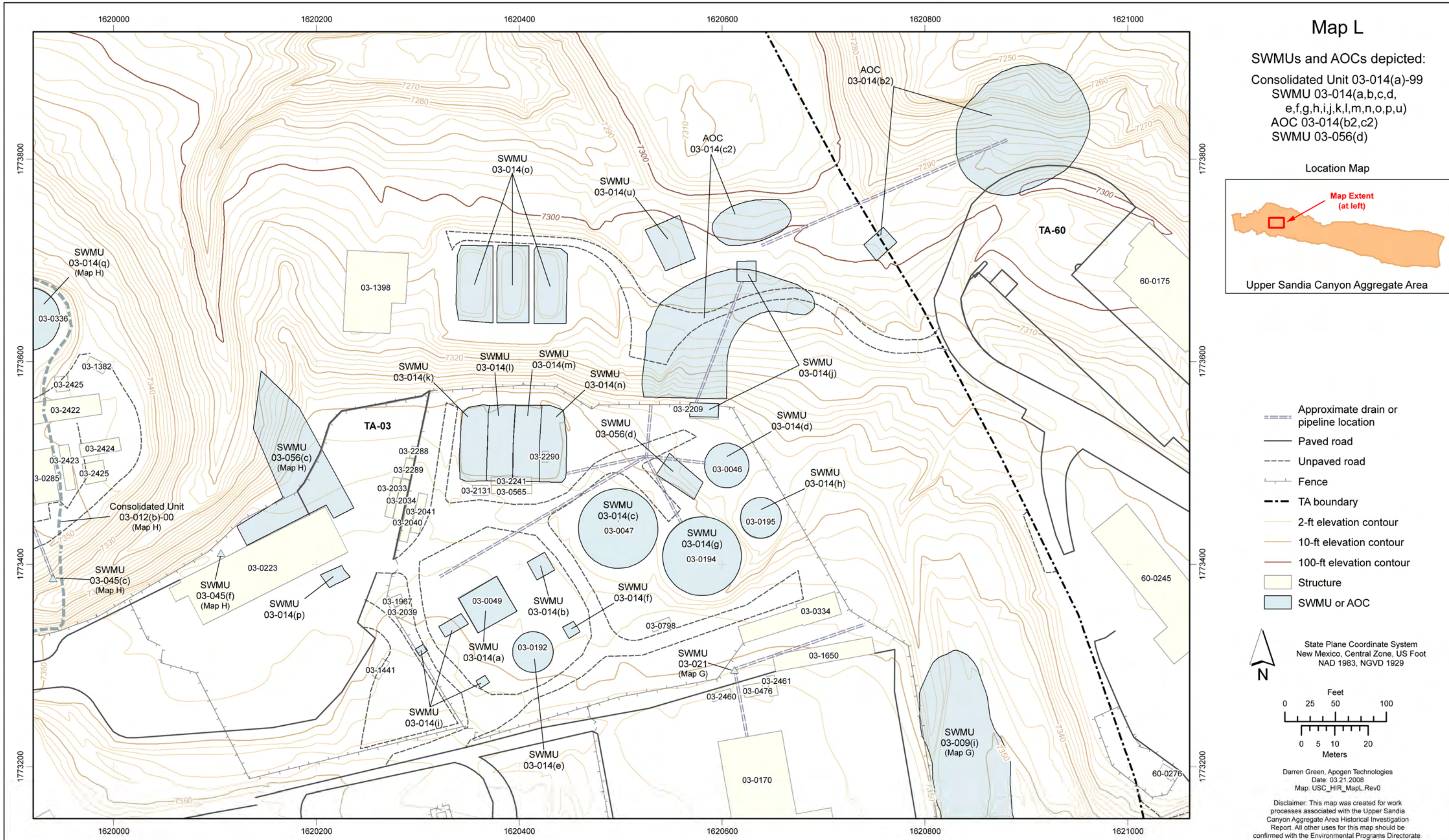


Figure 4.1-44 Map L site location

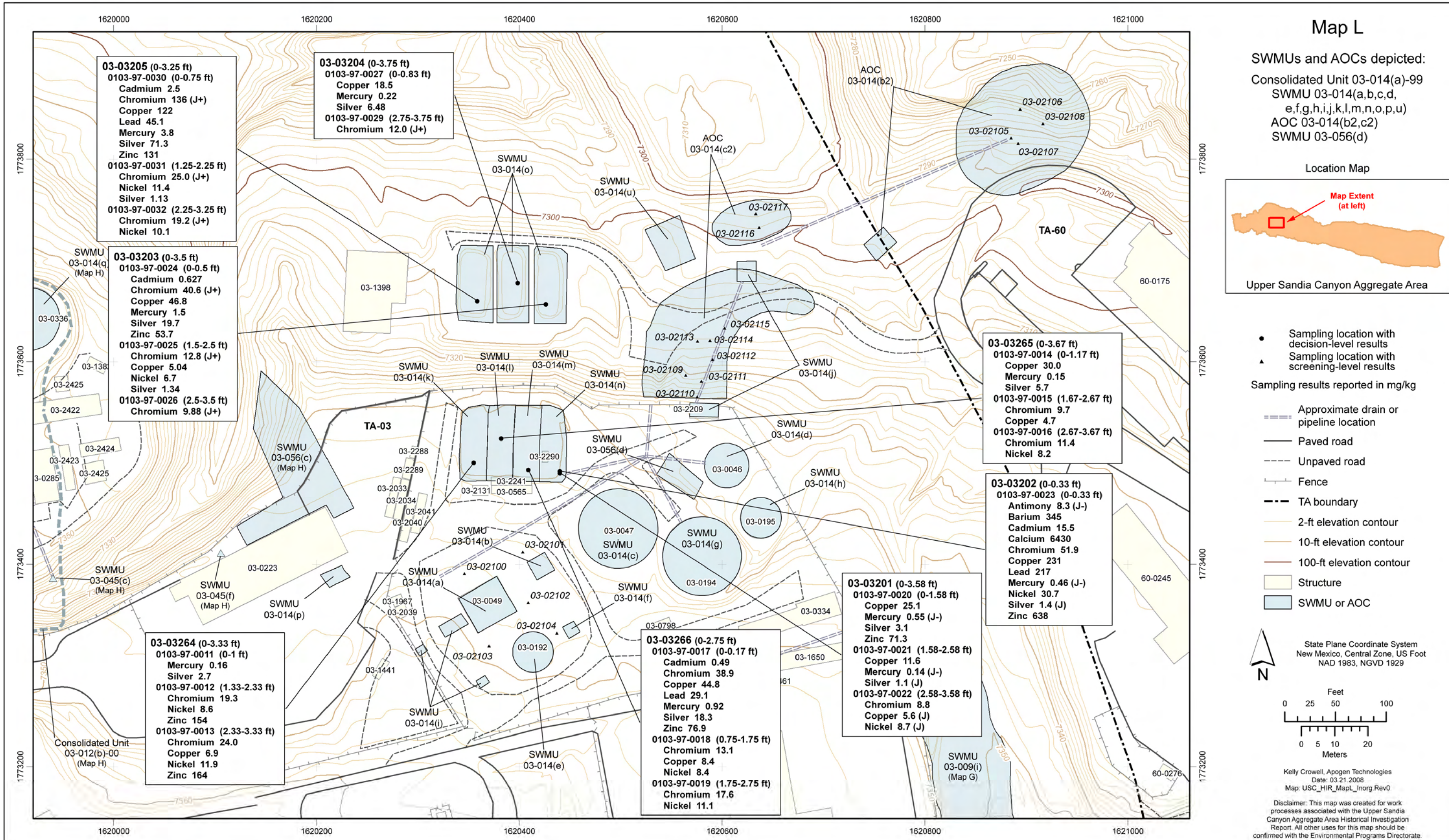


Figure 4.1-45 Map L inorganic chemical sampling locations and results detected above BVs

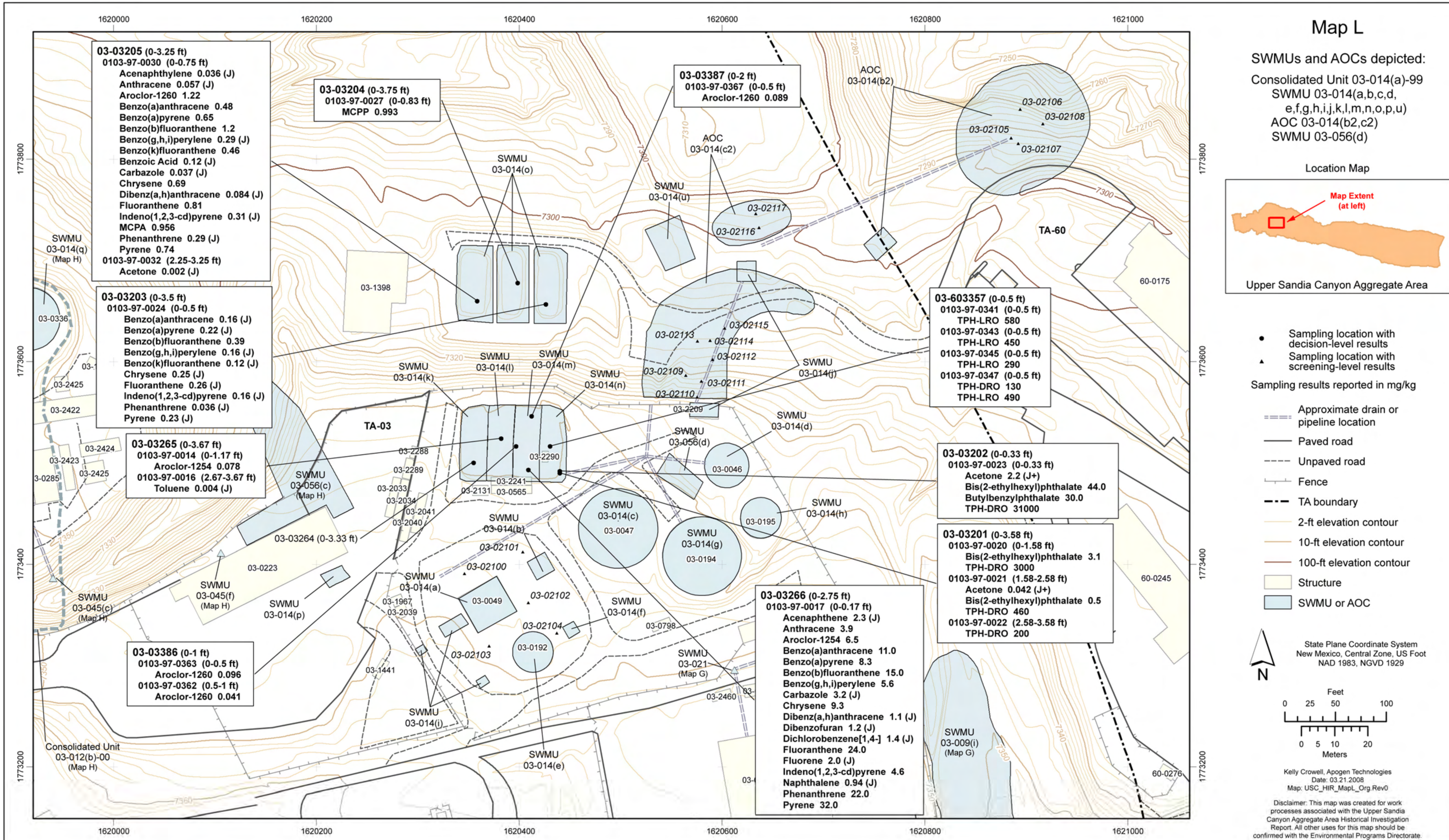


Figure 4.1-46 Map L organic chemical sampling locations and detected results

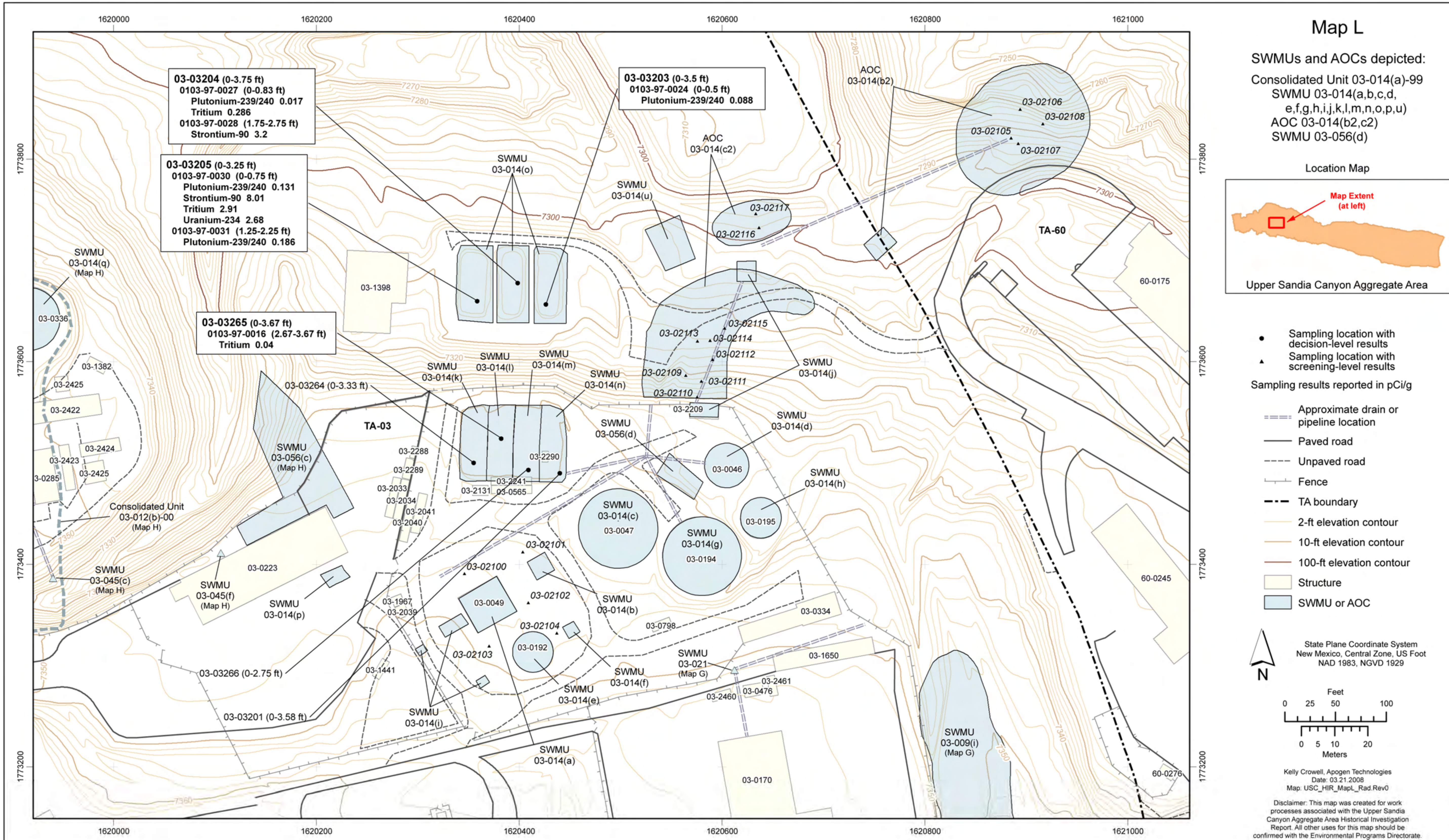


Figure 4.1-47   Map L radionuclide sampling locations and results detected above FVs/BVs

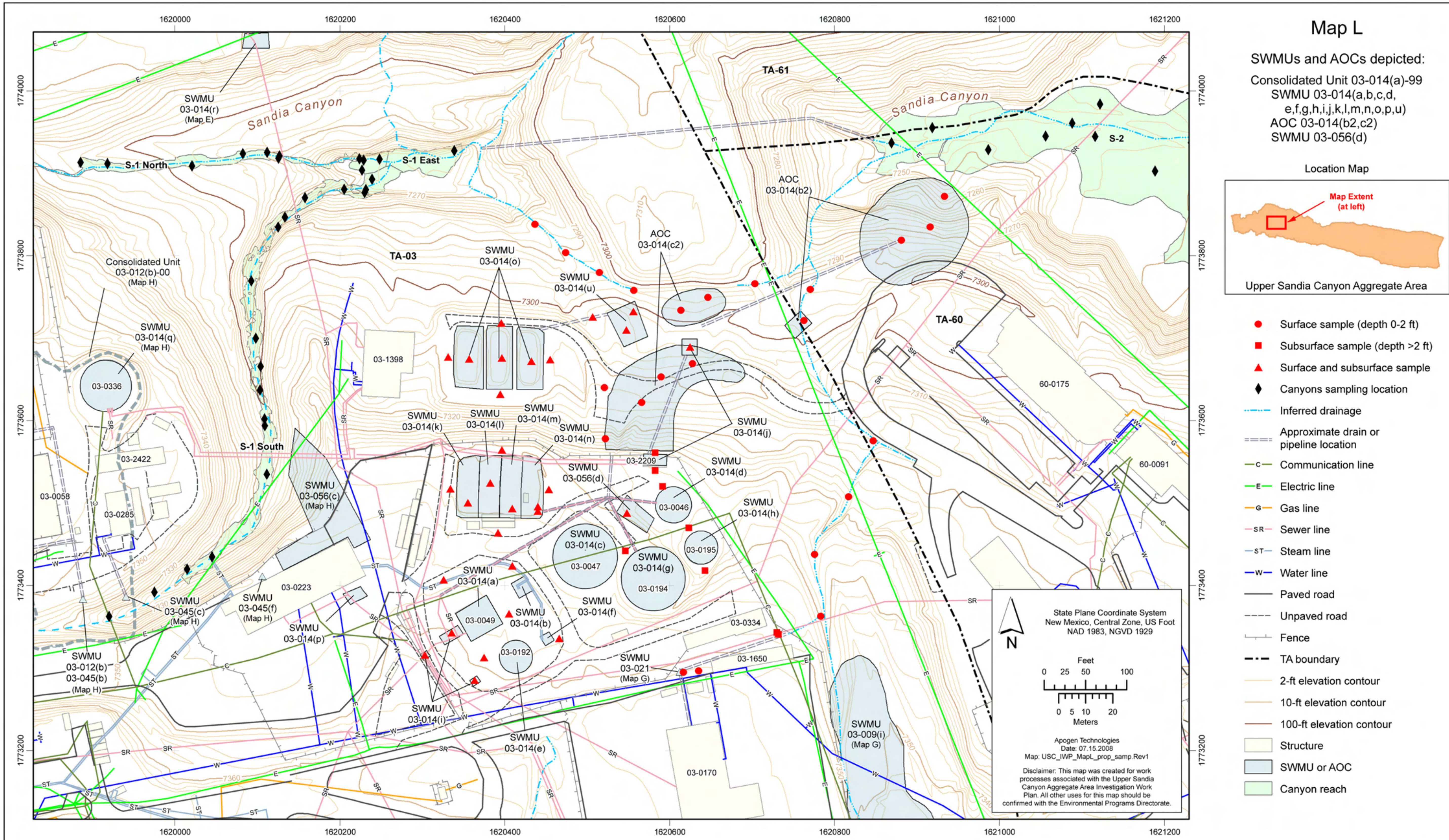


Figure 4.1-48 Map L proposed sampling locations

Figure 4.1-49 Map M site location

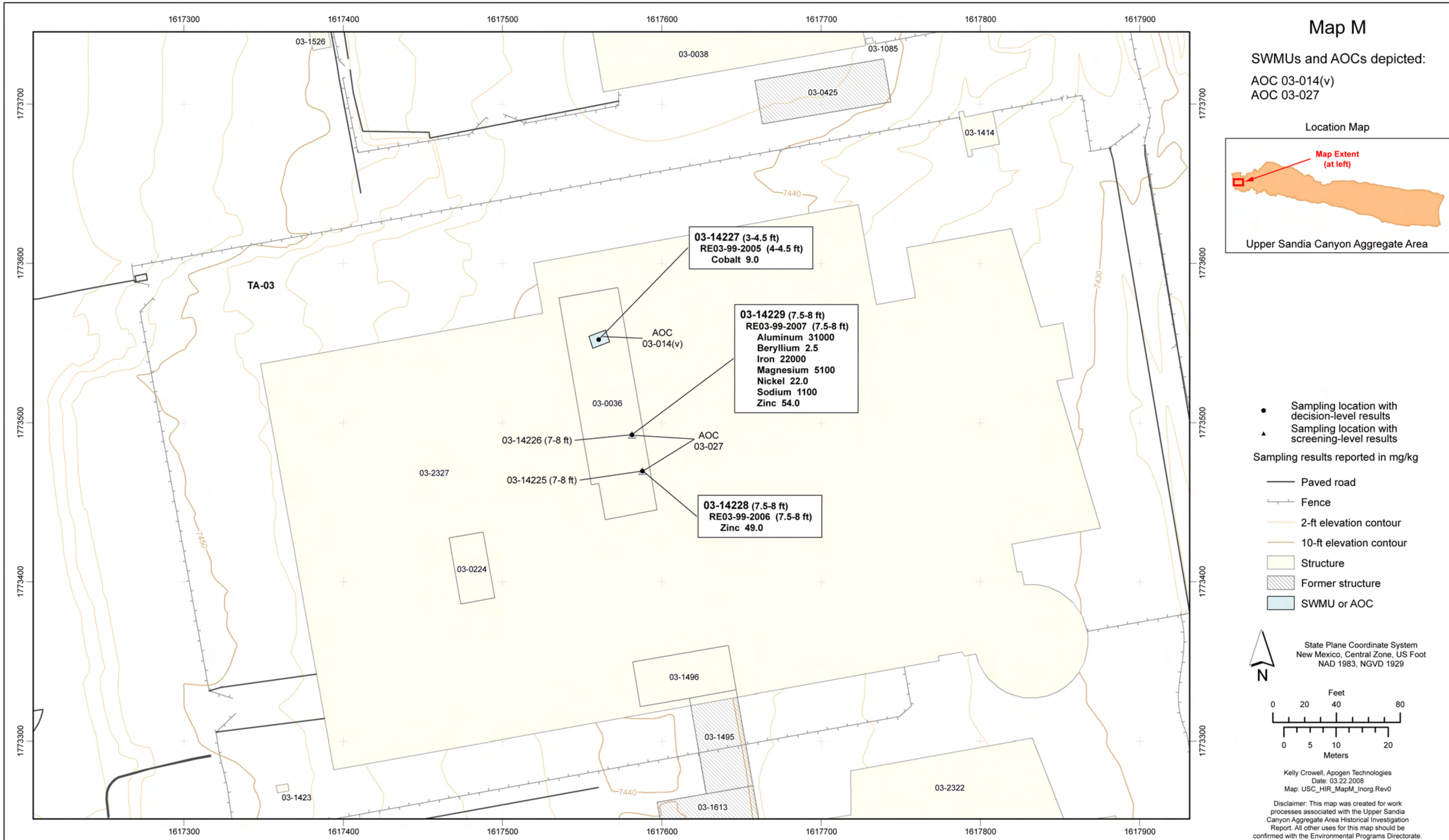


Figure 4.1-50 Map M inorganic chemical sampling locations and results detected above BVs

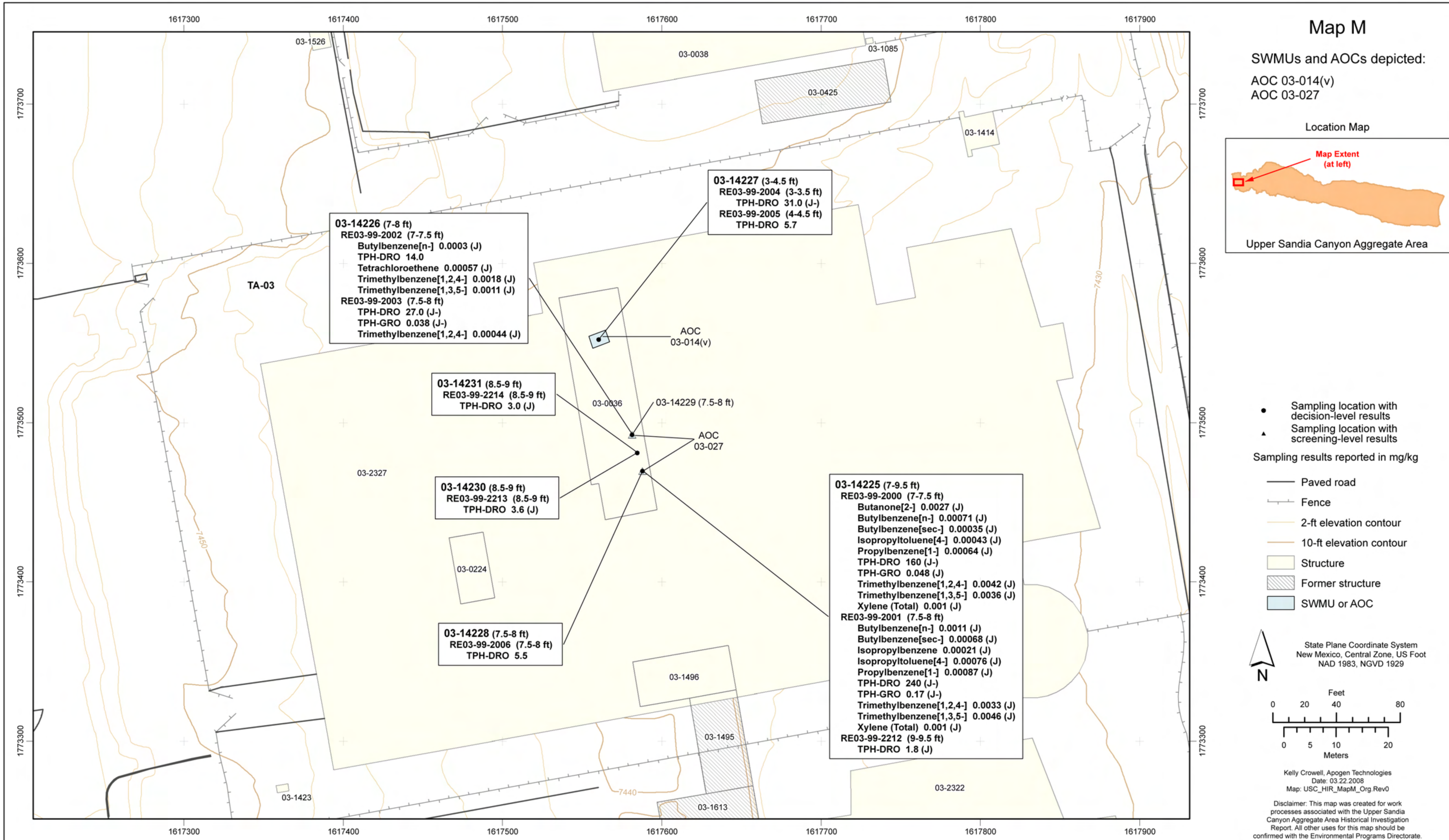


Figure 4.1-51 Map M organic chemical sampling locations and detected results

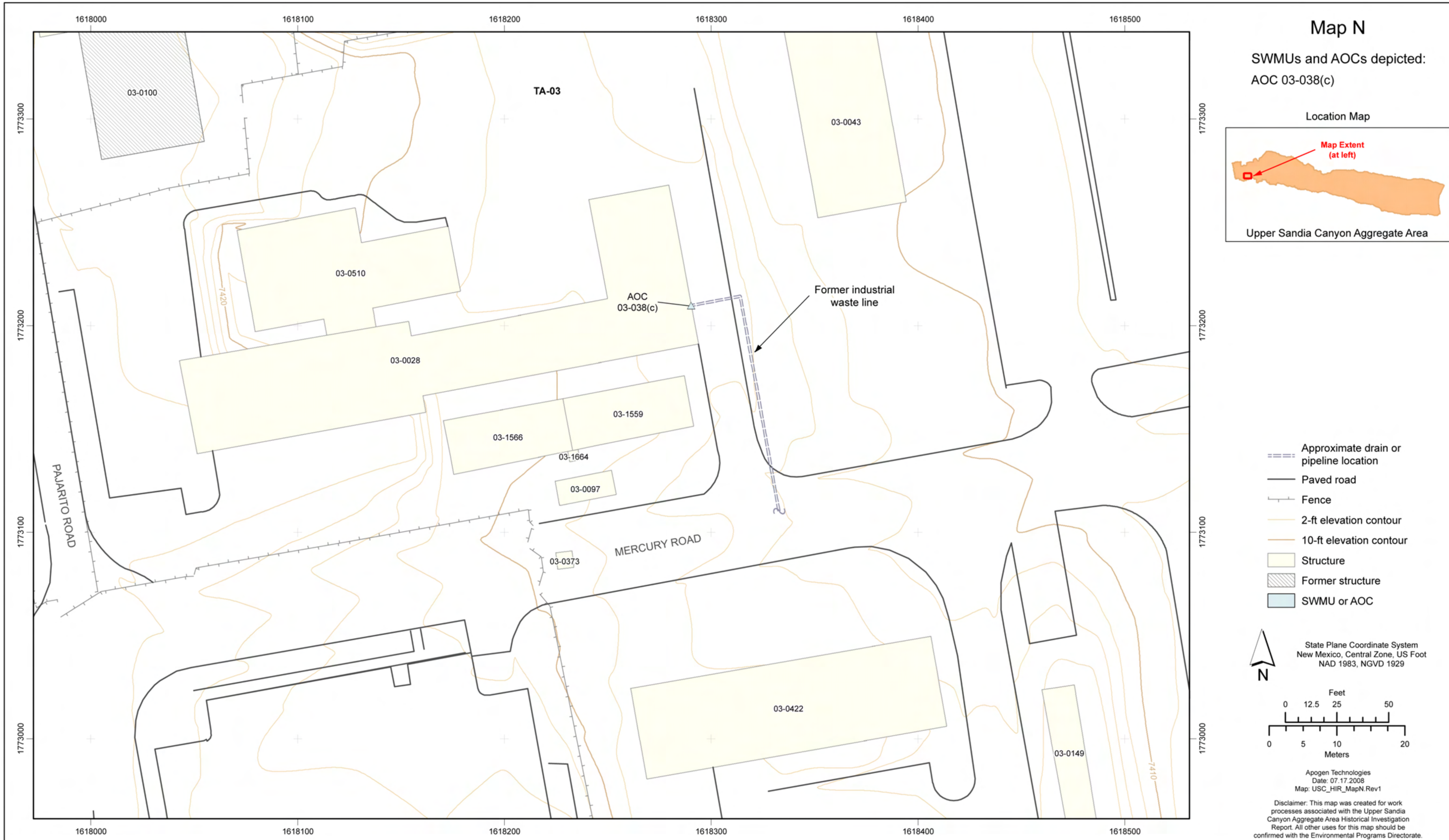


Figure 4.1-52 Map N site location

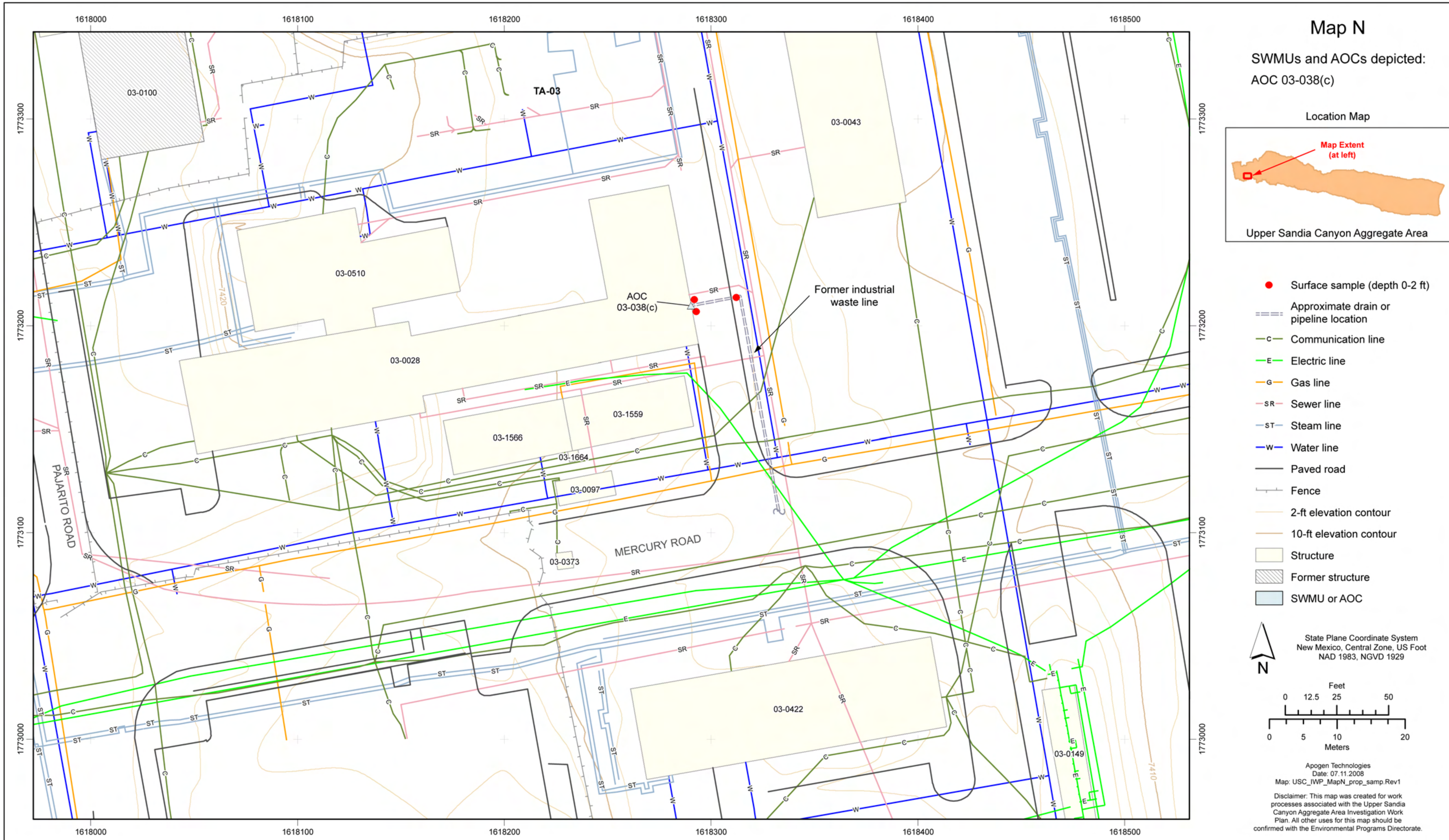


Figure 4.1-53 Map N proposed sampling locations

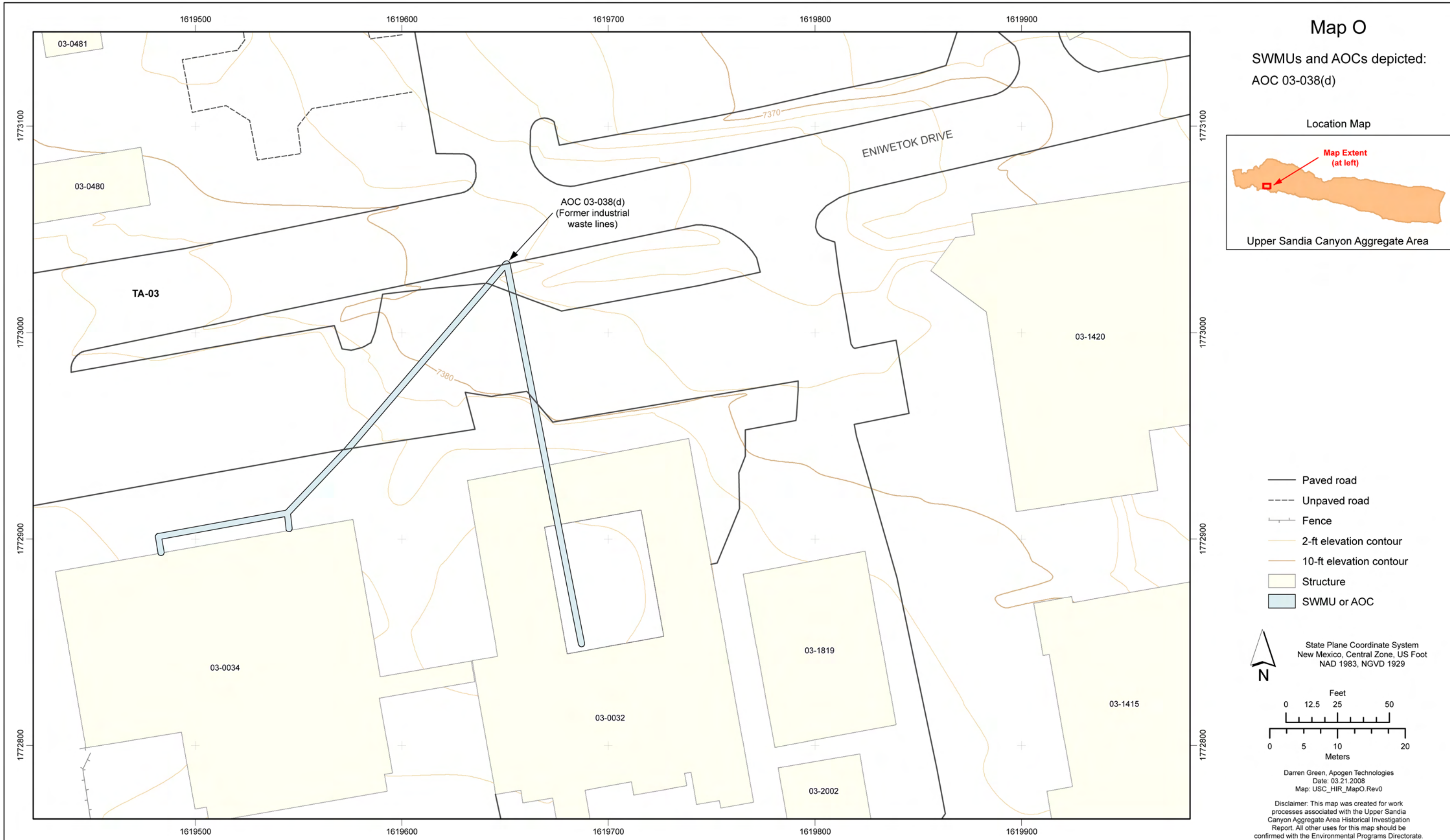


Figure 4.1-54 Map O site location

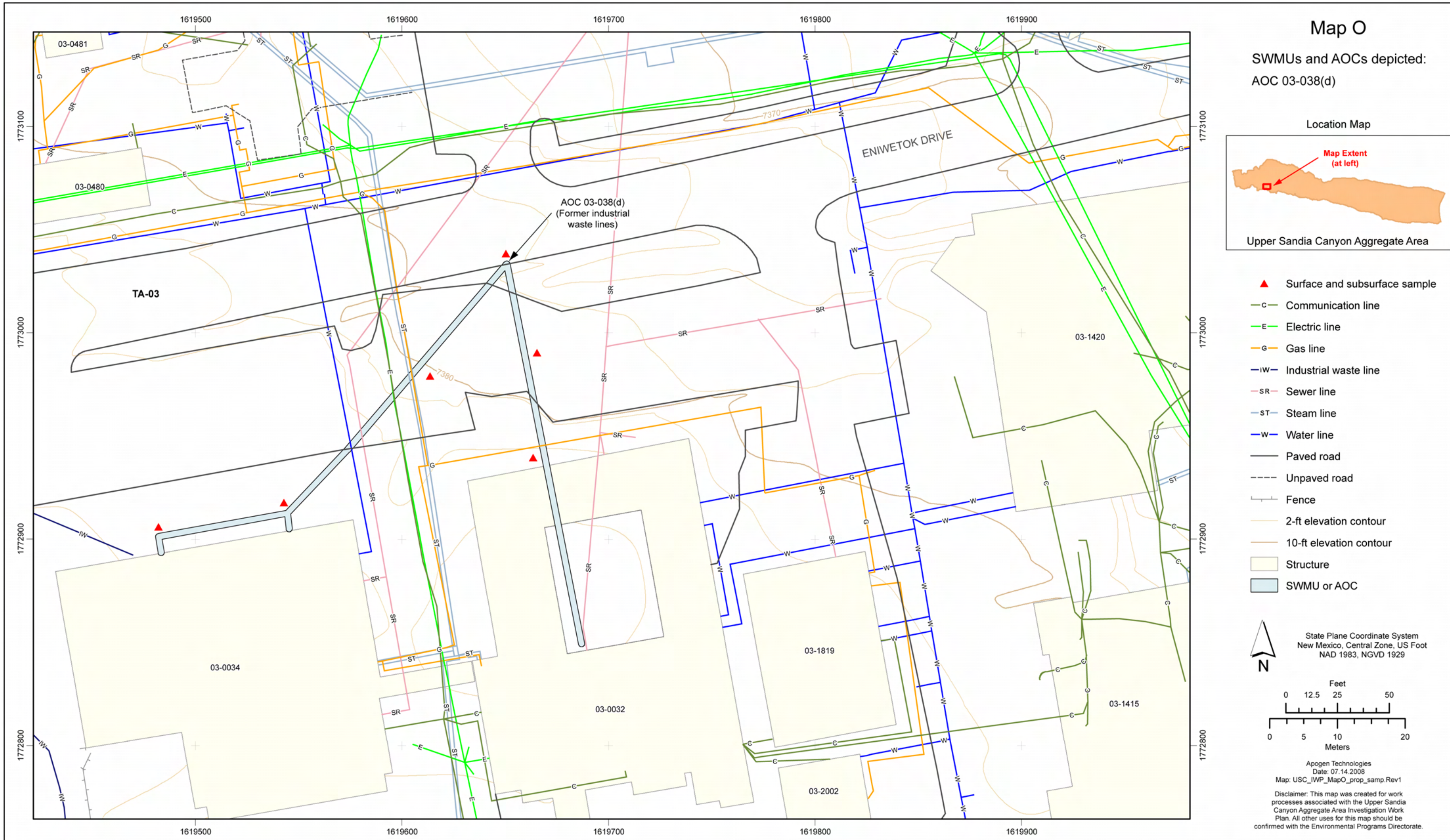


Figure 4.1-55 Map O proposed sampling locations

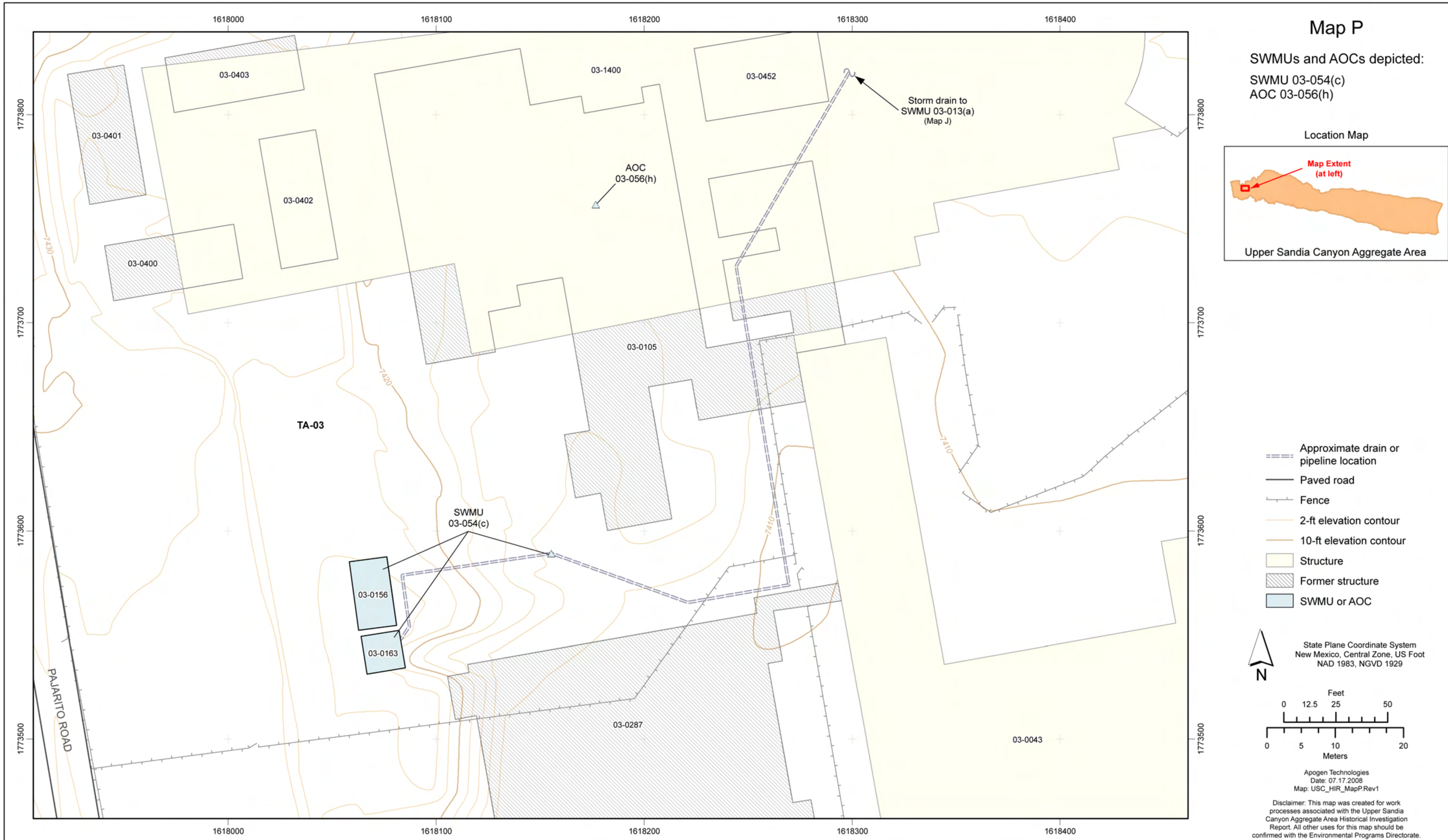


Figure 4.1-56 Map P site location

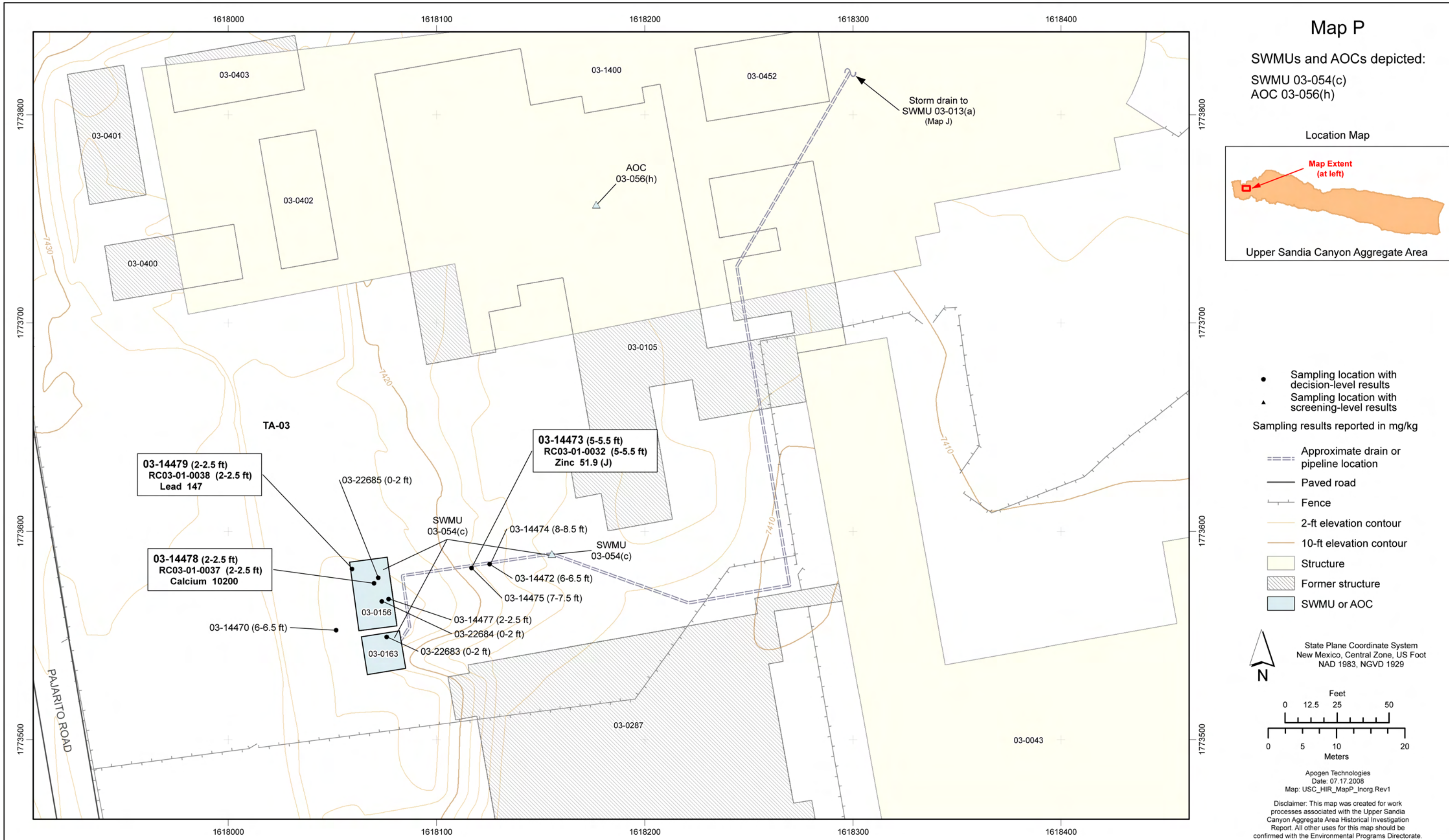


Figure 4.1-57 Map P inorganic chemical sampling locations and results detected above BVs

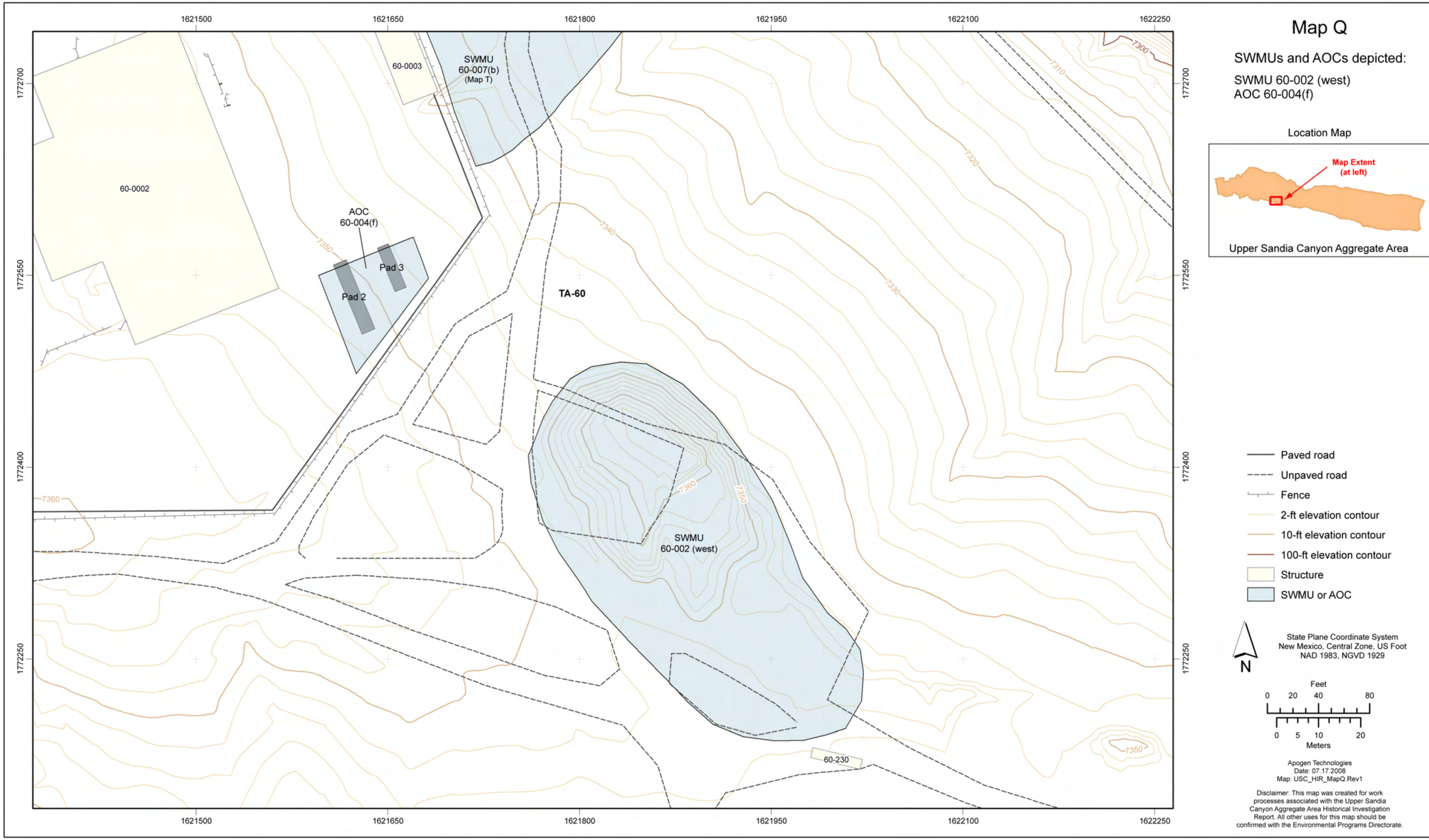


Figure 4.2-1 Map Q site location

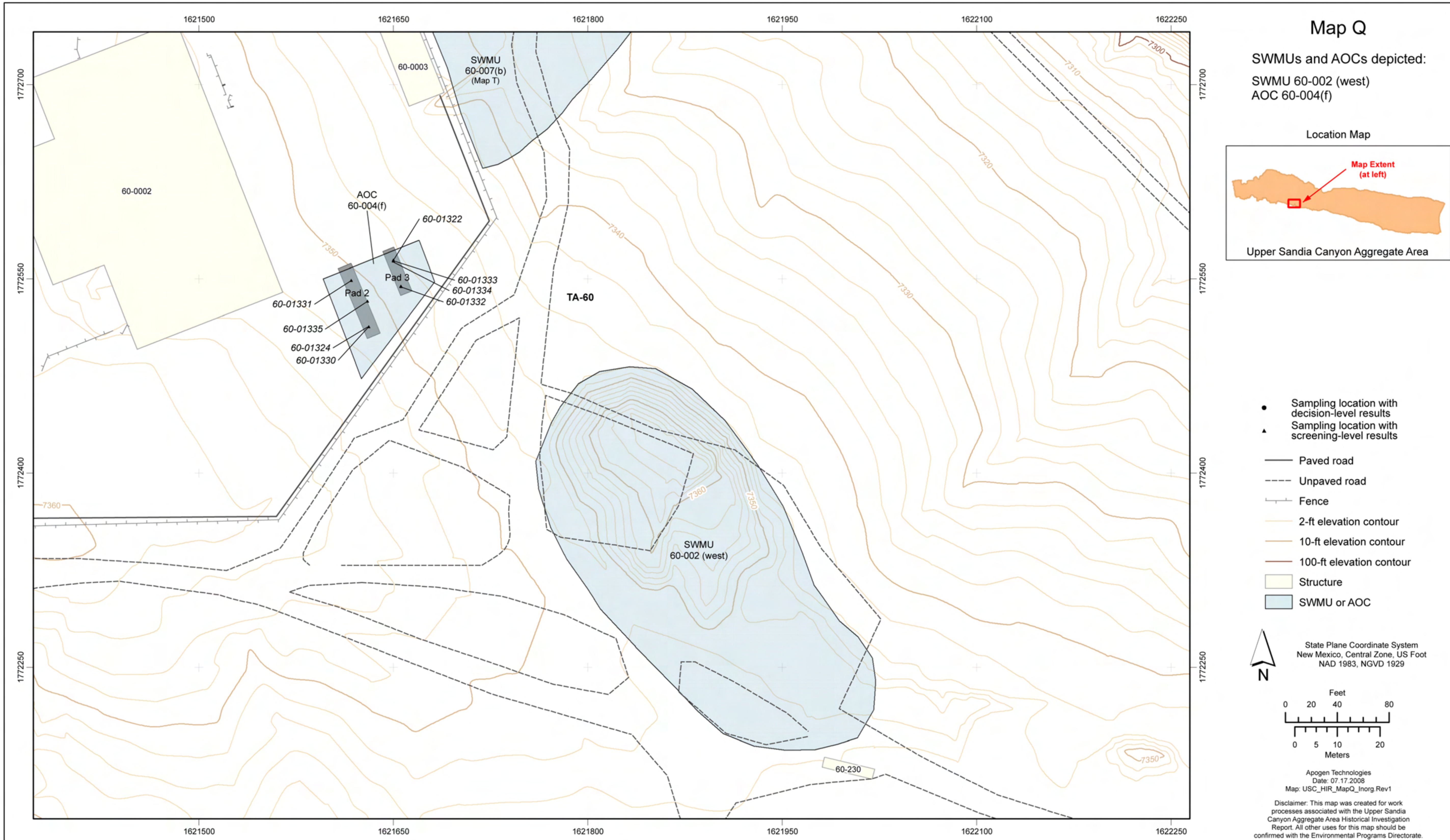


Figure 4.2-2 Map Q inorganic chemical sampling locations and results detected above BVs

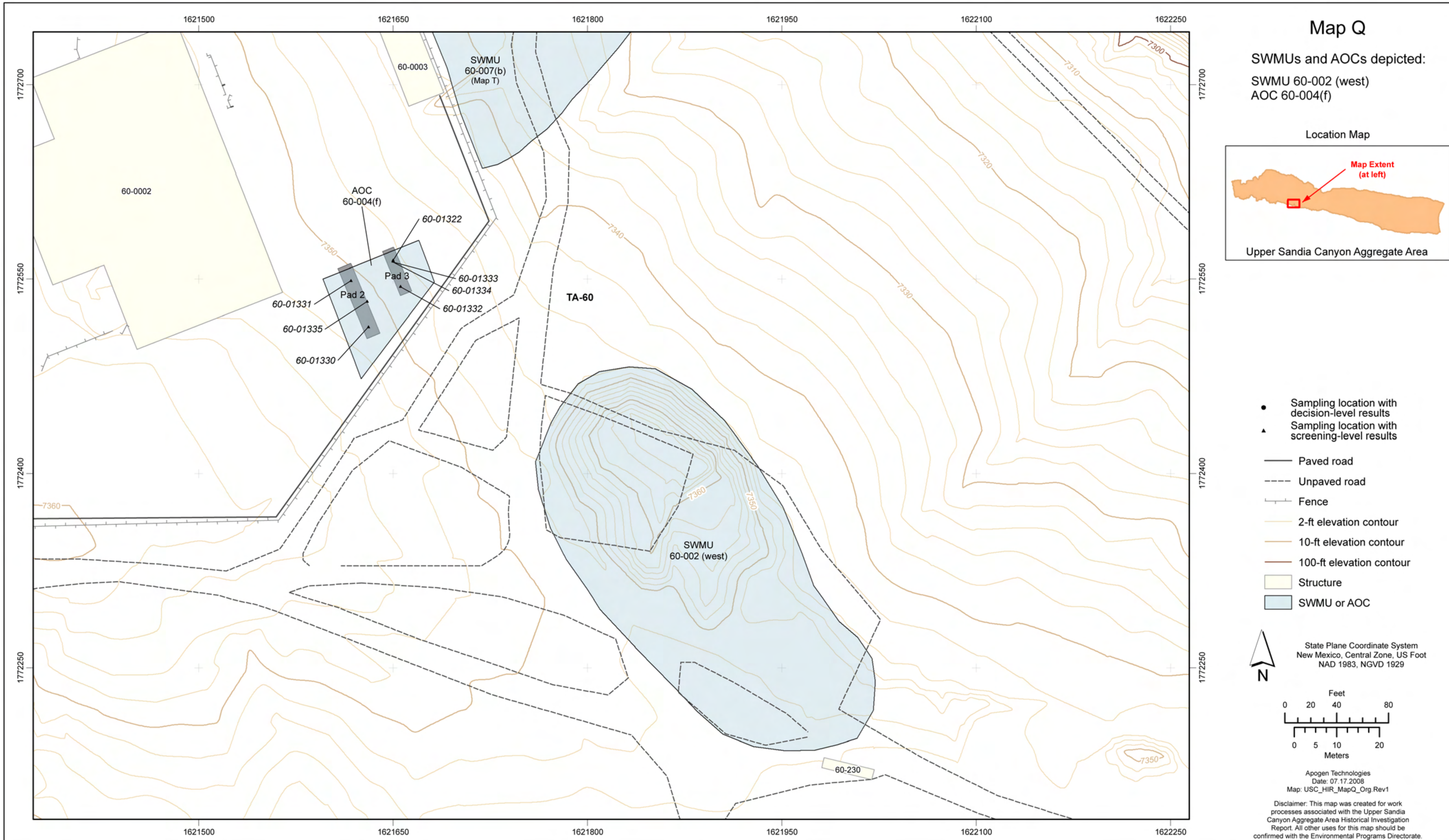


Figure 4.2-3 Map Q organic chemical sampling locations

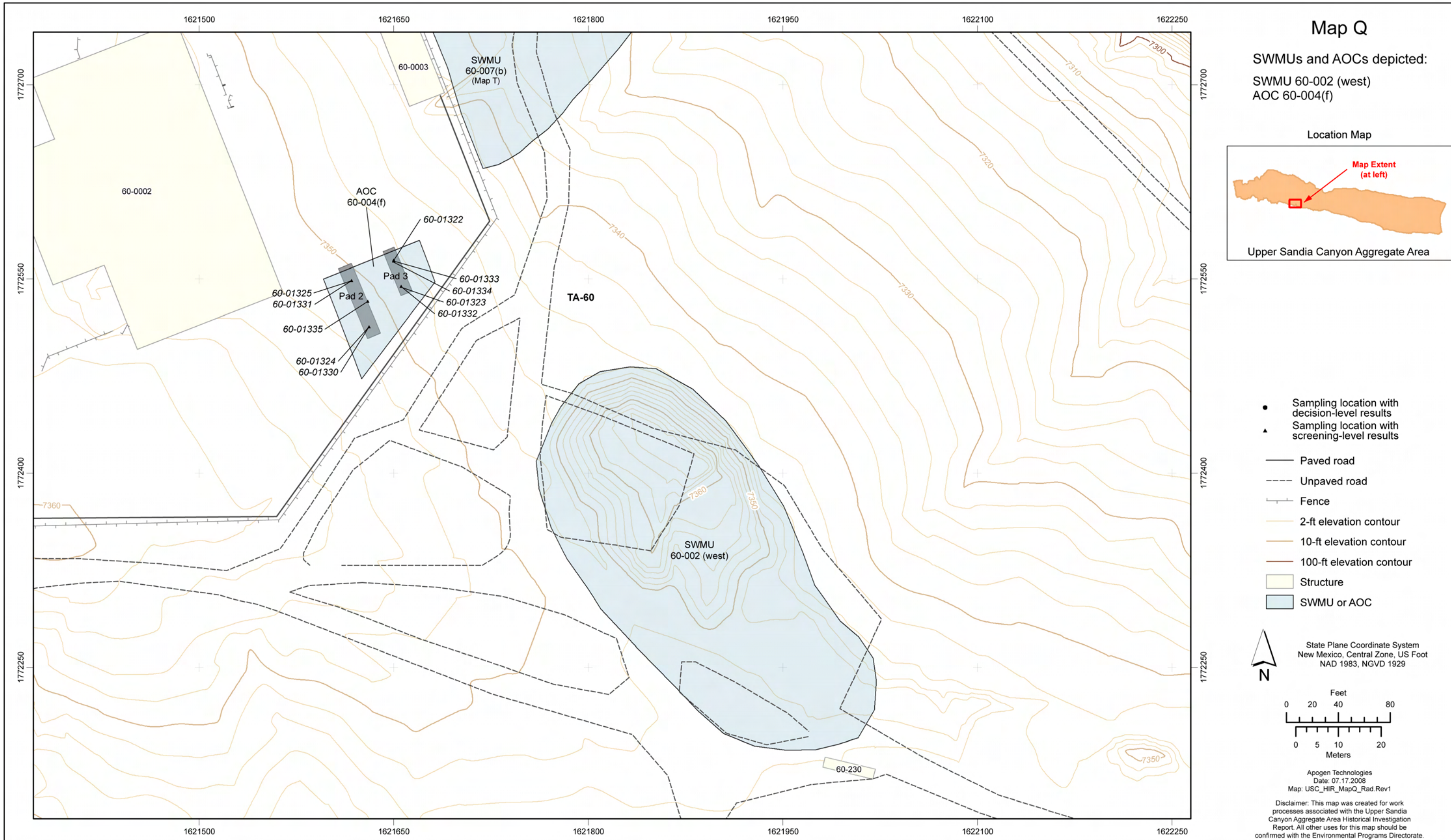


Figure 4.2-4 Map Q radionuclide sampling locations

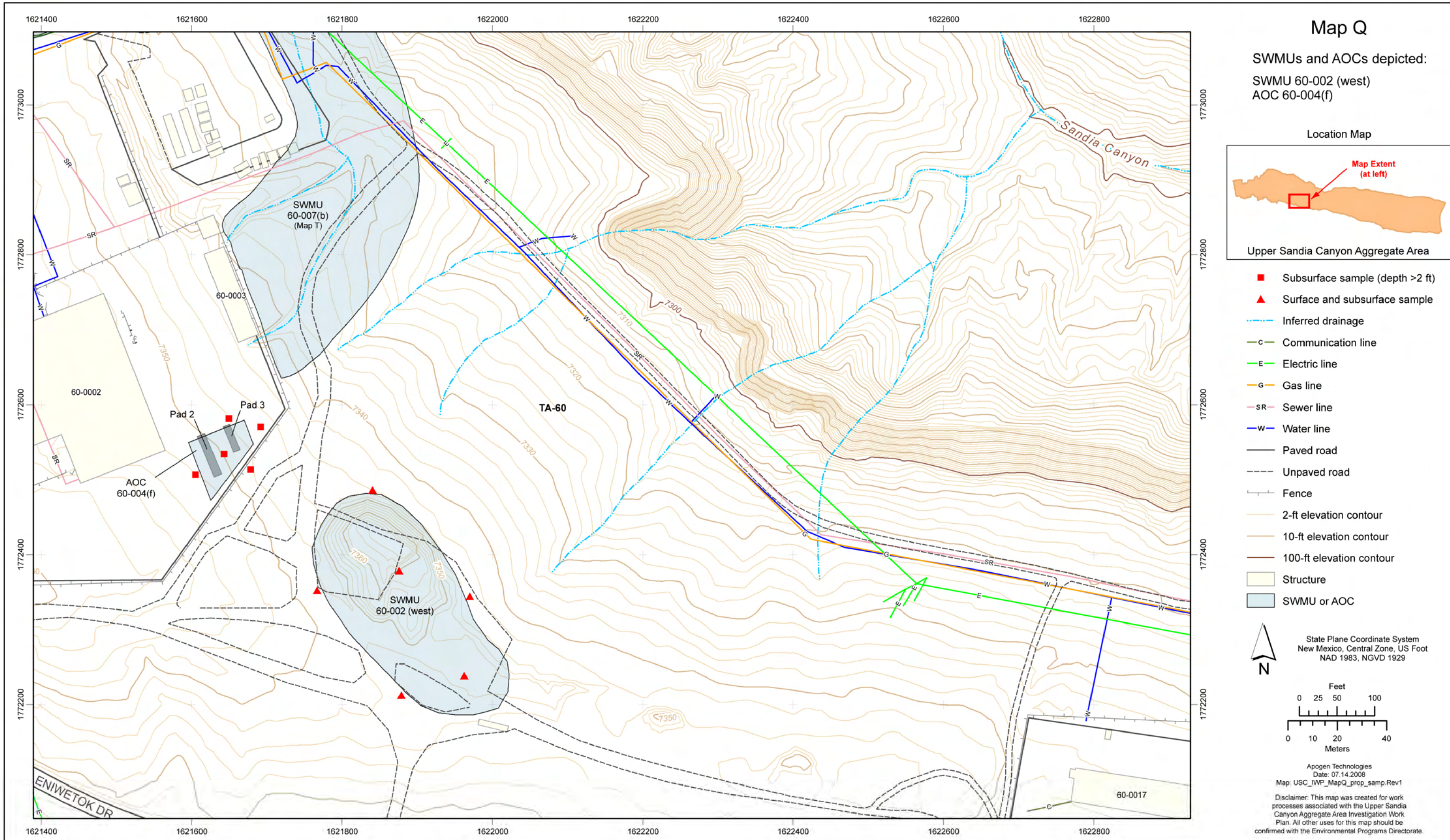


Figure 4.2-5 Map Q proposed sampling locations

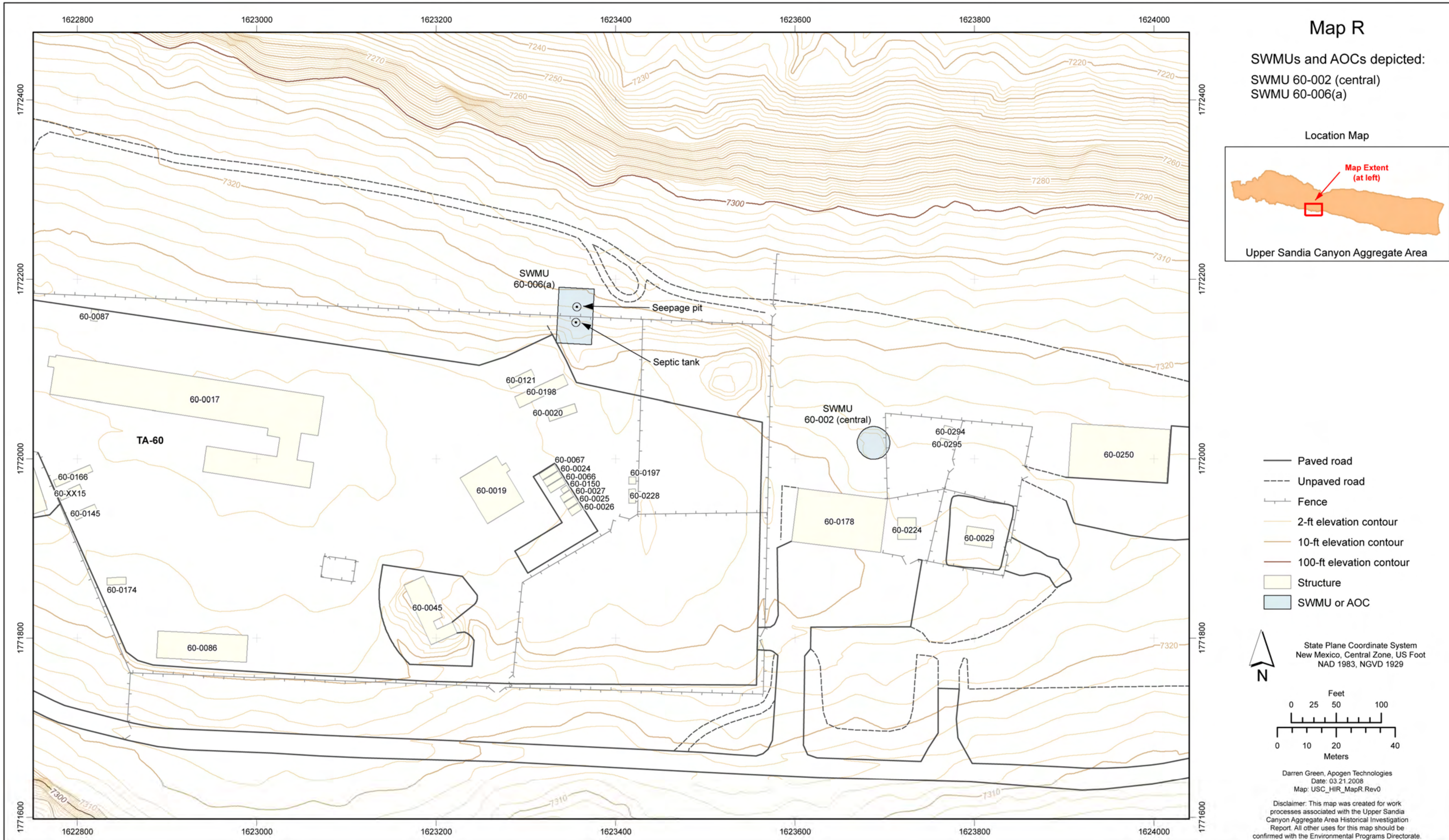


Figure 4.2-6 Map R site location

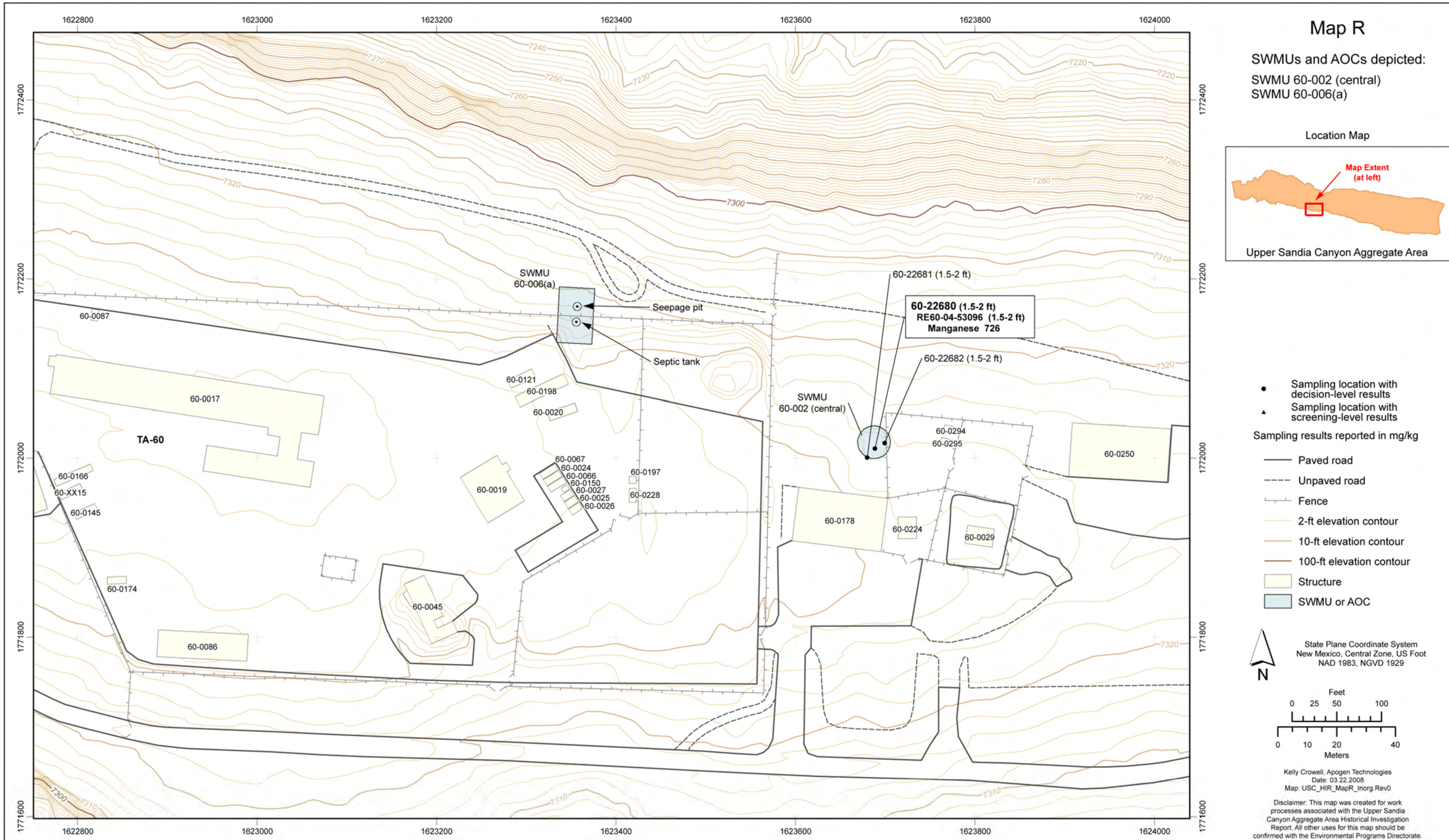


Figure 4.2-7 Map R inorganic chemical sampling locations and results detected above BVs

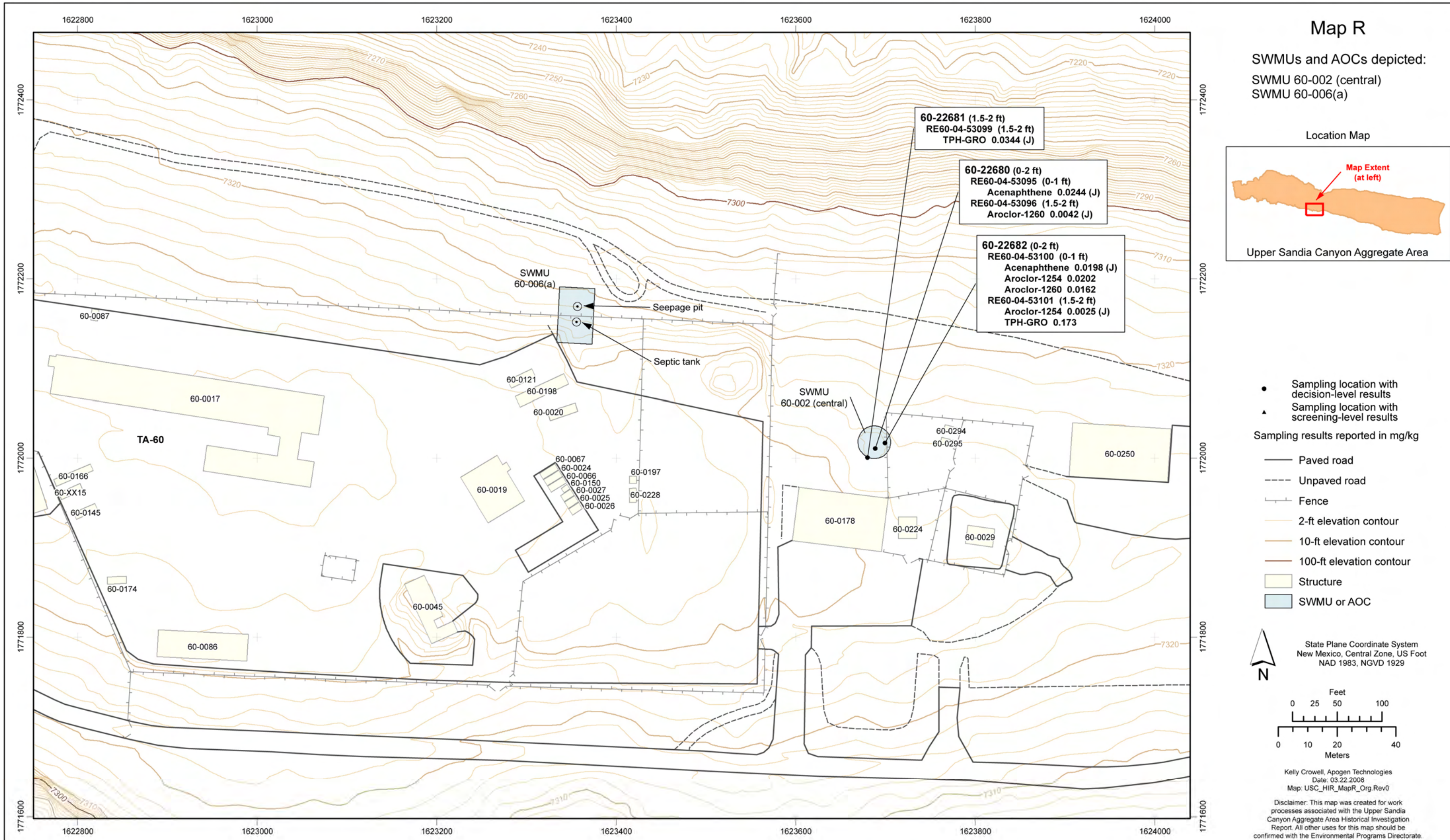


Figure 4.2-8 Map R organic chemical sampling locations and detected results

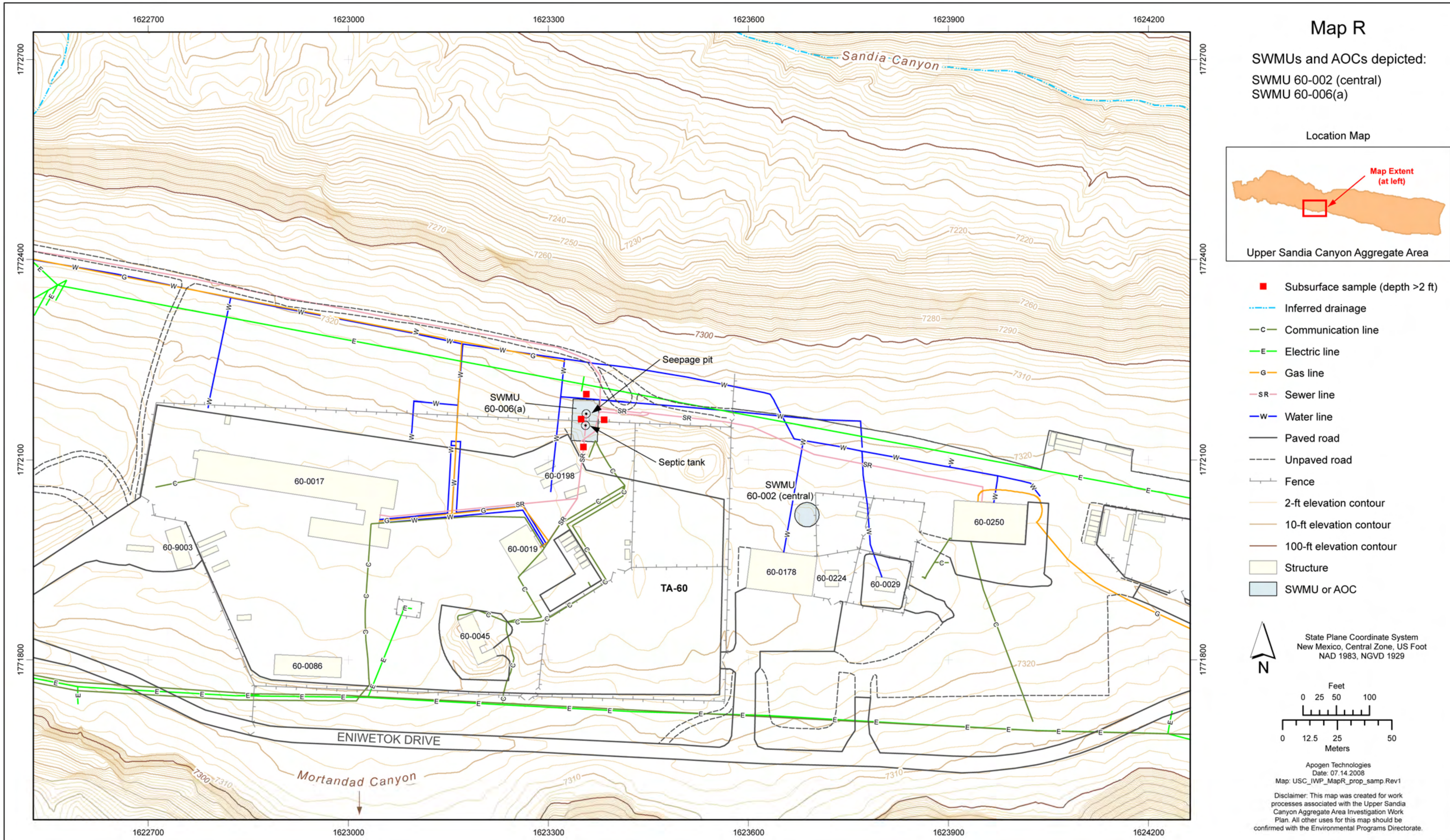


Figure 4.2-9 Map R proposed sampling locations

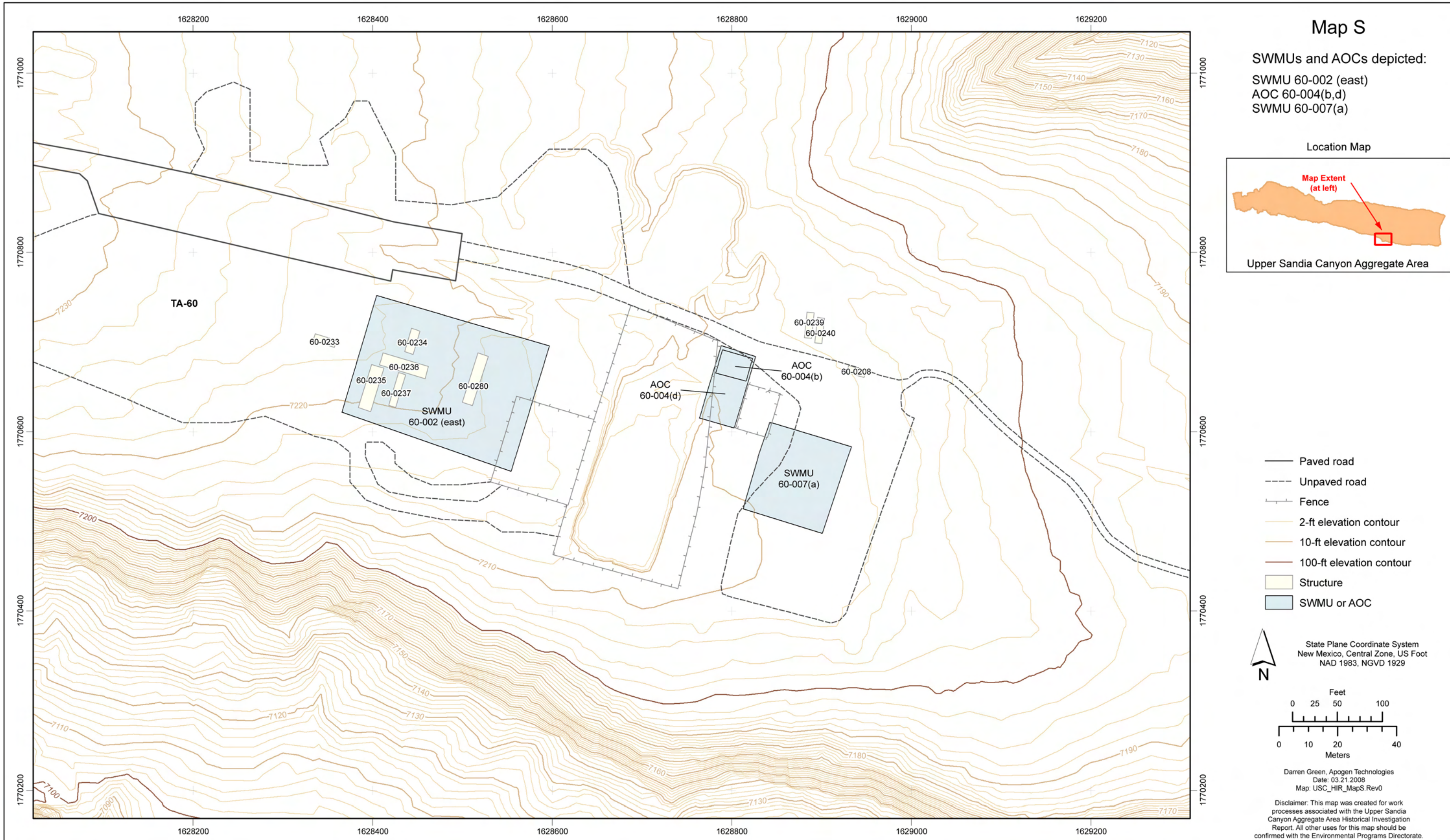


Figure 4.2-10 Map S site location

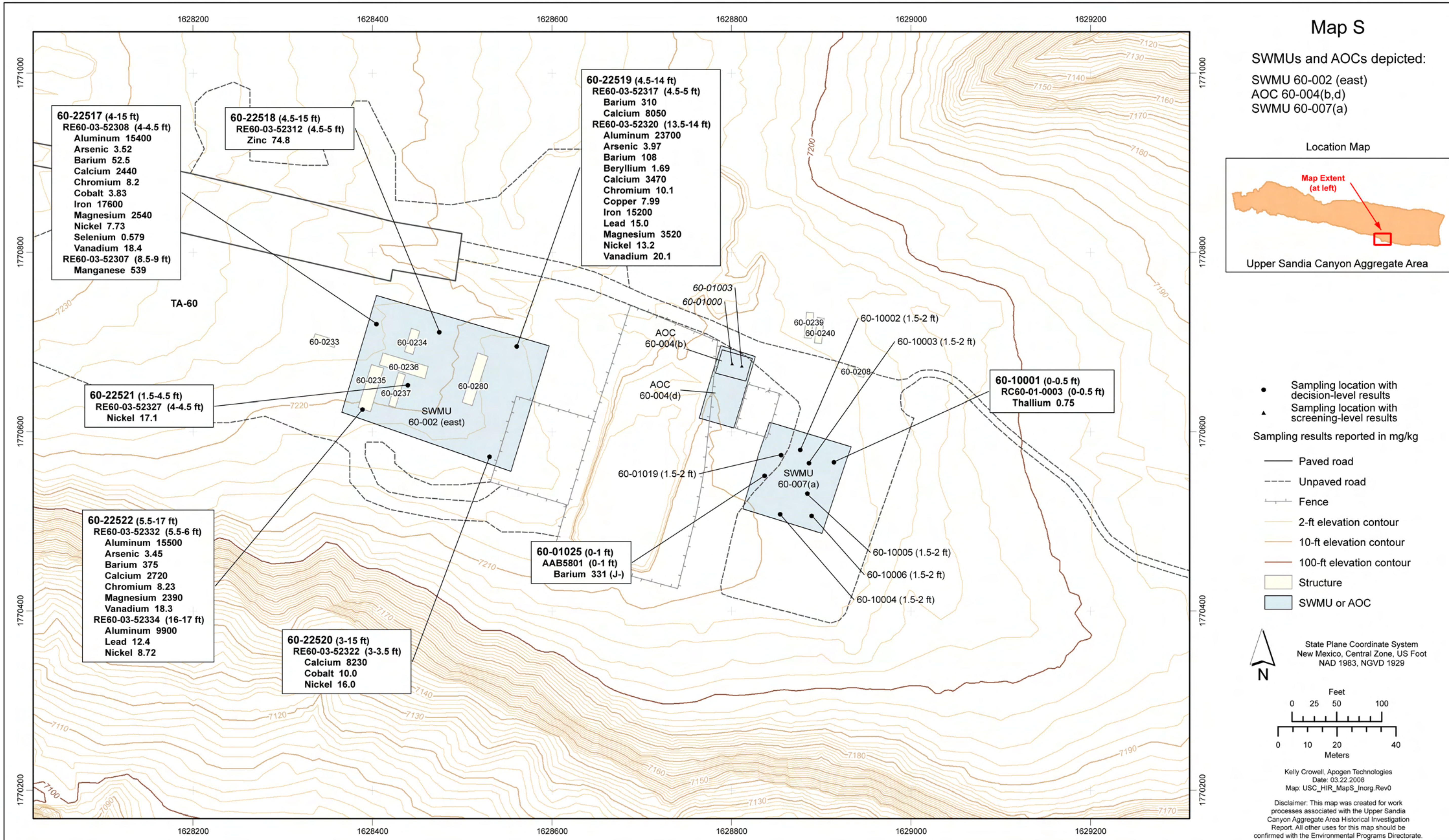


Figure 4.2-11 Map S inorganic chemical sampling locations and results detected above BVs

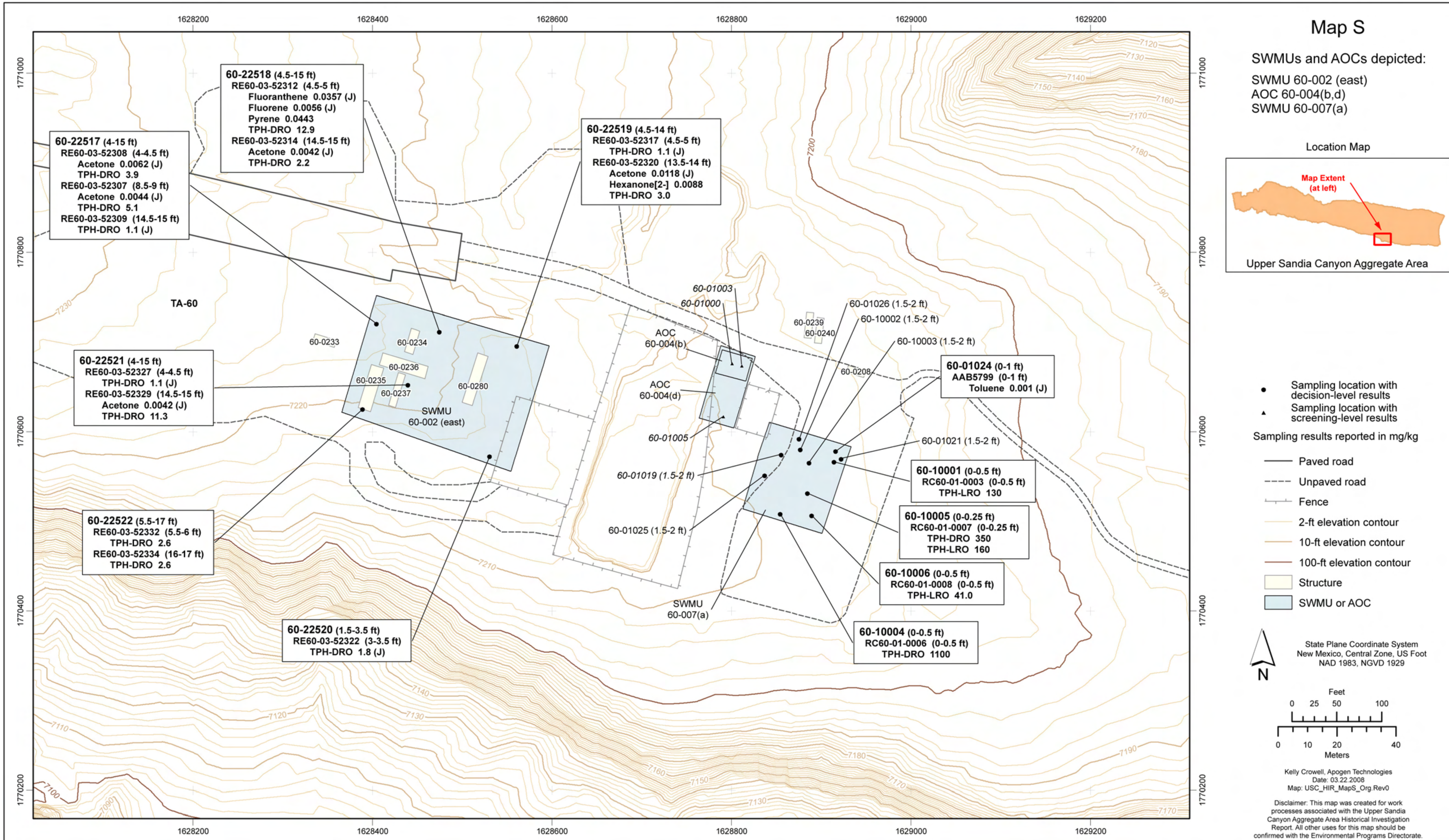


Figure 4.2-12 Map S organic chemical sampling locations and detected results

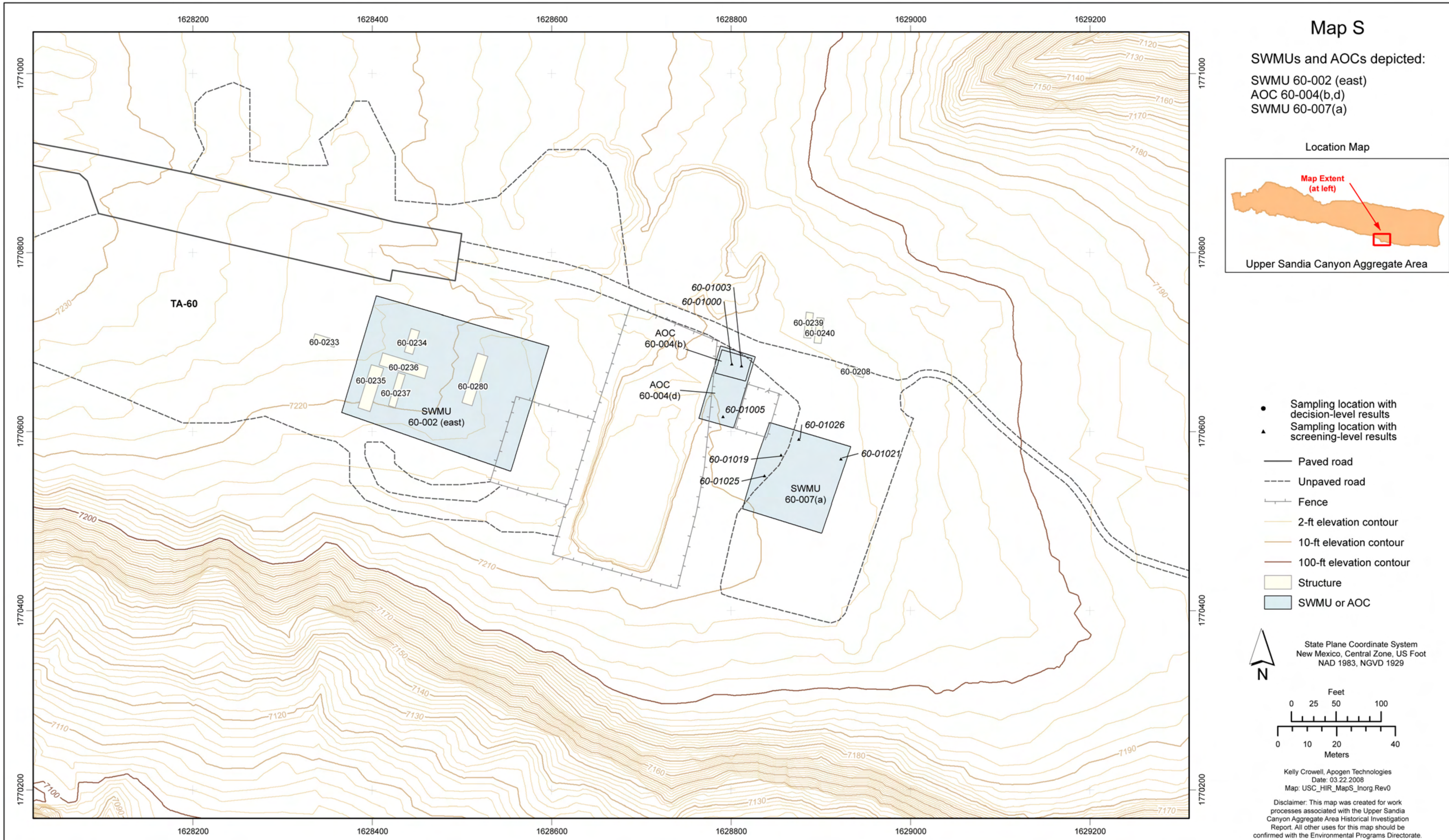


Figure 4.2-13 Map S radionuclide sampling locations

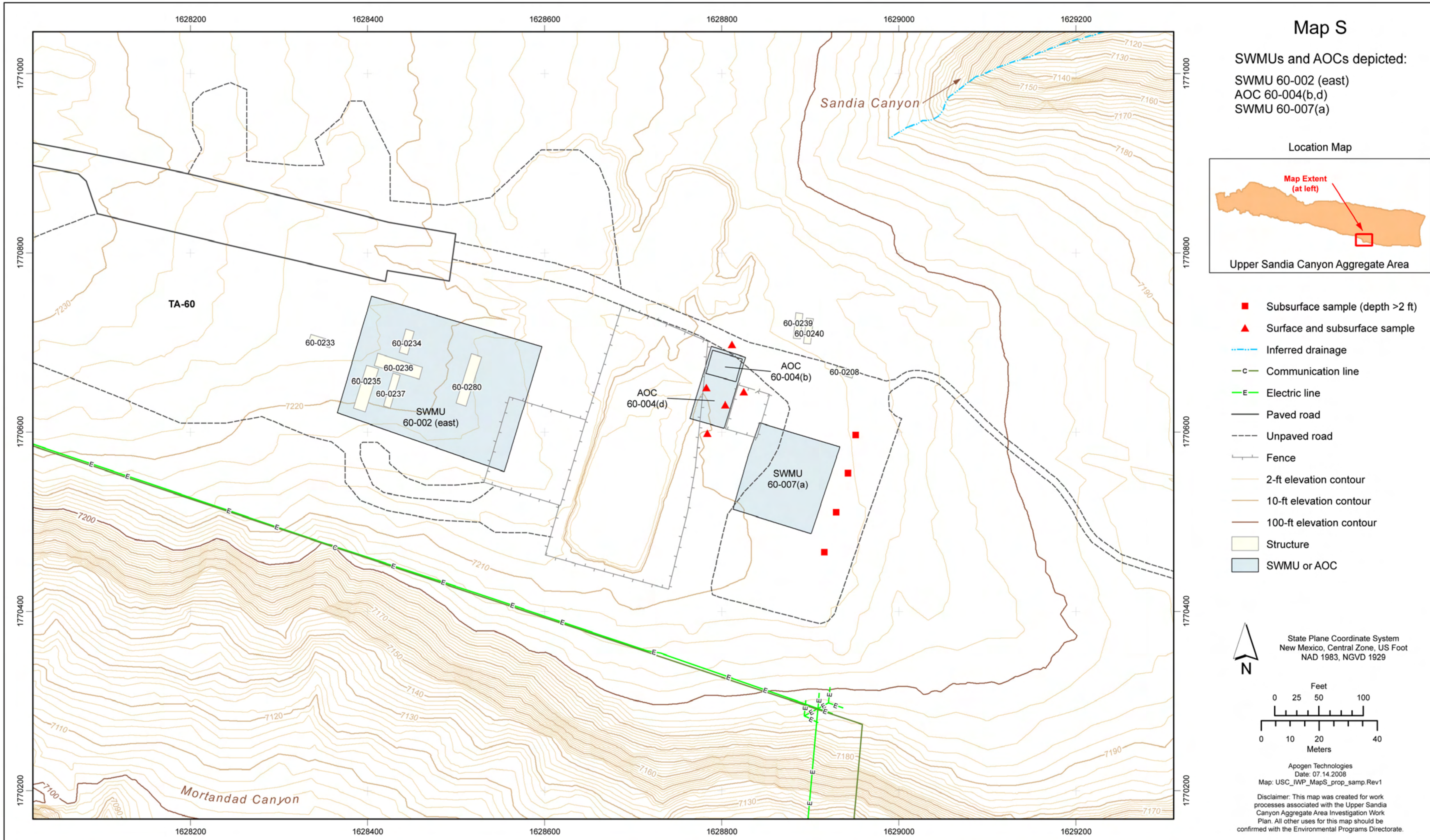


Figure 4.2-14 Map S proposed sampling locations

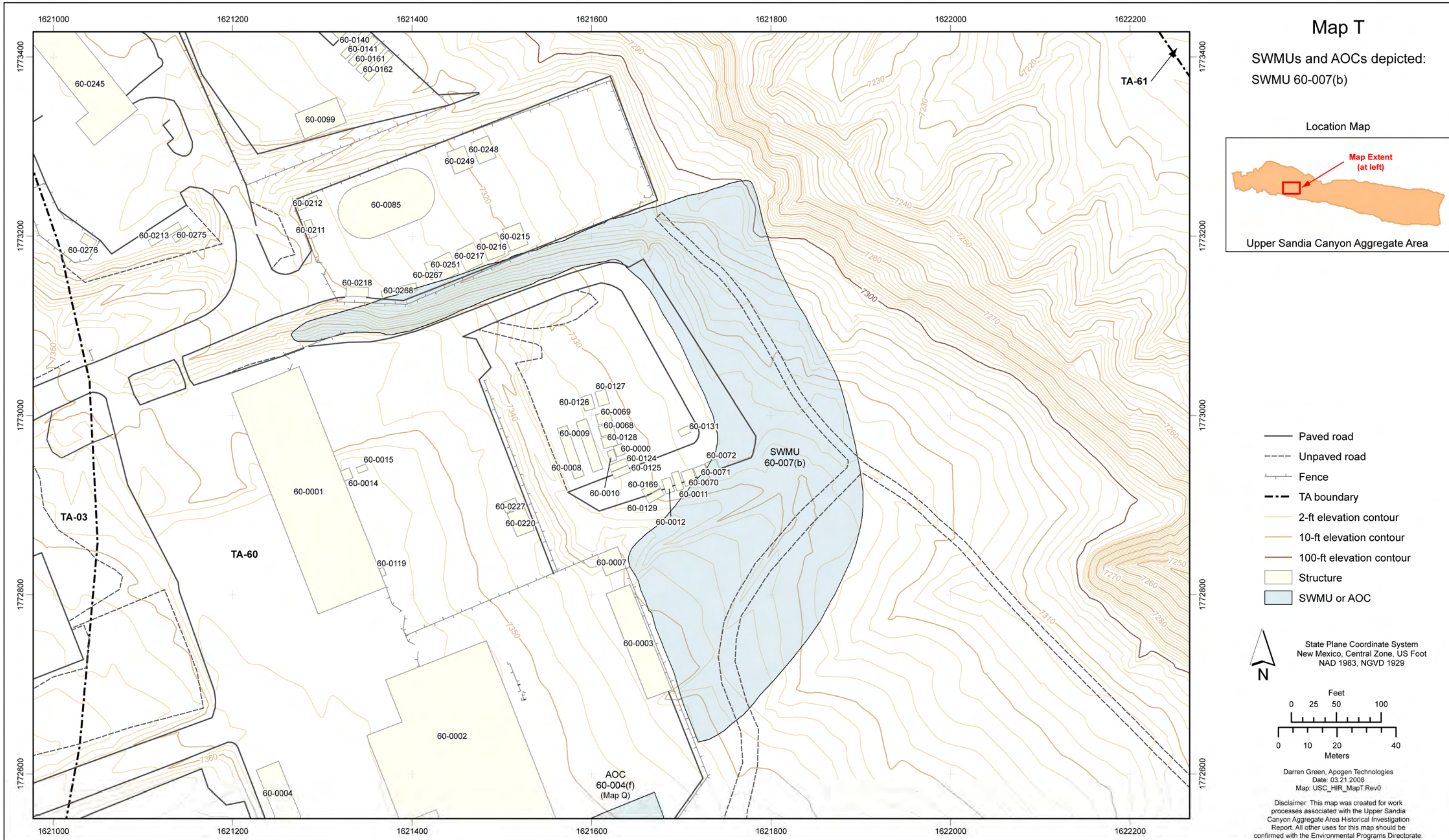


Figure 4.2-15 Map T site location

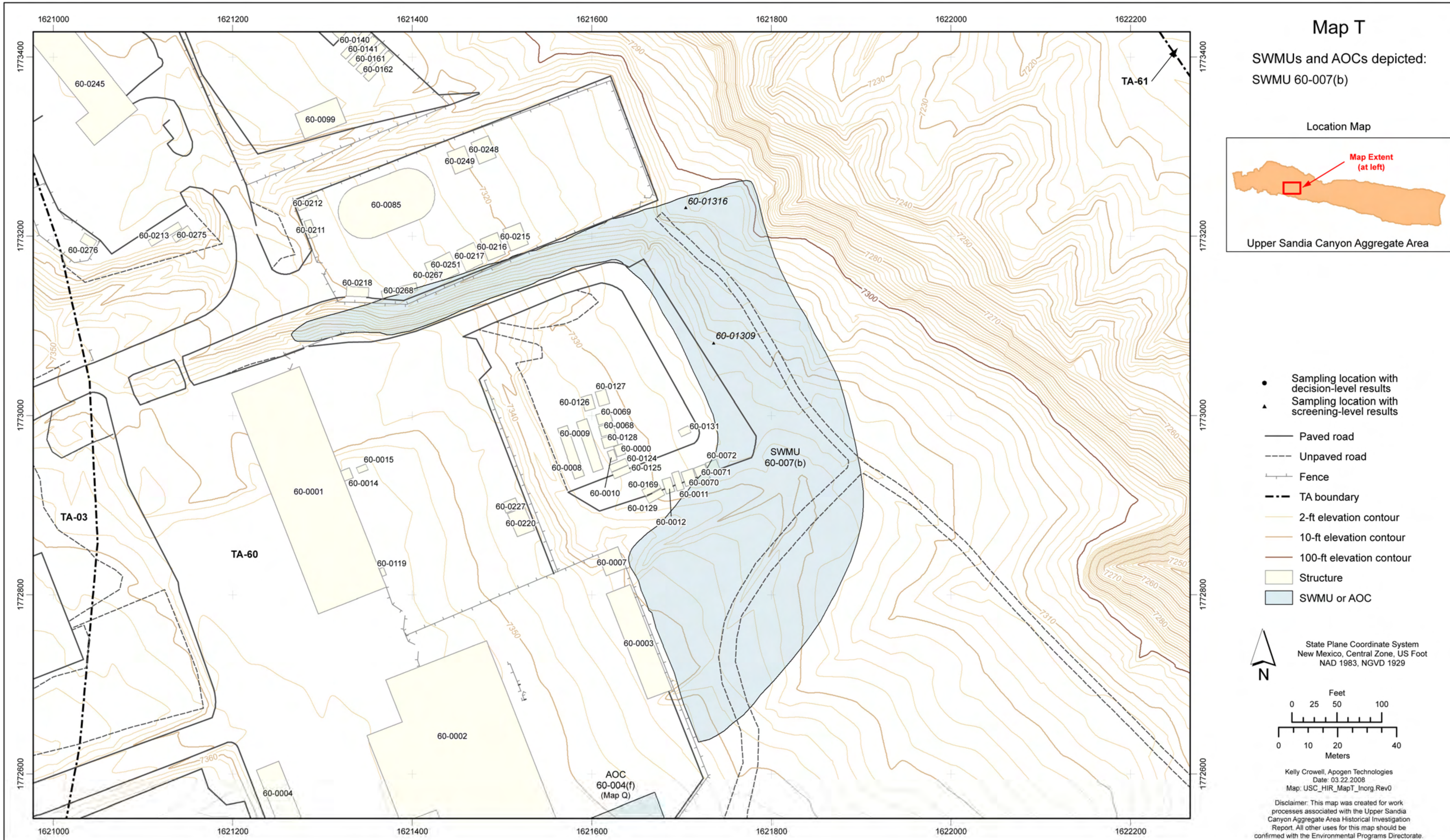


Figure 4.2-16 Map T inorganic chemical sampling locations

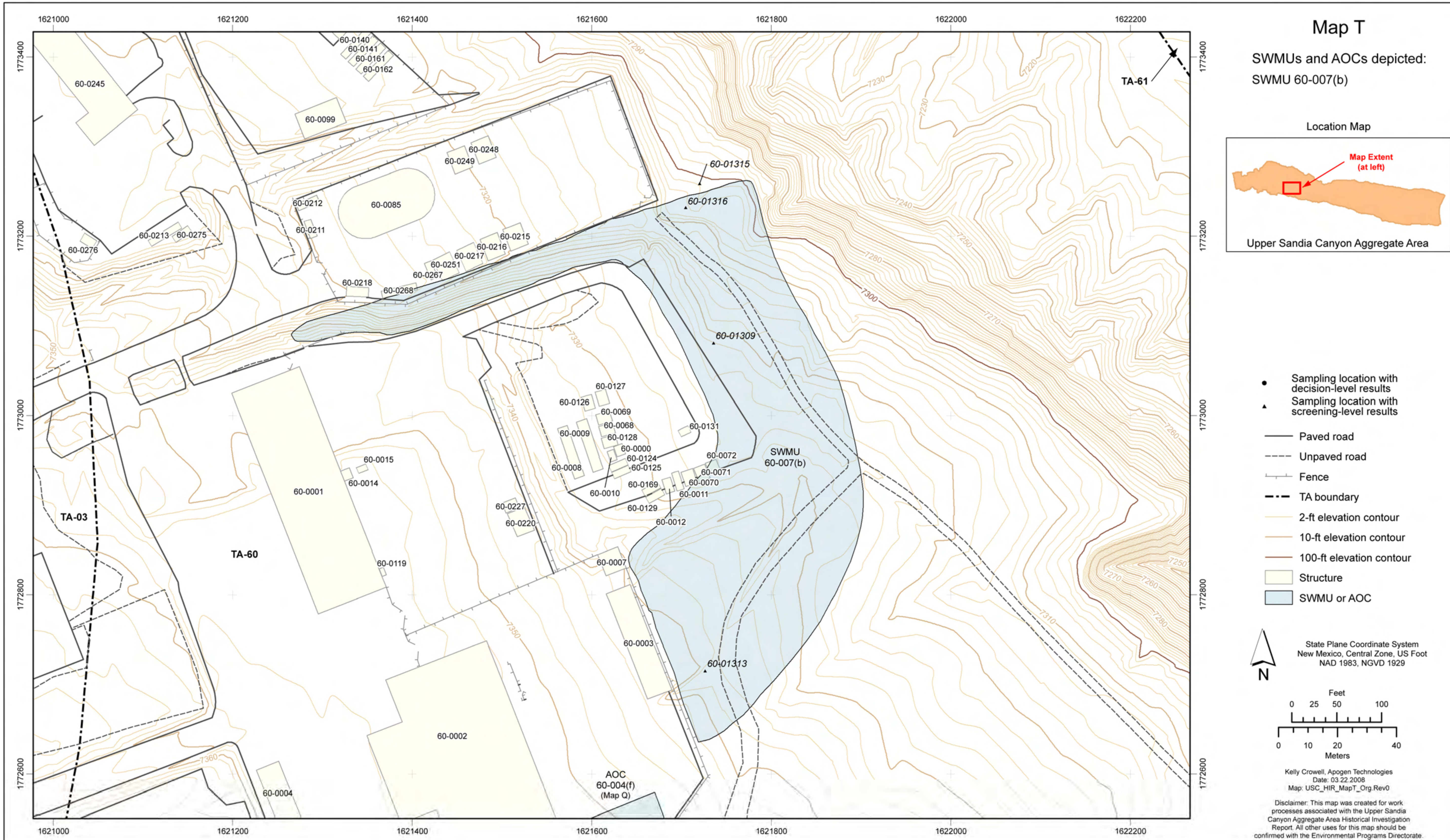


Figure 4.2-17 Map T organic chemical sampling locations

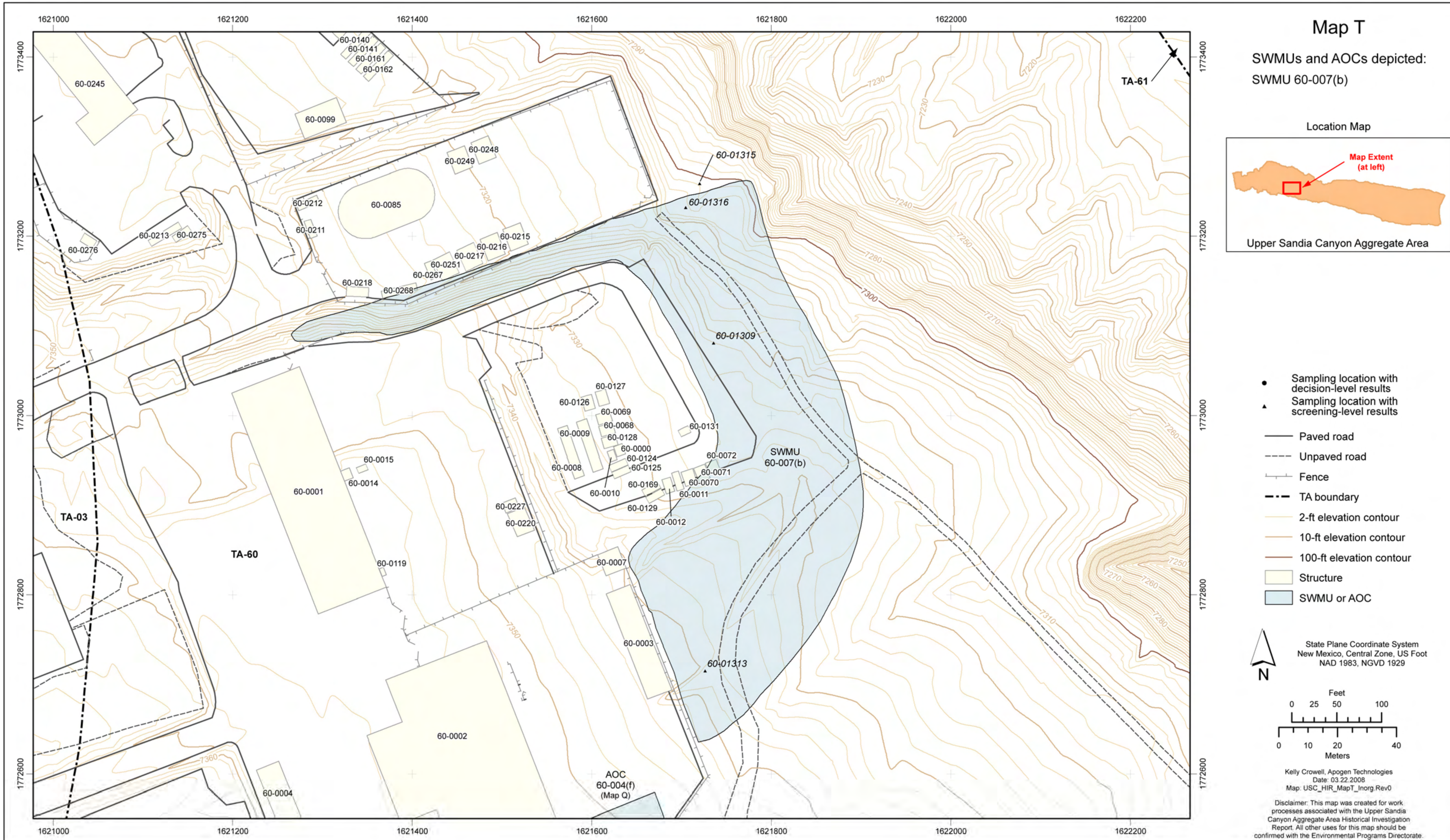


Figure 4.2-18 Map T radionuclide sampling locations

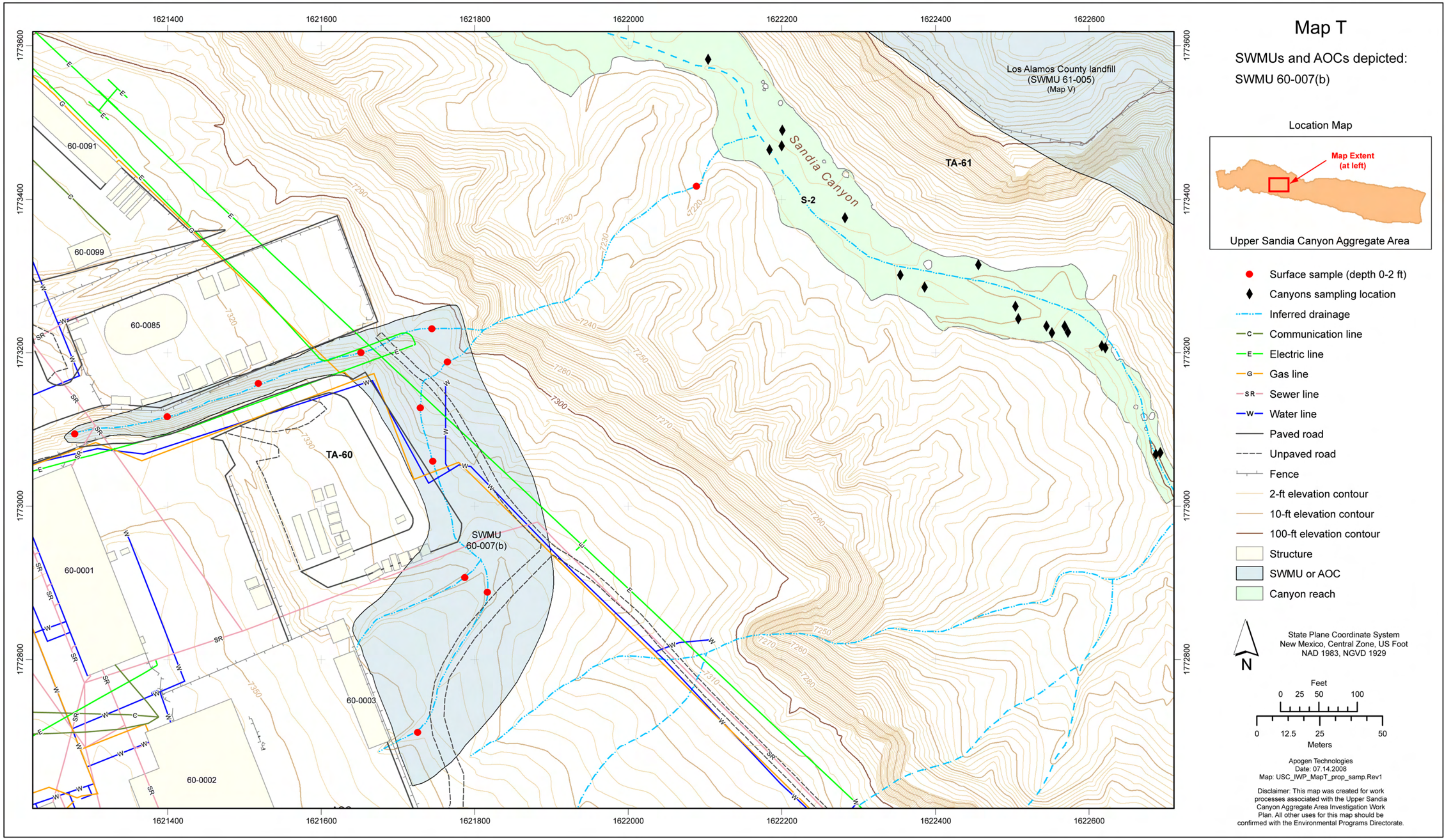


Figure 4.2-19 Map T proposed sampling locations

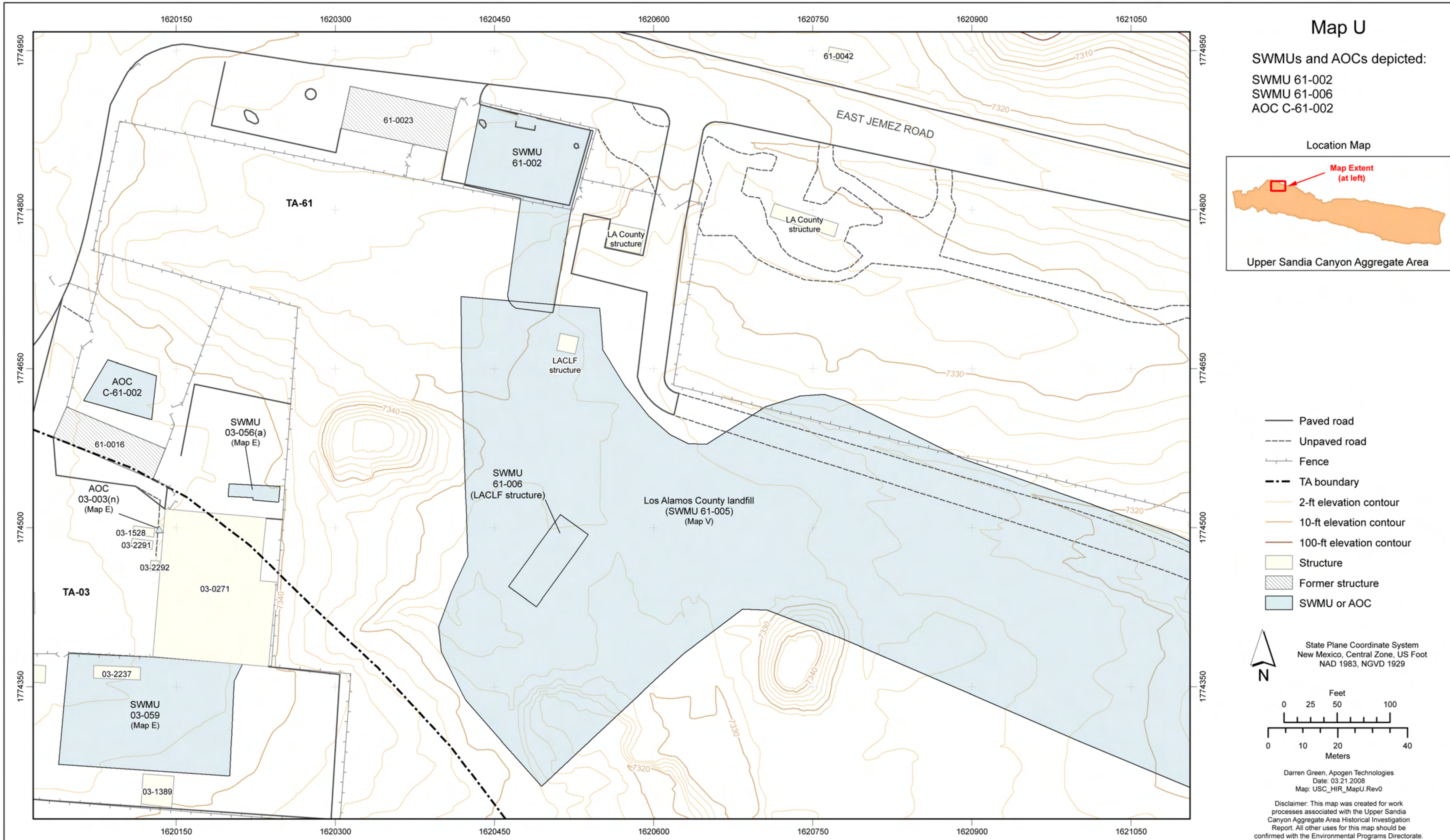


Figure 4.3-1 Map U site location

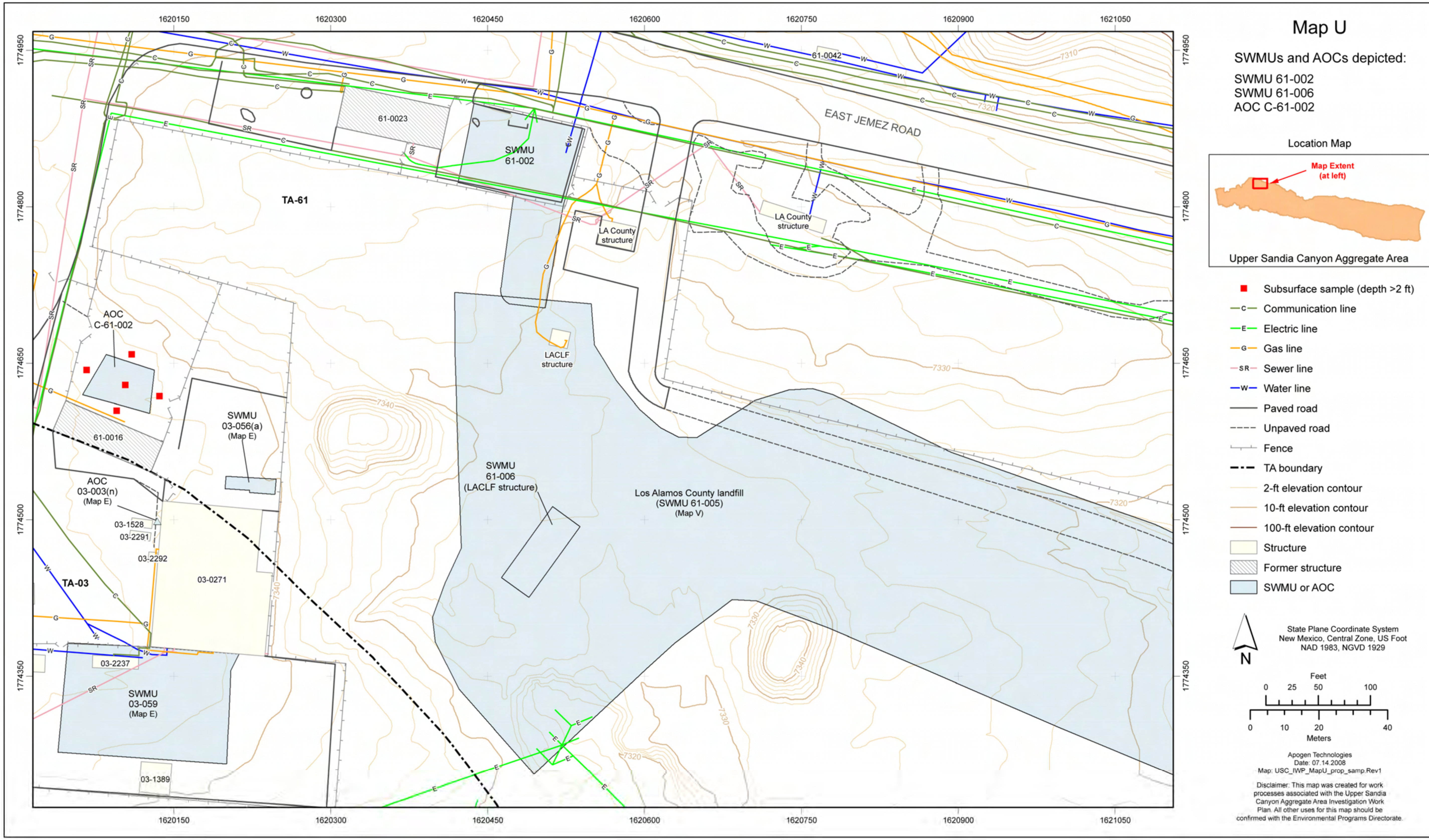


Figure 4.3-2 Map U proposed sampling locations

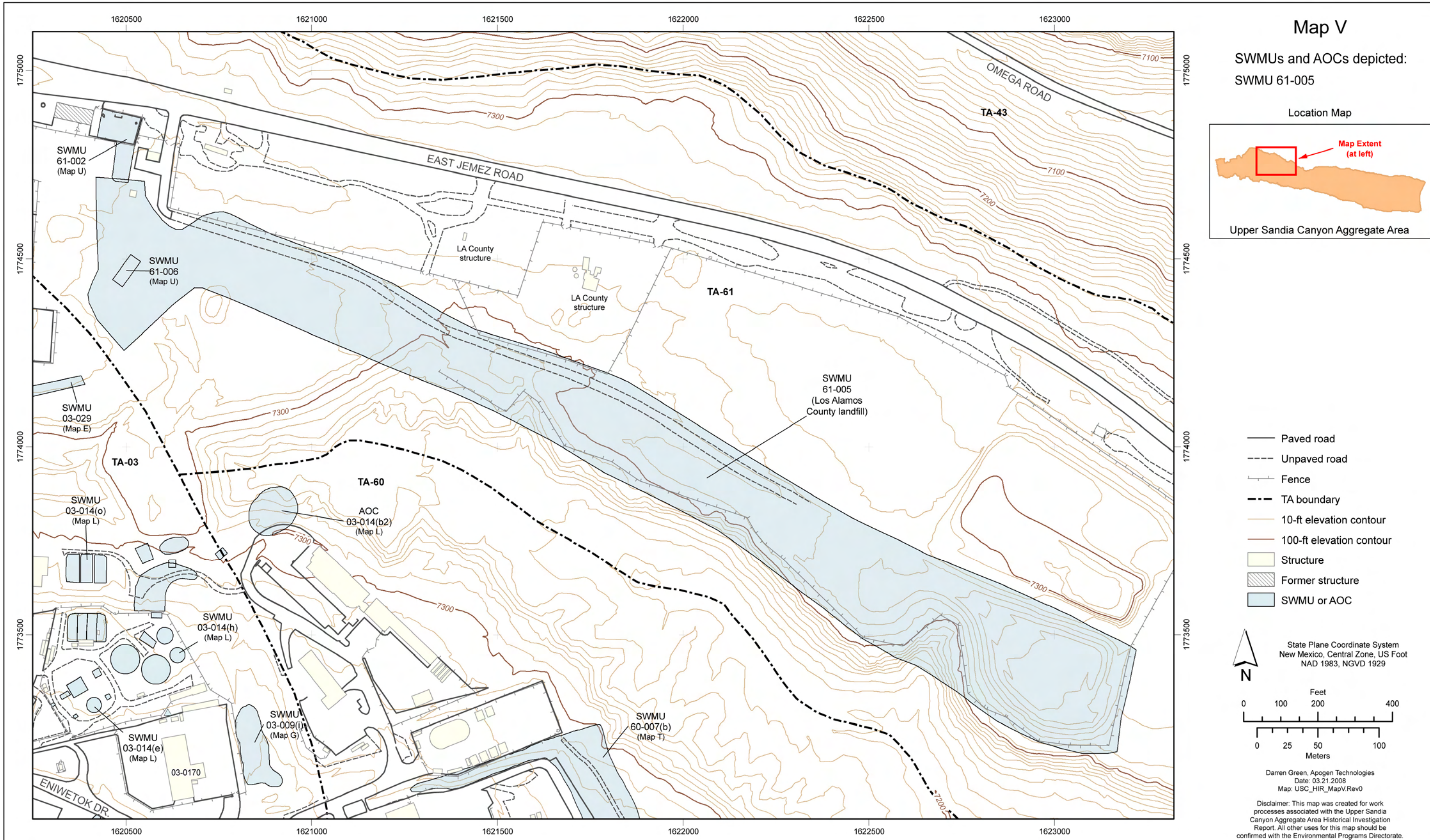


Figure 4.3-3 Map V site location

Table 1.1-1
SWMUs and AOCs within the Upper Sandia Canyon Aggregate Area

Site ID	Subunit	Brief Description	Site Status	Reference	Proposed Action
TA-03					
AOC 03-001(d)		Former satellite accumulation area located on a paved area northwest of building 03-0170	NFA Approved	EPA 2005, 088464	None
AOC 03-001(f)		Satellite accumulation areas (rooms 122, 125, and 132) and a less-than-90-day hazardous waste accumulation area (room 103) within building 03-0038	Certificate of Completion with Controls	EPA 2005, 088464	None
AOC 03-001(i)		Two inactive material and equipment storage areas located near a parks and refuse office building (building 03-0070)	NFA Approved	NMED 2006, 094384	None
AOC 03-001(n)		Satellite accumulation areas in room 104 and on the south loading dock of building 03-032	NFA Approved	EPA 2005, 088464	None
AOC 03-001(o)		A former satellite accumulation area within room 100 of building 03-035	NFA Approved	EPA 2005, 088464	None
AOC 03-001(p)		Former satellite accumulation area located within building 03-037 (a carpenter shed)	NFA Approved	EPA 2005, 088464	None
AOC 03-001(q)		Former satellite accumulation areas located in rooms 108A and A326 of building 03-043	NFA Approved	EPA 2005, 088464	None
AOC 03-001(r)		Former satellite accumulation area within room 101 of building 03-409	NFA Approved	EPA 2005, 088464	None
AOC 03-001(v)		Former satellite accumulation area within a pesticide storage shed (building 60-029, formerly designated building 03-1486)	NFA Approved	EPA 2005, 088464	None
AOC 03-001(x)		Former Satellite accumulation area within building 03-022	NFA Approved	EPA 2005, 088464	None

Table 1.1-1 (continued)

Site ID	Subunit	Brief Description	Site Status	Reference	Proposed Action
SWMU 03-002(a)		A former less-than-90-day hazardous waste accumulation area that has also been identified as a less-than-90-day storage area that was established at the Laboratory within building 03-066 (outside of room P-100)	Removed from Module VIII, Hazardous Waste Facility Permit (HWFP)	NMED 2001, 070010	None
SWMU 03-002(b)		An inactive hazardous waste satellite accumulation area established at the Laboratory within building 03-1966	Removed from Module VIII, HWFP	NMED 1998, 063042	None
SWMU 03-002(c)		Former storage area used to store pesticides and herbicides	Under Investigation	Work plan section 4.1.1	Collect samples
SWMU 03-003(c)		Equipment storage area—PCB only site—used to temporarily store used dielectric oils/capacitors	Under Investigation	Work plan section 4.1.2	None
AOC 03-003(d)		Transformer pad—PCB only site—is a concrete pad that formerly housed transformers	Under Investigation	Work plan section 4.1.3	Collect samples
AOC 03-003(f)		Transformer—PCB only site—is an area of potential soil contamination	Under Investigation	Work plan section 4.1.4	Collect samples
AOC 03-003(g)		Transformer area—PCB only storage site	Under Investigation	Work plan section 4.1.5	Collect samples
AOC 03-003(m)		The location of two former capacitor banks at building 03-1188 in a limited access, fenced area	NFA Approved	EPA 2003, 078142	None
AOC 03-003(o)		Former non-PCB capacitor bank for Scyllac experiment	Under Investigation	Work plan section 4.1.6	None
AOC 03-006		Burn site	NFA Approved	EPA 2005, 088464	None
AOC 03-008(b)		Decommissioned firing chamber located in building 03-0043	NFA Approved	EPA 2005, 088464	None

Table 1.1-1 (continued)

Site ID	Subunit	Brief Description	Site Status	Reference	Proposed Action
Consolidated Unit 03-009(a)-00	SWMU 03-009(a)	Surface disposal (soil fill) located at the canyon rim south of asphalt plant	Under Investigation	Work plan section 4.1.7.1	Collect samples
	SWMU 03-028	Surface impoundment holding pond near asphalt plant	Under Investigation	Work plan section 4.1.7.2	None
	SWMU 03-029	Landfill near rim of Sandia Canyon south of building 03-0271	Under Investigation	Work plan section 4.1.7.3	Collect samples
	SWMU 03-036(a)	Aboveground tanks-two former product tanks at asphalt plant	Under Investigation	Work plan section 4.1.7.4	None
	SWMU 03-036(c)	Aboveground tank, former tank for cooled asphalt storage	Under Investigation	Work plan section 4.1.7.5	None
	SWMU 03-036(d)	Underground tank, hot emulsion storage tank	Under Investigation	Work plan section 4.1.7.6	None
	AOC 03-043(b)	Aboveground tank, asphalt emulsion storage	Under Investigation	Work plan section 4.1.7.7	None
	AOC 03-043(d)	Aboveground tank, duplicate of 03-036(a)	No Investigation Proposed	Work plan section 4.1.7.8	None
	AOC 03-043(h)	Aboveground tank, duplicate of 03-036(a)	No Investigation Proposed	Work plan section 4.1.7.9	None
	SWMU 03-045(g)	Storm drain, closed and locked formerly permitted outfall	Under Investigation	Work plan section 4.1.7.10	Collect samples
SWMU 03-009(i)		Surface disposal site for construction debris	Under Investigation	Work plan section 4.1.8	Collect samples
AOC 03-010(c)		Former hydraulic pump in metal shed north of building 03-0216	NFA Approved	EPA 2005, 088464	None
AOC 03-010(d)		Two former vacuum pumps in metal shed on east side of building 03-0141	NFA Approved	EPA 2005, 088464	None
Consolidated Unit 03-012(b)-00	SWMU 03-012(b)	Operational release and outfall associated with the power plant	Under Investigation	Work plan section 4.1.9.1	Collect samples
	SWMU 03-014(q)	Holding tank, former effluent tank	Under Investigation	Work plan section 4.1.9.2	Collect samples
	SWMU 03-045(b)	Operational release, duplicate of SWMU 03-012(b)	No Investigation Proposed	Work plan section 4.1.9.3	Collect samples

Table 1.1-1 (continued)

Site ID	Subunit	Brief Description	Site Status	Reference	Proposed Action
Consolidated Unit 03-012(b)-00 (continued)	SWMU 03-045(c)	Outfall currently NPDES permitted, receives effluent from cooling tower	Under Investigation	Work plan section 4.1.9.4	Collect samples
Consolidated Unit 03-013(a)-00	SWMU 03-013(a)	Storm drain, corrugated metal pipe	Under Investigation	Work plan section 4.1.10.1	None
	SWMU 03-052(f)	Outfall received wastewater from building 03-0038	Under Investigation	Work plan section 4.1.10.2	Collect samples
AOC 03-013(b)		Floor drains in basement of building 03-0038	Under Investigation	Work plan section 4.1.11	None
AOC 03-013(c)		Operational release, former cable cleaning site west of building 03-0038	NFA Approved	EPA 2005, 088464	None
AOC 03-013(d)		Operational release, site of former metal working equipment (hydraulic bender and shearer)	NFA Approved	EPA 2005, 088464	None
AOC 03-013(e)		Operational release, site of one-time antifreeze spill in paved storage yard west of building 03-0036	NFA Approved	EPA 2005, 088464	None
AOC 03-013(f)		Operational release, former area of stained soil associated with tar-melting pot and hopper	NFA Approved	EPA 2005, 088464	None
SWMU 03-013(i)		Operational release, oil contaminated soil and gravel	Under Investigation	Work plan section 4.1.12	Collect samples
Consolidated Unit 03-014(a)-99	SWMU 03-014(a)	Structure associated with former WWTP, Imhoff tank	Under Investigation	Work plan section 4.1.13.1	Collect samples
	SWMU 03-014(b)	Structure associated with former WWTP, the dosing siphon	Under Investigation	Work plan section 4.1.13.2	Collect samples
	AOC 03-014(b2)	Outfall formerly permitted, received effluent from flow-measurement weir	Under Investigation	Work plan section 4.1.13.3	Collect samples
	SWMU 03-014(c)	Structure associated with former WWTP, trickling filter	Under Investigation	Work plan section 4.1.13.4	Collect samples
	AOC 03-014(c2)	Outfall, abandoned overflow, received effluent from WWTP	Under Investigation	Work plan section 4.1.13.5	Collect samples
	SWMU 03-014(d)	Structure associated with former WWTP, secondary clarifier	Under Investigation	Work plan section 4.1.13.6	Collect samples

Table 1.1-1 (continued)

Site ID	Subunit	Brief Description	Site Status	Reference	Proposed Action
Consolidated Unit 03-014(a)-99 (continued)	SWMU 03-014(e)	Structure associated with former WWTP, Imhoff tank	Under Investigation	Work plan section 4.1.13.7	Collect samples
	SWMU 03-014(f)	Structure associated with former WWTP, dosing siphon	Under Investigation	Work plan section 4.1.13.8	Collect samples
	SWMU 03-014(g)	Structure associated with former WWTP, trickling filter	Under Investigation	Work plan section 4.1.13.9	Collect samples
	SWMU 03-014(h)	Structure associated with former WWTP, secondary clarifier	Under Investigation	Work plan section 4.1.13.10	Collect samples
	SWMU 03-014(i)	Structure associated with former WWTP, splitter box, a comminutor, and bar screen	Under Investigation	Work plan section 4.1.13.11	Collect samples
	SWMU 03-014(j)	Structure associated with former WWTP, chlorination system	Under Investigation	Work plan section 4.1.13.12	Collect samples
	SWMU 03-014(k)	Structure associated with former WWTP, unlined sludge-drying bed	Under Investigation	Work plan section 4.1.13.13	Collect samples
	SWMU 03-014(l)	Structure associated with former WWTP, unlined sludge-drying bed	Under Investigation	Work plan section 4.1.13.14	Collect samples
	SWMU 03-014(m)	Structure associated with former WWTP, unlined sludge-drying bed	Under Investigation	Work plan section 4.1.13.15	Collect samples
	SWMU 03-014(n)	Structure associated with former WWTP, unlined sludge-drying bed	Under Investigation	Work plan section 4.1.13.16	Collect samples
	SWMU 03-014(o)	Structure associated with former WWTP, three lined sludge-drying bed	Under Investigation	Work plan section 4.1.13.17	Collect samples
	SWMU 03-014(p)	Structure associated with former WWTP, active lift station	Under Investigation	Work plan section 4.1.13.18	Delay characterization
	SWMU 03-014(u)	Structure associated with former WWTP, former holding tank	Under Investigation	Work plan section 4.1.13.19	Collect samples
	SWMU 03-056(d)	Drum storage, active site on northeast side of Plant 1 trickling filter	Under Investigation	Work plan section 4.1.13.20	Collect samples
SWMU 03-014(r)		Active lift station associated with former WWTP	Under Investigation	Work plan section 4.1.14	Delay characterization
SWMU 03-014(s)		Active lift station associated with former WWTP	Under Investigation	Work plan section 4.1.15	Delay characterization

Table 1.1-1 (continued)

Site ID	Subunit	Brief Description	Site Status	Reference	Proposed Action
AOC 03-014(v)		Drain associated with former WWTP in former garage (building 03-0036)	Under Investigation	Work plan section 4.1.16	None
AOC 03-014(y)		Drain associated with former WWTP in basement of press building (03-0035)	Under Investigation	Work plan section 4.1.17	Delay characterization
Consolidated Unit 03-015-00	SWMU 03-015	Outfall located between Eniwetok Drive and security fence NE of building 03-0141	Under Investigation	Work plan section 4.1.18.1	Collect samples
	AOC 03-053	Operational facility, basement area of building 03-0141	Under Investigation	Work plan section 4.1.18.2	Collect samples
AOC C-03-016		Oil metal bin, cleanout bin	Under Investigation	Work plan section 4.1.19	Collect samples
AOC 03-016(b)		Septic system, served lavatory in building 03-0271	NFA Approved	EPA 2005, 088464	None
AOC 03-016(c)		Septic system, served lavatory in building 03 0007	NFA Approved	EPA 2005, 088464	None
AOC 03-016(d)		Lift station associated with building 03-0443	NFA Approved	EPA 2005, 088464	None
AOC 03-016(e)		Lift station associated with former WWTP, duplicate of SWMU 03-014(s)	NFA Approved	EPA 2005, 088464	None
AOC 03-016(f)		Lift station associated with former WWTP, duplicate of SWMU 03-014(s)	NFA Approved	EPA 2005, 088464	None
SWMU 03-020(a)		Disposal pit associated with air compressor system at former building 03-0287	Removed from Module VIII, HWFP	NMED 1998, 063042	None
AOC 03-020(b)		Disposal pit associated with steam-cleaning engines	NFA Approved	EPA 2005, 088464	None
SWMU 03-021		Outfall located 60 ft north of building 03-0170	Under Investigation	Work plan section 4.1.20	Collect samples
AOC 03-023		Sump used to collect water from floor drains and sinks in building 03-0105	NFA Approved	EPA 2005, 088464	None
SWMU 03-024		Tank and/or associated equipment, concrete pump pit associated with noncontact cooling water	Removed from Module VIII, HWFP	NMED 1997, 059358	None

Table 1.1-1 (continued)

Site ID	Subunit	Brief Description	Site Status	Reference	Proposed Action
SWMU 03-026(b)		Sumps/lift stations located in building 03-0132	Removed from Module VIII, HWFP	NMED 2001, 070010	None
AOC 03-027		Lift wells, two concrete-block-lined lift wells	Under Investigation	Work plan section 4.1.21	None
SWMU 03-032		Tank and associated equipment, recirculation tank in building 03-0038 used to control air emissions	Removed from Module VIII, HWFP	NMED 2001, 070010	None
SWMU 03-035(a)		Former underground diesel storage tank	Removed from Module VIII, HWFP	NMED 1998, 063042	None
SWMU 03-035(b)		Former underground diesel storage tank	Removed from Module VIII, HWFP	NMED 1998, 063042	None
AOC 03-036(b)		Former aboveground tanks that contained diesel fuel	Under Investigation	Work plan section 4.1.22	Collect samples
AOC 03-036(e)		Aboveground tank	NFA Approved	EPA 2005, 088464	None
AOC 03-036(f)		Aboveground gasoline storage tank	NFA Approved	EPA 2005, 088464	None
AOC 03-036(g)		Aboveground sulfuric acid storage tank	NFA Approved	EPA 2005, 088464	None
AOC 03-036(h)		Aboveground tanks used for cooling water corrosion inhibitors	NFA Approved	EPA 2005, 088464	None
AOC 03-036(i)		Aboveground diesel fuel storage tank	NFA Approved	EPA 2005, 088464	None
AOC 03-036(j)		Aboveground diesel fuel storage tanks	NFA Approved	EPA 2005, 088464	None
SWMU 03-037		Underground tanks, active concrete tank in basement of Sigma Building	Under Investigation	Work plan section 4.1.23	Delay characterization
AOC 03-038(c)		Waste lines, cast-iron piped rinse solution from copper electroplating	Under Investigation	Work plan section 4.1.24	Collect samples
AOC 03-038(d)		Waste lines, industrial line associated with liquid waste treatment system	Under Investigation	Work plan section 4.1.25	Collect samples
SWMU 03-039(a)		Silver recovery unit used at photography-processing operation in building 03-0043	Removed from Module VIII, HWFP	NMED 1998, 063042	None

Table 1.1-1 (continued)

Site ID	Subunit	Brief Description	Site Status	Reference	Proposed Action
AOC 03-039(b)		Silver recovery unit used at photography-processing operation in building 03-0028	NFA Approved	EPA 2005, 088464	None
AOC 03-039(d)		Silver recovery unit used at photography-processing operation in building 03-0132	NFA Approved	EPA 2005, 088464	None
AOC 03-039(e)		Silver recovery unit used at photography-processing operation in building 03-0409	NFA Approved	EPA 2005, 088464	None
AOC 03-040(b)		Storage area that contained a former film disintegrator in building 03-0043	NFA Approved	EPA 2005, 088464	None
AOC 03-043(a)		Aboveground tank stored asphalt emulsion	Under Investigation	Work plan section 4.1.26	None
SWMU 03-043(e)		Former diesel underground storage tank	Removed from Module VIII, HWFP	NMED 2001, 070010	None
AOC 03-043(f)		Aboveground tank, duplicate of 03-036(c)	No Investigation Proposed	Work plan section 4.1.27	None
AOC 03-043(g)		Aboveground tank, duplicate of 03-036(d)	No Investigation Proposed	Work plan section 4.1.28	None
SWMU 03-044(a)		Container storage area near building 03-0070 that contained wooden cable spools and drums containing diesel fuel, kerosene, and oil emulsion	Removed from Module VIII, HWFP	NMED 2001, 070010	None
SWMU 03-045(a)		Outfall from building 03-0022	Under Investigation	Work plan section 4.1.29	Collect samples
SWMU 03-045(d)		Outfall from structure 03-0336	Removed from Module VIII, HWFP	NMED 1997, 059358	None
SWMU 03-045(e)		Outfall from drain in an oil pump house, 03-0057	Under Investigation	Work plan section 4.1.30	Collect samples
SWMU 03-045(f)		Outfall from sink in utilities control center building 03-0223	Under Investigation	Work plan section 4.1.31	Collect samples
SWMU 03-045(h)		Outfall located at north perimeter of Sigma Complex	Under Investigation	Work plan section 4.1.32	Collect samples

Table 1.1-1 (continued)

Site ID	Subunit	Brief Description	Site Status	Reference	Proposed Action
SWMU 03-045(i)		Outfall for stormwater from parking lot into ditch, north of building 03-0034	Removed from Module VIII, HWFP	NMED 2001, 070010	None
SWMU 03-046		Aboveground wastewater neutralization tank located southeast of building 03-0022	Certificate of Completion	NMED 2008, 100116	None
AOC 03-047(a)		Storage area that contained materials used for lead-pouring shop and heavy-equipment repair	NFA Approved	EPA 2005, 088464	None
AOC 03-047(b)		Storage area that contained materials for road maintenance	NFA Approved	EPA 2005, 088464	None
AOC 03-047(c)		Drum storage used to store lubricating oil in 55-gal. drums and small equipment	NFA Approved	EPA 2005, 088464	None
AOC 03-047(d)		Storage area for containers for steam plant	Under Investigation	Work plan section 4.1.34	None
AOC 03-047(e)		Storage area that was used to store paint and related materials	NFA Approved	EPA 2005, 088464	None
AOC 03-047(f)		Storage area used to store engine and replacements parts for equipment	NFA Approved	EPA 2005, 088464	None
AOC 03-047(g)		Drum storage for three drums	Under Investigation	Work plan section 4.1.35	Collect samples
AOC 03-047(h)		Storage area for three drums	NFA Approved	EPA 2005, 088464	None
AOC 03-047(i)		Satellite accumulation area located on a paved area on the south side loading dock of building 03-0216	NFA Approved	EPA 2005, 088464	None
SWMU 03-049(c)		Outfall from building 03-0066, receives discharge from condensate system	Removed from Module VIII, HWFP	NMED 2001, 070010	None
AOC 03-050(c)		Exhaust emissions, off-gas scrubber of HEPA filter system	NFA Approved	EPA 2005, 088464	None
AOC 03-051(c)		Soil contamination from vacuum pump leaking	Under Investigation	Work plan section 4.1.36	Collect samples

Table 1.1-1 (continued)

Site ID	Subunit	Brief Description	Site Status	Reference	Proposed Action
AOC 03-052(b)		Storm drainage 20 ft north and west of Sigma Building (03-0066)	Under Investigation	Work plan section 4.1.37	Collect samples
SWMU 03-052(c)		One-time release of hydraulic oil	Removed from Module VIII, HWFP	NMED 2001, 070010	None
AOC 03-052(d)		Storm drainage southeast of building 03-0287	NFA Approved	EPA 2003, 078142	None
SWMU 03-054(c)		Outfall, former cooling tower, and pump house	Under Investigation	Work plan section 4.1.38	None
SWMU 03-056(a)		Storage area, inactive, used for oil accumulation	Under Investigation	Work plan section 4.1.39	Collect samples
AOC 03-056(b)		Container storage area used to store wooden cable spools and drums containing sand/asphalt mixtures	NFA Approved	EPA 2003, 078142	None
SWMU 03-056(c)		Transformer storage area—PCB only site north of utilities shop, 03-0223	Under Investigation	Work plan section 4.1.40	None
AOC 03-056(h)		Container storage area near 03-0105 and 03-0287	Under Investigation	Work plan section 4.1.41	None
AOC 03-056(i)		Drum storage on east dock of building 03-0038 that stored a drum that contained waste turbine oil	NFA Approved	EPA 2005, 088464	None
AOC 03-056(k)		Container storage area north side of loading dock at Sigma building 03-0066	Under Investigation	Work plan section 4.1.42	Collect samples
SWMU 03-056(l)		Storage area outside building 03-0141	Under Investigation	Work plan section 4.1.43	Collect samples
SWMU 03-056(n)		Container storage area that contained drums that stored waste from lead shop	Removed from Module VIII, HWFP	NMED 2001, 070010	None
AOC 03-057		Sump/grease trap that served building 03-0100	NFA Approved	EPA 2005, 088464	None
Consolidated Unit 03-059-00	AOC 03-003(n)	One-time spill—PCB only site	Under Investigation	Work plan section 4.1.44.1	Collect samples
	SWMU 03-059	Storage area—PCB only site—former salvage yard	Under Investigation	Work plan section 4.1.44.2	Collect samples
AOC C-03-001		Gas trap	NFA Approved	EPA 2005, 088464	None

Table 1.1-1 (continued)

Site ID	Subunit	Brief Description	Site Status	Reference	Proposed Action
AOC C-03-002		One-time spill, leak from asphalt machine in building 03-0035	NFA Approved	EPA 2005, 088464	None
AOC C-03-004		Miscellaneous construction debris pile located northwest of building 03-066	NFA Approved	EPA 2005, 088464	None
AOC C-03-005		Oil spill from asphalt oil distributor truck	NFA Approved	EPA 2005, 088464	None
AOC C-03-009		Storage area used to store equipment, oil, and chemicals for use in building 03-0066	NFA Approved	EPA 2005, 088464	None
AOC C-03-011		Former aboveground gasoline storage tank that was located north of asphalt batch plant	NFA Approved	EPA 2005, 088464	None
AOC C-03-015		Underground gasoline storage tank located northeast of building 03-0036	NFA Approved	EPA 2005, 088464	None
AOC C-03-017		Underground fuel storage tank located north of building 03-0028	NFA Approved	EPA 2005, 088464	None
AOC C-03-018		Underground diesel storage tank located north of building 03-0028	NFA Approved	EPA 2005, 088464	None
AOC C-03-020		Underground transformer oil storage tanks associated with building 03-0105	NFA Approved	EPA 2005, 088464	None
AOC C-03-022		Kerosene tanker trailer used to store and distribute kerosene for asphalt plant	Under Investigation	Work plan section 4.1.45	None
TA-60					
AOC 60-001(a)		Storage area on east side of building 60-0001	NFA Approved	EPA 2003, 078142	None
AOC 60-001(b)		Storage area in a metal shed, structure 60-0007, used to store paint and related-materials	NFA Approved	EPA 2005, 088464	None
AOC 60-001(c)		Satellite accumulation areas located at NTS test fabrication facility	NFA Approved	EPA 2005, 088464	None
AOC 60-001(d)		Storage area, located in a storage shed, structure 60-0029, east of NTS test fabrication facility	NFA Approved	EPA 2005, 088464	None

Table 1.1-1 (continued)

Site ID	Subunit	Brief Description	Site Status	Reference	Proposed Action
SWMU 60-002		Storage areas on Sigma Mesa (west, central, east)	Under Investigation	Work plan section 4.2.1	West- collect samples
AOC 60-003		Oil-water separator located northeast of building 60-0001 and used to collect liquid waste produced by a steam cleaning process	NFA Approved	EPA 2005, 088464	None
AOC 60-004(a)		Storage area that contained equipment and supplies such as wooden cables, light poles, and lumber posts.	NFA Approved	EPA 2005, 088464	None
AOC 60-004(b)		Storage area for 12 containers of diesel sludge	Under Investigation	Work plan section 4.2.2	Collect samples
AOC 60-004(d)		Storage area for dismantled underground storage tanks and contents	Under Investigation	Work plan section 4.2.3	Collect samples
AOC 60-004(f)		Storage area bermed and used for new product storage	Under Investigation	Work plan section 4.2.4	Collect samples
AOC 60-005(b)		Drilling mud pit used as a settling area to recycle water from spent mud	NFA Approved	EPA 2005, 088464	None
SWMU 60-006(a)		Septic system on Sigma Mesa	Under Investigation	Work plan section 4.2.5	Remove tank, collect samples
AOC 60-006(c)		Septic system on Sigma Mesa	NFA Approved	EPA 2005, 088464	None
SWMU 60-007(a)		Release, equipment stored leaked oil	Under Investigation	Work plan section 4.2.6	Collect samples
SWMU 60-007(b)		Release, storm drainage from motor pool building 03-0001	Under Investigation	Work plan section 4.2.7	Collect samples
AOC C-60-001		Former underground diesel fuel tank located near building 60-0001	NFA Approved	EPA 2005, 088464	None
AOC C-60-003		One-time spill of potable water from ruptured water line at pesticide shed, building 60-0029	NFA Approved	EPA 2005, 088464	None
AOC C-60-004		Former underground diesel storage tank located near building 60-0001	NFA Approved	EPA 2005, 088464	None

Table 1.1-1 (continued)

Site ID	Subunit	Brief Description	Site Status	Reference	Proposed Action
TA-61					
AOC 61-001		Transformer storage area—PCB only site located east of Radio Repair Shop 61-0023	NFA Approved	EPA 2005, 088464	None
SWMU 61-002		Transformer storage area—PCB only site located east of Radio Repair Shop 61-0023	Under Investigation	Work plan section 4.3.1	None
AOC 61-003		Burn site (nonexistent)	NFA Approved	EPA 2005, 088464	None
SWMU 61-004(a)		Septic tank located northeast of building 61-0023	Removed from Module VIII, HWFP	NMED 2001, 070010	None
AOC 61-004(c)		Former septic system at Los Alamos County landfill	NFA Approved	EPA 2005, 088464	None
SWMU 61-005		Landfill, County Subtitle D	Under Investigation	Work plan section 4.3.2	Delay characterization
SWMU 61-006		Waste oil tank, active, used oil recycling	Under Investigation	Work plan section 4.3.3	Delay characterization
AOC C-61-001		Leak from transformer storage area—PCB only site at building 61-0023,	NFA Approved	EPA 2005, 088464	None
AOC C-61-002		Subsurface contamination, potentially petroleum-based	Under Investigation	Work plan section 4.3.4	Collect samples

Note: Shading denotes sites approved for NFA.

Table 2.3-1
Industrial SSLs

Chemical	Industrial SSL[a]
Inorganic Chemicals (mg/kg)	
Aluminum	100,000
Antimony	454
Arsenic	17.7
Barium	100,000
Beryllium	2250
Cadmium	564
Chromium (total)	5000[b]
Chromium (hexavalent)	3400
Cobalt	20,500
Copper	45,400
Iron	100,000
Lead	800
Manganese	48,400
Mercury	340[c]
Nickel	22,700
Selenium	5680
Silver	5680
Thallium	74.9
Vanadium	1140
Zinc	100,000
Organic Chemicals (mg/kg)	
Acenaphthene	33,500
Acetone	100,000
Anthracene	100,000
Benzene	25.8
Benzo(a)anthracene	23.4
Benzo(a)pyrene	2.34
Benzo(b)fluoranthene	23.4
Benzo(k)fluoranthene	234
Benzoic Acid	10,000
Bis(2-ethylhexyl) phthalate	1370
2-Butanone	48,700
n-Butylbenzene	62.1
tert-Butylbenzene	106
Carbon disulfide	460
Chrysene	2310
Dibenz(a,h)anthracene	2.34

Table 2.3-1 (continued)

Chemical	Industrial SSL[a]
Dibenzofuran	1620
1,4-Dichlorobenzene	103
Fluoranthene	24,400
Fluorene	26,500
Indeno(1,2,3-c,d)pyrene	23.4
Methylene chloride	490
Naphthalene	300
Phenanthrene	20,500
Phenol	100,000
Aroclor-1254	8.26
Aroclor-1260	8.26
n-Propylbenzene	62.1
Pyrene	30,900
Tetrachloroethene	31.6
Toluene	252
TPH-DRO	2000[d]
TPH-GRO	2000[d]
TPH-LRO	2000[d]
1,1,1-Trichloroethane	563
Trichloroethylene	1.56
1,2,4-Trimethylbenzene	213
1,3,5-Trimethylbenzene	69.2
Xylenes	82
Radionuclides (pCi/g)[e]	
Plutonium-239	210
Strontium-90	1900
Tritium	440,000
Uranium-234	1500
Uranium-235	87
Uranium-238	430

[a] SSLs from NMED 2006, 092513, unless otherwise noted.
[b] SSL from EPA Region 6 (EPA 2007, 099314).
[c] SSL from EPA Region 9 Preliminary Remediation Goals (www.epa.gov/region09/waste/sfund/prg).
[d] NMED 2006, 094614.
[e] Radionuclides from screening actions levels from LANL 2005, 088493.

Table 4.0-1
Proposed Sampling Description and Analyses

Site	Sampling Justification	Depth (ft)	Media	TAL Metals (EPA SW-846:6010B/6020)	VOCs (EPA SW-846:8260B)	SVOCs (EPA SW-846:8270C)	TPH (EPA-8015B)	Pesticides (EPA SW-846:8081A)	PCBs[c] (EPA SW-846:8082)	Nitrate (EPA 300)	Cyanide (EPA SW-846:9012A)	Perchlorate (EPA SW-846:6850)	Uranium, Plutonium, or Americium (HASL-300)	Tritium (EPA 906)
TA-03														
SWMU 03-002(c)	8 samples at 4 locations (based on historic results) will be collected to confirm Phase I RFI results and define extent of contamination (Figure 4.1-5)	0–1, soil/tuff interface	Soil, tuff	X[a]	X	X	—[b]	X	X	—	X	—	—	—
SWMU 03-003(c)	No sampling is proposed. Refer to section 4.1.2.	—	—	—	—	—	—	—	—	—	—	—	—	—
AOC 03-003(d)	5 chip samples will be collected to confirm the absence of PCBs (Figure 4.1-12)	Surface	Concrete	—	—	—	—	—	X	—	—	—	—	—
	4 samples will be collected from 2 locations under the concrete pad and 6 samples will be collected from 3 locations surrounding the concrete pad to determine if PCBs have migrated (Figure 4.1-12)	0–1, 1–2	Soil	—	—	—	—	—	X	—	—	—	—	—
AOC 03-003(f)	No sampling is proposed. Refer to section 4.1.4.	—	—	—	—	—	—	—	—	—	—	—	—	—
AOC 03-003(g)	3 surface swipe samples to confirm if PCBs are present (Figure 4.1-17)	Surface	—	—	—	—	—	—	X	—	—	—	—	—
AOC 03-003(o)	No sampling is proposed. Refer to section 4.1.6.	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 4.0-1 (continued)

Site	Sampling Justification	Depth (ft)	Media	TAL Metals (EPA SW-846:6010B/6020)	VOCs (EPA SW-846:8260B)[a]	SVOCs (EPA SW-846:8270C)	TPH (EPA-8015B)	Pesticides (EPA SW-846:8081A)	PCBs[c] (EPA SW-846:8082)	Nitrate (EPA 300)	Cyanide (EPA SW-846:9012A)	Perchlorate (EPA SW-846:6850)	Uranium, Plutonium, or Americium (HASL-300)	Tritium (EPA 906)
Consolidated Unit 03-009(a)-00														
SWMU 03-009(a)	12 samples will be collected from 3 locations to determine the extent of contamination identified in previous sampling efforts	Soil/tuff interface, 9–10, 14–15, 19–20	Soil, tuff	X	X	X	DRO	—	X	—	X	—	—	—
	4 samples will be collected from 2 locations at 2 depths to define lateral extent of contamination (Figure 4.1-5)	0–1, 1–2												
SWMU 03-028	No sampling is proposed. Refer to section 4.1.7.2.	—	—	—	—	—	—	—	—	—	—	—	—	—
SWMU 03-029	6 samples will be collected from 2 locations to define nature and extent of contamination (Figure 4.1-22)	Soil/tuff interface, 4–5, 9–10	Soil, tuff	X	X	X	DRO	—	X	—	X	—	—	—
	4 samples will be collected from 2 locations between the canyon edge and the canyon bottom on the slope below the site	0–1, 1–2												
SWMU 03-036(a)	No sampling is proposed. Refer to section 4.1.7.4.	—	—	—	—	—	—	—	—	—	—	—	—	—
SWMU 03-036(c)	No sampling is proposed. Refer to section 4.1.7.5.	—	—	—	—	—	—	—	—	—	—	—	—	—
SWMU 03-036(d)	No sampling is proposed. Refer to section 4.1.7.6.	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 4.0-1 (continued)

Site	Sampling Justification	Depth (ft)	Media	TAL Metals (EPA SW-846:6010B/6020)	VOCs (EPA SW-846:8260B)[a]	SVOCs (EPA SW-846:8270C)	TPH (EPA-8015B)	Pesticides (EPA SW-846:8081A)	PCBs[c] (EPA SW-846:8082)	Nitrate (EPA 300)	Cyanide (EPA SW-846:9012A)	Perchlorate (EPA SW-846:6850)	Uranium, Plutonium, or Americium (HASL-300)	Tritium (EPA 906)
AOC 03-043(b)	No sampling is proposed. Refer to section 4.1.7.7.	—	—	—	—	—	—	—	—	—	—	—	—	—
AOC 03-043(d)	No sampling is proposed for this AOC because it is a duplicate of SWMU 03-036(a). Refer to section 4.1.7.4.	—	—	—	—	—	—	—	—	—	—	—	—	—
AOC 03-043(h)	No sampling is proposed for this AOC because it is a duplicate of SWMU 03-036(a). Refer to section 4.1.7.4.	—	—	—	—	—	—	—	—	—	—	—	—	—
SWMU 03-045(g)	4 samples will be collected from 2 locations to define the extent of contamination (Figure 4.1-5)	0–1, 1–2	Soil	X	X	X	GRO, DRO	—	X	—	X	—	—	—
	2 samples will be collected from historical sampling location 03-22536. 2 samples will also be collected from 1 location above the inlet (Figure 4.1-5)	1–2, 4–5												
SWMU 03-009(i)	8 grab samples will be collected from 4 test pits to characterize the material (Figure 4.1-28)	5, 10	Soil	X	X	X	DRO	—	X	—	X	—	—	—
	4 samples will be collected from 2 locations to define lateral extent. (Figure 4.1-28)	0–1, 1–2												

Table 4.0-1 (continued)

Site	Sampling Justification	Depth (ft)	Media	TAL Metals (EPA SW-846:6010B/6020)	VOCs (EPA SW-846:8260B)[a]	SVOCs (EPA SW-846:8270C)	TPH (EPA-8015B)	Pesticides (EPA SW-846:8081A)	PCBs[c] (EPA SW-846:8082)	Nitrate (EPA 300)	Cyanide (EPA SW-846:9012A)	Perchlorate (EPA SW-846:6850)	Uranium, Plutonium, or Americium (HASL-300)	Tritium (EPA 906)
Consolidated Unit 03-012(b)-00														
SWMU 03-012(b) **SWMU 03-045(c)**	4 samples will be collected from 2 locations below the outfalls to define the nature and extent of contamination (Figure 4.1-33)	0–1, 1–2	Sediment, soil	X	X	X	DRO	—	X	—	X	—	—	—
SWMU 03-014(q)	6 samples will be collected from 3 locations to confirm previous results and characterize the site (Figure 4.1-33)	0–1, 1–2	Sediment, soil	X	—	—	—	—	X	—	—	—	—	—
Consolidated Unit 03-013(a)-00														
SWMU 03-013(a)	No sampling is proposed. Refer to section 4.1.10.1.	—	—	—	—	—	—	—	—	—	—	—	—	—
SWMU 03-052(f)	14 samples will be collected from 7 locations to determine the extent of contamination (Figure 4.1-39)	0–1, 1–2	Sediment, soil	X	X	X	DRO	—	X	—	X	X	X	—
AOC 03-013(b)	No sampling is proposed. Refer to section 4.1.11.	—	—	—	—	—	—	—	—	—	—	—	—	—
SWMU 03-013(i)	32 samples will be collected from 16 locations to determine the extent of contamination (Figure 4.1-43)	0–1, 4–5	—	X	X	X	DRO	—	X	—	X	—	—	—

Table 4.0-1 (continued)

Site	Sampling Justification	Depth (ft)	Media	TAL Metals (EPA SW-846:6010B/6020)	VOCs (EPA SW-846:8260B)[a]	SVOCs (EPA SW-846:8270C)	TPH (EPA-8015B)	Pesticides (EPA SW-846:8081A)	PCBs[c] (EPA SW-846:8082)	Nitrate (EPA 300)	Cyanide (EPA SW-846:9012A)	Perchlorate (EPA SW-846:6850)	Uranium, Plutonium, or Americium (HASL-300)	Tritium (EPA 906)
Consolidated Unit 03-014(a)-99														
SWMU 03-014(a) **SWMU 03-014(b)** **SWMU 03-014(e)** **SWMU 03-014(f)**	15 samples will be collected from 5 locations to confirm Phase I RFI results and define the extent of contamination, samples will bound 03-014 (a, b, e, and f) (Figure 4.1-48)	0–1, 1–2, soil/tuff interface	Soil, tuff	X	X	X	DRO	—	X	X	X	X	X	—
AOC 03-014(b2)	10 samples will be collected from 5 locations to confirm Phase I RFI data (Figure 4.1-48)	0–1, 1–2	Soil, sediment	X	X	X	DRO	—	X	X	X	X	X	—
SWMU 03-014(c) **SWMU 03-014(g)**	3 samples will be collected from 1 location between SWMU 03-014(c) and SWMU 03-014(g) to characterize the site (Figure 4.1-48)	Base of tank, soil/tuff interface, 5 ft below interface	Soil, tuff	X	X	X	DRO	—	X	X	X	X	X	—

Table 4.0-1 (continued)

Site	Sampling Justification	Depth (ft)	Media	TAL Metals (EPA SW-846:6010B/6020)	VOCs (EPA SW-846:8260B)[a]	SVOCs (EPA SW-846:8270C)	TPH (EPA-8015B)	Pesticides (EPA SW-846:8081A)	PCBs[c] (EPA SW-846:8082)	Nitrate (EPA 300)	Cyanide (EPA SW-846:9012A)	Perchlorate (EPA SW-846:6850)	Uranium, Plutonium, or Americium (HASL-300)	Tritium (EPA 906)
AOC 03-014(c2)	10 samples will be collected from 5 locations to characterize the drainage, confirm Phase I RFI results, and define the extent of contamination. (Figure 4.1-48)	0–1, 1–2	Soil, sediment	X	X	X	DRO	—	X	X	X	X	X	—
	6 samples will be collected from 3 locations in the northern SWMU polygon and associated drainage (Figure 4.1-48)	0–1, 2–3	Soil, sediment	X	X	X	DRO	—	X	X	X	X	X	—
SWMU 03-014(d) **SWMU 03-014(h)**	9 samples will be collected from 3 locations characterize the sites (Figure 4.1-48)	Base of tank, soil/tuff interface, 5 ft below interface	Soil, tuff	X	X	X	DRO	—	X	X	X	X	X	—
SWMU 03-014(i)	12 samples will be collected from 3 locations to characterize the site (Figure 4.1-48)	Base of structure, soil/tuff interface, 5 ft below interface	Soil, tuff	X	X	X	DRO	—	X	X	X	X	X	—

Table 4.0-1 (continued)

Site	Sampling Justification	Depth (ft)	Media	TAL Metals (EPA SW-846:6010B/6020)	VOCs (EPA SW-846:8260B)[a]	SVOCs (EPA SW-846:8270C)	TPH (EPA-8015B)	Pesticides (EPA SW-846:8081A)	PCBs[c] (EPA SW-846:8082)	Nitrate (EPA 300)	Cyanide (EPA SW-846:9012A)	Perchlorate (EPA SW-846:6850)	Uranium, Plutonium, or Americium (HASL-300)	Tritium (EPA 906)
SWMU 03-014(j)	6 samples will be collected from 2 locations to define the nature and extent of contamination at the pump pit (Figure 4.1-48)	Base of structure, soil/tuff interface, 5 ft below interface	Soil, tuff	X	X	X	DRO	—	X	X	X	X	X	—
	2 samples will be collected from 1 location to define the nature and extent of contamination (Figure 4.1-48)	0–1, soil/tuff interface	Soil, tuff	X	X	X	DRO	—	X		X	X	X	—
SWMU 03-014(k), SWMU 03-014(l), SWMU 03-014(m), SWMU 03-014(n)	10 samples will be collected from 5 locations to confirm the Phase I RFI investigation results and to define the vertical extent of contamination (Figure 4.1-48)	4–5, 6–7	Soil, tuff	X	X	X	DRO	—	X	X	X	X	X	X
	16 soil samples will be collected from 4 locations to bound the 4 SWMUs (Figure 4.1-48)	0–1, 1–2, 4–5, 6–7												
SWMU 03-014(o)	6 samples will be collected from 3 locations; 1 historical sample location (03-03204) in the center bed and two locations in the other beds to define vertical extent of contamination (Figure 4.1-48)	4–5, 6–7	Soil, tuff	X	—	—	—	—	X		X	—	—	
	16 samples will be collected from 4 locations to define the lateral and vertical extent of contamination (Figure 4.1-48)	0–1, 1–2, 4–5, 6–7	Soil, tuff	X	X	X	DRO	—	X	X	X	X	X[d]	X

Table 4.0-1 (continued)

Site	Sampling Justification	Depth (ft)	Media	TAL Metals (EPA SW-846:6010B/6020)	VOCs (EPA SW-846:8260B)[a]	SVOCs (EPA SW-846:8270C)	TPH (EPA-8015B)	Pesticides (EPA SW-846:8081A)	PCBs[c] (EPA SW-846:8082)	Nitrate (EPA 300)	Cyanide (EPA SW-846:9012A)	Perchlorate (EPA SW-846:6850)	Uranium, Plutonium, or Americium (HASL-300)	Tritium (EPA 906)
SWMU 03-014(p)	No sampling is proposed. Refer to section 4.1.13.18.	—	—	—	—	—	—	—	—	—	—	—	—	—
SWMU 03-014(u)	6 samples will be collected from 3 locations to define the nature and extent of contamination (Figure 4.1-48)	0–1, 3–4	Soil, tuff	X	X	X	DRO	—	X	X	X	X	X	—
	8 samples will be collected from 4 locations in the drainage northwest of site to define nature and extent of contamination (Figure 4.1-48)	0–1, 1–2	Soil, sediment	X	X	X	DRO	—	X	X	X	X	X	—
SWMU 03-056(d)	2 samples will be collected from 1 location to define the nature and extent of contamination (Figure 4.1-48)	0–1, soil/tuff interface	Soil, tuff	X	X	X	DRO	—	X	—	X	—	—	—
SWMU 03-014(r)	No sampling is proposed. Refer to section 4.1.14.	—	—	—	—	—	—	—	—	—	—	—	—	—
SWMU 03-014(s)	No sampling is proposed. Refer to section 4.1.15.	—	—	—	—	—	—	—	—	—	—	—	—	—
AOC 03-014(v)	No sampling is proposed. Refer to section 4.1.16.	—	—	—	—	—	—	—	—	—	—	—	—	—
AOC 03-014(y)	No sampling is proposed. Refer to section 4.1.17.	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 4.0-1 (continued)

Site	Sampling Justification	Depth (ft)	Media	TAL Metals (EPA SW-846:6010B/6020)	VOCs (EPA SW-846:8260B)[a]	SVOCs (EPA SW-846:8270C)	TPH (EPA-8015B)	Pesticides (EPA SW-846:8081A)	PCBs[c] (EPA SW-846:8082)	Nitrate (EPA 300)	Cyanide (EPA SW-846:9012A)	Perchlorate (EPA SW-846:6850)	Uranium, Plutonium, or Americium (HASL-300)	Tritium (EPA 906)
Consolidated Unit 03-015-00														
SWMU 03-015	18 samples will be collected from 9 locations to define the nature and extent of contamination (Figure 4.1-12)	0–1, 1–2	Soil, sediment	X	X	X	DRO	—	X	—	—	X	X	—
	2 samples will be collected from 1 location under outfall drainline (Figure 4.1-12)	0–1 (beginning depth under drainline), 3–4 (under drainline)	Soil, tuff											
AOC 03-053														
AOC C-03-016	3 samples will be collected from historical location 03-22533 to determine vertical extent (Figure 4.1-5)	4–5, 10–11, 19–20	Soil, tuff	X	X	X	DRO, GRO	—	X	—	X	—	—	—

Table 4.0-1 (continued)

Site	Sampling Justification	Depth (ft)	Media	TAL Metals (EPA SW-846:6010B/6020)	VOCs (EPA SW-846:8260B)[a]	SVOCs (EPA SW-846:8270C)	TPH (EPA-8015B)	Pesticides (EPA SW-846:8081A)	PCBs[c] (EPA SW-846:8082)	Nitrate (EPA 300)	Cyanide (EPA SW-846:9012A)	Perchlorate (EPA SW-846:6850)	Uranium, Plutonium, or Americium (HASL-300)	Tritium (EPA 906)
SWMU 03-021	4 samples will be collected from 2 historical locations to confirm the Phase I RFI investigation results and define the vertical extent of contamination (the samples will be collected from historic sampling locations 03-03331 and 03-03329 at greater depths) (Figure 4.1-28)	4–5, 6–7	Soil, tuff	X	—	—	—	—	X	—	X	—	—	—
	12 samples will be collected from 6 locations to define the extent of contamination in the drainage (Figure 4.1-28)	0–1, 1–2	Soil	X	X	X	—	—	X	—	X	—	—	—
AOC 03-027	No sampling is proposed. Refer to section 4.1.21.	—	—	—	—	—	—	—	—	—	—	—	—	—
AOC 03-036(b)	6 samples will be collected from 2 locations to confirm the results of the previous investigation (Figure 4.1-5)	14–15, 19–20, 24–25	Soil, tuff	X	X	X	DRO, GRO	—	X	—	X	—	—	—
SWMU 03-037	No sampling is proposed. Refer to section 4.1.23.	—	—	—	—	—	—	—	—	—	—	—	—	—
AOC 03-038(c)	6 samples will be collected from 3 locations to characterize the site (Figure 4.1-53)	0–1, 1–2	Soil	X	—	—	—	—		—	X	—	—	—
AOC 03-038(d)	12 samples will be collected from 6 locations to characterize the site (Figure 4.1-55)	0–1, 1–2	Soil	X	X	X		—	X	X	X	X	X	X
AOC 03-043(a)	No sampling is proposed. Refer to section 4.1.26.	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 4.0-1 (continued)

Site	Sampling Justification	Depth (ft)	Media	TAL Metals (EPA SW-846:6010B/6020)	VOCs (EPA SW-846:8260B)[a]	SVOCs (EPA SW-846:8270C)	TPH (EPA-8015B)	Pesticides (EPA SW-846:8081A)	PCBs[c] (EPA SW-846:8082)	Nitrate (EPA 300)	Cyanide (EPA SW-846:9012A)	Perchlorate (EPA SW-846:6850)	Uranium, Plutonium, or Americium (HASL-300)	Tritium (EPA 906)
AOC 03-043(f)	No sampling is proposed; this site is the same location as SWMU 03-036(c). Refer to section 4.1.7.5.	—	—	—	—	—	—	—	—	—	—	—	—	—
AOC 03-043(g)	No sampling is proposed; this site is the same location as SWMU 03-036(d). Refer to section 4.1.7.6.	—	—	—	—	—	—	—	—	—	—	—	—	—
SWMU 03-045(a)	8 samples will be collected from 4 locations to confirm previous sampling results and define the nature and extent of contamination (Figure 4.1-33)	0–1, 1–2	Sediment, soil	X	X	X	DRO, LRO	—	X	—	X	—	—	—
SWMU 03-045(e)	2 samples will be collected from 1 location to define the nature and extent of contamination (Figure 4.1-24)	0–1, 1–2	Soil	X	X	X	DRO	—	X	—	X	—	—	—
SWMU 03-045(f)	4 samples will be collected from 2 locations to determine the nature and extent of contamination (Figure 4.1-33)	0–1, 1–2	Sediment, soil	X	X	X	—	—	X	X	X	—	—	—
SWMU 03-045(h)	2 samples will be collected from 1 location (45h-8) as part of the Upper Mortandad Aggregate Area investigation. Discharges below the outfall will be sampled as part of AOC 03-052(b)]. Refer to section 4.1.37.	—	—	—	—	—	—	—	—	—	—	—	—	—
AOC 03-047(d)	No sampling is proposed. Refer to section 4.1.34.	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 4.0-1 (continued)

Site	Sampling Justification	Depth (ft)	Media	TAL Metals (EPA SW-846:6010B/6020)	VOCs (EPA SW-846:8260B)[a]	SVOCs (EPA SW-846:8270C)	TPH (EPA-8015B)	Pesticides (EPA SW-846:8081A)	PCBs[c] (EPA SW-846:8082)	Nitrate (EPA 300)	Cyanide (EPA SW-846:9012A)	Perchlorate (EPA SW-846:6850)	Uranium, Plutonium, or Americium (HASL-300)	Tritium (EPA 906)
AOC 03-047(g)	8 samples will be collected from 4 locations immediately adjacent to the concrete pad to define the nature and extent of contamination (Figure 4.1-12)	0–1, 1–2	Soil	X	X	X	DRO	—	X	X	X	X	—	—
AOC 03-051(c)	4 samples will be collected from 2 locations to confirm the effectiveness of the VCA (Figure 4.1-12)	2.5–3.5, 4.5–5.5	Soil	X	—	X	DRO	—	X	X	X	X	—	—
AOC 03-052(b)	4 samples will be collected from 2 locations near historical sampling locations 03-03291 and 03-03286 to define the extent of contamination (Figure 4.1-17)	7–8, 10–11	Soil, tuff	X	X	X	—	—	X	—	X	—	—	—
	26 samples will be collected from 13 locations to define extent of contamination (Figure 4.1-17)	1–2, 4–5	Soil	X	X	X	—	—	X	—	X	—	—	—
	4 samples will be collected from 2 locations in the stormwater collection area northeast of the site to define extent of contamination (Figure 4.1-17)	3–4, 5–6	Soil	X	X	X	—	—	X	—	X	—	—	—
SWMU 03-054(c)	No sampling is proposed. Refer to section 4.1.38.	—	—	—	—	—	—	—	—	—	—	—	—	—
SWMU 03-056(a)	8 samples will be collected from 4 locations (2 along each side of concrete floor) to confirm previous investigation and extent (Figure 4.1-22)	0–1 beneath concrete, 1–2 beneath concrete	Soil	X	X	X	DRO	—	X	—	X	—	—	—

Table 4.0-1 (continued)

Site	Sampling Justification	Depth (ft)	Media	TAL Metals (EPA SW-846:6010B/6020)	VOCs (EPA SW-846:8260B)[a]	SVOCs (EPA SW-846:8270C)	TPH (EPA-8015B)	Pesticides (EPA SW-846:8081A)	PCBs[c] (EPA SW-846:8082)	Nitrate (EPA 300)	Cyanide (EPA SW-846:9012A)	Perchlorate (EPA SW-846:6850)	Uranium, Plutonium, or Americium (HASL-300)	Tritium (EPA 906)
SWMU 03-056(c)	No sampling is proposed. Refer to section 4.1.40.	—	—	—	—	—	—	—	—	—	—	—	—	—
AOC 03-056(h)	No sampling is proposed. Refer to section 4.1.41.	—	—	—	—	—	—	—	—	—	—	—	—	—
AOC 03-056(k)	9 samples will be collected from 3 locations south, west, and northeast of the above samples define extent of contamination (Figure 4.1-17)	0–1, 3–4, 6–7	Soil, tuff	X	X	X	—	—	X	—	X	—	X	—
	2 samples will be collected from 1 location at historical sampling location 03-03281 to define the extent of organic chemical contamination (Figure 4.1-17)	3–4, 6–7	Soil, tuff	—	X	X	—	—	X	—	—	—	—	—
	2 samples will be collected from historic location 03-03290 to define extent of contamination (Figure 4.1-17)	3–4, 6–7	Soil, tuff	X	X	X	—		X		X	—	X	—
	8 samples will be collected from 4 new locations (Figure 4.1-17)	1–2, 3–4	Soil, tuff	—	X	X	—	—	X		—	—	—	—
SWMU 03-056(l)	5 samples will be collected from the asphalt and 5 samples will be collected from soil beneath the asphalt to confirm results of previous investigation (Figure 4.1-12)	Asphalt and 2–3 beneath the asphalt	Asphalt, soil	X	—	—	—	—	X		X	—	—	—

Table 4.0-1 (continued)

Site	Sampling Justification	Depth (ft)	Media	TAL Metals (EPA SW-846:6010B/6020)	VOCs (EPA SW-846:8260B)[a]	SVOCs (EPA SW-846:8270C)	TPH (EPA-8015B)	Pesticides (EPA SW-846:8081A)	PCBs[c] (EPA SW-846:8082)	Nitrate (EPA 300)	Cyanide (EPA SW-846:9012A)	Perchlorate (EPA SW-846:6850)	Uranium, Plutonium, or Americium (HASL-300)	Tritium (EPA 906)
Consolidated Unit 03-059-00														
AOC 03-003(n)	8 samples will be collected from 4 locations along the outside of Building 03-0271 to confirm effectiveness of previous remedial activities. (Figure 4.1-22)	0–1, 1–2	Soil	—	—	—	—	—	X	—	—	—	—	—
SWMU 03-059	34 samples will be collected from 17 locations beneath the asphalt (Figure 4.1-22)	0–1, 2–3	Soil	X	X	X	DRO	—	X	X	X	X	—	X
AOC C-03-022	8 samples will be collected from 4 locations around former tanker (Figure 4.1-5)	1–2, 4–5	Soil, tuff	X	—	—	DRO	—	—	—	—	—	—	—
TA-60														
SWMU 60-002	12 samples will be collected from 6 locations to investigate nature and extent of contamination at the western portion of the SWMU (Figure 4.2-5) No sampling is proposed for the central and eastern portions. Refer to section 4.2.1.	1–2, 4–5	Soil, tuff	X	X	X	DRO, GRO	—	X	—	X	—	—	—
AOC 60-004(b) **AOC 60-004(d)**	25 samples will be collected from 5 boreholes to determine the nature and extent of contamination (Figure 4.2-14)	0–1, 2–3, 4–5, 9–10, 14–15	Soil, tuff	X	X	X	DRO	—	X	—	X	—	—	—

Table 4.0-1 (continued)

Site	Sampling Justification	Depth (ft)	Media	TAL Metals (EPA SW-846:6010B/6020)	VOCs (EPA SW-846:8260B)[a]	SVOCs (EPA SW-846:8270C)	TPH (EPA-8015B)	Pesticides (EPA SW-846:8081A)	PCBs[c] (EPA SW-846:8082)	Nitrate (EPA 300)	Cyanide (EPA SW-846:9012A)	Perchlorate (EPA SW-846:6850)	Uranium, Plutonium, or Americium (HASL-300)	Tritium (EPA 906)
AOC 60-004(f)	20 samples will be collected from 5 boreholes to define the nature and extent of contamination (Figure 4.2-5)	0–1, 2–3, 4–5, 9–10	Soil, tuff	X	X	X	DRO	—	X	—	X	—	—	X
SWMU 60-006(a)	9 confirmatory samples will be collected from 3 boreholes around the former location of the tank to characterize the site (Figure 4.2-9)	5–6, 9–10, 14–15	Soil, tuff	X	X	X	—	—	X	X	X	X	X	X
	4 samples will be collected from 1 borehole in the seepage pit to define the nature and vertical extent of contamination (Figure 4.2-9)	2–3, 5–6, 9–10, 14–15	Soil, tuff	X	X	X	—	—	X	X	X	X	X	X
SWMU 60-007(a)	12 samples will be collected from 4 locations to confirm effectiveness of remedial activities (Figure 4.2-14)	0–1, 2–3, 4–5	Soil	X	X	X	DRO	—	X	—	X	—	—	—
SWMU 60-007(b)	24 samples will be collected from 12 locations within the drainage to define the nature and extent of contamination (Figure 4.2-19)	0–1, 1–2	Sediment	X	X	X	DRO	—	X	—	X	—	—	—
TA-61														
SWMU 61-002	No sampling is proposed. Refer to section 4.3.1	—	—	—	—	—	—	—	—	—	—	—	—	—
SWMU 61-005	No sampling is proposed. Refer to section 4.3.2	—	—	—	—	—	—	—	—	—	—	—	—	—
SWMU 61-006	No sampling is proposed. Refer to section 4.3.3	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 4.0-1 (continued)

Site	Sampling Justification	Depth (ft)	Media	TAL Metals (EPA SW-846:6010B/6020)	VOCs (EPA SW-846:8260B)[a]	SVOCs (EPA SW-846:8270C)	TPH (EPA-8015B)	Pesticides (EPA SW-846:8081A)	PCBs[c] (EPA SW-846:8082)	Nitrate (EPA 300)	Cyanide (EPA SW-846:9012A)	Perchlorate (EPA SW-846:6850)	Uranium, Plutonium, or Americium (HASL-300)	Tritium (EPA 906)
AOC C-61-002	30 samples will be collected from 5 boreholes to define the nature and extent of contamination (Figure 4.3-2)	3–4, 5–6, 7–8, 9–10, 11–12, 14–15	Soil/tuff	X	X	X	DRO	—	X	—	X	—	—	—

Note: Shading indicates the SWMU or AOC is part of a consolidated unit.

[a] X = Analysis proposed.

[b] — = Analysis will not be performed.

[c] PCBs = Proposed sampling has been revised to include PCB analyses for at least 20% of samples at each site undergoing investigation.

[d] Includes strontium-90 analysis.

Table 4.0-2
Analytical Methods for Surface and Subsurface Characterization

Analytical Method	Analytical Description	Analytical Suite
Inorganic Methods		
EPA Method 300	Ion chromatography	Anions (nitrates)
EPA SW-846: 9012A	Colorimetric	Cyanide
EPA SW-846: 6010B/6020	Inductively Coupled Plasma Emission Spectrometry—Atomic Emission Spectroscopy	Aluminum, antimony, arsenic, barium, beryllium, boron, calcium, cadmium, cobalt, chromium, copper, iron, lead, lithium, magnesium, manganese, nickel, potassium, selenium, silicon, sodium, silver, thallium, titanium, uranium, vanadium, and zinc (TAL metals)
EPA SW-846: 6850	Liquid Chromatography/Mass Spectrometry	Perchlorate
Organic Methods		
EPA SW-846:8270C	Gas Chromatograph/Mass Spectrometry	SVOCs
EPA SW-846:8260B	Gas Chromatograph/Mass Spectrometry	VOCs
EPA SW-846:8082	Gas Chromatograph	PCBs
EPA SW-846:8081A	Gas Chromatograph	Organochlorinated pesticides
EPA SW-846:8015B	Gas Chromatograph	TPH-DRO
Radionuclide Methods		
HASL-300	Chemical Separation/Alpha Spectroscopy	Isotopic plutonium, isotopic uranium, americium-241
EPA 906	Liquid Scintillation	Tritium
EPA 905.0, ASTM: D5811-95M	Gas Flow Proportionate Counting	Strontium-90

Table 4.1-1
Decision-Level Data from TA-03 Site Samples Collected and Analyses Requested

Sample Id	Location Id	Depth (ft)	Media	Chromium Hexavalent Ion	Gamma Spectroscopy	Gross Alpha/Beta Radiation	Herbicides	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	Strontium-90	SVOCs	TPH-DRO	TPH-GRO	Tritium	VOCs
SWMU 03-003(c)																		
RC03-01-0012	03-14454	0.0–0.25	Debris	—*	—	—	—	—	—	—	9441R	—	—	—	—	—	—	—
RC03-01-0013	03-14455	0.0–0.25	Debris	—	—	—	—	—	—	—	9441R	—	—	—	—	—	—	—
RC03-01-0014	03-14456	0.0–0.25	Debris	—	—	—	—	—	—	—	9441R	—	—	—	—	—	—	—
RC03-01-0015	03-14457	0.33–0.5	Fill	—	—	—	—	—	—	—	9441R	—	—	—	—	—	—	—
RC03-01-0016	03-14458	0.33–0.5	Fill	—	—	—	—	—	—	—	9441R	—	—	—	—	—	—	—
RC03-01-0017	03-14459	0.33–0.5	Fill	—	—	—	—	—	—	—	9441R	—	—	—	—	—	—	—
Consolidated Unit 03-009(a)-00																		
SWMU 03-009(a)																		
RE03-03-52417	03-22537	4.5–5.0	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
RE03-03-52419	03-22537	19.5–20.0	Qbt 4	—	—	—	—	—	—	1892S	—	—	—	1892S	1892S	1892S	—	1892S
RE03-03-52422	03-22538	14.5–15.0	Fill	—	—	—	—	—	—	1886S	—	—	—	1886S	1886S	1886S	—	1886S
RE03-03-52423	03-22538	19.5–20.0	Qbt 4	—	—	—	—	—	—	1892S	—	—	—	1892S	1892S	1892S	—	1892S
RE03-03-52427	03-22539	4.0–5.0	Qbt 4	—	—	—	—	—	—	1886S	—	—	—	1886S	1886S	1886S	—	1886S
RE03-03-52429	03-22539	19.5–20.0	Qbt 4	—	—	—	—	—	—	1886S	—	—	—	1886S	1886S	1886S	—	1886S
SWMU 03-028																		
RE03-03-52348	03-22523	5.0–5.5	Soil	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
RE03-03-52351	03-22523	19.0–19.5	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
RE03-03-52352	03-22524	7.5–8.0	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
RE03-03-52354	03-22524	19.5–20.0	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
SWMU 03-036(a)																		
RE03-03-52357	03-22525	8.0–8.5	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
RE03-03-52359	03-22525	19.5–20.0	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
SWMU 03-036(c)																		
RE03-03-52362	03-22526	3.0–4.0	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
RE03-03-52365	03-22526	19.5–20.0	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
SWMU 03-036(d)																		
RE03-03-52368	03-22527	4.5–5.0	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
AOC 03-043(b)																		
RE03-03-52372	03-22528	9.5–10.0	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
RE03-03-52374	03-22528	19.5–20.0	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S

Table 4.1-1 (continued)

Sample Id	Location Id	Depth (ft)	Media	Chromium Hexavalent Ion	Gamma Spectroscopy	Gross Alpha/Beta Radiation	Herbicides	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	Strontium-90	SVOCs	TPH-DRO	TPH-GRO	Tritium	VOCs
SWMU 03-045(g)																		
RE03-03-52407	03-22535	0.0–0.5	Sediment	—	—	—	—	—	—	1886S	—	—	—	1886S	1886S	1886S	—	1886S
RE03-03-52408	03-22535	1.5–2.0	Sediment	—	—	—	—	—	—	1886S	—	—	—	1886S	1886S	1886S	—	1886S
RE03-03-52412	03-22536	0.0–0.5	Sediment	—	—	—	—	—	—	1886S	—	—	—	1886S	1886S	1886S	—	1886S
RE03-03-52413	03-22536	1.5–2.0	Sediment	—	—	—	—	—	—	1886S	—	—	—	1886S	1886S	1886S	—	1886S
Consolidated Unit 03-012(b)-00																		
03-012(b)-00																		
RE03-02-49270	03-02-21036	0.0–0.5	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49284	03-02-21036	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49271	03-02-21037	0.0–0.5	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49285	03-02-21037	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49272	03-02-21038	0.0–0.5	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49286	03-02-21038	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49273	03-02-21039	0.0–0.5	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49287	03-02-21039	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49274	03-02-21040	0.0–0.5	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49288	03-02-21040	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49275	03-02-21041	0.0–0.5	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49289	03-02-21041	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49276	03-02-21042	0.0–0.5	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49290	03-02-21042	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49277	03-02-21043	0.0–0.5	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49291	03-02-21043	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49278	03-02-21044	0.0–0.5	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49292	03-02-21044	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49279	03-02-21045	0.0–0.5	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49293	03-02-21045	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49280	03-02-21046	0.0–0.5	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49294	03-02-21046	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49281	03-02-21047	0.0–0.5	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49295	03-02-21047	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49282	03-02-21048	0.0–0.5	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49296	03-02-21048	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49283	03-02-21049	0.0–0.5	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49297	03-02-21049	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—

Table 4.1-1 (continued)

Sample Id	Location Id	Depth (ft)	Media	Chromium Hexavalent Ion	Gamma Spectroscopy	Gross Alpha/Beta Radiation	Herbicides	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	Strontium-90	SVOCs	TPH-DRO	TPH-GRO	Tritium	VOCs
RE03-02-49298	03-02-21050	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49299	03-02-21051	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49300	03-02-21052	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-02-49301	03-02-21053	0.5–1.0	Fill	1199S	—	—	—	—	—	1199S	—	—	—	—	—	—	—	—
RE03-04-52775	03-22576	0.0–0.5	Soil	1954S	—	—	—	—	—	1954S	1953S	—	—	—	—	—	—	—
RE03-04-52785	03-22576	3.5–4.0	Soil	1954S	—	—	—	—	—	1954S	—	—	—	—	—	—	—	—
RE03-04-52776	03-22577	0.0–0.5	Soil	1954S	—	—	—	—	—	1954S	—	—	—	—	—	—	—	—
RE03-04-52786	03-22577	3.0–3.5	Soil	1954S	—	—	—	—	—	1954S	—	—	—	—	—	—	—	—
RE03-04-52777	03-22578	0.0–0.5	Soil	1954S	—	—	—	—	—	1954S	1953S	—	—	—	—	—	—	—
RE03-04-52787	03-22578	3.5–4.0	Soil	1954S	—	—	—	—	—	1954S	—	—	—	—	—	—	—	—
RE03-04-52778	03-22579	0.0–0.5	Soil	1954S	—	—	—	—	—	1954S	—	—	—	—	—	—	—	—
RE03-04-52788	03-22579	3.5–4.0	Soil	1954S	—	—	—	—	—	1954S	—	—	—	—	—	—	—	—
RE03-04-52779	03-22580	0.0–0.5	Soil	1961S	—	—	—	—	—	1961S	1960S	—	—	—	—	—	—	—
RE03-04-52789	03-22580	3.5–4.0	Soil	1961S	—	—	—	—	—	1961S	—	—	—	—	—	—	—	—
RE03-04-52781	03-22582	0.83–1.33	Soil	1959S	—	—	—	—	—	1959S	1958S	—	—	—	—	—	—	—
RE03-04-52791	03-22582	1.83–2.83	Soil	1959S	—	—	—	—	—	1959S	—	—	—	—	—	—	—	—
RE03-04-52782	03-22583	0.0–0.5	Soil	1959S	—	—	—	—	—	1959S	—	—	—	—	—	—	—	—
RE03-04-52792	03-22583	3.5–4.0	Soil	1959S	—	—	—	—	—	1959S	—	—	—	—	—	—	—	—
RE03-04-52783	03-22584	0.0–0.5	Soil	1959S	—	—	—	—	—	1959S	1958S	—	—	—	—	—	—	—
RE03-04-52793	03-22584	3.5–4.0	Soil	1959S	—	—	—	—	—	1959S	—	—	—	—	—	—	—	—
RE03-04-52784	03-22585	0.0–0.5	Soil	1959S	—	—	—	—	—	1959S	—	—	—	—	—	—	—	—
RE03-04-52794	03-22585	3.5–4.0	Soil	1959S	—	—	—	—	—	1959S	—	—	—	—	—	—	—	—
SWMU 03-013(i)																		
RE03-05-59527	03-24444	0.0–0.5	Fill	—	—	—	—	—	—	3193S	3192S	—	—	3192S	3192S	3192S	—	—
RE03-05-59528	03-24444	1.5–1.5	Fill	—	—	—	—	—	—	3193S	3192S	—	—	3192S	3192S	3192S	—	3192S
RE03-05-59529	03-24445	0.0–0.5	Fill	—	—	—	—	—	—	3193S	3192S	—	—	3192S	3192S	3192S	—	—
RE03-05-59530	03-24445	1.5–1.5	Fill	—	—	—	—	—	—	3193S	3192S	—	—	3192S	3192S	3192S	—	3192S
RE03-05-59531	03-24446	0.0–0.5	Fill	—	—	—	—	—	—	3195S	3194S	—	—	3194S	3194S	3194S	—	—
RE03-05-59532	03-24446	1.5–1.5	Fill	—	—	—	—	—	—	3195S	3194S	—	—	3194S	3194S	3194S	—	3194S
RE03-05-59533	03-24447	0.0–0.5	Fill	—	—	—	—	—	—	3193S	3192S	—	—	3192S	3192S	3192S	—	—
RE03-05-59534	03-24447	1.5–1.5	Fill	—	—	—	—	—	—	3193S	3192S	—	—	3192S	3192S	3192S	—	3192S
RE03-05-59535	03-24448	0.0–0.5	Fill	—	—	—	—	—	—	3193S	3192S	—	—	3192S	3192S	3192S	—	—
RE03-05-59536	03-24448	1.5–1.5	Fill	—	—	—	—	—	—	3193S	3192S	—	—	3192S	3192S	3192S	—	3192S
RE03-05-59537	03-24449	0.0–0.5	Fill	—	—	—	—	—	—	3193S	3192S	—	—	3192S	3192S	3192S	—	—
RE03-05-59538	03-24449	1.5–1.5	Fill	—	—	—	—	—	—	3193S	3192S	—	—	3192S	3192S	3192S	—	3192S

Table 4.1-1 (continued)

Sample Id	Location Id	Depth (ft)	Media	Chromium Hexavalent Ion	Gamma Spectroscopy	Gross Alpha/Beta Radiation	Herbicides	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	Strontium-90	SVOCs	TPH-DRO	TPH-GRO	Tritium	VOCs
RE03-05-59539	03-24450	0.0–0.5	Fill	—	—	—	—	—	—	3193S	3192S	—	—	3192S	3192S	3192S	—	—
RE03-05-59540	03-24450	1.5–1.5	Fill	—	—	—	—	—	—	3193S	3192S	—	—	3192S	3192S	3192S	—	3192S
RE03-05-59541	03-24451	0.0–0.5	Fill	—	—	—	—	—	—	3195S	3194S	—	—	3194S	3194S	3194S	—	—
RE03-05-59542	03-24451	1.5–1.5	Fill	—	—	—	—	—	—	3195S	3194S	—	—	3194S	3194S	3194S	—	3194S
Consolidated Unit 03-014(a)-99																		
SWMU 03-014(k)																		
0103-97-0011	03-03264	0.0–1.0	Fill	—	—	—	3375R	3377R	3377R	3376R	3375R	3375R	3377R	3375R	—	—	3377R	—
0103-97-0012	03-03264	1.33–2.33	Qbt 4	—	—	—	3375R	3377R	3377R	3376R	3375R	3375R	3377R	3375R	—	—	3377R	—
0103-97-0013	03-03264	2.33–3.33	Qbt 4	—	—	—	3375R	3377R	3377R	3376R	3375R	3375R	3377R	3375R	—	—	3377R	3375R
SWMU 03-014(l)																		
0103-97-0014	03-03265	0.0–1.17	Fill	—	—	—	3375R	3377R	3377R	3376R	3375R	3375R	3377R	3375R	—	—	3377R	—
0103-97-0015	03-03265	1.67–2.67	Qbt 4	—	—	—	3375R	3377R	3377R	3376R	3375R	3375R	3377R	3375R	—	—	3377R	—
0103-97-0016	03-03265	2.67–3.67	Qbt 4	—	—	—	3375R	3377R	3377R	3376R	3375R	3375R	3377R	3375R	—	—	3377R	3375R
SWMU 03-014(m)																		
0103-97-0017	03-03266	0.0–0.17	Fill	—	—	—	3375R	3377R	3377R	3376R	3375R	3375R	3377R	3375R	—	—	3377R	—
0103-97-0018	03-03266	0.75–1.75	Qbt 4	—	—	—	3375R	3377R	3377R	3376R	3375R	3375R	3377R	3375R	—	—	3377R	—
0103-97-0019	03-03266	1.75–2.75	Qbt 4	—	—	—	3375R	3377R	3377R	3376R	3375R	3375R	3377R	3375R	—	—	3377R	3375R
0103-97-0363	03-03386	0.0–0.5	Fill	—	—	—	—	—	—	—	4002R	—	—	4002R	—	—	—	—
0103-97-0362	03-03386	0.5–1.0	Fill	—	—	—	—	—	—	—	4002R	—	—	4002R	—	—	—	—
0103-97-0361	03-03386	0.67–1.0	Fill	—	—	—	—	—	—	—	4002R	—	—	4002R	—	—	—	—
0103-97-0367	03-03387	0.0–0.5	Fill	—	—	—	—	—	—	—	4002R	—	—	4002R	—	—	—	—
0103-97-0366	03-03387	0.5–1.0	Fill	—	—	—	—	—	—	—	4002R	—	—	4002R	—	—	—	—
0103-97-0365	03-03387	1.0–1.5	Fill	—	—	—	—	—	—	—	4002R	—	—	4002R	—	—	—	—
0103-97-0364	03-03387	1.5–2.0	Fill	—	—	—	—	—	—	—	4002R	—	—	4002R	—	—	—	—
SWMU 03-014(n)																		
0103-97-0020	03-03201	0.0–1.58	Fill	—	—	—	3433R	3435R	3435R	3434R	—	3433R	3435R	3433R	3433R	—	3435R	3433R
0103-97-0021	03-03201	1.58–2.58	Qbt 4	—	—	—	3433R	3435R	3435R	3434R	—	3433R	3435R	3433R	3433R	—	3435R	3433R
0103-97-0022	03-03201	2.58–3.58	Qbt 4	—	—	—	3433R	3435R	3435R	3434R	—	3433R	3435R	3433R	3433R	—	3435R	3433R
0103-97-0023	03-03202	0.0–0.33	Fill	—	—	—	3433R	—	—	3434R	—	3433R	—	3433R	3433R	—	—	3433R
0103-97-0341	03-603357	0.0–0.5	Sludge	—	—	—	—	—	—	—	—	—	—	—	3721R	—	—	—
0103-97-0343	03-603357	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	3721R	—	—	—
0103-97-0345	03-603357	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	3721R	—	—	—
0103-97-0347	03-603357	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	3721R	—	—	—
SWMU 03-014(o)																		
0103-97-0024	03-03203	0.0–0.5	Fill	—	—	—	3444R	3446R	3446R	3445R	3444R	3444R	3446R	3444R	—	—	—	—

Table 4.1-1 (continued)

Sample Id	Location Id	Depth (ft)	Media	Chromium Hexavalent Ion	Gamma Spectroscopy	Gross Alpha/Beta Radiation	Herbicides	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	Strontium-90	SVOCs	TPH-DRO	TPH-GRO	Tritium	VOCs
0103-97-0025	03-03203	1.5–2.5	Qbt 4	—	—	—	3444R	3446R	3446R	3445R	3444R	3444R	3446R	3444R	—	—	3446R	—
0103-97-0026	03-03203	2.5000–3.5	Qbt 4	—	—	—	3444R	3446R	3446R	3445R	3444R	3444R	3446R	3444R	—	—	3446R	3444R
0103-97-0027	03-03204	0.0–0.83	Fill	—	—	—	3444R	3446R	3446R	3445R	3444R	3444R	3446R	3444R	—	—	3446R	—
0103-97-0028	03-03204	1.75–2.75	Qbt 4	—	—	—	3444R	3446R	3446R	3445R	3444R	3444R	3446R	3444R	—	—	3446R	—
0103-97-0029	03-03204	2.75–3.75	Qbt 4	—	—	—	3444R	3446R	3446R	3445R	3444R	3444R	3446R	3444R	—	—	3446R	3444R
0103-97-0030	03-03205	0.0–0.75	Fill	—	—	—	3444R	3446R	3446R	3445R	3444R	3444R	3446R	3444R	—	—	3446R	—
0103-97-0031	03-03205	1.25–2.25	Qbt 4	—	—	—	3444R	3446R	3446R	3445R	3444R	3444R	3446R	3444R	—	—	3446R	—
0103-97-0032	03-03205	2.25–3.25	Qbt 4	—	—	—	3444R	3446R	3446R	3445R	3444R	3444R	3446R	3444R	—	—	3446R	3444R
AOC 03-014(v)																		
RE03-99-2004	03-14227	3.0–3.5	Fill	—	—	—	—	—	—	5825R	5824R	—	—	—	5824R	5824R	—	5824R
RE03-99-2005	03-14227	4.0–4.5	Fill	—	—	—	—	—	—	5825R	5824R	—	—	—	5824R	5824R	—	5824R
Consolidated Unit 03-015-00																		
SWMU 03-015																		
AAB5813	03-02004	0.0–1.5	Sediment	—	20229	20229, 20957	—	—	—	20215	—	—	—	—	—	—	20229, 20957	—
AOC C-03-016																		
RE03-03-52397	03-22533	1.0–1.5	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
RE03-03-52398	03-22533	16.0–16.5	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
RE03-03-52402	03-22534	4.0–5.0	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
RE03-03-52403	03-22534	9.5–10.0	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
RE03-03-52405	03-22534	19.5–20.0	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
SWMU 03-021																		
0103-97-0241	03-03326	0.0–1.0	Soil	—	—	—	—	—	—	3429R	—	—	—	3428R	—	—	—	—
0103-97-0242	03-03327	2.0–3.0	Soil	—	—	—	—	—	—	3429R	—	—	—	3428R	—	—	—	—
0103-97-0243	03-03327	3.0–4.0	Soil	—	—	—	—	—	—	3429R	—	—	—	3428R	—	—	—	—
0103-97-0244	03-03328	3.0–4.0	Soil	—	—	—	—	—	—	3429R	—	—	—	3428R	—	—	—	3427R
0103-97-0245	03-03328	4.0–5.0	Soil	—	—	—	—	—	—	3429R	—	—	—	3428R	—	—	—	—
0103-97-0246	03-03329	2.0–3.0	Soil	—	—	—	—	—	—	3429R	—	—	—	3428R	—	—	—	—
0103-97-0247	03-03329	3.0–4.0	Soil	—	—	—	—	—	—	3429R	—	—	—	3428R	—	—	—	—
0103-97-0248	03-03330	2.75–3.75	Soil	—	—	—	—	—	—	3429R	—	—	—	3428R	—	—	—	—
0103-97-0251	03-03330	3.75–4.25	Soil	—	—	—	—	—	—	3429R	—	—	—	3428R	—	—	—	—
0103-97-0249	03-03331	3.0–4.0	Soil	—	—	—	—	—	—	3429R	—	—	—	3428R	—	—	—	—
0103-97-0250	03-03331	4.0–5.0	Soil	—	—	—	—	—	—	3429R	—	—	—	3428R	—	—	—	—

Table 4.1-1 (continued)

Sample Id	Location Id	Depth (ft)	Media	Chromium Hexavalent Ion	Gamma Spectroscopy	Gross Alpha/Beta Radiation	Herbicides	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	Strontium-90	SVOCs	TPH-DRO	TPH-GRO	Tritium	VOCs
AOC 03-027																		
RE03-99-2000	03-14225	7.0–7.5	Fill	—	—	—	—	—	—	5825R	5824R	—	—	—	5824R	5824R	—	5824R
RE03-99-2001	03-14225	7.5–8.0	Fill	—	—	—	—	—	—	5825R	5824R	—	—	—	5824R	5824R	—	5824R
RE03-99-2212	03-14225	9.0–9.5	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	6108R	—	—	—
RE03-99-2002	03-14226	7.0–7.5	Fill	—	—	—	—	—	—	5825R	5824R	—	—	—	5824R	5824R	—	5824R
RE03-99-2003	03-14226	7.5–8.0	Fill	—	—	—	—	—	—	5825R	5824R	—	—	—	5824R	5824R	—	5824R
RE03-99-2006	03-14228	7.5–8.0	Fill	—	—	—	—	—	—	5825R	5824R	—	—	—	5824R	5824R	—	5824R
RE03-99-2007	03-14229	7.5–8.0	Fill	—	—	—	—	—	—	5825R	5824R	—	—	—	5824R	5824R	—	5824R
RE03-99-2213	03-14230	8.5–9.0	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	6108R	—	—	—
RE03-99-2214	03-14231	8.5–9.0	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	6108R	—	—	—
AOC 03-036(b)																		
RE03-03-52377	03-22529	11.0–11.5	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
RE03-03-52378	03-22529	14.5–15.0	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
RE03-03-52379	03-22529	19.5–20.0	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
RE03-03-52382	03-22530	10.0–11.0	Soil	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
RE03-03-52383	03-22530	14.5–15.0	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
RE03-03-52384	03-22530	19.5–20.0	Qbt 4	—	—	—	—	—	—	1885S	—	—	—	1885S	1885S	1885S	—	1885S
AOC 03-052(b)																		
0103-97-0163	03-03285	0.0–1.0	Soil	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—
0103-97-0164	03-03285	2.0–3.0	Fill	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	3408R
0103-97-0165	03-03286	0.0–1.0	Fill	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—
0103-97-0166	03-03286	1.0–2.0	Fill	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—
0103-97-0167	03-03287	0.0–1.0	Fill	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—
0103-97-0168	03-03287	1.0–2.0	Fill	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—
0103-97-0169	03-03288	0.0–1.0	Fill	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—
0103-97-0170	03-03288	1.0–2.0	Fill	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—
0103-97-0175	03-03291	0.0–1.0	Soil	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—
0103-97-0176	03-03291	4.0–5.0	Soil	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—
0103-97-0177	03-03292	0.0–0.67	Fill	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—
SWMU 03-054(c)																		
RC03-01-0029	03-14470	6.0–6.5	Fill	9516R	—	—	—	—	—	9516R	—	—	—	—	—	—	—	—
RC03-01-0031	03-14472	6.0–6.5	Fill	9516R	—	—	—	—	—	9516R	—	—	—	—	—	—	—	—
RC03-01-0032	03-14473	5.0–5.5	Fill	9516R	—	—	—	—	—	9516R	—	—	—	—	—	—	—	—
RC03-01-0033	03-14474	8.0–8.5	Fill	9516R	—	—	—	—	—	9516R	—	—	—	—	—	—	—	—
RC03-01-0034	03-14475	7.0–7.5	Soil	9516R	—	—	—	—	—	9516R	—	—	—	—	—	—	—	—

Table 4.1-1 (continued)

Sample Id	Location Id	Depth (ft)	Media	Chromium Hexavalent Ion	Gamma Spectroscopy	Gross Alpha/Beta Radiation	Herbicides	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	Strontium-90	SVOCs	TPH-DRO	TPH-GRO	Tritium	VOCs
RC03-01-0036	03-14477	2.0–2.5	Soil	9516R	—	—	—	—	—	9516R	—	—	—	—	—	—	—	—
RC03-01-0037	03-14478	2.0–2.5	Soil	9516R	—	—	—	—	—	9516R	—	—	—	—	—	—	—	—
RC03-01-0038	03-14479	2.0–2.5	Soil	9516R	—	—	—	—	—	9516R	—	—	—	—	—	—	—	—
RE03-04-53103	03-22683	0.0–0.5	Fill	—	—	—	—	—	—	2039S	—	—	—	—	—	—	—	—
RE03-04-53104	03-22683	1.5–2.0	Fill	—	—	—	—	—	—	2039S	—	—	—	—	—	—	—	—
RE03-04-53108	03-22684	0.0–0.5	Fill	—	—	—	—	—	—	2039S	—	—	—	—	—	—	—	—
RE03-04-53109	03-22684	1.5–2.0	Fill	—	—	—	—	—	—	2039S	—	—	—	—	—	—	—	—
RE03-04-53110	03-22685	0.0–0.5	Fill	—	—	—	—	—	—	2039S	—	—	—	—	—	—	—	—
RE03-04-53111	03-22685	1.5–2.0	Fill	—	—	—	—	—	—	2039S	—	—	—	—	—	—	—	—
SWMU 03-056(a)																		
RC03-01-0041	03-14481	0.5–1.0	Fill	—	—	—	—	—	—	9433R	—	—	—	—	9432R	—	—	—
RC03-01-0042	03-14482	0.5–1.0	Fill	—	—	—	—	—	—	9433R	—	—	—	—	9432R	—	—	—
RC03-01-0043	03-14483	0.5–1.0	Fill	—	—	—	—	—	—	9433R	—	—	—	—	9432R	—	—	—
RC03-01-0044	03-14484	0.5–1.0	Fill	—	—	—	—	—	—	9433R	—	—	—	—	9432R	—	—	—
RC03-01-0046	03-14485	0.0–0.5	Debris	—	—	—	—	—	—	9433R	—	—	—	—	—	—	—	—
RC03-01-0047	03-14486	0.0–0.5	Debris	—	—	—	—	—	—	9433R	—	—	—	—	—	—	—	—
RC03-01-0048	03-14487	0.0–0.5	Debris	—	—	—	—	—	—	9433R	—	—	—	—	—	—	—	—
RC03-01-0049	03-14488	0.0–0.25	Debris	—	—	—	—	—	—	9433R	—	—	—	—	—	—	—	—
AOC 03-056(k)																		
0103-97-0151	03-03281	0.0–0.17	Engineered Material	—	—	—	—	—	3411R	—	—	—	—	—	—	—	—	—
0103-97-0152	03-03281	0.5–1.0	Fill	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—
0103-97-0153	03-03281	1.83–2.83	Fill	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	3408R
0103-97-0154	03-03282	0.0–0.5	Engineered Material	—	3411R	3411R	—	—	3411R	—	—	—	—	—	—	—	—	—
0103-97-0155	03-03282	0.5–1.5	Fill	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—
0103-97-0156	03-03282	1.5–2.17	Soil	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—
0103-97-0157	03-03283	0.0–0.25	Engineered Material	—	—	—	—	—	3411R	—	—	—	—	—	—	—	—	—
0103-97-0158	03-03283	0.33–1.25	Fill	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—
0103-97-0160	03-03284	0.0–0.17	Engineered Material	—	—	—	—	—	3411R	—	—	—	—	—	—	—	—	—
0103-97-0161	03-03284	0.5–1.25	Fill	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—
0103-97-0171	03-03289	0.0–1.0	Fill	—	3411R	3411R	—	—	3411R	3410R	—	—	—	—	—	—	—	—
0103-97-0172	03-03289	3.5–4.5	Soil	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—
0103-97-0173	03-03290	0.0–1.0	Fill	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—
0103-97-0174	03-03290	1.0–1.5	Fill	—	—	—	—	—	3411R	3410R	—	—	—	—	—	—	—	—

Table 4.1-1 (continued)

Sample Id	Location Id	Depth (ft)	Media	Chromium Hexavalent Ion	Gamma Spectroscopy	Gross Alpha/Beta Radiation	Herbicides	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	Strontium-90	SVOCs	TPH-DRO	TPH-GRO	Tritium	VOCs
SWMU 03-056(l)																		
RE03-03-51685	03-22331	0.0–0.4921	Engineered Material	—	—	—	—	—	—	1803S	—	—	—	—	—	—	—	—
RE03-03-51686	03-22331	0.4921–2.2966	Soil	—	—	—	—	—	—	1803S	—	—	—	—	—	—	—	—
RE03-03-51687	03-22332	0.0–0.4921	Engineered Material	—	—	—	—	—	—	1803S	—	—	—	—	—	—	—	—
RE03-03-51688	03-22332	0.4921–2.2966	Soil	—	—	—	—	—	—	1803S	—	—	—	—	—	—	—	—
RE03-03-51689	03-22333	0.0–0.6562	Engineered Material	—	—	—	—	—	—	1803S	—	—	—	—	—	—	—	—
RE03-03-51690	03-22333	0.6562–1.6404	Soil	—	—	—	—	—	—	1803S	—	—	—	—	—	—	—	—
RE03-03-51692	03-22334	0.0–1.6404	Soil	—	—	—	—	—	—	1803S	—	—	—	—	—	—	—	—

*— = Analyses not requested.

Table 4.1-2
Screening-Level Data from TA-03 Site Samples Collected and Analyses Requested

Sample ID	Location ID	Depth (ft)	Media	Gamma Spectroscopy	Gross Alpha/Beta Radiation	Gross Gamma Radiation	Herbicides	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	Tritium	SVOCs	VOCs
SWMU 03-002(c)																	
AAB6034	03-02300	0.0–0.5	Fill	—*	19231	19231	18269	—	—	18460	18269	18269	—	—	19231	18269	—
AAB6037	03-02301	0.0–0.5	Fill	—	19231	19231	18269	—	—	18460	18269	18269	—	—	19231	18269	—
AAB6038	03-02302	0.0–0.5	Fill	—	19231	19231	18269	—	—	18460	18269	18269	—	—	19231	18269	18269
AAB6039	03-02303	0.0–0.5	Fill	—	19231	19231	18269	—	—	18460	18269	18269	—	—	19231	18269	—
AAB6035	03-02304	0.0–0.25	Fill	—	19231	19231	18269	—	—	18460	18269	18269	—	—	19231	18269	—
Consolidated Unit 03-012(b)-00																	
SWMU 03-012(b)																	
AAB5881	03-02118	0.0–0.5	Soil	19954	19954	21698	—	—	—	20225	18186	18186	—	—	19954	18186	18186
AAB7668	03-02118	0.0–0.5	Soil	—	20714	20714	18550	—	—	—	18550	—	—	—	20714	—	—
AAB7703	03-02118	0.0–0.5	Soil	—	20520	20520	19136	—	—	—	19136	—	—	—	20520	—	—
AAB5882	03-02119	0.0–0.5	Soil	19954	19954	21698	18186	19954	19954	20225	18186	18186	—	19954	19954	18186	18186
AAB5883	03-02120	0.0–0.5	Sediment	19954	19954	21698	18186	—	—	20225	18186	18186	—	—	19954	18186	18186
AAB5884	03-02121	0.0–0.5	Engineered Material	19954	19954	21698	—	—	—	20225	18186	18186	—	—	19954	18186	18186
AAB7669	03-02121	0.0–0.5	Sediment	—	20714	20714	18550	—	—	—	18550	—	—	—	20714	—	—
AAB7704	03-02121	0.0–0.5	Sediment	—	20520	20520	19136	—	—	—	19136	—	—	—	20520	—	—
AAB5885	03-02122	0.0–0.5	Sediment	19954	19954	21698	—	—	—	20225	18186	18186	—	—	19954	18186	18186
AAB7667	03-02122	0.0–0.5	Sediment	—	20714	20714	18550	—	—	—	18550	—	—	—	20714	—	—
AAB7702	03-02122	0.0–0.5	Sediment	—	20520	20520	19136	—	—	—	19136	—	—	—	20520	—	—
Consolidated Unit 03-013(a)-00																	
AAB6023	03-02600	0.0–0.33	Sediment	—	19230	19230	—	—	—	18459	18315	—	—	—	19230	18315	18315
AAB6026	03-02601	0.0–0.25	Sediment	—	19230	19230	—	—	—	18459	18315	—	—	—	19230	18315	18315
AAB6029	03-02601	0.0–0.25	Sediment	—	19230	19230	—	—	—	18459	18315	—	—	—	19230	18315	—
AAB6027	03-02602	0.0–0.5	Sediment	—	19230	19230	—	—	—	18459	18315	—	—	—	19230	18315	18315
AAB6028	03-02603	0.0–0.5	Sediment	—	19230	19230	—	—	—	18459	18315	—	—	—	19230	18315	18315
AAB6030	03-02604	0.0–0.67	Sediment	—	19230	19230	—	—	—	18459	18315	—	—	—	19230	18315	18315
Consolidated Unit 03-014(a)-99																	
SWMU 03-014(a)																	
AAB5944	03-02100	0.0–1.0	Soil	19329	18891	18891	18246	19329	19329	18298	18246	18246	—	—	18891	18246	—
AAB5952	03-02100	1.0–1.5	Soil	—	18891	18891	—	—	—	18298	—	—	—	—	18891	—	18246

Table 4.1-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Gamma Spectroscopy	Gross Alpha/Beta Radiation	Gross Gamma Radiation	Herbicides	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Tritium	VOCs
AAB5945	03-02101	0.0–1.0	Soil	19329	18891	18891	18246	19329	19329	18298	18246	18246	—	—	18246	18891	—
AAB5953	03-02101	1.0–1.5	Soil	—	18891	18891	—	—	—	18298	—	—	—	—	—	18891	18246
AAB5947	03-02102	0.0–1.0	Soil	19329	18891	18891	18246	19329	19329	18298	18246	18246	—	—	18246	18891	—
AAB5954	03-02102	1.0–1.5	Soil	—	18891	18891	—	—	—	18298	—	—	—	—	—	18891	18246
AAB5948	03-02103	0.0–1.0	Soil	19329	18891	18891	—	19329	19329	18298	—	—	—	—	—	18891	—
AAB5955	03-02103	1.0–1.5	Soil	—	18891	18891	—	—	—	18298	—	—	—	—	—	18891	18246
AAB5949	03-02104	0.0–1.0	Soil	19329	18891	18891	18246	19329	19329	18298	18246	18246	—	—	18246	18891	—
AAB5956	03-02104	1.0–1.5	Soil	—	18891	18891	—	—	—	18298	—	—	—	—	—	18891	18246
AOC 03-014(b2)																	
AAB5930	03-02105	0.0–1.0	Soil	19954	19954	21698	18186	—	—	20225	18186	18186	—	—	18186	19954	18186
AAB5932	03-02105	0.0–1.0	Soil	—	—	—	—	—	—	20225	—	—	—	—	—	—	—
AAB5931	03-02106	0.0–1.0	Soil	19954	19954	21698	18186	—	—	20225	18186	18186	—		18186	19954	18186
AAB5933	03-02106	1.0–1.5	Soil	—	—	—	—	—	—	20225	—	—	—	—	—	—	—
AAB5934	03-02107	0.0–1.0	Soil	19954	19954	21698	18186	—	—	20225	18186	18186	—	—	18186	19954	
AAB5936	03-02107	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	18186
AAB5935	03-02108	0.0–0.5	Soil	19954	19954	21698	18186	—	—	20225	18186	18186	—		18186	19954	—
AAB5937	03-02108	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	18186
AAB7670	03-02108	0.0–0.5	Soil	—	20714	20714	18550	—	—	—	18550	—	—	—	—	20714	—
AAB7701	03-02108	0.0–0.17	Soil	—	20520	20520	19136	—	—	—	19136	—	—	—	—	20520	—
AOC 03-014(c2)																	
AAB5907	03-02109	0.0–1.0	Sediment	19329	18891	18891	18246	19329	19329	18298	18246	18246	—	19329	18246	18891	—
AAB5908	03-02110	0.0–1.0	Sediment	19329	18891	18891	18246	19329	19329	18298	18246	18246	—	19329	18246	18891	—
AAB5909	03-02110	0.67–1	Sediment	—	18891	18891	—	—	—	18298	—	—	—	—	—	18891	18246
AAB5910	03-02110	1.0–1.5	Sediment	—	18891	18891	—	—	—	18298	—	—	—	—	—	18891	18246
AAB5911	03-02111	0.0–1.0	Sediment	19329	18891	18891	18246	19329	19329	18298	18246	18246	—	19329	18246	18891	—
AAB5913	03-02111	1.0–1.5	Sediment	—	18891	18891	—	—	—	18298	—	—	—	—	—	18891	18246
AAB5912	03-02112	0.0–1.0	Sediment	19329	18891	18891	18246	19329	19329	18298	18246	18246	—	19329	18246	18891	—
AAB5914	03-02112	0.67–1	Sediment	—	18891	18891	—	—	—	18298	—	—	—	—	—	18891	18246
AAB5915	03-02113	0.0–1.0	Sediment	19329	18891	18891	18246	19329	19329	18298	18246	18246	—	19329	18246	18891	—
AAB5916	03-02113	1.0–1.5	Sediment	—	18891	18891	—	—	—	18298	—	—	—	—	—	18891	18246
AAB5917	03-02114	0.0–1.0	Sediment	19329	18891	18891	18246	19329	19329	18298	18246	18246	—	19329	18246	18891	—
AAB5919	03-02114	1.0–1.5	Sediment	—	18891	18891	—	—	—	18298	—	—	—	—	—	18891	18246
AAB5918	03-02115	0.0–0.5	Sediment	19329	18891	18891	18246	19329	19329	18298	18246	18246		19329	18246	18891	

Table 4.1-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Gamma Spectroscopy	Gross Alpha/Beta Radiation	Gross Gamma Radiation	Herbicides	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Tritium	VOCs
AAB5921	03-02115	0.33–0.5	Sediment	—	18891	18891	—	—	—	18298	—	—	—	—	—	18891	18246
AAB5929	03-02115	0.33–0.5	Sediment	—	18891	18891	—	—	—	18298	—	—	—	—	—	18891	18246
AAB5922	03-02116	0.0–0.67	Sediment	19329	18891	18891	18246	19329	19329	18298	18246	18246	—	19329	18246	18891	—
AAB5924	03-02116	0.0–0.67	Sediment	—	18891	18891	—	—	—	18298	—	—	—	—	—	18891	18246
AAB5923	03-02117	0.0–0.5	Sediment	19329	18891	18891	18246	19329	19329	18298	18246	18246	—	19329	18246	18891	—
AAB5925	03-02117	0.0–0.5	Sediment	—	18891	18891	—	—	—	18298	—	—	—	—	—	18891	18246
SWMU 03-014(0)																	
0103-97-0024	03-03203	0.0–0.5	Fill	—	—	—	—	—	—	3446R	—	—	—	—	—	—	—
Consolidated Unit 03-015-00																	
SWMU 03-015																	
AAB5809	03-02000	0.0–1.5	Soil	20251	20251	20864	—	20251	20251	20221	—	—	—	—	18212	20251	—
AAB5810	03-02001	0.0–1.5	Soil	20251	20251	20864	—	20251	20251	20221	—	—	—	—	18212	20251	—
AAB5811	03-02002	0.0–1.5	Soil	20251	20251	20864	—	20251	20251	20221	—	—	—	—	18212	20251	—
AAB5812	03-02003	0.0–1.5	Soil	20251	20251	20864	—	—	—	20221	—	—	—	—	18212	20251	—
AAB5813	03-02004	0.0–1.5	Sediment	—	20957	20957	—	—	—	—	—	—	—	—	18213	20957	—
AOC 03-047(d)																	
VCXX-95-0082	03-09008	0.0–0.5	Soil	—	—	—	—	—	—	72632	—	—	72619	—	72618	—	72580
VCXX-95-0083	03-09009	0.0–0.5	Soil	—	—	—	—	—	—	72632	—	—	72619	—	72618	—	72580
VCXX-95-0084	03-09010	0.0–0.5	Soil	—	—	—	—	—	—	72632	—	—	72619	—	72618	—	72580
AOC 03-051(c)																	
VCXX-95-0091	03-09012	0.0–0.5	Soil	—	—	—	—	—	—	72520	—	—	72541	—	72542	—	—
VCXX-95-0092	03-09013	0.0–0.5	Soil	—	—	—	—	—	—	72520	—	—	72541	—	72542	—	—
VCXX-95-0093	03-09014	0.0–0.5	Soil	—	—	—	—	—	—	72520	—	—	72541	—	72542	—	—
VCXX-95-0094	03-09015	0.0–0.5	Soil	—	—	—	—	—	—	72520	—	—	72541	—	72542	—	—
Consolidated Unit 03-059-00																	
SWMU 03-059																	
AAB7765	03-02700	0.0–0.83	Soil	—	20758	20758	—	—	—	—	20492	—	—	—	—	20758	—
AAB7766	03-02701	0.0–0.83	Soil	—	20758	20758	—	—	—	—	20492	—	—	—	—	20758	—
AAB7768	03-02703	0.0–0.5	Engineered Material	—	20758	20758	—	—	—	—	20492	—	—	—	—	20758	—
AAB7769	03-02704	0.0–0.5	Engineered Material	—	20758	20758	—	—	—	—	20492	—	—	—	—	20758	—
AAB7770	03-02705	0.0–0.5	Engineered Material	—	20758	20758	—	—	—	—	20492	—	—	—	—	20758	—
AAB7771	03-02706	0.0–0.5	Engineered Material	—	20758	20758	—	—	—	—	20492	—	—	—	—	20758	—
AAB7772	03-02707	0.0–0.5	Engineered Material	—	20758	20758	—	—	—	—	20492	—	—	—	—	20758	—

Table 4.1-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Gamma Spectroscopy	Gross Alpha/Beta Radiation	Gross Gamma Radiation	Herbicides	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Tritium	VOCs
AAB7773	03-02708	0.0–0.5	Engineered Material	—	20758	20758	—	—	—	—	20492	—	—	—	—	20758	—
AAB7774	03-02709	0.0–0.5	Engineered Material	—	20758	20758	—	—	—	—	20492	—	—	—	—	20758	—
AAB7775	03-02710	0.0–0.5	Engineered Material	—	20758	20758	—	—	—	—	20492	—	—	—	—	20758	—
AAB7776	03-02711	0.0–0.5	Engineered Material	—	20758	20758	—	—	—	—	20492	—	—	—	—	20758	—
AAB7777	03-02712	0.0–0.5	Engineered Material	—	20758	20758	—	—	—	—	20492	—	—	—	—	20758	—

*— = Analyses not requested.

Table 4.1-3
Summary of Inorganic Chemicals Detected Above BVs for TA-03 Sites

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Chromium hexavalent ion	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Soil/Fill BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**na**[a]	**8.64**	**14.7**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**3460**	**1.52**	**1**	**915**	**0.73**	**39.6**	**48.8**
Sediment BV				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**na**	**4.73**	**11.2**	**13800**	**19.7**	**2370**	**543**	**0.1**	**9.38**	**2690**	**0.3**	**1**	**1470**	**0.73**	**19.7**	**60.2**
Qbt 3/Qbt 4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**na**	**3.14**	**4.66**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**3500**	**0.3**	**1**	**2770**	**1.1**	**17**	**63.5**
Consolidated Unit 03-009(a)-00																											
SWMU 03-009(a)																											
RE03-03-52423	03-22538	19.5–20.0	Qbt 4	—[b]	—	—	—	—	—	—	—	NA[c]	—	—	—	—	—	—	—	—	—	0.48(J+)	—	—	—	—	—
RE03-03-52427	03-22539	4.0–5.0	Qbt 4	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	0.43(J+)	—	—	—	—	—
SWMU 03-028																											
RE03-03-52351	03-22523	19.0–19.5	Qbt 4	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	0.43(J-)	—	—	—	—	—
RE03-03-52352	03-22524	7.5–8.0	Qbt 4	10500	—	3.2	148	—	—	5020	—	NA	—	5.4	—	13	2460	—	—	7.7	—	0.68(J-)	—	—	—	—	—
RE03-03-52354	03-22524	19.5–20.0	Qbt 4	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	0.54(J-)	—	—	—	—	—
SWMU 03-036(a)																											
RE03-03-52357	03-22525	8.0–8.5	Qbt 4	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	0.67(J-)	—	—	—	—	—
SWMU 03-036(c)																											
RE03-03-52362	03-22526	3.0–4.0	Qbt 4	—	—	5.7	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	0.43(J-)	—	—	—	—	—
SWMU 03-036(d)																											
RE03-03-52368	03-22527	4.5–5.0	Qbt 4	—	—	—	—	—	—	—	—	NA	—	—	—	13.8	—	—	—	—	—	0.51(J-)	—	—	—	—	—
AOC 03-043(b)																											
RE03-03-52372	03-22528	9.5–10.0	Qbt 4	7480	—	4.3	67.5	—	—	—	10(J-)	NA	—	—	18400	31.7	2190	—	—	6.6	—	0.66(J-)	—	—	—	—	115
RE03-03-52374	03-22528	19.5–20.0	Qbt 4	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	0.4(J-)	—	—	—	—	—
SWMU 03-045(g)																											
RE03-03-52407	03-22535	0.0–0.5	Sediment	—	—	4.2	262	—	—	23400	27.5(J-)	NA	7.9	29.4	19700	—	6310	582(J)	—	17.5	2850	—	—	2190	—	32	61.1
RE03-03-52408	03-22535	1.5–2.0	Sediment	—	—	—	128	—	0.63	13700	14.4(J-)	NA	—	24.5	—	—	2700	—	—	11	—	—	—	—	—	21.6	65.1
RE03-03-52412	03-22536	0.0–0.5	Sediment	—	—	—	241	—	0.93	22100	27.7(J-)	NA	7.7	39.2	19900	27.3	5200	—	—	19.3	2870	—	—	1510	—	31.3	141
RE03-03-52413	03-22536	1.5–2.0	Sediment	—	—	—	—	—	—	66000	10.9(J-)	NA	—	—	—	—	3340	654(J)	—	11.9	—	—	—	—	—	—	—
Consolidated Unit 03-012(b)-00																											
RE03-02-49270	03-02-21036	0.0–0.5	Fill	—	—	—	—	—	0.688	—	157	4.22	—	26.1	—	—	—	—	0.102	—	—	—	6.45	—	—	—	98.0
RE03-02-49272	03-02-21038	0.0–0.5	Fill	—	—	—	—	—	—	—	42.9	8.94	—	20.6	—	—	—	—	—	—	—	—	1.49	—	—	—	49.9
RE03-02-49273	03-02-21039	0.0–0.5	Fill	—	—	—	—	—	—	—	—	5.23	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-02-49287	03-02-21039	0.5–1.0	Fill	—	5.57(U)	—	—	—	2.79(U)	—	—	2.06	—	—	—	—	—	—	—	—	—	—	2.79(U)	—	2.79(U)	—	—
RE03-02-49275	03-02-21041	0.0–0.5	Fill	—	—	—	—	—	—	—	—	5.61	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 4.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Chromium hexavalent ion	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Soil/Fill BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**na[a]**	**8.64**	**14.7**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**3460**	**1.52**	**1**	**915**	**0.73**	**39.6**	**48.8**
Sediment BV				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**na**	**4.73**	**11.2**	**13800**	**19.7**	**2370**	**543**	**0.1**	**9.38**	**2690**	**0.3**	**1**	**1470**	**0.73**	**19.7**	**60.2**
Qbt 3/Qbt 4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**na**	**3.14**	**4.66**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**3500**	**0.3**	**1**	**2770**	**1.1**	**17**	**63.5**
RE03-02-49289	03-02-21041	0.5–1.0	Fill	—	—	—	—	—	—	—	—	3.66	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-02-49277	03-02-21043	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	62
RE03-02-49291	03-02-21043	0.5–1.0	Fill	—	—	—	—	—	—	—	—	4.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-02-49278	03-02-21044	0.0–0.5	Fill	—	—	—	—	—	—	—	21.3	3.25	—	—	—	—	—	—	—	—	—	—	1.28	—	—	—	145
RE03-02-49292	03-02-21044	0.5–1.0	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	73.7
RE03-02-49279	03-02-21045	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	130
RE03-02-49293	03-02-21045	0.5–1.0	Fill	—	—	—	—	—	—	—	22.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	78.8
RE03-02-49280	03-02-21046	0.0–0.5	Fill	—	—	—	—	—	—	—	—	7.57	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-02-49294	03-02-21046	0.5–1.0	Fill	—	—	—	—	—	—	—	—	5.16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-02-49281	03-02-21047	0.0–0.5	Fill	—	—	—	—	—	—	—	—	9.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-02-49296	03-02-21048	0.5–1.0	Fill	—	—	—	—	—	—	—	19.4	1.83	—	—	—	—	—	—	—	—	—	—	—	—	—	—	57.3
RE03-02-49283	03-02-21049	0.0–0.5	Fill	—	—	—	—	—	—	—	45.8	2.31	—	—	—	—	—	—	—	—	—	—	1.63	—	—	—	52.3
RE03-02-49297	03-02-21049	0.5–1.0	Fill	—	—	—	—	—	—	—	—	1.46	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-02-49298	03-02-21050	0.5–1.0	Fill	—	—	—	—	—	—	—	—	3.70	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-02-49300	03-02-21052	0.5–1.0	Fill	—	—	—	—	—	—	—	—	2.08	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-02-49301	03-02-21053	0.5–1.0	Fill	—	—	—	—	—	0.470	—	—	5.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	67.7
RE03-04-52775	03-22576	0.0–0.5	Soil	—	—	—	—	—	0.524(U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-04-52785	03-22576	3.5–4.0	Soil	—	—	—	—	—	0.547(U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-04-52776	03-22577	0.0–0.5	Soil	—	—	—	—	—	—	—	31	0.241	—	—	—	—	—	—	—	—	—	—	1.18	—	—	—	54.5
RE03-04-52786	03-22577	3.0–3.5	Soil	—	—	—	—	—	0.539(U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-04-52777	03-22578	0.0–0.5	Soil	—	—	—	—	—	0.56(U)	—	25	—	—	—	—	—	—	—	—	—	—	—	1.88	—	—	—	—
RE03-04-52778	03-22579	0.0–0.5	Soil	—	—	—	—	—	—	—	28	—	—	—	—	—	—	—	—	—	—	—	1.04	—	—	—	54.6
RE03-04-52788	03-22579	3.5–4.0	Soil	—	—	—	—	—	0.501(U)	—	—	0.102(J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-04-52779	03-22580	0.0–0.5	Soil	—	—	—	—	—	—	—	—	0.0952(J)	—	—	—	—	—	—	—	—	—	—	1.99	—	—	—	—
RE03-04-52791	03-22582	1.83–2.83	Soil	—	—	—	—	—	0.545(U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-04-52782	03-22583	0.0–0.5	Soil	—	—	—	—	—	0.514(U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-04-52792	03-22583	3.5–4.0	Soil	—	—	—	—	—	0.532(U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-04-52783	03-22584	0.0–0.5	Soil	—	—	—	—	—	—	—	—	0.157	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-04-52793	03-22584	3.5–4.0	Soil	—	—	—	—	—	0.491(U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-04-52784	03-22585	0.0–0.5	Soil	—	—	—	—	—	—	—	32.5	—	—	—	—	—	—	—	—	—	—	—	2.08	—	—	—	54.2
RE03-04-52794	03-22585	3.5–4.0	Soil	—	—	—	—	—	—	—	—	0.21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 4.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Chromium hexavalent ion	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Soil/Fill BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**na[a]**	**8.64**	**14.7**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**3460**	**1.52**	**1**	**915**	**0.73**	**39.6**	**48.8**
Sediment BV				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**na**	**4.73**	**11.2**	**13800**	**19.7**	**2370**	**543**	**0.1**	**9.38**	**2690**	**0.3**	**1**	**1470**	**0.73**	**19.7**	**60.2**
Qbt 3/Qbt 4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**na**	**3.14**	**4.66**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**3500**	**0.3**	**1**	**2770**	**1.1**	**17**	**63.5**
SWMU 03-013(i)																											
RE03-05-59527	03-24444	0.0–0.5	Fill	—	—	—	—	—	0.505(J)	—	—	NA	—	—	—	38.1	—	—	—	—	—	1.7(U)	—	—	—	—	52.8
RE03-05-59528	03-24444	1.5–1.5	Fill	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	1.75(U)	—	—	—	—	—
RE03-05-59529	03-24445	0.0–0.5	Fill	—	—	—	—	—	0.797	—	—	NA	—	—	—	—	—	—	—	—	—	1.68(U)	—	—	—	—	—
RE03-05-59530	03-24445	1.5–1.5	Fill	—	—	—	—	—	3.53	—	—	NA	—	—	—	—	—	—	—	—	—	1.81(U)	—	—	—	—	55.9
RE03-05-59531	03-24446	0.0–0.5	Fill	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	1.76(U)	—	—	—	—	—
RE03-05-59532	03-24446	1.5–1.5	Fill	—	—	—	—	—	0.57(U)	—	—	NA	—	—	—	—	—	—	—	—	—	1.71(U)	—	—	—	—	—
RE03-05-59533	03-24447	0.0–0.5	Fill	—	1.71(J-)	—	—	—	5.58	—	—	NA	—	21.8(J)	—	238	—	—	—	16.3	—	1.76(U)	—	—	—	—	482
RE03-05-59534	03-24447	1.5–1.5	Fill	—	1.55(J-)	—	—	—	2.79	—	—	NA	—	—	—	140	—	—	—	—	—	1.68(U)	—	—	—	—	196
RE03-05-59535	03-24448	0.0–0.5	Fill	—	0.961(J-)	—	—	—	1.18	—	—	NA	—	—	—	137	—	—	—	—	—	1.66(U)	—	—	—	—	113
RE03-05-59536	03-24448	1.5–1.5	Fill	—	—	—	—	—	—	—	—	NA	—	—	—	37.6	—	—	—	—	—	1.72(U)	—	—	—	—	56.5
RE03-05-59537	03-24449	0.0–0.5	Fill	—	—	—	—	—	0.406(J)	—	—	NA	—	—	—	45.8	—	—	—	—	—	1.79(U)	—	—	—	—	61.7
RE03-05-59538	03-24449	1.5–1.5	Fill	—	—	—	—	—	0.656(U)	—	—	NA	—	—	—	—	—	—	—	—	—	1.97(U)	—	—	—	—	—
RE03-05-59539	03-24450	0.0–0.5	Fill	—	—	—	302(J+)	—	0.623	—	—	NA	—	—	—	37.1	—	—	—	—	—	—	—	—	—	—	59.1
RE03-05-59540	03-24450	1.5–1.5	Fill	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	1.89(U)	—	—	—	—	—
RE03-05-59541	03-24451	0.0–0.5	Fill	—	—	—	—	—	0.568(U)	—	—	NA	—	—	—	—	—	—	—	—	—	1.7(U)	—	—	—	—	—
RE03-05-59542	03-24451	1.5–1.5	Fill	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	1.7(U)	—	—	—	—	—
Consolidated Unit 03-014(a)-99																											
SWMU 03-014(k)																											
0103-97-0011	03-03264	0.0–1.0	Fill	—	4.7(U)	—	—	—	0.47(U)	—	—	NA	—	—	—	—	—	—	0.16	—	—	—	2.7	—	—	—	—
0103-97-0012	03-03264	1.33–2.33	Qbt 4	—	5.4(U)	—	—	—	—	—	19.3	NA	—	—	—	—	—	—	—	8.6	—	—	—	—	—	—	154
0103-97-0013	03-03264	2.33–3.33	Qbt 4	—	5(U)	—	—	—	—	—	24	NA	—	6.9	—	—	—	—	—	11.9	—	—	—	—	—	—	164
SWMU 03-014(l)																											
0103-97-0014	03-03265	0.0–1.17	Fill	—	5(U)	—	—	—	0.5(U)	—	—	NA	—	30	—	—	—	—	0.15	—	—	—	5.7	—	—	—	—
0103-97-0015	03-03265	1.67–2.67	Qbt 4	—	5.2(U)	—	—	—	—	—	9.7	NA	—	4.7	—	—	—	—	—	—	—	—	—	—	—	—	—
0103-97-0016	03-03265	2.67–3.67	Qbt 4	—	5(U)	—	—	—	—	—	11.4	NA	—	—	—	—	—	—	—	8.2	—	—	—	—	—	—	—
SWMU 03-014(m)																											
0103-97-0017	03-03266	0.0–0.17	Fill	—	4.6(U)	—	—	—	0.49	—	38.9	NA	—	44.8	—	29.1	—	—	0.92	—	—	—	18.3	—	—	—	76.9
0103-97-0018	03-03266	0.75–1.75	Qbt 4	—	5.3(U)	—	—	—	—	—	13.1	NA	—	8.4	—	—	—	—	—	8.4	—	—	—	—	—	—	—
0103-97-0019	03-03266	1.75–2.75	Qbt 4	—	5.8(U)	—	—	—	—	—	17.6	NA	—	—	—	—	—	—	—	11.1	—	—	—	—	—	—	—

Table 4.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Chromium hexavalent ion	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Soil/Fill BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**na[a]**	**8.64**	**14.7**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**3460**	**1.52**	**1**	**915**	**0.73**	**39.6**	**48.8**
Sediment BV				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**na**	**4.73**	**11.2**	**13800**	**19.7**	**2370**	**543**	**0.1**	**9.38**	**2690**	**0.3**	**1**	**1470**	**0.73**	**19.7**	**60.2**
Qbt 3/Qbt 4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**na**	**3.14**	**4.66**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**3500**	**0.3**	**1**	**2770**	**1.1**	**17**	**63.5**
SWMU 03-014(n)																											
0103-97-0020	03-03201	0.0–1.58	Fill	—	—	—	—	—	—	—	—	NA	—	25.1	—	—	—	—	0.55(J-)	—	—	—	3.1	—	—	—	71.3
0103-97-0021	03-03201	1.58–2.58	Qbt 4	—	0.75(UJ)	—	—	—	—	—	—	NA	—	11.6	—	—	—	—	0.14(J-)	—	—	0.6(U)	1.1(J)	—	—	—	—
0103-97-0022	03-03201	2.58–3.58	Qbt 4	—	0.76(UJ)	—	—	—	—	—	8.8	NA	—	5.6(J)	—	—	—	—	—	8.7(J)	—	0.61(U)	—	—	—	—	—
0103-97-0023	03-03202	0.0–0.33	Fill	—	8.3(J-)	—	345	—	15.5	6430	51.9	NA	—	231	—	217	—	—	0.46(J-)	30.7	—	—	1.4(J)	—	—	—	638
SWMU 03-014(o)																											
0103-97-0024	03-03203	0.0–0.5	Fill	—	4.31(U)	—	—	—	0.627	—	40.6(J+)	NA	—	46.8	—	—	—	—	1.5	—	—	—	19.7	—	—	—	53.7
0103-97-0025	03-03203	1.5–2.5	Qbt 4	—	3.82(U)	—	—	—	—	—	12.8(J+)	NA	—	5.04	—	—	—	—	—	6.7	—	—	1.34	—	—	—	—
0103-97-0026	03-03203	2.5–3.5	Qbt 4	—	4.79(U)	—	—	—	—	—	9.88(J+)	NA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0103-97-0027	03-03204	0.0–0.83	Fill	—	5.38(U)	—	—	—	0.538(U)	—	—	NA	—	18.5	—	—	—	—	0.22	—	—	—	6.48	—	—	—	—
0103-97-0028	03-03204	1.75–2.75	Qbt 4	—	4.86(U)	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0103-97-0029	03-03204	2.75–3.75	Qbt 4	—	5.09(U)	—	—	—	—	—	12(J+)	NA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0103-97-0030	03-03205	0.0–0.75	Fill	—	4.96(U)	—	—	—	2.5	—	136(J+)	NA	—	122	—	45.1	—	—	3.8	—	—	—	71.3	—	—	—	131
0103-97-0031	03-03205	1.25–2.25	Qbt 4	—	4.94(U)	—	—	—	—	—	25(J+)	NA	—	—	—	—	—	—	—	11.4	—	—	1.13	—	—	—	—
0103-97-0032	03-03205	2.25–3.25	Qbt 4	—	4.62(U)	—	—	—	—	—	19.2(J+)	NA	—	—	—	—	—	—	—	10.1	—	—	—	—	—	—	—
SWMU 03-014(v)																											
RE03-99-2005	03-14227	4.0–4.5	Fill	—	—	—	—	—	—	—	—	NA	9	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consolidated Unit 03-015-00																											
SWMU 03-015																											
AAB5813	03-02004	0.0–1.5	Sediment	NA	—	—	181(J-)	—	—	NA	—	NA	NA	NA	NA	29.3(J-)	NA	NA	—	—	NA	0.61(UJ)	—	NA	—	NA	NA
AOC C-03-016																											
RE03-03-52397	03-22533	1.0–1.5	Qbt 4	—	—	—	48	—	—	—	—	NA	—	9.5	—	31.5	—	1490	—	—	—	0.37(J-)	—	—	—	—	—
RE03-03-52398	03-22533	16.0–16.5	Qbt 4	24800	—	3.6	156	4.2	—	9830(J)	12(J-)	NA	—	10.8	16400	26	4980	—	—	10	—	0.69(J-)	—	—	—	19.4	—
RE03-03-52402	03-22534	4.0–5.0	Qbt 4	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	0.39(J-)	—	—	—	—	—
RE03-03-52403	03-22534	9.5–10.0	Qbt 4	—	—	—	—	—	—	—	—	NA	—	—	—	12.6	—	—	—	—	—	0.48(J-)	—	—	—	—	—
RE03-03-52405	03-22534	19.5–20.0	Qbt 4	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	0.38(J-)	—	—	—	—	—
SWMU 03-021																											
0103-97-0241	03-03326	0.0–1.0	Soil	—	—	—	—	—	—	—	—	NA	—	22.9	—	24.7	—	—	—	24.5	—	—	—	—	2.1(J)	—	53
0103-97-0242	03-03327	2.0–3.0	Soil	—	—	—	—	—	—	—	28.1	NA	—	—	—	84.7	—	—	—	—	—	—	—	—	2(J)	—	—
0103-97-0243	03-03327	3.0–4.0	Soil	—	0.95(U)	—	—	—	—	—	101	NA	—	—	33200	33.7	—	—	—	—	—	—	—	—	1.3(J)	—	—
0103-97-0244	03-03328	3.0–4.0	Soil	—	—	—	—	—	—	—	—	NA	—	—	—	29.7	—	—	—	—	—	—	—	—	—	—	—
0103-97-0245	03-03328	4.0–5.0	Soil	—	0.86(U)	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 4.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Chromium hexavalent ion	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Soil/Fill BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**na**[a]	**8.64**	**14.7**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**3460**	**1.52**	**1**	**915**	**0.73**	**39.6**	**48.8**
Sediment BV				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**na**	**4.73**	**11.2**	**13800**	**19.7**	**2370**	**543**	**0.1**	**9.38**	**2690**	**0.3**	**1**	**1470**	**0.73**	**19.7**	**60.2**
Qbt 3/Qbt 4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**na**	**3.14**	**4.66**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**3500**	**0.3**	**1**	**2770**	**1.1**	**17**	**63.5**
0103-97-0246	03-03329	2.0–3.0	Soil	—	—	—	—	—	—	—	—	NA	—	—	—	31.4	—	—	—	—	—	—	—	—	—	—	52.5
0103-97-0247	03-03329	3.0–4.0	Soil	—	—	—	—	—	—	—	56.6	NA	11.2	—	—	358	—	—	—	—	—	—	—	—	—	—	193
0103-97-0248	03-03330	2.75–3.75	Soil	—	—	—	—	—	—	—	—	NA	—	—	—	103	—	—	—	—	—	—	—	—	—	—	—
0103-97-0251	03-03330	3.75–4.25	Soil	—	—	—	—	—	—	—	—	NA	—	—	—	67.1	—	—	—	—	—	—	—	—	—	—	49.3
0103-97-0249	03-03331	3.0–4.0	Soil	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	49.3
0103-97-0250	03-03331	4.0–5.0	Soil	—	—	—	—	—	—	—	—	NA	—	—	—	41.6	—	—	—	—	—	—	—	—	—	—	74.9
AOC 03-027																											
RE03-99-2001	03-14225	7.5–8.0	Fill	—	2.8(U)	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-99-2003	03-14226	7.5–8.0	Fill	—	3(U)	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE03-99-2006	03-14228	7.5–8.0	Fill	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	49
RE03-99-2007	03-14229	7.5–8.0	Fill	31000	3.1(U)	—	—	2.5	—	—	—	NA	—	—	22000	—	5100	—	—	22	—	—	—	1100	—	—	54
AOC 03-036(b)																											
RE03-03-52377	03-22529	11.0–11.5	Qbt 4	—	—	—	66.4	—	—	4500	—	NA	—	5.9	—	27.3	—	—	—	—	—	0.59(J-)	—	—	—	—	—
RE03-03-52378	03-22529	14.5–15.0	Qbt 4	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	0.35(J-)	—	—	—	—	64.5
RE03-03-52379	03-22529	19.5–20.0	Qbt 4	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	0.39(J-)	—	—	—	—	—
RE03-03-52383	03-22530	14.5–15.0	Qbt 4	—	—	—	—	—	—	—	—	NA	—	—	—	21	—	—	—	—	—	1.2(J-)	—	—	—	—	—
RE03-03-52384	03-22530	19.5–20.0	Qbt 4	—	—	—	—	1.3	—	—	—	NA	—	—	—	11.3	—	—	—	—	—	0.54(J-)	—	—	—	—	—
AOC 03-052(b)																											
0103-97-0163	03-03285	0.0–1.0	Soil	—	7.7(UJ)	—	—	—	0.64(U)	—	—	NA	—	—	—	—	—	—	—	—	—	—	2.2(U)	—	—	—	—
0103-97-0164	03-03285	2.0–3.0	Fill	—	7.6(UJ)	—	—	—	0.63(U)	—	—	NA	—	—	—	—	—	—	—	—	—	—	2.2(U)	—	—	—	—
0103-97-0165	03-03286	0.0–1.0	Fill	—	6.7(UJ)	—	—	—	0.55(U)	—	—	NA	—	—	—	—	—	—	—	—	—	—	1.9(U)	—	—	—	—
0103-97-0166	03-03286	1.0–2.0	Fill	—	7.2(UJ)	—	—	—	0.6(U)	—	—	NA	—	—	—	64(J-)	—	—	—	—	—	—	2.1(U)	—	—	—	—
0103-97-0167	03-03287	0.0–1.0	Fill	—	7.4(UJ)	—	—	—	0.62(U)	—	—	NA	—	—	—	—	—	—	—	—	—	—	2.2(U)	—	—	—	49.8
0103-97-0168	03-03287	1.0–2.0	Fill	—	7.1(UJ)	—	—	—	0.59(U)	—	—	NA	—	—	—	45(J-)	—	—	—	—	—	—	2.1(U)	—	—	—	—
0103-97-0169	03-03288	0.0–1.0	Fill	—	7.3(UJ)	—	—	—	0.6(U)	—	—	NA	—	—	—	—	—	—	—	—	—	—	2.1(U)	—	—	—	—
0103-97-0170	03-03288	1.0–2.0	Fill	—	7.5(UJ)	—	—	—	0.62(U)	—	—	NA	—	—	—	—	—	—	—	—	—	—	2.2(U)	—	—	—	—
0103-97-0175	03-03291	0.0–1.0	Soil	—	6.7(UJ)	—	—	—	0.55(U)	—	—	NA	21.5	—	—	—	—	—	—	—	—	—	1.9(U)	—	—	—	—
0103-97-0176	03-03291	4.0–5.0	Soil	—	7.1(UJ)	—	—	—	0.59(U)	—	—	NA	13.7	—	—	—	—	1000(J+)	—	20	—	—	2.1(U)	—	—	—	—
0103-97-0177	03-03292	0.0–0.67	Fill	—	5.9(UJ)	—	—	—	0.61(J-)	—	—	NA	—	—	—	—	—	—	—	—	—	—	1.7(U)	—	—	—	152
SWMU 03-054(c)																											
RC03-01-0029	03-14470	6.0–6.5	Fill	—	0.92(UJ)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RC03-01-0031	03-14472	6.0–6.5	Fill	—	0.86(UJ)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 4.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Chromium hexavalent ion	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Soil/Fill BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**na[a]**	**8.64**	**14.7**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**3460**	**1.52**	**1**	**915**	**0.73**	**39.6**	**48.8**
Sediment BV				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**na**	**4.73**	**11.2**	**13800**	**19.7**	**2370**	**543**	**0.1**	**9.38**	**2690**	**0.3**	**1**	**1470**	**0.73**	**19.7**	**60.2**
Qbt 3/Qbt 4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**na**	**3.14**	**4.66**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**3500**	**0.3**	**1**	**2770**	**1.1**	**17**	**63.5**
RC03-01-0032	03-14473	5.0–5.5	Fill	—	0.87(UJ)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	51.9(J)
RC03-01-0033	03-14474	8.0–8.5	Fill	—	0.86(UJ)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RC03-01-0034	03-14475	7.0–7.5	Soil	—	0.87(UJ)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RC03-01-0036	03-14477	2.0–2.5	Soil	—	0.9(UJ)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RC03-01-0037	03-14478	2.0–2.5	Soil	—	0.85(UJ)	—	—	—	—	10200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RC03-01-0038	03-14479	2.0–2.5	Soil	—	0.92(UJ)	—	—	—	—	—	—	—	—	—	—	147	—	—	—	—	—	—	—	—	—	—	—
SWMU 03-056(a)																											
RC03-01-0041	03-14481	0.5–1.0	Fill	—	—	—	—	—	—	7850(J)	—	NA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RC03-01-0042	03-14482	0.5–1.0	Fill	—	—	—	—	—	—	6750(J)	—	NA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RC03-01-0043	03-14483	0.5–1.0	Fill	—	—	—	—	—	—	11500(J)	—	NA	—	—	—	—	—	—	—	—	—	—	1.6	—	—	—	89.8
RC03-01-0044	03-14484	0.5–1.0	Fill	—	—	—	—	—	—	10400(J)	—	NA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AOC 03-056(k)																											
0103-97-0152	03-03281	0.5–1.0	Fill	—	7.6(UJ)	—	—	—	0.63(U)	—	—	NA	—	—	—	—	—	—	—	—	—	—	2.2(U)	—	—	—	—
0103-97-0153	03-03281	1.83–2.83	Fill	—	7.2(UJ)	—	—	—	0.6(U)	—	—	NA	—	—	—	—	—	—	—	—	—	—	2.1(U)	—	—	—	—
0103-97-0155	03-03282	0.5–1.5	Fill	—	6.4(UJ)	—	—	—	0.53(U)	—	—	NA	—	—	—	—	—	—	—	—	—	—	1.9(U)	—	—	—	—
0103-97-0156	03-03282	1.5–2.17	Soil	—	7.5(UJ)	—	—	—	0.62(U)	—	—	NA	—	—	—	—	—	—	—	—	—	—	2.2(U)	—	—	—	—
0103-97-0158	03-03283	0.33–1.25	Fill	—	7.4(UJ)	—	—	—	0.61(U)	—	—	NA	—	—	—	—	—	—	—	—	—	—	2.2(U)	—	—	—	—
0103-97-0161	03-03284	0.5–1.25	Fill	—	7(UJ)	—	—	—	0.58(U)	—	—	NA	—	—	—	—	—	—	—	—	—	—	2(U)	—	—	—	—
0103-97-0171	03-03289	0.0–1.0	Fill	—	6.6(UJ)	—	—	—	0.55(U)	—	—	NA	—	20.1	—	24.9(J-)	—	—	—	—	—	—	1.9(U)	—	—	—	—
0103-97-0172	03-03289	3.5–4.5	Soil	—	7.4(UJ)	—	—	—	0.61(U)	—	—	NA	—	—	—	—	—	—	—	—	—	—	2.1(U)	—	—	—	—
0103-97-0173	03-03290	0.0–1.0	Fill	—	6.3(UJ)	—	—	—	0.52(U)	—	—	NA	—	—	—	—	—	—	—	—	—	—	1.8(U)	—	—	—	—
0103-97-0174	03-03290	1.0–1.5	Fill	—	6.9(UJ)	—	—	—	0.57(U)	—	—	NA	—	28.2	—	—	—	—	—	—	—	—	2(U)	—	—	—	—
SWMU 03-056(l)																											
RE03-03-51690	03-22333	0.65–1.64	Soil	—	—	—	—	—	—	9050	—	NA	—	29.4	—	—	—	1530	—	—	—	—	—	—	—	—	—
RE03-03-51692	03-22334	0.0–1.64	Soil	—	—	—	—	—	—	6800	—	NA	—	19.5	—	—	—	—	—	—	—	—	—	—	—	—	60.9

Note: All values in mg/kg. BVs are provided in LANL 1998, 059730.

[a] na = Not available.

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

[c] NA = Not analyzed.

Table 4.1-4
Summary of Detected VOCs for TA-03 Sites

Sample ID	Location ID	Depth (ft)	Media	Acetone	Benzene	Butanone[2-]	Butylbenzene[n-]	Butylbenzene[sec-]	Carbon Disulfide	Isopropylbenzene	Isopropyltoluene[4-]	Methylene Chloride	Propylbenzene[1-]	Tetrachloroethene	Toluene	Trichloroethane[1,1,1-]	Trichloroethene	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Xylene (Total)
Consolidated Unit 03-009(a)-00																				
SWMU 03-009(a)																				
RE03-03-52422	03-22538	14.5–15.0	Fill	—[a]	—	—	—	—	—	—	—	0.031	—	0.00057(J)	—	—	—	—	—	—
RE03-03-52427	03-22539	4.0–5.0	Qbt 4	—	—	—	—	—	—	—	—	0.023	—	—	—	—	—	—	—	—
RE03-03-52429	03-22539	19.5–20.0	Qbt 4	—	—	—	—	—	—	—	—	0.024	—	—	—	—	—	—	—	—
SWMU 03-028																				
RE03-03-52352	03-22524	7.5–8.0	Qbt 4	—	—	—	—	—	—	—	—	0.0036(J)	—	—	—	—	—	—	—	—
RE03-03-52354	03-22524	19.5–20.0	Qbt 4	0.0057(J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SWMU 03-036(a)																				
RE03-03-52357	03-22525	8.0–8.5	Qbt 4	0.0062(J)	—	—	—	—	—	—	—	—	—	0.00053(J)	—	—	—	—	—	—
SWMU 03-036(c)																				
RE03-03-52365	03-22526	19.5–20.0	Qbt 4	0.0051(J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SWMU 03-036(d)																				
RE03-03-52368	03-22527	4.5–5.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.00025(J)	—	—	—	—	—	—
AOC 03-043(b)																				
RE03-03-52374	03-22528	19.5–20.0	Qbt 4	0.003(J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SWMU 03-045(g)																				
RE03-03-52407	03-22535	0.0–0.5	Sediment	—	—	—	—	—	—	—	—	0.013	—	—	—	—	—	—	—	—
RE03-03-52408	03-22535	1.5–2.0	Sediment	—	—	—	—	—	—	—	—	0.011	—	—	—	—	—	—	—	—
RE03-03-52412	03-22536	0.0–0.5	Sediment	—	—	—	—	—	—	—	—	0.018	—	—	—	—	—	—	—	—
RE03-03-52413	03-22536	1.5–2.0	Sediment	—	—	—	0.0018(J)	—	—	—	0.014	0.013	—	—	—	—	0.0019(J)	0.0029(J)	0.0011(J)	—
SWMU 03-013(i)																				
RE03-05-59528	03-24444	1.5–1.5	Fill	0.0168	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	NA[b]
RE03-05-59530	03-24445	1.5–1.5	Fill	0.376	—	0.0174	—	—	—	—	—	—	—	—	—	—	—	—	—	NA
RE03-05-59532	03-24446	1.5–1.5	Fill	0.0091	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	NA
RE03-05-59534	03-24447	1.5–1.5	Fill	0.0296	—	—	—	—	—	—	0.0017	—	—	—	—	—	—	—	—	NA
RE03-05-59536	03-24448	1.5–1.5	Fill	—	—	—	—	—	—	—	0.0012(J)	—	—	—	—	—	—	—	—	NA

Table 4.1-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Benzene	Butanone[2-]	Butylbenzene[n-]	Butylbenzene[sec-]	Carbon Disulfide	Isopropylbenzene	Isopropyltoluene[4-]	Methylene Chloride	Propylbenzene[1-]	Tetrachloroethene	Toluene	Trichloroethane[1,1,1-]	Trichloroethene	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Xylene (Total)
Consolidated Unit 03-014(a)-99																				
SWMU 03-014(l)																				
0103-97-0016	03-03265	2.67–3.67	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	0.004(J)	—	—	—	—	—
SWMU 03-014(n)																				
0103-97-0021	03-03201	1.58–2.58	Qbt 4	0.042(J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0103-97-0023	03-03202	0.0–0.33	Fill	2.2(J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SWMU 03-014(o)																				
0103-97-0032	03-03205	2.25–3.25	Qbt 4	0.002(J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AOC 03-027																				
RE03-99-2000	03-14225	7.0–7.5	Fill	—	—	0.0027(J)	0.00071(J)	0.00035(J)	—	—	0.00043(J)	—	0.00064(J)	—	—	—	—	0.0042(J)	0.0036(J)	0.001(J)
RE03-99-2001	03-14225	7.5–8.0	Fill	—	—	—	0.0011(J)	0.00068(J)	—	0.00021(J)	0.00076(J)	—	0.00087(J)	—	—	—	—	0.0033(J)	0.0046(J)	0.001(J)
RE03-99-2002	03-14226	7.0–7.5	Fill	—	—	—	0.0003(J)	—	—	—	—	—	—	0.00057(J)	—	—	—	0.0018(J)	0.0011(J)	—
RE03-99-2003	03-14226	7.5–8.0	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00044(J)	—	—
AOC 03-036(b)																				
RE03-03-52382	03-22530	10.0–11.0	Soil	—	—	—	—	—	—	—	—	—	—	0.00075(J)	—	—	—	0.0013(J)	—	—
RE03-03-52384	03-22530	19.5–20.0	Qbt 4	0.0026(J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AOC 03-056(k)																				
0103-97-0153	03-03281	1.83–2.83	Fill	—	—	0.006(J)	—	—	0.004(J)	—	—	—	—	—	—	—	—	—	—	—

Note: All values in mg/kg.

[a] — = Not detected.

[b] NA = Not analyzed.

Table 4.1-5
Summary of Detected SVOCs for TA-03 Sites

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butylbenzylphthalate	Carbazole	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Dichlorobenzene[1,4-]	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene
Consolidated Unit 03-009(a)-00																										
SWMU 03-028																										
RE03-03-52348	03-22523	5.0–5.5	Soil	—[a]	—	—	—	—	—	—	—	0.28(J)	0.079(J)	—	NA[b]	—	—	—	—	—	—	—	—	—	—	—
RE03-03-52351	03-22523	19.0–19.5	Qbt 4	—	—	—	—	—	—	—	—	0.14(J)	—	—	NA	—	—	—	—	—	—	—	—	—	—	—
SWMU 03-036(a)																										
RE03-03-52359	03-22525	19.5–20.0	Qbt 4	—	—	—	—	—	—	—	—	0.25(J)	—	—	NA	—	—	—	—	—	—	—	—	—	—	—
SWMU 03-045(g)																										
RE03-03-52407	03-22535	0.0–0.5	Sediment	—	—	—	0.16(J)	0.22(J)	0.19(J)	0.2(J)	0.2(J)	—	0.73	—	NA	0.21(J)	—	—	—	0.37(J)	—	0.18(J)	—	—	0.14(J)	0.38(J)
RE03-03-52408	03-22535	1.5–2.0	Sediment	—	—	—	—	—	—	—	—	—	0.28(J)	—	NA	—	—	—	—	0.12(J)	—	—	—	—	—	0.11(J)
RE03-03-52412	03-22536	0.0–0.5	Sediment	—	—	—	0.12(J)	0.14(J)	0.15(J)	—	0.12(J)	—	0.77	—	NA	0.15(J)	—	—	—	0.33(J)	—	0.12(J)	—	—	0.12(J)	0.28(J)
RE03-03-52413	03-22536	1.5–2.0	Sediment	—	—	—	0.16(J)	0.16(J)	0.15(J)	0.11(J)	0.14(J)	—	0.32(J)	—	NA	0.18(J)	—	—	—	0.42	—	0.12(J)	—	—	0.2(J)	0.34(J)
SWMU 03-013(i)																										
RE03-05-59529	03-24445	0.0–0.5	Fill	—	—	—	—	—	—	—	—	0.689(J)	—	—	NA	—	—	—	—	—	—	—	—	—	—	—
RE03-05-59533	03-24447	0.0–0.5	Fill	0.0923	0.0421	0.095	—	—	—	—	—	0.666(J)	—	—	NA	—	—	—	—	1.32	0.0947	—	0.0275(J)	—	1.09	1.36
RE03-05-59534	03-24447	1.5–1.5	Fill	—	—	—	—	—	—	—	—	—	1.13(J)	—	NA	—	—	—	—	0.0795	—	—	—	—	—	—
RE03-05-59535	03-24448	0.0–0.5	Fill	—	0.0186(J)	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	0.535	0.017(J)	—	0.0141(J)	—	0.468	0.477
RE03-05-59536	03-24448	1.5–1.5	Fill	—	—	—	—	—	—	—	—	0.609(J)	—	—	NA	—	—	—	—	—	—	—	—	—	—	—
RE03-05-59537	03-24449	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	0.0393(J)	—
RE03-05-59538	03-24449	1.5–1.5	Fill	—	—	—	—	—	—	—	—	—	1.39(J)	—	NA	—	—	—	—	—	—	—	—	—	—	—
RE03-05-59539	03-24450	0.0–0.5	Fill	—	—	0.0266(J)	—	—	—	—	—	—	—	—	NA	—	—	—	—	0.161	0.013(J)	—	—	—	0.108	0.2
RE03-05-59542	03-24451	1.5–1.5	Fill	—	—	—	—	—	—	—	—	—	1.19(J)	—	NA	—	—	—	—	—	—	—	—	—	—	—
Consolidated Unit 03-014(a)-99																										
SWMU 03-014(m)																										
0103-97-0017	03-03266	0.0–0.17	Fill	2.3(J)	—	3.9	11	8.3	15	5.6	NA	—	—	—	3.2(J)	9.3	1.1(J)	1.2(J)	1.4(J)	24	2(J)	4.6	—	0.94(J)	22	32
SWMU 03-014(n)																										
0103-97-0020	03-03201	0.0–1.58	Fill	—	—	—	—	—	—	—	—	—	3.1	—	NA	—	—	—	—	—	—	—	—	—	—	—
0103-97-0021	03-03201	1.58–2.58	Qbt 4	—	—	—	—	—	—	—	—	—	0.5	—	NA	—	—	—	—	—	—	—	—	—	—	—
0103-97-0023	03-03202	0.0–0.33	Fill	—	—	—	—	—	—	—	—	—	44	30	NA	—	—	—	—	—	—	—	—	—	—	—

Table 4.1-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butylbenzylphthalate	Carbazole	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Dichlorobenzene[1,4-]	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene
SWMU 03-014(o)																										
0103-97-0024	03-03203	0.0–0.5	Fill	—	—	—	0.16(J)	0.22(J)	0.39	0.16(J)	0.12(J)	—	—	—	—	0.25(J)	—	—	—	0.26(J)	—	0.16(J)	—	—	0.036(J)	0.23(J)
0103-97-0030	03-03205	0.0–0.75	Fill	—	0.036(J)	0.057(J)	0.48	0.65	1.2	0.29(J)	0.46	0.12(J)	—	—	0.037(J)	0.69	0.084(J)	—	—	0.81	—	0.31(J)	—	—	0.29(J)	0.74
AOC C-03-016																										
RE03-03-52402	03-22534	4.0–5.0	Qbt 4	—	—	—	—	—	—	—	—	—	0.15(J)	—	NA	—	—	—	—	—	—	—	—	—	—	—
RE03-03-52403	03-22534	9.5–10.0	Qbt 4	—	—	—	—	—	—	—	—	—	0.13(J)	—	NA	—	—	—	—	—	—	—	—	—	—	—
AOC 03-036(b)																										
RE03-03-52377	03-22529	11.0–11.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	0.61	—	0.092(J)	—
RE03-03-52383	03-22530	14.5–15.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	0.092(J)	—		

Note: All values in mg/kg.

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

[b] NA = Not analyzed.

Table 4.1-6
Summary of Detected PCBs, Herbicides, and TPH for TA-03 Sites

Sample ID	Location ID	Depth (ft)	Media	PCBs		Herbicides		TPH		
				Aroclor-1254	Aroclor-1260	MCPA	MCPP	DRO	GRO	LRO
SWMU 03-003(c)										
RC03-01-0015	03-14457	0.33–0.5	Fill	0.054	—[a]	NA[b]	NA	NA	NA	NA
RC03-01-0016	03-14458	0.33–0.5	Fill	0.043	—	NA	NA	NA	NA	NA
Consolidated Unit 03-009(a)-00										
SWMU 03-036(d)										
RE03-03-52368	03-22527	4.5–5.0	Qbt 4	NA	NA	NA	NA	—	0.86	NA
SWMU 03-045(g)										
RE03-03-52413	03-22536	1.5–2.0	Sediment	NA	NA	NA	NA	—	0.95	NA
Consolidated Unit 03-012(b)-00										
RE03-04-52777	03-22578	0.0–0.5	Soil	0.0085(J)	0.0321(J)	NA	NA	NA	NA	NA
RE03-04-52779	03-22580	0.0–0.5	Soil	0.0213(J)	0.0711(J)	NA	NA	NA	NA	NA
RE03-04-52781	03-22582	0.83–1.33	Soil	—	0.259	NA	NA	NA	NA	NA
RE03-04-52783	03-22584	0.0–0.5	Soil	0.336	0.925	NA	NA	NA	NA	NA
SWMU 03-013(i)										
RE03-05-59527	03-24444	0.0–0.5	Fill	2.81	2.26	NA	NA	231	0.0156(J)	NA
RE03-05-59528	03-24444	1.5–1.5	Fill	—	—	NA	NA	134	0.0127(J-)	NA
RE03-05-59529	03-24445	0.0–0.5	Fill	—	—	NA	NA	2730	0.35(J-)	NA
RE03-05-59530	03-24445	1.5–1.5	Fill	—	—	NA	NA	3340	0.132(J-)	NA
RE03-05-59531	03-24446	0.0–0.5	Fill	0.0184(J)	—	NA	NA	398	0.0292(J)	NA
RE03-05-59532	03-24446	1.5–1.5	Fill	—	—	NA	NA	88	—	NA
RE03-05-59533	03-24447	0.0–0.5	Fill	0.193	0.0665	NA	NA	5370	—	NA
RE03-05-59534	03-24447	1.5–1.5	Fill	0.0274(J)	0.0154(J)	NA	NA	595	0.308	NA
RE03-05-59535	03-24448	0.0–0.5	Fill	0.0483(J-)	0.021(J-)	NA	NA	208	—	NA
RE03-05-59536	03-24448	1.5–1.5	Fill	0.0054(J-)	0.0039(J-)	NA	NA	270	0.338	NA
RE03-05-59537	03-24449	0.0–0.5	Fill	0.0537(J-)	0.0193(J-)	NA	NA	604	0.0192(J)	NA
RE03-05-59538	03-24449	1.5–1.5	Fill	0.0018(J)	—	NA	NA	9.3(J)	—	NA
RE03-05-59539	03-24450	0.0–0.5	Fill	0.0261	0.0082	NA	NA	92	—	NA
RE03-05-59540	03-24450	1.5–1.5	Fill	0.0209(J-)	0.0071(J-)	NA	NA	161	0.013(J-)	NA
RE03-05-59541	03-24451	0.0–0.5	Fill	0.0025(J)	0.0013(J)	NA	NA	99.9	—	NA
RE03-05-59542	03-24451	1.5–1.5	Fill	0.0024(J)	0.0014(J)	NA	NA	230	0.0292(J)	NA

Table 4.1-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	PCBs		Herbicides		TPH		
				Aroclor-1254	Aroclor-1260	MCPA	MCPP	DRO	GRO	LRO
Consolidated Unit 03-014(a)-99										
SWMU 03-014(l)										
0103-97-0014	03-03265	0.0–1.17	Fill	0.078	—	—	—	NA	NA	NA
SWMU 03-014(m)										
0103-97-0017	03-03266	0.0–0.17	Fill	6.5	—	—	—	NA	NA	NA
0103-97-0363	03-03386	0.0–0.5	Fill	—	0.096	NA	NA	NA	NA	NA
0103-97-0362	03-03386	0.5–1.0	Fill	—	0.041	NA	NA	NA	NA	NA
0103-97-0367	03-03387	0.0–0.5	Fill	—	0.089	NA	NA	NA	NA	NA
SWMU 03-014(n)										
0103-97-0020	03-03201	0.0–1.58	Fill	—	—	—	—	3000	NA	NA
0103-97-0021	03-03201	1.58–2.58	Qbt 4	—	—	—	—	460	NA	NA
0103-97-0022	03-03201	2.58–3.58	Qbt 4	—	—	—	—	200	NA	NA
0103-97-0023	03-03202	0.0–0.33	Fill	—	—	—	—	31000	NA	NA
0103-97-0343	03-603357	0.0–0.5	Soil	NA	NA	NA	NA	—	NA	450
0103-97-0345	03-603357	0.0–0.5	Fill	NA	NA	NA	NA	—	NA	290
0103-97-0347	03-603357	0.0–0.5	Fill	NA	NA	NA	NA	130	NA	490
SWMU 03-014(o)										
0103-97-0027	03-03204	0.0–0.83	Fill	—	—	—	0.993	NA	NA	NA
0103-97-0030	03-03205	0.0–0.75	Fill	—	1.22	0.956	—	NA	NA	NA
AOC 03-014(v)										
RE03-99-2004	03-14227	3.0–3.5	Fill	—	—	NA	NA	31(J-)	—	NA
RE03-99-2005	03-14227	4.0–4.5	Fill	—	—	NA	NA	5.7	—	NA
AOC C-03-016										
RE03-03-52402	03-22534	4.0–5.0	Qbt 4	NA	NA	NA	NA	5900	390	NA
RE03-03-52403	03-22534	9.5–10.0	Qbt 4	NA	NA	NA	NA	7100	770	NA
AOC 03-027										
RE03-99-2000	03-14225	7.0–7.5	Fill	—	—	NA	NA	160(J-)	0.048(J)	NA
RE03-99-2001	03-14225	7.5–8.0	Fill	—	—	NA	NA	240(J-)	0.17(J-)	NA
RE03-99-2212	03-14225	9.0–9.5	Qbt 3	NA	NA	NA	NA	1.8(J)	NA	NA
RE03-99-2002	03-14226	7.0–7.5	Fill	—	—	NA	NA	14	—	NA
RE03-99-2003	03-14226	7.5–8.0	Fill	—	—	NA	NA	27(J-)	0.038(J-)	NA
RE03-99-2006	03-14228	7.5–8.0	Fill	—	—	NA	NA	5.5	—	NA
RE03-99-2213	03-14230	8.5–9.0	Qbt 3	NA	NA	NA	NA	3.6(J)	NA	NA
RE03-99-2214	03-14231	8.5–9.0	Qbt 3	NA	NA	NA	NA	3(J)	NA	NA

Table 4.1-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	PCBs		Herbicides		TPH		
				Aroclor-1254	Aroclor-1260	MCPA	MCPP	DRO	GRO	LRO
AOC 03-036(b)										
RE03-03-52377	03-22529	11.0–11.5	Qbt 4	NA	NA	NA	NA	46	0.38	NA
RE03-03-52378	03-22529	14.5–15.0	Qbt 4	NA	NA	NA	NA	—	0.23	NA
RE03-03-52379	03-22529	19.5–20.0	Qbt 4	NA	NA	NA	NA	—	0.64	NA
RE03-03-52382	03-22530	10.0–11.0	Soil	NA	NA	NA	NA	—	0.18	NA
RE03-03-52383	03-22530	14.5–15.0	Qbt 4	NA	NA	NA	NA	51	0.47	NA
RE03-03-52384	03-22530	19.5–20.0	Qbt 4	NA	NA	NA	NA	—	0.18	NA

Note: All values in mg/kg.

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

[b] NA = Not analyzed.

Table 4.1-7
Summary of Radionuclides Detected or Detected Above BVs/FVs for TA-03 Sites

Sample ID	Location ID	Depth (ft)	Media	Gross Alpha	Gross Beta	Plutonium–239/240	Strontium–90	Tritium	Uranium–234	Uranium–235	Uranium–238
Soil/Fill BV/FV				**na**[a]	**na**	**0.054**	**1.31**	**na**	**2.59**	**0.2**	**2.29**
Qbt 4 BV/FV				**na**	**na**	**na**	**na**	**na**	**1.98**	**0.09**	**1.93**
Consolidated Unit 03-014(a)-99											
SWMU 03-014(l)											
0103-97-0016	03-03265	2.67–3.67	Qbt 4	NA[b]	NA	—[c]	—	0.04	—	—	—
SWMU 03-014(o)											
0103-97-0024	03-03203	0.0–0.5	Fill	NA	NA	0.088	—	NA	—	—	—
0103-97-0027	03-03204	0.00–0.83	Fill	NA	NA	0.017	—	0.286	—	—	—
0103-97-0028	03-03204	1.75–2.75	Qbt 4	NA	NA	—	3.2	—	—	—	—
0103-97-0030	03-03205	0.00–0.75	Fill	NA	NA	0.131	8.01	2.906	2.68	—	—
0103-97-0031	03-03205	1.25–2.25	Qbt 4	NA	NA	0.186	—	—	—	—	—
SWMU 03-056(k)											
0103-97-0171	03-03289	0.0–1.0	Fill	6.1	5.9	NA	NA	NA	—	—	4.44
0103-97-0173	03-03290	0.0–1.0	Fill	NA	NA	NA	NA	NA	—	—	10.07
0103-97-0174	03-03290	1.0–1.5	Fill	NA	NA	NA	NA	NA	—	0.203	7.13

Note: All values in pCi/g. BV/FV are provided in LANL 1998, 059730.

[a] na = Not available.

[b] NA = Not analyzed.

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

Table 4.1-8
Summary of Inorganic Chemicals Detected in Debris and Engineered Material for TA-03 Sites

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
SWMU 03-056(a)																									
RC03-01-0046	03-14485	0.0–0.5	Debris	3340	—*	2.7	67.5	0.23	—	5830(J)	7.1	2.6	7.5(J)	7550	7.3	1740	139	9.8(J)	759	—	—	259	—	16.4	21.7(J)
RC03-01-0047	03-14486	0.0–0.5	Debris	3200	—	1.7	51	0.23	—	5370(J)	7.4	2.5	8(J)	7160	5.5	1780	133	7.8	663	—	—	306	—	15.4	18.4(J)
RC03-01-0048	03-14487	0.0–0.5	Debris	2420	0.24	1.2	43.1	0.25	0.1	6660(J)	3.8	2	4.7	6170	7	1250	126	5	839	—	0.36	121	—	12.1	56.7(J)
RC03-01-0049	03-14488	0.0–0.25	Debris	6090	—	2	77.7	0.41	—	10900(J)	8.9	3.1	6.9(J)	10600	5.1	2760	182	6.8	1790	—	—	187	—	20.7	42.2
SWMU 03-056(l)																									
RE03-03-51685	03-22331	0.0–0.4921	Engineered Material	3810	—	3.49	33.2	0.313	0.262	802	2.74	1.13	6.83	4970(J+)	8.98	441	154	4.36	470	2.92	—	911	2.82	6.26	34.4
RE03-03-51687	03-22332	0.0–0.4921	Engineered Material	1780	—	0.911	93.5	—	0.05	9920	2.49	0.906	6.32	2870(J+)	2.08	747	135	5.38	340	0.116	—	876	—	8.31	10.4
RE03-03-51689	03-22333	0.0–0.6562	Engineered Material	2150	—	1.62	29.8	0.263	0.08	3780	5.61	1.85	9.32	4600(J+)	4.43	1290	150	6.76	452	0.478	—	746	—	9.27	16.5

Note: All values in mg/kg.

* — = Not detected.

Table 4.1-9
Summary of Organic Chemicals Detected in Debris and Sludge for TA-03 Sites

Sample ID	Location ID	Depth (ft)	Media	Aroclor-1254	LRO
SWMU 03-003(c)					
RC03-01-0013	03-14455	0.0–0.25	Debris	14	NA*
RC03-01-0014	03-14456	0.0–0.25	Debris	0.64	NA
Consolidated Unit 03-014(a)-99					
SWMU 03-014(n)					
0103-97-0341	03-603357	0.0–0.5	Sludge	NA	580

Note: All values in mg/kg.
* NA = Not analyzed.

Table 4.1-10
Summary of Radionuclides Detected in Engineered Material for TA-03 Sites

Sample ID	Location ID	Depth (ft)	Media	Cesium-134	Cesium-137	Gross alpha	Gross beta	Uranium-234	Uranium-235	Uranium-238
AOC 03-056(k)										
0103-97-0151	03-03281	0.0–0.17	Engineered Material	NA*	NA	NA	NA	0.801	0.076	2.91
0103-97-0154	03-03282	0.0–0.5	Engineered Material	0.101	0.22	6.1	10.8	1.39	0.144	4.71
0103-97-0157	03-03283	0.0–0.25	Engineered Material	NA	NA	NA	NA	0.607	0.071	1.59
0103-97-0160	03-03284	0.0–0.17	Engineered Material	NA	NA	NA	NA	1.07	0.092	2.01

Note: All values in pCi/g.
* NA = Not analyzed.

Table 4.1-11
Summary of Inorganic Chemical Screening-Level Results for TA-03 Sites

Sample ID	Location	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Soil/Fill BV				**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**	**3460**	**1.52**	**1**	**915**	**0.73**	**39.6**	**48.8**
Sediment BV				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**13800**	**19.7**	**2370**	**543**	**0.1**	**9.38**	**2690**	**0.3**	**1**	**1470**	**0.73**	**19.7**	**60.2**
SWMU 03-002(c)																											
AAB6034	03-02300	0.0–0.5	Fill	8440	<5.6[a]	<1.4	341	<1.2	<1.1	6220	5.8	<11.7	<5.1	NA[b]	10100	11.2	1330	1410	<0.08	<7.9	<1130	<0.53	<0.98	<235	<0.53	21.5	25.5
AAB6037	03-02301	0.0–0.5	Fill	7190	<5.1	<0.95	59	<0.89	<1	3750	7.4	<3.5	<5.2	NA	7890	10.4	<1150	106	<0.03	<6.3	<959	<0.49	<0.9	<189	<0.49	28.6	23.9
AAB6038	03-02302	0.0–0.5	Fill	7090	<5.2	<1.1	96.8	<0.9	1.5	9360	6.9	<5	<6.1	NA	8060	12.5	<1060	311	0.14	<6.8	<1010	<0.49	<0.91	<509	<0.49	13.4	41.3
AAB6039	03-02303	0.0–0.5	Fill	7740	<5.1	<0.91	72.7	<0.85	<1	5540	6.1	<7.2	10.6	NA	10900	18.4	1230	204	<0.04	<8.4	<1070	<0.49	12.5	<343	<0.49	15.3	88.8
AAB6035	03-02304	0.0–0.25	Fill	3480	<4.5	<1.2	57.9	<0.47	<0.86	8480	13.1	<3.8	10.7	NA	8470	21.5	1750	182	<0.03	10.8	<825	<0.43	<0.8	<464	<0.43	14.4	61.6
Consolidated Unit 03-012(b)-00																											
SWMU 03-012(b)																											
AAB5881	03-02118	0.0–0.5	Soil	NA	<0.45	<2.3	<46.9	<0.38	<0.96	NA	130	NA	NA	NA	NA	21.4	NA	NA	NA	<6.5	NA	<0.72	25.8	NA	<0.69	NA	NA
AAB5882	03-02119	0.0–0.5	Soil	NA	<0.44	10.1	211	<0.18	5.2	NA	2080	NA	NA	NA	NA	224	NA	NA	NA	19.8	NA	<0.71	108	NA	<0.68	NA	NA
AAB5883	03-02120	0.0–0.5	Sediment	NA	<0.45	<0.97	<28	<0.13	<0.05	NA	8.3	NA	NA	NA	NA	8.1	NA	NA	NA	<3.6	NA	<0.73	<0.08	NA	<0.7	NA	NA
AAB5884	03-02121	0.0–0.5	Engineered Material	NA	<0.44	<1.1	<20.9	<0.1	<0.07	NA	4.4	NA	NA	NA	NA	8.3	NA	NA	NA	<2.3	NA	<0.72	<0.07	NA	<0.69	NA	NA
AAB5885	03-02122	0.0–0.5	Sediment	NA	<0.43	<0.83	<16	<0.08	<0.24	NA	2.7	NA	NA	NA	NA	6.2	NA	NA	NA	<1.6	NA	<0.69	<0.12	NA	<0.67	NA	NA
Consolidated Unit 03-013(a)-00																											
AAB6023	03-02600	0.0–0.33	Sediment	2160	<4.5	<0.43	<35.9	<0.28	<0.51	3690	9.9	<2	114	NA	3900	60.6	<776	142	<0.03	<6.8	<389	<0.57	<1.7	<106	<0.43	<5.4	94.6
AAB6026	03-02601	0.0–0.25	Sediment	1340	<4.7	<0.45	<27.2	<0.33	<0.52	1720	2.3	<2.6	5.9	NA	4380	42.4	<759	77.5	<0.03	<3.2	<376	<0.45	<0.83	<121	<0.45	<5.2	107
AAB6029	03-02601	0.0–0.25	Sediment	1480	<5.5	<0.53	<31.3	<0.39	<0.45	<1160	3	<2	6.7	NA	5730	13.9	<735	86.7	<0.03	<4.3	<412	<0.53	<0.97	<85.9	<0.53	<9.1	80.9
AAB6027	03-02602	0.0–0.5	Sediment	1980	<5.5	<0.52	<40.2	<0.43	<0.58	2230	16.5	<2.1	10.1	NA	4310	14.1	<725	67.2	0.14	<4.9	<446	<0.52	<0.96	<118	<0.52	<6.1	111
AAB6028	03-02603	0.0–0.5	Sediment	1550	<5.7	<0.54	<31.5	<0.31	<0.46	3260	3.6	<1.6	<5.2	NA	3480	15	<711	75.2	<0.03	<4.3	<438	<0.54	<1	<114	<0.54	<4.8	72.7
AAB6030	03-02604	0.0–0.67	Sediment	2260	<4.4	<0.48	<31	<0.44	<0.58	2120	5.4	<2.5	6.7	NA	3320	49.4	<780	117	<0.03	<3.7	<472	<0.42	<0.78	<203	<0.42	<5.7	83.9
Consolidated Unit 03-014(a)-99																											
SWMU 03-014(a)																											
AAB5944	03-02100	0.0–1.0	Soil	7310	<4.8	<1.4	70.5	<0.69	2.4	<991	30.6	<2.2	68.6	NA	9830	45.8	1170	258	0.14	<6.6	<1060	<0.45	20.2	<225	<0.45	12	94.7
AAB5952	03-02100	1.0–1.5	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB5945	03-02101	0.0–1.0	Soil	7360	<4.4	3.1	136	<0.69	2.3	2480	164	<3.8	159	NA	11100	115	1170	341	0.67	<8.3	<1020	<0.42	81.2	<143	<0.42	20.1	111
AAB5953	03-02101	1.0–1.5	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB5947	03-02102	0.0–1.0	Soil	11700	<4.7	3.6	169	1.3	4	2620	239	<8.4	210	NA	17400	102	1950	472	0.14	10.6	1240	<0.45	110	<425	<0.45	30.6	125
AAB5954	03-02102	1.0–1.5	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB5948	03-02103	0.0–1.0	Soil	5950	<4.6	<1.9	116	<0.76	3.4	1730	200	<2.6	220	NA	7420	76.4	1350	193	2.6	10.6	<950	<0.44	106	<180	<0.44	13.9	113
AAB5955	03-02103	1.0–1.5	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB5949	03-02104	0.0–1.0	Soil	7730	<4.6	<1.8	132	<0.7	3	1590	209	<2.7	203	NA	8410	93	1170	272	0.21	<8.5	<910	<0.44	106	<259	<0.44	17.2	104
AAB5956	03-02104	1.0–1.5	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 4.1-11 (continued)

Sample ID	Location	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
AOC 03-014(b2)																											
AAB5930	03-02105	0.0–1.0	Soil	NA	<0.43	<1.1	<22.1	<0.45	<0.05	NA	2.6	NA	NA	NA	NA	8.4	NA	NA	NA	<1.5	NA	<0.69	<0.61	NA	<0.66	NA	NA
AAB5931	03-02106	0.0–1.0	Soil	NA	<0.58	<1.6	<57.4	<0.33	<0.29	NA	86	NA	NA	NA	NA	30.5	NA	NA	NA	<4.4	NA	<0.94	42.4	NA	<0.91	NA	NA
AAB5934	03-02107	0.0–1.0	Soil	NA	<0.53	<2	<53.6	<0.51	<0.1	NA	10.8	NA	NA	NA	NA	17.7	NA	NA	NA	<2.6	NA	<0.85	5.5	NA	<0.82	NA	NA
AAB5935	03-02108	0.0–0.5	Soil	NA	<0.49	2.9	60.8	<0.41	<0.32	NA	4.1	NA	NA	NA	NA	30.2	NA	NA	NA	<2.9	NA	<0.79	<0.62	NA	<0.77	NA	NA
AOC 03-014(c2)																											
AAB5907	03-02109	0.0–1.0	Sediment	3330	<4.5	<0.67	<37.3	<0.52	<1.1	1860	4.2	<0.8	<5.1	NA	6440	1550	<948	242	<0.03	<1.3	<513	<0.43	<1.9	<115	<0.43	<6.8	28.2
AAB5908	03-02110	0.0–1.0	Sediment	6500	<4.5	<1.3	68.8	<0.65	<1.1	1850	5.8	<1.4	11.1	NA	8710	27	1150	191	<0.09	<2.3	1080	<0.42	<1.8	<106	<0.42	<9.7	42.7
AAB5909	03-02110	0.67–1.0	Sediment	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB5910	03-02110	1.0–1.5	Sediment	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB5911	03-02111	0.0–1.0	Sediment	5240	<4.4	<0.66	45.7	<0.78	1.4	1160	2.8	<2	<2.9	NA	9740	13.3	<1050	235	<0.03	<3.6	<860	<0.42	<0.78	<96.9	<0.42	<9	39.4
AAB5913	03-02111	1.0–1.5	Sediment	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB5912	03-02112	0.0–1.0	Sediment	3720	<4.5	2.3	47.4	<0.4	7.3	2600	118	<1.2	105	NA	11800	39.7	<865	179	1.3	26.5	<717	<0.43	60.2	<120	<0.43	<7.3	106
AAB5914	03-02112	0.67–1.0	Sediment	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB5915	03-02113	0.0–1.0	Sediment	4160	<4.5	<0.66	84.2	<0.4	1.7	1940	61.4	<1.4	36.9	NA	5960	17.8	1090	194	0.26	<6.8	<779	<0.43	29.2	<194	<0.43	<8.6	52.2
AAB5916	03-02113	1.0–1.5	Sediment	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	32.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB5917	03-02114	0.0–1.0	Sediment	5120	<4.5	<1.7	46.4	<0.62	2	1610	11.5	<1.1	16.7	NA	8570	9.7	1140	243	0.23	11.3	<923	<0.43	3	<136	<0.43	<9.7	40.2
AAB5919	03-02114	1.0–1.5	Sediment	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.42	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB5918	03-02115	0.0–0.5	Sediment	3680	<4.4	<0.78	89.4	<0.38	1.4	6970	67.8	<1.7	30.2	NA	6190	18.4	1120	184	0.25	<4.3	<749	<0.42	32	<124	<0.42	<8	49.2
AAB5921	03-02115	0.33–0.5	Sediment	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	14.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB5929	03-02115	0.33–0.5	Sediment	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	13.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB5922	03-02116	0.0–0.67	Sediment	2880	<4.3	<0.64	45.8	<0.39	<0.82	2180	30.9	<0.79	26.3	NA	4680	10.5	<702	126	0.14	<2.1	<645	<0.41	15.3	<185	<0.41	<5.2	30.7
AAB5924	03-02116	0.0–0.67	Sediment	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB5923	03-02117	0.0–0.5	Sediment	3370	<4.6	<1.4	<38.3	<0.4	1.3	1280	74.9	<0.77	52.9	NA	5560	15.5	<588	61.6	0.5	12.6	<727	<0.44	32.6	<180	<0.44	<8.8	39.9
AAB5925	03-02117	0.0–0.5	Sediment	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	17.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Consolidated Unit 03-015-00																											
SWMU 03-015																											
AAB5809	03-02000	0.0–1.5	Soil	NA	<0.83	3.7	134	<0.96	<0.75	NA	16.1	NA	NA	NA	NA	71.5	NA	NA	2.4	16.5	NA	1.2	2.7	NA	<0.64	NA	NA
AAB5810	03-02001	0.0–1.5	Soil	NA	<0.39	4.4	105	<0.74	<0.23	NA	13	NA	NA	NA	NA	22.1	NA	NA	NA	<8.4	NA	<1	<0.07	NA	<0.61	NA	NA
AAB5811	03-02002	0.0–1.5	Soil	NA	<0.4	4.2	150	<0.8	<0.07	NA	11.7	NA	NA	NA	NA	15.1	NA	NA	NA	<7.7	NA	<0.65	<0.07	NA	<0.62	NA	NA
AAB5812	03-02003	0.0–1.5	Soil	NA	<0.47	5.1	129	<0.9	<0.11	NA	10.8	NA	NA	NA	NA	20.8	NA	NA	NA	<7.6	NA	<0.64	<0.07	NA	<0.62	NA	NA
AOC 03-047(d)																											
VCXX-95-0082	03-09008	0.0–0.5	Soil	4690	<0.992	2.19	52.2	0.417	0.562	3240	13	2.14	18.3	NA	8430	21.7	1120	175	0.637	6.16	790	0.372	<0.992	132	<0.992	10.5	71.6
VCXX-95-0083	03-09009	0.0–0.5	Soil	4870	<0.992	2.13	38.7	0.545	<0.496	1120	4.73	1.29	5.28	NA	8660	13	915	197	0.0561	3.41	732	0.346	<0.992	231	<0.992	7.91	43.3
VCXX-95-0084	03-09010	0.0–0.5	Soil	4450	0.246	2.56	217	0.354	0.346	6040	13.2	2.87	16.9	NA	10100	391	1050	198	0.15	7.63	723	0.518	<0.995	81.4	<0.995	12.4	125

Table 4.1-11 (continued)

Sample ID	Location	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
AOC 03-051(c)																											
VCXX-95-0091	03-09012	0.0–0.5	Soil	8810	<0.941	2.7	64.7	0.566	0.862	1070	6.27	2.52	3.73	NA	10800	18.3	1270	210	<0.0305	4.25	1020	<0.47	<0.941	115	<0.941	15.1	34.4
VCXX-95-0092	03-09013	0.0–0.5	Soil	15300	<0.953	3.71	94.8	0.874	1.34	2830	14.1	3.9	7.63	NA	16200	199	2730	444	<0.0328	7.48	1980	<0.477	<0.953	126	<0.953	26.6	305
VCXX-95-0093	03-09014	0.0–0.5	Soil	6520	<0.936	2.34	52.8	0.471	0.808	1110	4.43	2.35	3.2	NA	10100	17.9	1130	247	<0.0319	4.88	760	<0.468	<0.936	102	<2.34	10.2	42.1
VCXX-95-0094	03-09015	0.0–0.5	Soil	11800	0.319	4.04	115	0.796	1.07	1950	9.23	6.03	6.19	NA	13800	18.4	1790	442	<0.0261	6.74	1180	<0.47	<0.94	98.2	<2.35	26.2	27.5

Note: All values in mg/kg. Shaded values denote results detected above BV.

[a] < = Result is not detected.

[b] NA = Not analyzed.

Table 4.1-12
Summary of VOC Screening-Level Results for TA-03 Sites

Sample ID	Location ID	Depth (ft)	Media	Acetone	Isopropyltoluene 4-	Methylene Chloride	Toluene
Consolidated Unit 03-014(a)-99							
AOC 03-014(b2)							
AAB5930	03-02105	0.0–1.0	Soil	<0.074[a]	0.28	<0.007	0.008
AOC 03-047(d)							
VCXX-95-0082	03-09008	0.0–0.5	Soil	0.0134	NA[b]	0.00267	<0.002
VCXX-95-0083	03-09009	0.0–0.5	Soil	0.0487	NA	0.00508	<0.002
VCXX-95-0084	03-09010	0.0–0.5	Soil	0.00994	NA	0.0028	<0.002

Note: All values in mg/kg. Shaded values denote detected results.

[a] < = Result is not detected.

[b] NA = Not analyzed.

Table 4.1-13
Summary of SVOC Screening-Level Results for TA-03 Sites

Sample ID	Location ID	Depth (ft)	Media Code	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
Consolidated Unit 03-012(b)-00																				
SWMU 03-012(b)																				
AAB5881	03-02118	0–0.5	Soil	<0.41*	<0.41	<0.41	<0.41	<0.41	<0.41	<0.41	<0.41	<0.41	<0.41	<0.41	0.41	<0.41	<0.41	<0.41	<0.41	<0.41
AAB5882	03-02119	0–0.5	Soil	<0.44	1.5	5.9	4.1	4.9	1.2	1.2	<0.44	3.5	0.5	<0.44	11	<0.44	1.6	<0.44	6.3	7.8
Consolidated Unit 03-014(a)-99																				
AOC 03-014(b2)																				
AAB5931	03-02106	0–1	Soil	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	0.6	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58
AOC 03-014(c2)																				
AAB5912	03-02112	0–1	Sediment	<0.35	<0.35	<0.35	1.8	1.7	0.43	2	<0.35	1.8	<0.35	<0.35	3.2	<0.35	0.66	<0.35	1.3	3.2
Consolidated Unit 03-015-00																				
SWMU 03-015																				
AAB5809	03-02000	0–1.5	Soil	12	22	63	57	54	40	38	<3.8	60	14	5.6	120	10	45	7.2	88	120
AAB5810	03-02001	0–1.5	Soil	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	0.52	<0.36	<0.36	<0.36	<0.36	0.44
AOC 03-047(d)																				
VCXX-95-0082	03-09008	0–0.5	Soil	<13.2	<13.2	<13.2	21.9	31.3	<13.2	<13.2	<13.2	<13.2	<13.2	<13.2	60.1	<13.2	11.6	<13.2	49.6	43
VCXX-95-0084	03-09010	0–0.5	Soil	<12.9	<12.9	<12.9	10.1	13.4	<12.9	<12.9	<12.9	9.57	<12.9	<12.9	29.1	<12.9	<12.9	<12.9	23.5	20.7

Note: All values in mg/kg. Shaded values denote detected results.
* < = Result is not detected.

Table 4.1-14
Summary of PCB Screening-Level Results for TA-03 Sites

Sample ID	Location ID	Depth (ft)	Media Code	Aroclor-1254	Aroclor-1260	Total PCB
Consolidated Unit 03-012(b)-00						
SWMU 03-012(b)						
AAB5881	03-02118	0–0.5	Soil	<0.21[a]	6.2	NA[b]
AAB7668	03-02118	0–0.5	Soil	<2.2	4.5	<8.3
AAB7703	03-02118	0–0.5	Soil	<0.064	7.6	7.6
AAB5882	03-02119	0–0.5	Soil	<0.88	0.83	NA
Consolidated Unit 03-013(a)-00						
AAB6029	03-02601	0–0.25	Sediment	0.021	<0.0156	0.021
Consolidated Unit 03-014(a)-99						
SWMU 03-014(a)						
AAB5944	03-02100	0–1	Soil	<0.037	0.18	NA
AAB5945	03-02101	0–1	Soil	<0.035	0.73	NA
AAB5947	03-02102	0–1	Soil	<0.037	0.42	NA
AAB5949	03-02104	0–1	Soil	<0.037	0.36	NA
AOC 03-014(c2)						
AAB5907	03-02109	0–1	Sediment	<0.035	0.16	NA
AAB5908	03-02110	0–1	Sediment	<0.035	0.3	NA
AAB5911	03-02111	0–1	Sediment	<0.035	0.34	NA
AAB5912	03-02112	0–1	Sediment	<1.1	0.63	NA
AAB5915	03-02113	0–1	Sediment	<0.035	0.25	NA
AAB5917	03-02114	0–1	Sediment	<0.035	0.38	NA
AAB5922	03-02116	0–0.67	Sediment	<0.034	0.15	NA
AAB5923	03-02117	0–0.5	Sediment	<0.108	0.19	NA
AOC 03-047(d)						
VCXX-95-0083	03-09009	0–0.5	Soil	<0.0333	0.0866	NA
VCXX-95-0084	03-09010	0–0.5	Soil	<0.331	1.19	NA

Note: All values in mg/kg. Shaded values denote detected results.
[a] < = Result is not detected.
[b] NA = Not analyzed.

Table 4.1-15
Summary of Radionuclide Screening-Level Results for TA-03 Sites

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Cobalt-60	Europium-152	Gross alpha	Gross beta	Plutonium-238	Plutonium-239/240	Strontium-90	Tritium	Uranium-234	Uranium-235	Uranium-238
Soil BV/FV				**0.013**	**1.65**	**na[a]**	**na**	**na**	**na**	**0.023**	**0.054**	**1.31**	**na**	**2.59**	**0.2**	**2.29**
Sediment BV/FV				**0.04**	**0.9**	**na**	**na**	**na**	**na**	**0.006**	**0.068**	**1.04**	**na**	**2.59**	**0.2**	**2.29**
Consolidated Unit 03-012(b)-00																
SWMU 03-012(b)																
AAB5881	03-02118	0.0–0.5	Soil	<0.002[b]	0.232	<0	<-0.017	4.21	2.54	NA	NA	NA	<0.0891	NA	NA	NA
AAB5882	03-02119	0.0–0.5	Soil	<0.054	0.307	<-0.037	<0.014	8	5.03	0.1	0.81	<-0.05	0.420	5.68	0.22	3.81
AAB7669	03-02121	0.0–0.5	Sediment	NA[c]	NA	NA	NA	<-14.67	<-34.65	NA	NA	NA	1.5	NA	NA	NA
AAB7702	03-02122	0.0–0.5	Sediment	NA	NA	NA	NA	<-7.34	<-15.07	NA	NA	NA	6.66	NA	NA	NA
Consolidated Unit 03-014(a)-99																
SWMU 03-014(a)																
AAB5944	03-02100	0.0–1.0	Soil	<0.022	<0.053	<-0.006	<0.086	<-44.02	<-42.94	0.07	0.047	<0.5	<0	1.482	0.056	1.059
AAB5945	03-02101	0.0–1.0	Soil	<0.177	<0.091	<-0.006	<0.135	<-14.67	<-24.86	0.097	0.57	<0.06	<0	2.734	0.131	1.284
AAB5947	03-02102	0.0–1.0	Soil	<0.025	0.301	<0.016	<0.075	<-44.02	<-45.95	0.178	0.113	<-0.12	<0	10.011	0.543	2.581
AAB5954	03-02102	1.0–1.5	Soil	NA	NA	NA	NA	<-44.02	<-59.51	NA	NA	NA	0.94	NA	NA	NA
AAB5948	03-02103	0.0–1.0	Soil	<0.14	0.145	<-0.022	<0.021	<29.35	<-18.83	0.135	0.164	<-0.04	<0.6	2.644	0.113	1.633
AAB5949	03-02104	0.0–1.0	Soil	0.068	0.271	<0.013	<0.147	<-29.35	<-30.88	0.144	0.074	<-0.17	<0	2.757	0.092	2.16
SWMU 03-014(b2)																
AAB5930	03-02105	0.0–1.0	Soil	<0.078	<0.037	<0.019	<0.111	2.7	1.73	NA	NA	NA	<0.0319	NA	NA	NA
AAB5931	03-02106	0.0–1.0	Soil	<0.025	0.904	0.07	<0.151	3.59	3.92	NA	NA	NA	<0.304	NA	NA	NA
AAB5934	03-02107	0.0–1.0	Soil	<0.028	0.797	<-0.041	<0.169	6.3	4.62	NA	NA	NA	<0.0339	NA	NA	NA
AAB5935	03-02108	0.0–0.5	Soil	<0.076	2.44	<0.005	<-0.042	7.42	9.7	NA	NA	0.66	<0.185	NA	NA	NA
SWMU 03-014(c2)																
AAB5907	03-02109	0.0–1.0	Sediment	<0	0.173	<0.012	<0.073	<-29.35	<-32.39	0.009	<-0.002	<0.03	<0.03	0.617	0.029	0.628
AAB5908	03-02110	0.0–1.0	Sediment	<0.104	0.101	<-0.042	<0.159	<14.67	<-18.83	0.02	<0.002	<0.37	<0	0.689	0.011	0.68
AAB5911	03-02111	0.0–1.0	Sediment	<0.023	<0.034	<0.015	0.44	<-44.02	<-35.4	<-0.002	NA	<0.07	<0	0.554	0.034	0.507
AAB5912	03-02112	0.0–1.0	Sediment	<0.045	0.235	<0.039	<0.141	<-44.02	<-26.36	0.007	0.257	<0.01	<0.44	2.41	0.104	1.117
AAB5915	03-02113	0.0–1.0	Sediment	<0.005	0.067	<-0.042	<0.07	<-44.02	<-56.49	0.002	0.065	<-0.22	1.03	1.248	0.056	0.863
AAB5917	03-02114	0.0–1.0	Sediment	<0.04	<0.041	<-0.008	<0.171	<-29.35	<-29.38	<-0.009	0.011	<-0.14	<0.87	0.899	0.032	0.689
AAB5918	03-02115	0.0–0.5	Sediment	<0.031	<0.079	<-0.002	<0.004	<-44.02	<-44.44	0.014	0.011	<-1.31	<0.54	1.095	0.059	0.869
AAB5922	03-02116	0–0.67	Sediment	<0.052	<0.038	<-0.003	0.214	<-29.35	<-44.44	0.007	0.005	<0.27	<0.47	0.759	0.032	0.768
AAB5923	03-02117	0.0–0.5	Sediment	<0.028	0.206	<-0.021	<0.146	<-44.02	<-54.99	0.016	0.029	<0	3.14	1.815	0.101	1.468

Table 4.1-15 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Cobalt-60	Europium-152	Gross alpha	Gross beta	Plutonium-238	Plutonium-239/240	Strontium-90	Tritium	Uranium-234	Uranium-235	Uranium-238
Soil BV/FV				**0.013**	**1.65**	**na**[a]	**na**	**na**	**na**	**0.023**	**0.054**	**1.31**	**na**	**2.59**	**0.2**	**2.29**
Sediment BV/FV				**0.04**	**0.9**	**na**	**na**	**na**	**na**	**0.006**	**0.068**	**1.04**	**na**	**2.59**	**0.2**	**2.29**
Consolidated Unit 03-015-00																
SWMU 03-015																
AAB5809	03-02000	0.0–1.5	Soil	<0.042	0.191	<0.022	<0.061	23.2	15.2	<0.01	0.03	<-0.06	<0	6.31	0.31	6.29
AAB5810	03-02001	0.0–1.5	Soil	<0.072	0.068	<0.001	<0.12	<-29.35	<12.81	<0	<0.01	NA	<0	1.91	0.12	1.89
AAB5811	03-02002	0.0–1.5	Soil	<0.181	<0.026	<0.018	0.195	<-29.35	3.52	<-0.01	<0.01	NA	<0	0.95	0.07	0.99
Consolidated Unit 03-059-00																
SWMU 03-059																
AAB7771	03-02706	0.0–0.5	Engineered Material	NA	NA	NA	NA	<-7.38	<-16.01	NA	NA	NA	2.55	NA	NA	NA
AAB7774	03-02709	0.0–0.5	Engineered Material	NA	NA	NA	NA	<-7.38	<-22.42	NA	NA	NA	5.69	NA	NA	NA
AAB7777	03-02712	0.0–0.5	Engineered Material	NA	NA	NA	NA	<7.38	<30.96	NA	NA	NA	1.48	NA	NA	NA

Note: All values in pCi/g. Shaded values denote results detected above BV/FV. BV/FV are provided in LANL 1998, 059730.

[a] na = Not available.

[b] < = Result is not detected.

[c] NA = Not analyzed.

Table 4.2-1
Decision-Level Data from TA-60 Site Samples Collected and Analyses Requested

Sample ID	Location ID	Depth (ft)	Media	Metals	PCBs	SVOCs	TPH	VOCs
SWMU 60-002 (east and central)								
RE60-03-52308	60-22517	4–4.5	Qbt 4	1884S	—*	1884S	1884S	1884S
RE60-03-52307	60-22517	8.5–9	Qbt 4	1884S	—	1884S	1884S	1884S
RE60-03-52309	60-22517	14.5–15	Qbt 4	1884S	—	1884S	1884S	1884S
RE60-03-52312	60-22518	4.5–5	Soil	1884S	—	1884S	1884S	1884S
RE60-03-52314	60-22518	14.5–15	Qbt 4	1884S	—	1884S	1884S	1884S
RE60-03-52317	60-22519	4.5–5	Soil	1884S	—	1884S	1884S	1884S
RE60-03-52320	60-22519	13.5–14	Qbt 4	1884S	—	1884S	1884S	1884S
RE60-03-52322	60-22520	3–3.5	Soil	1884S	—	1884S	1884S	1884S
RE60-03-52324	60-22520	14.5–15	Qbt 4	1884S	—	1884S	1884S	1884S
RE60-03-52327	60-22521	4–4.5	Soil	1884S	—	1884S	1884S	1884S
RE60-03-52329	60-22521	14.5–15	Qbt 4	1884S	—	1884S	1884S	1884S
RE60-03-52332	60-22522	5.5–6	Qbt 4	1884S	—	1884S	1884S	1884S
RE60-03-52334	60-22522	16–17	Qbt 4	1884S	—	1884S	1884S	1884S
RE60-04-53095	60-22680	0–1	Soil	2042S	2042S	2042S	2042S	2042S
RE60-04-53096	60-22680	1.5–2	Soil	2042S	2042S	2042S	2042S	2042S
RE60-04-53098	60-22681	0–1	Soil	2042S	2042S	2042S	2042S	2042S
RE60-04-53099	60-22681	1.5–2	Soil	2042S	2042S	2042S	2042S	2042S
RE60-04-53100	60-22682	0–1	Soil	2042S	2042S	2042S	2042S	2042S
RE60-04-53101	60-22682	1.5–2	Soil	—	2042S	—	2042S	2042S
SWMU 60-007(a)								
AAB5794	60-01019	0–1	Fill	—	—	—	—	18086
AAB5804	60-01019	0–1	Soil	20203	18086	18086	—	—
AAB5796	60-01021	0–1	Soil	—	—	—	—	18086
AAB5799	60-01024	0–1	Soil	—	—	—	—	18086
AAB5801	60-01025	0–1	Soil	20203	18086	18086	—	18086
AAB5806	60-01026	0–1	Soil	—	18086	—	—	18086
RC60-01-0003	60-10001	0–0.5	Fill	9408R	9407R	—	9407R	—
RC60-01-0004	60-10002	0–0.5	Fill	9408R	9407R	—	9407R	—
RC60-01-0005	60-10003	0–0.5	Fill	9408R	9407R	—	9407R	—
RC60-01-0006	60-10004	0–0.5	Fill	9408R	9407R	—	9407R	—
RC60-01-0007	60-10005	0–0.25	Fill	9408R	9407R	—	9407R	—
RC60-01-0008	60-10006	0–0.5	Fill	9408R	9407R	—	9407R	—

*— = Analyses not requested.

Table 4.2-2
Screening-Level Data from TA-60 Site Samples Collected and Analyses Requested

Sample ID	Location ID	Depth (ft)	Media	Gross Alpha/Beta Radiation	Gross Gamma Radiation	Tritium	Metals	PCBs	Pesticides	SVOCs	VOCs
AOC 60-004(b)											
AAB5769	60-01000	0.0–1.0	Soil	18896	18896	—*	18958	18084	18084	18084	—
AAB5875	60-01003	0.0–1.0	Soil	18896	18896	—	18958	18084	18084	18084	—
AAB5774	60-01005	0.0–1.0	Soil	18896	18896	—	—	—	—	—	18084
AOC 60-004(f)											
AAB7646	60-01322	0.0–0.5	Sediment	20713	20713	20713	19168	—	—	—	—
AAC0418	60-01322	2.0–2.5	Soil	20639	20639	20639	—	—	—	—	19731
AAC0419	60-01322	6.0–6.5	Qbt 4	20639	20639	20639	—	—	—	—	19731
AAC0417	60-01322	6.5–7.0	Qbt 4	20639	20639	20639	19990	19731	19731	19731	—
AAB7641	60-01323	0.0–1.5	Sediment	20713	20713	20713	—	—	—	—	—
AAB7635	60-01324	0.0–1.5	Sediment	20713	20713	20713	19168	—	—	—	—
AAB7647	60-01325	1.0–1.5	Soil	20713	20713	20713	—	—	—	—	—
AAB7726	60-01330	1.0–2.0	Soil	20527	20527	20527	19866	19137	—	19137	—
AAC0406	60-01330	2.0–2.5	Soil	20639	20639	20639	—	—	—	—	19731
AAC0407	60-01330	5.5–6.0	Qbt 4	20639	20639	20639	—	—	—	—	19731
AAC0405	60-01330	6.0–6.5	Qbt 4	20639	20639	20639	19990	19731	19731	19731	—
AAB7727	60-01331	1.0–2.0	Soil	20527	20527	20527	19866	19137		19137	—
AAC0412	60-01331	2.0–2.5	Soil	20639	20639	20639	—	—	—	—	19731
AAC0413	60-01331	5.0–5.5	Qbt 4	20639	20639	20639	—	—	—	—	19731
AAC0411	60-01331	5.5–6.0	Qbt 4	20639	20639	20639	19990	19731	19731	19731	—
AAB7728	60-01332	1.0–2.0	Soil	20527	20527	20527	19866	19137		19137	—
AAC0415	60-01332	2.0–2.5	Soil	20639	20639	20639	—	—	—	—	19731
AAC0416	60-01332	5.0–5.5	Qbt 4	20639	20639	20639	—	—	—	—	19731
AAC0414	60-01332	5.5–6.0	Qbt 4	20639	20639	20639	19990	19731	19731	19731	—
AAB7729	60-01333	1.0–2.0	Soil	20527	20527	20527	19866	19137	—	19137	—
AAB7730	60-01334	1.0–2.0	Soil	20527	20527	20527	19866	19137	—	19137	—
AAC0409	60-01335	2.0–2.5	Soil	20639	20639	20639	—	—	—	—	19731
AAC0410	60-01335	5.0–5.5	Qbt 4	20639	20639	20639	—	—	—	—	19731
AAC0408	60-01335	5.5–6.0	Qbt 4	20639	20639	20639	19990	19731	19731	19731	—
SWMU 60-006(a)											
AAB5817	60-01100	1.0–2.0	Sludge	18896	18896	18896	18958	—	—	18084	—
AAB5818	60-01100	1.0–2.0	Sludge	18896	18896	18896	18958	—	—	18084	—

Table 4.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Gross Alpha/Beta Radiation	Gross Gamma Radiation	Tritium	Metals	PCBs	Pesticides	SVOCs	VOCs
SWMU 60-007(a)											
AAB5794	60-01019	0.0–1.0	Fill	20952	20952	—	—	—	—	—	—
AAB5804	60-01019	0.0–1.0	Soil	20952	20952	—	—	—	—	—	—
AAB5796	60-01021	0.0–1.0	Soil	20952	20952	—	—	—	—	—	—
AAB5801	60-01025	0.0–1.0	Soil	20952	20952	—	—	—	—	—	—
AAB5806	60-01026	0.0–1.0	Soil	20952	20952	—	—	—	—	—	—
SWMU 60-007(b)											
AAB7639	60-01309	0.0–1.0	Sediment	20713	20713	20713	19168	—	—	—	—
AAB7708	60-01309	0.0–1.0	Sediment	20520	20520	20520	—	19136	—	19136	—
AAB7636	60-01313	0.0–1.5	Soil	20713	20713	20713	—	—	—	—	—
AAB7705	60-01313	0.0–1.5	Soil	20520	20520	20520	—	—	—	—	19136
AAB7643	60-01315	0.0–0.5	Sediment	21950	21950	21950	—	—	—	—	—
AAB7706	60-01315	0.0–0.5	Sediment	20520	20520	20520	—	—	—	—	19136
AAB7648	60-01316	0.0–0.5	Sediment	20713	20713	20713	19168	—	—	—	—
AAB7707	60-01316	0.0–1.0	Sediment	20520	20520	20520	—	19136	—	19136	—

*— = Analyses not requested.

Table 4.2-3
Summary of Inorganic Chemicals Above BVs for TA-60 Sites

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Nickel	Selenium	Thallium	Vanadium	Zinc
Soil/Fill BV				**29200**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21500**	**22.3**	**4610**	**671**	**15.4**	**1.52**	**0.73**	**39.6**	**48.8**
Sediment BV				**15400**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13800**	**19.7**	**2370**	**543**	**9.38**	**0.3**	**0.73**	**19.7**	**60.2**
Qbt 4 BV				**7340**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14500**	**11.2**	**1690**	**482**	**6.58**	**0.3**	**1.1**	**17**	**63.5**
SWMU 60-002 (east)																					
RE60-03-52308	60-22517	4.0–4.5	Qbt 4	15350	3.52	52.5	—[a]	—	2440	8.2	3.83	—	17600	—	2540	—	7.73	0.579	—	18.4	—
RE60-03-52307	60-22517	8.5–9.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	539	—	0.54(U)	—	—	—
RE60-03-52309	60-22517	14.5–15.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.516(U)	—	—	—
RE60-03-52312	60-22518	4.5–5.0	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	74.8
RE60-03-52314	60-22518	14.5–15.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.48(U)	—	—	—
RE60-03-52317	60-22519	4.50–5.00	Soil	—	—	310	—	0.539(U)	8050	—	—	—	—	—	—	—	—	—	—	—	—
RE60-03-52320	60-22519	13.5–14.0	Qbt 4	23720	3.97	108	1.69	—	3470	10.1	—	7.99	15200	15	3520	—	13.2	0.583(U)	—	20.1	—
RE60-03-52322	60-22520	3.0-3.5	Soil	—	—	—	—	0.55(U)	8230	—	10	—	—	—	—	—	16	—	—	—	—
RE60-03-52324	60-22520	14.5–15.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.489(U)	—	—	—
RE60-03-52327	60-22521	4.0–4.5	Soil	—	—	—	—	0.533(U)	—	—	—	—	—	—	—	—	17.1	—	—	—	—
RE60-03-52332	60-22522	5.5–6.0	Qbt 4	15520	3.45	375	—	—	2720	8.23	—	—	—	—	2390	—	—	0.542(U)	—	18.3	—
RE60-03-52334	60-22522	16.0–17.0	Qbt 4	9900	—	—	—	—	—	—	—	—	—	12.4	—	—	8.72	0.565(U)	—	—	—
SWMU 60-002 (central)																					
RE60-04-53096	60-22680	1.5–2.0	Soil	—	—	—	—	—	—	—	—	—	—	—	—	726	—	—	—	—	—
SWMU 60-007(a)																					
AAB5801	60-01025	0.0–1.0	Soil	NA[b]	—	331(J-)	—	—	NA	—	NA	NA	NA	—	NA	NA	—	—	—	NA	NA
RC60-01-0003	60-10001	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.75	—	—

Note: All values in mg/kg. BVs are provided in LANL 1998, 059730.

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

[b] NA = Not analyzed.

Table 4.2-4
Summary of Detected Organic Chemicals for TA-60 Sites

Sample ID	Location ID	Depth (ft)	Media	VOCs			SVOCs				PCBs		TPH		
				Acetone	Hexanone[2-]	Toluene	Acenaphthene	Fluoranthene	Fluorene	Pyrene	Aroclor-1254	Aroclor-1260	DRO	GRO	LRO
SWMU 60-002 (east)															
RE60-03-52308	60-22517	4.0–4.5	Qbt 4	0.0062(J)	—[a]	—	—	—	—	—	NA[b]	NA	3.9	—	NA
RE60-03-52307	60-22517	8.5–9.0	Qbt 4	0.0044(J)	—	—	—	—	—	—	NA	NA	5.1	—	NA
RE60-03-52309	60-22517	14.5–15.0	Qbt 4	—	—	—	—	—	—	—	NA	NA	1.1(J)	—	NA
RE60-03-52312	60-22518	4.5–5.0	Soil	—	—	—	—	0.0357(J)	0.0056(J)	0.0443	NA	NA	12.9	—	NA
RE60-03-52314	60-22518	14.5–15.0	Qbt 4	0.0042(J)	—	—	—	—	—	—	NA	NA	2.2	—	NA
RE60-03-52317	60-22519	4.50–5.00	Soil	—	—	—	—	—	—	—	NA	NA	1.1(J)	—	NA
RE60-03-52320	60-22519	13.5–14.0	Qbt 4	0.0118(J)	0.0088	—	—	—	—	—	NA	NA	3	—	NA
RE60-03-52322	60-22520	3.0–3.5	Soil	—	—	—	—	—	—	—	NA	NA	1.8(J)	—	NA
RE60-03-52327	60-22521	4.0–4.5	Soil	—	—	—	—	—	—	—	NA	NA	1.1(J)	—	NA
RE60-03-52329	60-22521	14.5–15.0	Qbt 4	0.0042(J)	—	—	—	—	—	—	NA	NA	11.3	—	NA
RE60-03-52332	60-22522	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	NA	NA	2.6	—	NA
RE60-03-52334	60-22522	16.0–17.0	Qbt 4	—	—	—	—	—	—	—	NA	NA	2.6	—	NA
SWMU 60-002 (central)															
RE60-04-53095	60-22680	0.0–1.0	Soil	—	—	—	0.0244(J)	—	—	—	—	—	—	—	NA
RE60-04-53096	60-22680	1.5–2.0	Soil	—	—	—	—	—	—	—	—	0.0042(J)	—	—	NA
RE60-04-53099	60-22681	1.5–2.0	Soil	—	—	—	—	—	—	—	—	—	—	0.0344(J)	NA
RE60-04-53100	60-22682	0.0–1.0	Soil	—	—	—	0.0198(J)	—	—	—	0.0202	0.0162	—	—	NA
RE60-04-53101	60-22682	1.5–2.0	Soil	—	—	—	NA	NA	NA	NA	0.0025(J)	—	NA	0.173	NA
SWMU 60-007(a)															
AAB5799	60-01024	0.0–1.0	Soil	—	—	0.001(J)	NA	NA	NA	NA	NA	NA	NA	NA	NA
RC60-01-0003	60-10001	0.0–0.5	Fill	NA	NA	NA	NA	NA	NA	NA	—	—	—	NA	130
RC60-01-0006	60-10004	0.0–0.5	Fill	NA	NA	NA	NA	NA	NA	NA	—	—	1100	NA	—
RC60-01-0007	60-10005	0.0–0.25	Fill	NA	NA	NA	NA	NA	NA	NA	—	—	350	NA	160
RC60-01-0008	60-10006	0.0–0.5	Fill	NA	NA	NA	NA	NA	NA	NA	—	—	—	NA	41

Note: All values in mg/kg.
[a] — = Not detected.
[b] NA = Not analyzed.

Table 4.2-5
Summary of Inorganic Chemical Screening-Level Results for TA-60 Sites

Sample ID	Location ID	Depth (ft)	Media Code	Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Vanadium	Zinc
Soil BV				**29200**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**3460**	**1.52**	**1**	**915**	**39.6**	**48.8**
Sediment BV				**15400**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13800**	**19.7**	**2370**	**543**	**0.1**	**9.38**	**2690**	**0.3**	**1**	**1470**	**19.7**	**60.2**
Qbt 4 BV				**7340**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**3500**	**0.3**	**1**	**2770**	**17**	**63.5**
AOC 60-004(b)																								
AAB5769	60-01000	0.0–1.0	Soil	3270	<1.1[a]	95.4	<0.43	<0.56	1880	5.3	<3.2	6.6	8180	7.9	1120	225	0.17	<6.4	<607	<0.34	<0.43	<192	12.6	27.7
AAB5875	60-01003	0.0–1.0	Soil	2700	<0.45	66	<0.36	<0.56	1180	4.5	<2.1	<4.3	7450	19.4	<885	243	<0.06	<4.7	<563	<0.34	<0.43	<154	<8.3	43.5
AOC 60-004(f)																								
AAB7646	60-01322	0.0–0.5	Sediment	7250	3.4	149	<0.7	<0.5	2460	8.9	<4.1	16.6	9870	13	1700	252	<0.06	<5.3	1220	<0.54	<0.8	<205	16.9	85.7
AAC0417	60-01322	6.5–7.0	Qbt 4	11200	<2.1	64.2	<0.78	<0.07	2050	7.4	<3.9	<3.4	12700	18.6	2180	NA[b]	<0.11	<8.7	1510	<1	<0.61	<76	12.8	50.2
AAB7635	60-01324	0.0–1.5	Sediment	6600	5.9	147	<0.53	<0.37	2280	8.3	<3.2	7.5	7460	9.7	1650	223	<0.02	<5	1100	<0.54	<0.8	<187	15.5	36.4
AAB7726	60-01330	1.0–2.0	Soil	6770	5.8	230	<0.57	<0.07	2700	7.7	<4.6	7.5	9850	8	2090	305	NA	<6.8	1270	<0.94	<0.47	NA	23.2	32.8
AAC0405	60-01330	6.0–6.5	Qbt 4	13000	<2.2	74	<0.91	<0.08	2400	7.9	<2.5	<3.8	13400	4.1	2410	NA	0.28	<9.5	1710	<1.1	<0.73	<80.8	<12.7	57.2
AAB7727	60-01331	1.0–2.0	Soil	7940	5.2	180	<0.63	<0.07	1890	9.6	<4.6	8.7	9080	15.4	1700	347	NA	<6.6	1500	<0.95	<0.56	NA	19.1	47.1
AAC0411	60-01331	5.5–6.0	Qbt 4	9330	<1.7	61.9	<0.62	<0.08	1610	7.9	<2	<2.6	10500	10.9	1870	NA	0.27	<7	<1280	<1.1	<0.63	<92.6	<9.8	38.6
AAB7728	60-01332	1.0–2.0	Soil	8960	3.1	163	<0.65	<0.06	2180	7.4	<4.6	13.6	9900	12	1820	247	NA	<6.6	1570	<0.86	<0.39	NA	22	98.2
AAC0414	60-01332	5.5–6.0	Qbt 4	13800	3.7	200	<1.1	<0.08	13400	8.7	<4.1	<3.7	13900	10.5	2770	NA	0.28	10.9	1890	<1.1	<1	<155	<16.9	53.6
AAB7729	60-01333	1.0–2.0	Soil	7490	2.5	225	<0.5	<0.07	5850	7.7	<5.1	<1.7	11000	8.2	2380	956	NA	<6.4	1260	<0.94	<0.49	NA	24.5	160
AAB7730	60-01334	1.0–2.0	Soil	11600	5	193	<0.72	<0.07	2530	11.7	<5	28.7	12000	18.4	2080	245	NA	<8	1930	<0.96	<0.51	NA	26.5	77.7
AAC0408	60-01335	5.5–6.0	Qbt 4	5500	<1.5	57.5	<0.4	<0.08	1530	4.3	<1.7	<0.78	9990	5.7	1280	NA	0.31	<4.3	<975	<1.1	<0.66	<80.3	<8.1	45.5
SWMU 60-006(a)																								
AAB5817	60-01100	1.0–2.0	Sludge	116000	115	5060	9.7	174	327000	1230	106	4240	237000	3600	33100	2450	65.6	737	67100	71.28	215	72400	819	42600
AAB5818	60-01100	1.0–2.0	Sludge	9820	<7.5	334	<1.7	10.6	170000	96.7	<13.6	285	21900	369	16900	287	3.76	82.4	52300	<6.2	<7.6	66200	56.5	2950
SWMU 60-007(b)																								
AAB7639	60-01309	0.0–1.0	Sediment	2900	<0.68	48.5	<0.39	<0.37	1770	2.7	<3.7	<2.6	3960	6.7	<714	331	<0.02	<4.1	<448	<0.55	<0.81	<89.7	<6.2	35.8
AAB7648	60-01316	0.0–0.5	Sediment	1750	<0.56	<31	<0.3	<0.35	5890	2.3	<1	<3.5	3340	3.4	<597	102	<0.02	<1.6	<335	<0.52	<0.77	<102	<5.1	20.7

Note: All values in mg/kg. Shaded values denote results detected above BV.

[a] < = Result is not detected.

[b] NA = Not analyzed.

Table 4.2-6
Summary of Organic Chemical Screening-Level Results for TA-60 Sites

Sample ID	Location ID	Depth (ft)	Media Code	PCBs		SVOCs			
				Aroclor-1254	Aroclor-1260	Benzoic Acid	Benzyl Alcohol	Bis(2-ethylhexyl)phthalate	Phenol
SWMU 60-004(b)									
AAB5769	60-01000	0-1	Soil	0.0563	<0.0359*	<1.7	<0.36	<0.36	<0.36
AAB5875	60-01003	0-1	Soil	<0.0359	<0.0359	<1.7	<0.36	0.36	1.9
SWMU 60-004(f)									
AAC0411	60-01331	5.5-6	Qbt 4	0.0556	0.0439	<2	<0.41	<0.41	<0.41
SWMU 60-007(b)									
AAB7707	60-01316	0-1	Sediment	<0.46	<0.46	<3.5	<1.7	5.3	<0.35

Note: All values in mg/kg. Shaded values denote detected results.
* < = Result is not detected.

Table 4.2-7
Summary of Radionuclide Screening-Level Results for TA-60 Sites

Sample ID	Location ID	Depth (ft)	Media	Tritium
AOC 60-004(f)				
AAC0418	60-01322	2.0–2.5	Soil	1.21
AAC0419	60-01322	6.0–6.5	Qbt 4	0.98
AAC0417	60-01322	6.5–7.0	Qbt 4	1.37
AAB7641	60-01323	0.0–1.5	Sediment	0.95
AAC0407	60-01330	5.5–6.0	Qbt 4	1.52
AAC0405	60-01330	6.0–6.5	Qbt 4	1.93
AAC0411	60-01331	5.5–6.0	Qbt 4	1.97
AAC0416	60-01332	5.0–5.5	Qbt 4	1.48
AAC0414	60-01332	5.5–6.0	Qbt 4	1.08
AAC0408	60-01335	5.5–6.0	Qbt 4	0.93
SWMU 60-006(a)				
AAB5817	60-01100	1.0–2.0	Sludge	910
AAB5818	60-01100	1.0–2.0	Sludge	1090
SWMU 60-007(b)				
AAB7639	60-01309	0.0–1.0	Sediment	0.99
AAB7636	60-01313	0.0–1.5	Soil	2.97
AAB7648	60-01316	0.0–0.5	Sediment	0.99

Note: All values in pCi/g.

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 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. inner diameter), creating a vertical hole which can be advanced to the desired sample depth. When the desired depth is reached, the auger is decontaminated before advancing the hole through the sample depth. The sample material is transferred from the auger bucket to a stainless-steel sampling bowl before filling the various required sample containers.
Handling, Packaging, and Shipping of Samples	Field team member 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. After all environmental samples are collected, packaged, and preserved; a field team member transports the samples to either the SMO or an SMO-approved radiation screening laboratory under chain of custody. The SMO arranges for shipping of samples to 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.
Sample Control and Field Documentation	The collection, screening, and transport of samples are documented on standard forms generated by the SMO. These include sample collection logs, chain-of-custody forms, and sample container labels. Collection logs are completed at the time of sample collection and are signed by the sampler and a reviewer who verifies the logs for completeness and accuracy. Corresponding labels are initialed and applied to each sample container, and custody seals are placed around container lids or openings. Chain-of-custody forms are completed and assigned to verify that the samples are not left unattended. Site attributes (e.g., former and proposed soil sampling locations, sediment sampling locations) are located by using a global positioning system. 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 Environmental Restoration Database.
Field Quality Control Samples	Field quality control samples are collected as directed in the Order on Consent as follows: *Field Duplicate*: At a frequency 10%; collected at the same time as a regular sample and submitted for the same analyses. *Equipment Rinsate Blank*: 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. *Trip Blanks*: Required for all field events that include the collection of samples for VOC analysis. Trip blanks containers of certified clean sand that are opened and kept with the other sample containers during the sampling process.

Table 5.0-1 (continued)

Method	Summary
Field Decontamination of Drilling and Sampling Equipment	Dry decontamination is the preferred method to minimize generating liquid waste. Dry decontamination may include the use of a wire brush or other tool to remove soil or other material adhering to the sampling equipment, followed by use of a commercial cleaning agent (nonacid, waxless cleaners) 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 quality assurance. Specific requirements for each sample are printed on the sample collection logs provided by the sample management office (size and type of container (glass, amber glass, polyethylene, preservative, etc.). All samples are preserved by placing in insulated containers with ice to maintain a temperature of 4°C. Other requirements such as nitric acid or other preservatives may apply to different media or analytical requests.
Management, Characterization, and Storage of Investigation-Derived Waste	Investigation-derived 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 shall be adequate to comply with on-site or off-site waste acceptance criteria. All stored IDW will be marked with appropriate signage and labels, as appropriate. Drummed IDW will be stored on pallets to prevent the containers from deterioration. Generators are required to reduce the volume of waste generated as much as technically and economically feasible. Means to store, control, and transport each potential waste type and classification shall be determined before field operations that generate waste begin A waste storage area shall be established before generating waste. Waste storage areas located in controlled areas of the laboratory shall be controlled as needed to prevent inadvertent addition or management of wastes by unauthorized personnel. Each container of waste generated shall 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. See Appendix B for additional information.
Geodetic Surveys	This method describes the methodology 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.
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.

Appendix A

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

A-1.0 ACRONYMS AND ABBREVIATIONS

ACA	accelerated corrective action
AIRNET	air sampling network
AK	acceptable knowledge
amsl	above mean sea level
AOC	area of concern
bgs	below ground surface
BV	background value
CFR	Code of Federal Regulations
CSM	conceptual site model
CST	Chemical Sciences and Technology
D&D	decontamination and decommissioning
DOE	Department of Energy (U.S.)
DOT	Department of Transportation (U.S.)
dpm	disintegrations per minute
DRO	diesel range organic
DU	depleted uranium
EM	electromagnetic
EP	Environmental Programs Directorate
EPA	Environmental Protection Agency (U.S.)
EQL	estimated quantitation limit
ER	Environmental Restoration (Project)
FFCA	Federal Facility Compliance Act
FV	fallout value
GPR	ground-penetrating radar
GPS	global-positioning system
GRO	gasoline range organic
HE	high explosives
HIR	historical investigation report
HWFP	Hazardous Waste Facility Permit
IDW	investigation-derived waste
IFWGMP	Interim Facility-Wide Groundwater Monitoring Plan
kV	kilovolt
LANL	Los Alamos National Laboratory

LRO	lubrication range organic
MCL	maximum contaminant level
MCPA	methyl chlorophenoxy acetic acid
MCPP	2-(2-methyl-4- chlorophenoxy) propionic
MSGP	Multi-Sector General Permit
NFA	no further action
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
NSSB	National Security Science Building
NTS	Nevada Test Site
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	perchloroethylene (also tetrachloroethane)
pH	potential of hydrogen
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RLW	radioactive liquid waste
RFI	RCRA facility investigation
RPF	Records Processing Facility
SOP	standard operating procedure
SSL	soil screening level
SVOCs	semivolatile organic compounds
SWMU	solid waste management unit
SWSC	Sanitary Wastewater Systems Consolidation
TA	technical area
TLD	thermoluminescent dosimeter
TPH	total petroleum hydrocarbons
TSCA	Toxic Substances Control Act
TSS	total suspended solids
VCA	voluntary corrective action

VOC	volatile organic compound
WAC	waste acceptance criteria
WCSF	waste characterization strategy form
WWTP	wastewater treatment plant
XRF	x-ray fluorescence

A-2.0 GLOSSARY

abandonment—The plugging of a well or borehole in a manner that precludes the migration of surface runoff or groundwater along the length of the well or borehole.

administrative authority—For Los Alamos National Laboratory, one or more regulatory agencies, such as the New Mexico Environment Department, the U.S. Environmental Protection Agency, or the U.S. Department of Energy, as appropriate.

aggregate—At the Los Alamos National Laboratory, an area within a *watershed* containing solid waste management units (SWMUs) and/or areas of concern (AOCs), and the media affected or potentially affected by releases from those SWMUs and/or AOCs. Aggregates are designated to promote efficient and effective corrective action activities.

alluvial—Pertaining to geologic deposits or features formed by running water.

alluvium—Soil deposited by a river or other running water.

analysis—A critical evaluation, usually made by breaking a subject (either material or intellectual) down into its constituent parts, then describing the parts and their relationship to the whole. Analyses may include physical analysis, chemical analysis, toxicological analysis, and knowledge-of-process determinations.

analyte—The element, nuclide, or ion a chemical analysis seeks to identify and/or quantify; the chemical constituent of interest.

analytical method—A procedure or technique for systematically performing an activity.

aquifer—An underground geological formation (or group of formations) containing water that is the source of groundwater for wells and springs.

area of concern—(1) A release that may warrant investigation or remediation and is not a solid waste management unit (SWMU). (2) An area at Los Alamos National Laboratory that may have had a release of a hazardous waste or a hazardous constituent but is not a SWMU.

assessment—(1) The act of reviewing, inspecting, testing, checking, conducting surveillance, auditing, or otherwise determining and documenting whether items, processes, or services meet specified requirements. (2) An evaluation process used to measure the performance or effectiveness of a system and its elements. In this glossary, assessment is an all-inclusive term used to denote any one of the following: audit, performance evaluation, management system review, peer review, inspection, or surveillance.

background concentration—Naturally occurring concentrations of an inorganic chemical or radionuclide in soil, sediment, or tuff.

background data—Data that represent naturally occurring concentrations of inorganic and radionuclide constituents in a geologic medium. Los Alamos National Laboratory's (the Laboratory's) background data are derived from samples collected at locations that are either within, or adjacent to, the

Laboratory. These locations (1) are representative of geological media found within Laboratory boundaries, and (2) have not been affected by Laboratory operations.

background level—(1) The concentration of a substance in an environmental medium (air, water, or soil) that occurs naturally or is not the result of human activities. (2) In exposure assessment, the concentration of a substance in a defined control area over a fixed period of time before, during, or after a data-gathering operation.

background radiation—The amount of radioactivity naturally present in the environment, including cosmic rays from space and natural radiation from soils and rock.

background value (BV)—A statistically derived concentration (i.e., the upper tolerance limit [UTL]) of a chemical used to represent the background data set. If a UTL cannot be derived, either the detection limit or maximum reported value in the background data set is used.

bentonite—An absorbent aluminum silicate clay formed from volcanic ash and used in various adhesives, cements, and ceramic fillers. Because bentonite can absorb large quantities of water and expand to several times its normal volume, it is a common drilling mud additive.

beta radiation—High-energy electrons emitted by certain types of radioactive nuclei, such as potassium-40. The beta particles emitted are a form of ionizing radiation also known as beta rays.

blank—A sample that is expected to have a negligible or unmeasurable amount of an analyte. Results of blank sample analyses indicate whether field samples might have been contaminated during the sample collection, transport, storage, preparation, or analysis processes.

borehole—(1) A hole drilled or bored into the ground, usually for exploratory or economic purposes. (2) A hole into which casing, screen, and other materials may be installed to construct a well.

caldera—A large crater formed by a volcanic explosion or by the collapse of a volcanic cone.

canyon—A stream-cut chasm or gorge, the sides of which are composed of cliffs or a series of cliffs rising from the chasm's bed. Canyons are characteristic of arid or semiarid regions where downcutting by streams greatly exceeds weathering.

catchment—(1) A structure, such as a basin or reservoir, used for collecting or draining water. (2) The amount of water collected in such a structure. (3) A catching or collecting of water, especially rainwater.

certificate of completion—A document to be issued by the New Mexico Environment Department (NMED) under the March 1, 2005, Compliance Order on Consent (Consent Order) once NMED determines that the requirements of the Consent Order have been satisfied for a particular solid waste management unit or area of concern.

chain of custody—An unbroken, documented trail of accountability that is designed to ensure the uncompromised physical integrity of samples, data, and records.

chemical—Any naturally occurring or human-made substance characterized by a definite molecular composition.

chemical analysis—A process used to measure one or more attributes of a sample in a clearly defined, controlled, and systematic manner. Chemical analysis often requires treating a sample chemically or physically before measurement.

cleanup—A series of actions taken to deal with the release, or threat of a release, of a hazardous substance that could affect humans and/or the environment. The term cleanup is sometimes used interchangeably with the terms remedial action, removal action, or corrective action.

Code of Federal Regulations (CFR)—A document that codifies all rules of the executive departments and agencies of the federal government. The code is divided into 50 volumes, known as titles. Title 40 of the CFR (referenced as 40 CFR) covers environmental regulations.

colluvium—A loose deposit of rock debris accumulated through the action of gravity at the base of a cliff or slope.

Compliance Order on Consent (Consent Order)—For the Environmental Remediation and Surveillance Program, an enforcement document signed by the New Mexico Environment Department, the U.S. Department of Energy, and the Regents of the University of California on March 1, 2005, which prescribes the requirements for corrective action at Los Alamos National Laboratory. The purposes of the Consent Order are (1) to define the nature and extent of releases of contaminants at, or from, the facility; (2) to identify and evaluate, where needed, alternatives for corrective measures to clean up contaminants in the environment and prevent or mitigate the migration of contaminants at, or from, the facility; and (3) to implement such corrective measures. The Consent Order supersedes the corrective action requirements previously specified in Module VIII of the Laboratory's Hazardous Waste Facility Permit.

Consent Order—See Compliance Order on Consent.

consolidated unit—A group of solid waste management units (SWMUs), or SWMUs and areas of concern, which generally are geographically proximate and have been combined for the purposes of investigation, reporting, or remediation.

contaminant—(1) Chemicals and radionuclides present in environmental media or on debris above background levels. (2) According to the March 1, 2005, Compliance Order on Consent (Consent Order), any hazardous waste listed or identified as characteristic in 40 Code of Federal Regulations (CFR) 261 (incorporated by 20.4.1.200 New Mexico Administrative Code [NMAC]); any hazardous constituent listed in 40 CFR 261 Appendix VIII (incorporated by 20.4.1.200 NMAC) or 40 CFR 264 Appendix IX (incorporated by 20.4.1.500 NMAC); any groundwater contaminant listed in the Water Quality Control Commission (WQCC) Regulations at 20.6.3.3103 NMAC; any toxic pollutant listed in the WQCC Regulations at 20.6.2.7 NMAC; explosive compounds; nitrate; and perchlorate. (Note: Under the Consent Order, the term "contaminant" does <u>not</u> include radionuclides or the radioactive portion of mixed waste.)

corrective action—(1) In the Resource Conservation and Recovery Act, an action taken to rectify conditions potentially adverse to human health or the environment. (2) In the quality assurance field, the process of rectifying and preventing nonconformances.

data validation—A systematic process that applies a defined set of performance-based criteria to a body of data and that may result in the qualification of the data. The data-validation process is performed independently of the analytical laboratory that generates the data set and occurs before conclusions are drawn from the data. The process may include a standardized data review (routine data validation) and/or a problem-specific data review (focused data validation).

data verification—The process of evaluating the completeness, correctness, consistency, and compliance of a laboratory data package against a specified standard or contract.

- <u>Completeness</u>: All required information is present—in both hard copy and electronic forms.
- <u>Correctness</u>: The reported results are based on properly documented and correctly applied algorithms.
- <u>Consistency</u>: The values are the same when they appear in different reports or are transcribed from one report to another.

- Compliance: The data pass numerical quality-control tests based on parameters or limits specified in a contract or in an auxiliary document.

decision peer review—A technical (subject-matter-expert) review that occurs before document writing has begun. The focus of the decision peer review is on the appropriateness of the stated objectives for the identified problem, on the adequacy of the proposed approach to address the objectives, and on the identification of concerns and necessary contingencies. Any decision that is expected to lead to the writing of a peer-reviewed document is subject to a decision peer review and falls under Quality Procedure 3.5, Peer Review Process.

decommissioning—The permanent removal of facilities and their components from service after the discontinued use of structures or buildings that are deemed no longer useful. Decommissioning must take place in accordance with regulatory requirements and applicable environmental policies.

decontamination—The removal of unwanted material from the surface of, or from within, another material.

detect (detection)—An analytical result, as reported by an analytical laboratory, that denotes a chemical or radionuclide to be present in a sample at a given concentration.

detection limit—The minimum concentration that can be determined by a single measurement of an instrument. A detection limit implies a specified statistical confidence that the analytical concentration is greater than zero.

discharge—The accidental or intentional spilling, leaking, pumping, pouring, emitting, emptying, or dumping of hazardous waste into, or on, any land or water.

disposal—The discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into, or on, any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including groundwaters.

document catalog number—A unique document identifier designed to track every document generated by the Environmental Remediation and Surveillance Program. (This number is automatically assigned when an online document signature form is obtained.)

document peer review—A technical, regulatory, and legal review of a final, professionally edited document. Before the peer review, the document should receive a Level 3 (full) edit as defined by Los Alamos National Laboratory's Communication Arts and Services (IM-1) Group. Because this review follows the decision peer review, the approach should already have been agreed upon. Thus, the primary focus of a document peer review is on content (and to a lesser extent on approach; the clarity of presentation; and a consistent, appropriate format). The document peer review may be either a panel review or a read review. Quality Procedure 4.9 (Document Development and Approval Process) lists the types of Environmental Remediation and Surveillance Program documents that require a formal peer review.

effluent—Wastewater (treated or untreated) that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

Environmental Restoration (ER) Project—A Los Alamos National Laboratory project established in 1989 as part of a U.S. Department of Energy nationwide program, and precursor of today's Environmental Remediation and Surveillance (ERS) Program. This program is designed (1) to investigate hazardous and/or radioactive materials that may be present in the environment as a result of past Laboratory operations, (2) to determine if the materials currently pose an unacceptable risk to human health or the environment, and (3) to remediate (clean up, stabilize, or restore) those sites where unacceptable risk is still present.

environmental samples—Air, soil, water, or other media samples that have been collected from streams, wells, and soils, or other locations, and that are not expected to exhibit properties classified as hazardous by the U.S. Department of Transportation.

ephemeral—Pertaining to a stream or spring that flows only during, and immediately after, periods of rainfall or snowmelt.

ER data—Data derived from samples that have been collected and paid for through Environmental Remediation and Surveillance Program funding.

ER database (ERDB)—A database housing analytical and other programmatic information for the Environmental Remediation and Surveillance Program. The ERDB currently contains about 3 million analyses in 300 tables.

ER identification (ER ID) number—A unique identifier assigned by the Environmental Remediation and Surveillance Program‘s Records Processing Facility to each document when it is submitted as a final record.

estimated quantitation limit (EQL)—The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine analytical-laboratory operating conditions. The low point on a calibration curve should reflect this quantitation limit. The EQL is not used to establish detection status. Sample EQLs are highly matrix dependent, and the specified EQLs might not always be achievable.

evapotranspiration—(1) The discharge of water from the earth’s surface to the atmosphere by evaporation from lakes, streams, and soil surfaces and by transpiration from plants. (2) The loss of water from the soil by evaporation and/or by transpiration from the plants growing in the soil.

facility—All contiguous land (and structures, other appurtenances, and improvements on the land) used for treating, storing, or disposing of hazardous waste. A facility may consist of several treatment, storage, or disposal operational units. For the purpose of implementing a corrective action, a facility is all the contiguous property that is under the control of the owner or operator seeking a permit under Subtitle C of the Resource Conservation and Recovery Act.

field duplicate (replicate) samples—Two separate, independent samples taken from the same source, which are collected as collocated samples (i.e., equally representative of a sample matrix at a given location and time).

floodplain—The flat, or nearly flat, land along a river or stream, or in a tidal area, that is covered by water during a flood.

gamma radiation—A form of electromagnetic, high-energy ionizing radiation emitted from a nucleus. Gamma rays are essentially the same as x-rays (though at higher energy) and require heavy shielding, such as concrete or steel, to be blocked.

groundwater—Interstitial water that occurs in saturated earth material and is capable of entering a well in sufficient amounts to be used as a water supply.

hazard index—The sum of hazard quotients for multiple contaminants to which a receptor may have been exposed.

Hazardous and Solid Waste Amendments (HSWA)—Public Law No. 98-616, 98 Stat. 3221, enacted in 1984, which amended the Resource Conservation and Recovery Act of 1976 (42 United States Code § 6901 et seq).

hazardous waste—(1) Solid waste that is listed as a hazardous waste, or exhibits any of the characteristics of hazardous waste (i.e., ignitability, corrosivity, reactivity, or toxicity, as provided in 40 CFR, Subpart C). (2) According to the March 1, 2005, Compliance Order of Consent (Consent Order), any solid waste or combination of solid wastes that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, meets the description set forth in New Mexico Statutes Annotated 1978, § 74-4-3(K) and is listed as a hazardous waste or exhibits a hazardous waste characteristic under 40 CFR 261 (incorporated by 20.4.1.200 New Mexico Administrative Code).

Hazardous Waste Bureau—The New Mexico Environment Department bureau charged with providing regulatory oversight and technical guidance to New Mexico hazardous waste generators and to treatment, storage, and disposal facilities, as required by the New Mexico Hazardous Waste Act.

Hazardous Waste Facility Permit—The authorization issued to Los Alamos National Laboratory (the Laboratory) by the New Mexico Environment Department that allows the Laboratory to operate as a hazardous waste treatment, storage, and disposal facility.

high-explosive wastes—Any waste-containing material having an amount of stored chemical energy that could start a violent reaction when initiated by impact, spark, or heat. This violent reaction would be accompanied by a strong shock wave and the potential for high-velocity particles to be propelled.

HSWA module—See Module VIII.

infiltration—(1) The penetration of water through the ground surface into subsurface soil. (2) The technique of applying large volumes of wastewater to land to penetrate the surface and percolate through the underlying soil.

investigation-derived waste—Solid waste or hazardous waste that was generated as a result of corrective action investigation or remediation field activities. Investigation-derived waste may include drilling muds, cuttings, and purge water from the installation of test pits or wells; purge water, soil, and other materials from the collection of samples; residues from the testing of treatment technologies and pump-and-treat systems; contaminated personal protective equipment; and solutions (aqueous or otherwise) used to decontaminate nondisposable protective clothing and equipment.

laboratory qualifier (laboratory flag)—Codes applied to data by a contract analytical laboratory to indicate, on a gross scale, a verifiable or potential data deficiency. These flags are applied according to the U.S. Environmental Protection Agency contract-laboratory program guidelines.

LANL (Los Alamos National Laboratory) data validation qualifiers—The Los Alamos National Laboratory data qualifiers which are defined by, and used, in the Environmental Remediation and Surveillance (ERS) Program validation process. The qualifiers describe the general usability (or quality) of data. For a complete list of data qualifiers applicable to any particular analytical suite, consult the appropriate ERS standard operating procedure.

medium (environmental)—Any material capable of absorbing or transporting constituents. Examples of media include tuffs, soils and sediments derived from these tuffs, surface water, soil water, groundwater, air, structural surfaces, and debris.

migration—The movement of inorganic and organic chemical species through unsaturated or saturated materials.

mixed waste—Waste containing both hazardous and source, special nuclear, or byproduct materials subject to the Atomic Energy Act of 1954.

Module VIII—Module VIII of the Los Alamos National Laboratory (the Laboratory) Hazardous Waste Facility Permit. This permit allows the Laboratory to operate as a hazardous-waste treatment, storage, and disposal facility. From 1990 to 2005, Module VIII included requirements from the Hazardous and Solid Waste Amendments. These requirements have been superceded by the March 1, 2005, Compliance Order on Consent (Consent Order).

monitoring well—(1) A well used to obtain water-quality samples or to measure groundwater levels, (2) A well drilled at a hazardous waste management facility or Superfund site to collect groundwater samples for the purpose of physical, chemical, or biological analysis and to determine the amounts, types, and distribution of contaminants in the groundwater beneath the site.

National Pollutant Discharge Elimination System—The national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing permits to discharge wastewater or storm water, and for imposing and enforcing pretreatment requirements under the Clean Water Act.

no further action—Under the Resource Conservation and Recovery Act, a corrective-action determination whereby, based on evidence or risk, no further investigation or remediation is warranted.

nondetect—A result that is less than the method detection limit.

operable units (OUs)—At Los Alamos National Laboratory, 24 areas originally established for administering the Environmental Remediation and Surveillance Program. Set up as groups of potential release sites, the OUs were aggregated according to geographic proximity for the purposes of planning and conducting Resource Conservation and Recovery Act (RCRA) facility assessments and RCRA facility investigations. As the project matured, it became apparent that there were too many areas to allow efficient communication and to ensure consistency in approach. In 1994, the 24 OUs were reduced to 6 administrative field units.

peer review—See decision peer review and document peer review.

permit—An authorization, license, or equivalent control document issued by the U.S. Environmental Protection Agency or an approved state agency to implement the requirements of an environmental regulation.

permit modification—A change to a condition in a facility's permit, initiated by either a request from the permittee or by the administrative authority's action.

polychlorinated biphenyls (PCBs)—Any chemical substance limited to the biphenyl molecule that has been chlorinated to varying degrees, or any combination that contains such substances. PCBs are colorless, odorless compounds that are chemically, electrically, and thermally stable and have proven to be toxic to both humans and other animals.

quality assurance/quality control—A system of procedures, checks, audits, and corrective actions set up to ensure that all U.S. Environmental Protection Agency research design and performance, environmental monitoring and sampling, and other technical and reporting activities are of the highest achievable quality.

quality control—See quality assurance/quality control.

radiation—A stream of particles or electromagnetic waves emitted by atoms and molecules of a radioactive substance as a result of nuclear decay. The particles or waves emitted can consist of neutrons, positrons, alpha particles, beta particles, or gamma radiation.

radioactive material—For purposes of complying with U.S. Department of Transportation regulations, any material having a specific activity (activity per unit mass of the material) greater than 2 nanocuries per gram (nCi/g) and in which the radioactivity is evenly distributed.

radioactive waste—Waste that, by either monitoring and analysis, or acceptable knowledge, or both, has been determined to contain added (or concentrated and naturally occurring) radioactive material or activation products, or that does not meet radiological release criteria.

radionuclide—Radioactive particle (human-made or natural) with a distinct atomic weight number.

RCRA facility investigation (RFI)—A Resource Conservation and Recovery Act (RCRA) investigation that determines if a release has occurred and characterizes the nature and extent of contamination at a hazardous waste facility. The RFI is generally equivalent to the remedial investigation portion of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process.

reach—A specific length of a canyon that is treated as a single unit for sampling and analysis. Reaches tend to be internally uniform with respect to geomorphic setting and land use.

record—Any book, paper, map, photograph, machine-readable material, or other documentary material, regardless of physical form or characteristics.

reference set—A hard-copy compilation of reference items cited in Environmental Remediation and Surveillance Program documents.

regional aquifer—Geologic material(s) or unit(s) of regional extent whose saturated portion yields significant quantities of water to wells, contains the regional zone of saturation, and is characterized by the regional water table or potentiometric surface.

release—Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of hazardous waste or hazardous constituents into the environment.

remediation—(1) The process of reducing the concentration of a contaminant (or contaminants) in air, water, or soil media to a level that poses an acceptable risk to human health and the environment. (2) The act of restoring a contaminated area to a usable condition based on specified standards.

request number—An identifying number assigned by the Environmental Remediation and Surveillance Program to a group of samples submitted for analysis.

Resource Conservation and Recovery Act—The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976 (Public Law [PL] 94-580, as amended by PL 95-609 and PL 96-482, United States Code 6901 et seq.).

risk—A measure of the probability that damage to life, health, property, and/or the environment will occur as a result of a given hazard.

runoff—The portion of the precipitation on a drainage area that is discharged from the area.

sample—A portion of a material (e.g., rock, soil, water, or air), which, alone or in combination with other portions, is expected to be representative of the material or area from which it is taken. Samples are typically either sent to a laboratory for analysis or inspection or are analyzed in the field. When referring to samples of environmental media, the term field sample may be used.

screening action level (SAL)—A radionuclide's medium-specific concentration level; it is calculated by using conservative criteria below which it is generally assumed that no potential exists for a dose that is unacceptable to human health. The derivation of a SAL is based on conservative exposure and on land-use assumptions. However, if an applicable regulatory standard exists that is less than the value derived, it is used in place of the SAL.

sediment—(1) A mass of fragmented inorganic solid that comes from the weathering of rock and is carried or dropped by air, water, gravity, or ice. (2) A mass that is accumulated by any other natural agent and that forms in layers on the earth's surface (e.g., sand, gravel, silt, mud, fill, or loess). (3) A solid material that is not in solution and is either distributed through the liquid or has settled out of the liquid.

site characterization—Defining the pathways and methods of migration of hazardous waste or constituents, including the media affected; the extent, direction and speed of the contaminants; complicating factors influencing movement; or concentration profiles.

site conceptual model—A qualitative or quantitative description of sources of contamination, environmental transport pathways for contamination, and receptors that may be impacted by contamination and whose relationships describe qualitatively or quantitatively the release of contamination from the sources, the movement of contamination along the pathways to the exposure points, and the uptake of contaminants by the receptors.

soil—(1) A material that overlies bedrock and has been subject to soil-forming processes. (2) A sample media group that includes naturally occurring and artificial fill materials.

solid waste—Any garbage, refuse, or sludge from a waste treatment plant, water-supply treatment plant, or air-pollution control facility, and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations and from community activities. Solid waste does not include solid or dissolved materials in domestic sewage; solid or dissolved materials in irrigation return flows; industrial discharges that are point sources subject to permits under section 402 of the Federal Water Pollution Control Act, as amended; or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended.

solid waste management unit (SWMU)—(1) Any discernible site at which solid wastes have been placed at any time, whether or not the site use was intended to be the management of solid or hazardous waste. SWMUs include any site at a facility at which solid wastes have been routinely and systematically released. This definition includes regulated sites (i.e., landfills, surface impoundments, waste piles, and land treatment sites), but does not include passive leakage or one-time spills from production areas and sites in which wastes have not been managed (e.g., product storage areas). (2) According to the March 1, 2005, Compliance Order on Consent (Consent Order), any discernible site at which solid waste has been placed at any time, and from which the New Mexico Environment Department determines there may be a risk of a release of hazardous waste or hazardous waste constituents (hazardous constituents), whether or not the site use was intended to be the management of solid or hazardous waste. Such sites include any area in Los Alamos National Laboratory at which solid wastes have been routinely and systematically released; they do not include one-time spills.

standard operating procedure—A document that details the officially approved method(s) for an operation, analysis, or action, with thoroughly prescribed techniques and steps.

surface sample—A sample taken at a collection depth that is (or was) representative of the medium's surface during the period of investigative interest. A typical depth interval for a surface sample is 0 to 6 in. for mesa-top locations, but may be up to several feet in sediment-deposition areas within canyons.

technical area (TA)—At Los Alamos National Laboratory, an administrative unit of operational organization (e.g., TA-21).

topography—The physical or natural features of an object or entity and their structural relationships.

transport (transportation)—(1) The movement of a hazardous waste by air, rail, highway, or water. (2) The movement of a contaminant from a source through a medium to a receptor.

treatment—Any method, technique, or process, including elementary neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, recover energy or material resources from the waste, or to render such waste nonhazardous or less hazardous; safer to transport, store, or dispose of; or amenable for recovery or storage; or reduced in volume.

tuff—Consolidated volcanic ash, composed largely of fragments produced by volcanic eruptions.

underground storage tank—A tank located at least partially underground and designed to hold gasoline or other petroleum products or chemicals.

U.S. Department of Energy—The federal agency that sponsors energy research and regulates nuclear materials for weapons production.

U.S. Environmental Protection Agency (EPA)—The federal agency responsible for enforcing environmental laws. Although state regulatory agencies may be authorized to administer some of this responsibility, EPA retains oversight authority to ensure the protection of human health and the environment.

vadose zone—The zone between the land surface and the water table within which the moisture content is less than saturation (except in the capillary fringe) and pressure is less than atmospheric. Soil pore space also typically contains air or other gases. The capillary fringe is included in the vadose zone.

verification—A test or tests, generally performed before and after logging in lieu of a calibration, to ascertain whether the logging system is operating properly. Verification differs from calibration in that it does not provide updated system-calibration values.

welded tuff—A volcanic deposit hardened by the action of heat, pressures from overlying material, and hot gases.

work plan—A document that specifies the activities to be performed when implementing an investigation or remedy. At a minimum, the work plan should identify the scope of the work to be performed, specify the procedures to be used to perform the work, and present a schedule for performing the work. The work plan may also present the technical basis for performing the work.

A-3.0 METRIC CONVERSION TABLE

Multiply SI (Metric) Unit	by	To Obtain US 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-4.0 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

Investigation-Derived Waste Management Plan

B-1.0 INTRODUCTION

This appendix describes the management of investigation-derived waste (IDW) generated during the investigation of sites comprising Upper Sandia Canyon Aggregate Area at Los Alamos National Laboratory (LANL or the Laboratory). This waste is generated during field-investigation activities and 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.

B-2.0 INVESTIGATION-DERIVED WASTE

All IDW generated during the Upper Sandia Canyon Aggregate Area field-investigation activities will also be managed in accordance with applicable standard operating procedures (SOPs). These SOPs incorporate the requirements of all applicable U.S. Environmental Protection Agency (EPA) and New Mexico Environment Department regulations, U.S. Department of Energy (DOE) orders, and Laboratory implementation requirements. Two SOPs are applicable to the characterization and management of IDW.

- SOP-5022, Characterization and Management of Environmental Restoration Project Waste
- SOP-5023, Waste Characterization.

These SOPs are available at http://www.lanl.gov/environment/all/qa.shtml.

All IDW will be placed in a hazardous waste accumulation area until it is characterized. If the waste is found not to be hazardous, it will be stored in an appropriate nonhazardous storage area until final disposal.

Preliminary sampling will be conducted to provide sufficient information to complete the waste characterization strategy form (WCSF) for dispositioning. The characterization strategy to complete the WCSF is described in section 8 of SOP-01-10, as follows:

- Review existing data/documentation to determine if they meet requirements for acceptable knowledge (AK), as specified in LIG 404-00-02.0.
- Identify preliminary waste classifications. Classifications may include, but are not limited to, the following:
    - Radioactive
    - Solid
    - Hazardous
    - Mixed (hazardous and radioactive)
    - Toxic Substances Control Act
    - New Mexico Special Waste
    - Industrial
    - Or combinations of the above

- Identify additional waste classification considerations. SOP-01.06, Management of Environmental Remediation Project Waste, specifically addresses IDW remediation waste
- Prepare the WCSF

Investigation activities will be conducted in a manner that minimizes waste generation. Waste minimization will be accomplished by implementing the requirements of the Environmental Programs Directorate's portion of the "Los Alamos National Laboratory Hazardous Waste Minimization Report" (LANL 2006, 096015). This report is updated annually to meet a requirement of Module VIII of the Laboratory's Hazardous Waste Facility Permit, which was issued by the EPA on May 23, 1990, and modified on May 19, 1994 (EPA 1990, 001585; EPA 1994, 044146).

The waste streams that will be generated and managed during the field investigation at Upper Sandia Canyon Aggregate Area sites are described below. Container and storage requirements will be detailed in the WCSF and approved before waste is generated.

B-2.1 Drill Cuttings

The drill cuttings waste stream will consist of cuttings from boreholes that will be drilled in, and around, Upper Sandia Canyon Aggregate Area sites. Drill cuttings will be collected and initially placed in containers at a hazardous waste accumulation area until it is characterized. If the waste is found not to be hazardous, it will be stored in an appropriate nonhazardous storage area until final disposal. The drill cuttings waste stream will be characterized using analytical results from direct sampling of the containerized cuttings. Potential contaminants of concern include radionuclides, inorganic chemicals, volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs). The maximum detected concentrations of radionuclides will be compared with the background or fallout values. If the maximum detected concentrations exceed these values, the drill cuttings will be designated as low-level radioactive waste. Maximum concentrations of toxicity characteristic leaching procedure (TCLP) constituents will be compared with 20 times the TCLP regulatory level. If the concentrations are less than 20 times the regulatory level, the drill cuttings will be designated as nontoxicity characteristic nonhazardous waste. If the concentrations exceed 20 times the regulatory level, the drill cuttings will be sampled and analyzed by TCLP to determine whether it is a toxicity characteristic hazardous (or mixed) waste. Based on the results of previous investigations, the Laboratory expects most of these drill cuttings to be designated as nonhazardous, nonradioactive waste that will be either used for cover material at Technical Area 54 (TA-54) or disposed of at an off-site disposal facility permitted for the disposal of industrial waste. Potentially, some drill cuttings may be designated as low-level radioactive or mixed waste because of the presence of radionuclides and metals. Low-level waste will be disposed of at TA-54 or off-site at a licensed facility. Mixed waste will be sent to an off-site facility permitted for treating and/or disposing of mixed waste.

B-2.2 Septic Tank and Seepage Pit

Waste from the removal of the septic tank and seepage pit may consist of liquid contents, sludge, concrete reinforced with steel rebar and vitrified clay pipe or steel pipe. Waste will be placed into drums or 20-yd^3 rolloff containers, secured, and temporarily stored at the site. Chemicals of potential concern include inorganic and organic chemicals. Determination of whether the waste is hazardous will be based on AK using characterization data from the tank contents or from media where the tank contents were released. Based on the results of previous investigations, the Laboratory expects these wastes to be designated as nonhazardous, nonradioactive waste that will be disposed of at an off-site disposal facility permitted for the disposal of solid waste.

B-2.3 Soil

Soil will be placed into containers appropriate to the waste volume generated (drums and/or rolloff containers), secured, and temporarily stored at a hazardous waste accumulation area until it is characterized If the waste found not to be hazardous, it will be stored in an appropriate nonhazardous storage area until final disposal. Potential contaminants of concern include radionuclides, inorganic chemicals, VOCs, and SVOCs. The maximum detected concentrations of radionuclides will be compared with the background or fallout values. If the maximum concentrations exceed these values, the soil will be designated as low-level radioactive waste. Maximum concentrations of TCLP constituents will be compared with 20 times the TCLP regulatory level. If the concentrations are less than 20 times the regulatory level, the drill cuttings will be designated as nontoxicity characteristic nonhazardous waste. If the concentrations exceed 20 times the regulatory level, the drill cuttings will be sampled and analyzed by TCLP to determine whether it is a toxicity characteristic hazardous (or mixed) waste. Based on the results of previous investigations, the Laboratory expects these wastes to be designated as nonhazardous, nonradioactive waste that will be used either for cover material at TA-54 or disposed of at an off-site disposal facility permitted for the disposal of industrial waste. Potentially, some soil may be designated as low-level radioactive or mixed waste because of the presence of radionuclides and metals. Low-level waste will be disposed of on-site at TA-54 or off-site at a licensed facility. Mixed waste will be sent to an off-site facility permitted for the treatment and/or disposal of mixed waste.

B-2.4 Spent PPE and Disposable Sampling Supplies

The spent PPE waste stream will consist of PPE that has come into contact with contaminated environmental media (e.g., core and/or drill cuttings) and cannot be decontaminated. The bulk of this waste stream will consist of protective clothing such as coveralls, gloves, shoe covers, and (if required) respirator cartridges. Spent PPE will be collected in containers at personnel decontamination stations, secured, and temporarily stored at a hazardous waste accumulation area until it is characterized. If the waste is found not to be hazardous, it will be stored in an appropriate nonhazardous storage area until final disposal. Characterization of this waste stream will be performed through AK of the waste materials, the methods of generation, and the levels of contamination observed in the associated environmental media. The Laboratory expects spent PPE to be designated as nonhazardous, nonradioactive waste that will be disposed of at an off-site disposal facility permitted for the disposal of industrial waste.

The disposable sampling supplies waste stream will consist of all equipment and materials that are necessary for collecting samples and that have come into direct contact with contaminated environmental media and cannot be decontaminated. This waste stream also includes wastes associated with dry decontamination activities and will consist primarily of paper and plastic items collected in bags at a hazardous waste accumulation area until it is characterized. If the waste is found not to be hazardous, it will be stored in an appropriate nonhazardous storage area until final disposal. Characterization of this waste stream will be performed through AK of the waste materials, the methods of generation, and the levels of contamination observed in the associated environmental media. The Laboratory expects disposable sampling supplies to be designated as nonhazardous, nonradioactive waste. Nonhazardous wastes will be disposed of at an off-site disposal facility permitted for the disposal of industrial waste; hazardous wastes will be sent to an off-site facility permitted for the treatment and/or disposal of hazardous waste.

B-2.5 Decontamination Fluids

The decontamination fluids waste stream will consist of liquid wastes from decontamination activities (e.g., decontamination solutions and rinse waters). Following 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 and transferred to accumulation drums. Decontamination fluids will be accumulated in drums and temporarily stored at a hazardous waste accumulation area until it is characterized. If the waste is found not to be hazardous, it will be stored in an appropriate nonhazardous storage area. The Laboratory expects that the majority of decontamination fluids will be designated as nonhazardous, nonradioactive liquid waste. A potential exists for some decontamination rinsate to be designated as low-level radioactive or mixed waste at several of the sites because of presence of radionuclides and metals. Nonhazardous and radioactive liquid wastes may be treated and discharged by several Clean Water Act-permitted on-site treatment facilities, provided the waste meets the facility's waste acceptance criteria (WAC). Mixed waste and waste that does not meet the WAC of Laboratory treatment facilities will be sent to permitted off-site treatment facilities.

B-2.6 Returned or Excess Samples

Soil samples either returned from or obtained but not submitted to the analytical laboratory will be containerized and stored at a hazardous waste accumulation area until they are characterized. If the waste is found not to be hazardous, it will be stored in an appropriate nonhazardous storage area until final disposal. Returned soil samples will be managed in a manner consistent with analytical results, and it is anticipated that the returned soil samples will be classified as nonhazardous, nonradioactive solid waste. The returned soil samples will be disposed of at a Laboratory-approved off-site industrial waste facility.

B-3.0 WASTE MANAGEMENT

All wastes will be managed in accordance with applicable federal, state, DOE, and Laboratory requirements. The IDW waste streams, expected waste types, estimated waste volumes, and other data are listed in Table B-3.0-1.

All waste drums and containers (rolloff bins) will remain at a registered hazardous waste accumulation area until analytical results have been received and waste characterization completed shows that the waste is nonhazardous.

Before field-investigation activities begin, a WCSF will be prepared and approved as required by the current version of SOP-5023. The WCSF will provide detailed information about IDW characterization, management, containerization, and potential volume generated for each subaggregate.

The IDW will be characterized through existing data and/or documentation, direct sampling of the IDW, or sampling of the media being investigated (e.g., surface soil, subsurface soil). If sampling is necessary, the procedures will be described in a sampling and analysis plan that will be developed in conjunction with the WCSF.

Some wastes will be characterized on the basis of AK rather than direct waste analysis. The AK characterization will consist of the results of analyzing the environmental media associated with each waste stream. For example, spent PPE and disposable sampling supplies that have potentially come into contact with contaminated media will be characterized based on the analytical results for samples of that media. Similarly, borehole drill cuttings will be characterized by the analytical results from direct sampling of the containerized cuttings. If decontamination fluids are to be sent off-site for disposal, they will be sampled to demonstrate compliance with the WAC of the receiving facility.

B-4.0 WASTE CONTAINERS AND TRANSPORTATION

The selection of waste containers will be based on both the appropriate U.S. Department of Transportation (DOT) requirements and the type and amount of IDW anticipated to be generated. Immediately following containerization, each waste container will be individually labeled to identify the waste classification, the item identification number, its radioactivity (if applicable), and the date of generation. Waste containers will be managed in clearly marked and appropriately constructed waste accumulation areas. Waste accumulation area postings, regulated storage duration, and inspection requirements will be based on IDW type and classification. The wastes will be stored in accordance with Laboratory hazardous and mixed waste requirements documents.

Transportation of IDW will comply with appropriate DOT requirements. Transportation and disposal requirements will be detailed in the WCSF and approved prior to the generation of waste.

B-5.0 REFERENCES

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID number. This information is also included in text citations. ER ID numbers are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

EPA (U.S. Environmental Protection Agency), April 10, 1990. "Module VIII of RCRA Permit No. NM0890010515, issued to Los Alamos National Laboratory, Los Alamos, New Mexico," EPA Region VI, Hazardous Waste Management Division, Dallas, Texas. (EPA 1990, 001585)

EPA (U.S. Environmental Protection Agency), April 19, 1994. "Module VIII of RCRA Permit No. NM0890010515, EPA, Region 6, New Requirements Issued to Los Alamos National Laboratory, Los Alamos, New Mexico," EPA Region 6, Hazardous Waste Management Division, Dallas, Texas. (EPA 1994, 044146)

LANL (Los Alamos National Laboratory), November 2006. "Los Alamos National Laboratory Hazardous Waste Minimization Report," Los Alamos National Laboratory document LA-UR-06-8175, Los Alamos, New Mexico. (LANL 2006, 096015)

Table B-3.0-1
Generation and Management of the Estimated IDW for Upper Sandia Canyon Aggregate Area

Waste Stream	Expected Waste Type	Estimated Volume*	Characterization Method	On-Site Management	Expected Disposition
Drill Cuttings and Soil*	Industrial waste, nonhazardous, nonradioactive	3.5 yd^3	Analytical results from waste and core samples	Accumulation in 55-gal. drums, covered rolloff containers, or soft-sided containers	Permitted off-site facility for which waste meets acceptance criteria
Septic Tank and Seepage Pit	Structure: Industrial waste, nonhazardous, nonradioactive	50 yd^3	Analytical results from direct sampling of waste	Accumulation in 55-gal. drums or covered rolloff containers	Permitted off-site facility for which waste meets acceptance criteria
	Soil: Industrial waste, nonhazardous, nonradioactive	10 yd^3			
	Tank contents: Liquid waste, nonhazardous	<1000 gal.			On-site Clean Water Act-permitted treatment facility for which waste meets acceptance criteria
Spent PPE and Disposable Sampling Supplies	Industrial waste, nonhazardous, nonradioactive	0.3 yd^3	AK	Accumulation in 55-gal. drums	Permitted off-site facility for which waste meets acceptance criteria
Decontamination Fluids	Liquid waste, nonhazardous or low-level radioactive	54 gal.	Analytical results from direct sampling of waste	Accumulation in 55-gal. drum	On-site Clean Water Act-permitted treatment facility for which waste meets acceptance criteria
Returned or Excess Samples	Industrial waste, nonhazardous, nonradioactive	0.2 yd^3	AK from sample analytical data and method of generation	Accumulation in a 5-gal. bucket or 55-gal. drum, stored on Laboratory property	Permitted off-site facility for which waste meets acceptance criteria

* Sample depths, numbers, and/or locations are yet to be determined.