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Investigation Work Plan for Starmer/Upper Pajarito Canyon Aggregate Area, Revision 1

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EXECUTIVE SUMMARY

The Starmer/Upper Pajarito Canyon Aggregate Area includes Technical Area 08 (TA-08), TA-09, and portions of TA-22 and TA-40 of Los Alamos National Laboratory and consists of 139 solid waste management units (SWMUs) and areas of concern (AOCs). Of these sites, 62 have been previously investigated and/or remediated and have been approved for no further action. They are not discussed in this work plan.

For the remaining 77 sites, this work plan describes the operational history, evaluates existing analytical data, and proposes additional sampling and analyses. Details of previous investigations and analytical results for all 77 sites are provided in the historical investigation report for the Starmer/Upper Pajarito Canyon Aggregate Area. Of the 77 SWMUs and AOCs in the Starmer/Upper Pajarito Canyon Aggregate Area that require some additional characterization, 16 sites are located within TA-08, 41 sites are located within TA-09, 7 sites are located within TA-22, and 13 sites are located within TA-40. The sites include

- off-gas systems
- firing sites, firing pits, and a detonation site
- a burn pit and burning areas
- septic tanks, sumps, septic systems, drainlines, storm drains, and outfalls
- a basket pit, surface impoundment, and oxidation pond
- a storage vessel and storage areas
- material disposal areas, disposal pits, a landfill, and surface disposal areas
- building footprints.

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 Starmer/Upper Pajarito Canyon Aggregate Area and assess the human health and ecological risk associated with this contamination.

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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 to 7800 ft above mean sea level (amsl). The Starmer/Upper Pajarito Canyon Aggregate Area is shown in Figure 1.0-1.

The Laboratory's Environmental Programs (EP) Directorate, formerly the Environmental Restoration Project, is participating in a national effort by DOE to clean up sites and facilities formerly involved in weapons research and development. The goal of the EP Directorate is to ensure that past operations do not threaten human or environmental health and safety in and around Los Alamos County, New Mexico. To achieve this goal, the EP Directorate is currently investigating sites potentially contaminated by past Laboratory operations. The purpose of this investigation work plan is to propose sampling and analyses that will define the nature and extent of contamination. The sites under investigation are designated as solid waste management units (SWMUs) and areas of concern (AOCs).

The SWMUs and AOCs (the sites) 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 Starmer/Upper Pajarito Canyon Aggregate Area consists of 139 SWMUs and AOCs located in Technical Area 08 (TA-08), TA-09, and portions of TA-22 and TA-40. Of the 139 sites in the Starmer/Upper Pajarito Canyon Aggregate Area, 62 have been previously investigated and/or remediated and approved for no further action (NFA). The remaining 77 sites require additional characterization. Of these 77 sites, 16 are located within TA-08, 41 are located within TA-09, 7 are located within TA-22, and 13 are located within TA-40.

Historical details of previous investigations and data for the 77 sites are provided in the historical investigation report (HIR) for Starmer/Upper Pajarito Canyon Aggregate Area (2010, 110528). This work plan proposes investigation activities for the 77 sites using information from previous field investigations to evaluate current conditions at each site.

Table 1.1-1 provides a summary of the 139 sites within the Starmer/Upper Pajarito Canyon Aggregate Area. For the 62 sites approved for NFA, brief descriptions and the references for the approval documents are provided in Table 1.1-1. Plate 1 shows only the sites under investigation in the Starmer/Upper Pajarito Canyon Aggregate Area with monitoring wells, surface water and stormwater runoff monitoring stations, and canyon reaches.

Section 2 of this work plan presents general site information, operational history, the conceptual site model, and a data overview. General site conditions are presented in section 3. Specific site descriptions and proposed investigation activities are presented in sections 4 (TA-08), 5 (TA-09), 6 (TA-22), and 7 (TA-40). The investigation methods are described in section 8. Ongoing monitoring and sampling programs in the Starmer/Upper Pajarito Canyon Aggregate Area are presented in section 9, and an anticipated schedule is presented in section 10. Section 11 lists the references cited in this work plan and the map data sources. Appendix A contains the list of acronyms and abbreviations used in this investigation work plan, a metric conversion table, and a data qualifier definition table. Appendix B describes the management of investigation-derived waste (IDW).

1.2 Work Plan Objectives

The first objective of this work plan is to propose sampling and analyses that will define the nature and extent of contamination associated with the sites. The second objective is to support decisions regarding the need to remediate or remove inactive structures related to the sites, where appropriate. 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 finalize characterization at these sites.

As discussed in the individual sections for each site, the nature and extent of contamination are not currently defined for any of the sites under investigation. Additional investigation is required to define the nature and extent of contamination for each site and allow human health and ecological risks to be evaluated. The proposed investigation is based on a biased sampling approach enabled by adequate knowledge of site operational history and current site configurations. Where appropriate, the investigation will use data collected in canyon reaches, reported in the Pajarito Canyon Investigation Report (LANL 2008, 104909), to supplement the data from samples proposed in this work plan as necessary to define the nature and extent of contamination.

2.0 BACKGROUND

2.1 General Site Information

The Starmer/Upper Pajarito Canyon Aggregate Area, located in the west-central portion of the Laboratory, includes mesa tops, the upper section of Pajarito Canyon, and Starmer and Bulldog gulches (Plate 1). The mesa tops (Pajarito Plateau) lie at elevations between 7800 ft amsl at TA-08 and 6960 ft amsl at TA-40. The aggregate area includes TA-08 and TA-09 on a broad mesa bounded by Pajarito Canyon to the north and Cañon de Valle to the south, and portions of TA-22 and TA-40 on Twomile Mesa bounded by Twomile Canyon to the north and Pajarito Canyon to the south.

TA-08, also known as Anchor Site West, is a dynamic testing site that serves the entire Laboratory. Capability is maintained in all modern nondestructive testing techniques for ensuring the quality of material in items ranging from test weapons components to high-pressure dies and molds. Capabilities include radiographic and radioisotope techniques. Other activities include ultrasonic and penetrant testing and electromagnetic test methods.

TA-09, also known as Anchor Site East, is used to conduct experimental science work. Activities include exploring fabrication feasibility, investigating the physical properties of explosives, and investigating new organic compounds for possible use as explosives. Explosives storage and stability problems are also studied.

TA-22 is used for the research, development, fabrication, and testing of high-energy detonators and related devices. Detonators, cables, and firing systems are built at TA-22. Capabilities include detonator design; printed circuit manufacture; metal deposition; metal joining; plastic materials technology; and explosives loading, initiation, and diagnostics.

TA-40 is used for developing special detonators for initiating high-explosives systems. Activities include investigating phenomena associated with the physics of high explosives and research in rapid shock-induced reactions. The site is also used for investigating the physics and chemistry of detonators and shock-wave propagation.

2.2 Operational History

2.2.1 TA-08

Technical Area 08 is located on a broad mesa bounded on the north by Pajarito Canyon and on the south by Cañon de Valle. The mesa drains to Pajarito Canyon via three tributaries. A homestead, Anchor Ranch, originally occupied the land from the early 1900s to 1943. In 1943 the War Department acquired Anchor Ranch to construct a proving ground for the development and testing of components for a uranium gun device, the weapon known as Little Boy, which was exploded over Hiroshima. When the War Department acquired Anchor Ranch, eight log/adobe structures occupied the site.

The Anchor West proving ground (ie.,TA-08) was constructed in 1943 west of Anchor Ranch Road. Structures included three partially underground concrete buildings and a gun site. The three buildings housed operational support for the experiments conducted at the gun site.

Building 08-1, the largest of the structures, served as the primary support facility and contained the tower periscope, darkroom, camera room, loading docks, ventilation systems, and work areas. Building 08-2, the process building, is west of building 08-1. Based on this building’s explosion-proof fixtures and “deluge” fire suppression system, building 08-2 was likely used for handling volatile materials. Building 08-3 is located to the east of building 08-1. It contained diesel-powered electrical generators to support operations at buildings 08-1 and 08-2 and the gun site and also provided diesel fuel storage to run the generators.

The gun site was positioned to the south of and above the roof level of the three partially underground buildings. The gun site consisted of two 3-in. naval antiaircraft guns and three sand or sawdust butts to catch the experimental projectiles fired from the two gun mounts. Instrumentation, propellants, and various preliminary projectile designs were tested. When the gun site ceased operation in 1946, the naval guns and various other items were buried in a pit, Material Disposal Area Q (MDA Q), north of the northernmost sand butt.

Beginning in 1948 and continuing through 1966, buildings 08-1, 08-2, and 08-3 underwent certain alterations to accommodate new functionality at TA-08. Building 08-1 was subsequently used for developing new types of explosives and as a laboratory for crystal growth experiments. Building 08-2 was used as a machine shop and later as a storage area. Building 08-3 housed a hydraulic press and later was used as a laboratory.

In 1949 and 1950, modern TA-08 was established northwest of the gun site to house Group X-1, which had been developing x-ray techniques at a location outside TA-08. Several of the original ranch buildings were removed to make way for the new construction, and the rest were abandoned in place. Seven major structures were erected. The new buildings contained office space, photographic-processing labs, and laboratories devoted to various types of x-ray work, some involving the use of contained radioactive sources. In addition, septic and drainage systems, water and electric utilities, and transformer stations were installed. Most of the structures erected from 1949 to 1950 are still in use.

The only structures that remain of the historic TA-08 proving ground are the three core, partially underground concrete buildings (including their retaining walls) and the two concrete pads that supported the gun mounts, The three core buildings, which have been inactive for several years, are about to undergo historic preservation. Restoration of the buildings is planned to begin in the spring of 2011.

2.2.2 TA-09

Technical Area 09 is located on a broad mesa bounded on the north by Pajarito Canyon and on the south by Cañon de Valle. The mesa drains to Pajarito Canyon via three tributaries. Technical Area 09 encompasses three Manhattan Project sites known as Old Anchor East, the Far Detonation Point (Far Point), and Nu Site, as well as New Anchor East, and MDA M.

Old Anchor East (now TA-09) was established in 1943 to house explosives production, development, and testing, and x-ray work. The main explosives manufacturing and x-ray facilities were next to Anchor Ridge Road, with the Far Point and Nu Site test-firing facilities located several hundred yards to the east. Originally, eight major buildings containing laboratories, offices, machine shops and storage areas occupied the explosives manufacturing and x-ray portion of the facility along with five magazines. The Far Point firing site was used to conduct explosives detonation experiments and consisted of four underground steel-lined firing chambers (structures 09-4, 09-5, 09-15, and 09-58) and an open firing area (structure 09-57) composed of a concrete pad and steel-faced barricade. Use of Far Point ceased in the late 1940s. Beginning in 1950, the activities that had been conducted at the Old Anchor East site were moved to New Anchor East. In 1957, all of the Old Anchor East facilities (including Far Point) were decommissioned. From 1959 to 1965, buildings were intentionally burned; associated drains, sumps, pipes, and debris were removed; and the entire site was graded. Since 1965, the surface has been disturbed numerous times for the installation of various cable, electrical, and communication lines.

Nu Site was established south of Far Point in 1945 (DOE 1987, 008664) and designated as TA-23. Nu Site consisted of one firing point (west of building 09-76) and four small structures (09-76, 09-77, 09-78, and 09-79). The site was used for explosives testing and operated from 1945 to 1950 Explosives tests of up to 135 lb of high explosives (HE) were conducted regularly. Nu Site was decommissioned in 1949−50 in preparation for the construction of New Anchor East (TA-09). For administrative purposes as part of the decommissioning process, Nu site was incorporated into TA-09 and the existing Nu Site structures were given TA-09 structure numbers. All Nu site structures were removed between 1950 and 1952.

Construction of New Anchor East (modern TA-09) began in 1950 immediately following the completion of construction activities at TA-08. Approximately 30 new structures were erected, together with associated settling tanks, septic tanks, drainlines, manholes, and other support facilities. The newly erected structures included laboratory/office buildings, processing laboratories, a pressing facility a machining building, a carpenter shop, compressed gas- and solvent-storage buildings, and magazines for HE storage. New Anchor East supported the same activities as had been formerly conducted at Old Anchor East, including explosives development, production, compatibilities studies, and testing.

Material Disposal Area M was created during the demolition of the Old Anchor Ranch East and West sites and the construction of the modern TA-08 and TA-09 facilities (1949−1965). MDA M was used as a surface dumping area for construction and demolition debris.

As a result of the 1989 Laboratory redefinition of technical area boundaries, eight sights associated with TA-09 are within the physical boundaries of TA-08. The eight sights are SWMUs 09-001(d), 09-003(d), 09-003(g), 09-003(h), 09-005(a), 09-005(d), 09-006, and 09-008(b).

2.2.3 TA-22

Late in 1944, the Gadget (G) Division constructed four buildings on the south edge of Twomile Mesa to assemble the conventional explosives for the Fat Man weapon. This area is now called Trap Door (TD) Site (TA-22). After assembly of Fat Man, the buildings were abandoned until 1948, when they were remodeled for use by Group X-7 (now Group W-6, the Detonator Technology Group).

By 1948, the abandoned buildings at TA-22 were remodeled into office, laboratory, and fabrication space to replace activities at TA-06, and new magazines and utility buildings were built. In the early 1980s, a new Detonation Systems Laboratory was constructed north of the old buildings in TA-22. By 1985, the laboratory was occupied and the old buildings were demolished or abandoned.

Both TA-22 and TA-40 (section 2.2.4) are currently active sites occupied by several Laboratory organizations. Detonators are produced at TA-22 and tested at TA-40. The production operations include handling explosives, particularly pentaerythritol tetranitrate (PETN), and printed circuit processing. Testing includes a variety of test-firing activities monitored by sophisticated optical and electronic equipment. In all cases, quantities of materials used are small. A typical detonator contains only a few milligrams of explosives.

2.2.4 TA-40

TA-40 lies at elevations between 6960 and 7480 feet amsl. It is located on a narrow finger of Twomile Mesa. The finger mesa is bounded on the north by an unnamed branch of Twomile Canyon, and on the south by Pajarito Canyon.

Technical Area 40, the Detonator Firing Site, was built in 1950 to replace the detonator firing chambers at TA-06. TA-40 includes an office building, an inert assembly building, six firing chambers, five shot preparation buildings, eight magazines, and utility buildings. The six firing sites have been used since 1950 for explosives testing related to research and development of detonators and other small explosives assemblies. One of the firing chambers, TA-40-9, was upgraded in the 1980s to house a two-stage gas gun. The Laboratory's first contained test-firing facility was completed in 1992 at chamber TA-40-8.

Currently, TA-40 continues to be used for developing special detonators for initiating high-explosives systems. Activities include investigating phenomena associated with the physics of high explosives and research in rapid-shock induced reactions. TA-40 is also used for investigating the physics and chemistry of detonators and shock-wave propagation.

2.3 Conceptual Site Model

The sampling and analyses proposed in this work plan are based on a conceptual site model that identifies likely areas of potential contamination. A conceptual site model describes potential contaminant sources, transport mechanisms, and receptors. The conceptual site model is applied to individual sites to select sampling locations most likely to define the nature and extent of contamination. Analytical results from the samples collected may lead to changes or refinement of the conceptual site model and to a need for additional characterization sampling in a later phase of the investigation.

2.3.1 Potential Contaminant Sources

Releases at the sites may have occurred as results of normal site operations or potential spills/leaks. Potential contaminant sources include

- off-gas systems
- firing sites, firing pits, and a detonation site
- a burn pit and burning areas
- septic tanks, sumps, septic systems, drainlines, storm drains, and outfalls
- a basket pit, a surface impoundment, and an oxidation pond
- a storage vessel and storage areas
- material disposal areas, disposal pits, a landfill, and surface disposal areas
- building footprints.

2.3.2 Potential Contaminant Transport Mechanisms

Current potential transport mechanisms that may lead to exposure include the following:

- airborne transport of contaminated surface soil
- dissolution and particulate transport of surface contaminants during precipitation and runoff events
- disturbance of contaminants in shallow soil and subsurface tuff
- infiltration and advective/dispersive transport of contaminants contained in subsurface soil and tuff
- disturbance and uptake of contaminants in shallow soil by plants and animals.

2.3.2.1 Surface Processes

Laboratory operations, disturbance and uptake by plants and animals, surface water runoff, and wind can disturb contaminants present in shallow soils. During summer thunderstorms and spring snowmelt, runoff from the mesa top may flow down the hillsides and into the perennial and ephemeral streams present in Upper Pajarito Canyon and its tributary canyons. Springs are also present in the canyons in this area (Plate 1). Surface water runoff and erosion of contaminated surface soil could lead to contamination of bench areas on the hillside and contamination of the surface water off-site. Surface water may also access subsurface contaminants exposed by soil erosion. Soil erosion can vary significantly depending on factors that include soil properties, the amount of vegetative cover, the slope of the contaminated area, and the intensity and frequency of precipitation. Surface transport of contaminants represents the dominant transport pathway in the Starmer/Upper Pajarito Canyon Aggregate Area.

2.3.2.2 Subsurface Processes

Studies have shown that infiltration of natural precipitation is quite low across the mesa tops of the Pajarito Plateau. The average annual potential evapotranspiration rates far exceed precipitation rates.

Under these conditions, infiltration events that propagate beneath the root zone are sporadic and occur only when the short-term infiltration rate exceeds the evapotranspiration rate, such as during summer thunderstorms and spring snowmelt. However, these events more commonly produce runoff into neighboring canyons resulting in infiltration rates below the root zone on the order of a few millimeters or less per year for mesa-top sites (Collins et al. 2005, 092028, pp. 2-84−2-88; Kwicklis et al. 2005, 090069).

This slow infiltration rate generally leads to present-day subsurface contaminant migration of only a few meters deep. Geochemical interactions between the contaminants and the rocks generally act to retard migration further. Therefore, groundwater transport of contaminants through the unsaturated zone to the regional aquifer does not represent a dominant pathway for contaminant transport in the Starmer/Upper Pajarito Canyon Aggregate Area. The perennial streams present in the Starmer/Upper Pajarito Canyon Aggregate Area may represent a potential pathway to the subsurface through infiltration.

2.3.3 Potential Receptors

The potential human receptors of contaminants are workers on site. It is unlikely that visitors would come into contact with contaminated media because access to the sites is restricted. Ecological receptors, such as plants and animals, may be exposed to contaminants from the sites.

No residential or recreational functions currently exist at any of the sites and the land use will remain industrial in the foreseeable future. However, restoration of the gun site and buildings 08-1, 08-2, and 08-3 are planned to begin in the spring of 2011. The public will eventually be granted access to only this historic site.

2.3.4 Cleanup Standards

As specified in section VIII.B.1 of the Consent Order, NMED soil screening levels (SSLs) (NMED 2009, 108070)} or Laboratory screening action levels (SALs) (LANL 2009, 107655) will be used as soil cleanup levels unless they are determined to be impractical (details of the process are outlined in the Consent Order, section VIII.E [Requests for Variance from Cleanup Goal or Cleanup Level]) or unless SSLs do not exist for the current and reasonably foreseeable future land use (i.e., neither NMED nor the U.S. Environmental Protection Agency [EPA] has determined SSLs for some analytes under some land use scenarios). If NMED SSLs do not exist, EPA regional screening values will be used (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm). Human health screening levels for chemicals and radionuclides are provided in the analytical data tables presented for each site.

2.4 Data Overview

Data evaluated in this investigation work plan include historical data collected from 1994 through 1997, 1999, and 2001 as part of Resource Conservation and Recovery Act (RCRA) facility investigations (RFIs) and other investigations or corrective actions.

All data records include a vintage code field denoting how and where samples were submitted for analyses. In the early years, the samples were submitted to the Laboratory’s Chemical Science and Technology (CST) Division and were either analyzed at a CST laboratory (on-site) or submitted to one of several off-site contract analytical laboratories. Samples analyzed at a CST laboratory are identified by the vintage code “CST Onsite.” Two vintage codes identify samples CST Division submitted to off-site contract analytical laboratories—“CST Offsite” if validation was not performed and “CSTROUT03” if validation was performed.

From late 1995 until the present, samples have been submitted through the Sample Management Office (SMO) to off-site contract analytical laboratories. Two vintage codes identify samples the SMO submitted to off-site contract analytical laboratories—"AN95" if validation was not performed and "SMO" if validation was performed.

Vintage codes for data are presented in Appendix B of the HIR. Data presented in tables and figures in this investigation work plan are decision-level data of "SMO" vintage only. Both decision-level data and screening-level data (vintage codes other than "SMO") are presented in Appendix B of the HIR. Decision-level data for inorganic chemicals and radionuclides from previous investigations are compared with background values (BVs) and fallout values (FVs) as applicable (LANL 1998, 059730). The data tables for inorganic chemicals and radionuclides include only decision-level data where sample concentrations are above the BVs/FVs or detected if no BVs/FVs are available. Data tables for organic chemicals include all detected concentrations of organic chemicals.

Decision-level data will be included, along with all results from samples proposed in this investigation work plan, in the subsequent investigation report and used to determine if the nature and extent of contamination are defined. All available decision-level data will be used to determine representative concentrations of site contaminants and to perform human health and ecological risk-screening evaluations as appropriate. Screening-level data are used to identify areas of contamination and to guide sample collection and analyses proposed in this investigation work plan but will not be used in defining the nature and extent of contamination or in risk-screening evaluations.

3.0 SITE CONDITIONS

3.1 Surface Conditions

3.1.1 Topography

The Starmer/Upper Pajarito Canyon Aggregate Area consists of roughly east- to southeast-trending, flat-topped mesas (Pajarito Plateau) bounded by branches of Twomile Canyon to the north and Cañon de Valle to the south. The aggregate area includes TA-08 and TA-09 on a broad mesa bounded by Pajarito Canyon to the north and Cañon de Valle to the south, and portions of TA-22 and TA-40 on Twomile Mesa bounded by Twomile Canyon to the north and Pajarito Canyon to the south. The mesa tops lie at elevations between 7800 ft amsl at TA-08 and 6960 ft amsl at TA-40. The mesa where TA-08 and TA-09 are located drains into three tributaries to Pajarito Canyon—Starmer Gulch, Bulldog Gulch, and one unnamed tributary (Plate 1). The mesa where TA-22 and TA-40 are located drains into Pajarito Canyon.

3.1.2 Vegetation

The vegetation in the Starmer/Upper Pajarito Canyon Aggregate Area is mostly in a ponderosa pine/piñon-juniper overstory vegetation zone, with small areas in ponderosa pine-fir and shrub-grass-forb overstory vegetation zones. Open areas without vegetation are also present.

3.1.3 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 in the Starmer/Upper Pajarito Canyon Aggregate Area includes Carjo loam, fine and clayey skeletal Typic Eutroboralfs, Tocal very fine sandy loam, Seaby loam, and rock outcrop (Nyhan et al. 1978, 005702).

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.

3.1.4 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. Figure 3.1-1 shows surface water drainages to the Rio Grande.

The mesa-top portion of the Starmer/Upper Pajarito Canyon Aggregate Area is currently an industrially developed area. No natural surface water is present in this area. During summer thunderstorms and spring snowmelt, runoff flows from the mesa top down the hillsides and into the reaches in Pajarito Canyon and its tributaries. Perennial and intermittent streams, as well as springs, are present in the Starmer/Upper Pajarito Canyon Aggregate Area (Plate 1). Runoff from TA-08 enters reach AW-1 (Anchor West basin) to the east and reach PAS-1E (in the south fork of Pajarito Canyon) to the north, both of which drain into reach PAS-2W located further downcanyon in the south fork of Pajarito Canyon. Perennial surface water exists at the confluence of Starmer Gulch to Pajarito Canyon, where reach PAS-2E joins reach PA-1W and both drain into reach PA-1C. Runoff from TA-09 enters reach AEN-1 (north Anchor East basin) and reach AES-1 (south Anchor East basin) that drain into the next downcanyon reach (PA-1E) in Pajarito Canyon.

3.1.5 Land Use

Currently, land use within the Starmer/Upper Pajarito Canyon Aggregate Area is industrial. It is anticipated the area will remain industrial through continued use by the Laboratory and will not change in the foreseeable future. Public access to TA-08, TA-09, TA-22, and TA-40 is prohibited and is controlled through physical controls, including fencing, and limited access via guard stations.

3.2 Subsurface Conditions

3.2.1 Stratigraphic Units

The stratigraphy of the Starmer/Upper Pajarito Canyon Aggregate Area is summarized in this section. Descriptions rely heavily on the stratigraphy observed in regional monitoring well R-18 located in TA-40 (Kleinfelder 2005, 092415). Additional information on the geologic setting of the area and information on the Pajarito Plateau is available in the Laboratory's Hydrogeologic Workplan (Collins et al. 2005, 092028). Figure 3.2-1 shows the stratigraphic sequences in well R-18. The stratigraphy includes, in descending order, Tshirege Member of the Bandelier Tuff, Cerro Toledo Interval, ash-flow tuffs of the Otowi Member of the Bandelier Tuff, the Guaje Pumice Bed of the Otowi Member, and the Puye Formation (Kleinfelder 2005, 092415, p. iv).

The Bandelier Tuff was emplaced during cataclysmic eruptions of the Valles Caldera between 1.61 and 1.22 million years 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 Vaniman 2005, 090038).

3.2.1.1 The Tshirege Member of the Bandelier Tuff

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 years 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 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 clifflike 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 Mortandad 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 has 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. This subunit 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 Mortandad 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 subunit Qbt 3 of the Tshirege Member. 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).

Subunit Qbt 4 is a complex unit consisting of nonwelded to densely welded ash-flow tuffs and thin intercalated surge deposits. Devitrification and vapor-phase alteration are typical in this unit, but thin zones of vitric ash-flow tuff occur locally. The occurrence of Qbt 4 is limited to the western part of the Pajarito Plateau and would likely appear in the Starmer/Upper Pajarito Canyon Aggregate Area.

In well R-18, the Tshirege Member of the Bandelier Tuff was encountered from ground surface to 309 ft below ground surface (bgs). Unit Qbt 3 of the Tshirege Member was observed from ground surface to 135 ft bgs. Unit Qbt 2 was interpreted to be from 135 to 244 ft bgs. Units Qbt 1v and 1g were interpreted to be present from 244 to 278 ft bgs and from 278 to 309 ft bgs, respectively. Most cuttings collected from the Tshirege Member represent a poorly to moderately welded ash-flow tuff, typically brownish gray to grayish orange-pink. Tuff fragments collected from Unit 2 indicate moderately to strongly welded volcanic tuff. The coarse fractions (i.e., the >#10 sieve size) of the Tshirege Member are composed of varying percentages of tuff fragments, volcanic ash, felsic (quartz and sanidine) crystals, lithic fragments, and trace pumice (most pumice is crushed or disaggregated during drilling). The ash and pumice are devitrified with the exception of cuttings collected from Unit 1g, where vitric tuff is encountered. The fine fraction (i.e., the >#35 sieve size) is made up of predominately felsic crystals with trace amounts of volcanic lithics.

3.2.1.2 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; Broxton and Reneau 1995, 049726; Goff 1995, 049682). 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). The Cerro Toledo interval contains primary volcanic deposits (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 equivalent of Cerro Toledo rhyolite tephra. Oxidation and clay-rich horizons indicate the occurrence of at least two periods of soil development 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 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, they 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).

In well R-18, the Cerro Toledo interval was encountered in the borehole from 309 to 505 ft bgs. These volcaniclastic deposits range from poorly graded gravel to sand with silt. The coarse fraction of this interval is made up of vitric pumices and intermediate-composition volcanic clasts with trace amounts of felsic crystals. The finer fraction is composed primarily of felsic crystals, with lesser amounts of lithic fragments and pumice. Frequent manganese/iron oxide staining of pumices is observed.

3.2.1.3 The Otowi Member of the Bandelier Tuff

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 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, crystal fragments, and perlite fragments.

In well R-18, ash-flow tuff of the Otowi Member was intersected in the borehole from 505 to 655 ft bgs. Cuttings showed that the Otowi Member is very pale orange, poorly welded, and contains varying percentages of vitric pumice, lithic fragments, and felsic crystals. The coarse fraction from this interval commonly consists of intermediate-composition volcanic lithics, vitric pumice, and trace amounts of felsic crystals. The pumice is typically white, occasionally manganese/iron oxide stained, and fibrous with felsic phenocrysts. The finer fraction is made up of predominately felsic crystals with subordinate amounts of lithics and pumice.

3.2.1.4 The Guaje Pumice Bed of the Otowi Member

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 Pajarito 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.

In well R-18, the Guaje Pumice Bed, encountered from 655 to 665 ft bgs, is composed of white to light-gray pumice-fall deposits that form the basal subunit of the Otowi Member of the Bandelier Tuff. The coarse fraction from this poorly welded interval consists of white, vitric pumices, with occasional felsic phenocrysts, and traces of free felsic crystals. The finer fraction consists of predominately felsic crystals with trace amounts of lithics and vitric pumice.

3.2.1.5 Puye Formation

The Puye Formation is a large apron of overlapping alluvial and pyroclastic fans that were shed eastward from the Jemez volcanic field into the western Española Basin. The Puye Formation unconformably overlies rocks of the Santa Fe Group, and the Otowi Member of the Bandelier Tuff unconformably overlies the Puye Formation.

In well R-18, the Puye Formation fanglomerate was encountered from 665 ft bgs to the total depth of 1440 ft bgs. Cuttings collected across this interval are volcaniclastic sediments with varying percentages of constituents ranging from sandy silt to gravel. The first 15 ft contains intermixed pumices from the overlying Guaje Pumice Bed. The cuttings exhibited minor variation in constituents across the interval. The fine fraction generally consists of intermediate-composition volcanic clasts similar to the coarser fraction. The coarse fraction consists of porphyritic to aphanitic clasts of intermediate-composition volcanics, with lesser amounts of aphyric clasts, and vitrophyres. Porphyritic clasts include hornblende dacite, biotite dacite, and andesite. Clasts are generally broken fragments, with occasional subrounded surfaces and trace amounts of smaller subrounded clasts. Although varied in color, clasts are predominately gray with lesser amounts of reddish-brown and mottled clasts. Formation microimaging logs (1289 to 1425 ft bgs) indicate that the Puye Formation is crudely stratified with numerous beds of cobbles and boulders.

3.2.2 Quaternary Alluvium

The Qal deposit consists of stratified, lenticular deposits of unconsolidated fluvial sands, gravels, and cobbles. Smaller canyons whose headwaters are located on the Pajarito Plateau contain detritus exclusively of Bandelier Tuff. Larger canyon systems that head in the Sierra de los Valles contain Bandelier detritus mixed with dacite detritus derived from the Tschicoma Formation. Active and inactive channels and floodplains form complex, cross-cutting deposits. The fluvial sediment interfingers laterally with colluvium derived from canyon walls.

3.2.3 Hydrogeology

The hydrogeology of the Pajarito Plateau is 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 perennial groundwater in the canyon-bottom alluvium. Dry canyons have only occasional stream flow and may lack alluvial groundwater. Intermediate-perched groundwater has been found at certain locations at depths ranging between 100 and 700 ft bgs. The regional aquifer is found at depths of about 600 to 1200 ft bgs.

The hydrogeologic conceptual site model for the Laboratory(Collins et al. 2005, 092028) 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.

A conceptual model for hydrology and contaminant transport in water was described in detail in the Pajarito Canyon Investigation Report (LANL 2009, 106939, pp. 40−55). Figure 3.2-2 illustrates key aspects of the hydrologic conceptual model for Pajarito Watershed, including contaminant pathways. The conceptual model forms the basis for identifying hydrologic pathways for contaminants to move from surface sources into surface and subsurface water.

3.2.3.1 Groundwater

In the Los Alamos area, groundwater occurs as (1) water in shallow alluvium in some of the larger canyons, (2) an intermediate-perched groundwater body, which 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 Starmer/Upper Pajarito Aggregate Area are shown in Plate 1. The Laboratory formulates an annual Interim Facility-Wide Groundwater Monitoring Plan (LANL 2010, 109830) for an enhanced set of characterization and monitoring activities.

Alluvial Groundwater

Intermittent and ephemeral stream flows in the canyons of the Pajarito Plateau have deposited alluvium as thick as 100 ft. The alluvium in canyons that head on the Jemez Mountains is generally composed of sands, gravels, pebbles, cobbles, and boulders derived from the Tschicoma Formation and Bandelier Tuff on the flank of the mountains. The alluvium in canyons that head on the plateau is comparatively more finely grained, consisting of clays, silts, sands, and gravels derived from the Bandelier Tuff (LANL 1998, 059599, p. 2-17).

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 (Collins et al. 2005, 092028, p. 2-90). 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).

The shallow alluvial groundwater body in Pajarito Canyon extends from below the confluence with Twomile Canyon to approximately regional well R-23, a distance of 7 km (Figure 3.2-2). The alluvial groundwater is recharged by stream flow and some local precipitation. This alluvial groundwater body is downcanyon from all the sites investigated in this work plan.

Intermediate-Perched Water

Identification of perched groundwater systems beneath the Pajarito Plateau comes mostly from direct observation of saturation in boreholes, wells, or piezometers or from borehole geophysics. Perched groundwater is widely distributed across the northern and central part of the Pajarito Plateau with depth-to-water ranging from 118 to 894 ft bgs. The principal occurrences of perched groundwater occur in (1) the relatively wet Los Alamos and Pueblo Canyon watersheds, (2) the smaller watersheds of Sandia and Mortandad Canyons that receive significant volumes of treated effluent from Laboratory operations, and (3) in the Cañon de Valle area in the southwestern part of the Laboratory. Perched water is most often found in Puye fanglomerates, Cerros del Rio basalt, and in units of Bandelier Tuff. Based on a few reported occurrences in the southern part of the Laboratory, a few deep boreholes are located in that area. Additional perched zones probably occur beneath the adjacent watersheds of Pajarito and Water Canyons (Collins et al. 2005, 092028, pp. 2-96–2-97).

Perched immediate groundwater occurs in Bandelier Tuff at TA-09 (Figure 3.2-2). However, flowing perched groundwater was not observed in well R-18. The processed geophysical logs also show no significant fully water-saturated (perched water) zones above the regional aquifer (Kleinfelder 2005, 092415, p. 11).

Regional Aquifer

The regional aquifer of the Los Alamos area is the only aquifer capable of large-scale municipal water supply (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 locations of wells and generalized water-level contours on top of the regional aquifer are described in the 2009 General Facility Information report (LANL 2009, 105632). 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). Groundwater monitoring is conducted under annual updates to the Interim Facility-Wide Groundwater Monitoring Plan (LANL 2010, 109830).

In well R-18, the processed geophysical logs indicate a significant increase in water saturation below 1300 ft bgs. The estimated pore-volume water saturation computed from the elemental analysis (ELAN) is high, mostly 80% to 100% from 1302 ft bgs to the bottom of the log interval at 1428 ft bgs. The estimate is similarly high when computed directly from bulk density and ELAN water-filled porosity for a grain-density range of 2.25 to 2.65 grams per cubic centimeter. These results suggest that the regional aquifer groundwater level may reside as high as 1302 ft bgs, with more definitive evidence of full saturation below 1352 ft bgs. The screened interval in the completed well is 1358 to 1381 ft bgs, with a piezometric surface at approximately 1288 ft bgs (Kleinfelder 2005, 092415, p. 11).

3.2.3.2 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.

The Bandelier Tuff is generally 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 tuff beneath the mesa tops is low, generally less than 5% by volume throughout the profile (Kearl et al. 1986, 015368; Purtymun and Stoker 1990, 007508).

Based on the hydrogeologic conceptual model for mesas (Collins et al. 2005, 092028), at the mesa-top sites in the Starmer/Upper Pajarito Canyon Aggregate Area, water is unlikely to infiltrate the several hundred vertical feet to intermediate perched groundwater or more than 1000 feet to the regional aquifer.

Figure 3.2-2 illustrates the density of infiltration arrows (blue arrows). The magnitude of the infiltration rates under the sites in this work plan (upper Pajarito Canyon) is not expected to be as high as that in the middle and lower Pajarito Canyon.

4.0 PROPOSED INVESTIGATION ACTIVITIES AT TA-08

The Starmer/Upper Pajarito Canyon Aggregate Area contains 49 sites associated with TA-08. Of these, 33 sites have been approved for NFA. These sites are presented in Table 1.1-1. The remaining 16 sites are described below.

A variety of resources was used to define and revise the boundaries of each site, shown on the related figures and plates. Existing structures, roads, and other features that could readily be observed in the field were of prime importance. If these conditions could still be observed in the field, site boundaries were then established relative to these landmarks. Other types of data references were used also, particularly for former site locations where significant changes have occurred over time. Historic aerial photographs have been an excellent resource but are not available for all areas, dates of imagery are sporadic, few are georeferenced, and many are at a small scale or are oblique. Drawings and sketches were used, particularly for structures and utilities, as well as engineering drawings produced for construction or record purposes. Finally, interviews with former site workers taken during earlier work plan preparations in the 1990s were very helpful. Not all of these resources were available for every site and sometimes conflicted with each other. For each site, staff reviewed the available information, resolved conflicts as satisfactorily as possible, and revised site locations and boundaries accordingly. If specific uncertainties impacted these determinations, they are described in the presentation of each site.

4.1 AOC 08-001(a), Off-Gas System

AOC 08-001(a) (Figure 4.1-1) is the off-gas ventilation system that served building 08-1 at TA-08 from 1943 to 1968. The ventilation system consisted of duct work, five exhaust vents in the main portion of the building, an exhaust fan in the dark room at the southwest corner of the building, and an exhaust fan in the boiler room at the east end of the building. The vents, which exhausted air to the outdoors, were louvered and located near the floor along the north wall of the building. Building 08-1 is covered with earth on three sides, and the building’s north wall extends beyond the building to the east and to the west as part of a retaining wall system. Building 08-1was built in 1943 during World War II for use as the control building for the gun site (SWMU 08-002). After the war, the building was used to develop new explosives until TA-09 was constructed (from 1950 to 1953) and became available for that purpose. Crystal growth experiments were later conducted at building 08-1. Building 08-1 is about to undergo historic preservation. Restoration of the building is planned to begin in the spring of 2011.

4.1.1 Summary of Previous Investigations for AOC 08-001(a)

No previous investigations have been conducted at this site.

4.1.2 Summary of Data for AOC 08-001(a)

No decision-level data are available for this site.

4.1.3 Scope of Activities for AOC 08-001(a)

Twenty-six surface and subsurface samples will be collected from 14 locations atop building 08-1, at the exhausts, and downwind of the building 08-1 off-gas system (Figure 4.1-2).

Two upwind surface samples will be collected from two locations atop building 08-1 at one depth (0−1 ft bgs). The samples will help characterize contamination in consideration of historical restoration activities associated with building 08-1.

One surface and one subsurface sample will be collected at each of five locations where the floor vent exhausts exited building 08-1. Samples will be collected from two depths (0−1 and 2−3 ft bgs). Fourteen surface and subsurface samples will be collected from seven locations downwind of building 08-1. These samples are biased in the dominant southwest wind direction approximately 50 ft apart from each other.

Samples will be analyzed for target analyte list (TAL) metals, nitrate, perchlorate, total cyanide, explosive compounds, semivolatile organic compounds (SVOCs), volatile organic compounds ([VOCs] except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 4.1-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

4.2 AOC 08-001(b), Off-Gas System

AOC 08-001(b) (Figure 4.1-1) is the off-gas ventilation system that served building 08-2 at TA-08 from 1943 to 1968. The ventilation system consisted of exhaust ductwork and a blower fan. Building 08-2 is covered with earth on three sides, and the building's north wall extends beyond the building to the east and to the west as part of a retaining wall system. Based on this building's explosion-proof fixtures and "deluge" fire suppression system, building 08-2 was likely used for handling volatile materials in support of operations at the gun site (SWMU 08-002). After World War II, building 08-2 was used as a machine shop and for storage. Building 08-2, which has been inactive for several years, is about to undergo historic preservation. Restoration of the building is planned to begin in the spring of 2011.

4.2.1 Summary of Previous Investigations for AOC 08-001(b)

No previous investigations have been conducted at this site.

4.2.2 Summary of Data for AOC 08-001(b)

No decision-level data are available for this site.

4.2.3 Scope of Activities for AOC 08-001(b)

Sixteen surface and subsurface samples will be collected from nine locations at the exhausts and downwind of the building 08-2 off-gas system (Figure 4.1-2).

Two upwind surface samples will be collected from two locations atop building 08-2 at one depth (0−1 ft bgs). The sample will help characterize contamination in consideration of historical restoration activities associated with building 08-2.

Fourteen surface and subsurface samples will be collected from seven locations downwind of building 08-2 at two depth intervals (0–1 and 2–3 ft bgs). These samples are biased in the dominant southwest wind direction approximately 50 ft apart from each other.

Samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 4.2-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

4.3 SWMU 08-002, Gun Site

SWMU 08-002 (Figure 4.3-1) is the location of a former gun site at TA-08, approximately 80 ft south of building 08-1. The gun site, designed specifically for testing the nonnuclear components of the Little Boy weapon, operated from 1943 to 1945. The gun site consisted of two individual gun installations (structures 08-4 and 08-5) placed next to each other. A wooden shed mounted on rails covered each gun, so that the shed could be moved away from the gun.

Each gun installation consisted of a 3-in. naval antiaircraft gun mounted on a concrete pad and a sand butt—target area—into which the gun fired. In addition to a sand butt, the southern gun installation (structure 08-4) employed a second butt that was filled with sawdust. Each butt was placed several yards away from its respective gun mount. The butts were constructed of heavy wooden beams on three sides with the fourth side open and facing the gun. The butts were 20 ft long × 10 ft wide × 3 ft high.

The butts received experimental shots fired from the guns. The explosive propellant commonly used in the tests was cordite, which contained nitroglycerin and nitrocellulose fabricated with acetone (LANL 1993, 020949, pp. 5-15−5-17). The butts generally received inert projectiles for recovery and examination, but occasionally projectiles were fired at targets placed in the butts. The targets were made of combinations of steel, tungsten carbide, depleted uranium, copper, lead, and in some instances, small components made of beryllium and polonium. The target tests occasionally resulted in the fragmentation of targets or projectiles, scattering debris for distances of up to 75 yd. Currently, only the concrete gun pads and two piles of sand are present at the site (LANL 1997, 056664, p. 49).

4.3.1 Summary of Previous Investigations for SWMU 08-002

An RFI was conducted at SWMU 08-002 in April 1994 (LANL 1997, 056664). Four samples were collected from two locations at each of the two sand butts. Samples were collected from depth intervals ranging from 0 to 4 ft bgs. Ten samples were collected from 10 locations within a 75-yd radius of the two sand butts. Samples were collected from depth intervals ranging from 0 to 0.5 ft bgs. An additional five samples were collected from five locations west of the sand butts to support the characterization of SWMU 08-006(a), but they fall within the potentially impacted area of SWMU 08-002 and are included in the data set for this site.

Samples were field-screened for radioactivity, organic vapors, and HE. All field-screening results were negative or at background levels. All samples were submitted to an off-site contract analytical laboratory for analysis of a limited suite of inorganic chemicals (metals), which included beryllium, copper, and lead (LANL 1997, 056664, pp. 49-56).

The results of the analyses of soil samples collected during the 1994 RFI are as follows (LANL 1997, 056664, p. 53-55): lead was detected above BV.

4.3.2 Summary of Data for SWMU 08-002

The data collected during the 1994 RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

4.3.3 Scope of Activities for SWMU 08-002

A walkover survey will be performed before sampling to identify any surface debris (unexploded ordnance, shrapnel, or similar items) remaining at the site. Any debris that can be readily removed will be picked up and disposed of. Debris with potential historical preservation value will not be disturbed.

Sixty surface and subsurface samples will be collected from 30 locations at the former gun site which consisted of a sand butt, a concrete pad, and a set of rails associated with each of the former mobile structures 08-4 and 08-5. Structure 08-4 had the added feature of a former sawdust bin (Figure 4.3-2).

Twenty-six surface and subsurface samples will be collected from 13 locations at and around former structure 08-4 from two depths (0–1 ft and 2–3 ft bgs). Four samples will be collected from two locations at the sand butt. Eight samples will be collected from four locations around the perimeter of the concrete pad. Four samples will be collected from two locations fanning out 50 ft from the impact point of both the sand butt and the sawdust bin. Two samples will be collected from one location at the sawdust bin. Eight samples will be collected from four locations adjacent to the exterior of the former rails.

Twenty-eight surface and subsurface samples will be collected from 14 locations at and around former structure 08-5 from two depths (0–1 ft and 2–3 ft bgs). Four samples will be collected from two locations at the sand butt. Eight samples will be collected from four locations around the perimeter of the concrete pad. Four samples will be collected from two locations fanning out 50 ft from the impact point of the sand bin. Twelve samples will be collected from six locations adjacent to the exterior of the former rails.

Six samples will be collected from three locations in two small drainages east of the northern gun installation. Samples will be collected from two depths at each location (0–1 ft and 2–3 ft bgs).

All samples will be collected from two depths and analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, polychlorinated biphenyls ([PCBs] in 20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 4.3-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

4.4 Consolidated Unit 08-003(a)-00

Consolidated Unit 08-003(a)-00 (Figure 4.4-1) consists of a decommissioned septic tank [SWMU 08-003(a)], floor drains from building 08-1 [SWMU 08-004(a)], drainlines from building 08-2 [SWMU 08-004(b)] and a storm drain inlet, drainline, and outfall [SWMU 08-009(a)].

4.4.1 SWMU 08-003(a), Decommissioned Septic Tank

SWMU 08-003(a) (Figure 4.4-1) is a decommissioned septic tank (structure 08-59), and associated inlet and outlet lines that served buildings 08-1 and 08-3 at TA-08. The septic tank is located approximately 35 ft north of building 08-3 on the west side of Anchor Ranch Road. The septic tank is constructed of precast reinforced concrete with dimensions of approximately 10 ft long × 4 ft wide × 7 ft deep and a capacity of 1197 gal. The septic tank and its associated lines are buried approximately 1.5 ft bgs.

The septic tank received effluent from the boiler room, darkroom, and restroom of building 08-1 and from the restroom of building 08-3. In 1995, the tank was pressure-washed, backfilled with sand, and left in place. Before backfilling, the tank discharged into a nearby storm drainline [SWMU 08-009(a)], which flowed to the outfall east of Anchor Ranch Road. Building 08-1 was the control building for the gun site (SWMU 08-002) during World War II. After the war, the building was used to develop explosives and still later used to conduct crystal growth experiments. Building 08-3 supported the activities conducted at the gun site (SWMU 08-002).

4.4.1.1 Summary of Previous Investigations for SWMU 08-003(a)

In 1971, the tank contents were sampled. Background counts of gross-alpha and gross-beta radioactivity were used to determine that the tank contents were free of radioactive contamination. Volatile hydrocarbons and oil, explosives, and chemicals were found in the tank (LANL 1995, 046092.21, p. 3).

The expedited cleanup (EC) plan documents that an RFI was conducted at SWMU 08-003(a) in August 1994. Two samples of tank sludge and two samples of tank liquid were obtained and analyzed for VOCs, SVOCs, RCRA metals, and HE (LANL 1995, 046092.21, p. 6).

An EC was conducted at SWMU 08-003(a) from August 1995 to September 1995. The EC consisted of removing the contents of the tank by first removing the overburden, removing the tank's lid, and pumping out part of the contents. The contents were removed and the waste was placed into 55-gal. drums for disposal. The inside of the tank was then cleaned by pressure-washing and left in place. The wash waste was removed using a vacuum truck. A backhoe was used to expose the soil adjacent to the tank to a depth of 7 ft, and soil samples were collected. A total of eight subsurface soil samples were collected from four locations adjacent to the tank and were analyzed for VOCs. Samples were collected from depth intervals ranging from 3 to 7 ft bgs. During sampling at the north end of the tank, a 2-ft section of the outlet pipe was broken. All of the pipe pieces and sludge were placed in containers. The pipe was plugged along with the tank inlet and outlet to prevent contamination migrating from the remaining drainline (LANL 1995, 059153, pp. 1–2).

The results of the analyses of soil samples collected during the 1995 EC are as follows (LANL 1995, 059153, Appendix A): acetone and methylene chloride were detected.

4.4.1.2 Summary of Data for SWMU 08-003(a)

The data collected during the 1995 EC do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

4.4.1.3 Scope of Activities for SWMU 08-003(a)

Thirty subsurface samples will be collected from 15 locations adjacent to the drainlines, tank inlet, septic tank, and tank outlet (Figure 4.4-2).

Twenty-four samples will be collected at 12 locations adjacent to inlet and outlet drainlines. The samples will be collected at approximately 20-ft intervals along the path of the line, beginning at the point of exit from the building or tank, to coincide with the expected locations of the pipe bends and joints. Each location will be sampled at two depth intervals (0–1 ft below the line and 5–6 ft below the line).

Eight samples will be collected from four locations adjacent to the tank inlet, the septic tank, and tank outlet. Each location will be sampled at two depths (0–1 ft below the line or tank and 5–6 ft below the line or tank).

The outfall discharged to the storm drain of SWMU 08-009(a). The discharge point will be characterized by proposed sampling location 9a-8 for SWMU 08-009(a).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs, total petroleum hydrocarbon−diesel range organics (TPH-DRO), TPH−oil range organics (TPH-ORO), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 4.4-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

4.4.2 SWMU 08-004(a), Floor Drains

SWMU 08-004(a) (Figure 4.4-1) consists of the floor drains in building 08-1 at TA-08. The only floor drains located in building 08-1 are the two floor drains in the boiler room at the east end of the building. Both floor drains lead to a single drainline that exits the north side of the building near its northeast corner and discharged to the SWMU 08-003(a) septic tank (structure 08-59). All other drainlines in building 08-1 are connected to plumbing fixtures and exit the building through a single drainline near the northwest corner of the building. This drainline also discharged to the SWMU 08-003(a) septic tank.

Building 08-1 was the control building for the gun site (SWMU 08-002) during World War II. After the war, the building was used to develop explosives and still later used to conduct crystal growth experiments. Building 08-1 has been inactive for several years.

4.4.2.1 Summary of Previous Investigations for SWMU 08-004(a)

No previous investigations have been conducted at this site.

4.4.2.2 Summary of Data for SWMU 08-004(a)

No decision-level data are available for this site.

4.4.2.3 Scope of Activities for SWMU 08-004(a)

In consideration of historic restoration to building 08-1 in the near future, no sampling will be conducted inside the building. Because the drainlines discharged to the septic tank SWMU 08-003(a), SWMU 08-004(a) will be characterized by drainline sampling associated with SWMU 08-003(a) (section 4.4.1.3).

4.4.3 SWMU 08-004(b), Drainline

SWMU 08-004(b) (Figure 4.4-1) consists of a drainline from building 08-2 at TA-08. Engineering drawings show the only drainline that exits building 08-2 is the 1.25-in.-diameter drainline exiting the building's north side (LASL 1943, 110446). This drainline received condensate from the two steam radiators located in the building (LASL 1943, 110447). Building 08-2 was built in 1943 and served as a process building for the gun site (SWMU 08-002). After World War II, the building was used as a machine shop and for storage. Building 08-2 has been inactive for several years.

4.4.3.1 Summary of Previous Investigations for SWMU 08-004(b)

No previous investigations have been conducted at this site.

4.4.3.2 Summary of Data for SWMU 08-004(b)

No decision-level data are available for this site.

4.4.3.3 Scope of Activities for SWMU 08-004(b)

Ten surface and subsurface samples will be collected from five locations adjacent to the drainline and at the outfall (Figure 4.4-2). Two subsurface samples will be collected from one location adjacent to the drainline's point of exit from the building at two depth intervals (0–1 ft below the drainline and 5–6 ft below the drainline). Eight samples will be collected from two depth intervals (0–1 and 2–3 ft bgs) at four locations at the outfall.

The discharge downgradient will be characterized by proposed sampling locations for AOC 08-001(b) (section 4.2.3).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs, americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 4.4-2 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

4.4.4 SWMU 08-009(a), Drainline and Outfall

SWMU 08-009(a) (Figure 4.4-1) is a storm drainline and outfall at TA-08 located north of buildings 08-1, 08-2, and 08-3. The 18-in.-diameter concrete drainline was installed in 1943 and receives storm water runoff from open land. The stormwater enters the drainline through three drop inlets placed along the length of the storm drainline. The first of these inlets is located approximately 40 ft west of building 08-2. From this inlet, the drainline extends east approximately 375 ft and discharges at a point 10 ft east of Anchor Ranch Road (LANL 1993, 020949, p. 5-28).

Before 1995, the outlet line from the SWMU 08-003(a) septic tank (structure 08-59) discharged into the SWMU 08-009(a) drainline pipe at a point approximately 5 ft west of where the storm drain passes under Anchor Ridge Road. In 1995, the tank was pressure-washed and backfilled with sand. Currently, the storm drain and outfall receive stormwater only.

4.4.4.1 Summary of Previous Investigations for SWMU 08-009(a)

An RFI was conducted at SWMU 08-009(a) in 1997. Five samples were collected from one location within the site and submitted to an off-site contract analytical laboratory for the analyses of metals, HE, PCBs, and SVOCs. Samples were collected from depth intervals ranging from 0 to 4.5 ft bgs.

4.4.4.2 Summary of Data for SWMU 08-009(a)

The samples collected, analyses requested, and decision-level analytical data from the 1997 RFI are presented in Tables 4.4-3 to 4.4-5. The results of the analyses of samples collected during the 1997 RFI are as follows:

- Antimony, cadmium, cobalt, copper, lead, mercury, silver, and zinc were detected above BVs (Figure 4.4-3).
- HE (HMX [high-melting explosive or 1,3,5,7-tetranitro-1,3,5,7-tetrazocine], RDX [research department explosive or hexahydro-1,3,5-trinitro-1,3,5-triazine, and TNT [2,4,6-trinitrotoluene]) and bis(2-ethylhexyl)phthalate were detected (Figure 4.4-4).

4.4.4.3 Scope of Activities for SWMU 08-009(a)

Thirty-four subsurface samples will be collected from 15 locations at the inlet, adjacent to the drainline, at the outfall, and downgradient of the outfall (Figure 4.4-2).

Sixteen samples will be collected at eight locations at the inlet and adjacent to the drainline. The samples adjacent to the drainline will be collected at 50-ft intervals along the path of the drainline, beginning at the inlet. Each location will be sampled at two depth intervals (0–1 ft below the drainline and 5–6 ft below the drainline).

Eighteen samples will be collected at seven locations at the outfall and in the drainage downgradient of the outfall. Four locations will be situated at the outfall—one immediately below the discharge point and three approximately 10 ft downgradient to bound the outfall. One location downgradient of the outfall will be adjacent to existing location 08-03100. Samples from these four locations will be collected from three depths (0–1 ft, 4–5 ft, and 9–10 ft bgs) because location 08-03100 was previously sampled to 4.5 ft bgs. Six additional samples will be collected from three locations positioned at 50-ft intervals within the drainage at two depth intervals (0–1 and 2–3 ft bgs). The drainage further downgradient will be characterized by sampling at SWMU 09-005(a) (section 5.15.1.3).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 4.4-6 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

4.5 SWMU 08-004(c), Floor Drain and Sumps

SWMU 08-004(c) (Figure 4.5-1) is identified in the 1990 SWMU report (LANL 1990, 007511) as a floor drain in building 08-3 and two sumps behind building 08-3 at TA-08. Building 08-3 was originally constructed to house diesel-powered electrical generators that provided the electricity necessary to support operations at buildings 08-1 and 08-2 and the gun site. Building 08-3 was constructed with one floor drain which exited the building through the north wall. The floor drain was placed beneath the flow-control device that managed the amount of diesel fuel being fed to the electrical generators within the building. The floor drain was intended to act as a preventative measure to receive any overflow that might occur should the fuel flow-control device have malfunctioned.

In 1948, building 08-3 was converted to house a hydraulic press and a control room to run the press. In 1957, building 08-3 underwent another conversion for use as a plastic scintillator facility. In 1983, building 08-3 underwent its last conversion to a laboratory.

The floor drain is not shown on the engineering drawings documenting the building’s 1948, 1957, and 1983 conversions and was likely covered over during the 1948 conversion. The two sumps described as being located behind building 08-3 in the 1990 SWMU report (LANL 1990, 007511) were misidentified. None of the engineering drawings for building 08-3 indicate the presence of sumps. The engineering drawings do, however, show two manholes behind the building. The manholes provided access to two 2000-gal. underground storage tanks. The eastern tank [AOC 08-011(a)] stored diesel fuel for the electrical generators originally occupying building 08-3. The western tank [AOC 08-811(b)] stored fuel oil to operate the steam-heating boiler in building 08-1. Both tanks were removed in 1987. It is highly likely that the authors of the SWMU report (LANL 1990, 007511) mistook the manholes for sumps.

Building 08-3 has been identified for historic preservation as a Manhattan Project–era structure and as such will not be removed in the foreseeable future.

4.5.1 Summary of Previous Investigations for SWMU 08-004(c)

No previous investigations have been conducted at SWMU 08-004(c) because the approved 1993 work plan states that characterization of SWMU 08-004(c) will be deferred until removal of building 08-3 (LANL 1993, 020949, pp. 5-27−5-28).

4.5.2 Summary of Data for SWMU 08-004(c)

No decision-level data are available for this site.

4.5.3 Scope of Activities for SWMU 08-004(c)

Two surface and subsurface samples will be collected from one location at the drainline's point of exit from building 08-3 (Figure 4.5-2). The drainage further downgradient will be characterized by sampling at SWMU 08-003(a) (section 4.4.1.3).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs (except in surface samples), TPH-DRO, TPH-ORO, americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 4.5-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

The floor drains inside the building will not be sampled in consideration of historic restoration and preservation to the building in the near future. The building will not be removed in the foreseeable future, but characterization of the site will be performed if and when the building is removed.

4.6 SWMU 08-004(d), Drains

SWMU 08-004(d) (Figure 4.6-1) consists of sink drains and the associated sewage line inside former building 08-24 (Isotope Building) at TA-08. The sewage line exited building 08-24 on the northeast side and runs east-northeast from the building. Building 08-24 was used to radiograph nuclear fuel elements from 1950 to 1971 and since then has had various other uses.

In 1954, SWMU 08-004(d) was contaminated with strontium-90 as a result of a spill. The spill occurred when a heavily shielded, 800-lb metal container (pig) used for x-ray examination was unloaded at the dock on the south side of the building. During unloading, the pig slipped and dropped, dumping a white powder, strontium-90 salt, on the truck and the dock. The powder was checked with a dosimeter and found highly radioactive.

The four people involved in the incident immediately decontaminated their hands by washing them in the sink in the center room of building 08-24. Following the spill, the building's interior was scrubbed with water and decontaminated. Contaminated dirt and asphalt outside the building were removed and disposed of in a radioactive waste disposal area. A radiation survey, conducted one month following the spill, detected contamination in concrete cracks on the loading dock and between dock sections, and the area was sealed with concrete to avoid spreading the contamination (LANL 1993, 020949, pp. 5-5−5-7). Building 08-24 was removed in 2006; however the building's slab and the drainlines beneath the slab remain in place.

4.6.1 Summary of Previous Investigations for SWMU 08-004(d)

An RFI was conducted at SWMU 08-004(d) in May 1994. One swipe sample was taken from the P-trap of a sink inside building 08-24 and screened for radioactivity. The P-trap had a circular port that allowed access to the interior of the drainpipe, where the swipe sample was taken by swabbing the inside of the drainpipe with a 2-in.-diameter standard filter media. A scale sample was taken at a manhole about 750 ft downgradient from building 08-24. At the bottom of the manhole is a concrete slab approximately 8 ft bgs with an open, 2- to 3-in.-diameter sewer channel. The contents of the sewer channel consisted of a carbonate-like scale that was collected from the sewer channel at the bottom of the manhole by scraping off the scale with a stainless-steel scoop.

A field-screening test did not detect HE. One sludge sample was collected from a second clay pipe that enters the manhole about 3 ft above the floor of the hole. All samples were analyzed for radionuclides and no detectable gross-alpha or -beta radioactivity in the scale or swipe samples were reported; however radioactivity was detected in the sludge sample. Strointium-90 was detected above FV in the sludge sample (LANL 1996, 054586, pp. 38−39).

4.6.2 Summary of Data for SWMU 08-004(d)

The data collected during the 1994 RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

4.6.3 Scope of Activities for SWMU 08-004(d)

Forty-four subsurface samples will be collected at 22 locations around the perimeter of the concrete foundation and adjacent to the associated drainline (Figure 4.6-2). Six subsurface samples will be collected from three locations around the perimeter of the concrete foundation at two depths (4–5 and 9–10 ft bgs).

Thirty-eight subsurface samples will be collected from 19 locations adjacent to the drainline. Samples adjacent to the drainlines will be collected at 50-ft intervals along the path of the drainline, beginning at the point of exit from the building up to the point where the drainline is plugged or disconnected, to coincide with the expected locations of the pipe joints. Samples from these locations will be collected at two depth intervals (0–1 ft below the drainline and 5–6 ft below the drainline).

All samples will be analyzed for strontium-90. Table 4.6-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

4.7 SWMU 08-005, Former Crystal Growth Incubator

SWMU 08-005 (Figure 4.7-1) is former crystal growth incubator that was located at TA-08 approximately 40 ft northwest of building 08-2. The incubator consisted of a 4-ft-long × 4-ft-wide × 4-ft-high metal box, with a lid that contained two windows. The interior of the incubator had a gasket and strap composed of a nonfriable asbestos-containing material. The incubator was used in the 1950s to grow crystals for photographic experiments conducted in building 08-1 (LANL 1993, 020949, p. 5-28; LANL 1996, 054328, p. 1). Chemicals used in the growth experiments were terphenyl, alpha naphthyl oxazole, styrene, methyl chloroform, and thallous iodide (DOE 1987, 008663). No explosive compounds or radionuclides were used in the former crystal growth incubator. At an unknown date, the incubator (which contained some crystallized residue) was removed from building 08-1 and placed outdoors, where it remained inoperative for several years until its removal in 1994. When the incubator was removed, no staining was observed on the ground around the incubator (LANL 1996, 054328, p. 1), and the exterior of the incubator had rusted from several years of exposure to the elements.

4.7.1 Summary of Previous Investigations for SWMU 08-005

A voluntary corrective action (VCA) was conducted at SWMU 08-005 in September 1994 and July 1995. On September 20, 1994, approximately 1 ft^3 of solid residue was removed from the storage vessel, containerized, and disposed of by LANL's Waste Services Group. The asbestos-containing material, which included a gasket, strap, and cord, were also removed and disposed of. Subsequent analysis of the residue indicated it was mostly naphthalene, but anthracene and 2-methylnaphthalene were also present.

On September 30, 1994, the vessel was transported to the Laboratory's salvage yard where the vessel was inspected and field-screened for radioactivity and HE. No elevated readings were detected. In October 1994, the soil beneath the former location of the incubator was screened for radiation and organic vapors. No elevated readings were detected. On July 26, 1995, a surface (0–0.5 ft bgs) sample was collected at the former location of the vessel and submitted to an off-site contract analytical laboratory for analysis of SVOCs and inorganic chemicals (metals) (LANL 1996, 054328, pp. 1−2).

The results of the analyses of the sample collected during the 1995 VCA are as follows (LANL 1996, 054328, pp. 1−2):

- Barium, cadmium, chromium, lead, and selenium were detected above BVs.
- Bis(2-ethylhexyl)phthalate was detected.

4.7.2 Summary of Data for SWMU 08-005

The data collected during the 1995 VCA do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

4.7.3 Scope of Activities for SWMU 08-005

Ten surface and subsurface samples will be collected from five locations within the former incubator site—with one location centered within the former incubator site (Figure 4.7-2). Samples will be collected from two depths (0–1 ft and 4–5 ft bgs) and analyzed for TAL metals, nitrate, perchlorate, total cyanide, PCBs, SVOCs, VOCs (except in surface samples), and pH. Samples will not be analyzed for radionuclides or explosives compounds because there is no record or indication of radionuclide or explosive-compound use at the site. Table 4.7-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

4.8 SWMU 08-006(a), MDA Q

SWMU 08-006(a) (Figure 4.8-1) is MDA Q, located at TA-08 approximately 290 ft southwest of building 08-1. The MDA was the disposal area for the naval guns used at the gun site (SWMU 08-002) during the Manhattan Project. Other objects that were used at the gun site are also buried within the MDA, including inert projectiles (nonnuclear), expended casings, and prototypes (nonnuclear) for the Little Boy weapon. The MDA was active only during 1946, when the objects were originally placed within the MDA. The 1990 SWMU report did not provide a specific location for MDA Q, merely stating that it was south of building 08-1 and east of building 08-23 (LANL 1990, 007511). The location of the MDA was identified by two electromagnetic surveys and a ground-penetrating radar survey conducted in December 1993 (Wilson 1994, 048763).

4.8.1 Summary of Previous Investigations for SWMU 08-006(a)

An RFI was conducted at SWMU 08-006(a) in 1994. Ten samples were collected from five locations within the site and analyzed for a limited set of inorganic chemicals—beryllium, copper, and lead. Samples were collected from depth intervals ranging from 0 to 4 ft bgs.

The results of the analysis of samples collected in 1994 are as follows: beryllium, copper, and lead were detected above BVs.

4.8.2 Summary of Data for SWMU 08-006(a)

The data collected during the 1994 investigation do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

4.8.3 Scope of Activities for SWMU 08-006(a)

Sixteen surface and subsurface samples will be collected from four locations 3 ft beyond the boundary determined by the 1993 geophysical survey of the site (Figure 4.8-2). Samples will be collected from four depths (0–1, 5–10, 15–20, and 25–30 ft bgs) and analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs (except in surface samples), and pH. Table 4.8-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

4.9 AOC 08-009(c), Drainline and Outfall

AOC 08-009(c) (Figure 4.9-1) consists of a drainline and outfall at TA-08 approximately 350 ft northeast of building 08-23 (the Betatron building). The drainline runs northeast from building 08-23 to the outfall and receives stormwater from the Betatron building (08-23). The stormwater is fed to the drainline via a French drain that surrounds the building. Before plugging, the floor drains in the basement of building 08-23 also discharged into the AOC 08-009(c) drainline. The Betatron building was built in 1950 and housed a 20-million-volt betatron, electron accelerator that was used to radiograph large items such as nuclear fuel elements, waste containers, and weapon assemblies.

In 1990, approximately 1 pint of oil containing an unknown concentration of PCBs is reported to have spilled from transformers placed in the building's basement. The spill was cleaned. Following the spill, all transformers were replaced. Because the basement floor drains could not be plugged because of the possibility of flooding the transformers, a trough and absorbent boom were installed to intercept any future leaks. The floor drains were subsequently plugged in 1996. There are no records of any other hazardous material entering the drainline (LANL 1993, 020949, pp. 5-8–5-9; LANL 1994, 038539, p. 6).

4.9.1 Summary of Previous Investigations for AOC 08-009(c)

An RFI was conducted at AOC 08-009(c) in 1994. Seven surface (0–0.5 ft bgs) samples were collected from seven locations within the site and submitted to an off-site contract analytical laboratory for the analysis of PCBs.

4.9.2 Summary of Data for AOC 08-009(c)

The samples collected, analyses requested, and decision-level analytical data from the 1994 RFI are presented in Tables 4.9-1 and 4.9-2. The results of the analysis of samples collected during the 1994 RFI are as follows: Aroclor-1260 was detected (Figure 4.9-2).

4.9.3 Scope of Activities for AOC 08-009(c)

Sixteen subsurface samples will be collected from eight locations along the drainline, including the point where it exits building 08-23, at the corner where the drainline turns north, and approximately every 50 ft along the drainline to the outfall (Figure 4.9-3). Samples will be collected from two depth intervals (0–1 ft and 5–6 ft below the drainline). Collection of these samples is subject to facility access restrictions, and collection of samples at all locations may not be possible.

Sixteen surface and subsurface samples will be collected from eight locations at the outfall and downgradient of the outfall (Figure 4.9-3). Eight surface and subsurface samples will be collected from four locations at the outfall—one immediately below the discharge point and three approximately 10 ft downgradient to bound the outfall. Eight surface and subsurface samples will be collected from four locations within the drainage downgradient of the outfall. All samples will be collected at two depth intervals (0–1 and 2–3 ft bgs) and analyzed for PCBs. Table 4.9-3 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

4.10 SWMU 08-009(d), Drains

SWMU 08-009(d) (Figure 4.10-1) consists of the drains located in the photo-processing and x-ray rooms of building 08-22 (x-ray building) at TA-08. Building 08-22 was built in 1950 and housed x-ray machines used to radiograph various items. The SWMU 08-009(d) drains were dedicated to receive photo-processing and photo-development solutions that contained silver salts, chromium, pentachlorophenol and other chemicals used during the radiography process. Before being plugged, the drains discharged effluent to a formerly National Pollutant Discharge Elimination System (NPDES)-permitted outfall (EPA 06A074), located approximately 300 ft northeast of building 08-22. The outfall drained into Starmer Gulch, a tributary of Pajarito Canyon. The drains were plugged between 1995 and 1997. The outfall was removed from the NPDES permit effective September 19, 1997 (EPA 1997, 109528).

Based on the NPDES-permit outfall number listed in the 1990 SWMU report (LANL 1990, 007511), the RFI investigating team concluded that the SWMU report incorrectly attributed the source of the SWMU 08-009(d) drains to effluent from fluorescent penetrant experiments, rather than to its correct source, which was photo-processing effluent. To account for the drain that received the fluorescent penetrant effluent, the approved RFI work plan proposed designating a new identifier, AOC, 08-009(f) (LANL 1993, 020949, p. 5-9).

4.10.1 Summary of Previous Investigations for SWMU 08-009(d)

An RFI was conducted at SWMU 08-009(d) in 1994. Four samples were collected at two locations—3 ft and 6 ft downgradient of the outfall. Samples were collected from depth intervals ranging from 0 to 1.4 ft bgs. Samples were field-screened for radioactivity, organic vapors, and HE. Field screening results showed elevated radioactivity levels detected at the location closest to the outfall, and photoionization detector (PID) measurements were less than 1 ppm; HE was not detected in the samples. The samples were submitted to an off-site contract analytical laboratory for analysis of inorganic chemicals, SVOCs, and VOCs. No radiochemistry analyses were conducted at SWMU 08-009(d) because of field-screening results (LANL 1996, 054586, pp. 56−57).

The results of the analyses of samples collected during the 1994 RFI are as follows (LANL 1996, 054586, p. 62):

- Antimony, chromium, mercury, and silver were detected above BVs.
- Bis(2-ethylhexyl)phthalate and VOCs (acetone, isopropylbenzene, isopropyltoluene [4-], and trichloro-1,2,2-trifluoroethane) were detected.

4.10.2 Summary of Data for SWMU 08-009(d)

The data collected during the 1994 RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

4.10.3 Scope of Activities for SWMU 08-009(d)

Twenty-six surface and subsurface samples will be collected from 13 locations at the outfall and downgradient of the outfall (Figure 4.10-2). Eight surface and subsurface samples will be collected from four locations at the outfall—one immediately below the discharge point and three approximately 10 ft downgradient to bound the outfall. Eighteen surface and subsurface samples will be collected from nine locations downgradient of the outfall. Samples downgradient of the outfall will be collected at 100-ft intervals along the path of the drainage up to the canyon reach. Samples will be collected from two depth intervals (0–1 ft and 2–3 ft bgs).

Fourteen subsurface samples will be collected from seven locations along the drainline, including where the drainline exits the building, at each bend in the drainline, and approximately every 50 ft along the drainline to the outfall. Drainline samples will be collected from two depth intervals (0–1 ft and 5–6 ft below the drainline). Collection of these samples is subject to facility access restrictions, and collection of samples at all locations may not be possible.

Because building 08-22 is an active facility, collection of samples at drains and drainlines within the building is not possible at this time. Samples at the locations of drains and drainlines within the footprint of building 08-22 are delayed until the building is removed.

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (in 20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 4.10-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

4.11 SWMU 08-009(e), Outfall

SWMU 08-009(e) (Figure 4.11-1) is the outfall at TA-08 associated with the photo-developing processes that occurred in building 08-21 (a laboratory and office building). The outfall, which is located approximately 200 ft east of building 08-21, is a former NPDES-permitted outfall (06A075) that drained into Starmer Gulch, a tributary of Pajarito Canyon. Building 08-21 was built in 1950 as an administration and laboratory building. The south wing originally contained 13 darkrooms, a photo-processing and photo-development laboratory, and a metallography laboratory. Before 1991, the waste generated in the photo laboratory was sent through a silver recovery resin bed for the removal of silver. After the silver was removed, the waste water was discharged to the NPDES-permitted outfall.

At the metallography laboratory, plutonium parts coated with nickel were x-rayed and fuel elements that consisted of graphite impregnated with uranium-235 were polished. In 1982 or 1983, the metallography laboratory was decontaminated and the floor was removed and replaced. In about 1998, the south wing was converted to office space, and only the photo laboratory and darkrooms remain in place. The outfall was removed from the Laboratory’s NPDES permit effective January 14, 1998, and currently receives stormwater only (EPA 1998, 109568). In 2003, Anchor Ranch Road was rerouted from TA-08 to TA-22. As part of this road reconstruction activity, the storm culvert beneath Anchor Ranch Road [and associated with the SWMU 08-009(e) outfall] was removed and the drainage was completely recontoured. A drop inlet located approximately 80 ft east of building 08-21 receives stormwater only from a grassy island (Figure 4.11-1), and was not associated with operations in the building.

4.11.1 Summary of Previous Investigations for SWMU 08-009(e)

An RFI was conducted at SWMU 08-009(e) in May 1994. Four samples were taken from two locations—4 ft and 8 ft east and downstream from the end of the Anchor Ranch Road culvert. Samples were collected from depth intervals ranging from 0 to 3 ft bgs. Samples were field-screened for radioactivity, organic vapors, and HE. Field-screening results showed no elevated radioactivity levels, and PID measurements were less than 1 ppm; HE was not detected in the samples. The samples were submitted to an off-site contract analytical laboratory for analysis of inorganic chemicals and SVOCs. No radiochemistry analyses were conducted at SWMU 08-009(e) because of field-screening results (LANL 1996, 054586, p. 64).

The results of the analyses of samples collected during the 1994 RFI are as follows (LANL 1996, 054586, p. 62):

- Antimony, mercury, silver, and zinc were detected above BVs.
- SVOCs were not detected.

4.11.2 Summary of Data for SWMU 08-009(e)

The data collected during the 1994 RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

4.11.3 Scope of Activities for SWMU 08-009(e)

Thirty surface and subsurface samples will be collected from 15 locations along former drainlines, at the outfall, and downgradient of the outfall (Figure 4.11-2). Sixteen subsurface samples will be collected from eight locations along former drainlines associated with the outfall. The samples will be collected at 30-ft intervals along the path of the drainline, beginning at the point where the former drainline exited the building. Each location will be sampled at two depth intervals (0–1 ft below the drainline and 5–6 ft below the drainline). Collection of these samples is subject to facility access restrictions, and collection of samples at all locations may not be possible.

Eight surface and subsurface samples will be collected from four locations at the outfall—one immediately below the discharge point and three approximately 10 ft downgradient to bound the outfall. Six surface and subsurface samples will be collected from three locations downgradient of the outfall Samples downgradient of the outfall will be collected at 50-ft intervals along the path of the drainage up to the canyon reach. All the outfall and drainage samples will be collected from two depth intervals (0–1 ft and 2–3 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (in 20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 4.11-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

4.12 AOC 08-009(f), Outfall

AOC 08-009(f) (Figure 4.12-1) is the outfall at TA-08 located approximately 40 ft southeast of building 08-22 (the x-ray building). Fluorescent penetrants (mixtures of dyes and surfactants) were used in building 08-22 to detect cracks in parts being prepared for installation into a weapons assembly. Historically, fluorescent penetrants, developers, and emulsifiers were discharged to the outfall through drains located within building 08-22. The valves to the sinks that discharged to the drains were disconnected in 1992, and the drains were rerouted to the building 08-22 sanitary sewer system. After 1992, secondary containers were used to collect the chemicals before disposal (LANL 1993, 020949, pp. 5-10−5-11).

4.12.1 Summary of Previous Investigations for AOC 08-009(f)

An RFI was conducted at AOC 08-009(f) in 1994. Eight samples were collected from two locations within the site and analyzed for inorganic chemicals and organic chemicals. Samples were collected from depth intervals ranging from 0 to 5 ft bgs.

The results of the analyses of samples collected in 1994 RFI are as follows:

- Nitrate was detected.
- Bis(2-ethylhexyl)phthalate, polycyclic aromatic hydrocarbons (PAHs), and VOCs were detected.

4.12.2 Summary of Data for AOC 08-009(f)

The data collected during the 1994 investigation do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

4.12.3 Scope of Activities for AOC 08-009(f)

Eleven surface and subsurface samples will be collected from five locations along the drainline, at the outfall, and downgradient of the outfall (Figure 4.12-2). Two surface and subsurface samples will be collected from one location 5 ft from the drainline's point of exit from active building 08-22. This location will be sampled at two depth intervals (0–1 ft below the drainline and 5–6 ft below the drainline).

A surface and two subsurface samples will be collected from one location at the outfall, immediately below the discharge point (at 0–1 ft, 2–3 ft, and 4–5 ft bgs). Six surface and subsurface samples will be collected from three locations downgradient of the outfall. Samples downgradient of the outfall will be collected at 40-ft intervals along the path of the drainage up to the confluence of drainage from downgradient building 08-120. Samples will be collected from two depth intervals (0–1 ft and 2–3 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 4.12-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

4.13 AOC C-08-014, Building

AOC C-08-014 (Figure 4.13-1) is building 08-21 at TA-08. Building 08-21 was built in 1950 as a laboratory building. The south wing originally contained 13 darkrooms, a photo-processing and photo-development laboratory, and a metallography laboratory. In about 1998, the south wing was converted to office space, and only the photo laboratory and darkrooms remain in place. The building remains in use and currently houses laboratories and administrative offices.

4.13.1 Summary of Previous Investigations for AOC C-08-014

No previous investigations have been conducted at this site.

4.13.2 Summary of Data for SWMU AOC C-08-014

No decision-level data are available for this site.

4.13.3 Scope of Activities for SWMU AOC C-08-014

Building 08-21 is currently active. Sampling at AOC C-08-014 will be performed when building 08-21 is removed.

5.0 PROPOSED INVESTIGATION ACTIVITIES AT TA-09

The Starmer/Upper Pajarito Canyon Aggregate Area contains 64 sites associated with TA-09. Of these, 23 sites have been approved for NFA or are pending NFA approval. These sites are presented in Table 1.1-1. The remaining 41 sites are described below.

A variety of resources was used to define and revise the boundaries of each site, shown on the related figures and plates. Existing structures, roads, and other features that could readily be observed in the field were of prime importance. If these conditions could still be observed in the field, site boundaries were then established relative to these landmarks. Other types of data references were used also, particularly for former site locations where significant changes have occurred over time. Historic aerial photographs have been an excellent resource but are not available for all areas, dates of imagery are sporadic, few are georeferenced, and many are at a small scale or are oblique. Drawings and sketches were used, particularly for structures and utilities, as well as engineering drawings produced for construction or record purposes. Finally, interviews with former site workers taken during earlier work plan preparations in the 1990s were very helpful. Not all of these resources were available for every site and sometimes conflicted with each other. For each site, staff reviewed the available information, resolved conflicts as satisfactorily as possible, and revised site locations and boundaries accordingly. If specific uncertainties impacted these determinations, they are described in the presentation of each site.

5.1 Consolidated Unit 09-001(a)-99

Consolidated Unit 09-001(a)-99 (Figure 5.1-1) consists of a former firing site and firing pit [SWMU 09-001(a)], and a former firing site [SWMU 09-001(b)]. These sites are components of the Far Point firing site, which was located about 300 ft north of buildings 09-36 and 09-40.

5.1.1 SWMU 09-001(a), Former Firing Site and Control Building

SWMU 09-001(a) (Figure 5.1-1) is a former firing and site control building (structure 09-4) that was located at the TA-09 Far Point firing site, approximately 260 ft north of existing buildings 09-36 and 09-40. The 1990 SWMU report (LANL 1990, 007511) identifies structure 09-4 as a firing site and pit (located northwest of Far Point). This Identification was likely based on structure location plan R-124 which is included in the SWMU report and which identifies structure 09-4 as a firing chamber. The SWMU report presumed that a firing chamber is always used to test explosives. However, a site worker describes the building as a personnel shelter (Jones 1993, 014993), i.e., a building used by firing site personnel to remotely fire and observe explosives tests. Use as a control/observation building is verified by an engineering drawing of building 09-4 under its former designation of AE-4 (LASL 1943, 110445). The engineering drawing shows structure 09-4 as an 8-ft-wide x 10-ft-long x 8-ft-high building constructed of 12-in.-thick reinforced concrete walls, with a door that was steel plated on the outside, and covered with earth on three sides. A 2.5 ft wide x 8 ft long wood bench stretched along the entire length of one interior wall with electrical outlets for instrumentation placed along the same wall. A wooden bench would not have been placed inside a building intended for test firing explosives. The presence of the steel plate on the door’s exterior rather than its interior signifies that the door was intended to protect the interior of the building from exterior forces. Structure 09-4 was built in 1944, decommissioned in 1959, and removed in 1965 (LANL 1993, 020949, pp. 5-65−5-66).

The pit associated with structure 09-4 in the SWMU report and described as northwest of Far Point near the edge of the mesa is likely the SWMU 09-001(c) recovery pit. Although the recovery pit is to the northeast of Far Point, the recovery pit is near the edge of the mesa. In addition, the Comprehensive Environmental Assessment and Response Program (CEARP) report (on which the SWMU report is based) identifies only one pit [09-001(c)] at Far Point (DOE 1987, 008664).

The Far Point firing site consisted of two test shot areas: the SWMU 09-001(c) recovery pit and a firing point (structure 09-57) located west of and between the two control buildings (structures 09-4 and 09-5). The structure 09-57 firing point consisted of a 7-ft-wide x 8-ft-long x 12-in.-thick concrete pad with an attached 8-ft-wide by 10-ft-high steel-plated barricade made of 12 x 12-in. timbers imbedded in concrete. Structure 09-57 was decommissioned in 1957 and destroyed by intentional burning in 1960. The concrete pad was removed in 1965. Although the 1990 SWMU report describes SWMU 09-001(a) as the “Far Point firing site,” the SWMU report associates only structure 09-4 (one of the control buildings) with the firing site, omitting structure 09-57 altogether. Structure 09-57 will be investigated as part of SWMU 09-001(a).

5.1.1.1 Summary of Previous Investigations for SWMU 09-001(a)

An RFI was conducted at SWMU 09-001(a) in April 1994. Ten surface (0–0.5 ft bgs) soil samples were collected from 10 locations within a grid adjacent to the firing site. Samples were field-screened for radioactivity, organic vapors, and HE. Field-screening results showed no elevated radioactivity levels, and PID measurements were less than 1 ppm; HE was not detected in the samples. All samples were submitted to an off-site contract analytical laboratory for analysis of inorganic chemicals, SVOCs, and HE (LANL 1996, 054586, p. 71).

The results of the analyses of samples collected during the 1994 RFI are as follows (LANL 1996, 054586, p. 75):

- Antimony, barium, calcium, copper, lead, and zinc were detected above BVs. Nitrate was detected.
- Organic chemicals were not detected.

5.1.1.2 Summary of Data for SWMU 09-001(a)

The data collected during the 1994 RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

5.1.1.3 Scope of Activities for SWMU 09-001(a)

Twenty-eight surface and subsurface samples will be collected from 14 locations at the former firing site (Figure 5.1-2).

Six surface and subsurface samples will be collected from three locations in the footprint of the former control building (structure 09-4) at two depths (0–1 and 2–3 ft bgs).

Sixteen surface and subsurface samples will be collected around the perimeter of the concrete firing pad. These locations will be positioned at radial distances approximately 10 ft and 25 ft from the center of the former firing pad, and samples will be collected from two depths (0–1 ft and 2–3 ft bgs). Six additional samples will be collected from three locations beneath the pad, and samples will be collected from two depths (0–1 ft and 2–3 ft bgs). These proposed sampling locations (1a-4 through 1a-14) will be used to characterize the firing pad common to both SWMU 09-001(a) and SWMU 09-001(b).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, dioxins/furans, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 5.1-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.1.2 SWMU 09-001(b), Former Firing Site Control Building

SWMU 09-001(b) (Figure 5.1-1) is a former firing site control building (structure 09-5) that was located at the TA-09 Far Point firing site, approximately 300 ft north of existing buildings 09-36 and 09-40. The 1990 SWMU report (LANL 1990, 007511) identifies structure 09-5 as a firing site. This identification was likely based on structure location plan R-124 which is included in the SWMU report and which identifies structure 09-5 as a firing chamber. The SWMU report presumed that a firing chamber is always used to test explosives. However, a site worker describes the building as a personnel shelter (Jones 1993, 014993), i.e., a building used by firing site personnel to remotely fire and observe explosives tests. Use as a control/observation building is verified by an engineering drawing of building 09-5 under its former designation of AE-5 (LASL 1943, 110540). The engineering drawing shows structure 09-5 as a 12 ft long x 10 ft wide x 8 ft high building constructed of 14 in.-thick reinforced concrete walls, with a door that was steel plated on the outside, and covered with earth on three sides. A 2.5-ft-wide x 8-ft.-long wood bench stretched along the length of one interior wall. A wooden bench would not have been placed inside a building intended for test firing explosives. The presence of the steel plate on the door's exterior rather than its interior signifies that the door was intended to protect the interior of the building from exterior forces. Structure 09-5 was built in 1947, decommissioned in 1959, and removed in 1965 (LANL 1993, 020949, pp. 5-67−5-68).

5.1.2.1 Summary of Previous Investigations for SWMU 09-001(b)

An RFI was conducted at SWMU 09-001(b) in April 1994. Ten surface (0–0.5 ft bgs) soil samples were collected from 10 locations within a grid adjacent to the firing site. Samples were field-screened for radioactivity, organic vapors, and HE. Field-screening results showed no elevated radioactivity levels, and PID measurements were less than 1 ppm; HE was not detected in the samples. All samples were submitted to an off-site contract analytical laboratory for analysis of inorganic chemicals, SVOCs, and HE (LANL 1996, 054586, p. 71).

The results of the analyses of samples collected during the 1994 RFI are as follows (LANL 1996, 054586, p. 75):

- Antimony, barium, calcium, copper, lead, and zinc were detected above BVs. Nitrate was detected.
- SVOCs were not detected.

5.1.2.2 Summary of Data for SWMU 09-001(b)

The data collected during the 1994 RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

5.1.2.3 Scope of Activities for SWMU 09-001(b)

Six surface and subsurface samples will be collected from three locations in the footprint of former structure 09-5 (Figure 5.1-2) at two depths (0–1 and 2–3 ft bgs). All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, dioxins/furans, explosive compounds, PCBs, SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 5.1-2 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

Proposed sampling locations 1a-4 through 1a-14 will be used to characterize the firing pad common to both SWMU 09-001(a) and SWMU 09-001(b).

5.2 SWMU 09-001(c), Former Recovery Pit

SWMU 09-001(c) (Figure 5.2-1) is a former recovery pit (structure 09-15) that was located at the northernmost end of the TA-09 Far Point firing site. The recovery pit was 12 ft square × 8 ft deep, with timbered sides lined with a 0.75-in.-thick steel plate, and had a metal cover. The pit was designed to recover metal from misfired shots. The pit was installed in 1943, modified in 1951, decommissioned in 1959, flash burned to remove HE residue in 1960, and removed in 1965 (LANL 1993, 020949, p. 5-68).

5.2.1 Summary of Previous Investigations for SWMU 09-001(c)

An RFI was conducted at SWMU 09-001(c) in 1995. Three samples were collected from three locations within the site and submitted to an off-site contract analytical laboratory for analyses of metals, nitrate, and HE. Samples were collected from depth intervals ranging from 8.5 to 10 ft bgs.

5.2.2 Summary of Data for SWMU 09-001(c)

The samples collected, analyses requested, and decision-level analytical data from the 1995 RFI are presented in Tables 5.2-1 and 5.2-2. The results of the analyses of samples collected during the 1995 RFI are as follows:

- Aluminum, antimony, arsenic, barium, calcium, chromium, cobalt, copper, lead, nickel, selenium, and vanadium were detected above BVs. Nitrate was detected (Figure 5.2-2).
- HE was not detected.

5.2.3 Scope of Activities for SWMU 09-001(c)

Ten surface and subsurface samples will be collected from five locations beneath and around the perimeter of former firing pit structure 09-15 (Figure 5.2-3). One location will be centered beneath the former structure 09-15. Four locations around the perimeter of the former pit will be sampled at two depths (at the pit level, approximately 8 ft bgs, and 5 ft below). All samples collected will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, dioxins/furans, explosive compounds, PCBs, SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 5.2-3 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.3 SWMU 09-001(d), Former Firing Chambers

SWMU 09-001(d) (Figure 5.3-1) consists of two former firing chambers that were located at former building 09-1, an x-ray laboratory used to study implosions of small charges. One firing chamber was located on the south exterior wall of the building. This firing chamber was approximately 25 ft square and constructed of steel-faced concrete. The firing chamber was roofed and contained three firing areas, two of which were open to the south. The chamber tested positive for radioactive contamination (U^{238}) before its removal in 1965 (LANL 1993, 020949, p. 5-57). The second firing chamber was located on the building’s west exterior wall. The second firing chamber was approximately 10.5 ft wide x11 ft long, constructed of steel plated timbers, and enclosed on all four sides and on top. Both firing chambers were removed when building 09-1 was removed in 1965.

Although associated with TA-09, SWMU 09-001(d) is within the physical boundaries of TA-08.

5.3.1 Summary of Previous Investigations for SWMU 09-001(d)

An RFI was conducted at SWMU 09-001(d) in April 1994. SWMU 09-001(d) was sampled as part of a set of sites referred to as the Anchor Ranch East Site set. SWMUs 09-003(g), 09-003(h), and 09-003(i) were also part of this set. The set was grouped because of past activities (HE research, development, and testing) and demolition and decommissioning of their associated structures (buildings 09-1, 09-2, 09-3, and 09-13). Thirteen surface (0–0.5 ft bgs) samples were taken from 13 locations in the area surrounding former building 09-1. Samples were field-screened for radioactivity, organic vapors, and HE. Field-screening results showed no elevated radioactivity levels, and PID measurements were less than 1 ppm; HE was not detected in the samples. All samples were submitted to an off-site analytical laboratory for analyses of inorganic chemicals, SVOCs, and HE (LANL 1996, 054586, p. 78).

The results of the analyses of samples collected during the 1994 RFI are as follows (LANL 1996, 054586, p. 81):

- Antimony, arsenic, cadmium, calcium, lead, mercury, silver, and zinc were detected above BVs. Nitrate was detected.
- HE and SVOCs were not detected.

5.3.2 Summary of Data for SWMU 09-001(d)

The data collected during the 1994 RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

5.3.3 Scope of Activities for SWMU 09-001(d)

Twenty-six surface and subsurface samples will be collected from 13 locations at and around the perimeter of the former firing sites adjacent to building 09-1 (Figure 5.3-2). These locations will be positioned at radial distances of approximately 15 ft, 30 ft, and 45 ft from the point equidistant from the center of the two former firing points (sampling point 1d-1) and will be sampled at two depths (0–1 ft and 2–3 ft bgs). Sampling points 1d-2 and 1d-5 are located at the approximate center of the firing points.

All samples collected will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, dioxins/furans, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 5.3-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.4 SWMU 09-002, Burn Pit

SWMU 09-002 (Figure 5.4-1) is a decommissioned burn pit located at TA-09 approximately 230 ft southeast of the SWMU 09-001(c) recovery pit. The burn pit consists of an open surface depression, about 10 ft wide × 13 ft long × 3 ft deep (LANL 1998, 059686). The sides of the pit are lined with rocks blackened from burning. The burn pit was used from 1945 until 1956 to dispose of film, photographs, and papers associated with studying the experimental detonations conducted at the former Far Point firing site.

5.4.1 Summary of Previous Investigations for SWMU 09-002

An RFI was conducted at SWMU 09-002 in May 1994. Two surface (0–0.5 ft bgs) soil samples were collected from two locations in the bottom of the burn pit. No ash or burned debris was observed in the soil sampling locations. Samples were field-screened for organic vapors and HE. PID measurements were less than 1 ppm; HE was not detected in the samples. All samples were submitted to an off-site analytical laboratory for analyses of inorganic chemicals (metals) (LANL 1998, 059686, p. 10).

The results of the analyses of the samples collected during the 1994 RFI (LANL 1998, 059686, p. 11) did not show detection of inorganic chemicals.

5.4.2 Summary of Data for SWMU 09-002

The data collected during the 1994 RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

5.4.3 Scope of Activities for SWMU 09-002

Twenty-one surface and subsurface samples will be collected from nine locations within and around the perimeter of the burn pit (Figure 5.4-2). Ten surface and subsurface samples will be collected from five locations within the burn pit perimeter—one at the center of the burn pit—at three depths (0−1, 3–4, and 5–6 ft bgs). Eight samples will be collected from four locations around the perimeter of the burn pit and will be sampled at three depths (0−1, 3–4, and 5–6 ft bgs).

All samples collected will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, dioxins/furans, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 5.4-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.5 Consolidated Unit 09-003(a)-99

Consolidated Unit 09-003(a)-99 (Figure 5.5-1) consists of two former sumps [SWMU 09-003(a) and SWMU 09-003(b)] and a former basket pit [SWMU 09-003(e)] at TA-09. The SWMUs in this consolidated unit served building 09-14, an HE processing and development laboratory that was decommissioned in 1959 and removed in 1965. Each structure was designed to remove contaminants by settling them out from that building’s processing and development wastewater.

5.5.1 SWMU 09-003(a), Former Sump

SWMU 09-003(a) (Figure 5.5-1) is a former sump (structure 09-83) that was located at TA-09, approximately 12 ft north of former building 09-14. The sump, made of reinforced concrete and measuring approximately 4 ft wide × 4 ft long x 4 ft deep, was installed in 1943 and served as an acid waste settling tank for building 09-14 (a former HE processing and development laboratory) (LANL 1993, 014995). The sump was decommissioned in 1962 and removed in 1965. At the time of removal, contaminant encrustation was present in the sump’s interior (LANL 1993, 020949, p. 6-74).

5.5.1.1 Summary of Previous Investigations for SWMU 09-003(a)

An RFI was conducted at SWMU 09-003(a) in 1995. Six samples were collected from six locations within the site and submitted to an off-site contract analytical laboratory for analyses of metals, total cyanide, HE, and VOCs. One of the six samples was also analyzed for tritium. Samples were collected from depth intervals ranging from 6 to 9 ft bgs. Samples were field-screened for HE and radioactivity. Field screening results showed no elevated radioactivity levels; HE was not detected in the samples.

5.5.1.2 Summary of Data for SWMU 09-003(a)

The samples collected, analyses requested, and decision-level analytical data from the 1995 RFI are presented in Tables 5.5-1 to 5.5-3. The results of the analyses of samples collected during the 1995 investigation are as follows:

- Antimony, barium, and calcium were detected above BVs (Figure 5.5-2).
- RDX and toluene were detected (Figure 5.5-3).
- Tritium was not detected.

5.5.1.3 Scope of Activities for SWMU 09-003(a)

Ten subsurface samples will be collected from five locations beneath and around the perimeter of the former sump (former structure 09-83) (Plate 2). Two subsurface samples will be collected from one location beneath the former location of the sump from two depths (4–5 and 9–10 ft bgs). Eight subsurface samples will be collected around the perimeter of the former sump from two depths (4–5 and 9–10 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs, and pH. Samples will not be analyzed for radionuclides because the sump was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.5-4 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.5.2 SWMU 09-003(b), Former Sump

SWMU 09-003(b) (Figure 5.5-1) is a former sump (structure 09-84) that was located at TA-09, north of former building 09-14. The sump, made of reinforced concrete and measuring approximately 4 ft wide × 5 ft long x 3 ft deep, was installed in 1943 and functioned as an acid waste settling tank (LANL 1943, 014995). There is a discrepancy in archival documentation as to whether this sump served building 09-12 (a personnel shelter) or 09-14 (a former HE processing and development laboratory). However, since the sump was in very close proximity to former building 09-14, it likely served that building. The sump was decommissioned in 1962 and removed in 1965. At the time of removal, contaminant encrustation was present in the sump’s interior (LANL 1993, 020949, p. 6-74).

5.5.2.1 Summary of Previous Investigations for SWMU 09-003(b)

An RFI was conducted at SWMU 09-003(b) in 1995. Six samples were collected from six locations within the site and submitted to an off-site contract analytical laboratory for analyses of metals, total cyanide, HE, and VOCs. Samples were collected from depth intervals ranging from 2.25 to 8 ft bgs. Samples were field-screened for HE and radioactivity. Field-screening results showed no elevated radioactivity levels; HE was not detected in the samples.

5.5.2.2 Summary of Data for SWMU 09-003(b)

The samples collected, analyses requested, and decision-level analytical data from the 1995 RFI are presented in Tables 5.5-5 to 5.5-7. The results of the analyses of samples collected during the 1995 RFI are as follows:

- Aluminum, antimony, arsenic, barium, calcium, copper, lead, mercury and selenium were detected above BVs (Figure 5.5-2).
- RDX, chlorodibromethane, and toluene were detected (Figure 5.5-3).

5.5.2.3 Scope of Activities for SWMU 09-003(b)

Ten subsurface samples will be collected from five locations at the location of the former sump (Plate 2). Two subsurface samples will be collected from one location centered on the former location of the sump from two depths (4–5 and 9–10 ft bgs). Eight subsurface samples will be collected from four locations around the perimeter of the former sump from two depths (4–5 and 9–10 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs, and pH. Samples will not be analyzed for radionuclides because the sump was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.5-8 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.5.3 SWMU 09-003(e), Former Basket Washing Pit

SWMU 09-003(e) (Figure 5.5-1) is a former basket washing pit (structure 09-62) (LANL 1990, 007511) that was located at TA-09, approximately 5 ft north of former building 09-14. The pit, made of reinforced concrete and measuring approximately 4 ft wide × 4 ft long x 5 ft deep, was installed in 1950 and served basket washing operations conducted at building 09-14 (a former HE processing and development laboratory) (LANL 1943, 014995). The basket washing pit was decommissioned in 1960 and removed in 1965. At the time of removal, contaminant encrustation was present in the pit’s interior (LANL 1993, 020949, p. 6-74).

5.5.3.1 Summary of Previous Investigations for SWMU 09-003(e)

An RFI was conducted at SWMU 09-003(e) in 1995. Five samples were collected from five locations within the site and submitted to an off-site contract analytical laboratory for analyses of metals, total cyanide, HE, and VOCs. Samples were collected from depth intervals ranging from 6 to 7.5 ft bgs. Samples were field-screened for HE and radioactivity. Field-screening results showed no elevated radioactivity levels, and HE was not detected in the samples.

5.5.3.2 Summary of Data for SWMU 09-003(e)

The samples collected, analyses requested, and decision-level analytical data from the 1995 RFI are presented in Tables 5.5-9 to 5.5-11. The results of the analyses of samples collected during the 1995 RFI are as follows:

- Antimony was detected above BV (Figure 5.5-2).
- Styrene and toluene were detected (Figure 5.5-3).
- HE was not detected.

5.5.3.3 Scope of Activities for SWMU 09-003(e)

Ten subsurface samples will be collected from five locations beneath and around the perimeter of the former basket washing pit (former structure 09-62) (Plate 2). Two subsurface samples will be collected from one location beneath the former location of the basket washing pit from two depths (4–5 and 9–10 ft bgs). Eight subsurface samples will be collected around the perimeter of the former basket washing pit from two depths (4–5 and 9–10 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs, and pH. Samples will not be analyzed for radionuclides because the basket washing pit was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.5-12 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.6 SWMU 09-003(d), Former Sump

SWMU 09-003(d) (Figure 5.6-1) is a former sump (structure 09-88) that was located approximately 10 ft east of former building 09-1. The sump, made of reinforced concrete and measuring approximately 4 ft wide x 7 ft long x 7 ft deep, was installed in 1943. Archival documentation does not provide any information as to which building this sump served. However, since the sump was in very close proximity to former building 09-1, it likely served that building (an x-ray laboratory used to study implosions of small charges). The sump was decommissioned in 1959 and removed in 1965.

Although associated with TA-09, SWMU 09-003(d) is located within the physical boundary of TA-08.

5.6.1 Summary of Previous Investigations for SWMU 09-003(d)

An RFI was conducted at SWMU 09-003(d) in 1995. Five samples were collected from five locations within the site and submitted to an off-site contract analytical laboratory for analysis of metals, total cyanide, HE, and VOCs. Samples were collected from depth intervals ranging from 3.5 to 8.5 ft bgs.

5.6.2 Summary of Data for SWMU 09-003(d)

The samples collected, analyses requested, and decision-level analytical data from the 1995 RFI are presented in Tables 5.6-1 to 5.6-3. The results of the analyses of samples collected during the 1995 RFI are as follows:

- Aluminum, antimony, arsenic, barium, calcium, cobalt, copper, iron, lead, magnesium and zinc were detected above BVs. Nitrate was detected (Figure 5.6-2).
- Butanone[2-], HMX, methylene chloride, RDX, tetrachloroethene, toluene, trinitrobenzene[1,3,5-], trinitrotoluene[2,4,6-]were detected (Figure 5.6-3).

5.6.3 Scope of Activities for SWMU 09-003(d)

Twelve subsurface samples will be collected from six locations beneath and around the perimeter of the former sump (former structure 09-88) (Figure 5.6-4).Four subsurface samples will be collected from two locations beneath the former location of the former sump from two depths (4–5 and 9–10 ft bgs). Eight subsurface samples will be collected around the perimeter of the former sump from two depths (4–5 and 9–10 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs, americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 5.6-4 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.7 SWMU 09-003(g), Former Sump and Pipes

SWMU 09-003(g) (Figure 5.7-1) is identified in the 1990 SWMU report (LANL 1990, 007511) as the sumps and associated pipes in former building 09-2 (a photo darkroom and boiler plant). Engineering drawings show that the “sumps” in building 09-2 were actually condensate pits that received boiler condensate. One pit (approximately 3 ft wide x 7 ft long) was installed in 1943 when the building was constructed, and a second, larger pit (5.5 ft wide x 8 ft long) was installed in 1948 (LASL 1948, 110444). Building 09-2 was decommissioned in 1959 and intentionally destroyed by burning in 1960. The condensate pits and pipes associated with former building 09-2 were removed in 1965.

Although associated with TA-09, SWMU 09-003(g) is located within the physical boundary of TA-08.

5.7.1 Summary of Previous Investigations for SWMU 09-003(g)

An RFI was conducted at SWMU 09-003(g) in April 1994. SWMU 09-003(g) was sampled as part of a set of sites referred to as the Anchor Ranch East Site set. SWMUs 09-001(d), 09-003(h), and 09-003(i) were also part of this set. The set was grouped because of past activities (HE research, development, and testing) and demolition and decommissioning of their associated structures (buildings 09-1, 09-2, 09-3, and 09-13). Thirteen surface (0–0.5 ft bgs) samples were taken from 13 locations in the area surrounding former building 09-1. Samples were field-screened for radioactivity, organic vapors, and HE. Field-screening results showed no elevated radioactivity levels, and PID measurements were less than 1 ppm; HE was not detected in the samples. All samples were submitted to an off-site analytical laboratory for analyses of inorganic chemicals, SVOCs, and HE (LANL 1996, 054586, p. 78).

The results of the analyses of samples collected during the 1994 RFI are as follows (LANL 1996, 054586, p. 81):

- Antimony, arsenic, cadmium, calcium, lead, mercury, silver, and zinc were detected above BVs. Nitrate was detected.
- SVOCs and HE were not detected.

5.7.2 Summary of Data for SWMU 09-003(g)

The data collected during the 1994 RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

5.7.3 Scope of Activities for SWMU 09-003(g)

Twenty subsurface samples will be collected from 10 locations beneath and around the perimeter of the former sump (Figure 5.7-2) and within the footprint of the former building. Four subsurface samples will be collected from two locations beneath the former location of the sump from two depths (4–5 and 9–10 ft bgs). Eight subsurface samples will be collected around the perimeter of the former sump from two depths (4–5 and 9–10 ft bgs). Eight subsurface samples will be collected from four locations within the footprint of the former building from two depths (4–5 ft and 9–10 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs, and pH. Samples will not be analyzed for radionuclides because the sump was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.7-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.8 SWMU 09-003(h), Former Sump and Pipes

SWMU 09-003(h) (Figure 5.8-1) is identified in the 1990 SWMU report (LANL 1990, 007511) as the sump and associated pipes in former building 09-3 (an HE casting facility). Engineering drawings show the “sump” in building 09-3 consisted of a single catch basin that functioned as an HE settling tank. Built in 1943, former building 09-3 had two sections: one was 17 ft wide × 30 ft long × 8 ft high, and the other 12 ft square × 9 ft high. The sections were joined by a wood-framed corridor. The larger section had three reinforced-concrete walls and one wood-framed wall. The building was surrounded on three sides and the top by an earthen berm. The catch basin received wastewater from drain troughs in the original building and had no discharge lines. The building housed an HE casting facility and contained a hydraulic press. A control room for remote-control mixing was added in 1949. The RFI work plan states that the building was also used to store radioactively contaminated equipment. Building 09-3 was decommissioned in 1959 and removed in 1965, including the catch basin and drain troughs.

Although associated with TA-09, SWMU 09-003(h) is located within the physical boundary of TA-08.

5.8.1 Summary of Previous Investigations for SWMU 09-003(h)

An RFI was conducted at SWMU 09-003(h) in April 1994. SWMU 09-003(h) was sampled as part of a set of sites referred to as the Anchor Ranch East Site set. SWMUs 09-001(d), 09-003(g), and 09-003(i) were also part of this set. The set was grouped because of past activities (HE research, development, and testing) and demolition and decommissioning of their associated structures (buildings 09-1, 09-2, 09-3, and 09-13). Thirteen surface (0–0.5 ft bgs) samples were taken from 13 locations in the area surrounding former building 09-3. Samples were field-screened for radioactivity, organic vapors, and HE. Field-screening results showed no elevated radioactivity levels, and PID measurements were less than 1 ppm; HE was not detected in the samples. All samples were submitted to an off-site analytical laboratory for analyses of inorganic chemicals, SVOCs, and HE (LANL 1996, 054586, p. 78).

The results of the analyses of samples collected during the 1994 RFI are as follows (LANL 1996, 054586, p. 81):

- Antimony, arsenic, cadmium, calcium, lead, mercury, silver, and zinc were detected above BVs.
- SVOCs and HE were not detected.

5.8.2 Summary of Data for SWMU 09-003(h)

The data collected during the 1994 RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

5.8.3 Scope of Activities for SWMU 09-003(h)

Twelve subsurface samples will be collected from six locations beneath and around the perimeter of the former sump (Figure 5.8-2). Four subsurface samples will be collected from two locations beneath the former location of the sump from two depths (4–5 and 9–10 ft bgs). Eight subsurface samples will be collected around the perimeter of the former sump from two depths (4–5 and 9–10 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs, americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 5.8-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.9 SWMU 09-003(i), Former Sump and Pipes

SWMU 09-003(i) (Figure 5.9-1) consists of the former sump and pipes that served former building 09-13 (a machine shop and charge preparation building) at TA-09. Built in 1945, building 09-13 was a wood-frame structure, 17 ft wide × 20 ft long × 9 ft high. Building 09-13 was decommissioned in 1959 and removed in 1965. The sump and pipes associated with building 09-13 were removed in 1965 (LANL 1993, 020949, p. 5-60).

5.9.1 Summary of Previous Investigations for SWMU 09-003(i)

An RFI was conducted at SWMU 09-003(i) in April 1994. SWMU 09-003(i) was sampled as part of a set of sites referred to as the Anchor Ranch East Site set. SWMUs 09-001(d), 09-003(g), and 09-003(h) were also part of this set. The set was grouped because of past activities (HE research, development, and testing) and demolition and decommissioning of their associated structures (buildings 09-1, 09-2, 09-3, and 09-13). Thirteen surface (0–0.5 ft bgs) samples were taken from 13 locations in the area surrounding former building 09-13. Samples were field-screened for radioactivity, organic vapors, and HE. Field-screening results showed no elevated radioactivity levels, and PID measurements were less than 1 ppm; HE was not detected in the samples. All samples were submitted to an off-site analytical laboratory for analyses of inorganic chemicals, SVOCs, and HE (LANL 1996, 054586, p. 78).

The results of the analyses of samples collected during the 1994 RFI are as follows (LANL 1996, 054586, p. 81):

- Antimony, arsenic, cadmium, calcium, lead, mercury, silver, and zinc were detected above BVs.
- SVOCs and HE were not detected.

5.9.2 Summary of Data for SWMU 09-003(i)

The data collected during the 1994 RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

5.9.3 Scope of Activities for SWMU 09-003(i)

Twenty subsurface samples will be collected from 10 locations beneath and around the perimeter of the former sump (Figure 5.9-2). Four subsurface samples will be collected from two locations beneath the former location of the sump from two depths (4–5 and 9–10 ft bgs). Sixteen subsurface samples will be collected at eight locations around the perimeter of the former building from two depths (4–5 and 9–10 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs, americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 5.9-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.10 Consolidated Unit 09-004(a)-99

Consolidated unit 09-004(a)-99 (Plate 3) consists of SWMUs 09-004(a-f) and (h-n). All of the SWMUs in this consolidated unit are sumps associated with laboratory buildings located at TA-09 in a large area east of building 09-21. All of the sumps within this consolidated unit discharged effluent to one of two former NPDES-permitted outfalls through an 8-in.-diameter vitrified-clay pipe (VCP) industrial waste line. Eight of the sumps [SWMUs 09-004(c), 09-004(d), 09-004(e), 09-004(f), 09-004(j), 09-004(k), 09-004(m), and 09-004(n)] discharged to former NPDES-permitted outfall EPA 05A067 (EPA 1998, 109792). Five of the sumps [SWMUs 09-004(a), 09-004(b), 09-004(h), 09-004(i), and 09-004(l)] discharged to EPA 05A066 (EPA 1998,109792). The industrial waste line is still in place but currently inactive. While some sumps are still active, all discharge drainlines from the sumps have been plugged, and the active sumps are pumped out periodically.

5.10.1 SWMU 09-004(a), Sump

SWMU 09-004(a) (Plate 3) is the southernmost sump (structure 09-184) located on the southeast side of building 09-21 (a laboratory and office building) at TA-09. The decommissioned sump, installed between 1950 and 1952, is made of reinforced concrete and formerly received industrial waste from a laboratory on the south side of building 09-21. Activities in the building involved laboratory-scale HE synthesis and testing. The sump collected settling HE particles that were not filtered out by the building's waste system and discharged effluent to a former NPDES-permitted outfall (EPA 05A066). Periodically, the sump was inspected, debris was removed using specially equipped trucks, and the sump was cleaned (LANL 1993, 020949, p. 5-36). The aluminum tank lining was replaced in 1991 because it was not chemically resistant (LANL 1993, 020949, p. 5-38). In September 2001, the sump was pressure-washed, filled with gravel, and capped with concrete (IT Corporation 2001, 073732).

5.10.1.1 Summary of Previous Investigations for SWMU 09-004(a)

An RFI was conducted at SWMU 09-004(a) in 1999. Two samples were collected from two locations within the site and submitted to an off-site contract analytical laboratory for analyses of HE and VOCs. Samples were collected from depth intervals ranging from 7 to 9.5 ft bgs.

5.10.1.2 Summary of Data for SWMU 09-004(a)

The samples collected and analyses requested from the 1999 RFI are presented in Table 5.10-1. The results of the analyses of samples collected during the 1999 RFI are as follows:

- HE was not detected.
- VOCs were not detected.

5.10.1.3 Scope of Activities for SWMU 09-004(a)

Twenty-six subsurface samples will be collected from 13 locations adjacent to the drainlines, the sump inlet, the sump, and the sump outlet (Plate 4).

Eighteen samples will be collected at nine locations adjacent to the inlet and outlet drainlines. The samples will be collected at approximately 50-ft intervals along the path of the drainline, beginning at the point of exit from the building, to coincide with the expected locations of the pipe bends and joints. Each location will be sampled at two depth intervals (0–1 ft below the drainline and 5–6 ft below the drainline).

Eight samples will be collected at four locations—adjacent to the sump inlet, the two sides of the sump, and the sump outlet. The samples will be collected at two depths (0–1 ft below the drainline or sump and 5–6 ft below the drainline or sump).

The drainline connects with the outlet drainline of SWMU 09-004(b), which will be characterized by sampling at SWMU 09-004(b).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs, and pH. Samples will not be analyzed for radionuclides because the sump was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.10-2 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.10.2 SWMU 09-004(b), Sump

SWMU 09-004(b) (Plate 3) is the northernmost sump (structure 09-185) located on the southeast side of building 09-21 (a laboratory and office building) at TA-09. The decommissioned sump, installed between 1950 and 1952, is made of reinforced concrete and formerly received industrial waste from a laboratory on the north side of building 09-21. Activities in the building involved laboratory-scale HE synthesis and testing. The sump collected settling HE particles that were not filtered out by the building's waste system and discharged effluent to a former NPDES-permitted outfall (EPA 05A066). Periodically, the sump was inspected, debris was removed using specially equipped trucks, and the sump was cleaned (LANL 1993, 020949, p. 5-36). The aluminum tank lining was replaced in 1991 because it was not chemically resistant (LANL 1993, 020949, p. 5-38). In September 2001, the sump was pressure-washed, filled with gravel, and capped with concrete (IT Corporation 2001, 073732).

5.10.2.1 Summary of Previous Investigations for SWMU 09-004(b)

No previous investigations have been conducted at this site.

5.10.2.2 Summary of Data for SWMU 09-004(b)

No decision-level data are available for this site.

5.10.2.3 Scope of Activities for SWMU 09-004(b)

Thirty-eight subsurface samples will be collected from 19 locations adjacent to the drainlines, the sump inlet, the sump, and the sump outlet (Plate 4).

Thirty samples will be collected at 15 locations adjacent to the inlet and outlet drainlines. The samples will be collected at approximately 50-ft intervals along the path of the drainline, beginning at the point of exit from the building, to coincide with the expected locations of the pipe bends and joints. Each location will be sampled at two depth intervals (0–1 ft below the drainline and 5–6 ft below the drainline).

Eight samples will be collected at four locations—adjacent to the sump inlet, the two sides of the sump, and the sump outlet. The samples will be collected at two depths (0–1 ft below the drainline or sump and 5–6 ft below the drainline or sump).

The drainline connects with the outlet drainline of SWMU 09-004(i), which will be characterized by sampling at SWMU 09-004(i).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs, and pH. Samples will not be analyzed for radionuclides because the sump was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.10-3 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.10.3 SWMU 09-004(c), Sump

SWMU 09-004(c) (Plate 3) is the decommissioned sump (structure 09-186) located at TA-09 on the south side of building 09-37 (a processing laboratory). The sump, installed between 1950 and 1952, is made of reinforced concrete and formerly received industrial waste from a laboratory on the south side of building 09-37. Activities in the building involved HE synthesis scale-up and processing. The sump collected settling HE particles that were not filtered out by the building's waste system and discharged effluent to a former NPDES-permitted outfall (EPA 05A067). Periodically, the sump was inspected, debris was removed using specially equipped trucks, and the sump was cleaned (LANL 1993, 020949, p. 5-39). In September 2001, the sump was pressure-washed, filled with gravel, and capped with concrete (IT Corporation 2001, 073732).

5.10.3.1 Summary of Previous Investigations for SWMU 09-004(c)

No previous investigations have been conducted at this site.

5.10.3.2 Summary of Data for SWMU 09-004(c)

No decision-level data are available for this site.

5.10.3.3 Scope of Activities for SWMU 09-004(c)

Twenty-two subsurface samples will be collected from 11 locations adjacent to the drainlines, the sump inlet, the sump, and the sump outlet (Plate 4).

Fourteen samples will be collected at seven locations adjacent to the inlet and outlet drainlines. The samples will be collected at approximately 50-ft intervals along the path of the drainline, beginning at the point of exit from the building, to coincide with the expected locations of the pipe bends and joints. Each location will be sampled at two depth intervals (0–1 ft below the drainline and 5–6 ft below the drainline).

Eight samples will be collected at four locations—adjacent to the sump inlet, the two sides of the sump, and the sump outlet. The samples will be collected at two depths (0–1 ft below the drainline or sump and 5–6 ft below the drainline or sump).

The drainline connects with the outlet drainline of SWMU 09-004(d), which will be characterized by sampling at SWMU 09-004(d).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs, and pH. Samples will not be analyzed for radionuclides because the sump was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.10-4 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.10.4 SWMU 09-004(d), Sump

SWMU 09-004(d) (Plate 3) is the decommissioned sump (structure 09-187) located at TA-09 on the south side of building 09-38 (a processing laboratory). The sump, installed between 1950 and 1952, is made of reinforced concrete and formerly received industrial waste from a laboratory on the south side of building 09-38. Activities in the building involved HE casting and pressing; small-scale mixers and extruders also are located in the building. The sump collected settling HE particles that were not filtered out by the building's waste system and discharged effluent to a former NPDES-permitted outfall (EPA 05A067). Periodically, the sump was inspected, debris was removed using specially equipped trucks, and the sump was cleaned (LANL 1993, 020949, p. 5-36). In November 2006, the sump was filled with gravel and capped with concrete (Johnson 2006, 110442).

5.10.4.1 Summary of Previous Investigations for SWMU 09-004(d)

No previous investigations have been conducted at this site.

5.10.4.2 Summary of Data for SWMU 09-004(d)

No decision-level data are available for this site.

5.10.4.3 Scope of Activities for SWMU 09-004(d)

Twenty subsurface samples will be collected from 10 locations adjacent to the drainlines, the sump inlet, the sump, and the sump outlet (Plate 4).

Twelve samples will be collected at six locations adjacent to the inlet and outlet drainlines. The samples will be collected at approximately 50-ft intervals along the path of the drainline, beginning at the point of exit from the building, to coincide with the expected locations of the pipe bends and joints. Each location will be sampled at two depth intervals (0–1 ft below the drainline and 5–6 ft below the drainline).

Eight samples will be collected at four locations—adjacent to the sump inlet, the two sides of the sump, and the sump outlet. The samples will be collected at two depths (0–1 ft below the drainline or sump and 5–6 ft below the drainline or sump).

The drainline connects with the outlet drainline of SWMU 09-004(e), which will be characterized by sampling at SWMU 09-004(e).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs, and pH. Samples will not be analyzed for radionuclides because the sump was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.10-5 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.10.5 SWMU 09-004(e), Sump

SWMU 09-004(e) (Plate 3) is the sump (structure 09-188) located at TA-09 on the south side of building 09-45 (a processing laboratory). The sump, installed between 1950 and 1952, is constructed of aluminum-lined, reinforced concrete and receives industrial waste from a laboratory on the south side of building 09-38. Activities in the building involve HE-synthesis scale-up, processing, and development; and ball-milling and sieving of explosives. Building 09-45 also contains various sized reactors, mixers and extruders. The sump collects settling HE particles that are not filtered out by the building's waste system. Originally effluent from the sump was discharged to an NPDES-permitted outfall (EPA 05A067). The outfall has been removed from the permit, and the sump is now periodically cleaned by pumping to a specially equipped truck. The sump is equipped with an overfill alarm and is regularly inspected.

5.10.5.1 Summary of Previous Investigations for SWMU 09-004(e)

No previous investigations have been conducted at this site.

5.10.5.2 Summary of Data for SWMU 09-004(e)

No decision-level data are available for this site.

5.10.5.3 Scope of Activities for SWMU 09-004(e)

Twenty-two subsurface samples will be collected at 11 locations adjacent to drainlines and the sump (Plate 4). Fourteen samples will be collected from seven locations at approximately 50-ft intervals along the path of the drainline, beginning at the point of exit from the building, to coincide with the expected locations of the pipe bends and joints. Eight samples will be collected from four locations surrounding the sump (at the inlet and the outlet, and on either side of the sump). Each location will be sampled at two depth intervals (0–1 ft and 5–6 ft below the drainline or sump).The drainline connects with the outlet drainline of SWMU 09-004(f), which will be characterized by sampling at SWMU 09-004(f). Collection of these samples is subject to facility access restrictions, and collection of samples at all locations may not be possible.

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs, and pH. Samples will not be analyzed for radionuclides because the sump was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.10-6 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.10.6 SWMU 09-004(f), Sump

SWMU 09-004(f) (Plate 3) is the sump (structure 09-189) located at TA-09 on the south side of building 09-46 (a processing laboratory). The sump, installed between 1950 and 1952, is constructed of aluminum-lined, reinforced concrete and receives industrial waste from a processing laboratory in building 09-46. Activities in the building involve HE-synthesis scale-up and processing; the building was also used as a storage facility for radioactive materials and waste until 1991. The sump collects settling HE particles that are not filtered out by the building’s waste system. Originally effluent from the sump was discharged to an NPDES-permitted outfall (EPA 05A067). The outfall has been removed from the permit, and the sump is now periodically cleaned by pumping to a specially equipped truck. The sump is equipped with an overfill alarm and is regularly inspected.

5.10.6.1 Summary of Previous Investigations for SWMU 09-004(f)

No previous investigations have been conducted at this site.

5.10.6.2 Summary of Data for SWMU 09-004(f)

No decision-level data are available for this site.

5.10.6.3 Scope of Activities for SWMU 09-004(f)

Thirty-two subsurface samples will be collected at 16 locations adjacent to the drainlines and around the sump (Plate 4). Twenty-four samples will be collected from 12 locations at approximately 50-ft intervals along the path of the drainline, beginning at the point of exit from the building, to coincide with the expected locations of the pipe bends and joints. Eight samples will be collected from four locations surrounding the sump (at the inlet and the outlet, and on either side of the sump). Each location will be sampled at two depth intervals (0–1 ft and 5–6 ft below the drainline or sump).The drainline connects to the common drainline connecting the outlet drainlines of SWMUs 09-004(j, k, m, n), which will be characterized by sampling at SWMU 09-004(n). Collection of these samples is subject to facility access restrictions, and collection of samples at all locations may not be possible.

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs, and pH. Samples will not be analyzed for radionuclides because the sump was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.10-7 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.10.7 SWMU 09-004(h), Sump

SWMU 09-004(h) (Plate 3) is the sump (structure 09-191) located at TA-09 on the west side of building 09-32 (a laboratory building). The sump, installed between 1950 and 1952, is constructed of reinforced concrete and receives industrial waste from building 09-32. Activities in the building involve mass spectroscopy, tritium analysis, and HE analytical work; the building is also used for HE pressing, packaging, and short-term storage. The sump collects settling HE particles that are not filtered out by the building’s waste system. Originally effluent from the sump was discharged to an NPDES-permitted outfall (EPA 05A066). The outfall has been removed from the permit, and the sump is now periodically cleaned by pumping to a specially equipped truck. The sump is equipped with an overfill alarm and is regularly inspected.

5.10.7.1 Summary of Previous Investigations for SWMU 09-004(h)

No previous investigations have been conducted at this site.

5.10.7.2 Summary of Data for SWMU 09-004(h)

No decision-level data are available for this site.

5.10.7.3 Scope of Activities for SWMU 09-004(h)

Sixty-four surface and subsurface samples will be collected from 32 locations adjacent to the drainlines, the sump inlet, the sump, and the sump outlet as well as at the outfall and in the drainage (Plate 4).

Thirty-eight samples will be collected from 19 locations adjacent to the common drainline where the outlet drainlines of SWMUs 09-004(h, a, b, i, l) connect. The samples will be collected at approximately 50-ft intervals along the path of the drainline, beginning at the joint of the outlet drainline of SWMU 09-004(h), to coincide with the locations of the pipe bends and the joints of the outlet drainlines (0–1 ft and 5–6 ft below the drainline).

Ten samples will be collected from five locations: where the drainline exits building 09-32, at the sump inlet and the sump outlet, and one location on each side of the sump. Samples will be collected from two depths at each location (0–1 ft and 5–6 ft below the drainline or the sump).

Sixteen samples will be collected at eight locations at the outfall and in the drainage downgradient of the outfall. Four locations will be situated at the outfall—one immediately below the discharge point and three approximately 10 ft downgradient to bound the outfall. Four additional locations will be situated in the drainage downgradient of the outfall. All outfall and drainage samples will be collected at two depth intervals (0–1 and 2–3 ft bgs). The drainage further downgradient will be characterized by sampling at SWMU 09-009.

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, tritium, moisture, and pH. Table 5.10-8 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.10.8 SWMU 09-004(i), Sump

SWMU 09-004(i) (Plate 3) is the decommissioned sump (structure 09-192) located at TA-09 on the north side of building 09-33 (a laboratory building). The sump, installed between 1950 and 1952, is made of reinforced concrete and formerly received industrial waste from building 09-33. Activities in the building involved compressed gas reactions using cyanogens, fluorine, chlorine, and hydrogen cyanide. The sump collected settling HE particles that were not filtered out by the building's waste system and discharged effluent to a former NPDES-permitted outfall (EPA 05A066). Periodically, the sump was inspected, debris was removed using specially equipped trucks, and the sump was cleaned (LANL 1993, 020949, p. 5-36). In September 2001, the sump was pressure-washed, filled with gravel, and capped with concrete (IT Corporation 2001, 073732).

5.10.8.1 Summary of Previous Investigations for SWMU 09-004(i)

No previous investigations have been conducted at this site.

5.10.8.2 Summary of Data for SWMU 09-004(i)

No decision-level data are available for this site.

5.10.8.3 Scope of Activities for SWMU 09-004(i)

Twenty-four subsurface samples will be collected from 12 locations adjacent to the drainlines, the sump inlet, the sump, and the sump outlet (Plate 4).

Sixteen samples will be collected at eight locations adjacent to the inlet and outlet drainlines. The samples will be collected at approximately 50-ft intervals along the path of the drainline, beginning at the point of exit from the building, to coincide with the expected locations of the pipe bends and joints. Each location will be sampled at two depth intervals (0–1 ft below the drainline and 5–6 ft below the drainline).

Eight samples will be collected at four locations—adjacent to the sump inlet, the two sides of the sump, and the sump outlet. The samples will be collected at two depths (0–1 ft below the drainline or sump and 5–6 ft below the drainline or sump).

The drainline connects to a common drainline that will be characterized by sampling at SWMU 09-004(h).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs, and pH. Samples will not be analyzed for radionuclides because the sump was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.10-9 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.10.9 SWMU 09-004(j), Sump

SWMU 09-004(j) (Plate 3) is the decommissioned sump (structure 09-193) located at TA-09 on the north side of building 09-34 (a processing laboratory). The sump, installed between 1950 and 1952, is made of reinforced concrete and formerly received industrial waste from building 09-34. Activities in the building involved HE pressing, mixing, and sieving; small-scale propellant grain preparation also was conducted in the building. Most of the activity in the building involved welding, opening containers with weapons components, and cutting explosive crystals. The sump collected settling HE particles that were not filtered out by the building's waste system and discharged effluent to a former NPDES-permitted outfall (EPA 05A067). Periodically, the sump was inspected, debris was removed using specially equipped trucks, and the sump was cleaned (LANL 1993, 020949, p. 5-36). In September 2001, the sump was pressure-washed, filled with gravel, and capped with concrete (IT Corporation 2001, 073732).

5.10.9.1 Summary of Previous Investigations for SWMU 09-004(j)

No previous investigations have been conducted at this site.

5.10.9.2 Summary of Data for SWMU 09-004(j)

No decision-level data are available for this site.

5.10.9.3 Scope of Activities for SWMU 09-004(j)

Twenty-two subsurface samples will be collected from 11 locations adjacent to the drainlines, the sump inlet, the sump, and the sump outlet (Plate 4).

Fourteen samples will be collected at seven locations adjacent to the inlet and outlet drainlines. The samples will be collected at approximately 50-ft intervals along the path of the drainline, beginning at the point of exit from the building, to coincide with the expected locations of the pipe bends and joints. Each location will be sampled at two depth intervals (0–1 ft below the drainline and 5–6 ft below the drainline).

Eight samples will be collected at four locations—adjacent to the sump inlet, the two sides of the sump, and the sump outlet. The samples will be collected at two depths (0–1 ft below the drainline or sump and 5–6 ft below the drainline or sump).

The drainline connects with the outlet drainline of SWMU 09-004(k), which will be characterized by sampling at SWMU 09-004(k).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs, and pH. Samples will not be analyzed for radionuclides because the sump was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.10-10 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.10.10 SWMU 09-004(k), Sump

SWMU 09-004(k) (Plate 3) is the decommissioned sump (structure 09-194) located at TA-09 on the north side of building 09-35 (a processing laboratory). The sump, installed between 1950 and 1952, is made of reinforced concrete and formerly received industrial waste from building 09-35. Activities in the building involved large-scale HE pressing. The sump collected settling HE particles that were not filtered out by the building's waste system and discharged effluent to a former NPDES-permitted outfall (EPA 05A067). Periodically, the sump was inspected, debris was removed using specially equipped trucks, and the sump was cleaned (LANL 1993, 020949, p. 5-36). In September 2001, the sump was pressure-washed, filled with gravel, and capped with concrete (IT Corporation 2001, 073732). Building 09-35 was removed during 2006 decontamination and decommissioning (D&D) activities; the foundation slab remains in place.

5.10.10.1 Summary of Previous Investigations for SWMU 09-004(k)

No previous investigations have been conducted at this site.

5.10.10.2 Summary of Data for SWMU 09-004(k)

No decision-level data are available for this site.

5.10.10.3 Scope of Activities for SWMU 09-004(k)

Twenty subsurface samples will be collected from 10 locations adjacent to the drainlines, the sump inlet, the sump, and the sump outlet (Plate 4).

Twelve samples will be collected at six locations adjacent to the inlet and outlet drainlines. The samples will be collected at approximately 50-ft intervals along the path of the drainline, beginning at the point of exit from the building, to coincide with the expected locations of the pipe bends and joints. Each location will be sampled at two depth intervals (0–1 ft below the drainline and 5–6 ft below the drainline).

Eight samples will be collected at four locations—adjacent to the sump inlet, the two sides of the sump, and the sump outlet. The samples will be collected at two depths (0–1 ft below the drainline or sump and 5–6 ft below the drainline or sump).

The drainline connects with the outlet drainline of SWMU 09-004(m), which will be characterized by sampling at SWMU 09-004(m).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs, and pH. Samples will not be analyzed for radionuclides because the sump was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.10-11 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.10.11 SWMU 09-004(l), Sump

SWMU 09-004(l) (Plate 3) is the decommissioned sump (structure 09-195) located at TA-09 on the north side of building 09-40 (a laboratory building). The sump, installed between 1950 and 1952, is made of reinforced concrete and formerly received industrial waste from building 09-40. Activities in the building involved temperature compatibility studies using large environmental test chambers and ovens. The sump collected settling HE particles that were not filtered out by the building's waste system and discharged effluent to a former NPDES-permitted outfall (EPA 05A066). Periodically, the sump was inspected, debris was removed using specially equipped trucks, and the sump was cleaned (LANL 1993, 020949, p. 5- 36). In September 2001, the sump was pressure washed, filled with gravel, and capped with concrete (IT Corporation 2001, 073732).

5.10.11.1 Summary of Previous Investigations for SWMU 09-004(l)

No previous investigations have been conducted at this site.

5.10.11.2 Summary of Data for SWMU 09-004(l)

No decision-level data are available for this site.

5.10.11.3 Scope of Activities for SWMU 09-004(l)

Sixteen subsurface samples will be collected from eight locations adjacent to drainlines, the sump inlet, the sump, and the sump outlet (Plate 4).

Ten samples will be collected at five locations adjacent to the inlet and outlet drainlines. The samples will be collected at approximately 50-ft intervals along the path of the drainline, beginning at the point of exit from the building, to coincide with the expected locations of the pipe bends and joints. Each location will be sampled at two depth intervals (0–1 ft and 5–6 ft below the drainline).

Eight samples will be collected at four locations—adjacent to the sump inlet, the two sides of the sump, and the sump outlet. The samples will be collected at two depths (0–1 ft and 5–6 ft below the drainline or sump).

The drainline connects to a common drainline that will be characterized by sampling at SWMU 09-004(h).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs, and pH. Samples will not be analyzed for radionuclides because the sump was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.10-12 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.10.12 SWMU 09-004(m), Sump

SWMU 09-004(m) (Plate 3) is the decommissioned sump (structure 09-196) located at TA-09 on the north side of building 09-42 (a processing laboratory). The sump, installed between 1950 and 1952, is made of reinforced concrete and formerly received industrial waste from building 09-42. Activities in the building involved nuclear compatibility aging studies using ovens. The sump collected settling HE particles that were not filtered out by the building's waste system and discharged effluent to a former NPDES-permitted outfall (EPA 05A067). Periodically, the sump was inspected, debris was removed using specially equipped trucks, and the sump was cleaned (LANL 1993, 020949, p. 5-36). In September 2001, the sump was pressure-washed, filled with gravel, and capped with concrete (IT Corporation 2001, 073732).

5.10.12.1 Summary of Previous Investigations for SWMU 09-004(m)

No previous investigations have been conducted at this site.

5.10.12.2 Summary of Data for SWMU 09-004(m)

No decision-level data are available for this site.

5.10.12.3 Scope of Activities for SWMU 09-004(m)

Twenty subsurface samples will be collected from 10 locations adjacent to the drainlines, the sump inlet, the sump, and the sump outlet (Plate 4).

Twelve samples will be collected at six locations adjacent to the inlet and outlet drainlines. The samples will be collected at approximately 50-ft intervals along the path of the drainline, beginning at the point of exit from the building, to coincide with the expected locations of the pipe bends and joints. Each location will be sampled at two depth intervals (0–1 ft below the drainline and 5–6 ft below the drainline).

Eight samples will be collected at four locations—adjacent to the sump inlet, the two sides of the sump, and the sump outlet. The samples will be collected at two depths (0–1 ft below the drainline or sump and 5–6 ft below the drainline or sump).

The drainline connects with the outlet drainline of SWMU 09-004(n), which will be characterized by sampling at SWMU 09-004(n).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs, americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 5.10-13 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.10.13 SWMU 09-004(n), Sump

SWMU 09-004(n) (Plate 3) is the decommissioned sump (structure 09-197) located at TA-09 on the north side of building 09-43 (a processing laboratory). The sump, installed between 1950 and 1952, is made of reinforced concrete and formerly received industrial waste from building 09-43. Activities in the building involved HE-pressing activities. The sump collected settling HE particles that were not filtered out by the building's waste system and discharged effluent to a former NPDES-permitted outfall (EPA 05A067). Periodically, the sump was inspected, debris was removed using specially equipped trucks, and the sump was cleaned (LANL 1993, 020949, p. 5-36). In September 2001, the sump was pressure-washed, filled with gravel, and capped with concrete (IT Corporation 2001, 073732). Building 09-43 was removed during 2006 D&D activities; the foundation slab remains in place.

5.10.13.1 Summary of Previous Investigations for SWMU 09-004(n)

No previous investigations have been conducted at this site.

5.10.13.2 Summary of Data for SWMU 09-004(n)

No decision-level data are available for this site.

5.10.13.3 Scope of Activities for SWMU 09-004(n)

Sixty surface and subsurface samples will be collected from 30 locations adjacent to the drainlines, the sump inlet, the sump, and the sump outlet as well as at the outfall and in the drainage (Plate 4).

Eight samples will be collected at four locations adjacent to the inlet and outlet drainlines. The samples will be collected along the path of the drainline, beginning at the point of exit from the building, to coincide with the expected locations of the pipe bends and joints. Each location will be sampled at two depth intervals (0–1 ft below the drainline and 5–6 ft below the drainline).

Eight samples will be collected at four locations adjacent to the sump inlet, the two sides of the sump, and the sump outlet. The samples will be collected at two depths (0–1 ft below the drainline or sump and 5–6 ft below the drainline or sump).

Twenty-four samples will be collected from 12 locations adjacent to the common line where the outlet drainlines of SWMUs 09-004(f and n) connect. The samples will be collected at approximately 50-ft intervals along the path of the drainline, beginning at the joint of the outlet lines of SWMUs 09-004(f and n), to coincide with the locations of the pipe bends as well as adjacent to the inlet and outlet of a manhole (structure 09-138). Each location will be sampled at two depth intervals (0–1 ft below the structure and 5–6 ft below the structure).

Twenty samples will be collected at ten locations at the outfall and in the drainage downgradient of the outfall. Four locations will be situated at the outfall—one immediately below the discharge point and three approximately 10 ft downgradient to bound the outfall. An additional six locations will be situated in the drainage downgradient of the outfall. All outfall and drainage samples will be collected at two depth intervals (0–1 and 2–3 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 5.10-14 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.11 SWMU 09-004(g), Sump

SWMU 09-004(g) (Figure 5.11-1) is the decommissioned sump (structure 09-190) located at TA-09 on the east side of building 09-50 (a shipping and receiving building). The sump, installed between 1950 and 1952, is made of reinforced concrete and formerly received industrial waste from building 09-50. Activities in the building involved shipping, receiving, short-term storage of HE and small-scale laser experiments. Since 1993 building 09-50 has been used for storage only. The sump collected settling HE particles that were not filtered out by the building’s waste system and discharged effluent to a former NPDES-permitted outfall (EPA 04A155). Periodically, the sump was inspected, debris was removed using specially equipped trucks, and the sump was cleaned (LANL 1993, 020949, p. 5-36). In October 2006, the sump was removed (Johnson 2006, 110442).

5.11.1 Summary of Previous Investigations for SWMU 09-004(g)

No previous investigations have been conducted at this site.

5.11.2 Summary of Data for SWMU 09-004(g)

No decision-level data are available for this site.

5.11.3 Scope of Activities for SWMU 09-004(g)

Fourteen surface and subsurface samples will be collected from seven locations at the sump and adjacent to associated drainlines (Figure 5.11-2). Two samples will be collected from one location (4g-1) where the drainline exits the building; six samples will be collected from three locations (4g-2, 4g-3, and 4g-7) adjacent to the sump, including the inlet and outlet locations; and six subsurface samples will be collected from three locations (4g-4 through 4g-6) adjacent to the drainline associated with the sump. Sampling will be conducted at 50-ft intervals along the length of the drainline. Each location will be sampled at two depth intervals (0–1 ft and 5–6 ft below the drainline or the sump). Collection of these samples is subject to facility access restrictions, and collection of samples at all locations may not be possible.

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs, and pH. Samples will not be analyzed for radionuclides because the sump was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.11-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.12 SWMU 09-004(o), Sump

SWMU 09-004(o) (Figure 5.12-1) is the sump (structure 09-198) located at TA-09 on the north side of building 09-48 (an HE machining building). The sump, installed between 1950 and 1952, is made of aluminum-lined, reinforced concrete and receives industrial waste from building 09-48. Activities in the building involve HE machining. The sump collects settling HE particles that are not filtered out by the building's waste system. Originally effluent from the sump was discharged to an NPDES-permitted outfall (EPA 05A068). The outfall has been removed from the permit and the sump is now periodically cleaned by pumping to a specially equipped truck. The sump is equipped with an overfill alarm and is regularly inspected.

5.12.1 Summary of Previous Investigations for SWMU 09-004(o)

An RFI was conducted at SWMU 09-004(o) in 1999. Two samples were collected from one location within the site and submitted to an off-site contract analytical laboratory for analysis of HE. Samples were collected from depth intervals ranging from 0 to 1.25 ft bgs.

5.12.2 Summary of Data for SWMU 09-004(o)

The samples collected and analysis requested from the 1999 RFI are presented in Tables 5.12-1 and 5.12-2. The results of the analysis of samples collected during the 1999 RFI are as follows: HMX was detected (Figure 5.12-2).

5.12.3 Scope of Activities for SWMU 09-004(o)

Forty-six surface and subsurface samples will be collected from 23 locations at the drainlines from the building to the sump, at the sump, at the sump inlet and outlet, along the drainline from the sump to the outfall, at the outfall, and downgradient of the outfall (Figure 5.12-3). Collection of these samples is subject to facility access restrictions, and collection of samples at all locations may not be possible.

Ten subsurface samples will be collected from five locations along the drainlines from the building and where the drainline turns north toward the sump. Samples will be collected at two depth intervals at each location (0–1 ft and 5–6 ft below the drainlines).

Six subsurface samples will be collected at three locations: one at the sump, and one each at the inlet and outlet to the sump. Samples will be collected at two depth intervals at each location (0–1 ft and 5–6 ft below the drainline or sump).

Eight subsurface samples will be collected from four locations, approximately every 50 ft along the drainline from the sump to the outfall. Samples will be collected at two depth intervals at each location (0–1 ft and 5–6 ft below the drainline).

Eight surface and subsurface samples will be collected from four locations at the outfall. Sampling will be conducted at the discharge point and at three downgradient locations to bound the outfall. Fourteen surface and subsurface samples will be collected from seven locations downgradient of the outfall. Samples will be collected within a discernable drainage if present, and the drainage will be sampled approximately at 50-ft intervals. The furthest downgradient location will be upgradient of Canyon Reach AEN-1. Outfall and drainage samples will be collected at two depth intervals (0–1 and 2–3 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs (except in surface samples), and pH. Samples will not be analyzed for radionuclides because the sump was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.12-3 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.13 SWMU 09-005(g), Septic System

SWMU 09-005(g) (Figure 5.11-1) is a septic system at TA-09 consisting of a septic tank (structure 09-109), drain field, and formerly NPDES-permitted outfall (EPA 04A155) located at TA-09 approximately 100 ft southeast of building 09-50 (a shipping and receiving building). Building 09-50 is an active facility. Installed between 1950 and 1952, the tank is approximately 5 ft wide × 8 ft long × 4 ft deep, with a capacity of 750-gal. The tank receives sanitary waste from building 09-50 and originally discharged into the same industrial waste line as the SWMU 09-004(g) sump. In 1989 the septic tank 09-109 was rerouted to bypass the industrial waste line and discharge to an absorption trench (i.e., drain field) (LANL 1989, 014961). The precise location of the drain field is not known. The outfall has been removed from the NPDES permit (EPA 1998, 109568). There is no documentation to show that the inlet drainline from the building to the septic tank has been either plugged or disconnected, although the outlet drainline was plugged in 1989. The septic tank is currently listed as abandoned in the Laboratory's Archibus facility information database, indicating it is not in use.

5.13.1 Summary of Previous Investigations for SWMU 09-005(g)

No previous investigations have been conducted at this site.

5.13.2 Summary of Data for SWMU 09-005(g)

No decision-level data are available for this site.

5.13.3 Scope of Activities for SWMU 09-005(g)

Fifty-one surface and subsurface samples will be collected from 24 locations (5g-1 through 5g-24) at the absorption trench, adjacent to the associated drainline, at the outfall, and downgradient of the outfall (Figure 5.11-2).

A geophysical survey will be conducted to locate the absorption trench. Thirteen samples will be collected from five locations (5g-1 through 5g-5) at the absorption trench. Four subsurface samples will be collected from two locations inside the trench. Sampling will be conducted at the discharge point and in the middle of the trench from two depth intervals (immediately below the trench bottom and 5 ft below the trench bottom). Nine surface and subsurface samples will be collected from three locations outside the trench. These locations will be sampled at three depth intervals (0–1 ft bgs, 0–1 ft below the trench bottom, and 5–6 ft below the trench bottom).

Twenty subsurface samples will be collected at 10 locations (5g-6 through 5g-15) adjacent to the drainline. The samples will be collected at approximately 50-ft intervals along the path of the drainline, beginning at the point where it was disconnected from the active drainline to the absorption trench. Each location will be sampled at two depth intervals (0–1 ft below the drainline and 5–6 ft below the drainline).

Eight surface and subsurface samples will be collected from four locations (5g-16 through 5g-19) at the outfall. Sampling will be conducted at the discharge point and at three downgradient locations to bound the outfall. Ten surface and subsurface samples will be collected from five locations (5g-20 through 5g-24) downgradient of the outfall. Samples will be collected within a discernable drainage if present; the drainage will be sampled approximately at 100-ft intervals. Outfall and drainage samples will be collected at two depth intervals (0–1 and 2–3 ft bgs).

Sixteen subsurface samples will be collected from eight locations (5g-25 through 5g-32) along the drainline from building 09-50 to the septic tank, below the septic tank, at the tank inlet and outlet, and where the drainline branches off to the absorption trench. Samples will be collected from two depths at each location (0–1 ft and 5–6 ft below the line or tank).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs (except in surface samples), and pH. Samples will not be analyzed for radionuclides because the septic system was used only for sanitary waste with no record or indication of radionuclide use at the site. Table 5.13-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.14 SWMU 09-006, Former Septic Tank

SWMU 09-006 (Figure 5.14-1) is a former septic tank (structure 09-203) at TA-09 that was located approximately 100 ft northeast of building 09-2 (a boiler plant and darkroom facility) (LASL 1954, 110449). Installed in 1943, the septic tank was constructed of reinforced concrete and measured 4 ft wide × 9 ft long × 4 ft deep. The septic tank served former building 09-2 and was used until 1950, when it was replaced by septic tank 09-81 [SWMU 09-005(a)]. Septic tank 09-203 was removed in 1965 (LANL 1943, 014995).

It should be noted that the 1990 SWMU report (LANL 1990, 007511) incorrectly states that septic tank 09-203 served building 09-3. Engineering drawings of building 09-3 (an HE casting facility) show that the building had no drains leading from the building to a septic tank and also show that the building had no restroom or sink drains. Building 09-2, however, did contain sink and restroom drains.

Although associated with TA-09, SWMU 09-006 is located within the physical boundary of TA-08.

5.14.1 Summary of Previous Investigations for SWMU 09-006

An RFI was conducted at SWMU 09-006 in April 1995. Two samples were collected from two locations within the site and submitted to an off-site contract analytical laboratory for analyses of metals, total cyanide, HE, VOCs, and tritium. Samples were collected from depth intervals ranging from 6.5 ft to 8.5 ft bgs.

5.14.2 Summary of Data for SWMU 09-006

The samples collected, analyses requested, and decision-level analytical data from the 1995 RFI are presented in Tables 5.14-1 to 5.14-3. The results of the analyses of samples collected during the 1995 RFI are as follows:

- Aluminum, antimony, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, selenium, silver, and zinc were detected above BVs. Nitrate was detected (Figure 5.14-2).
- Carbon tetrachloride, chloroform, hexachlorobutadiene, and tetrachloroethene were detected (Figure 5.14-3).
- HE was not detected.
- Tritium was not detected.

5.14.3 Scope of Activities for SWMU 09-006

Twenty-four surface and subsurface samples will be collected from 12 locations along the drainline, at the former septic tank, and at the outfall (Figure 5.14-4). Two subsurface samples will be collected from one location beneath the former location of the tank from two depths (0–1 ft and 5–6 ft below the tank). Two subsurface samples each will be collected at the inlet and outlet of the tank from two depths (0–1 ft and 5–6 ft below the drainline).

Ten subsurface samples will be collected from five locations adjacent to the drainline from two depth intervals (0–1 ft and 5–6 ft below the drainline). Samples adjacent to the drainlines will be collected at 50-ft intervals along the path of the drainline, beginning at the point of exit from the building or tank up to the septic tank, and from the septic tank to the outfall. Eight samples will be collected from four locations at and downgradient of the outfall at two depths (0–1 and 2–3 ft bgs). Sampling will not extend more than 10 ft beyond the outfall because the outfall lies within canyon reach AW-1, for which additional data are available.

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs, and pH. Samples will not be analyzed for radionuclides because the former septic tank was used only for sanitary waste with no record or indication of radionuclide use at the site. Table 5.14-4 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.15 Consolidated Unit 09-008(b)-99

Consolidated Unit 09-008(b)-99 (Figure 5.15-1) consists of a former septic tank [SWMU 09-005(a)], a septic tank [SWMU 09-005(d)], and an oxidation pond [SWMU 09-008(b)]. The consolidated unit is located approximately 200 ft east of Anchor Ranch Road.

5.15.1 SWMU 09-005(a), Former Septic System

SWMU 09-005(a) (Figure 5.15-1) is a former septic system that consisted of a septic tank (former structure 09-81), distribution box, and tile drain field located at TA-09 approximately 165 ft east of Anchor Ranch Road. The dimensions and configuration of the drain field are unknown. Installed in 1950, the SWMU 09-005(a) septic system served buildings 08-20, 08-21, 08-22, 08-23, 09-2 (LASL 1944, 110443), and 08-24, where the strontium-90 spill occurred in 1954 (see section 4.6). The buildings served by this septic system had various uses including radiography of nuclear fuel elements, photo-processing, photo-development, and x-ray operations. The septic system was installed in 1950 and used until replaced by a new system [SWMUs 09-005(d) and 09-008(b)] in 1970, at which time septic tank 09-81 was filled with dirt and left in place. In 1985, the septic tank was removed during a sewage-system upgrade (LANL 1993, 020949, p. 5-60). It is not known if the distribution box was removed.

Although associated with TA-09, SWMU 09-005(a) is located within the physical boundary of TA-08.

5.15.1.1 Summary of Previous Investigations for SWMU 09-005(a)

An RFI was conducted at SWMU 09-005(a) in May 1995 (LANL 1996, 054586, pp. 42–43). The first task conducted during the RFI was determining the location of the tile drain field system. The location of the tile drain field system had not been previously determined and no topographical features suggested the presence of a drain field. In an attempt to establish the location of the drain field, one subsurface (3–4 ft bgs) sample was taken from one location in the assumed location of the drain field. A piece of brown clay pipe was found at this location, which suggested that this was the correct location of the drain field.

As part of the RFI, three subsurface samples were taken from three locations in the area surrounding the former septic tank and the tile drain field system. Samples were collected from depth intervals ranging from 2 to 6 ft bgs. Samples were field-screened for radioactivity, organic vapors, and HE. Field-screening results showed no elevated radioactivity levels, and PID measurements were less than 1 ppm; HE was not detected in the samples. Samples were submitted to an off-site contract analytical laboratory for analyses of metals, total cyanide, HE, VOCs, strontium-90, and tritium; however, not all samples were analyzed from all suites (Table 5.15-1).

5.15.1.2 Summary of Data for SWMU 09-005(a)

The samples collected, analyses requested, and decision-level analytical data from the 1995 RFI are presented in Tables 5.15-1 to 5.14-4. The results of the analyses of samples collected during the 1995 RFI are as follows (LANL 1996, 054586, pp 42–43):

- Antimony, arsenic, barium, chromium, cobalt, copper, lead, mercury, selenium, silver, and vanadium were detected above BVs (Figure 5.15-2).
- 4-isopropyltoluene and toluene were detected (Figure 5.15-3).
- Strontium-90 was detected (Figure 5.15-4).
- HE and tritium were not detected.

5.15.1.3 Scope of Activities for SWMU 09-005(a)

Forty-eight subsurface samples will be collected from 24 locations adjacent to the septic tank inlet, the septic tank, the septic tank outlet, the distribution box, the drain field, and the sewer line (Figure 5.15-5).

Two samples will be collected from one location at the tank inlet, beneath the tank, and at the tank outlet (0–1 ft and 5–6 ft below the drainline or tank).

A geophysical survey will be conducted to locate the distribution box and outer drain field drainlines. Two samples will be collected from one location at the distribution box (0–1 ft and 5–6 ft below the distribution box. Twenty samples will be collected from nine locations adjacent to the drain field drainlines and one location 10 ft downgradient of the drain field from two depth intervals (8–9 and 13–14 ft bgs).

Twenty-eight subsurface samples will be collected from 19 locations, approximately every 50 ft along the sewer line west of SWMU 09-005(a). The samples will be collected from two depth intervals at each location (0–1 ft and 5–6 ft below the sewer line).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs, americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, strontium-90, and pH. Table 5.15-5 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.15.2 SWMU 09-005(d), Septic Tank

SWMU 09-005(d) (Figure 5.15-1) is a decommissioned septic tank (structure 09-211) located near the western boundary of TA-09, approximately 165 ft east of Anchor Ranch Road. Constructed of concrete, the septic tank measures 4 ft wide × 30 ft long × 6 ft deep and has a capacity of 4000 gal. It is divided into four compartments; each of which had an access port consisting of corrugated-metal pipe with a steel-plate cover. The septic tank was installed in 1970 as part of a sanitary-system upgrade that consisted of replacing septic tank 09-81 [SWMU 09-005(a)]. All former discharge to septic tank 09-81 was rerouted to septic tank 09-211. Septic tank 09-211 received effluent from buildings 08-20, 08-21, 08-22, 08-23, and 08-24, where the strontium-90 spill occurred in 1954 (see section 4.6). The septic tank discharged to the SWMU 09-008(b) oxidation pond. In 1988 the contents of septic tank 09-211 were removed, the access ports were removed, sand was backfilled over the tank, and the tank was decommissioned (LANL 1996, 054586).

Although associated with TA-09, SWMU 09-005(d) is located within the physical boundary of TA-08.

5.15.2.1 Summary of Previous Investigations for SWMU 09-005(d)

An RFI was conducted at SWMU 09-005(d) in April 1994. Two samples of the tank contents (sludge) were collected from two locations within the tank. Two additional samples were collected by chipping away the material that encrusted the inside walls of the tank. Samples were field-screened for radioactivity, organic vapors, and HE. Field-screening results showed no elevated radioactivity levels, and PID measurements were less than 1 ppm; HE was not detected in the samples. All samples were analyzed for strontium-90, which was detected above FV in the one sample (LANL 1996, 054586, pp. 47-48).

5.15.2.2 Summary of Data for SWMU 09-005(d)

The data collected during the 1994 RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

5.15.2.3 Scope of Activities for SWMU 09-005(d)

Fourteen subsurface samples will be collected from seven locations adjacent to drainlines, the tank inlet, the septic tank, and the tank outlet (Figure 5.15-5). Four samples will be collected from two locations adjacent to the inlet drainlines. Two subsurface samples will be collected at one location each at the tank inlet and the tank outlet from two depths. Four subsurface samples will be collected from two locations beneath the former septic tank. All samples will be collected from two depth intervals (8–9 and 13–14 ft bgs).

Two subsurface samples will be collected from one location at the point where four sewer lines join west of SWMU 09-005(a). These samples will be collected from two depth intervals (0–1 ft and 5–6 ft below the sewer lines).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs, americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, strontium-90, and pH. Table 5.15-6 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.15.3 SWMU 09-008(b), Oxidation Pond

SWMU 09-008(b) (Figure 5.15-1) is the decommissioned oxidation pond (structure 09-212) located next to the western boundary of TA-09, approximately 200 ft east of Anchor Ranch Road. Installed in 1969, the pond measures 15 ft wide × 65 ft long × 6 ft deep, is clay plated with emulsified asphalt water proofing, and is surrounded by an 8-ft-high chain-link fence. An overflow pipe, located at the southeast corner of the pond, discharged to a drainage channel that flows into Starmer Canyon. The pond treated sanitary waste received from the SWMU 09-005(d) septic tank, which served the sewer line from building 08-24, where the strontium-90 spill occurred in 1954 (see section 4.6) (LANL 1993, 020949, p. 5-61). The pond was decommissioned in 1988.

Although associated with TA-09, SWMU 09-008(b) is located within the physical boundary of TA-08.

5.15.3.1 Summary of Previous Investigations for SWMU 09-008(b)

An RFI was conducted SWMU 09-008(b) in April and June 1994. Three surface (0–0.5 ft bgs) sediment samples were collected from the pond bottom and the pond's receiving drainage outfall (approximately 15 ft downgradient of the pond). Samples were field-screened for radioactivity, organic vapors, and HE. Field-screening results showed slightly elevated radioactivity levels, and PID measurements were less than 1 ppm; HE was not detected in the samples. All samples were analyzed for strontium-90. Strontium-90 was detected above FV in one sample (LANL 1996, 054586, pp 47–48).

5.15.3.2 Summary of Data for SWMU 09-008(b)

The data collected during the 1994 RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

5.15.3.3 Scope of Activities for SWMU 09-008(b)

Thirty-six subsurface samples will be collected from 12 locations within the oxidation pond, adjacent to drainlines, and at the associated outfall (Figure 5.15-5).

Twenty-four samples will be collected from six locations within the oxidation pond. Samples will be collected at four depths within the oxidation pond (0–1, 5–10, 15–20, and 25–30 ft below bottom of pond). Four samples will be collected at two locations adjacent to the pipe turns from two depths (0–1 ft below the drainline and 5–6 ft below the drainline). Four locations will be sampled at the outfall at two depths (0–1 and 2–3 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, strontium-90, and pH. Table 5.15-7 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.16 SWMU 09-009, Surface Impoundment

SWMU 09-009 (Figure 5.16-1) consists of a decommissioned surface impoundment (structure 09-218) and two associated decommissioned sand filters at TA-09. The surface impoundment is located approximately 120 ft northeast of building 09-40 and the associated sand filters are approximately 120 ft northeast of the surface impoundment. The surface impoundment is 32 ft wide × 60 ft long × 7 ft deep; the sides are constructed of concrete, and the bottom of bentonite. The two sand filters, which cover a total area of 33 ft wide × 60 ft long and were approximately 4 ft deep, have a flexible membrane liner (butyl rubber) and are surrounded by a concrete curb. The surface impoundment was constructed in 1961 to treat sanitary waste from buildings 09-20, 09-21, 09-28, 09-29, 09-32, 09-33, 09-34, 09-35, 09-37, and 09-38 (LANL 1993, 020949, p. 5-45) and discharged to an outfall approximately 300 ft to the northwest. After the sand filters were installed in 1974, the surface impoundment discharged effluent to the sand filters. After flowing through the sand filters, effluent discharged to a former NPDES-permitted outfall (55502S) (LANL 1990, 007511). In 1986, the sewer lines from TA-08 were connected to the surface impoundment, including the sewer line from building 08-24 (LANL 1993, 020949, p.5-45), where the strontium-90 spill occurred in 1954 (see section 4.6). The surface impoundment and sand filter system were decommissioned when the Sanitary Wastewater Systems Consolidation (SWSC) came online in 1992. All active buildings formerly connected to the impoundment continue to discharge sanitary wastewater to the SWSC. The impoundment received sanitary wastewater only (LANL 1993, 020949, p. 5-45).

5.16.1 Summary of Previous Investigations for SWMU 09-009

An RFI was conducted at SWMU 09-009 in April 1994. Two sludge samples were collected from two locations within the surface impoundment and analyzed for strontium-90. The sludge samples were collected from depth intervals ranging from 0 to 3 ft within the surface impoundment. Samples were field-screened for radioactivity, organic vapors, and HE. Field-screening results showed no elevated radioactivity levels, and PID measurements were less than 1 ppm; HE was not detected in the samples. Strontium-90 was detected in both samples (LANL 1996, 054586, pp. 53–54).

5.16.2 Summary of Data for SWMU 09-009

The data collected during the 1994 RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

5.16.3 Scope of Activities for SWMU 09-009

Eighty-two surface and subsurface samples will be collected from 35 locations beneath the surface impoundment, adjacent to drainlines, beneath the associated sand filters, and downgradient of the associated outfalls (Figure 5.16-2). Drainline locations will be sampled first in order to determine if PCBs are present. PCB analyses for the drainline samples will be requested with quick data response. If PCBs are detected at any of the drainline sampling locations, PCB analyses will be added to samples collected from the surface impoundment, the sand filters, the outfalls, and downgradient of the outfalls.

Twenty-four surface and subsurface samples will be collected from six locations within the surface impoundment from four depths (0–1, 4–5, 9–10, and 14–15 ft below the bottom of impoundment). Four surface and subsurface samples will be collected from two locations beneath the discharge line at two depths (below the line and 5 ft below the line). Twelve surface and subsurface samples will be collected from six locations beneath the sand filters at two depths (0–1 and 4–5 ft beneath the base of the sand filters in native material).

Twenty-two subsurface samples will be collected from 11 locations adjacent to the drainlines associated with the surface impoundment and sand filters. Samples will be collected from two depth intervals (0–1 ft below the line or tank and 5–6 ft below the line or tank). Samples adjacent to the lines will be collected at 20-ft intervals along the path of the line, beginning at the point of exit from the tank, to coincide with the expected locations of the pipe joints.

Sixteen surface and subsurface samples will be collected from eight locations at each of the two outfalls at two depth intervals (0–1 and 2–3 ft bgs). Eight surface and subsurface samples will be collected from four locations downgradient of the outfalls to the toe of the slope.

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 5.16-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.17 AOC 09-010(a), Storage Area

AOC 09-010(a) (Figure 5.17-1) is a former container storage shelter (structure 09-207) that was located at TA-09 north of building 09-48 (an HE-machining building). Built in 1961, the shelter, measured approximately 2.5 ft wide x 11 ft long x 6.5 ft high. It was constructed of four steel pipe posts anchored in concrete with corrugated steel siding on three sides, with the north side open; and a steel-grid floor suspended above the ground (LANL 1996, 053777). The storage shelter was used to store HE-contaminated solid waste collected from building 09-48, including scrap HE from machining operations and solvent-contaminated wipes used to clean machinery and equipment (LANL 1996, 053777). Waste was packaged in heavy plastic bags and stored in metal containers that were staged in the storage shelter to await appropriate disposal (LANL 1993, 020949 p. 5-46). The shelter was removed in 1995 as part of a VCA (LANL 1996, 053777).

The 1990 SWMU report (LANL 1990, 007511) describes AOC 09-010(a) as a waste can shelter, which it mistakenly designates as structure 09-48. Further on in the description, the SWMU report correctly links the storage shelter described north of building 09-48 to structure 09-207.

5.17.1 Summary of Previous Investigations for AOC 09-010(a)

A VCA was conducted at AOC 09-010(a) on July 21, 1995. Structure 09-207 was removed and confirmation sampling and soil removal were not completed. During removal the storage shelter and concrete were field-screened for gross-alpha, -beta, and -gamma radioactivity and organic vapors. The debris was field-tested for HE. Field screening did not show the presence of radioactivity above instrument background or organic vapors. No HE was detected. The former sites of the footing for the steel pipe posts were backfilled with gravel. Approximately 3100 lb of concrete and metal from the storage structure were disposed of at the Los Alamos County Landfill (LANL 1996, 053777, pp. 5–6).

5.17.2 Summary of Data for AOC 09-010(a)

No decision-level data are available for this site.

5.17.3 Scope of Activities for AOC 09-010(a)

Ten surface and subsurface samples will be collected from five locations (Figure 5.17-2). Samples from one location within the footprint and four around the perimeter of the former storage area will be collected from two depths (0–1 ft and 4–5 ft bgs). If gravel or other fill material is encountered, samples will be collected at 0–1 ft and 4–5 ft beneath the fill material. All samples will be collected from native soil or tuff. All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs (except in surface samples), and pH. Samples will not be analyzed for radionuclides because the storage area was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.17-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.18 AOC 09-010(b), Storage Area

AOC 09-010(b) (Figure 5.18-1) is a former container storage shelter (structure 09-206) that was located at TA-09 approximately 35 ft south of building 09-45 (a processing laboratory). Built in 1961, the shelter, measured approximately 2.5 ft wide x 11 ft long x 6.5 ft high. It was constructed of four steel pipe posts anchored in concrete with corrugated steel siding on three sides, with the north side open (LANL 1996, 053777). The shelter had a steel-grid floor suspended above the ground with a secondary containment pan below the floor (LANL 1996, 053777). The storage shelter was used to store 5-gal. and 55-gal.

containers of organic solvents (LANL 1996, 053777). The shelter was removed in 1995 as part of a VCA (LANL 1996, 053777)

The 1990 SWMU report (LANL 1990, 007511) describes AOC 09-010(b) as located "northeast of the 09-142 laboratory building." It is presumed that the SWMU report made a typographical error and meant to associate the container storage shelter with structure 09-42, which is a processing laboratory, as opposed to structure 09-142, which is a manhole. However, no waste container storage shelter existed at building 09-42. Only two waste can shelters were constructed at TA-09, 09-206 and 09-207 (LASL 1961, 095144.1). Container storage shelter 09-206 [AOC 09-010(b)] was constructed south of building 09-45 and 09-207 [AOC 09-010(a)] (Figure 5.17-1) was constructed north of building 09-48.

5.18.1 Summary of Previous Investigations for AOC 09-010(b)

A VCA was conducted at AOC 09-010(b) in 1995. Structure 09-206 was removed, and confirmation sampling and soil removal were not completed. The storage shelter and concrete were field-screened for gross-alpha, -beta, and -gamma radioactivity and organic vapors and then removed. The debris was field-tested for HE. Field screening did not show the presence of radioactivity above instrument background or organic vapors. No HE was detected. Structure 09-206 was disposed of at the Los Alamos County Landfill. The former sites of the footing for the steel pipe posts were backfilled with gravel (LANL 1996, 053777, pp. 5–6).

5.18.2 Summary of Data for AOC 09-010(b)

No decision-level data are available for this site.

5.18.3 Scope of Activities for AOC 09-010(b)

Ten surface and subsurface samples will be collected from five locations (Figure 5.18-2). Samples from one location within the footprint and four around the perimeter of the former storage area will be collected from two depths (0–1 ft and 4–5 ft bgs). If gravel or other fill material is encountered, samples will be collected at 0–1 ft and 4–5 ft beneath the fill material. All samples will be collected from native soil or tuff. All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs (except in surface samples), and pH. Samples will not be analyzed for radionuclides because the storage area was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.18-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.19 AOC 09-011(b), Storage Area

AOC 09-011(b) (Figure 5.19-1) is a former storage area located at TA-09, approximately 30 ft southeast of building 09-39 (an HE magazine). The 10-ft-square area was used to temporarily stage equipment potentially contaminated with HE before the equipment was cleaned (flashed) and disposed of at TA-16. The area was once fenced and posted with signs (LANL 1993, 020949, p. 5-47). The date when the area was first used for staging equipment is unknown. After 1987, the area functioned as a satellite accumulation area, which was closed in 1991 (Rodriguez 1998, 058480)), and the storage area was no longer used.

5.19.1 Summary of Previous Investigations for AOC 09-011(b)

An RFI was conducted at AOC 09-011(b) in 1994 and additionally in 1997. In 1994, two surface (0–0.5 ft bgs) soil samples were collected next to and downgradient of the storage area pavement and analyzed for HE.

The results of the analysis of samples collected during the 1994 RFI are as follows: HE was not detected.

Additional sampling was conducted as part of the same RFI in April 1997. Four additional surface (0–0.5 ft bgs) samples were collected from a drainage channel that received runoff from the site. Samples were submitted to an off-site contract analytical laboratory for analysis of HE (LANL 1998, 059686, pp. 19−20).

5.19.2 Summary of Data for AOC 09-011(b)

The data collected during the 1994 portion of the RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

The samples collected, analysis requested, and decision-level analytical data from the 1997portion of the RFI are presented in Table 5.19-1. The results of the analysis of samples collected during the 1997 RFI are as follows (LANL 1998, 059686, pp. 19–20): HE was not detected.

5.19.3 Scope of Activities for AOC 09-011(b)

Ten surface and subsurface samples will be collected from five locations (Figure 5.19-2). Samples from one location within the footprint and four around the perimeter of the former storage area will be collected from two depths (0–1 ft and 4–5 ft bgs).

Four surface and subsurface samples will be collected from two locations in the drainage channel downgradient of the former storage area. Samples will be collected from two depths at each location (0–1 ft and 4–5 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs (except in surface samples), and pH. Samples will not be analyzed for radionuclides because the storage area was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.19-2 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.20 AOC 09-011(c), Storage Area

AOC 09-011(c) (Figure 5.20-1) is a former storage area located at TA-09 approximately 5 ft south of building 09-38 (an HE processing and development building). The storage area consisted of a solvent storage rack that measured approximately 3 ft wide x 8 ft long x 6 ft high (Harris 1993, 014946). The storage rack stored dimethylsulfoxide and isobutyl acetate in support of building 09-38 activities (LANL 1993, 020949, p. 5-47). The dates of operation of the storage rack are unknown. The storage rack has been removed (LANL 1993, 020949, pp. 5-47, 6-59–6-60).

5.20.1 Summary of Previous Investigations for AOC 09-011(c)

An RFI was conducted at AOC 09-011(c) in 1994. Twelve samples were collected from six locations within the site and submitted to an off-site contract analytical laboratory for analyses of HE, SVOCs, and VOCs. Samples were collected from depth intervals ranging from 0 to 1 ft bgs.

The results of the analyses of samples collected during the 1994 are as follows: HE, bis(2-ethylhexyl)phthalate, and VOCs were detected.

5.20.2 Summary of Data for AOC 09-011(c)

The data collected during the 1994 investigation do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

5.20.3 Scope of Activities for AOC 09-011(c)

One surface and one subsurface sample will be collected from one location within the footprint of the former storage area (Figure 5.20-2). If fill material is encountered, sample depths will be adjusted so that samples are collected from 0–1 ft and 4–5 ft below the base of the fill material, in native soil or tuff.

Samples will be collected from two depth intervals (0–1 ft and 4–5 ft bgs) and analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs (except in surface samples), and pH. Samples will not be analyzed for radionuclides because the storage area was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.20-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

The former storage area was located within the perimeter of drainlines associated with SWMU 09-004(d). Samples collected from SWMU 09-004(d), sampling locations 4d-1 through 4d-3, will also be used to characterize AOC 09-011(c).

5.21 AOC 09-012, Disposal Pit

AOC 09-012 (Figure 5.21-1) is described by the 1990 SWMU report (LANL 1990, 007511) “as a possible waste pit” at TA-09. The SWMU report further states that “It is unknown whether the pit was located in the old TA-09 or the new TA-09, or even if the disposal area existed. It has not been found during field surveys.” Based on this information, the RFI work plan for Operable Unit 1157 identified the disposal pit to consist of 15 circular, nonvegetated sites (LANL 1993, 020949, p. 5-62) within the Old Anchor East site (old TA-09). The circles begin 200 ft north of building 09-31 and continue north in a basically straight line. The circles are each approximately 6 ft in diameter and are spaced approximately 5 ft apart. (LANL 1993, 020949, p. 5-62). The depth of any excavations at the site and the types of waste that may have been disposed of are unknown.

5.21.1 Summary of Previous Investigations for AOC 09-012

An RFI was conducted at AOC 09-012 in 1994. Eighteen surface (0–0.5 ft bgs) samples were collected from eight locations within the site and analyzed for inorganic chemicals, herbicides, pesticides, SVOCs, VOCs, and radionuclides. The results of the analyses of the samples collected during the 1994 RFI are as follows:

- Aluminum, arsenic, barium, beryllium, chromium, copper, iron, lead, magnesium, manganese, potassium, vanadium, and zinc were detected above BVs. Nitrate was detected.
- HE, herbicides, pesticides, and acetone were detected.
- Cesium-137 and europium-152 were detected.

Additional sampling was conducted at AOC 09-012 in 1995. Two samples were collected from two locations within the site and submitted to an off-site contract analytical laboratory for analyses of metals, total cyanide, herbicides, pesticides, PCBs, SVOCs, VOCs, and gamma-emitting radionuclides. Samples were collected from depth intervals ranging from 6.5 to 8.5 ft bgs.

5.21.2 Summary of Data for AOC 09-012

The data collected during the 1994 portion of the RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

The samples collected, analyses requested, and decision-level analytical data from the 1995 portion of the RFI are presented in Tables 5.21-1 to 5.21-3 The results of the analyses of samples collected during the 1995 RFI are as follows:

- Total cyanide, lead, and selenium were detected above BVs (Figure 5.21-2).
- Seventy-two organic chemicals, including PAHs, other SVOCs, VOCs, herbicides, and pesticides were detected (Figure 5.21-3).
- Radionuclides were not detected.

5.21.3 Scope of Activities for AOC 09-012

Sixty surface and subsurface samples will be collected from 15 locations centered on the circular, nonvegetated disposal pits (Figure 5.21-4). Four surface and subsurface samples will be collected from the center of each of the 15 circular, nonvegetated disposal pits at four depths (0–1 ft, 4–5 ft, 9–10 ft, 15–20 ft bgs). All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, herbicides, PCBs, pesticides, SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 5.21-4 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.22 SWMU 09-013, MDA M

SWMU 09-013 (Plate 5) is MDA M, which consists of two surface disposal areas at TA-09, a main area and a smaller satellite area. The main area occupies about 3.2 acres and is located approximately 1600 ft southwest of building 22-120. The 150 ft wide x 260 ft long satellite area is located approximately 750 ft northwest of the main area. MDA M was created during the demolition of the Old Anchor Ranch East and West sites. Structures were flash burned to remove any HE residue and deposited over the MDA surface. Debris from the construction of current TA-08 and TA-09 facilities (1949−1965) and other sites (1960−1965) were also deposited at MDA M. Materials present at the MDA included metal debris, wood debris, laboratory appliances and fixtures, and metal and glass containers. The main disposal area was surrounded by an earth berm that eroded through by surface-water runoff (LANL 1993, 020949, pp. 2-19, 5-73). MDA M has been inactive since 1965. All debris and contaminated soil were removed from MDA M during an expedited cleanup conducted in 1995−1996 (LANL 1996, 062053).

5.22.1 Summary of Previous Investigations for SWMU 09-013

An RFI was conducted at SWMU 09-013 in 1994. Seventy-two soil samples from 50 locations were collected within the site and analyzed for inorganic chemicals, HE, PCBs, SVOCs, VOCs, pesticides, and radionuclides. Samples were collected from a depth interval ranging from 0 to 2 ft bgs. The results of the analyses of samples collected in 1994 are as follows:

- Aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, sodium, vanadium, and zinc were detected above BVs.
- HE, pesticides, Aroclor-1254, SVOCs, and VOCs were detected.
- Uranium-234, -235, and -238 were detected above BVs.

An EC was conducted at SWMU 09-013 in November 1995 to March 1996. Approximately 5700 yd^3 of materials, debris, and waste was removed for recycling and/or disposal. Low-level radioactive wastes (including asbestos) were disposed of at TA-54; all other wastes were managed off-site (LANL 1996, 062053, p. 10). After the removal of debris and contaminated soils, a verification survey was conducted to determine the presence of remaining contaminates for Phase II characterization. The MDA was divided into thirteen 100 ft^2 grids. Two samples were collected from each grid—one composite of five locations and one center location. Samples were analyzed for radionuclides, inorganic chemicals, PCBs, organic chemicals, and asbestos (LANL 1996, 062053, pp. 4–5). The results of the analyses of samples collected during the 1995−1996 EC are as follows (LANL 1996, 062053, pp. A-3–A-5):

- Cadmium, lead, and silver were detected above BVs.
- PCBs 1248, 1254, and 1260 were detected.
- VOCs were not detected.
- Radionuclides were not detected above BVs/FVs.

5.22.2 Summary of Data for SWMU 09-013

The data collected during the 1994 investigation and the 1995−1996 EC do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

5.22.3 Scope of Activities for SWMU 09-013

One hundred and twenty-four surface and subsurface samples will be collected from 33 locations within the perimeter and downgradient of the two separate MDA M disposal areas (Plate 6). Forty-four surface and subsurface samples will be collected from 11 locations at the northern satellite disposal area of MDA M. Seventy-two surface and subsurface samples will be collected from 18 locations at the southern main disposal area of MDA M. The samples at both areas will be collected in an irregular grid pattern with locations spaced between 50 ft and 100 ft apart, with additional samples beyond the SWMU boundary in the downgradient direction. Samples will be collected from four depths (0–1 ft, 4–5 ft, 9–10 ft, and 19–20 ft bgs). Additionally, eight surface and subsurface samples will be collected from four locations at approximately 100-ft intervals in the canyon channel downgradient of the MDA. These samples will be collected from two depths (0–1 ft and 2–3 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 5.22-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.23 AOC 09-014, Firing Site

AOC 09-014 (Figure 5.23-1) is the former location of a camera mount building (structure 09-176, formerly NU-6) and associated firing point that were located in the area between former building 09-43 and building 09-48. The camera mount building and firing point were components of the former Nu Site firing site that was constructed in 1945. At the time of its construction Nu Site was designated as TA-23. Between 1950 and 1952 Nu, Site was incorporated into TA-09.

The camera mount building housed cameras that photographed the shots conducted at Nu Site from 1945–1950. The building, measuring 15 ft square x 8 ft high, was constructed of reinforced concrete and covered on three sides and on top by an earth berm (LANL 1993, 014995). The interior of the camera mount building contained a camera chamber equipped with a periscope and an equipment box (approximately 3 ft wide × 4 ft long × 3 ft high) constructed of reinforced concrete with a ½-in-thick, steel-plated door (LASL 1947, 110448; LANL 1993, 014995).

The Nu Site firing point was to the east of the camera mount building. The firing point consisted of a 3.5-ft-wide × 12–ft-long × 1-ft-thick reinforced concrete apron containing two small firing pits (LANL 1993, 020949). The apron was on the west side of an earth mound within a loop access road that is visible on 1958 aerial photographs (USAF 1958, 015887). The apron faced toward the camera mount building to the west. The firing point was used from 1945–1950 to test lens charges of up to 135 lb of HE. Smaller shots were conducted in the two firing pits. Shots large enough to damage the apron were occasionally fired in unspecified locations outside the slab but within camera range (LANL 1994, 020949, pp. 5-69, 6-114). It is likely that these larger shots took place in the nonforested areas immediately north and south of the apron (USAF 1958, 015887).

All structures associated with the Nu Site firing point, including the camera mount building, concrete apron, and earthen mound, were removed in August 1952 (LANL 1943, 014995).

5.23.1 Summary of Previous Investigations for AOC 09-014

An RFI was conducted at AOC 09-014 in 1994. Ten surface (0–1 ft bgs) soil samples were collected from 10 locations within the site and analyzed for inorganic chemicals and HE. The results of the analyses of samples collected in 1994 RFI are as follows:

- Barium, beryllium, chromium, and lead were detected above BVs. Nitrate was detected.
- HE was not detected.

5.23.2 Summary of Data for AOC 09-014

The data collected during the 1994 investigation do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

5.23.3 Scope of Activities for AOC 09-014

Eighteen surface and subsurface samples will be collected from nine locations centered on the former firing site (Figure 5.23-2). These locations will be positioned at radial distances of approximately 15 ft and 30 ft from the center of the former firing point. Two samples will be collected at the center of the former firing point.

All samples will be collected from two depth intervals (0–1 ft and 2–3 ft bgs) and analyzed for TAL metals, nitrate, perchlorate, total cyanide, dioxins/furans, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 5.23-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

5.24 SWMU C-09-001, Area of Soil Contamination

SWMU C-09-001 (Figure 5.24-1) is a former area of soil contamination located at TA-09 near the southeast corner of building 09-31 (a chemical storage building). The types of chemicals formerly stored in the building are not documented and are unknown. The contaminated area consisted of a 2 ft wide × 3 ft long region of stained soil beneath the drainpipe at the southeast corner of the building. Before being plugged (at an unknown date), the drainpipe, discharged effluent from spill containment trays within the building. The dates the drainpipe operated are unknown. All contaminated soil associated with the drainpipe was removed during a 1995 VCA (LANL 1996, 054334, pp. 1–2).

5.24.1 Summary of Previous Investigations for SWMU C-09-001

An RFI was conducted at SWMU C-09-001 in 1994. Four samples were collected from two locations within the site and analyzed for SVOCs and VOCs. Samples were collected from depth intervals ranging from 0 to 0.5 ft bgs (IT Corporation 1995, 057521).

The results of the analyses of samples collected during the 1994 RFI are as follows:

- SVOCs (PAHs) were detected.
- VOCs were not detected.

A VCA was conducted at SWMU C-09-001 in 1995. The area was field-screened for gross-alpha, -beta, and -gamma radioactivity; organic vapors; and HE. Radioactivity and organic vapors were not detected above background. No HE was detected. The stained area was excavated using hand tools to a depth of approximately 2 ft , extending westward along building 09-31 for 3 ft. Waste was collected in 55-gal. drums and sent to TA-54, Area L. Two confirmation samples were collected from two locations beneath the excavation and analyzed for SVOCs and VOCs. Samples were collected from depth intervals ranging from 0 to 0.5 ft beneath the excavation. The site was restored by filling the excavated area with clean material, recontouring it, and reseeding it with native grasses (LANL 1996, 054334, pp. 2–3).

The results of the analyses of samples collected during the 1995 VCA are as follows (LANL 1996, 054334, p. 4): SVOCs and VOCs were not detected.

Sampling was conducted at SWMU C-09-001 in 2001. Six samples were collected from six locations within the site and submitted to an off-site contract analytical laboratory for analyses of HE, SVOCs, and VOCs. Samples were collected from depth intervals ranging from 0 to 0.5 ft bgs (LANL 2001, 070937, pp. 1, 4).

5.24.2 Summary of Data for SWMU C-09-001

The data collected during the 1994 RFI and the 1995 VCA do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

The samples collected, analyses requested, and decision-level analytical data from the 2001 sampling are presented in Tables 5.24-1 to 5.24-2. The results of the analyses of samples collected during the 2001 sampling are as follows:

- Twenty-six organic chemicals, including PAHs, other SVOCs, and VOCs, were detected (Figure 5.24-2).
- HE was not detected

5.24.3 Scope of Activities for SWMU C-09-001

Twenty-two surface and subsurface samples will be collected from nine locations located at previous sampling locations, at the point where the drainline exited building 09-31, and downgradient of excavated areas (Figure 5.24-3).

Based on the decision-level analytical data collected for SWMU C-09-001 during the 2001 investigation, which showed detected PAH levels above industrial soil screening levels, soil remediation will be conducted at this site. Soil will be excavated down to 2 ft bgs at each of five previous 2001 sampling locations (09-10025, 09-10026, 09-10027, 09-10028, and 09-10029). The initial excavation will extend 3 ft in each direction from the existing location, and samples will be collected to determine if additional lateral excavation is required. Samples will be submitted to an off-site analytical laboratory for analysis of PAHs, with accelerated results requested. Soil will be removed, stepping out laterally as needed, until PAH concentrations are below industrial SSLs or risk screening assessment results indicate no potential unacceptable risk from residual contamination. Additional samples will be collected laterally as needed to confirm the cleanup. To define the vertical extent of contamination, 10 samples will be collected at the former sampling locations after excavation at two additional depths (2–3 ft bgs and 5–6 ft bgs). The samples will be submitted to an off-site analytical laboratory and will be used as confirmation samples for the remediation. If fill material is encountered at any sampling locations, the sampling depths will be adjusted so that only native material beneath the fill is sampled.

To define the lateral extent of contamination, three additional samples will be collected from one location at the point the drainline exited the building, and nine samples will be collected from three downgradient locations. These samples will be collected from three depth intervals (0–1 ft, 2–3 ft, and 5–6 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, and VOCs (except in surface samples). Samples will not be analyzed for radionuclides because the site was used only for handling HE with no record or indication of radionuclide use at the site. Table 5.24-3 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

6.0 PROPOSED INVESTIGATION ACTIVITIES AT TA-22

The Starmer/Upper Pajarito Canyon Aggregate Area contains nine sites associated with TA-22. Of these, two sites have been approved for NFA or are pending NFA approval. These sites are presented in Table 1.1-1. The remaining seven sites are described below.

A variety of resources was used to define and revise the boundaries of each site, shown on the related figures and plates. Existing structures, roads, and other features that could readily be observed in the field were of prime importance. If these conditions could still be observed in the field, site boundaries were then established relative to these landmarks. Other types of data references were used also, particularly for former site locations where significant changes have occurred over time. Historic aerial photographs have been an excellent resource but are not available for all areas, dates of imagery are sporadic, few are georeferenced, and many are at a small scale or are oblique. Drawings and sketches were used, particularly for structures and utilities, as well as engineering drawings produced for construction or record purposes. Finally, interviews with former site workers taken during earlier work plan preparations in the 1990s were very helpful. Not all of these resources were available for every site and sometimes conflicted with each other. For each site, staff reviewed the available information, resolved conflicts as satisfactorily as possible, and revised site locations and boundaries accordingly. If specific uncertainties impacted these determinations, they are described in the presentation of each site.

6.1 SWMU 22-011, Disposal Pit

The 1990 SWMU report (LANL 1990, 007512) describes SWMU 22-011 as a pit installed at TA-22 for the disposal of classified objects and shapes. The SWMU report depicts a location for the pit on a map and states that warning signs are present at the area. The SWMU report description is from the CEARP Report (DOE 1987, 008663), which references a 1946 memo (Bradbury 1946, 015076). The Bradbury memo discusses a material pit prepared at Trap Door Site. No other location details are provided. Based on the map provided in the SWMU report, the RFI investigation field team identified a disturbed area with explosives warning signs south of building 22-1 as the location of the disposal pit. Upon subsequent investigation, the RFI field team determined this location was not the disposal pit but rather a seepage pit [SWMU 22-015(d)]. To find the location of the disposal pit, the RFI investigating team found and interviewed a Laboratory employee who formerly had worked at TD Site. This interview is documented in a 1992 memo (Van Vessem 1992, 015073).

The Van Vessem memo mentions both TD Site and Twomile Mesa Site. The two sites were located adjacent to each other on Twomile Mesa. TD Site lies within the current boundaries of TA-22, and the Twomile Mesa site lies within the current boundaries of TA-06. The Van Vessem memo states that the disposal pits excavated on Twomile Mesa, including the 1946 classified objects pit referred to in the Bradbury memo, were all located in the area designated as MDA F [SWMU 06-007(a)], which is within TA-06. The information provided in the Van Vessem memo substantiates that the SWMU report incorrectly placed the 1946 disposal pit within TA-22 as well as in TA-06. Therefore, the SWMU 22-011 disposal pit is a duplicate of SWMU 06-007(a), MDA F, and does not require sampling as part of this investigation because SWMU 06-007(a) is being investigated as part of the Twomile Canyon Aggregate Area.

6.1.1 Summary of Previous Investigations for SWMU 22-011

No previous investigations have been conducted at this site.

6.1.2 Summary of Data for SWMU 22-011

No decision-level data are available for this site.

6.1.3 Scope of Activities for SWMU 22-011

No sampling is proposed for SWMU 22-011. SWMU 22-011 is recommended for NFA based on Criterion 1: The site cannot be located or has been found not to exist, is a duplicate SWMU or AOC, or is located within and therefore investigated as part of another SWMU or AOC.

6.2 SWMU 22-015(c), Drainline and Outfall

SWMU 22-015(c) is a former NPDES-permitted outfall (06A077) located at TA-22 approximately 80 ft south of building 22-52 (Plate 7). The outfall received discharge from the floor drains in building 22-52, which were connected to the outfall via a 6-in.-diameter VCP drainline. The outfall daylighted in a channel that drained to a pond located near the edge of the mesa. Drainage from the pond eventually discharged into Pajarito Canyon. Beginning in 1952, building 22-52 was used as a plating laboratory and was later converted into a printed-circuit etching laboratory. Although most waste from the plating and etching operations at building 22-52 was collected manually, effluent from the rinse tanks overflowed to the floor drains. Discharge to the outfall was discontinued in 1977, when all liquid wastes were collected in drums and sent off-site for treatment.

6.2.1 Summary of Previous Investigations for SWMU 22-015(c)

An EC was conducted at SWMU 22-015(c) in August and September 1995. Twelve samples were collected from eight locations downgradient of the outfall. Samples were collected from depth intervals ranging from 0 to 2.5 ft bgs. Samples were field-screened for radioactivity and organic vapors. Samples were submitted to an off-site contract analytical laboratory for analyses; 6 of the 12 samples were analyzed for metals and HE and the other 6 were analyzed for VOCs. Soil excavation began on August 12, 1995, and continued through August 14, 1995. Field screening for VOCs and radionuclides was performed during the excavation. Approximately 260 yd^3 of contaminated soil was disposed of off-site (LANL 1995, 091212, pp. 1–3).

As part of the 1995 EC, additional excavation activities began on September 12, 1995, and were completed on September 21, 1995. The site was regraded to minimize further erosion. To confirm cleanup activities, five samples were collected from four locations where the contaminated soil was removed. Samples were submitted to an off-site contract analytical laboratory for analyses of metals (LANL 1995, 091212, p. 1).

6.2.2 Summary of Data for SWMU 22-015(c)

The samples collected, analyses requested, and decision-level analytical data from the 1995 EC are presented in Tables 6.2-1 to 6.2-3. The results of the samples collected during the 1995 EC are as follows (LANL 1995, 091212, p. 2):

- Antimony, arsenic, cadmium, chromium, cobalt, copper, iron, lead, mercury, nickel, silver, thallium, vanadium, and zinc were detected above BVs. Hexavalent chromium was detected (Plate 8).
- Sixty-two VOCs were detected (Plate 9).

6.2.3 Scope of Activities for SWMU 22-015(c)

Ninety-two surface and subsurface samples will be collected from 38 locations adjacent to the drainline, at the outfall, along the drainage, at the pond area, and in the drainage area downgradient from the pond (Plate 10).

Four samples will be collected at two locations adjacent to the drainline. Each location will be sampled at two depth intervals (0–1 ft below the line and 5–6 ft below the line).

Eighteen samples will be collected at six locations at the outfall and in the area downgradient of the outfall. Four locations will be situated at the outfall—one immediately below the discharge point and three approximately 10 ft downgradient to bound the outfall. An additional two locations will be situated in the drainage downgradient of the outfall. Each location will be sampled at three depth intervals (0–1 ft, 2–3 ft, and 4–5 ft bgs).

Thirty samples will be collected at ten locations in and around the pond area—three locations will be situated within the pond, adjacent to existing sampling locations; seven locations will be situated around the pond. Because the pond area was excavated and backfilled, sampling will avoid the fill material at the top. Each location will be sampled at three depth intervals (0–1 ft bgs or fill/tuff interface, 2–3 ft bgs or 2 ft below fill/tuff interface, and 4–5 ft bgs or 4 ft below fill/tuff interface).

Forty samples will be collected at 20 locations in six rows (west to east) approximately 40 ft apart on the canyon slope downgradient from the pond. Each existing location will have a proposed sampling location adjacent to it. The most downgradient locations will be near the edge of the main Pajarito Canyon channel. Each location will be sampled at two depth intervals (0–1 ft and 2–3 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, strontium-90 and pH. Table 6.2-4 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

6.3 Consolidated Unit 22-015(d)-99

Consolidated Unit 22-015(d)-99 (Plate 11) consists of a septic system [SWMU 22-010(b)], a wash area [SWMU 22-012], a drain and seepage pit [SWMU 22-015(d)], a sump [SWMU 22-015(e)], and a septic system [SWMU 22-016]. The consolidated unit is located in the north-central area of TA-22 south of building 22-1.

6.3.1 SWMU 22-010(b), Septic System

SWMU 22-010(b) is a septic system located at TA-22 approximately 90 ft south of building 22-1 (Plate 11). The septic system consists of a septic tank (structure 22-51), drainlines, a leach field, sand filter, and outfall. The septic tank was installed in 1948 and originally served buildings 22-1 (an assembly building), 22-4 (an office and fabrication building), and 22-5 (a shop and laboratory building). In the 1950s, buildings 22-32 (a guard shack) and 22-52 (a plating and circuit etching shop) were constructed and added to the septic system. In 1984, buildings 22-90 (an office building), 22-91 (an assembly building), and 22-93 (a detonator development building) were constructed and added to the system. In 1973, a sand filter was constructed (east of the leach field) to replace the leach field. The sand filter discharged through a 6-in.-diameter VCP drainline that extended south 120 ft before terminating at an outfall. The sand filter operated until the 1990s when it was rerouted to the SWSC.

6.3.1.1 Summary of Previous Investigations for SWMU 22-010(b)

An RFI was conducted at SWMU 22-010(b) in July and August 1994. Forty-seven samples were collected from 22 locations downgradient of building 22-1. The contents of septic tank 22-51, soils surrounding the tank, the outfall area no longer receiving discharges, the inactive leach field area, and the inactive sand filter and related outfall area were sampled. Samples were collected from depth intervals ranging from 0 to 25 ft bgs. Samples were analyzed for inorganic chemicals, HE, SVOCs, and VOCs (LANL 1997, 056664, pp. 159–161).

The results of the analyses of samples collected during the 1994 RFI are as follows:

- Arsenic, cadmium, chromium, copper, mercury, lead, silver, vanadium, and zinc were detected above BVs (LANL 1997, 056664, p. 163).
- Fifteen organic chemicals, including HE, PAHs, other SVOCs, and VOCs, were detected.

6.3.1.2 Summary of Data for SWMU 22-010(b)

The data collected during the 1994 RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

6.3.1.3 Scope of Activities for SWMU 22-010(b)

The drainlines north of the septic tank 22-51 are active and the inlet to the tank is plugged. One hundred eighty-eight surface and subsurface samples will be collected from 65 locations adjacent to the tank inlet, septic tank, tank outlet, drainlines, and at the sand filter and outfall area (Plate 12). Collection of these samples is subject to facility access restrictions, and collection of samples at all locations may not be possible.

Twelve samples will be collected at six locations: at the exit of the drainline from building 22-1 (location 10b-64), at the drainline junction approximately 50 ft south of the building (location 10b-65), and adjacent to the tank inlet (location 10b-1), the septic tank (locations 10b-2 and 10b-3), and the tank outlet (location 10b-4). Each location will be sampled at two depths (0–1 ft below the line or tank and 5–6 ft below the line or tank). Collection of these samples may be prohibited by facility access restrictions.

One hundred and fourteen samples will be collected from 38 locations (proposed sampling locations 10b-5 through 10b-38, 10b-59 through 10b-61, and 10b-63) adjacent to the main distribution pipe lines, within the leach fields, around the leach fields, and downgradient of the leach fields. Each location will be sampled at three depths (0–1 ft below the line, 5–6 ft below the line, and 10–11 ft below the line). The area in the middle downgradient from the eastern distribution lines will be characterized by sampling at SWMU 22-015(d).

Fourteen samples will be collected from seven locations—five adjacent to the inlet drainline (locations 10b-39 through 10b-43) and two adjacent to the outlet drainline of the sand filter (locations 10b-50 and 10b-51). Each location will be sampled at two depths (0–1 ft below the line and 5–6 ft below the line).

Twenty-four samples will be collected at six locations (10b-44 through 10b-49) at the sand filter—two within the sand filter and four around the perimeter of the sand filter. Each location will be sampled from four depths (0–1 ft, 4–5 ft, 9–10 ft, and 14–15 ft bgs).

Twenty-one samples will be collected at seven locations (10b-52 through 10b-58) at the outfall and in the area downgradient of the outfall. Four locations will be situated at the outfall—one immediately below the discharge point and three approximately 10 ft downgradient to bound the outfall. An additional three locations will be situated approximately 30 ft downgradient of the outfall. Each location will be sampled at three depth intervals (0–1 ft, 2–3 ft, and 4–5 ft bgs).

Three samples will be collected at one location in the drainage (10b-62) at depths of 0–1 ft, 2–3 ft, and 4–5 ft bgs.

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, strontium-90, and pH. Table 6.3-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

6.3.2 SWMU 22-012, Wash Area

SWMU 22-012 is an equipment wash area located at TA-22 south of building 22-1 (Plate 11). The wash area consists of a concrete pad placed adjacent to a sump [SWMU 22-015(e)]. The pad was constructed in 1950 and measures 8 ft long × 8 ft wide × 10 in. thick. The pad was used for washing explosives-contaminated equipment used in building 22-1. The contaminated wash water drained from the pad into the adjacent sump. The wash area ceased use after 1984 when building activities ceased, and the sump was filled with concrete.

6.3.2.1 Summary of Previous Investigations for SWMU 22-012

An RFI was conducted at SWMU 22-012 in June 1994. Nine surface samples (0–0.5 ft bgs) were collected from nine locations around the perimeter of the wash pad. Samples were analyzed for HE. No other analyses were requested for the samples because only HE contamination was expected to be associated with equipment washing activities (LANL 1997, 056749, pp. 31–33).

The results of the analyses of samples collected during the 1994 RFI are as follows:

- HMX was detected.

6.3.2.2 Summary of Data for SWMU 22-012

The data collected during the 1994 RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

6.3.2.3 Scope of Activities for SWMU 22-012

Six surface and subsurface samples will be collected at three locations around the perimeter of the concrete decontamination pad from two depths (0–1 and 4–5 ft bgs) (Plate 12).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs (except in surface samples), and pH. Samples will not be analyzed for radionuclides because the site was used only for handling HE with no record or indication of radionuclide use at the site. Table 6.3-2 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

6.3.3 SWMU 22-015(d), Drain and Seepage Pit

SWMU 22-015(d) is a drain and seepage pit at TA-22 that served building 22-1 (Plate 11). The 1990 SWMU report (LANL 1990, 007512) does not mention the existence of a seepage pit and describes the SWMU 22-015(d) drain as emptying on the ground at a discharge point approximately 100 ft south of the building. A second memo from a TA-22 site worker (Meyers 1993, 015263) states that in 1948, the floor drain was connected to a 10-ft-deep pit filled with gravel (i.e., a seepage pit) located south of the building. This discrepancy was resolved when the existence of the seepage pit was verified during 1993 RFI activities. The seepage pit had no outlet line; therefore, the SWMU report was mistaken in associating the SWMU 22-015(d) drain as the source for the outfall described as “emptying on the ground.” Use of the seepage pit likely ceased after installation of the HE sump [SWMU 22-015(e)].

6.3.3.1 Summary of Previous Investigations for SWMU 22-015(d)

An RFI was conducted at SWMU 22-015(d) in June and July 1994. Twelve samples were collected from three locations downgradient of the seepage pit. Samples were analyzed for HE and VOCs. Samples were collected from depth intervals ranging from 0 to 28.5 ft bgs (LANL 1997, 056749, p. 31).

The results of the analyses of samples collected during the 1994 RFI are as follows: HE (HMX and PETN) were detected. VOCs were not detected.

Additional sampling was conducted as part of the same RFI in April 1997. Four samples were collected from one location at the seepage pit, and one sample was collected from one location beneath an exposed section of the drainline upgradient of the seepage pit. Samples were collected from depth intervals ranging from 0 to 20 ft. The samples were submitted to an off-site contract analytical laboratory for analysis of HE and VOCs (LANL 1997, 056749, p. 31).

6.3.3.2 Summary of Data for SWMU 22-015(d)

The data collected during the 1994 portion of the RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

The samples collected, analyses requested, and decision-level analytical data from the 1997 portion of the RFI are presented in Tables 6.3-3 and 6.3-4. The results of the samples collected during the 1997 portion of the RFI are as follows (LANL 1997, 056749, p. 31): Fifty-seven organic chemicals, including PETN and VOCs, were detected (Plate 13).

6.3.3.3 Scope of Activities for SWMU 22-015(d)

The drainline to the seepage pit will be located by trenching. Thirty-six surface and subsurface samples will be collected from nine locations adjacent to the drainline, pit inlet, and seepage pit (Plate 12).

Eight samples will be collected from four locations adjacent to the inlet drainline. The samples will be collected at approximately 50-ft intervals along the path of the line, beginning at the point where the drainline exits the building (proposed sampling location 15d-9). Each location will be sampled at two depth intervals (0–1 ft below the line and 5–6 ft below the line).

Twenty-eight samples will be collected from five locations at the seepage pit—one at the center of the pit and four surrounding the pit with one location adjacent to the inlet and the other three approximately 5 ft away from the pit boundary. The bottom of the pit is at 10.5 bgs (LANL 1997, 056749, p. 31). The samples at the center of the pit will be collected from four depths (10.5–11.5 ft, 15–16 ft, 19–20 ft, and 29–30 ft bgs). The samples from the four locations surrounding the pit will be collected from six depths (0–1 ft, 4–5 ft, 10.5–11.5 ft, 15–16 ft, 19–20 ft, and 29–30 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs (except in surface samples), and pH. Samples will not be analyzed for radionuclides because the site was used only for handling HE with no record or indication of radionuclide use at the site. Table 6.3-5 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

6.3.4 SWMU 22-015(e), Sump

SWMU 22-015(e) is an HE sump that was located at TA-22 on the exterior south wall of building 22-1 (Plate 11). The sump was made of concrete and measured 6.4 ft long × 4.5 ft wide × 5 ft deep. The sump was installed in 1950 to receive discharge from a sink and floor troughs located within building 22-1, as well as wastewater from an equipment wash area (SWMU 22-012) located directly south of the sump. The sump discharged to an outfall that daylighted approximately 210 ft south of the building. The sump was filled with concrete in 1984 when building activities ceased.

6.3.4.1 Summary of Previous Investigations for SWMU 22-015(e)

An RFI was conducted at SWMU 22-015(e) in June 1994. Seventeen samples were collected from eight locations within a 10-ft radius of the sump. Samples were collected from depth intervals ranging from 0 to 7 ft bgs. Samples were analyzed for HE and VOCs (LANL 1997, 056749, p. 31).

The results of the analyses of samples collected during the 1994 RFI are as follows: HE was detected.

6.3.4.2 Summary of Data for SWMU 22-015(e)

The data collected during the 1994 RFI do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

6.3.4.3 Scope of Activities for SWMU 22-015(e)

Seventeen surface and subsurface samples will be collected from eight locations adjacent to the sump and drainline, and at the outfall (Plate 12). Four samples will be collected from two locations adjacent to the west and south sides of the sump. The samples will be collected from two depths (0–1 and 4–5 ft bgs). The nature and extent to the north and east will be characterized by sampling at SWMU 22-012 and SWMU 15-015(d), respectively.

Eight samples will be collected from four locations at approximately 50-ft intervals along the path of the line, beginning at the point of exit from the sump. Each location will be sampled at two depth intervals (0–1 ft below the line and 5–6 ft below the line).

Samples will be collected at two locations near the outfall–one at the discharge point of the outfall and one at 10 ft downgradient to the west of the outfall. Samples will be collected at two depth intervals (0–1 and 2–3 ft bgs). The discharge point location (15e-7) will have an additional sample collected at 5–6 ft bgs. Downgradient to the south and east of the outfall will be characterized by sampling at SWMU 22-010(b).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs (except in surface samples), and pH. Samples will not be analyzed for radionuclides because the site was used only for handling HE with no record or indication of radionuclide use at the site. Table 6.3-6 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

6.3.5 SWMU 22-016, Septic Tank

SWMU 22-016 is a decommissioned septic tank (structure 22-42) located approximately 120 ft south of building 22-1 (Plate 11). The septic tank was constructed of reinforced concrete and measured approximately 9 ft long × 6 ft wide × 5 ft deep with a capacity of 1365 gal. The tank served building 22-1 and former building 22-4 and was active from 1945 until 1948, when it was replaced by a new septic tank (structure 22-51) at SWMU 22-010(b).

6.3.5.1 Summary of Previous Investigations for SWMU 22-016

No previous investigations have been conducted at this site.

6.3.5.2 Summary of Data for SWMU 22-016

No data is available for this site.

6.3.5.3 Scope of Activities for SWMU 22-016

A geophysical survey will be conducted to locate the septic tank. Eight samples will be collected at four locations adjacent to the tank inlet, the septic tank, and tank outlet. Each location will be sampled at two depths (0–1 ft below the line or tank and 5–6 ft below the line or tank).

If the tank is located as described in the 1997 RFI report (LANL 1997, 056664, p. 160), it is likely that the tank connected to the drainline of SWMU 22-010(b) leading to the sand filter and outfall, which will be characterized by sampling at SWMU 22-010(b) (locations 10b-39 through 10b-58). If the tank is found to not be connected to the SWMU 22-010(b) drainline, it will be sampled as follows.

The drainline from the tank will be located by trenching. If the drainline is located, samples will be collected at approximately 50-ft intervals along the path of the line, beginning at the point of exit from the tank. Each location will be sampled at two depth intervals (0–1 ft below the line and 5–6 ft below the line).

If the discharge point is located, sampling will be conducted at the outfall and at three downgradient locations. If a discernable drainage is present, the drainage will be sampled approximately at 30-ft intervals. All outfall and drainage samples will be collected at two depth intervals (0–1 and 2–3 ft bgs).

Regardless of the location of the septic tank, if it is found to be in place, eight samples will be collected at four locations: adjacent to the tank inlet, on each side of the septic tank, and at the tank outlet. Each location will be sampled at two depths (0–1 ft below the drainline or tank and 5–6 ft below the drainline or tank).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, strontium-90, and pH. Table 6.3-7 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

7.0 PROPOSED INVESTIGATION ACTIVITIES AT TA-40

The Starmer/Upper Pajarito Canyon Aggregate Area contains 17 sites associated with TA-40. Of these, four sites have been approved for NFA or are pending NFA approval and three are deferred per Table IV-2 of the Consent Order. These sites are presented in Table 1.1-1. The remaining 10 sites are described below.

A variety of resources was used to define and revise the boundaries of each site, shown on the related figures and plates. Existing structures, roads, and other features that could readily be observed in the field were of prime importance. If these conditions could still be observed in the field, site boundaries were then established relative to these landmarks. Other types of data references were used also, particularly for former site locations where significant changes have occurred over time. Historic aerial photographs have been an excellent resource but are not available for all areas, dates of imagery are sporadic, few are georeferenced, and many are at a small scale or are oblique. Drawings and sketches were used, particularly for structures and utilities, as well as engineering drawings produced for construction or record purposes. Finally, interviews with former site workers taken during earlier work plan preparations in the 1990s were very helpful. Not all of these resources were available for every site and sometimes conflicted with each other. For each site, staff reviewed the available information, resolved conflicts as satisfactorily as possible, and revised site locations and boundaries accordingly. If specific uncertainties impacted these determinations, they are described in the presentation of each site.

7.1 SWMU 40-001(c), Septic Tank

SWMU 40-001(c) (Figure 7.1-1) is a septic tank (structure 40-25) located at TA-40 approximately 25 ft east of building 40-11. Constructed of reinforced concrete, the septic tank measures 4 ft wide × 7 ft long × 6 ft deep and has a capacity of 540 gal. (LASL 1949, 110465) The septic tank was installed in 1950 and serves building 40-11, which houses changing rooms and restrooms. Originally, the septic tank discharged northeast into Twomile Canyon. In 1951, the drainline was rerouted to discharge south to Pajarito Canyon (LASL 1951, 110464). In 1988, the septic tank outlet was again rerouted; this time to discharge to a leach field constructed south of the septic tank (LANL 1988, 110466). The septic tank is currently active.

7.1.1 Summary of Previous Investigations for SWMU 40-001(c)

An RFI was conducted at SWMU 40-001(c) in 1994. Fifteen samples were collected from six locations within the site and analyzed for inorganic chemicals, HE, SVOCs, and VOCs. Samples were collected from depth intervals ranging from 0 to 11 ft bgs.

The results of the analyses of samples collected during the 1994 RFI are as follows:

- Aluminum, arsenic, barium, beryllium, cadmium, chromium, copper, iron, lead, manganese, mercury, selenium, vanadium, and zinc were detected above BVs.
- SVOCs and methylene chloride were detected.

7.1.2 Summary of Data for SWMU 40-001(c)

The data collected during the 1994 investigation do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

7.1.3 Scope of Activities for SWMU 40-001(c)

Forty-six surface and subsurface samples will be collected from 23 locations adjacent to the drainlines from the building to the septic tank, at the septic tank inlet and outlet, at the septic tank, along the drainlines to Twomile Canyon and Pajarito Canyon, at the Twomile Canyon outfall and downgradient, in the active drain field, and at the Pajarito Canyon outfall and downgradient (Figure 7.1-2).

Sixteen subsurface samples will be collected from eight locations (1c-1 through 1c-8) along the drainline from the building, at the inlet and outlet of the septic tank, and at the septic tank. Samples will be collected from two depth intervals at each location (0–1 ft and 5–6 ft below the line or tank).

Six subsurface samples will be collected from three locations (1c-13 through 1c-15) adjacent to the drainline leading to the Twomile Canyon outfall. The samples will be collected at approximately 50-ft intervals along the path of the drainline, beginning at the point of the plugged end. Samples will be collected from two depth intervals at each location (0–1 ft and 5–6 ft below the drainline).

Eight samples will be collected from four locations (1c-9 through 1c-12) at and downgradient of the former outfall into Twomile Canyon. Samples will be collected from two depth intervals (0–1 ft and 2–3 ft bgs).

Ten samples will be collected from five locations (1c-16 through 1c-20) along the drainline to Pajarito Canyon and in the drain field. Samples will be collected from two depth intervals at each location (0–1 ft and 2–3 ft below the drainlines).

Six samples will be collected from three locations (1c-21 through 1c-23) at and downgradient of the outfall into Pajarito Canyon. Samples will be collected from two depth intervals at each location (0–1 ft and 2–3 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 7.1-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

7.2 SWMU 40-003(a), Open Detonation Area

SWMU 40-003(a), (Figure 7.2-1), consists of two former detonation areas located at TA-40. The first site was located 450 ft east of structure 40-15. The detonation area is roughly circular and approximately 30 ft in diameter. Use of the site began in the early 1950s, and detonations were remotely controlled from structure 40-15. In 1958, several instances occurred where intact detonators and pieces of HE were discharged during detonations. Efforts to recover all the scattered detonators and HE were unsuccessful (Anderson and Tucker 1959, 007559). Detonation activities at this first location ceased in the early 1960s when a second open detonation area was developed at a location further to the east.

This second site is approximately 1300 ft east of structure 40-15, within a natural amphitheatre at the end of an unnamed dirt road. At the second site, scrap explosive materials were detonated and controlled remotely from structure 40-15. The detonation area is approximately 90 ft (east-west) by 110 ft (north-south). After each detonation, scattered debris was picked up and transported to an appropriate waste disposal site. Rock rubble and crushed tuff that sloughed from the amphitheater wall was pushed to the south, creating an area of fill that extended nearly to the edge of Pajarito Canyon. The second detonation site was later operated under RCRA interim status. All detonation operations ceased in 1985. The interim status open detonation area underwent RCRA closure from 1992 to 1994. The closure report was approved by NMED in August 1995.

The 1990 SWMU report (LANL 1990, 007513) and the Operable Unit 1111 RFI Work Plan (LANL 1993, 026068) both describe SWMU 40-003(a) as being located 450 ft east of structure 40-15 and state that a RCRA closure plan was being developed for the site. Both documents mistakenly identify the location 450 ft east of structure 40-15 as undergoing RCRA closure. The 1991 Final Closure Plan (LANL 1991, 007653) was developed for the second detonation area located 1300 ft east of structure 40-15 and specifically states that the first detonation area located 450 ft east of structure 40-15 would not be addressed under RCRA closure. The first detonation area was omitted from the closure because its period of use occurred prior to RCRA regulation.

7.2.1 Summary of Previous Investigations for SWMU 40-003(a)

The Closure Certification Report for the TA-40 Scrap Detonation Site (IT Corporation 1995, 057521) documents that in 1990, LANL personnel found the site had been used as a dumping area for construction rubble and debris. The construction debris was removed from the detonation area in April 1992. During removal, all debris was field-screened for HE contamination, and all uncontaminated material was properly disposed of at the Los Alamos County landfill. Debris that showed residual HE contamination was either decontaminated and then disposed of at the landfill or it was collected for additional treatment and subsequent disposal. Along with the construction debris, approximately 177 yd^3 of rubble and soil were removed from the area and samples were taken beneath the excavation (IT Corporation 1995, 057521, p. 13).

According to the closure report, silver and thallium were detected above background (IT Corporation 1995, 057521, p.13).

7.2.2 Summary of Data for SWMU 40-003(a)

No decision-level data are available for this site.

7.2.3 Scope of Activities for SWMU 40-003(a)

Before investigation sampling takes place, unexploded ordnance (UXO) surveys will be conducted at each detonation area. The surveys will identify areas where UXO or other debris is present, and UXO will be picked up and disposed of. If the surveys determine that debris is present beyond the current boundaries of the detonation areas as shown in Figure 7.2-1, additional sampling locations may be proposed to include the expanded area(s).

Twenty-nine surface and subsurface samples will be collected from 12 locations at the first (western) detonation area in a grid pattern of 25-ft intervals (Figure 7.2-2). One location (3a-6) centered on the detonation point and the four nearest locations to the west, north, south, and east (3a-3, 3a-5, 3a-7, and 3a-10, respectively) will be sampled from three depth intervals (0–1 ft, 4–5 ft, and 9–10 ft bgs). At the remaining seven locations, samples will be collected from two depth intervals (0–1 ft and 2–3 ft bgs).

Thirty-one surface and subsurface samples will be collected from 13 locations at the second (eastern) detonation area (Figure 7.2-2). One location (3a-13) centered on the detonation point and the four nearest locations to the north, west, south, and east (3a-14 through 3a-17, respectively) will be sampled from three depth intervals (0–1 ft, 4–5 ft, and 9–10 ft bgs). Sixteen surface and subsurface samples will be collected from eight locations positioned at radial distances of approximately 10 ft, 25 ft, 50 ft, 75 ft, and 100 ft downgradient of the detonation point at two depth intervals (0–1 ft and 2–3 ft bgs).

Eighteen surface and subsurface samples will be collected from nine locations (3a-26 through 3a-34) south of the eastern detonation area to the edge of the mesa, to characterize potential contamination associated with rock debris that was pushed to the south. Samples will be collected at depths of 0–1 ft and 4–5 ft bgs.

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, dioxins/furans, explosive compounds, PCBs (in 20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 7.2-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

7.3 AOC 40-003(b), Burn Site

AOC 40-003(b) (Figure 7.2-1) is a former burn site located at TA-40 approximately 1400 ft east of building 40-15, adjacent to the open detonation area [SWMU 40-003(a)]. The burn site consists of three small burning areas (burn cage locations) and a burn pit. Materials burned consisted of explosives-contaminated combustibles, including rags, paper, wood, and glassware. From 1960 to 1985, a wire burn cage (4 ft wide × 4 ft long × 5 ft high) with a steel-plate floor was used at three different locations (depicted in Figure 7.2-1). The burn cage was used to contain burning materials and to prevent wastes from being windblown before and during burning activities. Kerosene was poured over the stacked waste, and burning was initiated using explosive detonators fired remotely (LANL 1991, 007653, section 2, pp. 1–7). The burn cage locations, operated as a hazardous waste thermal treatment unit under RCRA interim status until operations ceased in 1985. The burn cage locations underwent RCRA closure from 1992 to 1994. The closure report (IT Corporation 1995, 057521) was approved by NMED in August 1995.

The burn pit was located between the two northern locations of the burn cage and measured approximately 12 ft wide × 50 ft long × 12 ft deep. Burn pit operations began in 1961 and ceased sometime before 1977. Aerial photographs showed that the entire area, including the burn pit, was backfilled and covered by 1976 (IT Corporation 1995, 057521, p. 6). The burn pit was omitted from the RCRA closure because its period of use occurred before 1980 and, therefore, prior to RCRA regulation.

7.3.1 Summary of Previous Investigations for AOC 40-003(b)

The Closure Certification Report for the TA-40 Scrap Detonation Site (IT Corporation 1995, 057521) documents that characterization samples were collected at SWMU 40-003(b) in October 1994. These characterization samples were used to identify two small surface areas—approximately 4 ft × 4 ft (southernmost burn cage location) and 6 ft × 6 ft (to the east of the burn pit, which included the eastern burn cage location)—requiring remediation based on analytical results that indicated elevated levels of lead. Soil remediation of these areas was conducted during December 1994. Forty-one 55-gal. drums and six rolloff bins of waste were generated from the soil remediation. Of these, 28 drums determined to be nonhazardous waste were stored at TA-40 to await final disposal at an off-site landfill. The remaining 13 drums were stored at TA-54. The rolloff bins were disposed of at an off-site RCRA-permitted treatment, storage, or disposal facility. Confirmation sampling indicated contaminant concentrations below applicable cleanup levels (IT Corporation 1995, 057521, pp. 8–15).

The results of the analyses of the samples collected during the 1995 TA-40 closure are as follows (IT Corporation 1995, 057521, pp. 10–11): arsenic, silver, barium, cadmium, chromium, lead, mercury, nickel, selenium, and thallium were detected above BVs.

During RCRA closure activities in 1994, a 20-ft-long × 20-ft-wide × 4-ft-deep area was excavated from the eastern portion of the area undergoing closure. It was determined that this excavation had intercepted the former burn pit (IT Corporation 1995, 057521, p. 12). Because the burn pit was not subject to RCRA closure, further excavation was not performed as part of the RCRA closure implementation.

The excavated sites (the 20 ft × 20 ft area in the burn pit, the 22 ft × 20 ft area east of the burn pit, the 4 ft × 4 ft area at the southern burn cage location, and the 6 ft × 6 ft area that included the eastern burn cage location) were restored with clean backfill that was compacted and graded to the original contours of the surrounding terrain (IT Corporation 1995, 057521, p.15). The entire burn pit had been previously backfilled by 1976 (IT Corporation 1995, 057521, p. 6).

7.3.2 Summary of Data for AOC 40-003(b)

The data collected during the 1992 and 1994 investigations do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

7.3.3 Scope of Activities for AOC 40-003(b)

Twelve surface and subsurface samples will be collected from five locations within and around the burn pit (Figure 7.2-1).

Six subsurface samples at three locations will be collected within the burn pit from two depths (0–1 ft below the fill and 4–5 ft below the fill in native material). Six samples at two locations, one to the north and one to the south of the burn pit, will be collected from three depths (0-1 ft, 4-5 ft, and 9-10 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, dioxins/furans, explosive compounds, PCBs, SVOCs, VOCs (except in surface samples), TPH-DRO, americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 7.3-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

7.4 SWMU 40-004, Storage Area

SWMU 40-004 (Figure 7.4-1) was a container storage area located at TA-40 behind building 40-9 (DOE 1987, 008663). The 1990 SWMU report (LANL 1990, 007513) states that the storage area was outdoors, was confined within a 15 ft × 15 ft area, was used to store containers of chloroethane and vacuum pump oil, and that oil stains were observed. The dates of operation for the storage area are unknown. The 1990 SWMU report further states that all contaminated soil had been removed, placed in drums, and disposed of, but no date is given for the soil removal.

An extensive archival search was unable to find any additional information of any kind about this site other than what was provided in the 1990 SWMU report and the CEARP report (DOE 1987, 008663). The information described in the SWMU report is not in the CEARP report, so it is not known how the SWMU report derived its description of the SWMU 40-004 storage area and the products stored there. The RFI work plan states that this storage area is located beneath the southwest wing of building 40-9 (LANL 1993, 026068, p. 5-95); however, no references are provided as to how this information is known. Therefore, it is concluded that the storage area could have been located anywhere behind building 40-9, including the area beneath the southwest wing of the building, which is a new addition constructed in 1989.

7.4.1 Summary of Previous Investigations for SWMU 40-004

In 1994, the ER Project conducted RFI sampling at SWMU 40-004. Samples were collected and submitted to a fixed laboratory for analysis of organic chemicals. None of the chemicals analyzed exceeded BVs or screening levels.

7.4.2 Summary of Data for SWMU 40-004

The data collected during the 1994 RFI does not meet current data validation standards and is not decision-level data. The screening-level data are presented in Appendix B of the HIR.

7.4.3 Scope of Activities for SWMU 40-004

Sampling is proposed along the south side of building 40-9 to account for uncertainty in the location of the former storage area, which, according to the RFI work plan (LANL 1993, 026068, p. 5-95), is beneath the southwest wing of the building. Because the 1990 SWMU report (LANL 1990, 007513) stated that all contaminated soil had been removed, no sampling beneath the building is necessary. The proposed samples will determine if any residual contamination is present along the south side of building 40-9.

Ten subsurface samples will be collected from five locations within the approximate area of former storage area indicated in Figure 7.4-2. Because the area is paved, samples will be collected from two depth intervals below ground surface (2–3 and 4–5 ft bgs) (Figure 7.4-2). If necessary, lateral extent to the south of the storage area will be characterized by proposed sampling at SWMU 40-009 (section 7.12).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs, TPH-DRO, americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, strontium-90, and pH. Table 7.4-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

7.5 SWMU 40-006(a), Firing Site

SWMU 40-006(a) (Plate 14) is a firing site (structure 40-15) located at TA-40 on the northern rim of Pajarito Canyon, at the east end of TD Site road. SWMU 40-006(a) is listed in Table IV-2 of the Consent Order (Deferred Sites in Testing Hazard Zones), and investigation of this site is deferred per section IV.A.5.b and Table IV-2 of the Consent Order.

The SWMU 40-006(a) firing site consists of a reinforced concrete and steel building that allows observation of the test shots, a partially protected area on the south side of the building where shots are prepared, and an open firing pad connected to the south of the building where larger shots are fired. Since 1950, this firing site has been used to test and develop detonators. Tests conducted at this site have included detonator booster tests, which use 2 lb of explosives, and large open-air shots, which can use up to 50 lb of explosives (LANL 1993, 026068, p. 5-79). After each shot, large pieces of debris are removed and disposed of, the open area is graded, and the sand and debris are pushed to the edge of the canyon. This practice created a sand berm near the canyon edge. Building 40-15 also served as the remote-control point for the SWMU 40-003(a) detonation sites.

7.5.1 Summary of Previous Investigations for SWMU 40-006(a)

The 1993 RFI work plan (LANL 1993, 026068) reported a 1989 DOE investigation at SWMU 40-006(a). Three samples were collected from three locations and analyzed for HE, inorganic chemicals, and radionuclides. Samples were collected from depth intervals ranging from 0 to 0.5 ft bgs. The results of the analyses of samples collected during the 1989 investigation are as follows:

- Barium, copper, and zinc were detected above BVs.
- HE was not detected.
- Thorium-232 and potassium-40 were detected.

An RFI was conducted at SWMU 40-006(a) in 1995. One-hundred thirteen samples were collected from 48 locations and submitted to an off-site contract analytical laboratory for analyses of metals, total cyanide, uranium, HE, SVOCs, gamma-emitting radionuclides, strontium-90, and tritium; however, not all samples were analyzed for all suites. Samples were collected at depth intervals ranging from 0 to 14.5 ft bgs.

7.5.2 Summary of Data for SWMU 40-006(a)

The samples collected, analyses requested, and decision-level analytical data from the 1995 RFI are presented in Tables 7.5-1 to 7.5-4. The results of the analyses of samples collected during the 1995 RFI are as follows:

- Antimony, arsenic, barium, cadmium, calcium, chromium, cobalt, copper, lead, magnesium, manganese, mercury, nickel, selenium, silver, total uranium, and zinc were detected above BVs (Plate 15).
- Twenty-one organic chemicals, including PAHs, other SVOCs, and HE, were detected (Plate 16).
- Cesium-137 and strontium-90 were detected above FVs; cobalt-60 was detected (Plate 17).

7.5.3 Scope of Activities for SWMU 40-006(a)

Investigation of the firing site is deferred per section IV.A.5.b and Table IV-2 of the Consent Order.

7.6 SWMU 40-006(b), Firing Site

SWMU 40-006(b) (Figure 7.6-1) is a firing site (structure 40-8) located at TA-40 on the northern rim of Pajarito Canyon, at the west end of TD Site Rd. SWMU 40-006(b) is listed in Table IV-2 of the Consent Order (Deferred Sites in Testing Hazard Zones), and investigation of this site is deferred per section IV.A.5.b of the Consent Order.

The SWMU 40-006(b) firing site consists of a reinforced concrete and steel building that allows observation of the test shots and a partially protected area on the south side of the building where shots are prepared. Since 1950, this firing site has been used to test detonators. Historically, the firing site included an open firing pad connected to the south of the building where the larger shots (up to 85 lb) were fired. In the past after each shot, large pieces of debris were removed and disposed of, and sand and debris were pushed to the edge of the canyon. This practice created a soil berm near the canyon edge.

In 1992, the firing site was modified. The firing pad and the top 6 in. of soil were removed (LANL 1993, 026068, p. 5-80) and a containment system consisting of a large vessel with a high-efficiency particulate filtration system was installed. The firing site is now used only to test and develop small explosive devices.

7.6.1 Summary of Previous Investigations for SWMU 40-006(b)

In 1991, the SWMU 40-006(b) firing pad was excavated in preparation for the installation of a containment system. Before excavation, a reconnaissance survey was conducted for contaminants in the soil surrounding the firing pad. Samples were tested for total beryllium, total uranium, explosive residues, PCBs, SVOCs, VOCs, and gross radioactivity. Results showed that lead and uranium were present. Before construction began, the top 6 in. of soil on the firing pad were removed and placed on plastic sheeting (LANL 1993, 026068, pp. 5-79 –5-89).

Best management practices (BMP) were installed at SWMU 40-006(b) in 2000 as part of the post-Cerro Grande fire recovery. The fire damage was moderate to severe with several buildings destroyed near this site. Straw wattles were installed on the steep portion of the slope to reduce the sediment migration potential. Wattles were also installed on the mesa's edge to divert run-on from the slope (LANL 2000, 067370, p. 31).

7.6.2 Summary of Data for SWMU 40-006(b)

No decision-level data are available for this site.

7.6.3 Scope of Activities for SWMU 40-006(b)

Investigation of the firing site is deferred per Table IV-2 of the Consent Order.

7.7 SWMU 40-006(c), Firing Site

SWMU 40-006(c) (Figure 7.7-1) is a firing site (structure 40-5) located at TA-40 on the north edge of Pajarito Canyon at the west end of TD Site Rd. SWMU 40-006(c) is listed in Table IV-2 of the Consent Order (Deferred Sites in Testing Hazard Zones), and investigation of this site is deferred per section IV.A.5.b and Table IV-2 of the Consent Order.

The SWMU 40-006(c) firing site consists of a reinforced concrete and steel building that allows observation of test shots and a partially protected area on the south side of the building where shots are prepared. Since 1950, this firing site has been used to test detonators. Historically, the firing site included an open firing pad connected to the south of the building where the larger shots (up to 50 lb) were fired. In the past, after each shot, large pieces of debris were removed and disposed of, and sand and debris were pushed to the edge of the canyon. This practice has created a soil berm near the canyon edge. The firing site is now used only to test and develop small explosive devices.

7.7.1 Summary of Previous Investigations for SWMU 40-006(c)

BMPs were installed at SWMU 40-006(c) in 2000 as part of the post-Cerro Grande fire recovery. The fire damage was moderate to severe with several buildings destroyed near this site. Straw wattles were installed on the steep portion of the slope to reduce the sediment migration potential. Wattles were also installed on the mesa's edge to divert run-on from the slope (LANL 2000, 067370, p. 32).

7.7.2 Summary of Data for SWMU 40-006(c)

No decision-level data are available for this site.

7.7.3 Scope of Activities for SWMU 40-006(c)

Investigation of the firing site is deferred per section IV.A.5.b and Table IV-2 of the Consent order.

7.8 AOC 40-007(a), Storage Area

AOC 40-007(a) (Figure 7.8-1) is a satellite accumulation area (SAA) and former storage area located at TA-40 inside building 40-3 (an HE preparation building). Before this area became an SAA, it was used to store waste of unspecified type associated with HE detonator assembly operations. As an SAA, this site stores waste associated with HE detonator assembly operations, which typically consists of HE-contaminated rags. The waste is generated at a rate of 1 to 2 gal. per month.

7.8.1 Summary of Previous Investigations for AOC 40-007(a)

No previous investigations have been conducted at this site.

7.8.2 Summary of Data for AOC 40-007(a)

No decision-level data are available for this site.

7.8.3 Scope of Activities for AOC 40-007(a)

Building 40-3 is currently active. Therefore, it is proposed that characterization of the building be delayed until the building is removed. The storage area is currently regulated under 40 CFR 262, Standards Applicable to Generator of Hazardous Waste, and 20.4.1, NMAC Hazardous Waste Management Regulations.

7.9 AOC 40-007(b), Storage Area

AOC 40-007(b) (Figure 7.9-1) is an SAA and former storage area located at TA-40 inside building 40-6 (an HE preparation building). Before this area became an SAA, it was used to store waste of unspecified type associated with HE detonator assembly operations. As an SAA, this site stores waste associated with HE detonator assembly operations, which typically consists of HE-contaminated rags. The waste is generated at a rate of 1 to 2 gal. per month.

7.9.1 Summary of Previous Investigations for AOC 40-007(b)

No previous investigations have been conducted at this site.

7.9.2 Summary of Data for AOC 40-007(b)

No decision-level data are available for this site.

7.9.3 Scope of Activities for AOC 40-007(b)

Building 40-6 is currently active. Therefore, it is proposed that characterization of the building be delayed until the building is removed. The storage area is currently regulated under 40 CFR 262, Standards Applicable to Generator of Hazardous Waste, and 20.4.1, NMAC Hazardous Waste Management Regulations.

7.10 AOC 40-007(c), Storage Area

AOC 40-007(c) (Figure 7.10-1) is the location of a former SAA and storage area located at TA-40 inside building 40-11 (an HE preparation building). Before this area became an SAA, it was used to store waste of unspecified type associated with HE detonator assembly operations. As an SAA, this site stored waste associated with HE detonator assembly operations, which typically consists of HE-contaminated rags. The waste was generated at a rate of 1 to 2 gal. per month. In January 2007, the SAA was removed.

7.10.1 Summary of Previous Investigations for AOC 40-007(c)

No previous investigations have been conducted at this site.

7.10.2 Summary of Data for AOC 40-007(c)

No decision-level data are available for this site.

7.10.3 Scope of Activities for AOC 40-007(c)

Building 40-11 is currently active. Therefore, it is proposed that characterization of the building be delayed until the building is removed. The storage area is currently regulated under 40 CFR 262, Standards Applicable to Generator of Hazardous Waste, and 20.4.1, NMAC Hazardous Waste Management Regulations.

7.11 AOC 40-007(d), Storage Area

AOC 40-007(d) (Figure 7.11-1) is the location of a former SAA and storage area located at TA-40 inside building 40-14 (an HE preparation building). Before this area became an SAA, it was used to store waste of unspecified type associated with HE detonator assembly operations. As an SAA, this site stored waste associated with HE detonator assembly operations, which typically consists of HE-contaminated rags. The waste was generated at a rate of 1 to 2 gal. per month. In January 2005, the SAA was removed.

7.11.1 Summary of Previous Investigations for AOC 40-007(d)

No previous investigations have been conducted at this site.

7.11.2 Summary of Data for AOC 40-007(d)

No decision-level data are available for this site.

7.11.3 Scope of Activities for AOC 40-007(d)

Building 40-14 is currently active. Therefore, it is proposed that characterization of the building be delayed until the building is removed. The storage area is currently regulated under 40 CFR 262, Standards Applicable to Generator of Hazardous Waste, and 20.4.1, NMAC Hazardous Waste Management Regulations.

7.12 SWMU 40-009, Landfill

SWMU 40-009 (Figure 7.12-1) is a landfill located at TA-40 south of building 40-9. The 1990 SWMU report (LANL 1990, 007513) states that the landfill resulted from a decommissioning effort undertaken at TA-15 in 1967. The SWMU report provides only a vague location and no estimation of size or depth for the landfill, stating that debris from TA-15 was taken to TA-40 and disposed of in the canyon between buildings 40-5 and 40-15. The RFI investigating field team walked the canyon area between the two buildings and found two prominent earthen berms on the steep hillside directly south of building 40-9 (LANL 1995, 063947). The field team suspected the berms to be the landfill (LANL 1995, 063947).

7.12.1 Summary of Previous Investigations for SWMU 40-009

An RFI was conducted at SWMU 40-009 in 1995. Eighteen soil samples were collected from six locations within the site and submitted to an off-site contract analytical laboratory for analyses of metals, uranium, HE, SVOCs, gamma-emitting radionuclides, and strontium-90. One sample was also analyzed for tritium. Samples were collected from depth intervals ranging from 0 to 5.5 ft bgs.

BMPs were installed at SWMU 40-009 in 2000 as part of the post-Cerro Grande fire recovery. Straw wattles were installed along the mesa edge to divert run-on from the slope. Rock check dams (on-site materials used) were installed to dissipate flow within the drainage channels on both the east and west ends of the site (LANL 2000, 067370, p. 33).

7.12.2 Summary of Data for SWMU 40-009

The samples collected, analyses requested, and decision-level analytical data from the 1995 RFI are presented in Tables 7.12-1 to 7.12-4. The results of the analyses of samples collected during the 1995 RFI are as follows:

- Beryllium, cadmium, copper, lead, total uranium, and zinc were detected above BVs (Figure 7.12-2).
- Benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzoic acid, bis(2 ethylhexyl)phthalate, di-n-octylphthalate, RDX, and tetryl were detected (Figure 7.12-3).
- Cesium-137 and strontium-90 were detected above FVs (Figure 7.12-4).

7.12.3 Scope of Activities for SWMU 40-009

Fifty-two surface and subsurface samples will be collected from 20 locations within, around the perimeter of, and downgradient of the disposal area (Figure 7.12-5).

Thirty-six samples will be collected from 12 locations within and around the perimeter of the disposal area. Samples will be collected at 50-ft intervals from three depths (9–10 ft, 19–20 ft, and 24–25 ft bgs). Locations 9-5 and 9-9 are located west and east of the current perimeter of the disposal area as shown in Figure 7.12-5. If surface or subsurface debris is found at either of those locations, additional sampling locations may be proposed beyond the current perimeter of the site. Sixteen surface and subsurface samples will be collected from eight locations downgradient of the disposal area. Locations 9-13 through 9-20 extend downgradient to the toe of the slope in Pajarito Canyon. Samples will be collected at 50-ft intervals from two depths (0–1 and 2–3 ft bgs).

All samples will be analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs (in 20% of the samples), SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, strontium-90, and pH. Table 7.12-5 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

7.13 SWMU 40-010, Surface Disposal Area

SWMU 40-010 (Figure 7.13-1) is a surface disposal area located at TA-40 on the edge of Pajarito Canyon, approximately 200 ft south of former building 40-72. The surface disposal area extends about 150 ft along the canyon edge and 140 ft down the canyon side. The area contained various debris, including twenty 30-gallon drums (LANL 1993, 026068, p. 5-56). This area also contains debris from farm and home implements that predate Manhattan Project activities. Post-Cerro Grande fire activities removed all the drums and exposed debris, with the exception of the pre-Manhattan Project debris, which is considered to be of archaeological importance and therefore cannot be removed.

SWMU 40-010 is not listed in the 1990 SWMU report (LANL 1990, 007513). This SWMU was one of 27 newly identified SWMUs added to the Laboratory's Hazardous Waste Facility Permit (HWFP) by the Environmental Protection Agency (EPA) in 1993 (LANL 1993, 030074).

7.13.1 Summary of Previous Investigations for SWMU 40-010

An RFI was conducted at SWMU 40-010 in 1994. Six samples were collected from six locations and analyzed for inorganic chemicals, HE, SVOCs, VOCs, and radionuclides. Samples were collected from depth intervals ranging from 0 to 2.5 ft bgs. The results of the analyses of samples collected during the 1994 RFI are as follows:

- Aluminum, barium, calcium, chromium, copper, iron, lead, magnesium, manganese, potassium, vanadium, and zinc were detected above BVs; total cyanide was detected.
- Methylene chloride and toluene were detected.
- Cesium-137 and strontium-90 were detected above BVs/FVs.

BMPs were installed at SWMU 40-010 in 2000 as part of the post-Cerro Grande fire recovery. The fire damage exposed the surface disposal area. Straw wattles were installed upgradient of the surface disposal area to provide run-on diversion. The area was raked, reseeded, and mulched. Surface debris near the edge was removed and disposed of as solid wastes (LANL 2000, 067370, p. 34).

7.13.2 Summary of Data for SWMU 40-010

The data collected during the 1994 investigation do not meet current data validation standards and are not decision-level data. The screening-level data are presented in Appendix B of the HIR.

7.13.3 Scope of Activities for SWMU 40-010

Twenty-two surface and subsurface samples will be collected from 11 locations within and down gradient of the disposal area (Figure 7.13-2). Samples will be collected at 50-ft intervals from two depths (0–1 ft and 2–3 ft bgs) and analyzed for TAL metals, nitrate, perchlorate, total cyanide, explosive compounds, PCBs, SVOCs, VOCs (except in surface samples), americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and pH. Table 7.13-1 provides a summary of the proposed sampling strategy, locations, depths, and analytical suites.

The steepness of the slope below SWMU 40-010 makes sampling to the toe of the slope impractical and potentially unsafe. Therefore, sample data from Pajarito Canyon reach PA-1E (LANL 2009, 106939), directly below SWMU 40-010, will be used as necessary to define the lateral extent of contamination.

8.0 INVESTIGATION METHODS

A summary of investigation methods to be implemented is presented in Table 8.0-1. The standard operating procedures (SOPs) used to implement these methods are available at http://www.lanl.gov/environment/all/qa/adep.shtml.

Descriptions of the field investigation methods are provided in the next sections. Additional procedures may be added as necessary to describe and document activities affecting quality.

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

8.1 Establishing Sampling Locations

Proposed sampling locations are identified for each site based on engineering drawings, surveyed locations of existing structures, previous sampling locations, and topography or other features identified in the field, such as drainage channels and sediment accumulation areas. The coordinates of proposed locations will be obtained by georeferencing the points from the proposed sampling maps. The coordinates will be used to locate flags or other markers in the field using a differential global positioning system (GPS) unit. If any proposed sampling locations are moved because of field conditions, utilities, or other unexpected reasons, the new locations will be surveyed immediately following sample collection as described in section 8.3. Changes to sampling locations will be documented as deviations from the work plan in the appropriate section(s) of the investigation report.

Some of the planned sampling locations are in the vicinity of active buildings with attendant utility connections. After the desired locations are established, it may not be possible to obtain permission to collect samples or otherwise complete the site investigation. These cases will be documented as deviations in the investigation report.

8.2 Geophysical Surveys

Using as-built construction drawings and boring logs, geophysical surveys will be performed in accordance with the latest version of SOP-5030, Contract Geophysical Logging, at selected sites to verify the location, dimensions, total depth, base profile, topography, low-elevation point, and downslope end. The surveys will verify locations of subsurface structures 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 features surveyed.

8.3 Geodetic Surveys

Geodetic surveys will be conducted in accordance with the latest version of SOP-5028, Coordinating and Evaluating Geodetic Surveys, to locate historical structures and previous sampling locations, and to document field activities such as sample collection. The surveyors will use a Trimble GeoXT handheld GPS or equivalent for the surveys. The coordinate values will be expressed in the New Mexico State Plane Coordinate System (transverse mercator), Central Zone, North American Datum 1983. Elevations will be reported as per the National Geodetic Vertical Datum of 1929. All GPS equipment used will meet the accuracy requirements specified in the SOP.

8.4 Sampling

Soil, fill, sediment, and tuff samples will be collected by the most efficient and least invasive method practicable. The methods will be determined by the field team based on site conditions, such as topography, the nature of the material to be sampled, the depth intervals required, accessibility, and level of disruption to laboratory activities. Typically, samples will be collected using spade and scoop, hand auger, or drill rig.

8.4.1 Surface Sampling

8.4.1.1 Spade and Scoop Method

Surface and shallow subsurface soil and sediment samples will be collected 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. If the surface location is at bedrock, an axe or hammer and chisel may be used to collect samples. Samples collected for analyses will be placed in the appropriate sample containers depending on the analytical method requirement.

8.4.1.2 Sediment Samples

Sediment samples will be collected from areas of sediment accumulation that include sediments judged representative of the historical period of Laboratory operations—post-1943. The proposed sediment sampling locations will be selected based on geomorphic relationships in areas likely to have been affected by discharges from Laboratory operations. Selected sediment sampling locations shown in proposed sampling location figures are based on map contours. However, because sediment is dynamic and subject to redistribution by runoff events, some locations may need to be adjusted when this work plan is implemented.

In the course of collecting sediment samples, it may be determined, based on field conditions, that the selected location is not appropriate—for example, the sediment is much shallower than anticipated, the sediment is predominantly coarse-grained, or the sediment shows evidence of being older than the target age. Sediment sampling locations will be adjusted as appropriate, any revised locations will be surveyed, and the updated coordinates will be submitted to the Laboratory for inclusion in the Sample Management Database.

8.4.2 Subsurface Sampling

Subsurface sampling is proposed to include soil, fill, sediment, and tuff. Any adjustments to sampling locations or sampling intervals will be noted on sample collection logs and recorded in the subsequent investigation report as deviations from this investigation work plan. Subsurface samples will be collected 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. If encountered, alluvial groundwater will be sealed off before advancing the borehole to the desired sampling depths.

8.4.2.1 Hollow-Stem Auger

Boreholes will be drilled using a drill rig equipped with a 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 the bit 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 that samples may be retrieved during drilling operations. The hollow stem also acts to case the borehole core temporarily so that a well casing (a riser) may be inserted down through the center of the auger when 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.

During sampling, the auger will be advanced to just above the desired sampling interval. The sample will be collected by driving a split-spoon sampler into undisturbed soil/tuff to the desired depth. Samples will be collected in accordance with SOP-06.26, Core Barrel Sampling for Subsurface Earth Materials.

8.4.2.2 Hand Auger

Hand augers or power-assisted augers may be used to drill shallow holes (at locations that can be sampled without the use of a drill rig and at locations inaccessible by a drill rig). The hand auger is advanced by turning the auger into the soil or tuff until the barrel is filled. The auger is removed and the sample is placed in a stainless-steel bowl. Hand-auger samples will be collected in accordance with SOP-06.10, Hand Auger and Thin-Wall Tube Sampler.

8.4.2.3 Split-Spoon Sampling

Subsurface samples will be collected from core extracted in a split-spoon core barrel following the current version of SOP-06.24, Sample Collection from Split-Spoon Samplers and Shelby Tube Samplers. Samples collected for analyses will be placed in the appropriate sample containers depending on the analytical method requirement. The analytical suites for the samples from each borehole will vary according to the data requirements as described in sections 4, 5, 6, and 7 and in the proposed sampling tables.

Field documentation will include detailed borehole logs to document the matrix material in detail. Fractures and matrix samples will be assigned unique identifiers.

8.4.3 Borehole Abandonment

All boreholes will be properly abandoned according to the most recent version of SOP-5034, Monitoring Well and RFI Borehole Abandonment.

Shallow boreholes will be abandoned by filling the borehole with bentonite chips, which are subsequently hydrated. Chips will be hydrated in 1- to 2-ft lifts. The borehole will be visually inspected while the bentonite chips are added to ensure that bridging does not occur.

Deeper boreholes 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.

8.5 Excavation

Excavations 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 properly benched to allow access and egress, if necessary. After completion of confirmatory sampling and any necessary over-excavation work, the excavations and/or trenches will be backfilled with clean fill material or overburden, if they are not contaminated. Excavators may also be used to collect grab samples.

8.6 Chain of Custody for Samples

The collection, screening, and transport of samples will be documented on standard forms generated by the SMO. These include sample collection logs, chain-of-custody forms, and sample container labels. Sample collection logs will be completed at the time of sample collection and signed by the sampler and a reviewer who will verify the logs for completeness and accuracy. Corresponding labels will be initialed and applied to each sample container, and custody seals will be placed around container lids or openings. Chain-of-custody forms will be completed and signed to verify that the samples are not left unattended.

8.7 Field Screening

The primary field-screening methods to be used on samples include radiological screening and vapor screening for VOCs using a PID.

8.7.1 Radiological Screening

Radiological field-screening will be conducted to meet of U.S. Department of Transportation requirements for shipping samples. Each sample will be field-screened by a radiological control technician for gross-alpha, -beta, and -gamma radioactivity before transporting the samples to the SMO for processing as determined by the Laboratory's Health Physics Operations Group. Instruments used for field-screening will be calibrated in accordance with the Health Physics Operations Group procedures or equivalent procedures. All instrument calibration activities and field-screening results will be documented daily in the field logbooks in accordance with SOP-5181, Notebook and Logbook Documentation for Environmental Directorate Technical and Field Activities.

8.7.2 Organic Vapor Field Screening

Organic vapor screening of surface and subsurface samples will be conducted for health and safety purposes only, using a PID with an 11.7-electron-volt lamp. Before each day's field work begins, the PID will be calibrated to the manufacturer's standard for instrument operation. All daily calibration results will be documented, and PID results for each sample will be recorded on sample collection logs in accordance with 5181, Notebook and Logbook Documentation for Environmental Directorate Technical and Field Activities.

8.8 Quality Assurance/Quality Control Samples

Quality assurance and quality control samples will include field duplicate, equipment rinsate, and field trip blank samples. These samples will be collected following the current version of SOP 5059, Field Quality Control Samples. Field duplicate samples will be collected at an overall frequency of at least 1 for every 10 regular samples as directed by section IX.C.3.b of the Consent Order.

8.9 Laboratory Analytical Methods

The analytical suites for laboratory analyses are summarized in Table 8.9-1. All analytical methods are presented in the SOW for analytical laboratories (LANL 2008, 109962). Sample collection and analysis will be coordinated with the SMO.

At some sites where the presence or use of PCBs is possible but not confirmed, PCB analyses are planned only for 20% of the samples. For a site where the number of proposed sampling locations is more than 10, the locations of probable contamination of PCBs and the areas mostly likely to define lateral extent of PCB contamination, e.g., at discharge points and at the end of drainages, are selected to sample for PCBs. At each location selected for PCB analyses, samples from all depth intervals will be analyzed for PCBs. The number of samples that will be analyzed for PCBs will be at or above 20% of the total number of samples collected at the site. For a site where the number of proposed sampling locations is less than 10, all locations will be sampled for PCBs.

8.10 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 conducting fieldwork.

8.11 Equipment Decontamination

Equipment for drilling and sampling will be decontaminated before and after sampling activities to minimize the potential for cross-contamination. Dry decontamination methods will be used to avoid the generation of liquid waste and to minimize the IDW. Dry decontamination uses disposable paper towels and over-the-counter cleaner, such as Fantastik or equivalent. All sampling and measuring equipment will be decontaminated in accordance with SOP-5061, Field Decontamination of Equipment.

Dry decontamination may be followed by wet decontamination, if necessary. Wet decontamination may include washing with a nonphosphate detergent and water, followed by a water rinse and a second rinse with deionized water. Alternatively, drilling/exploration equipment that may come in contact with the borehole will be decontaminated by steam cleaning, by hot water pressure-washing, or by another method before each new borehole is drilled. 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.

8.12 Investigation-Derived Waste

IDW generated by the proposed investigation activities may include, but is not limited to, drill cuttings, excavated soil or other environmental media, contact waste such as personal protective equipment, decontamination fluids, 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 EPA and NMED regulations, DOE orders, and Laboratory requirements. Appendix B presents the IDW management plan.

9.0 MONITORING PROGRAMS

9.1 Groundwater

Section IV.B.2.a.ii of the Consent Order, as implemented under the Laboratory's annual Interim Facility-Wide Groundwater Monitoring Plan, requires monitoring and sampling of all wells that contain alluvial, intermediate, and regional groundwater located in the Starmer/Upper Pajarito Canyon Aggregate Area. No alluvial and intermediate groundwater monitoring wells are located in the aggregate area. Regional monitoring well R-18 is located in Pajarito Canyon in TA-40 (Plate 1). This well is monitored as part of the Interim Facility-Wide Groundwater Monitoring Plan (LANL 2009, 106115).

9.2 Sediment and Surface Water

Sixteen SWMUs and AOCs in the Starmer/Upper Pajarito Canyon Aggregate Area are included in the Laboratory's individual NPDES permit for stormwater discharges from SWMUs and AOCs (individual permit). Stormwater discharges from these sites are monitored at the following surface monitoring areas (SMAs), as specified in the individual permit:

- STRM-SMA-1, STRM-SMA-1.5, STRM-SMA-4.2, and STRM-SMA-5
- PJ-SMA-1, PJ-SMA-2, PJ-SMA-3, PJ-SMA-4, PJ-SMA-5, PJ-SMA-6, PJ-SMA-7, PJ-SMA-8, PJ-SMA-9, PJ-SMA-9.2, PJ-SMA-10, PJ-SMA-11, and PJ-SMA-11.1

These SMAs are used to monitor stormwater discharges from the SWMUs and AOCs in the vicinity.

The following surface water sampling stations are located within reaches in the Starmer/Upper Pajarito Canyon Aggregate Area: E240, E241, E242, and E242.5. The Laboratory periodically monitors these surface water sampling stations (Plate 1).

10.0 SCHEDULE

The original scheduled notice date for NMED to approve this investigation work plan was February 12, 2011. Based on the 45-d extension received by the Laboratory to submit the revised work plan, the new notice date would be March 29, 2011. Preparation for investigation activities is anticipated to begin in September 2011. Fieldwork is expected to begin in January 2012 and be completed in June 2012. A submittal date of no later than December 31, 2012, is proposed for the investigation report.

11.0 REFERENCES AND MAP DATA SOURCES

11.1 Document 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. This information is also included in text citations. ER IDs 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 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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11.2 Map Data Sources

Sampling location- er_location_ids_pnt; Point Feature Locations of the Environmental Restoration Project Database; Los Alamos National Laboratory, Waste and Environmental Services Division, EP2010-0035; 21 January 2010.

SWMU or AOC: er_prs_all_reg, Potential Release Sites; Los Alamos National Laboratory, Waste and Environmental Services Division, Environmental Data and Analysis Group, EP2009-0633; 1:2,500 Scale Data; 25 January 2010.

Structure or Building: ksl_structures_ply; Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

Fence: ksl_fences_arc; Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

Paved road: ksl_paved_rds_arc; Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

Dirt road: ksl_dirt_rds_arc; Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

Storm drain: ksl_stormdrn_arc; Storm Drain Line Distribution System; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

Contours: lanl_contour1991_; Hypsography, 2, 10, 20, 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.

Communication: ksl_comm_arc; Communication Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 08 August 2002; as published 28 May 2009.

Electric: ksl_electric_arc; Primary Electric Grid; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

Gas: ksl_gas_arc; Primary Gas Distribution Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

Industrial waste: wfm_indstrl_waste_arc; Primary Industrial Waste Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 15 January 2009.

Sewer: ksl_sewer_arc; Sewer Line System; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

Steam: ksl_steam_arc; Steam Line Distribution System; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

Water: ksl_water_arc; Water Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

(inset)LANL Boundary: plan_ownerclip_reg; Ownership Boundaries around LANL Area; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; 19 September 2007; as published 04 December 2008.

(Inset)ROADS: lac_streets_arc; Streets; County of Los Alamos, Information Services; as published 16 May 2006.

Landscape: ksl_landscape_arc; Primary Landscape Features; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

Former structures: frmr_structures_ply; Former Structures of the Los Alamos Site; Los Alamos National Laboratory, Waste and Environmental Services Division, EP2008-0441; 1:2,500 Scale Data; 08 August 2008.

Technical area boundary: plan_tecareas_ply; Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 04 December 2008.

Inactive Outfall: wqh_inact_outfalls_pnt; WQH Inactive Outfalls; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; Edition 2002.01; 01 September 2003.

NPDES Outfalls: wqh_npdes_outfalls_pnt: WQH NPDES Outfalls; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; Edition 2002.01; 01 September 2003.

Outfalls: er_outfalls_pnt: Outfalls; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; Unknown publication date.

Monitoring wells: Environmental Surveillance at Los Alamos During 2006, Groundwater monitoring; LANL Report LA-14341-ENV, September 2007.

Supply Wells: Locations of Monitoring and Supply Wells at Los Alamos National Laboratory, Table A-2, 2009 General Facility Information; LANL Report LA-UR-09-1341; March 2009.

Drainage: wqh_drainage_arc: WQH Drainage_arc; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003.

Aggregate Area: er_agg_areas_ply: Aggregate Areas; Los Alamos National Laboratory, ENV Environmental Remediation & Surveillance Program, ER2005-0496; 1:2,500 Scale Data; 22 September 2005.

Canyon Reaches: er_reaches_ply: Canyon Reaches; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program, ER2002-0592; 1:24,000 Scale Data; Unknown publication date.

Springs: er_springs_pnt: Locations of Springs; Los Alamos National Laboratory, Waste and Environmental Services Division in cooperation with the New Mexico Environment Department, Department of Energy Oversight Bureau, EP2008-0138; 1:2,500 Scale Data; 17 March 2008.

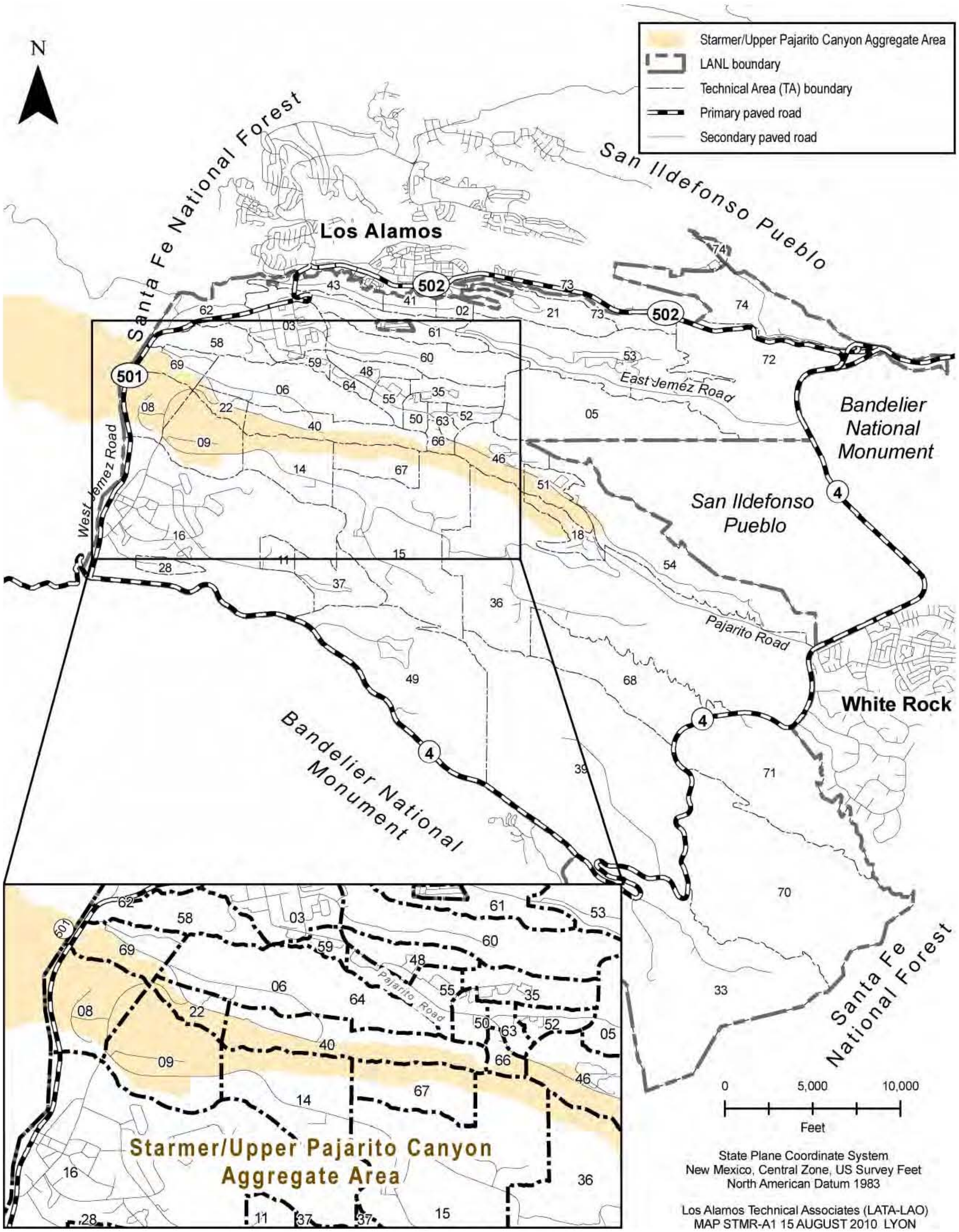


Figure 1.0-1 Location of Starmer/Upper Pajarito Canyon Aggregate Area with respect to Laboratory technical areas

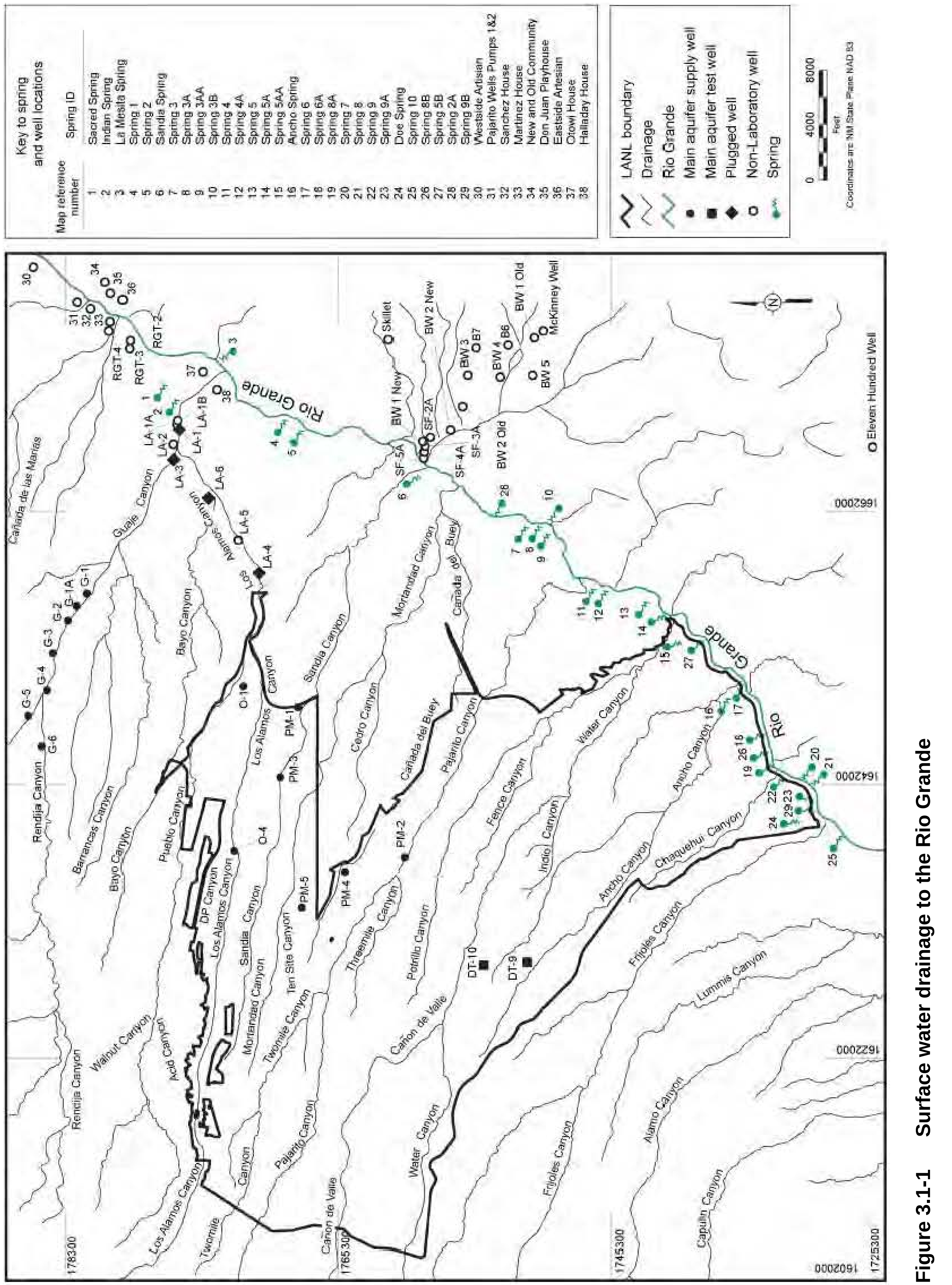


Figure 3.1-1 Surface water drainage to the Rio Grande

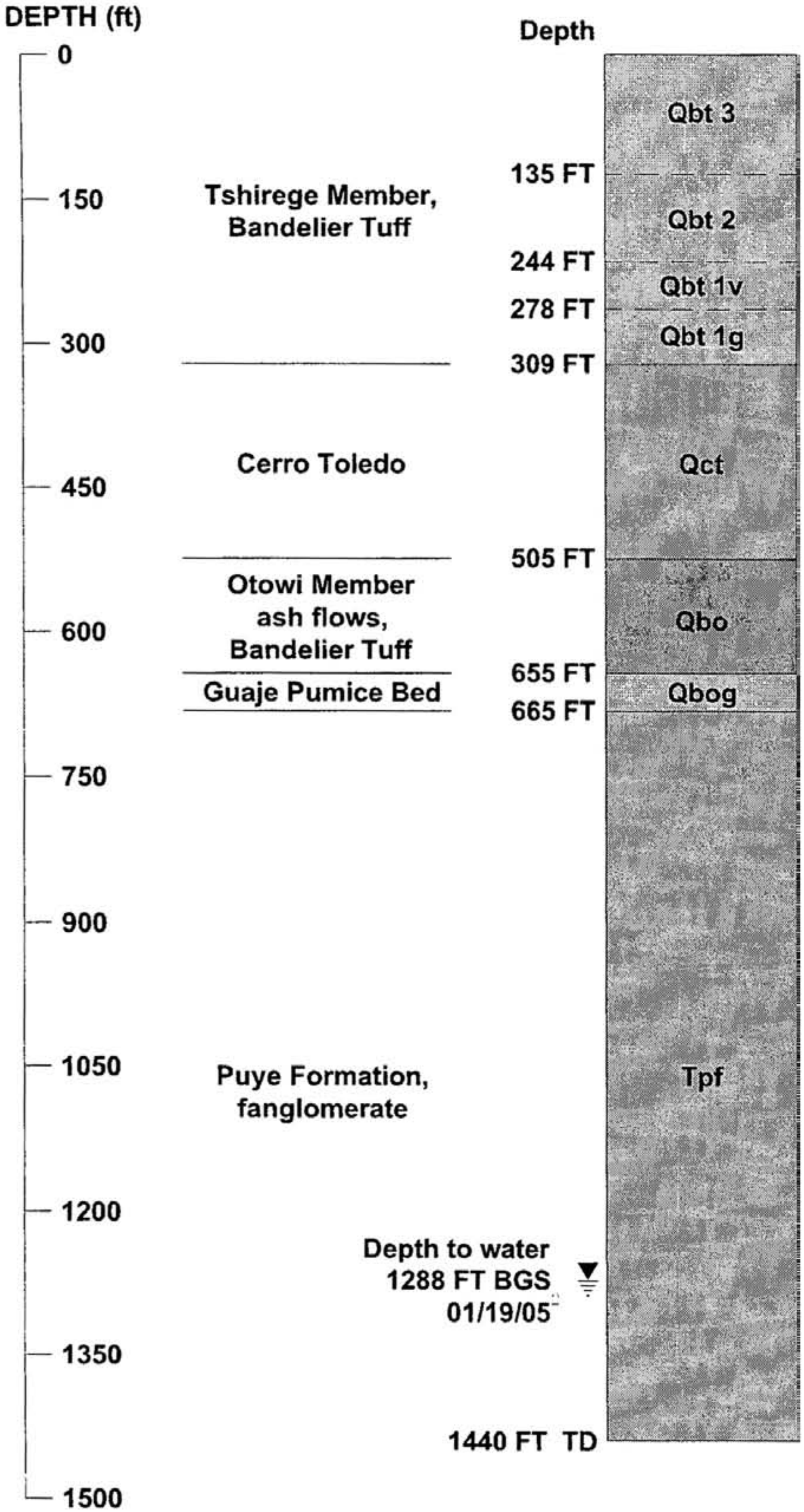
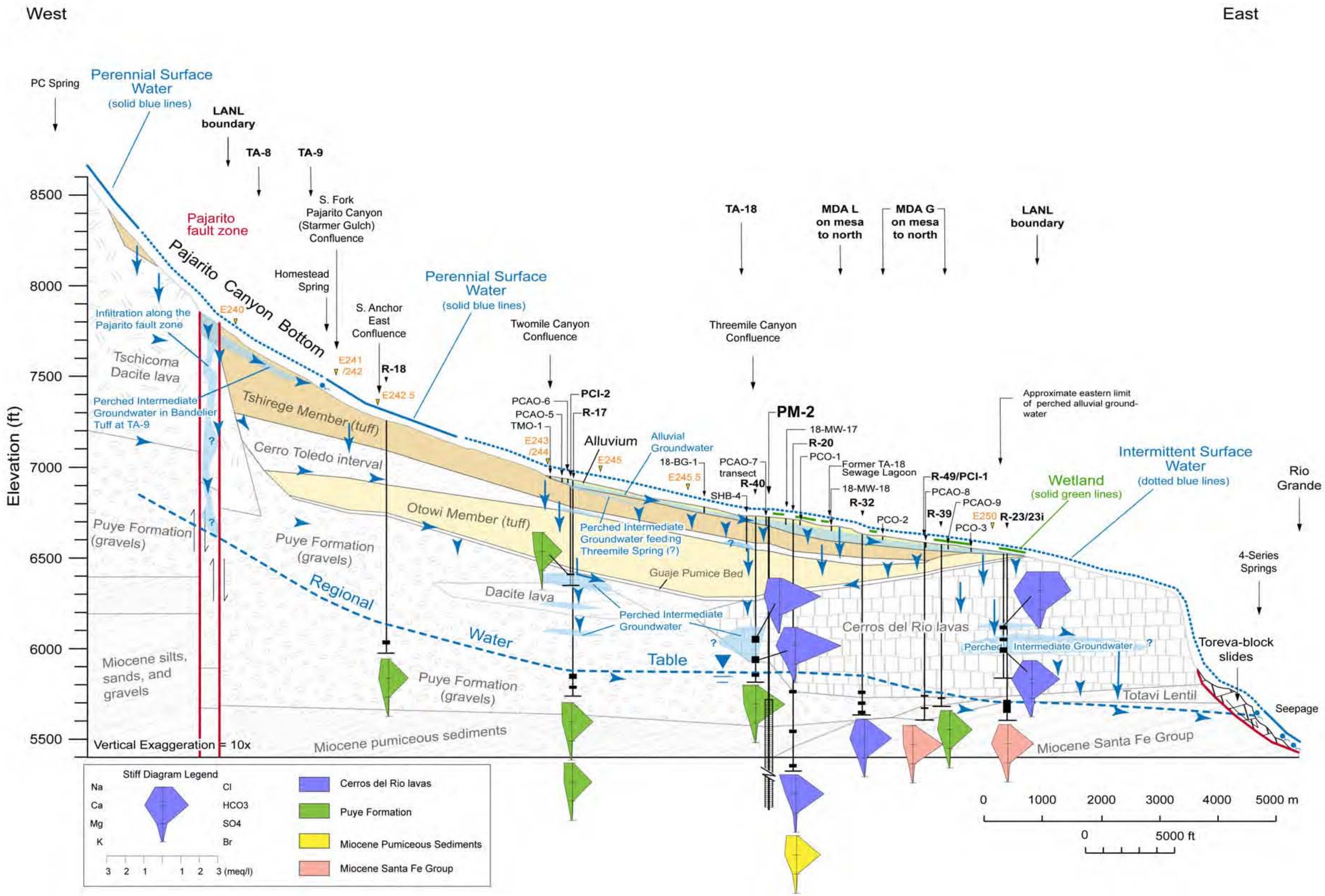


Figure 3.2-1 Stratigraphy of geologic units in regional well R-18 (located in TA-40)



Note: Line of section follows the canyon stream channel from the canyon headwaters to the Rio Grande. Potential groundwater pathways are shown with blue arrows. Wells on the line of section are shown by solid vertical lines with total depth of well shown by a short horizontal line. Well screens shown as black rectangles. (LANL 2009, 106939, p. 143).

Figure 3.2-2 Conceptual hydrogeologic cross-section for Pajarito Canyon

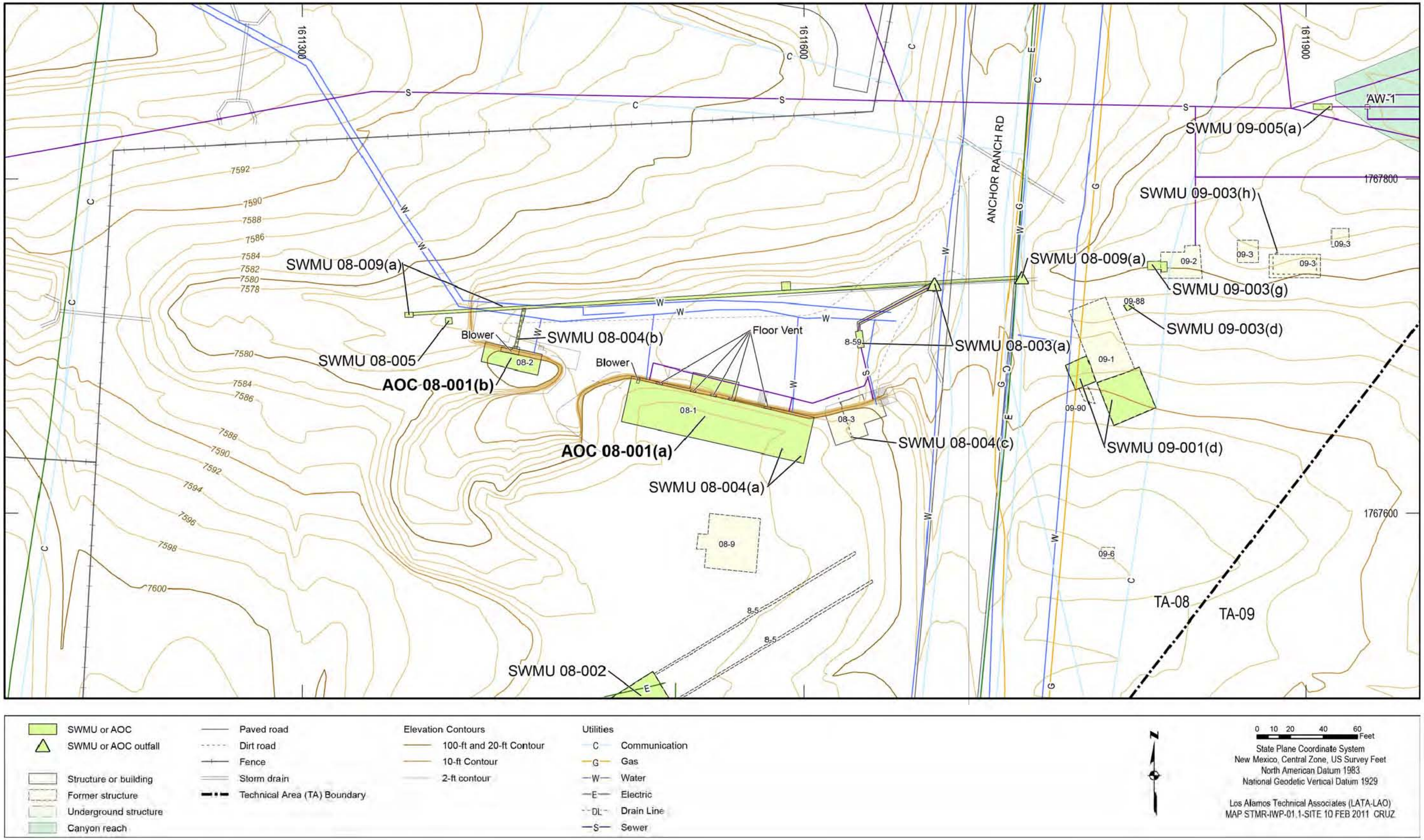


Figure 4.1-1 Site features of AOCs 08-001(a) and 08-001(b)

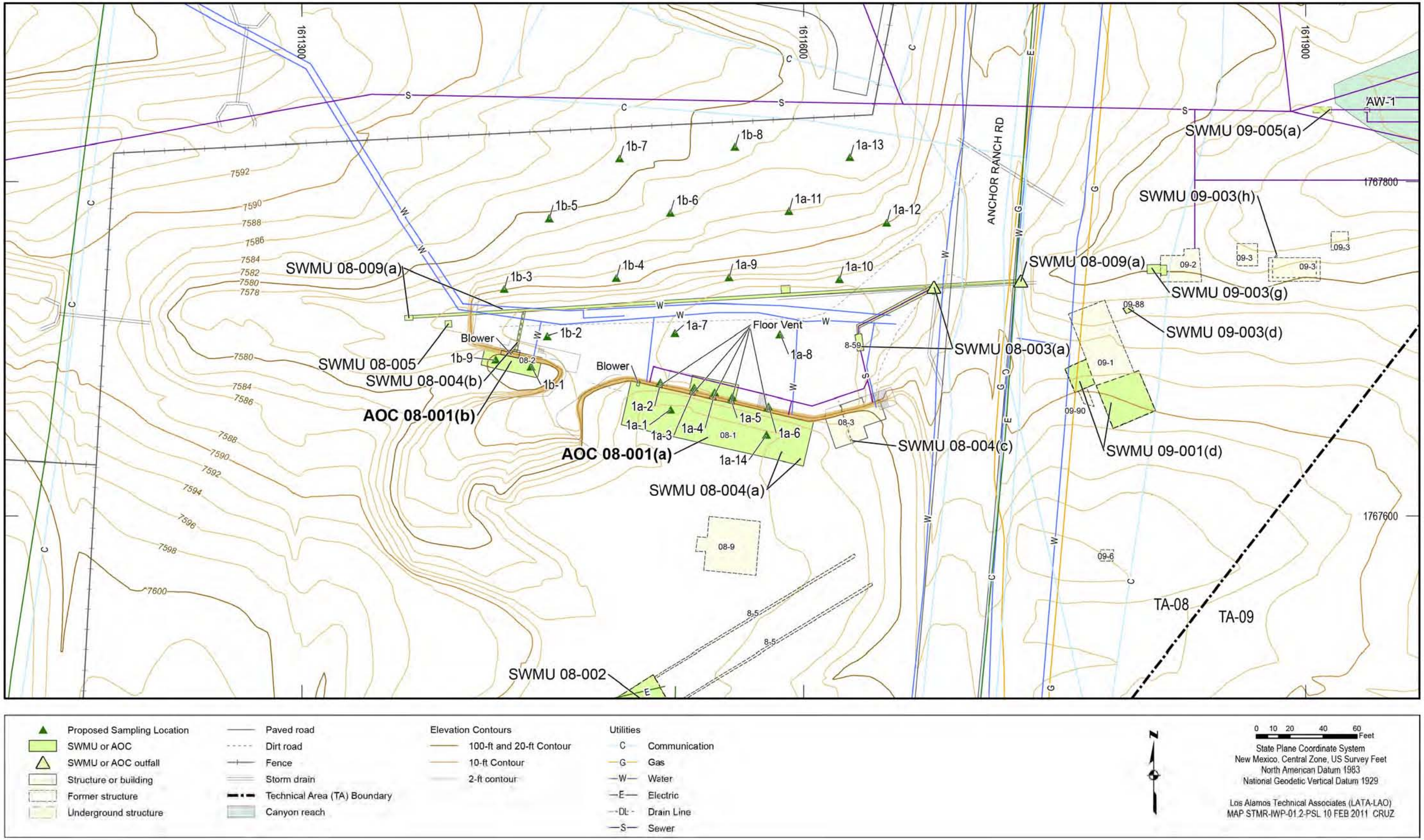


Figure 4.1-2 Proposed sampling locations for AOCs 08-001(a) and 08-001(b)

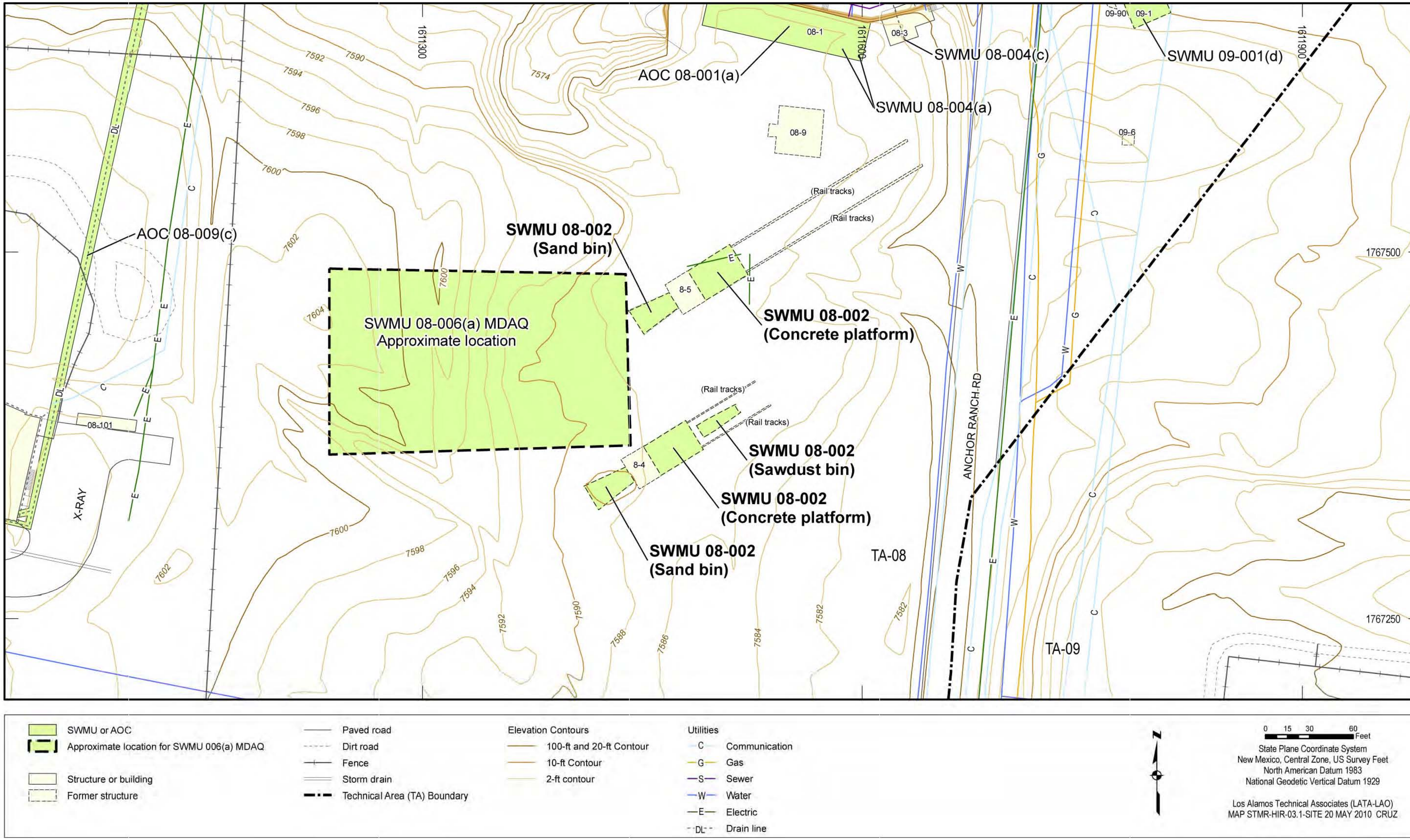


Figure 4.3-1 Site features of SWMU 08-002

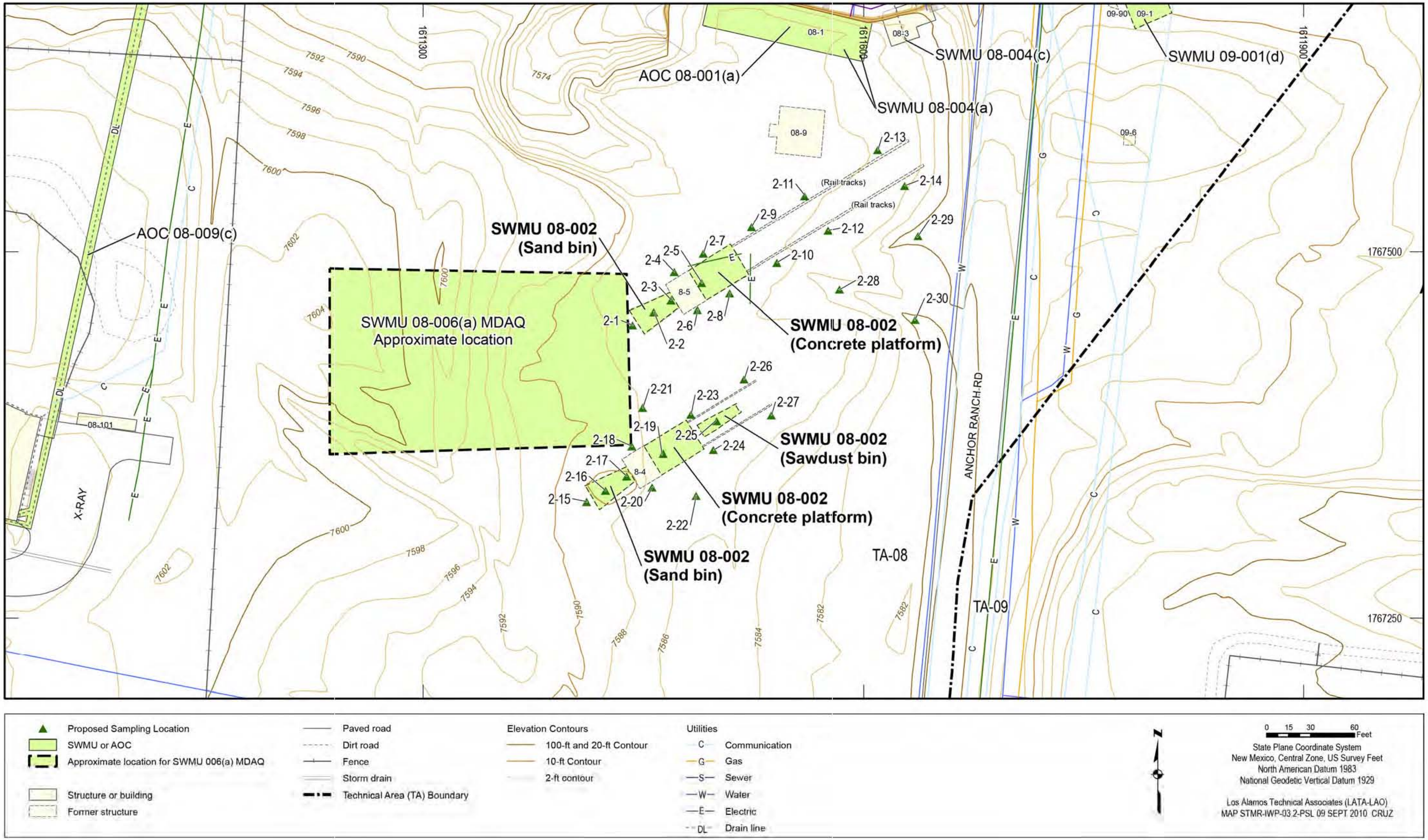


Figure 4.3-2 Proposed sampling locations for SWMU 08-002

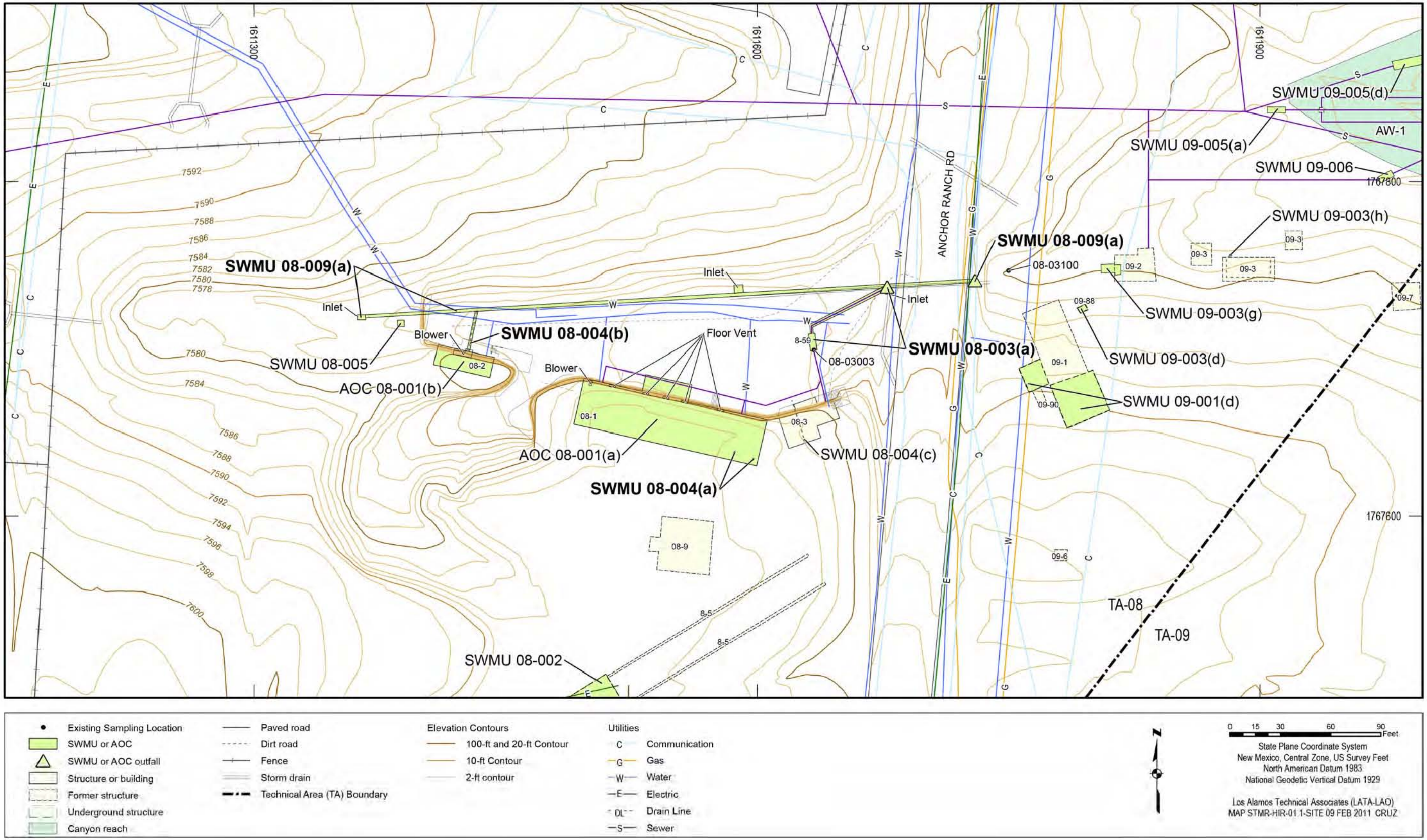


Figure 4.4-1 Site features of Consolidated Unit 08-003(a)-00 [SWMUs 08-003(a), 08-004(a), 08-004(b), and 08-009(a)]

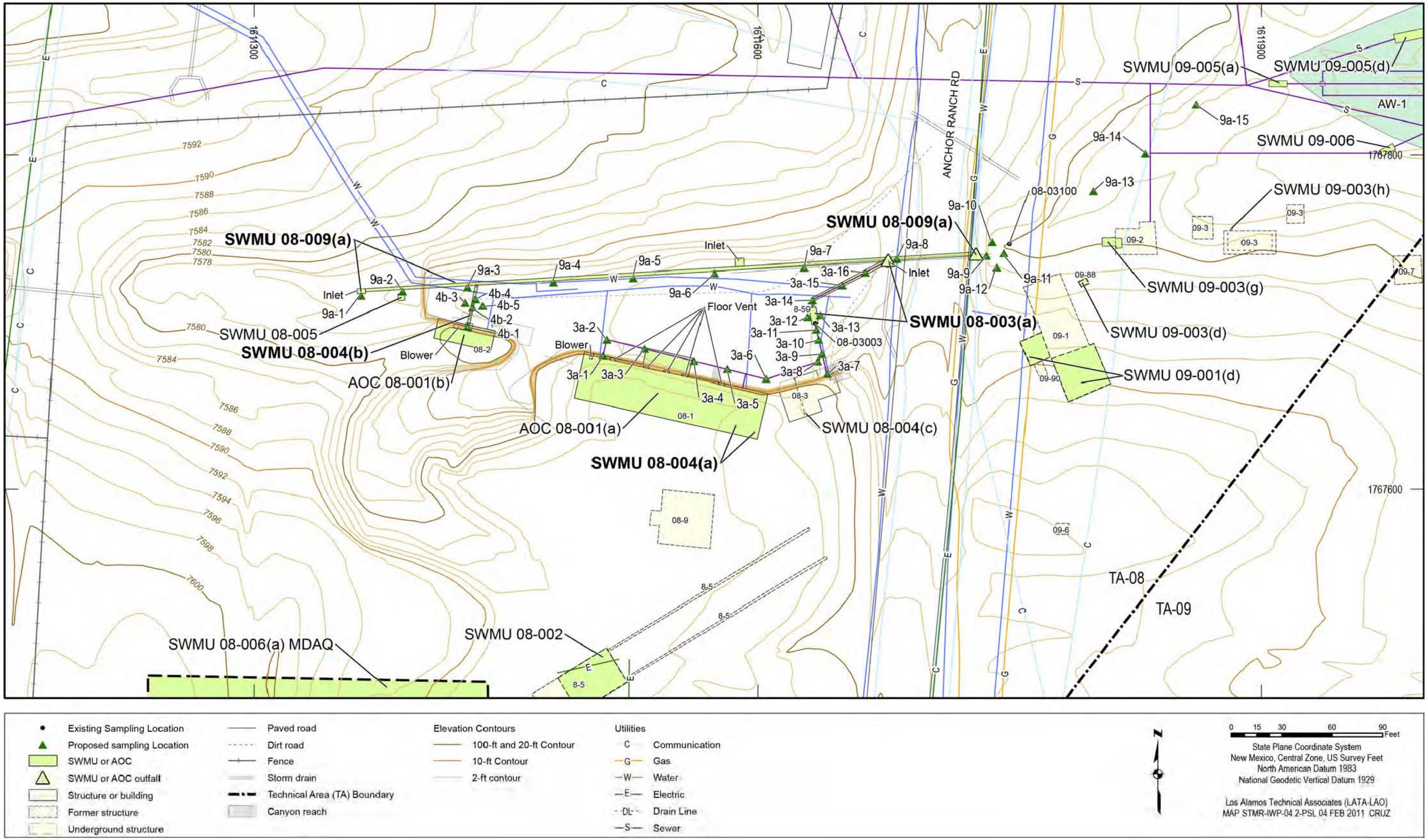


Figure 4.4-2 Proposed sampling locations for Consolidated Unit 08-003(a)-00 [SWMUs 08-003(a), 08-004(a), 08-004(b), and 08-009(a)]

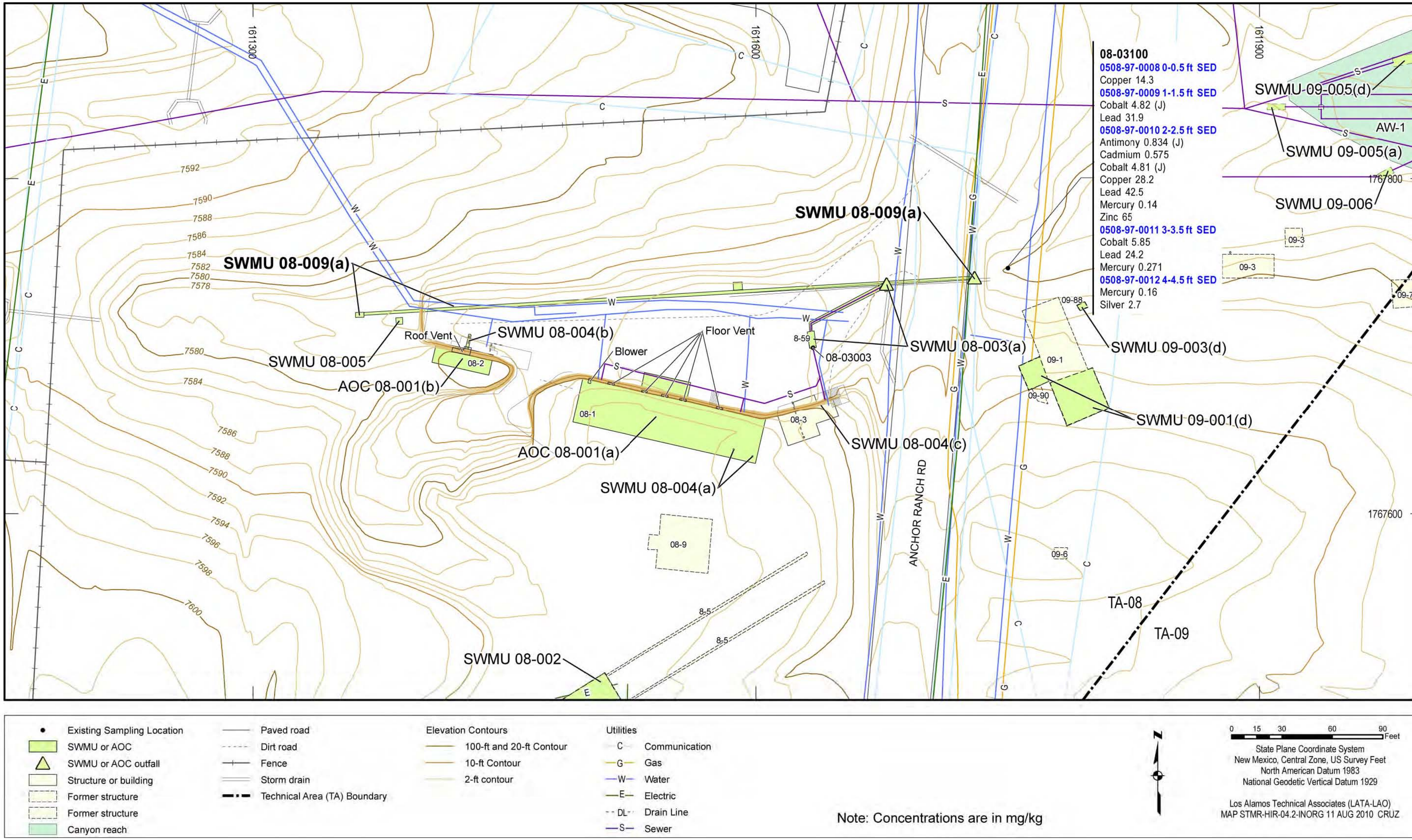


Figure 4.4-3 Inorganic chemicals detected above BVs at SWMU 08-009(a)

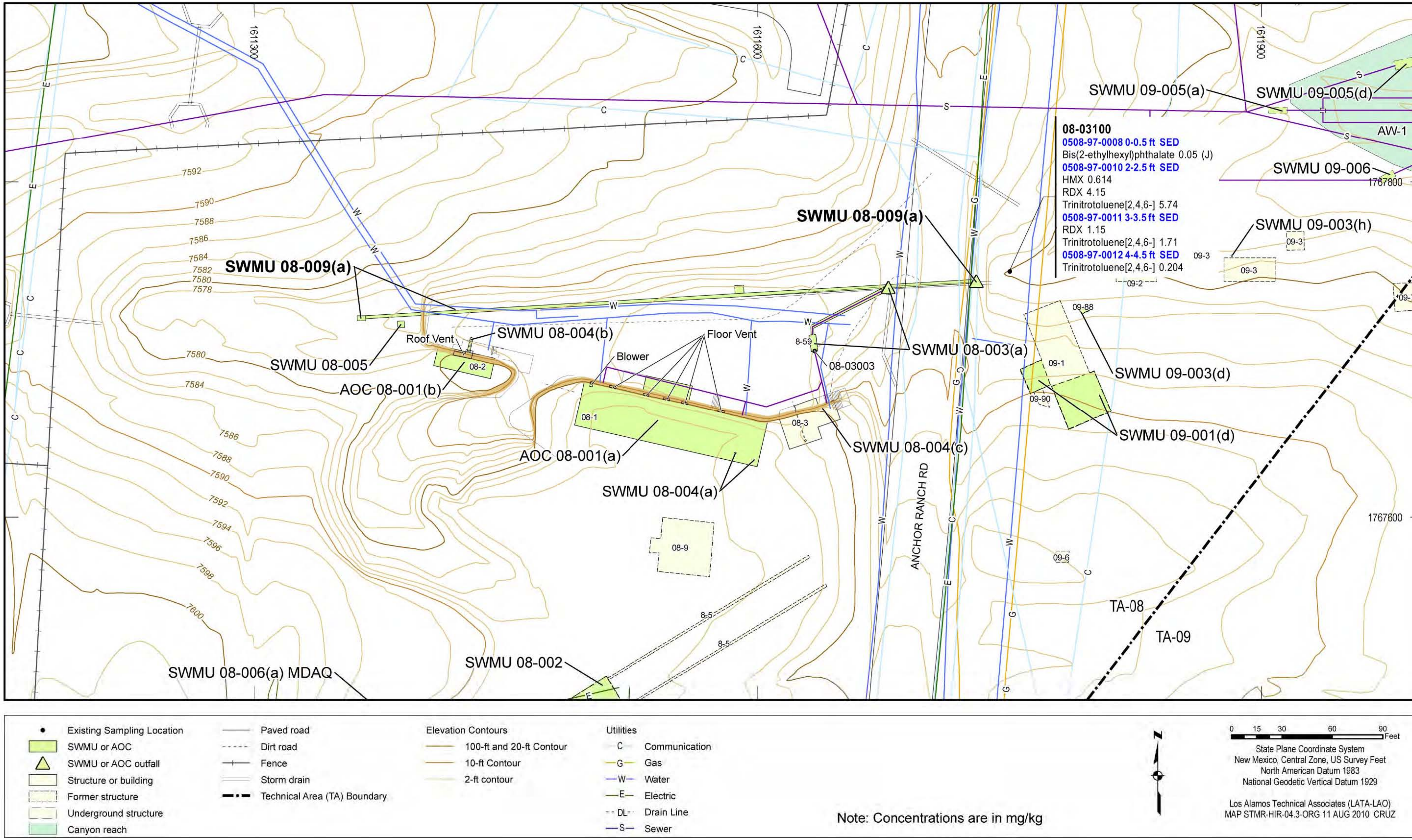


Figure 4.4-4 Organic chemicals detected at SWMU 08-009(a)

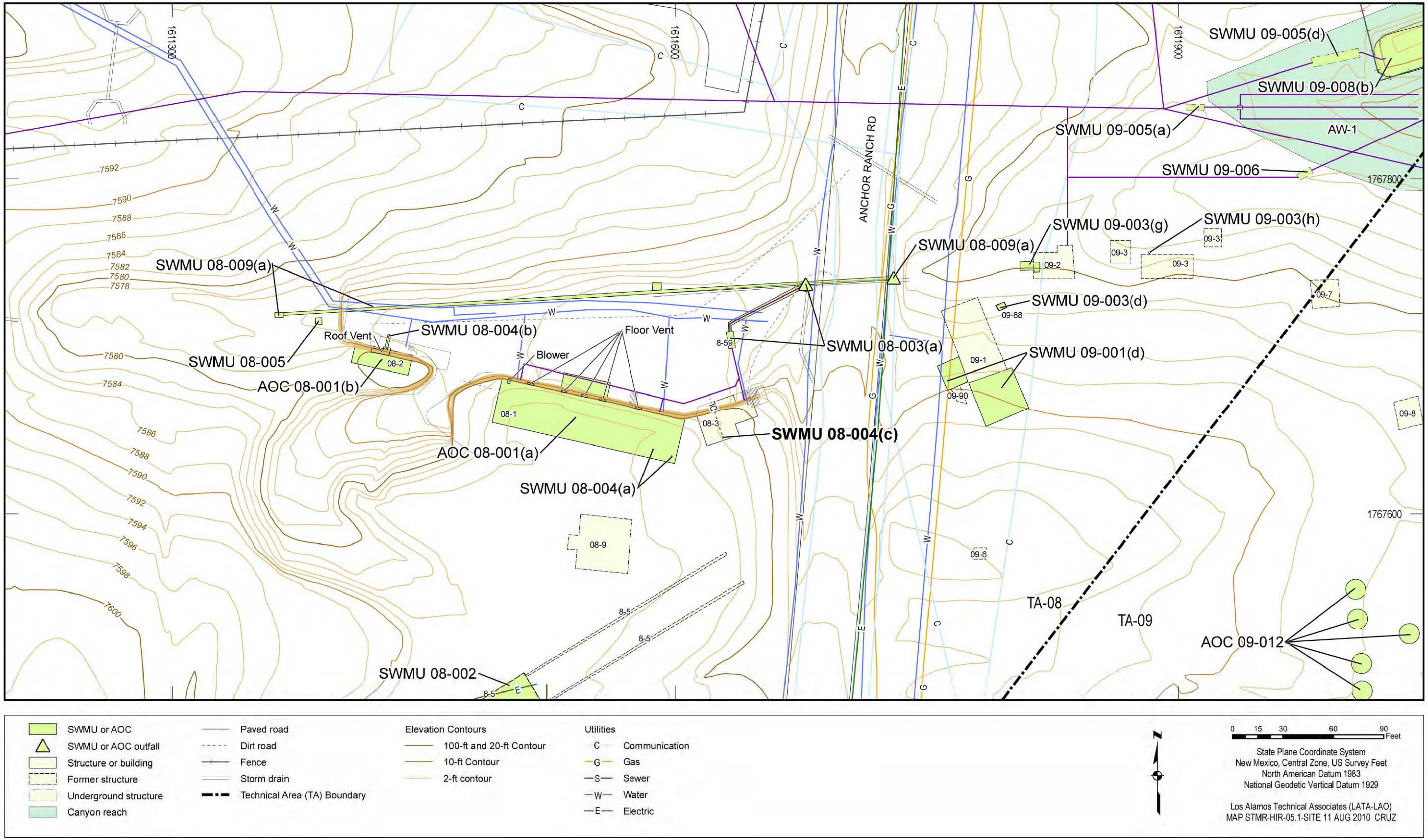
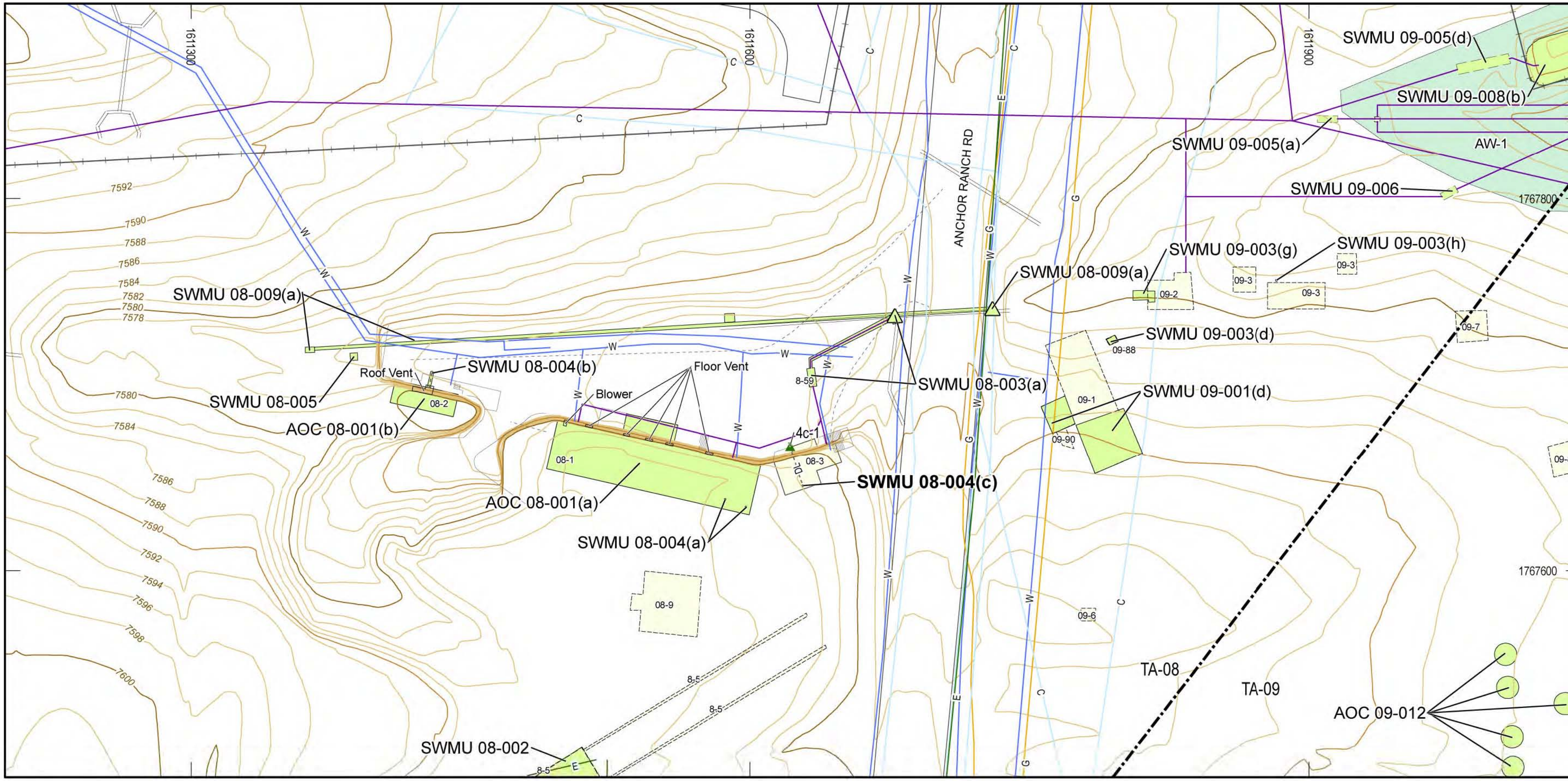


Figure 4.5-1 Site features of SWMU 08-004(c)



▲ Proposed Sampling Location	Paved road	Elevation Contours	Utilities		
SWMU or AOC	Dirt road	100-ft and 20-ft Contour	C Communication		
SWMU or AOC outfall	Fence	10-ft Contour	G Gas		
Structure or building	Storm drain	2-ft contour	S Sewer		
Former structure	Technical Area (TA) Boundary		W Water		
Underground structure	Canyon reach		E Electric		

0 15 30 60 90 Feet

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

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Figure 4.5-2 Proposed sampling locations for SWMU 08-004(c)

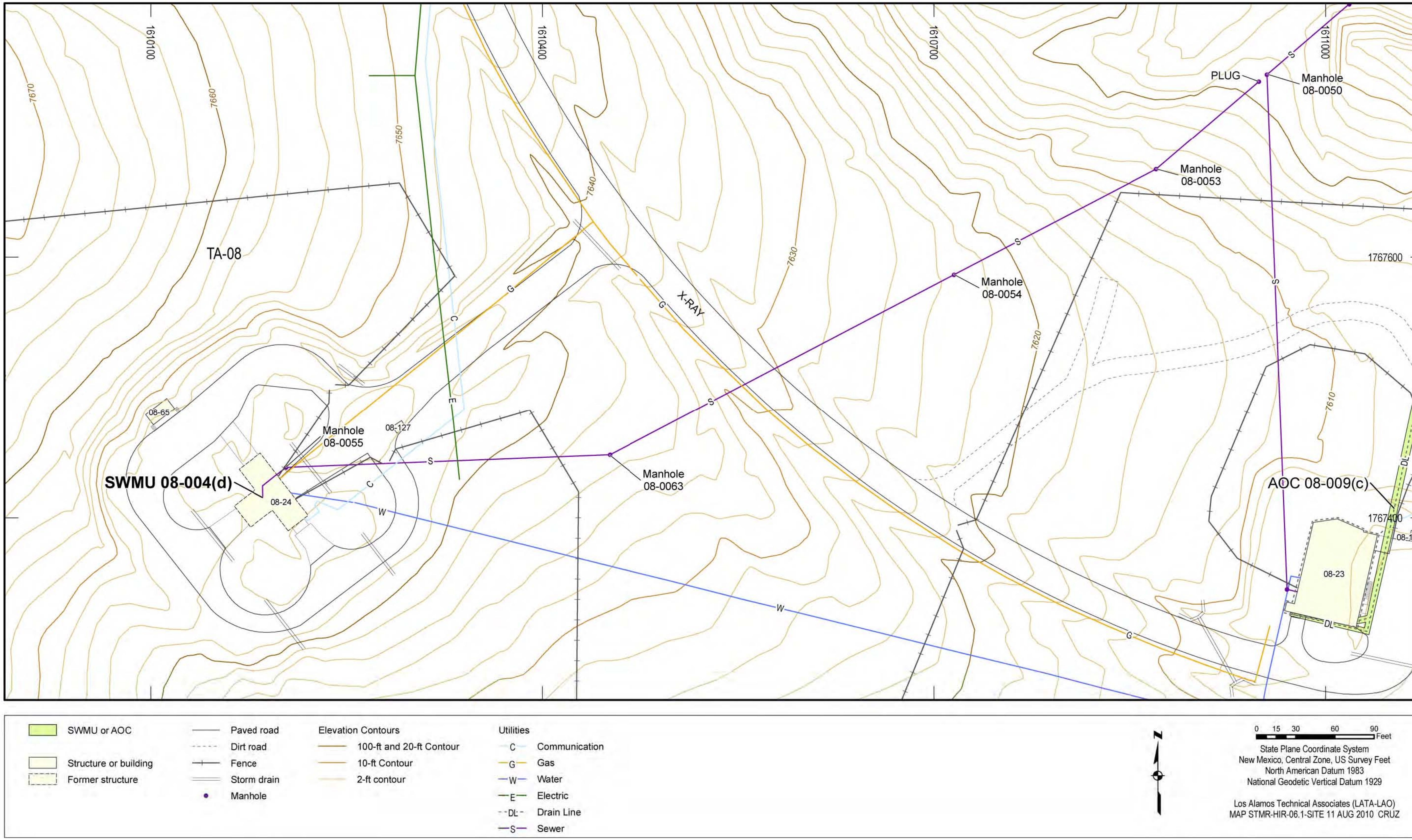


Figure 4.6-1 Site features of SWMU 08-004(d)

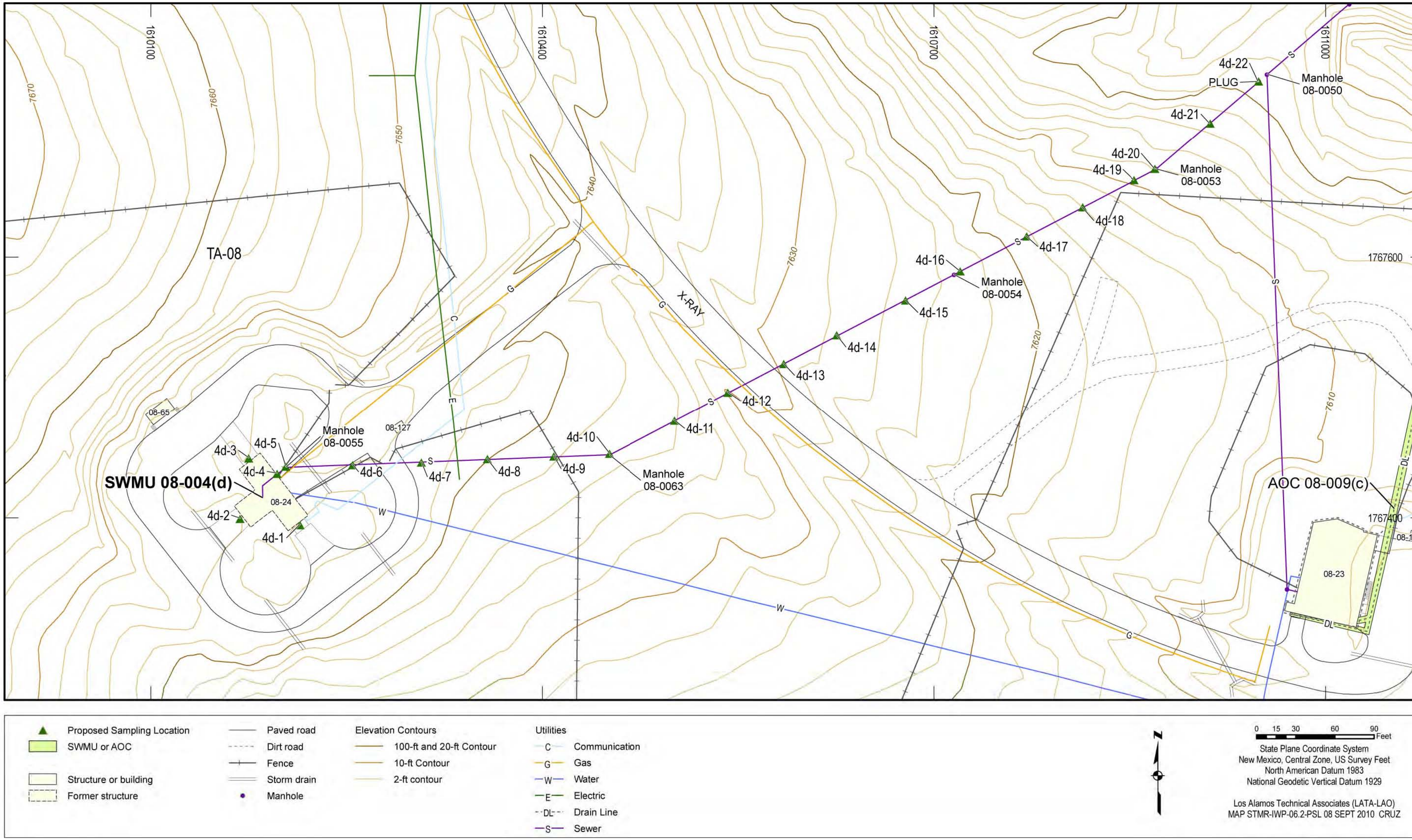


Figure 4.6-2 Proposed sampling locations for SWMU 08-004(d)

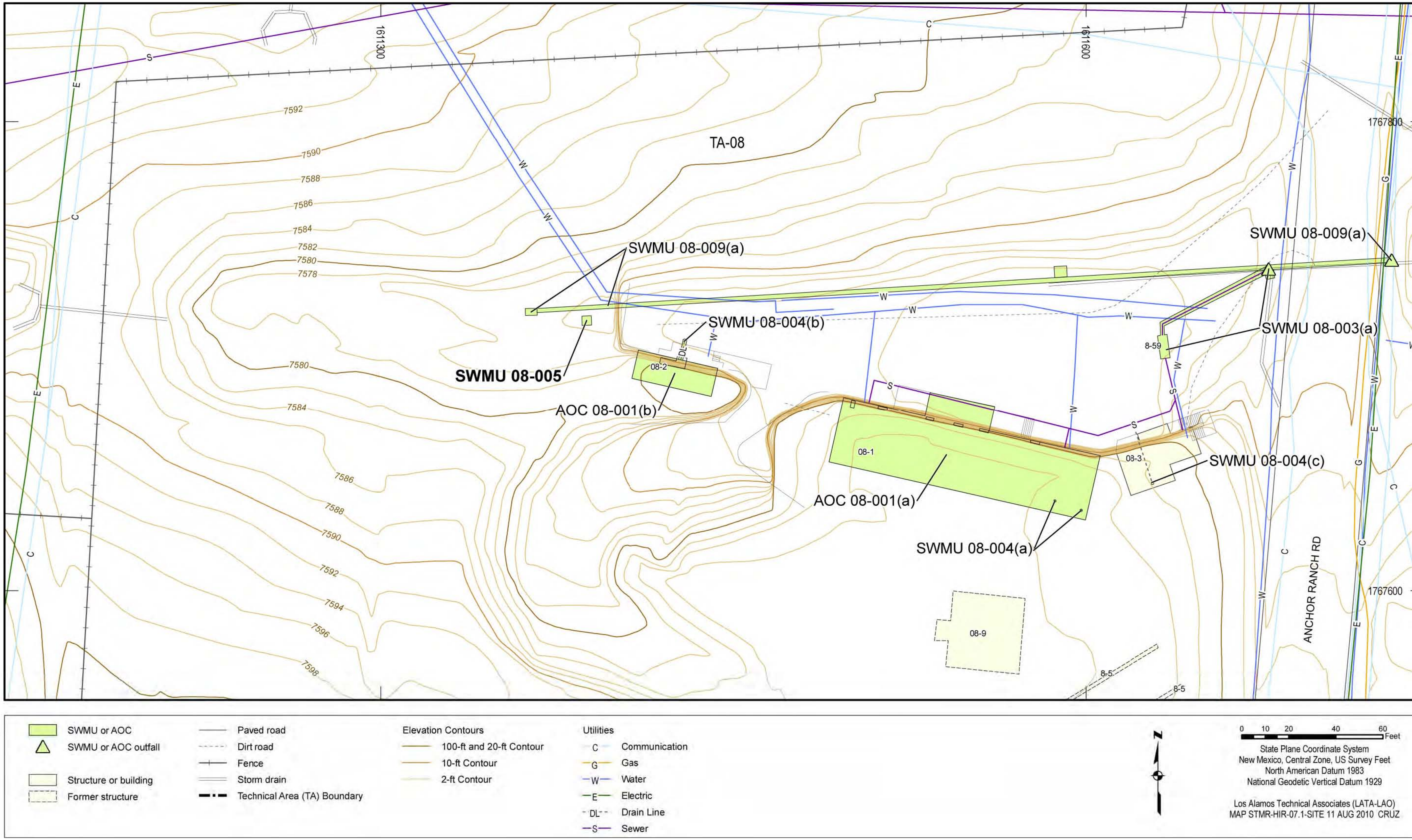


Figure 4.7-1 Site features of SWMU 08-005

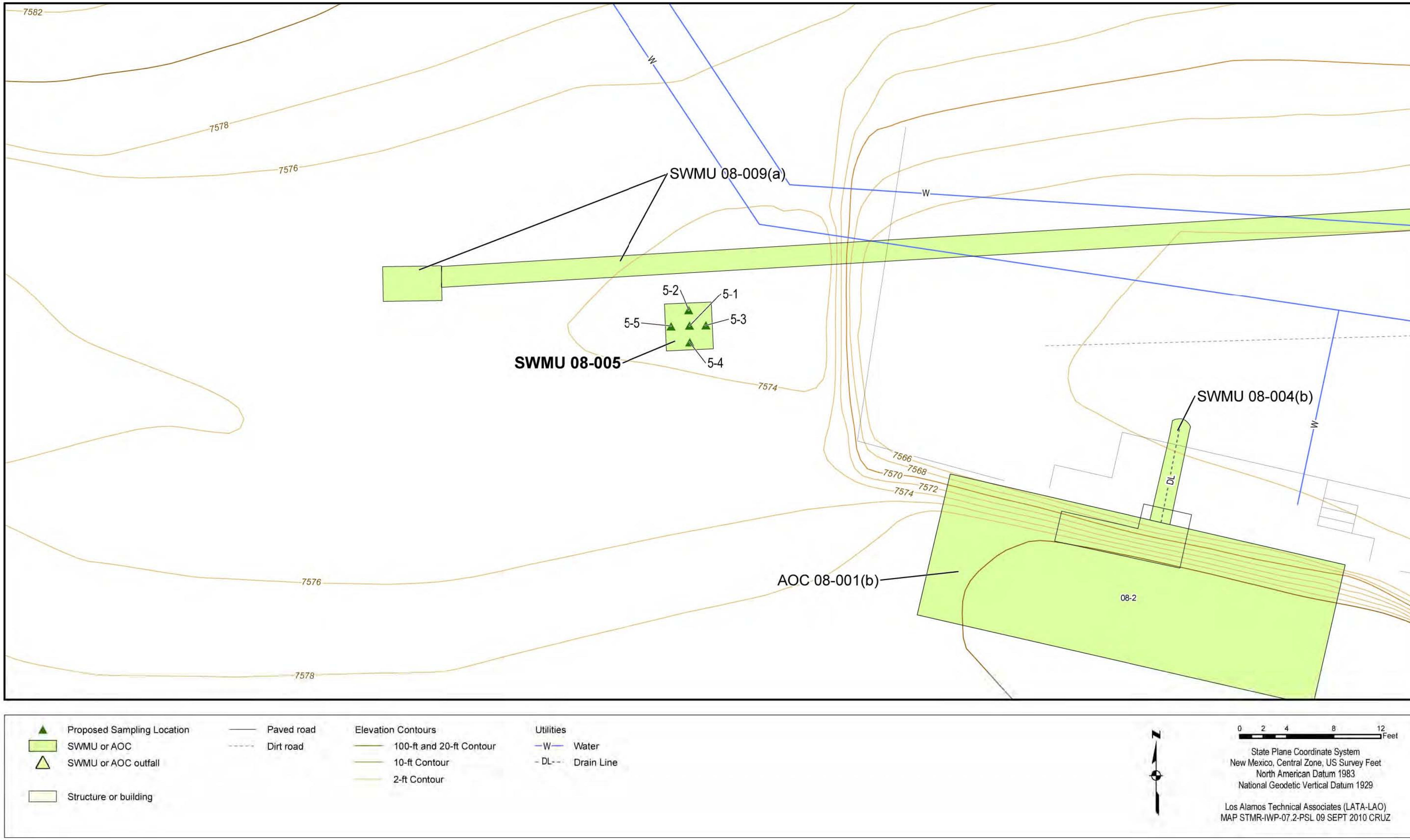


Figure 4.7-2 Proposed sampling locations for SWMU 08-005

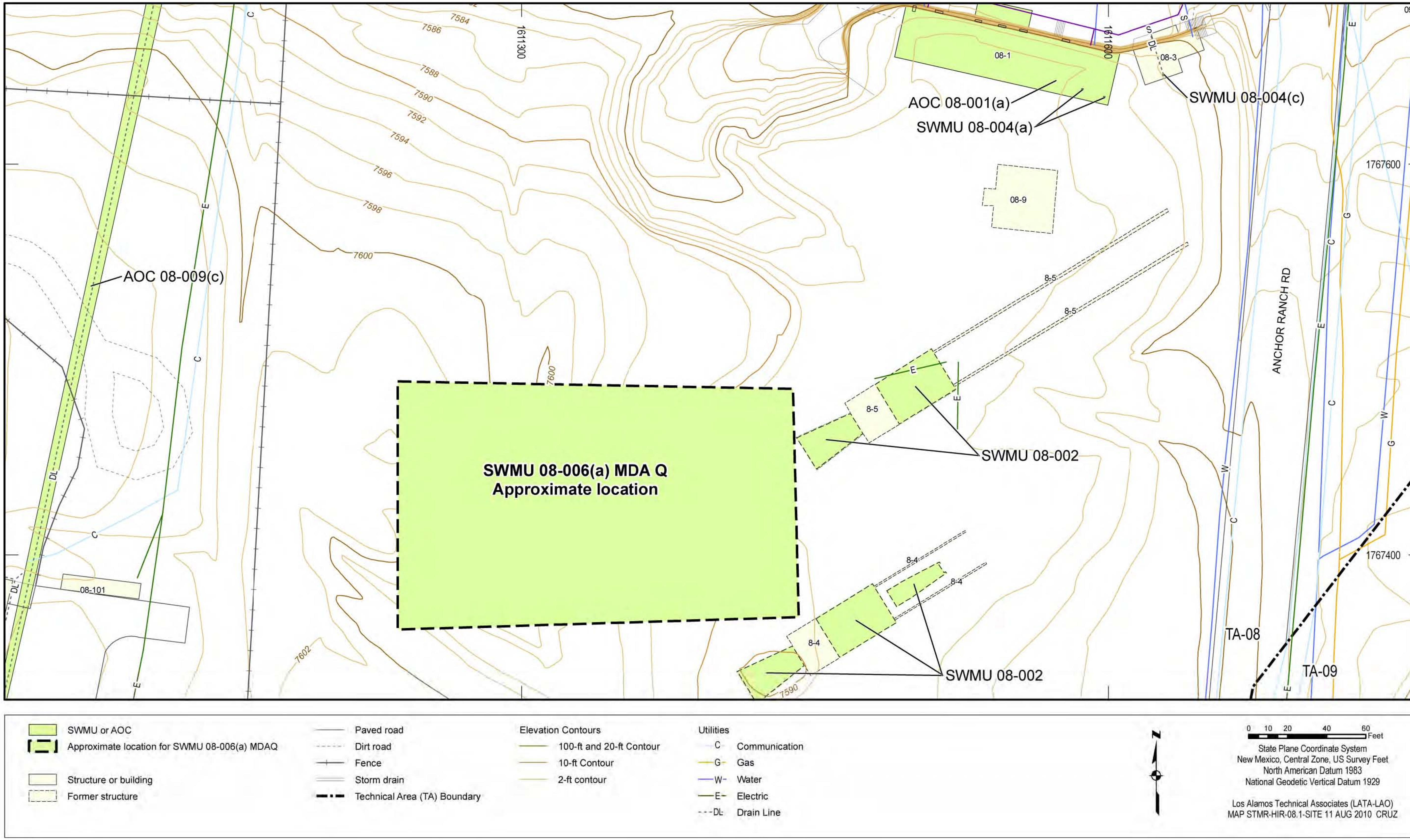


Figure 4.8-1 Site features of SWMU 08-006(a)

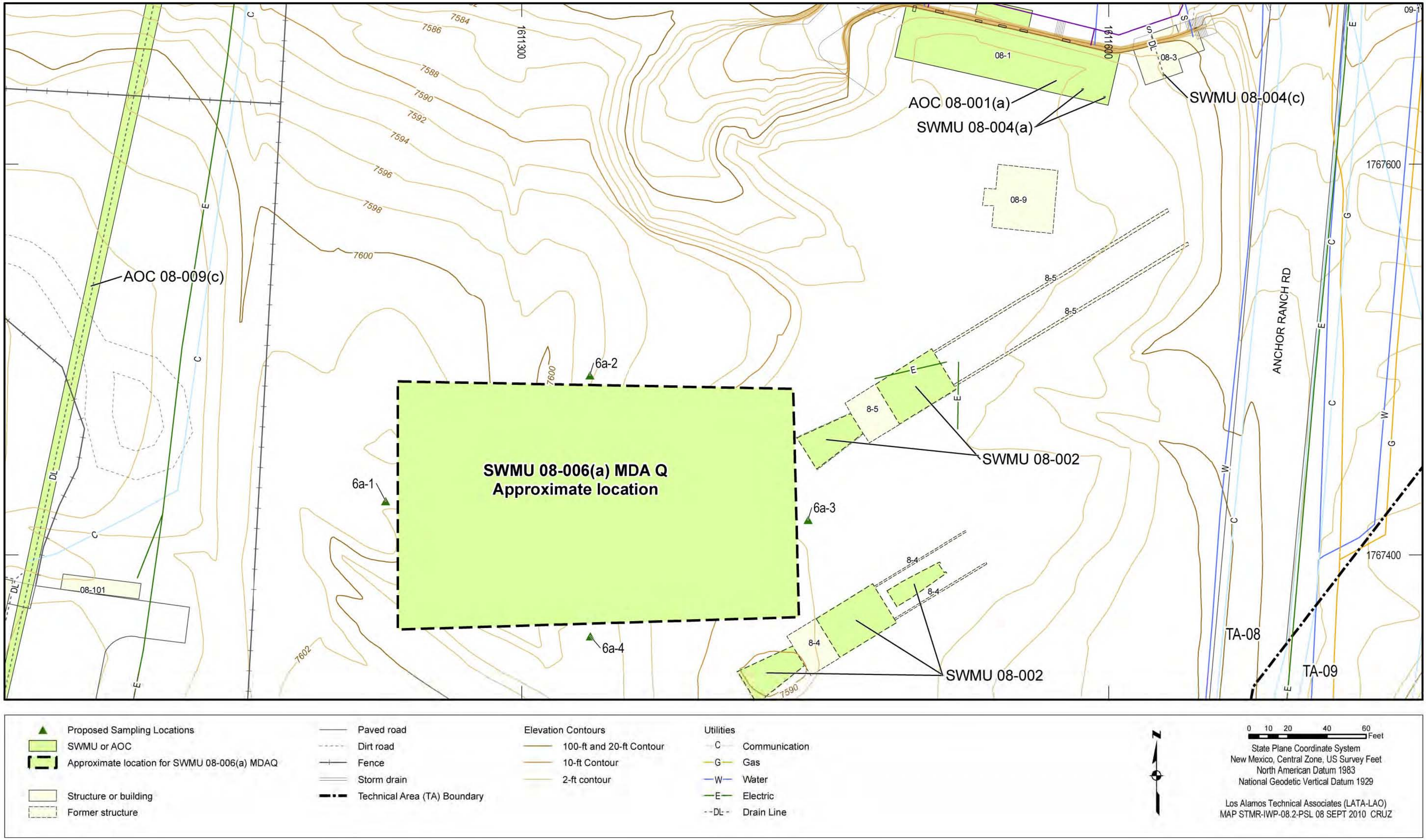


Figure 4.8-2 Proposed sampling locations for SWMU 08-006(a)

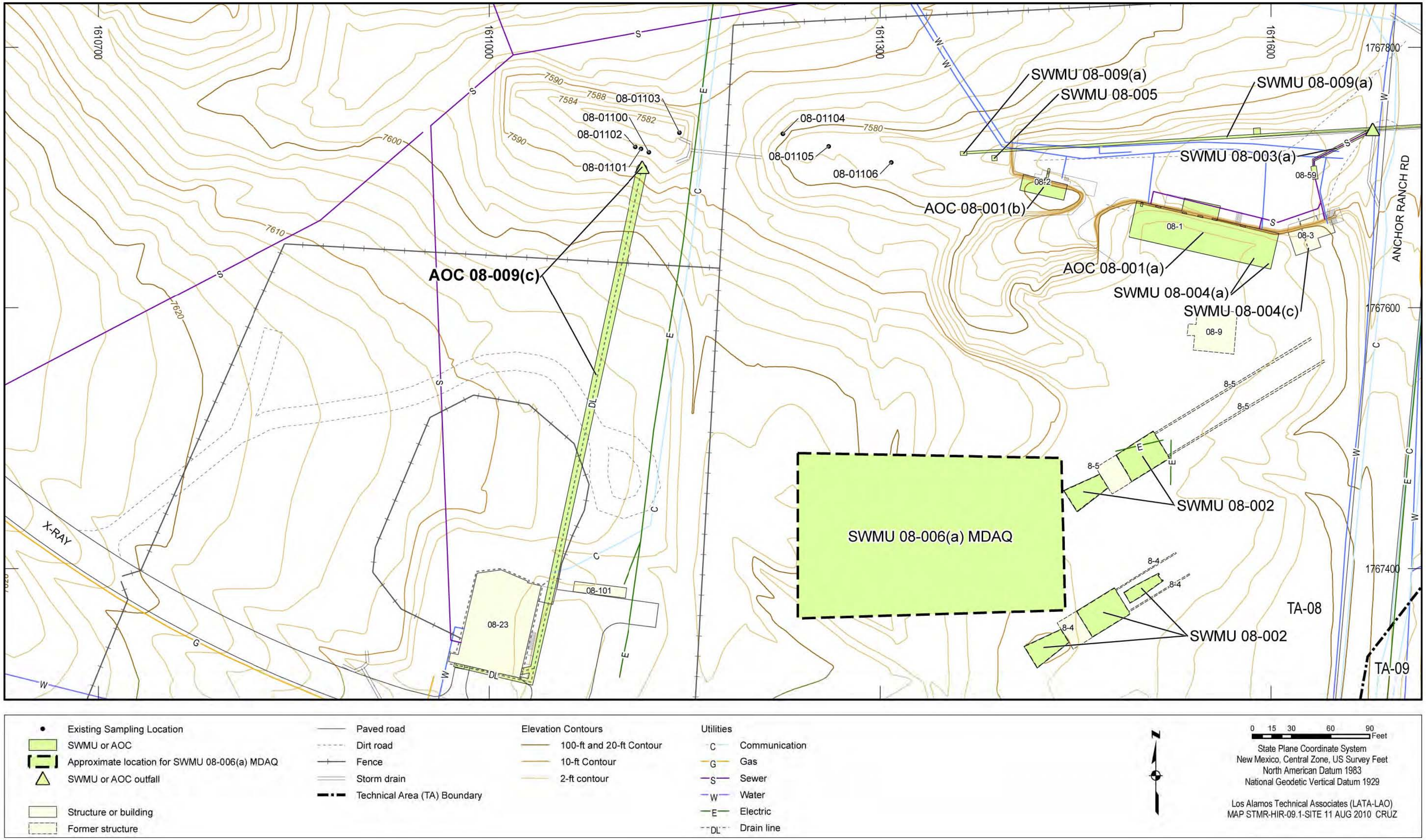


Figure 4.9-1 Site features of AOC 08-009(c)

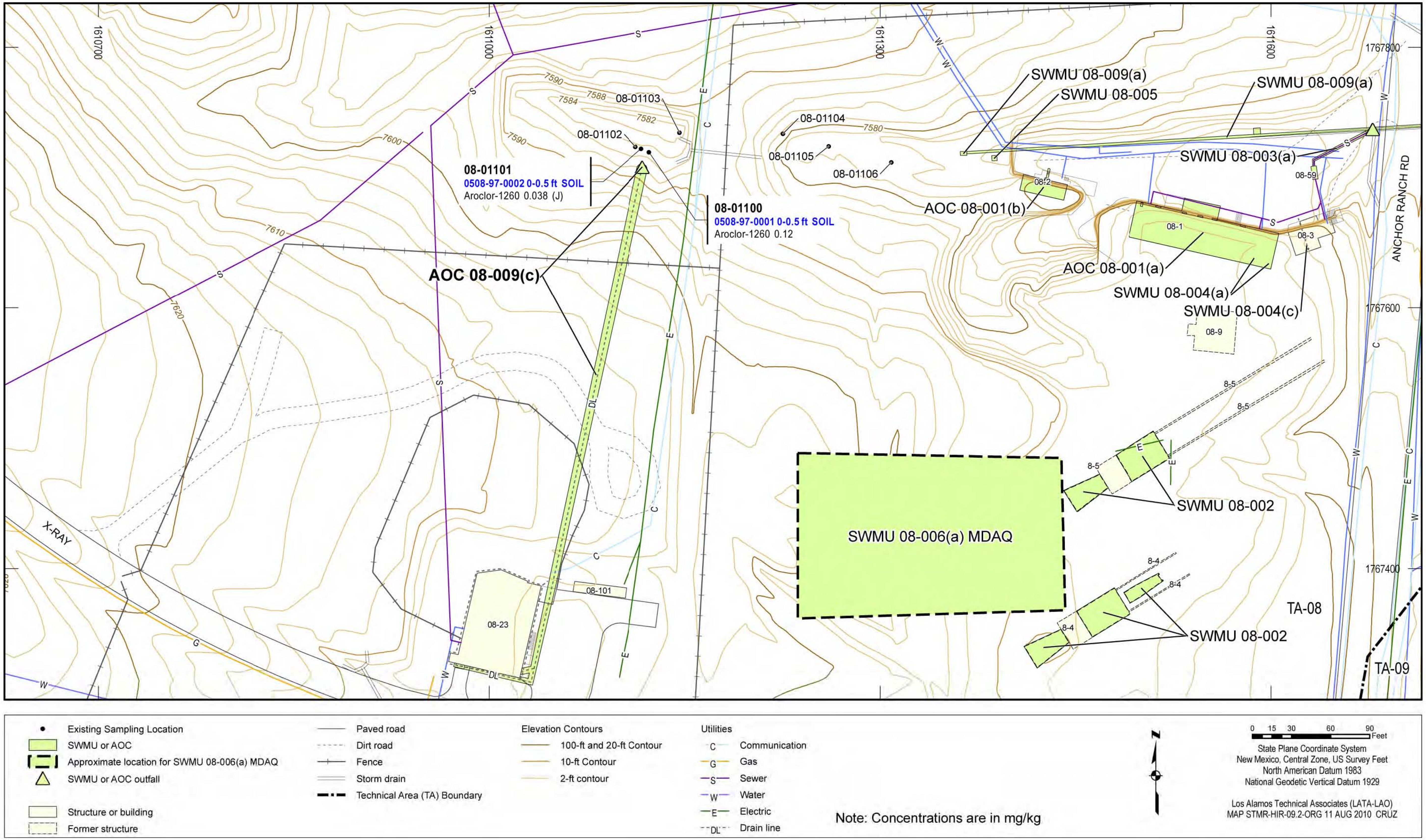


Figure 4.9-2 Organic chemicals detected at AOC 08-009(c)

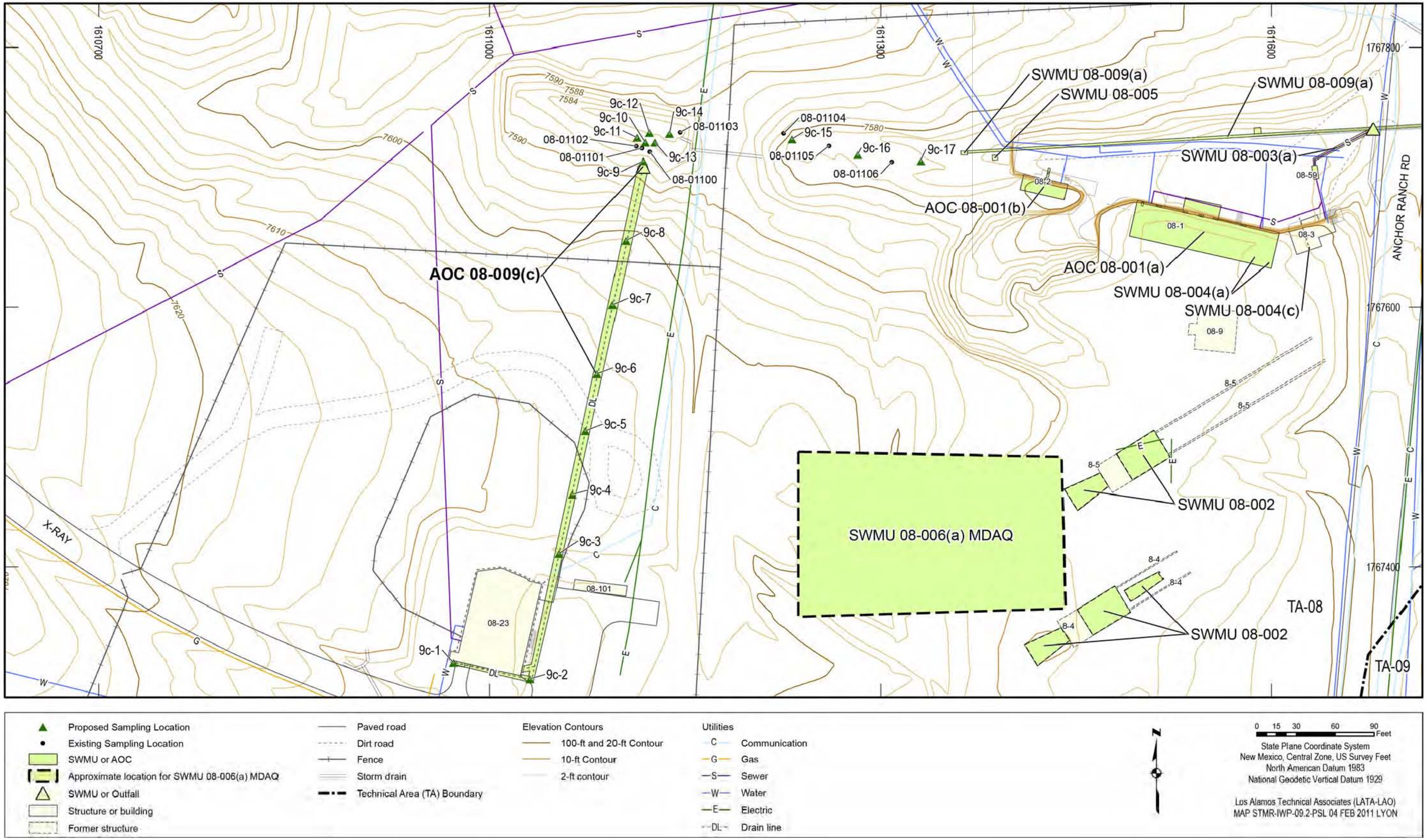


Figure 4.9-3 Proposed sampling locations for AOC 08-009(c)

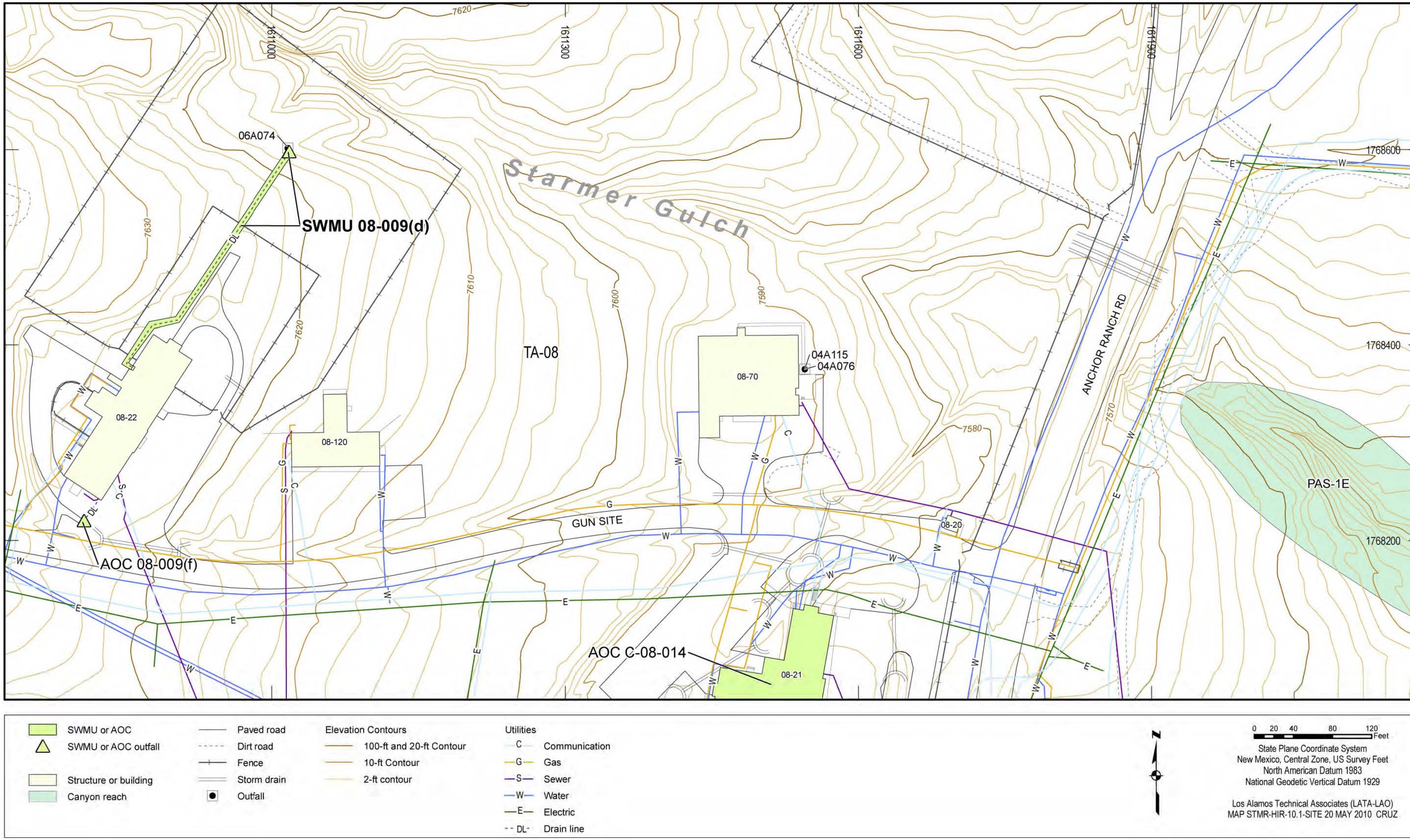


Figure 4.10-1 Site features of SWMU 08-009(d)

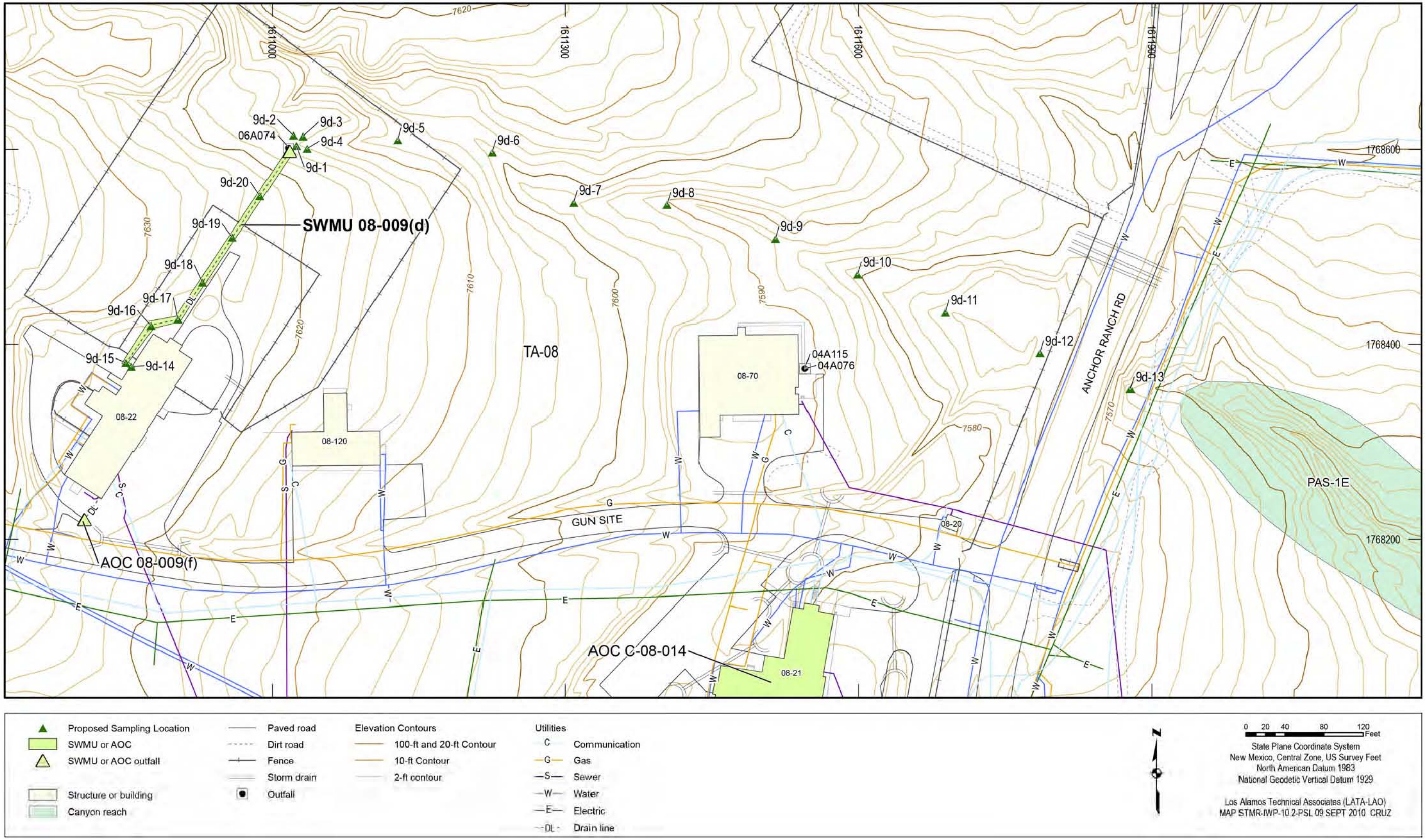


Figure 4.10-2 Proposed sampling locations for SWMU 08-009(d)

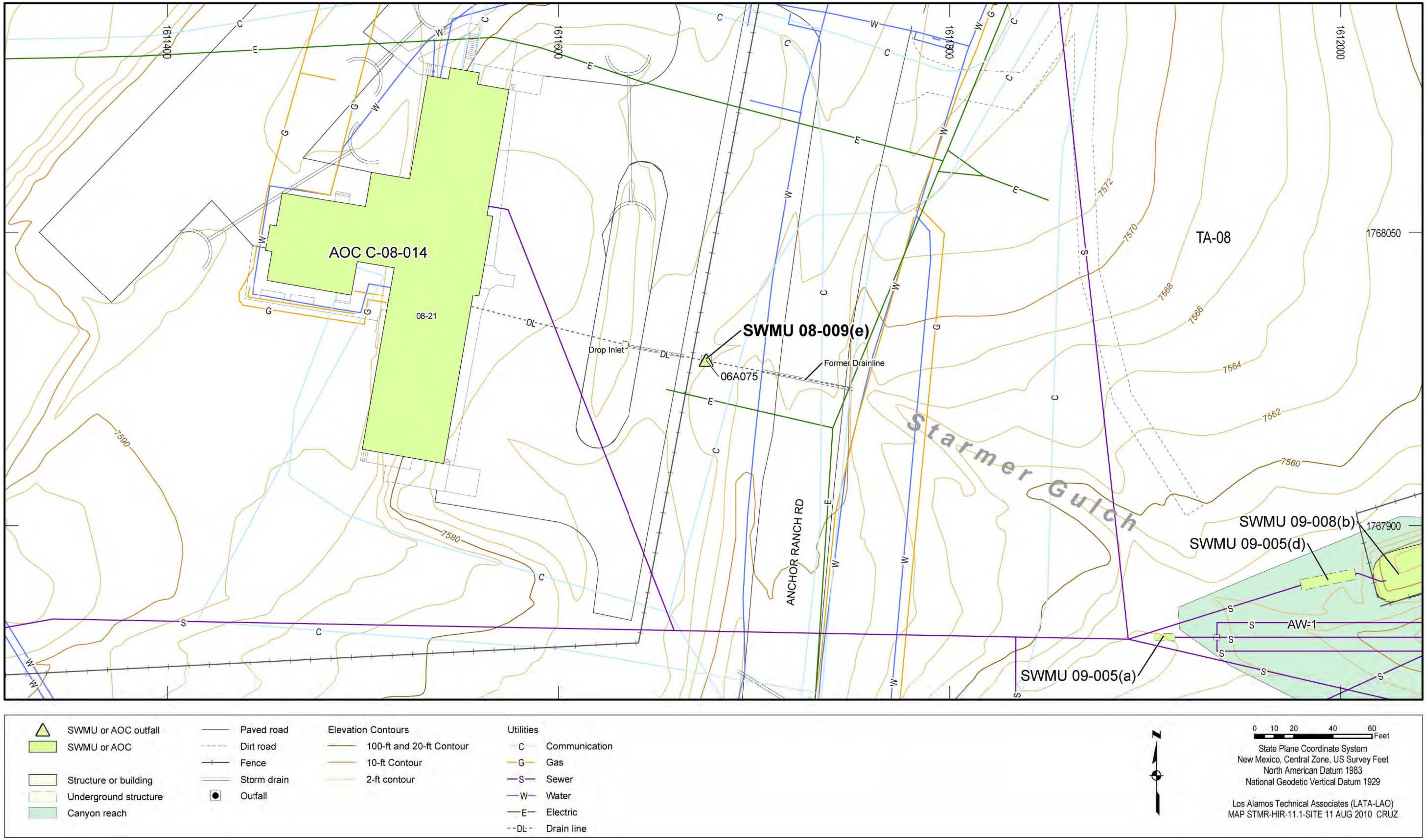


Figure 4.11-1 Site features of SWMU 08-009(e)

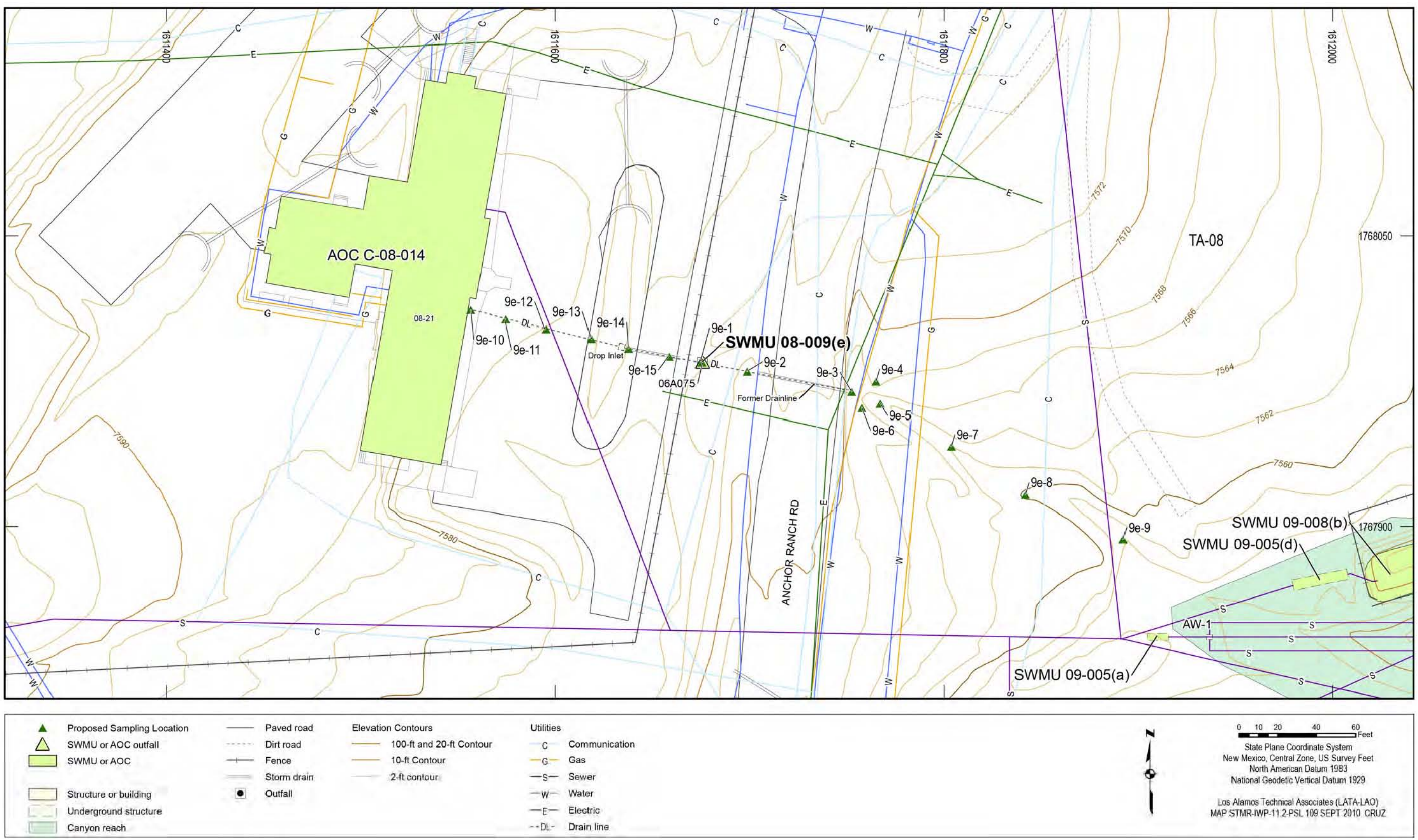


Figure 4.11-2 Proposed sampling locations for SWMU 08-009(e)

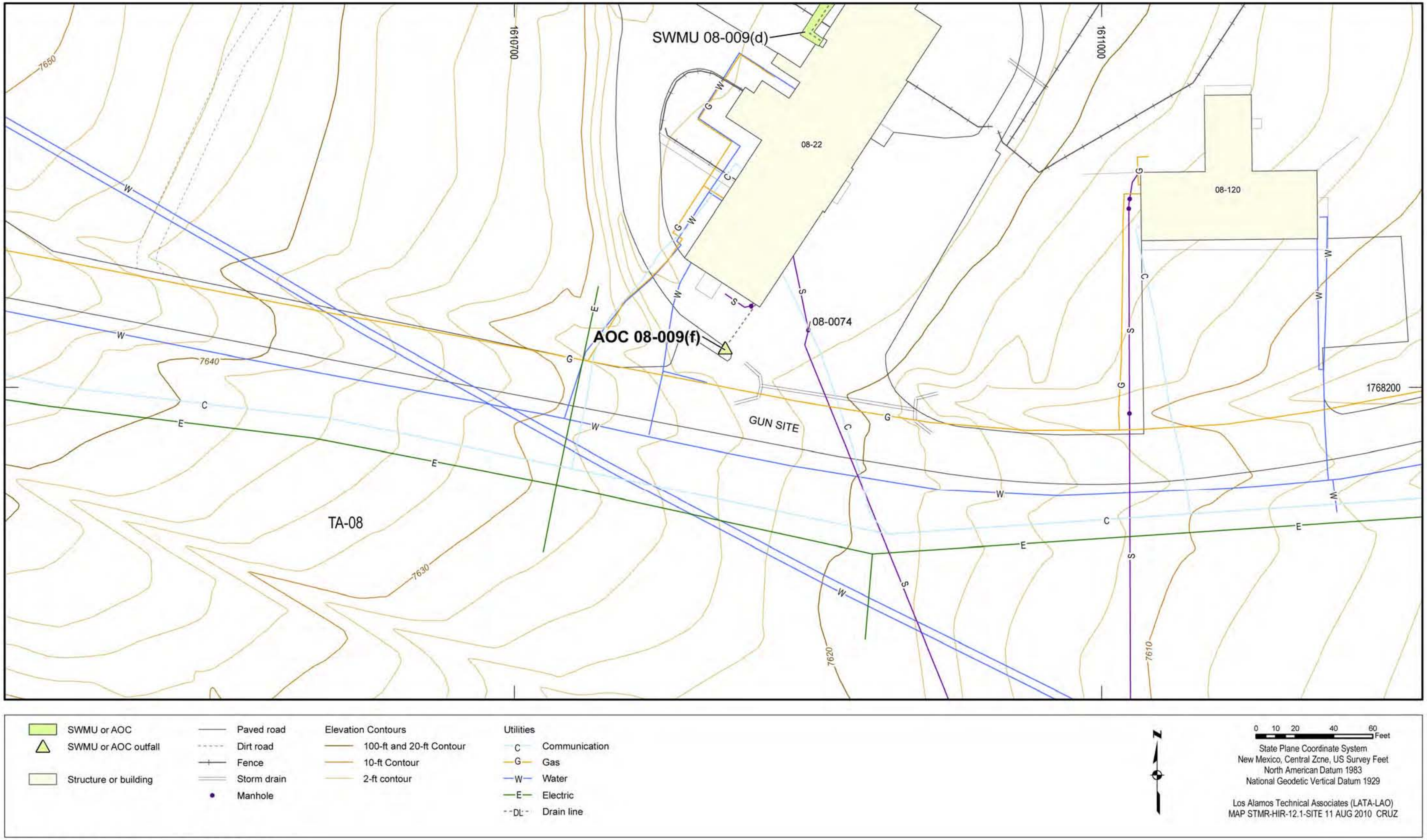


Figure 4.12-1 Site features of AOC 08-009(f)

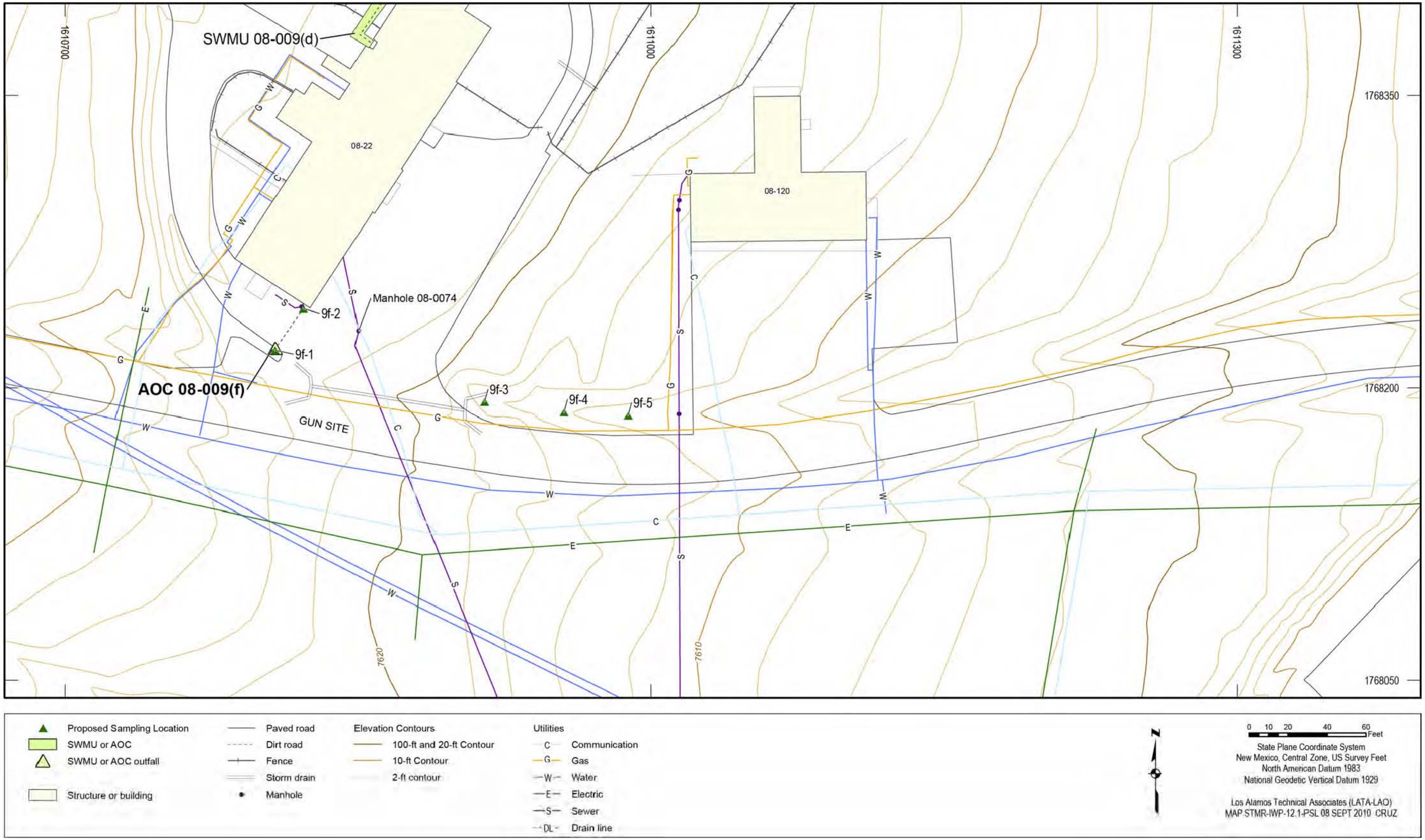


Figure 4.12-2 Proposed sampling locations for AOC 08-009(f)

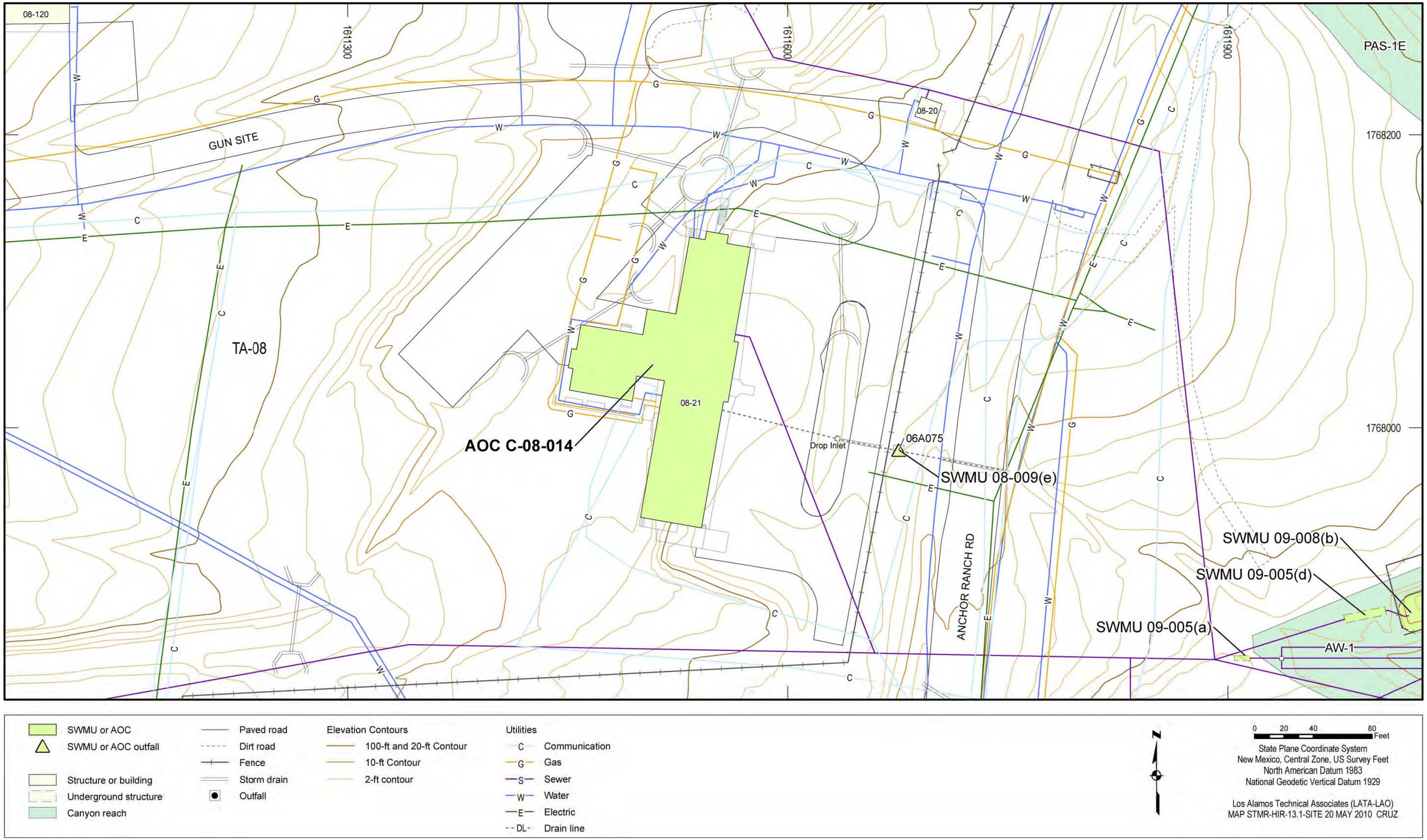


Figure 4.13-1 Site features of AOC C-08-014

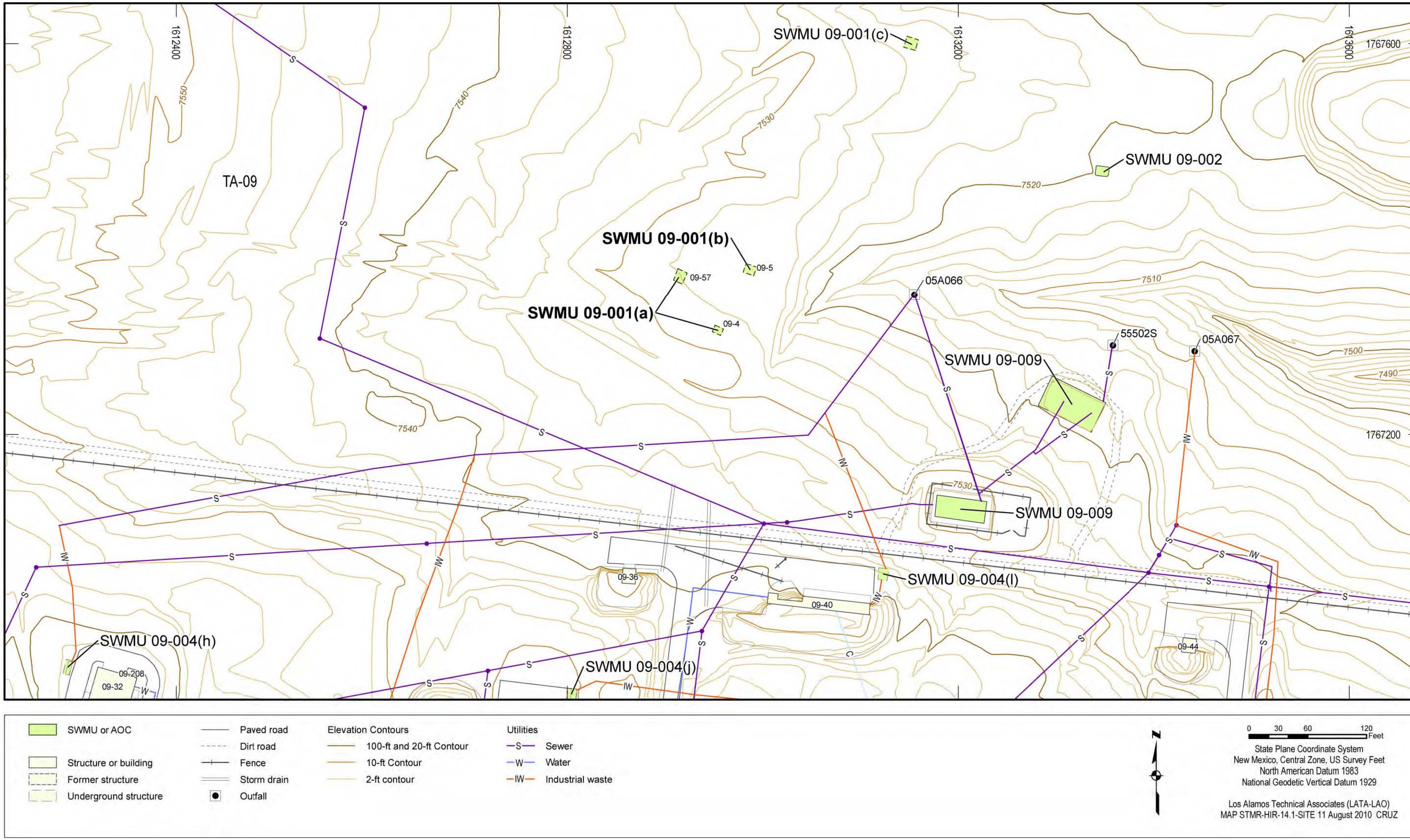
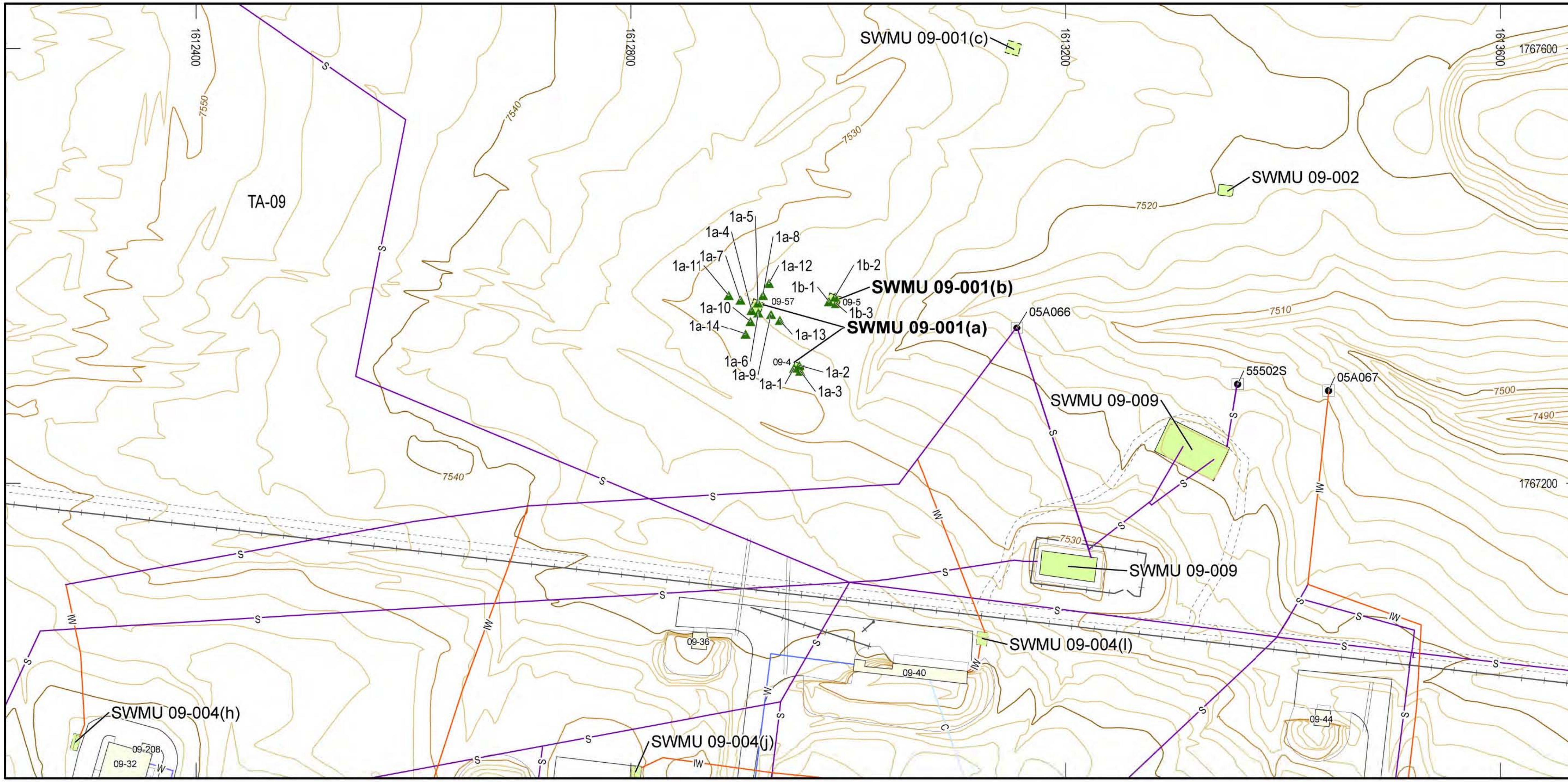


Figure 5.1-1 Site features of Consolidated Unit 09-001(a)-99 [SWMUs 09-001(a) and 09-001(b)]



Proposed Sampling Location
SWMU or AOC
Structure or building
Former structure
Underground structure

Paved road
Dirt road
Fence
Storm drain
Outfall

Elevation Contours
100-ft and 20-ft Contour
10-ft Contour
2-ft contour

Utilities
Sewer
Water
Industrial waste

0 30 60 120 Feet

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

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Figure 5.1-2 Proposed sampling locations for Consolidated Unit 09-001(a)-99 [SWMUs 09-001(a) and 09-001(b)]

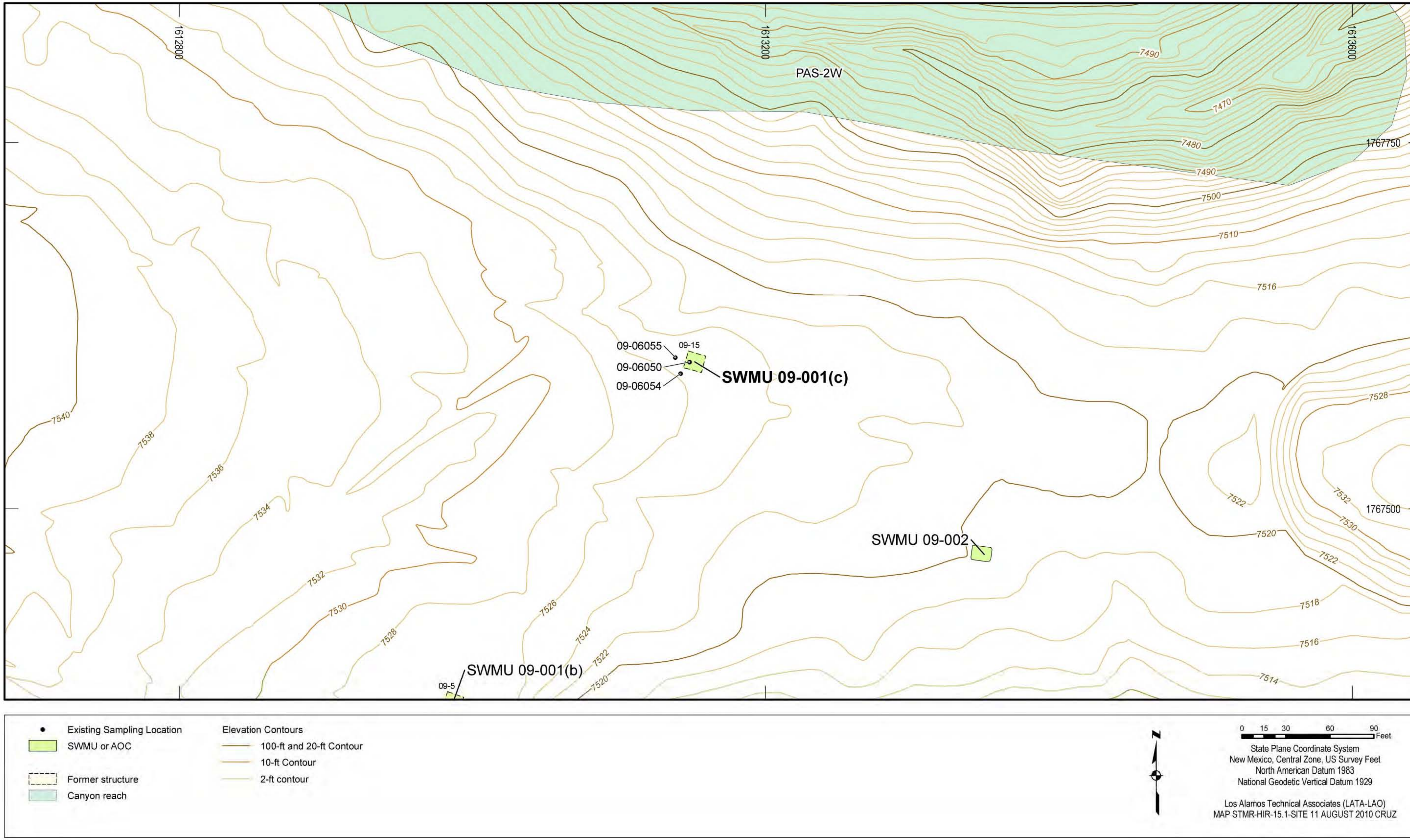

Figure 5.2-1 Site features of SWMU 09-001(c)

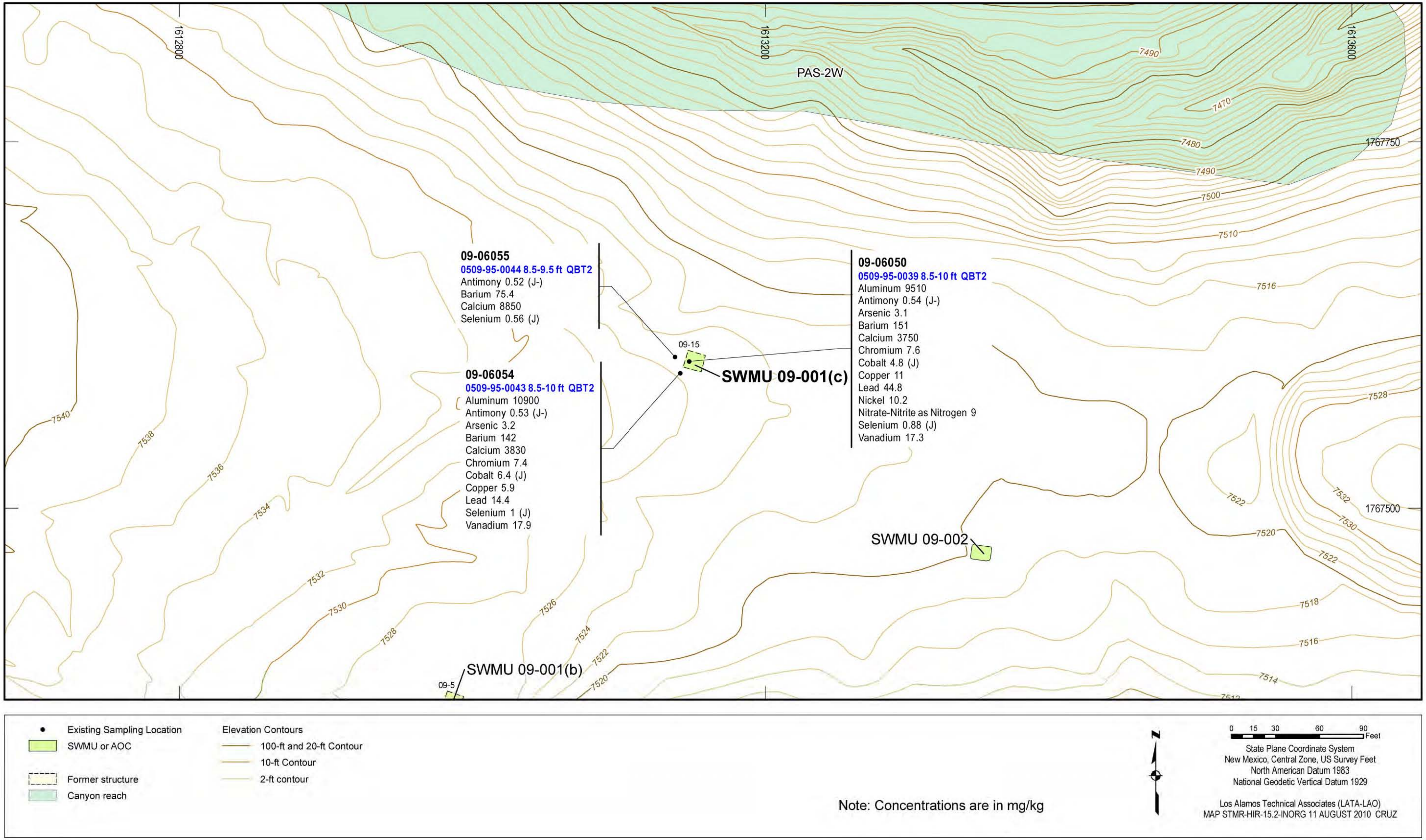

Figure 5.2-2 Inorganic chemicals detected above BVs at SWMU 09-001(c)

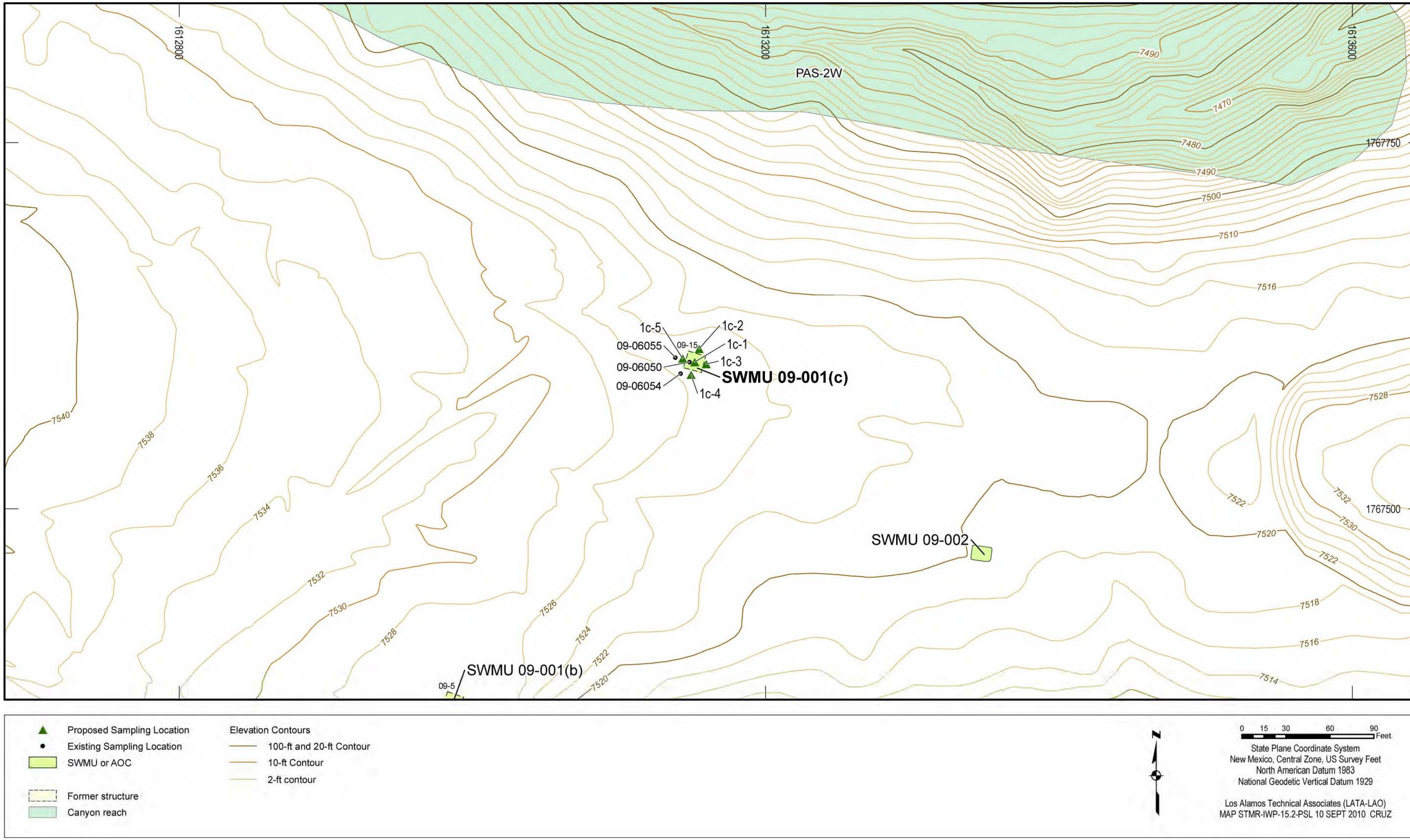

Figure 5.2-3 Proposed sampling locations for SWMU 09-001(c)

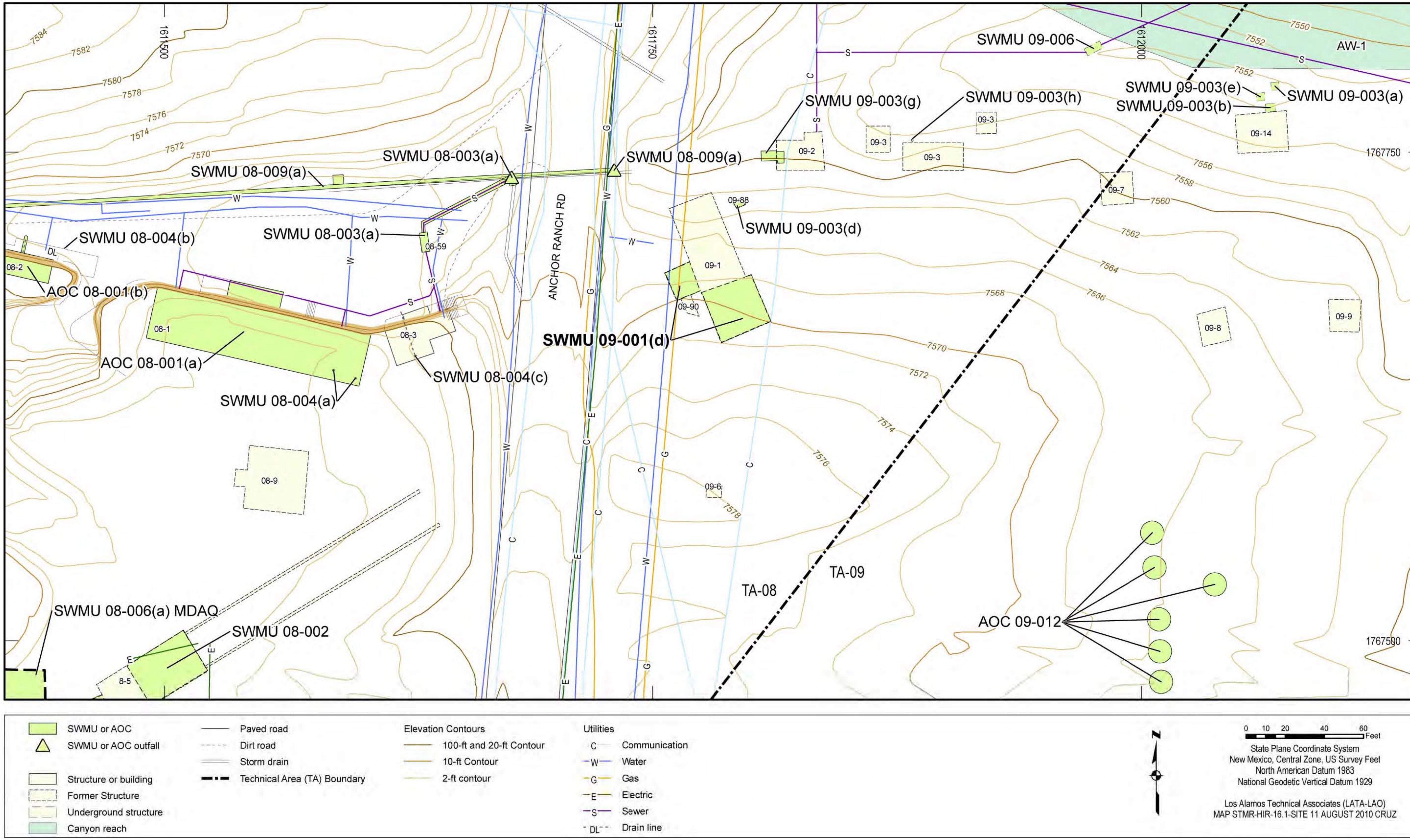

Figure 5.3-1 Site features of SWMU 09-001(d)

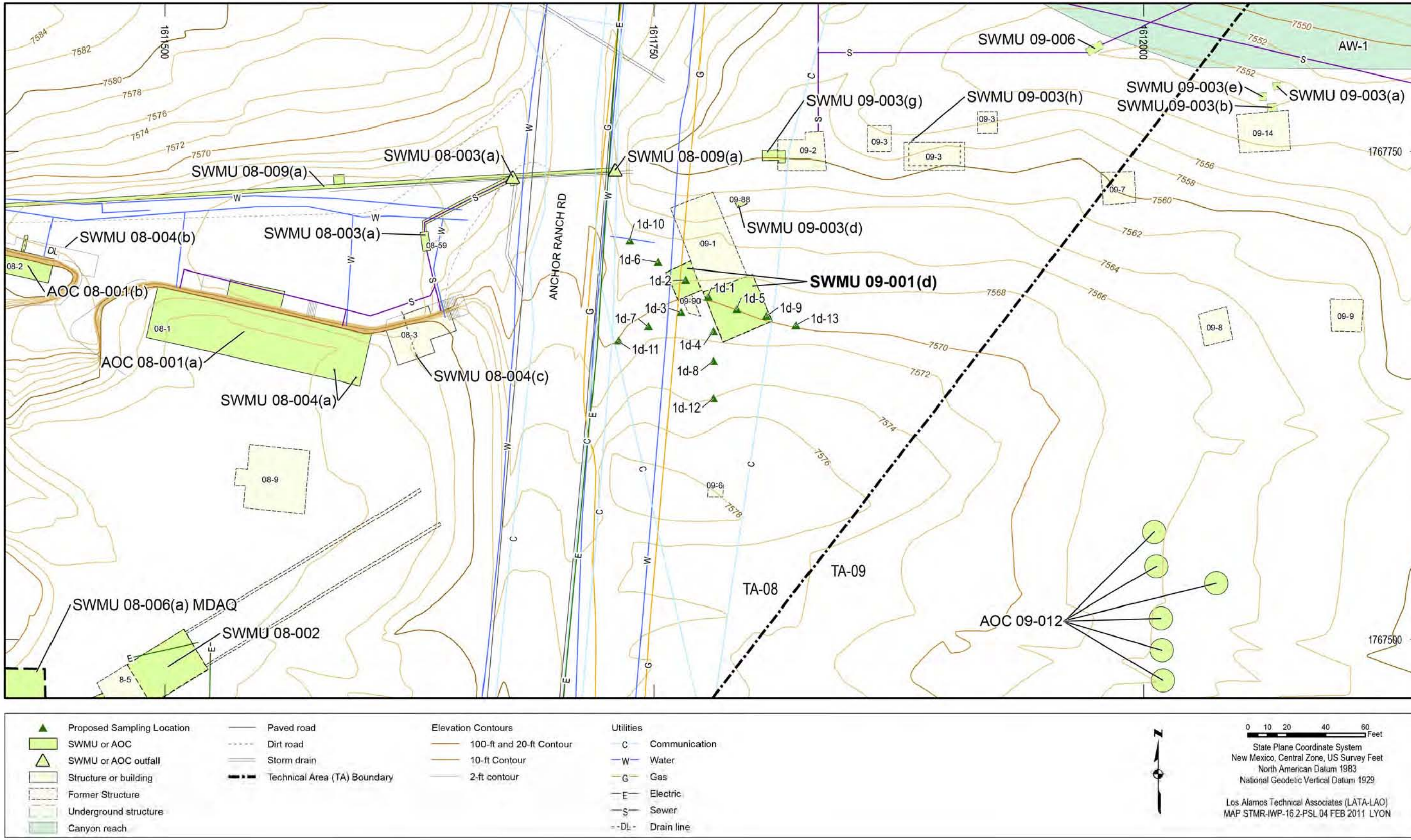

Figure 5.3-2 Proposed sampling locations for SWMU 09-001(d)

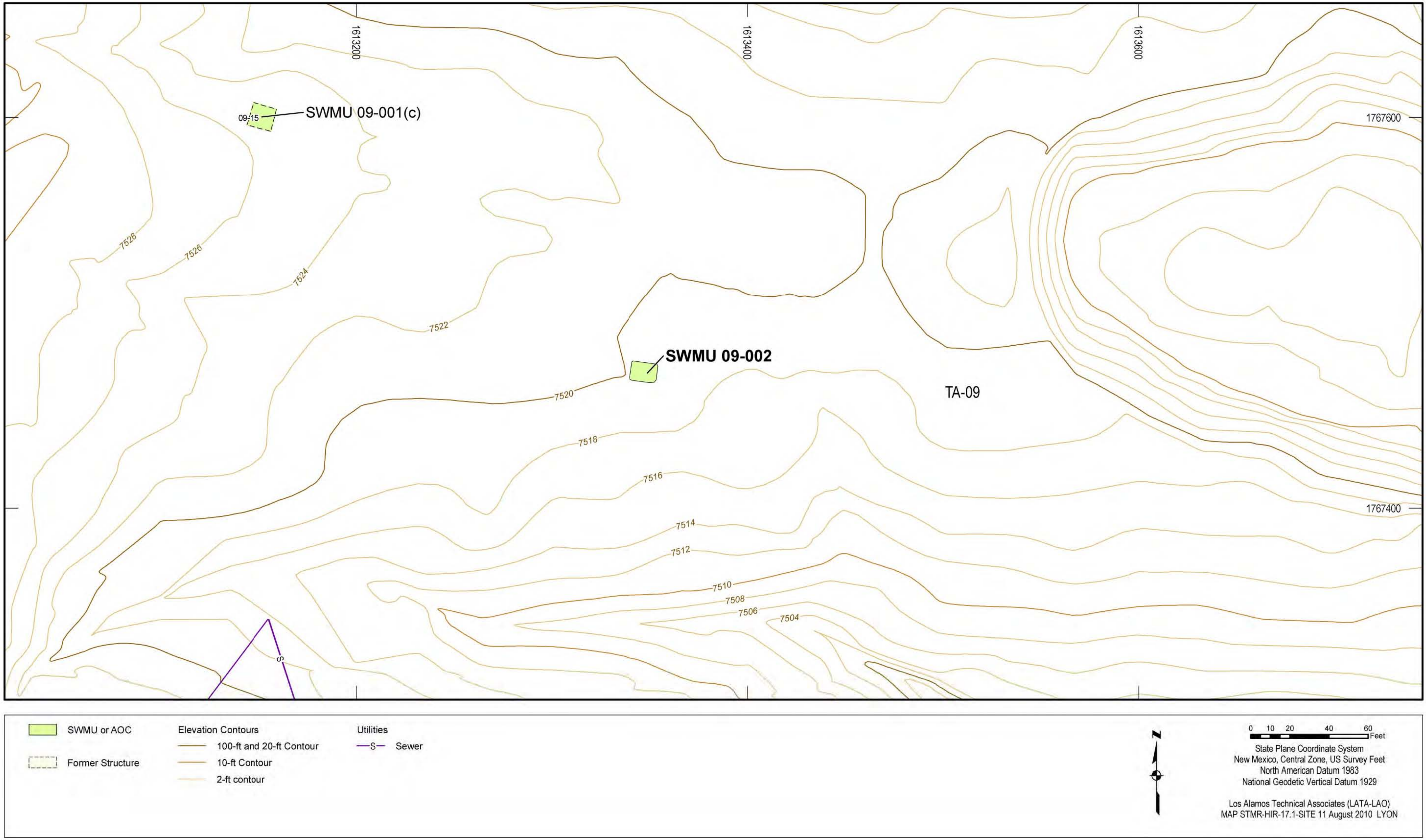

Figure 5.4-1 Site features of SWMU 09-002

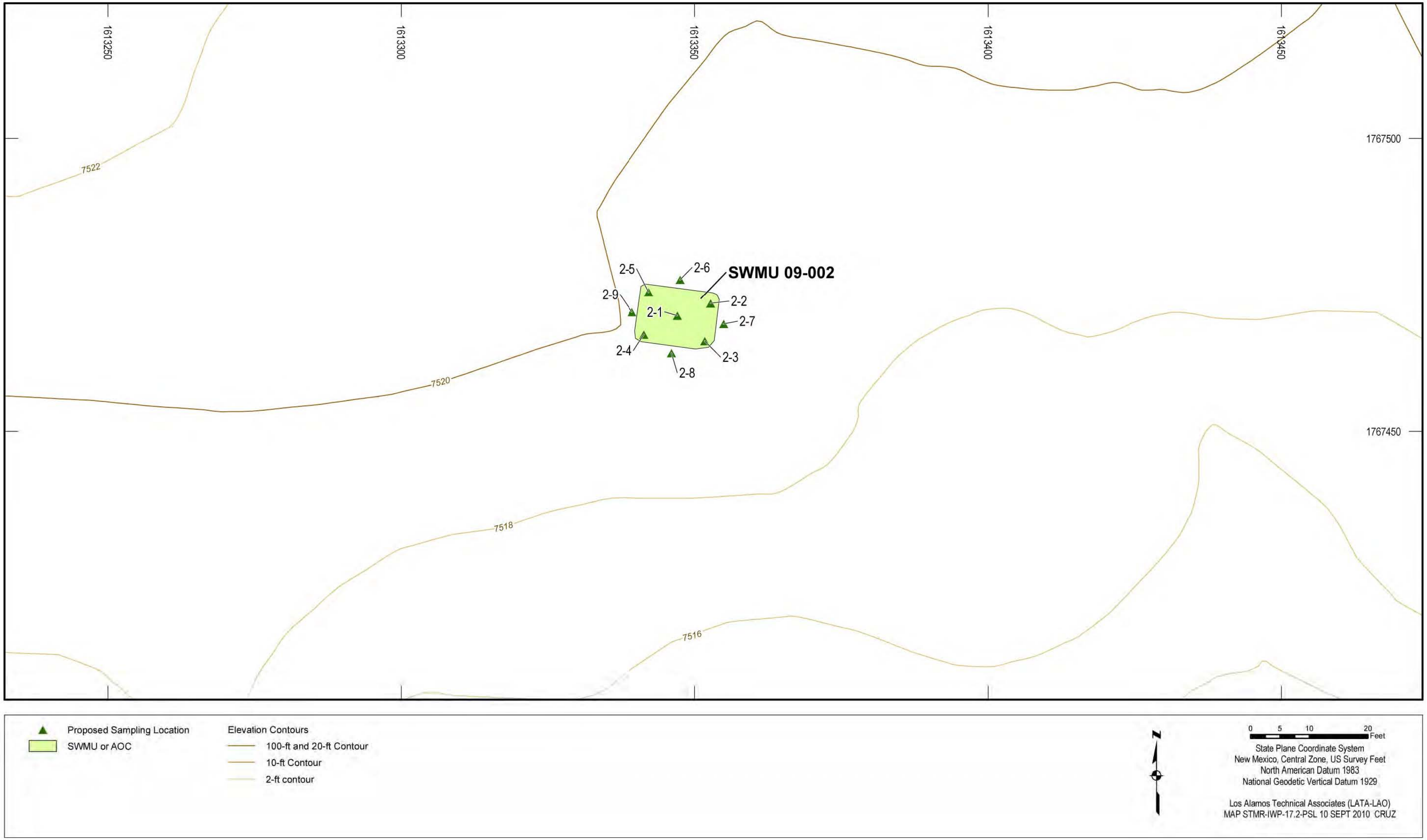

Figure 5.4-2 Proposed sampling locations for SWMU 09-002

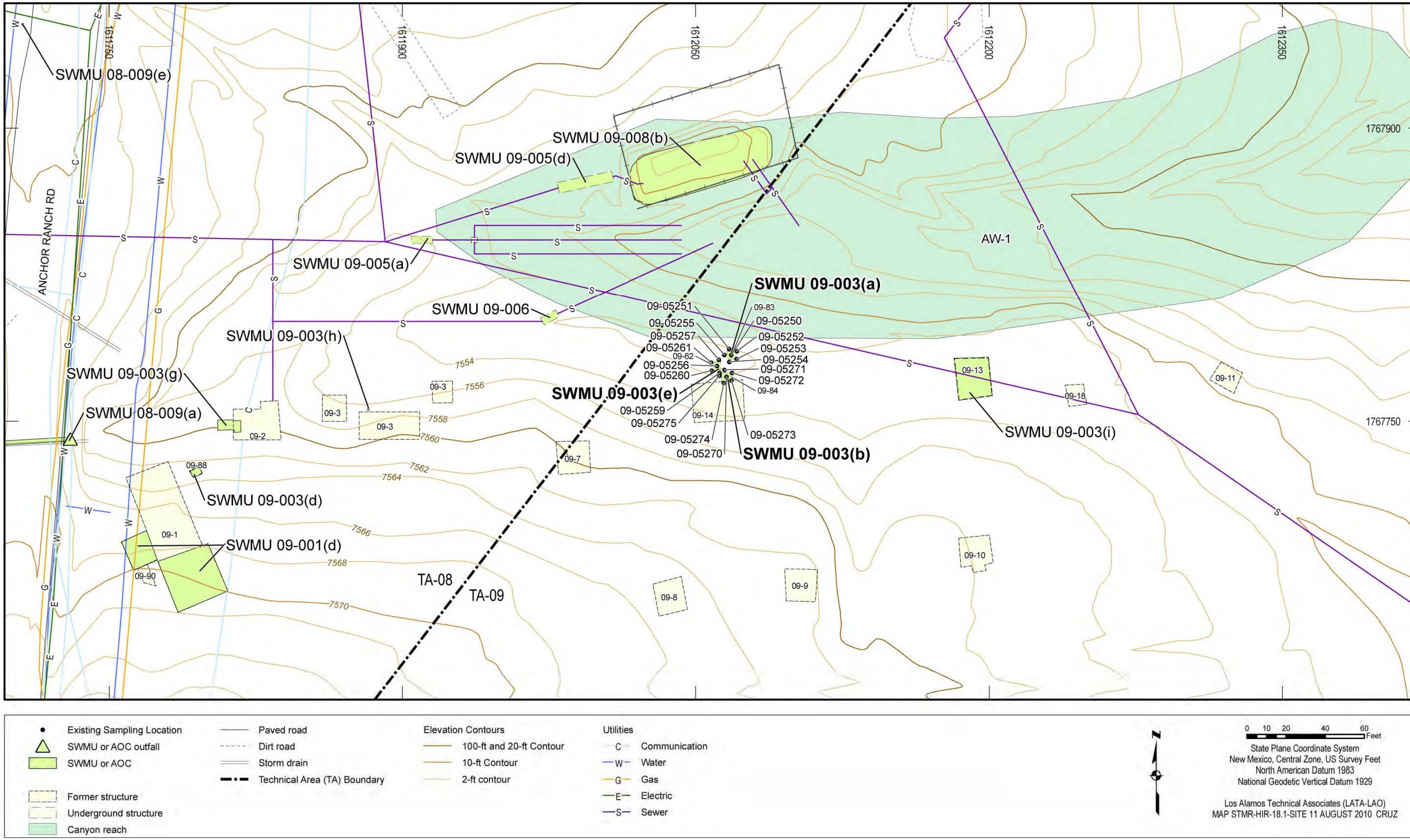

Figure 5.5-1 Site features of Consolidated Unit 09-003(a)-99 [SWMUs 09-003(a), 09-003(b), and 09-003(e)]

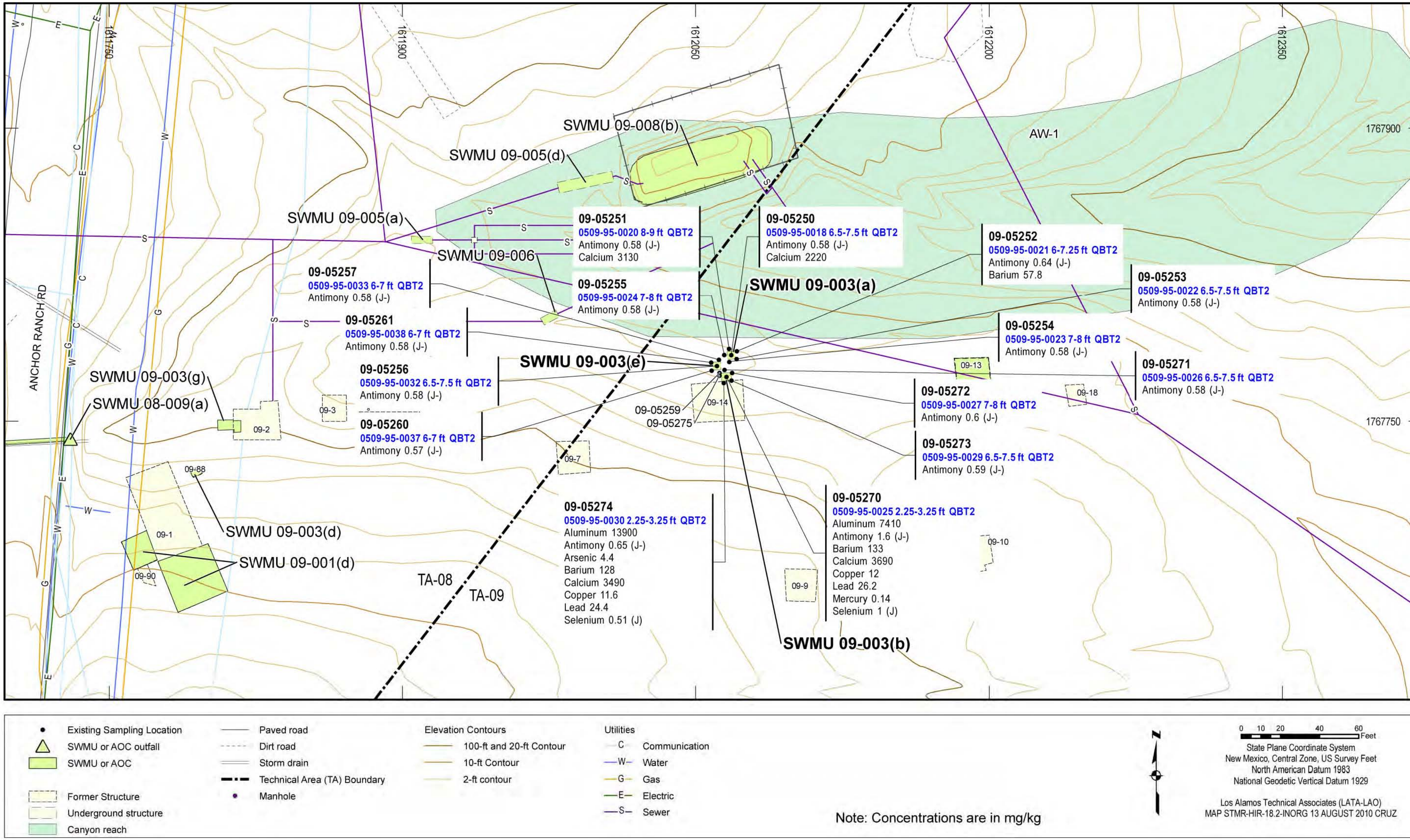

Figure 5.5-2 Inorganic chemicals detected above BVs at Consolidated Unit 09-003(a)-99 [SWMUs 09-003(a), 09-003(b), and 09-003(e)]

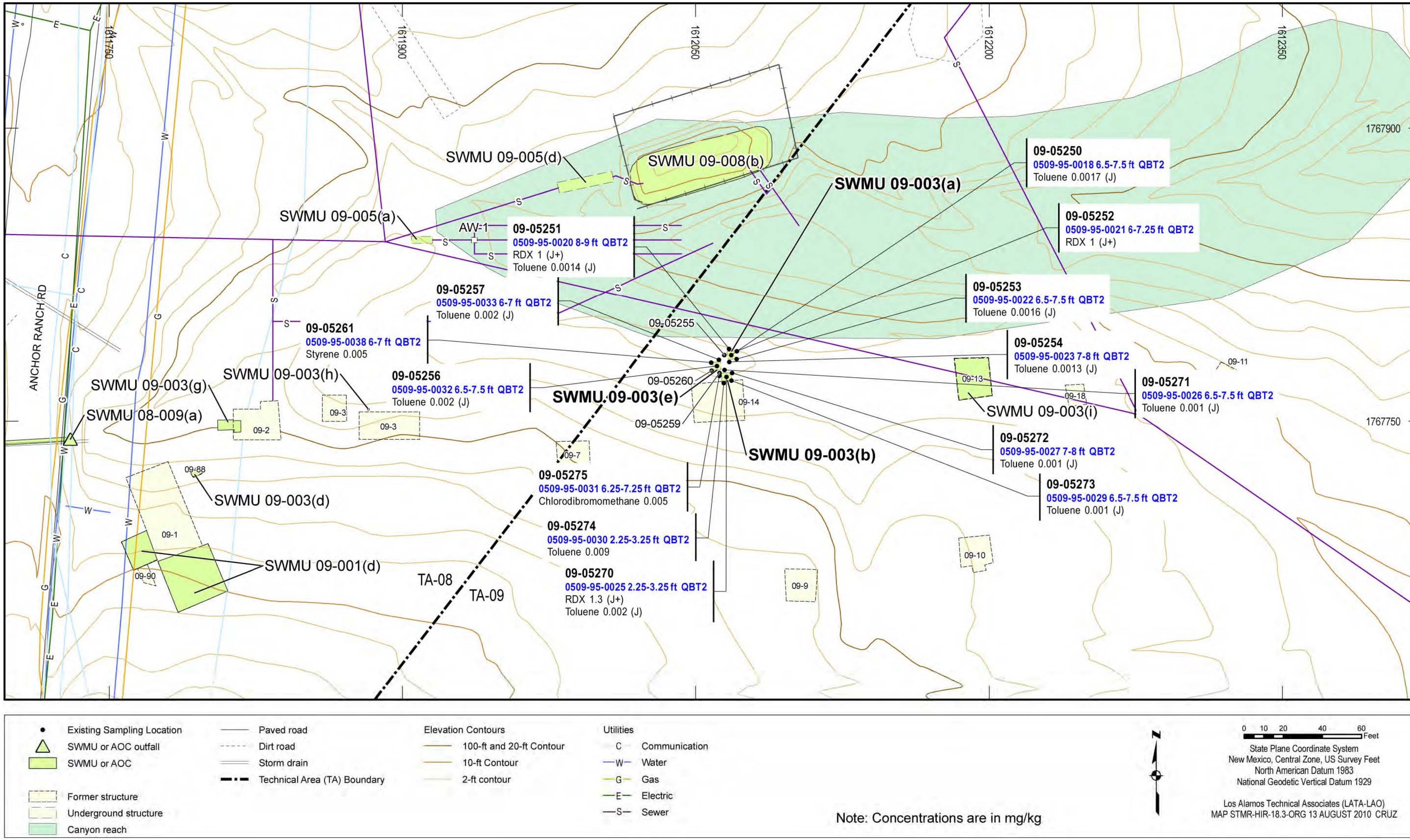

Figure 5.5-3 Organic chemicals detected at Consolidated Unit 09-003(a)-99 [SWMUs 09-003(a), 09-003(b), and 09-003(e)]

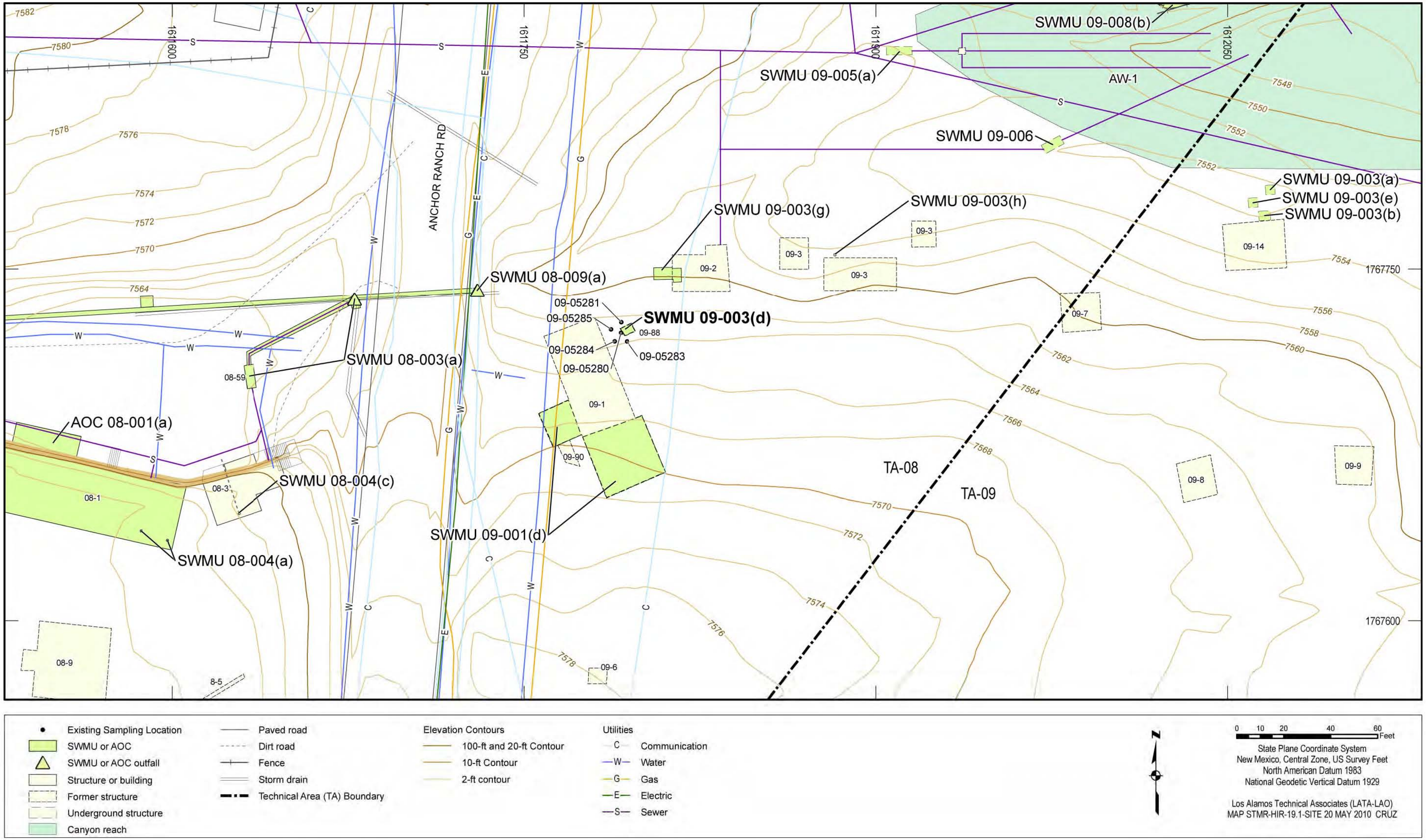

Figure 5.6-1 Site features of SWMU 09-003(d)

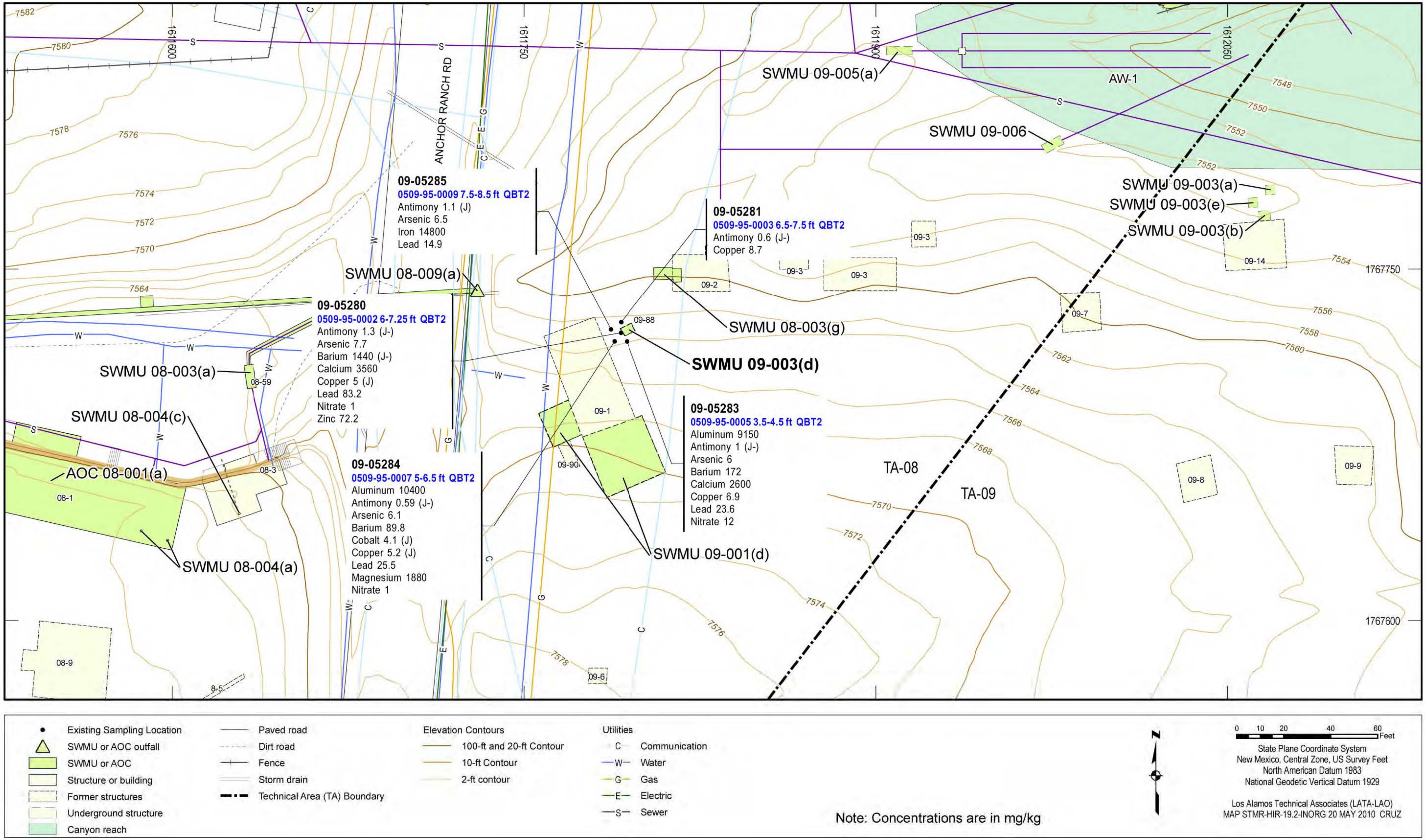

Figure 5.6-2 Inorganic chemicals detected above BVs at SWMU 09-003(d)

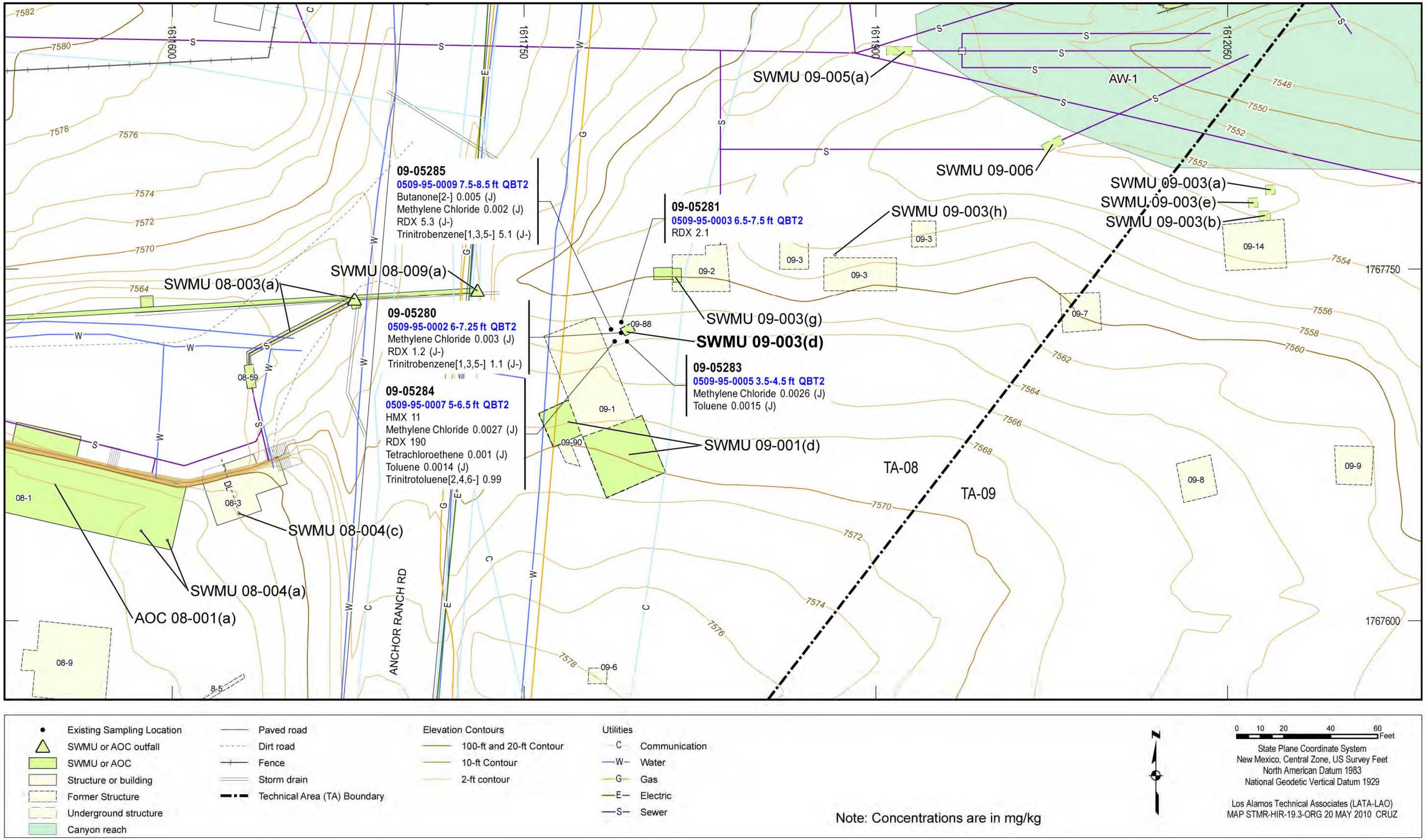

Figure 5.6-3 Organic chemicals detected at SWMU 09-003(d)

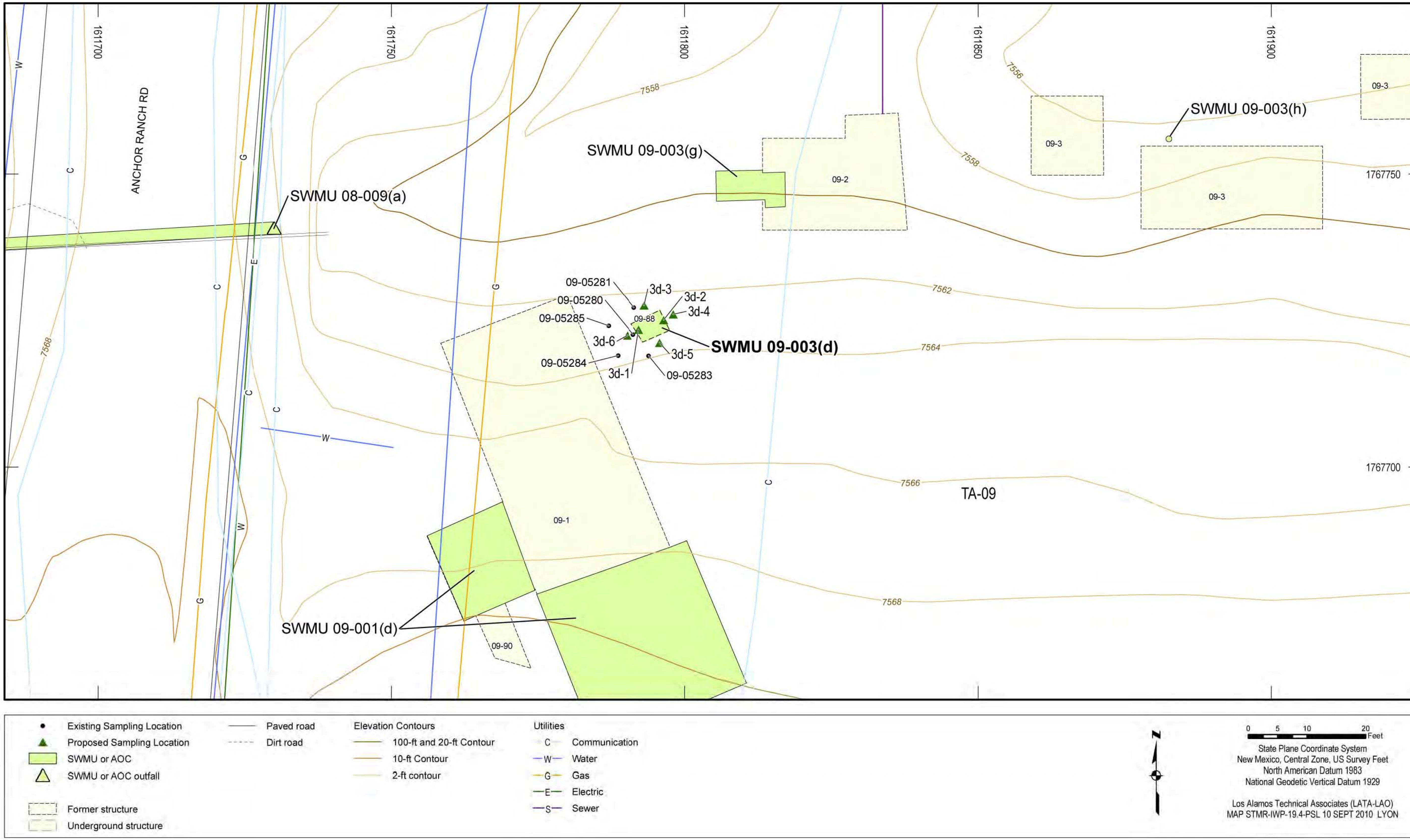

Figure 5.6-4 Proposed sampling locations for SWMU 09-003(d)

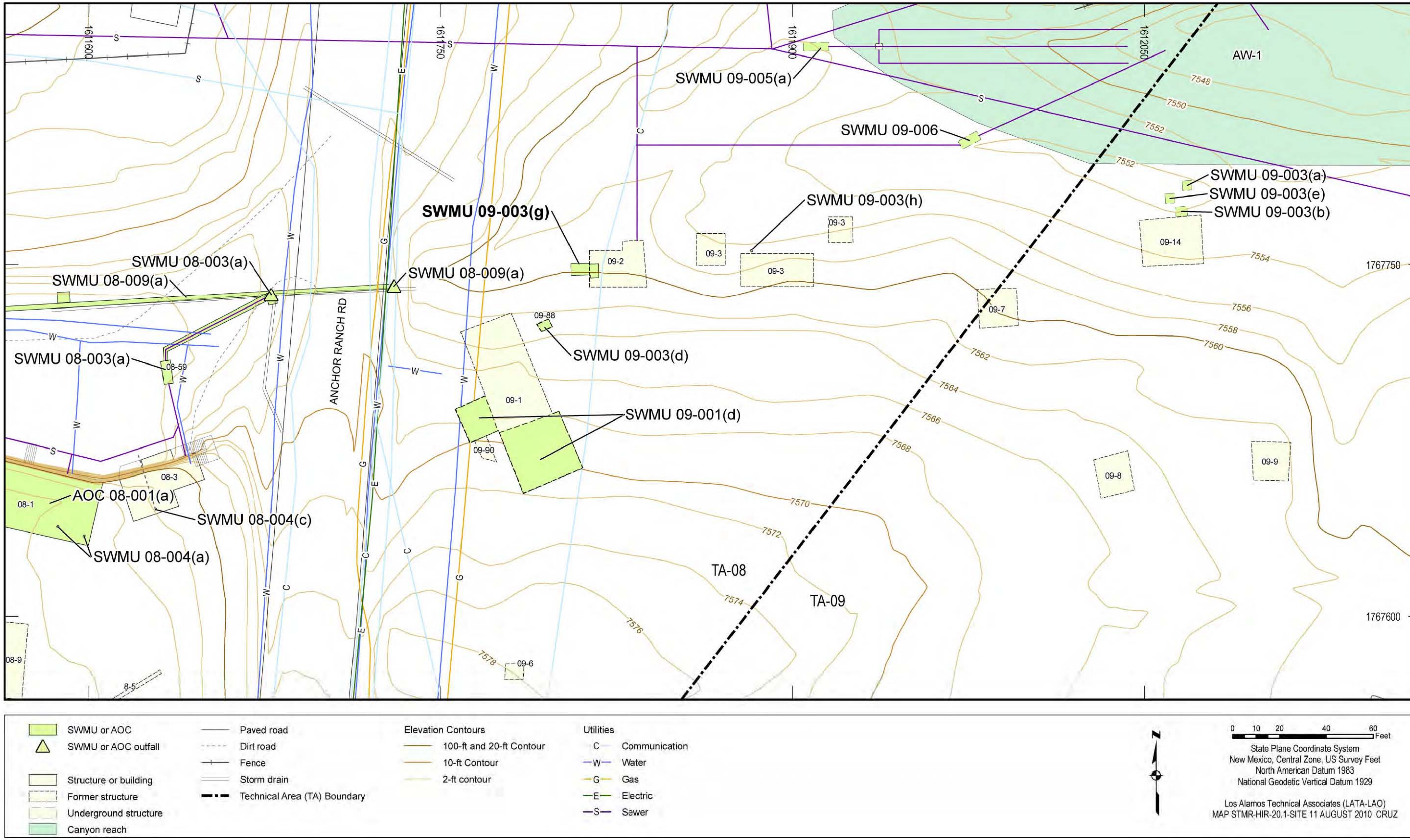

Figure 5.7-1 Site features of SWMU 09-003(g)

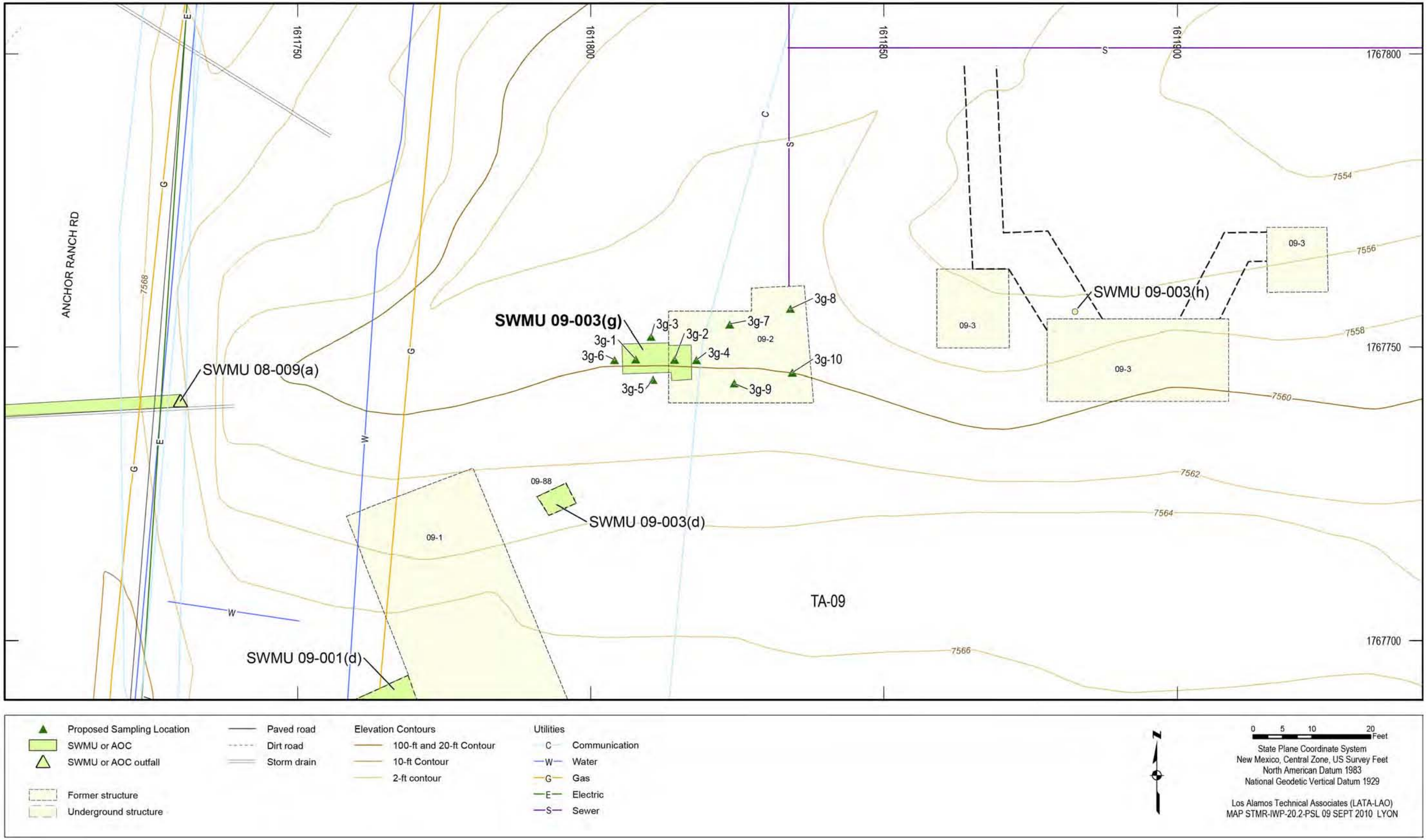

Figure 5.7-2 Proposed sampling locations for SWMU 09-003(g)

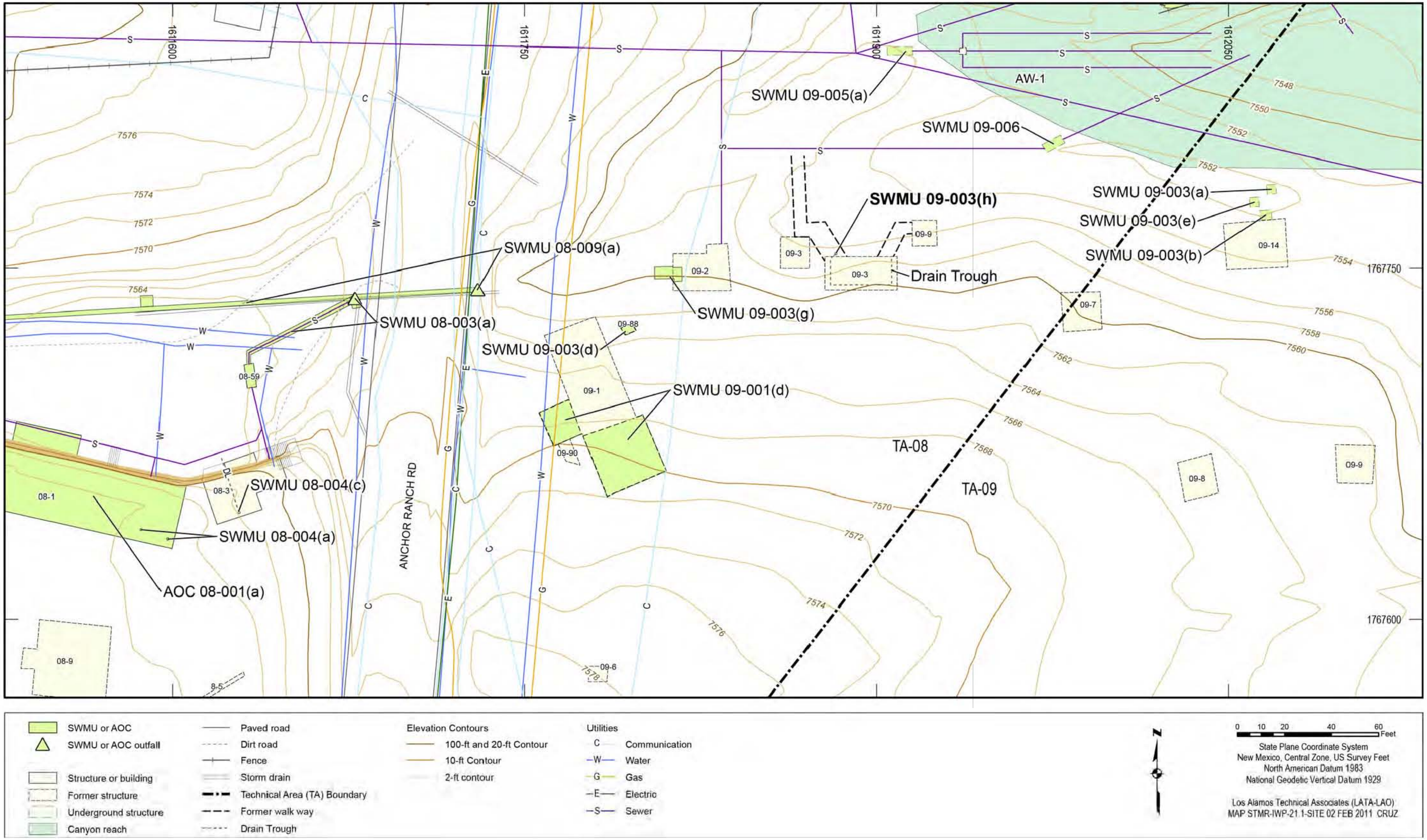

Figure 5.8-1 Site features of SWMU 09-003(h)

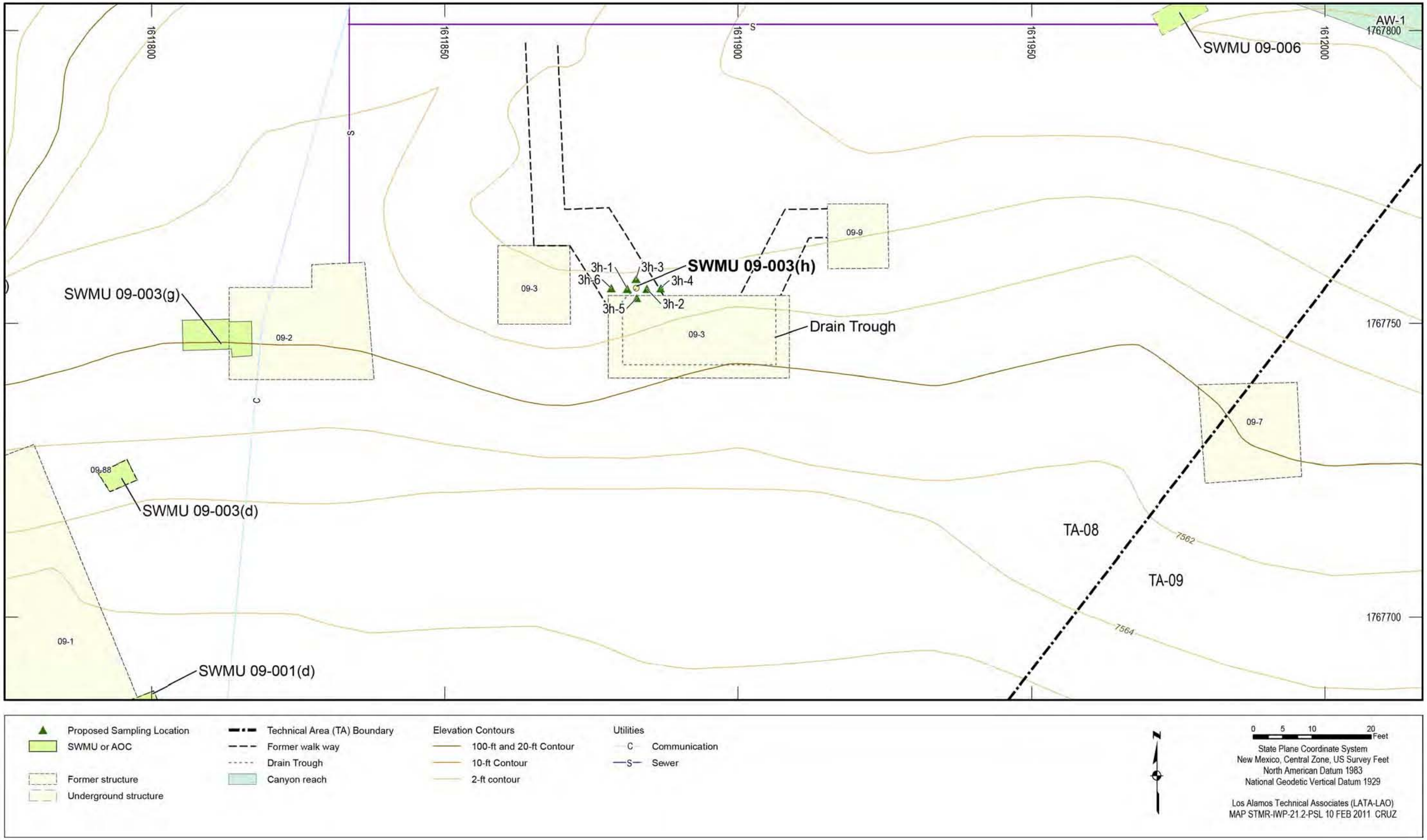

Figure 5.8-2 Proposed sampling locations for SWMU 09-003(h)

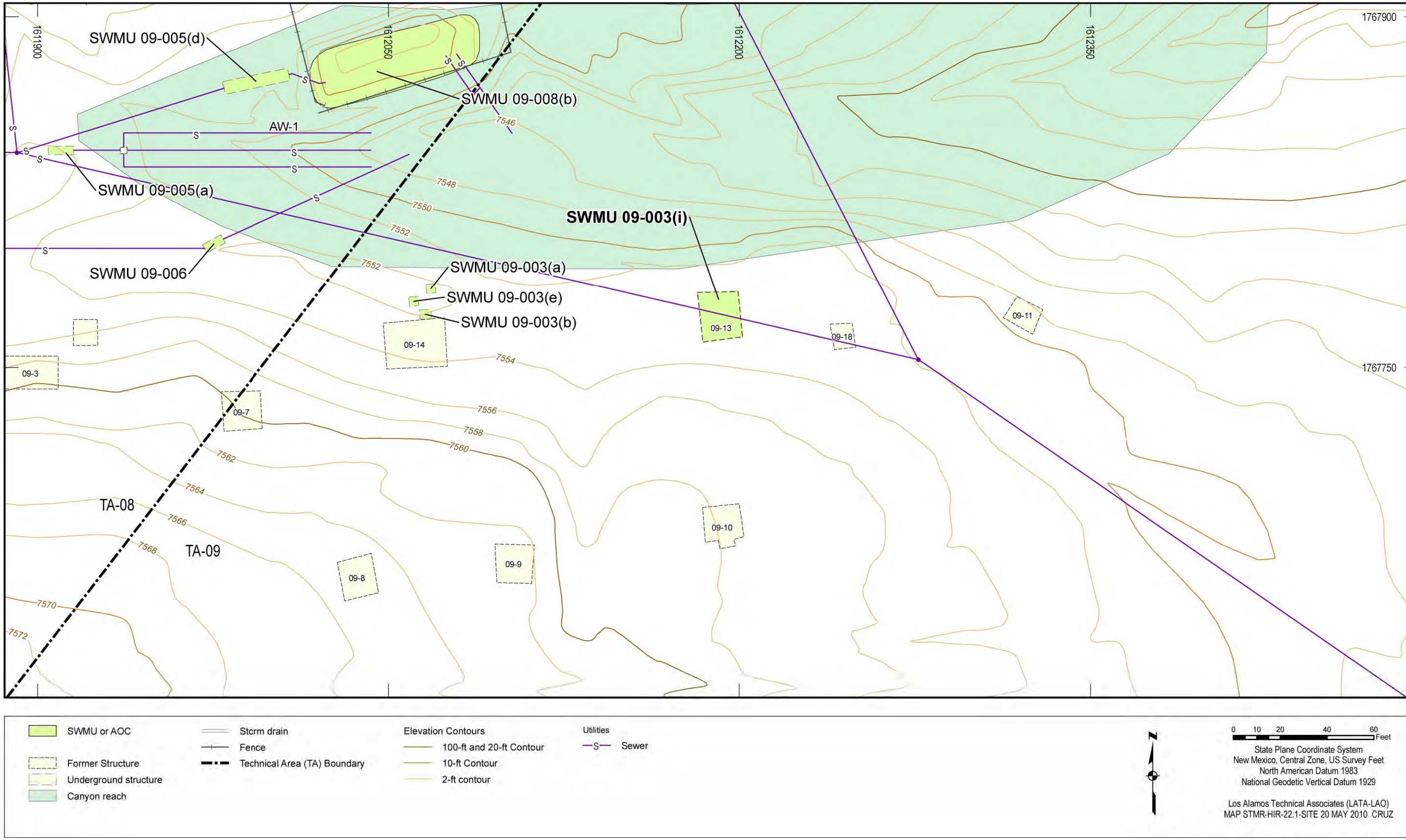

Figure 5.9-1 Site features of SWMU 09-003(i)

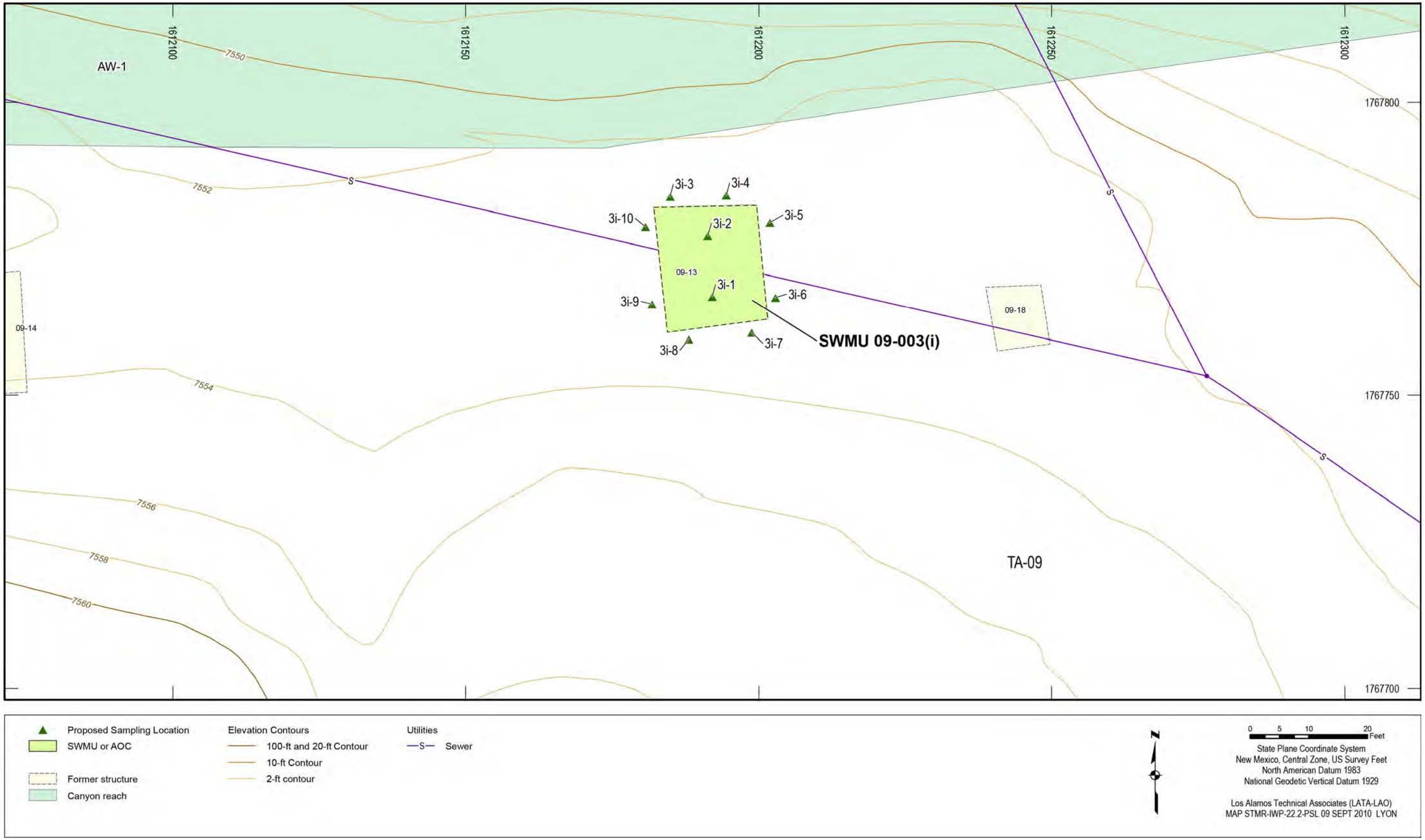

Figure 5.9-2 Proposed sampling locations for SWMU 09-003(i)

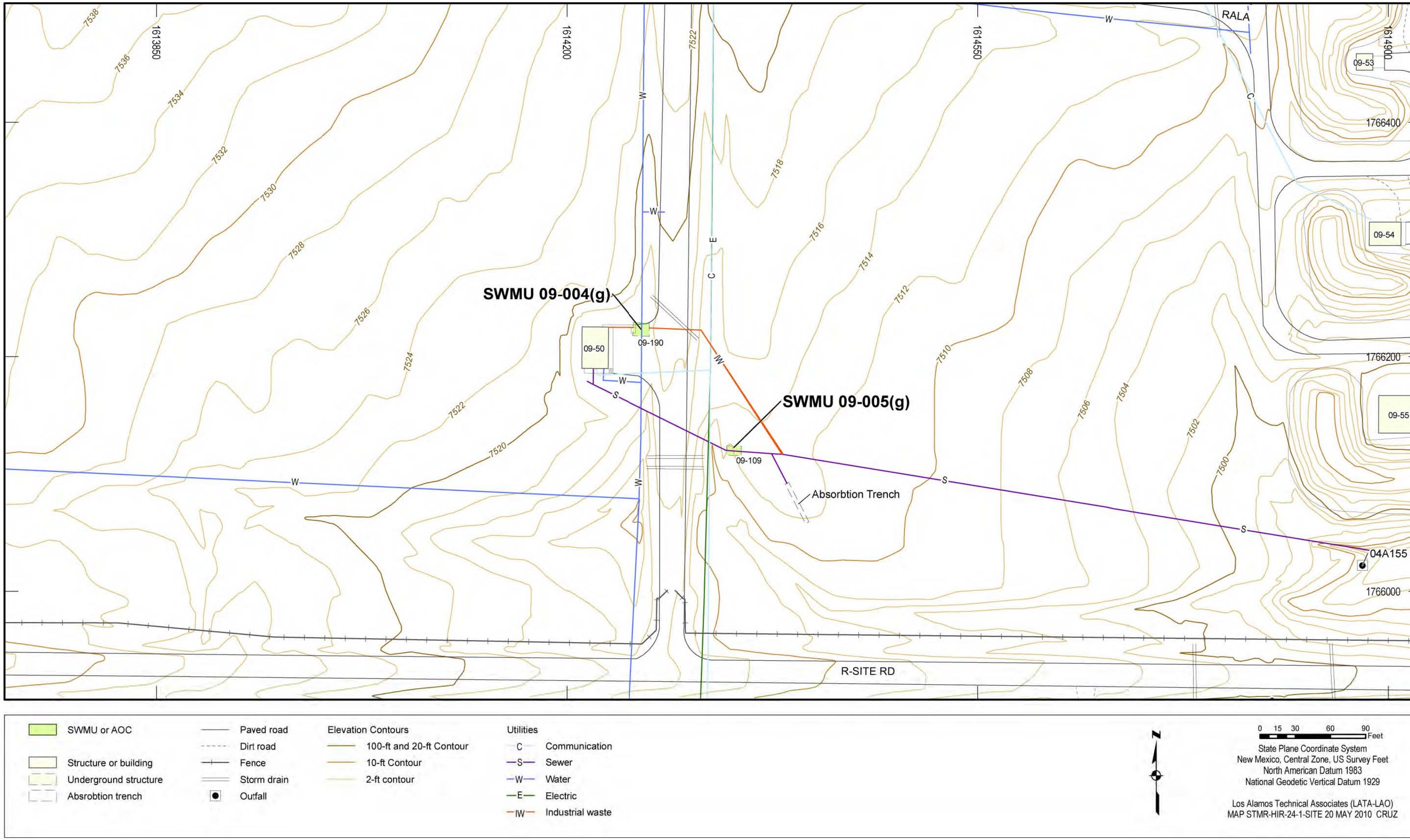

Figure 5.11-1 Site features of SWMUs 09-004(g) and 09-005(g)

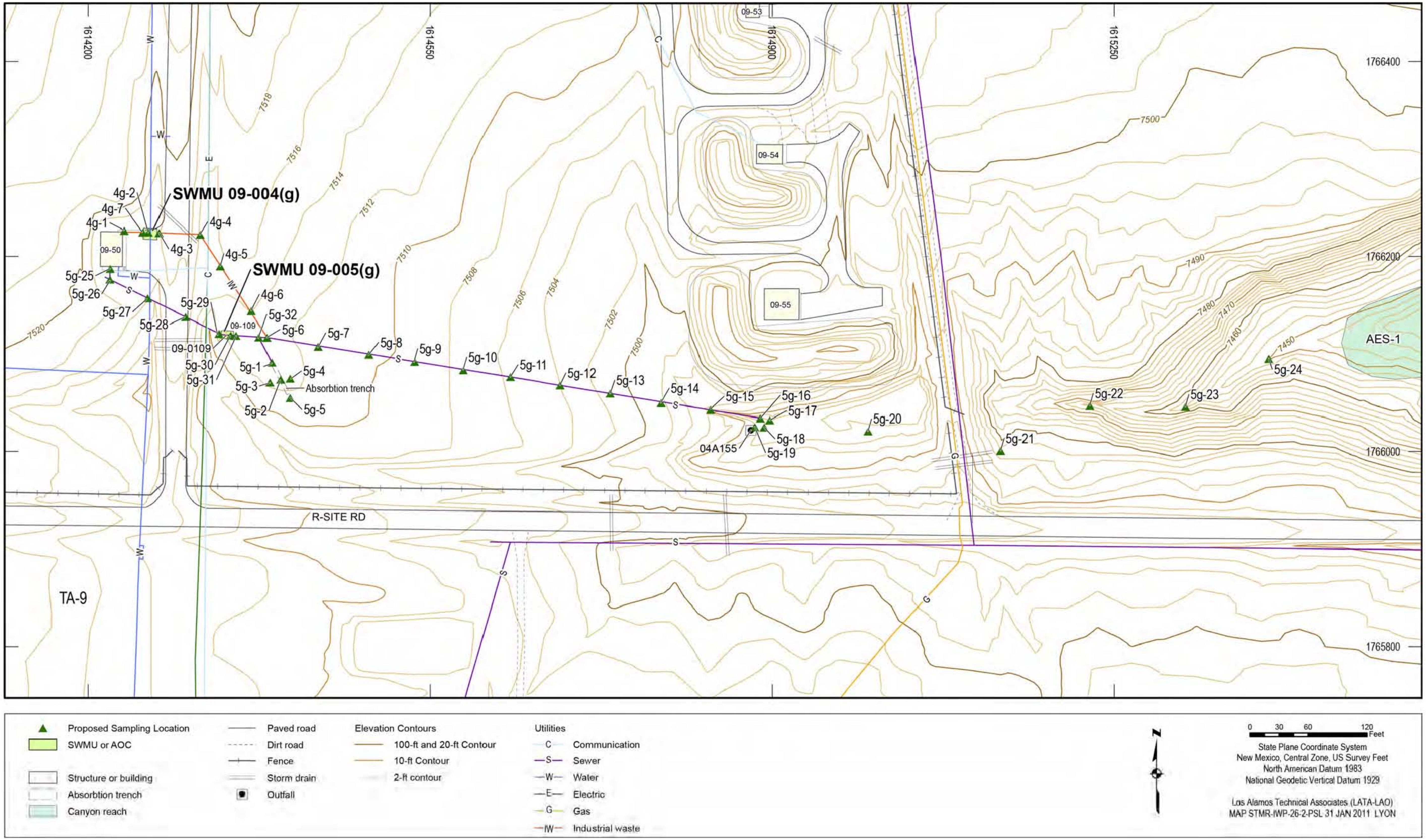

Figure 5.11-2 Proposed sampling locations for SWMUs 09-004(g) and 09-005(g)

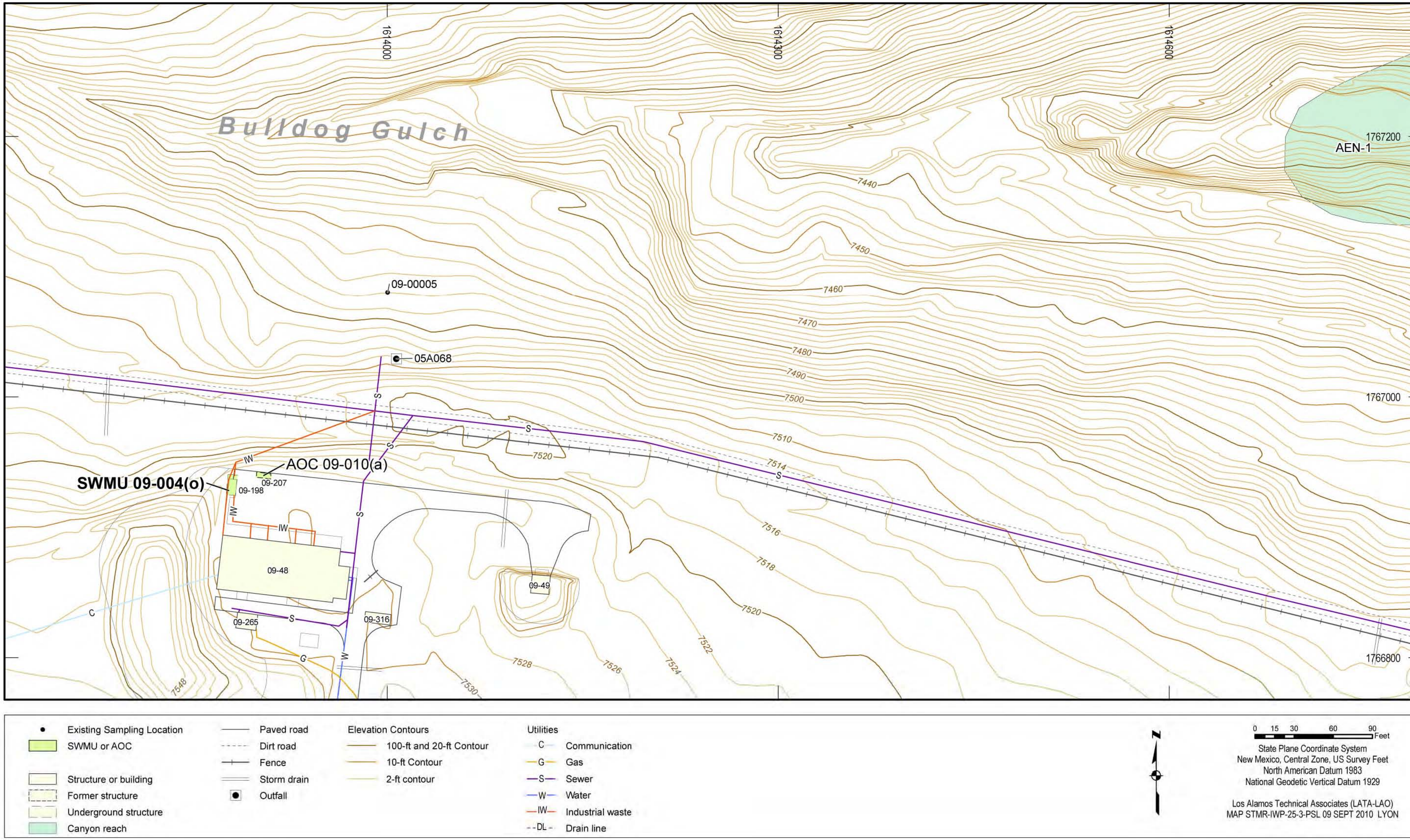

Figure 5.12-1 Site features of SWMU 09-004(o)

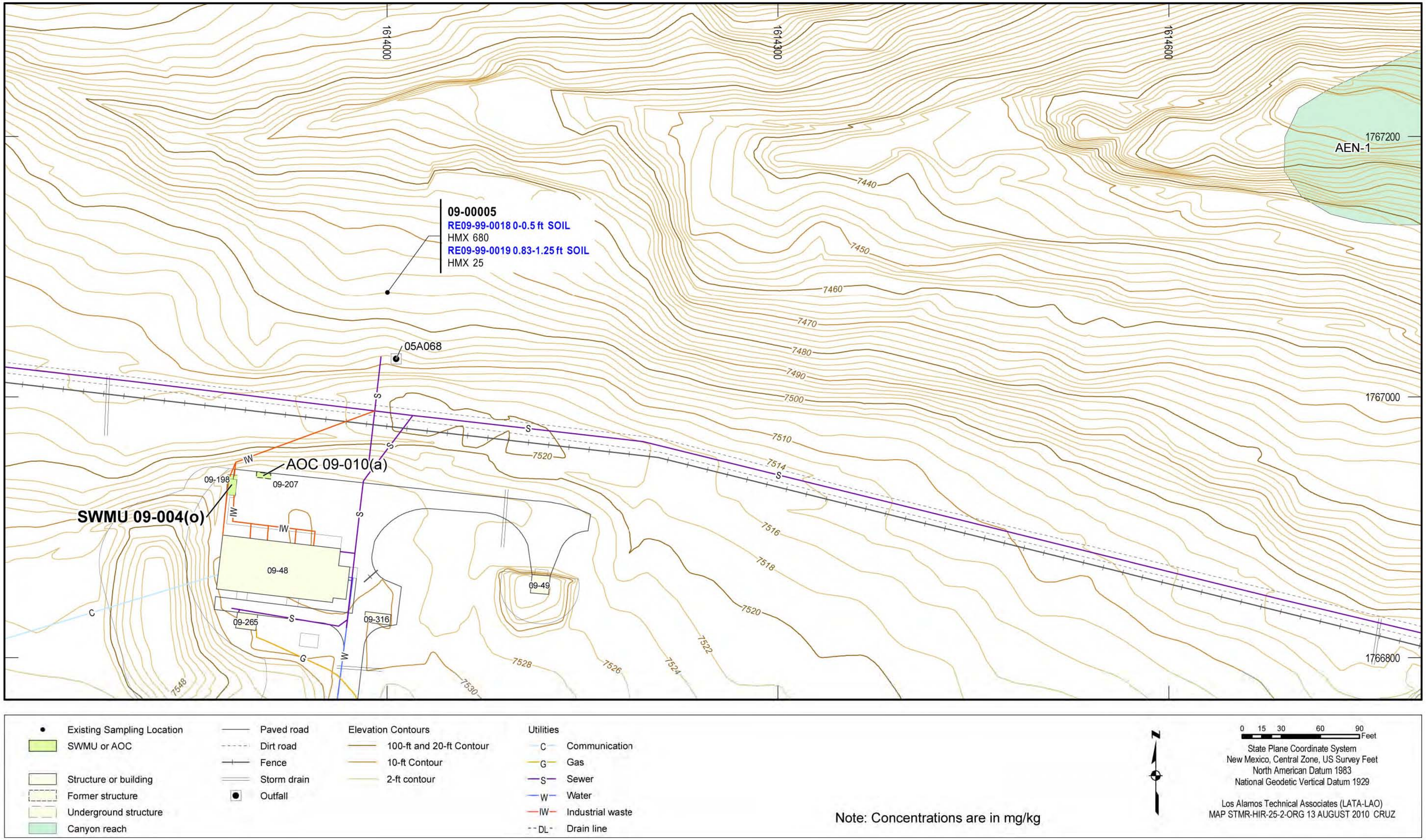

Figure 5.12-2 Organic chemicals detected at SWMU 09-004(o)

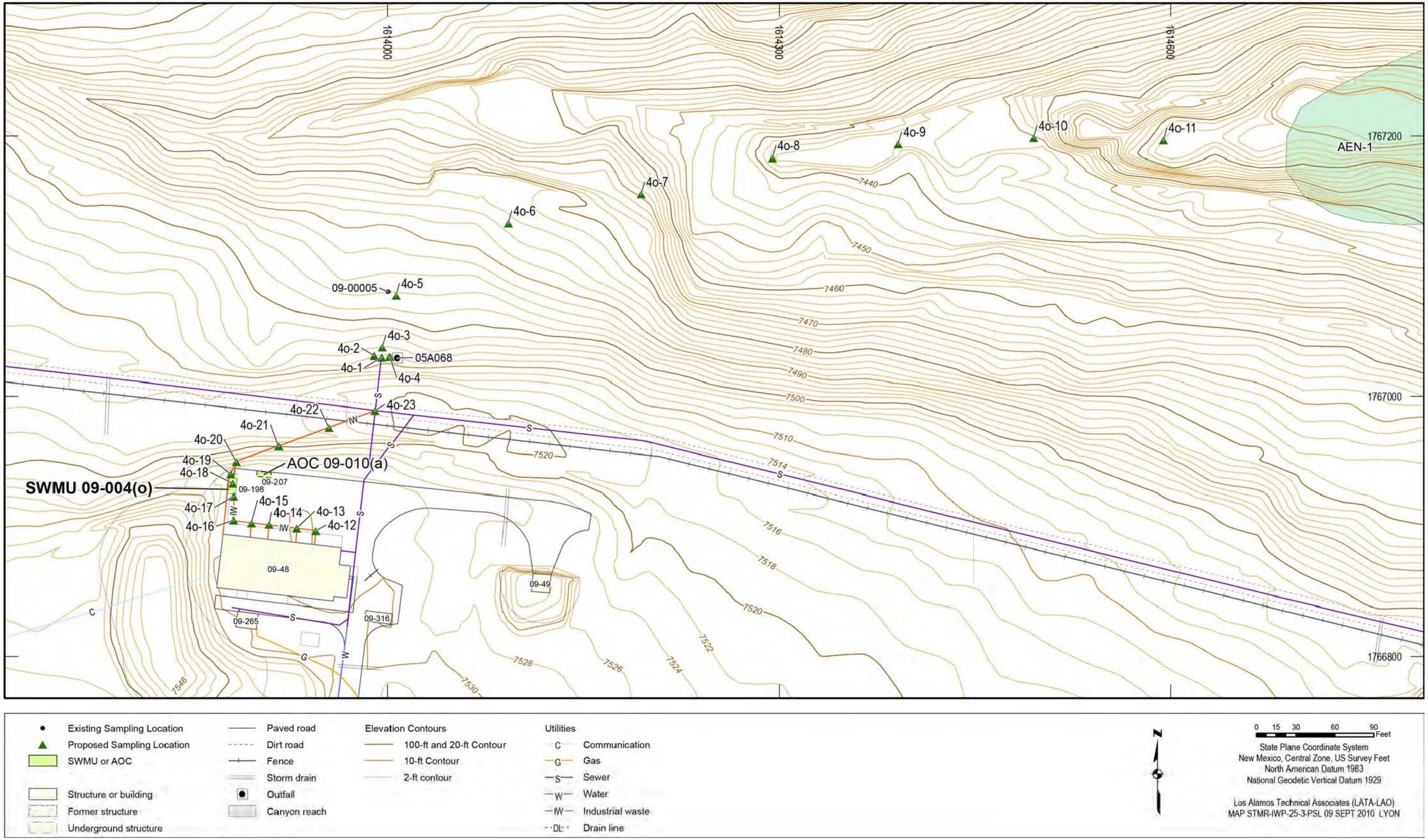

Figure 5.12-3 Proposed sampling locations for SWMU 09-004(o)

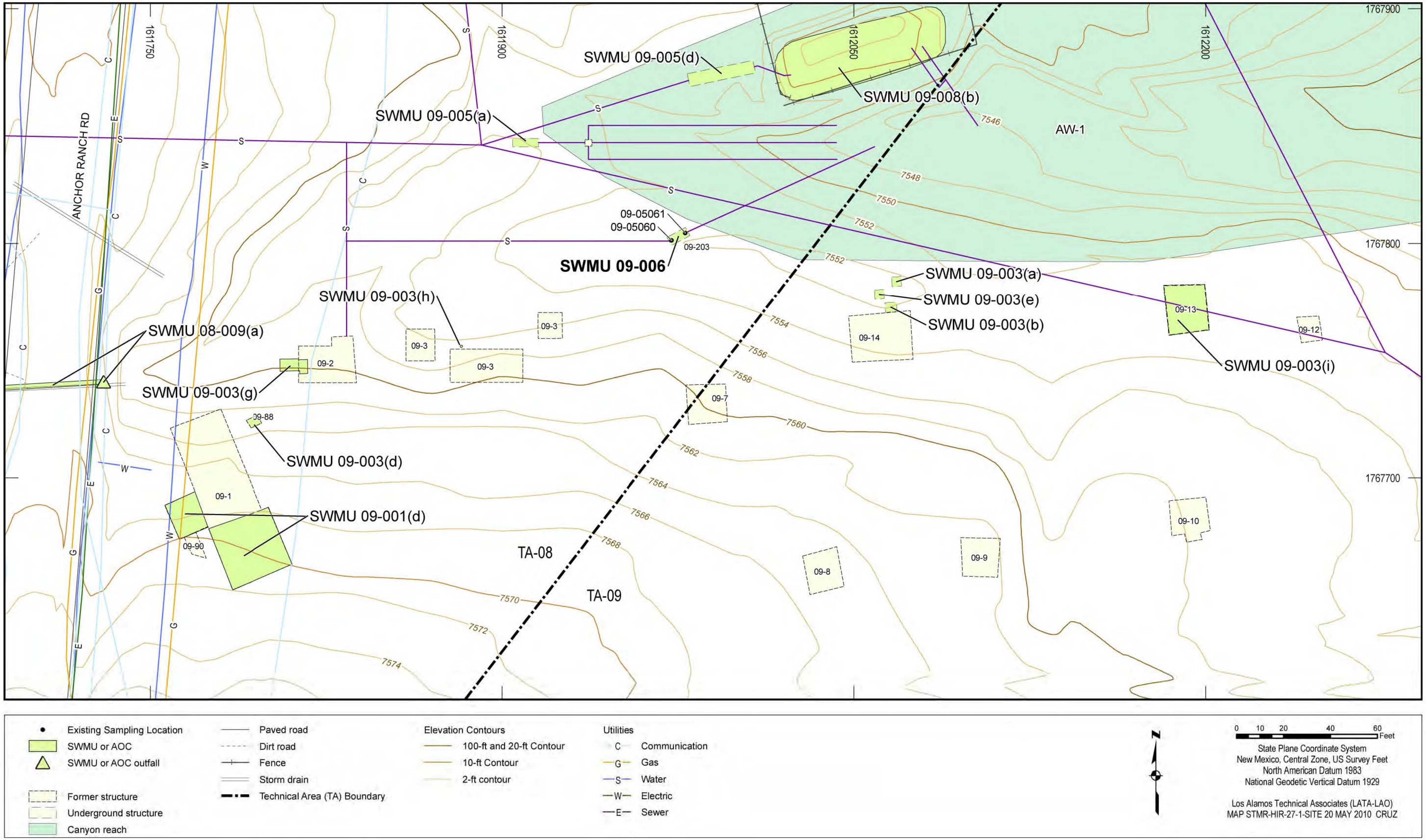

Figure 5.14-1 Site features of SWMU 09-006

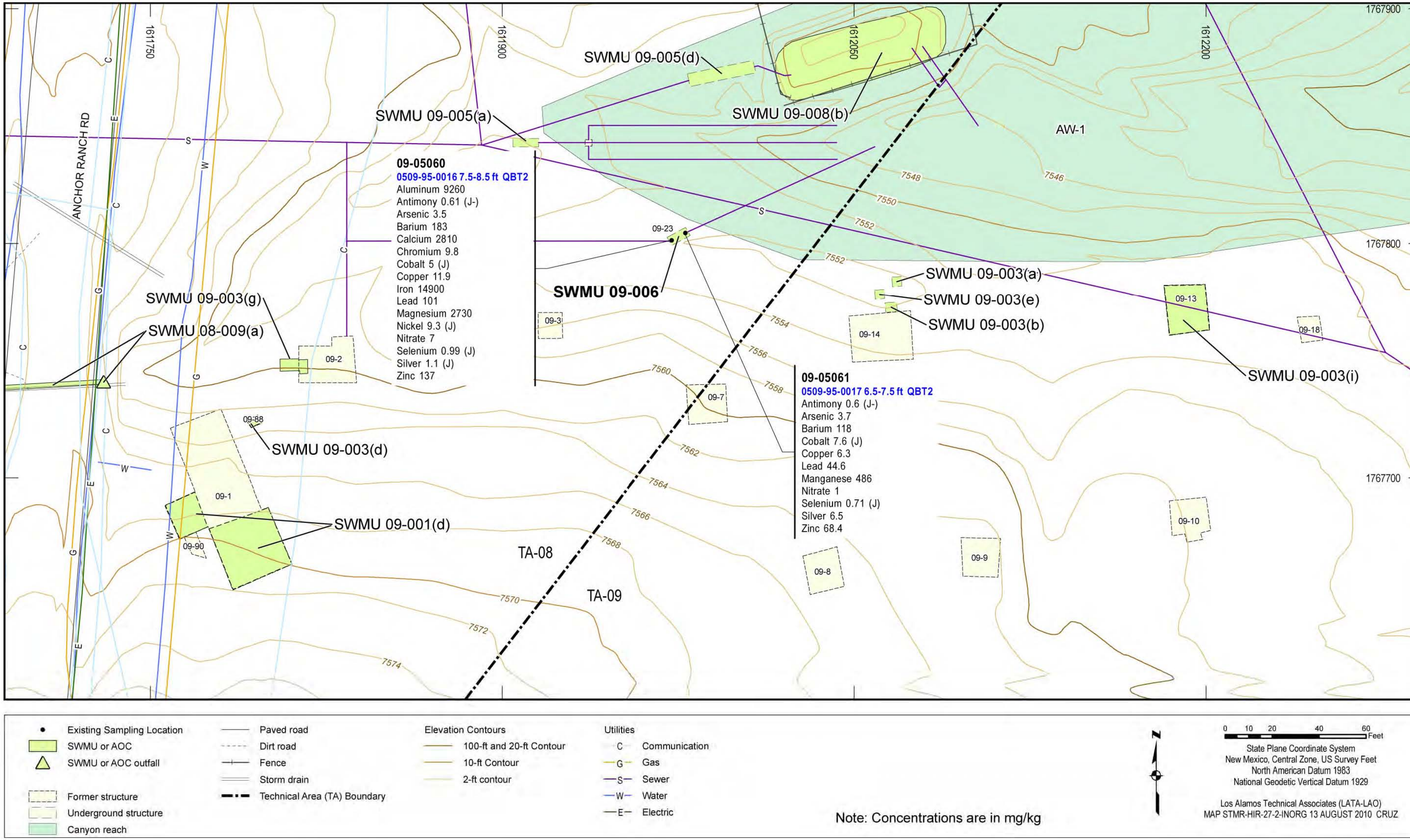

Figure 5.14-2 Inorganic chemicals detected above BVs at SWMU 09-006

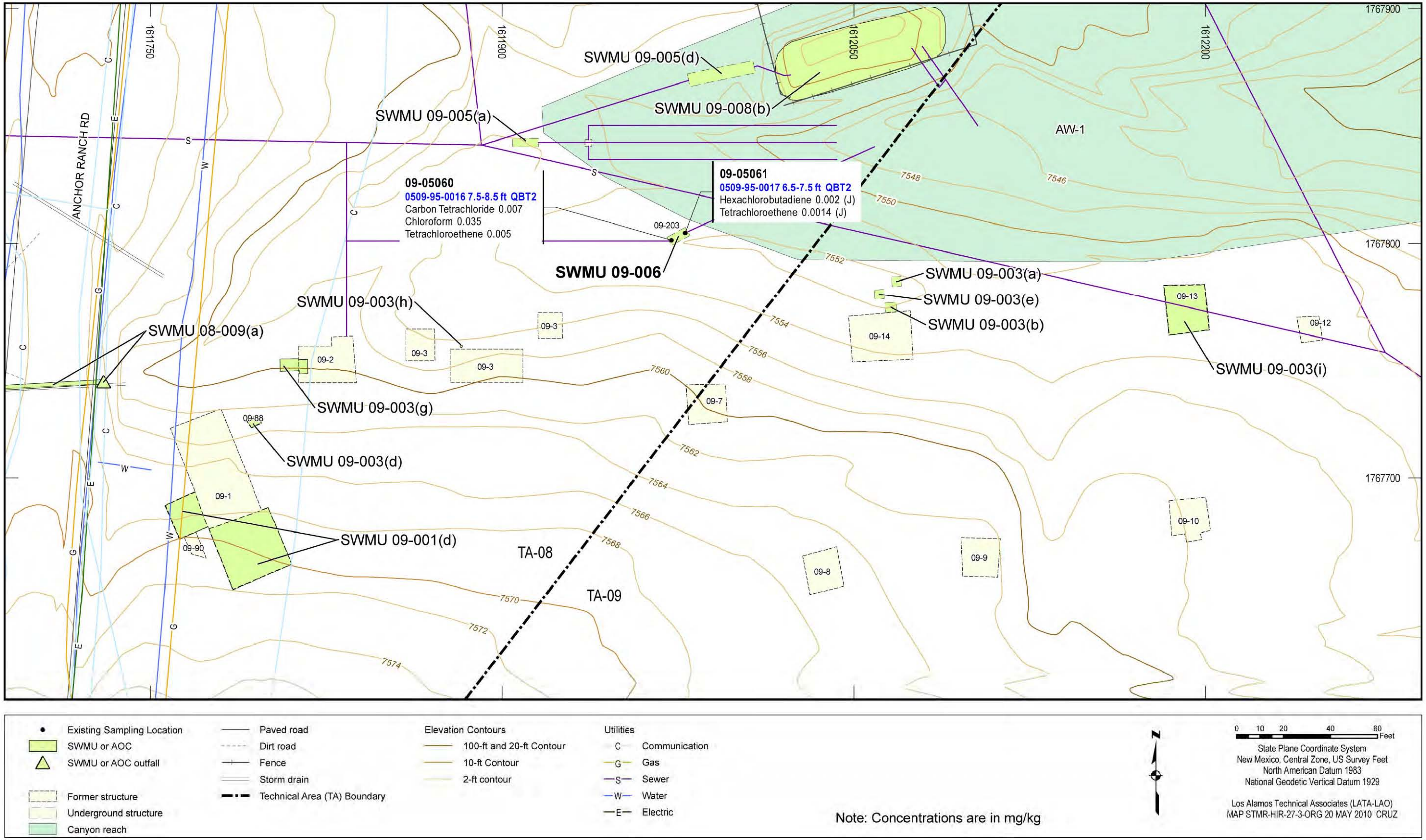

Figure 5.14-3 Organic chemicals detected at SWMU 09-006

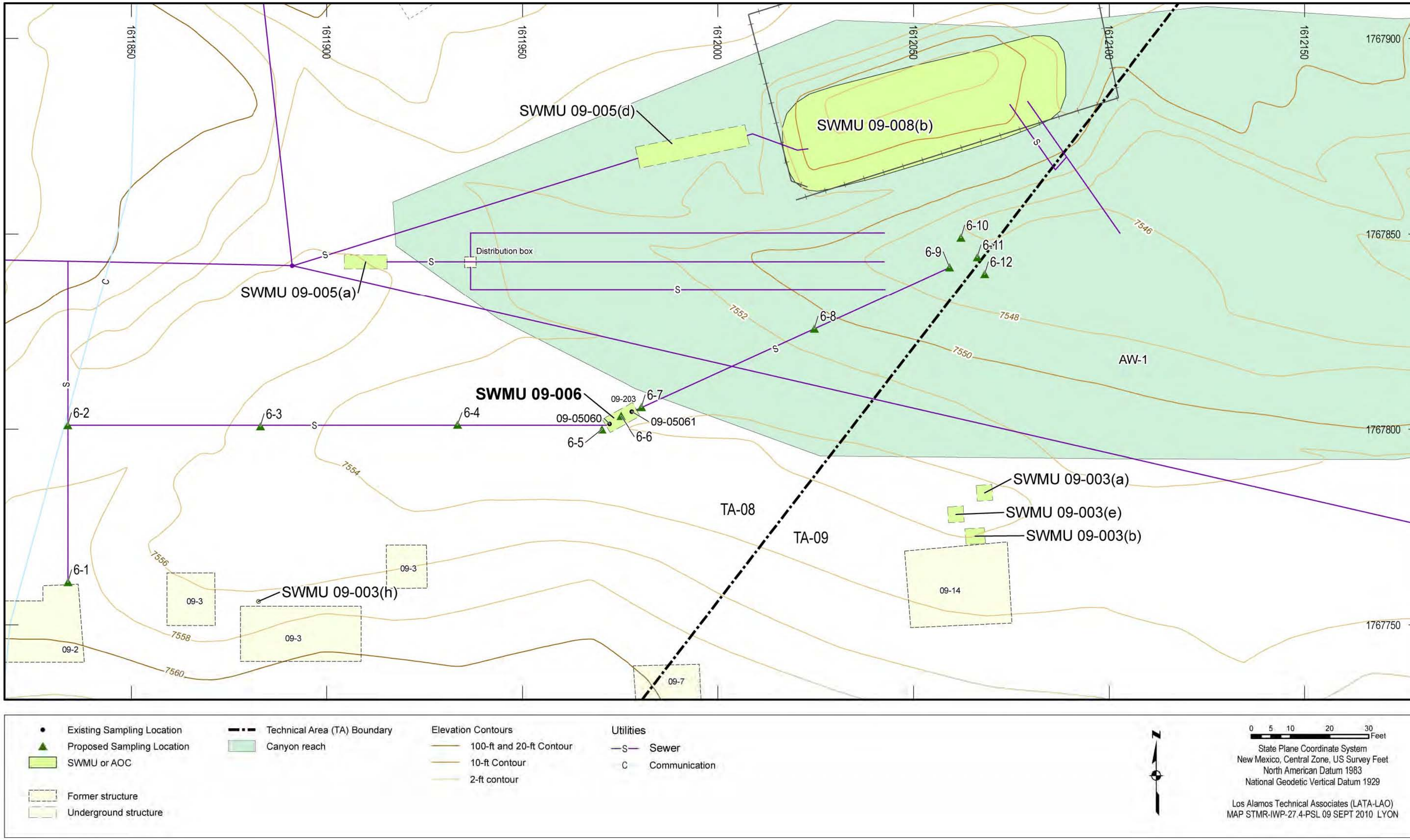

Figure 5.14-4 Proposed sampling locations for SWMU 09-006

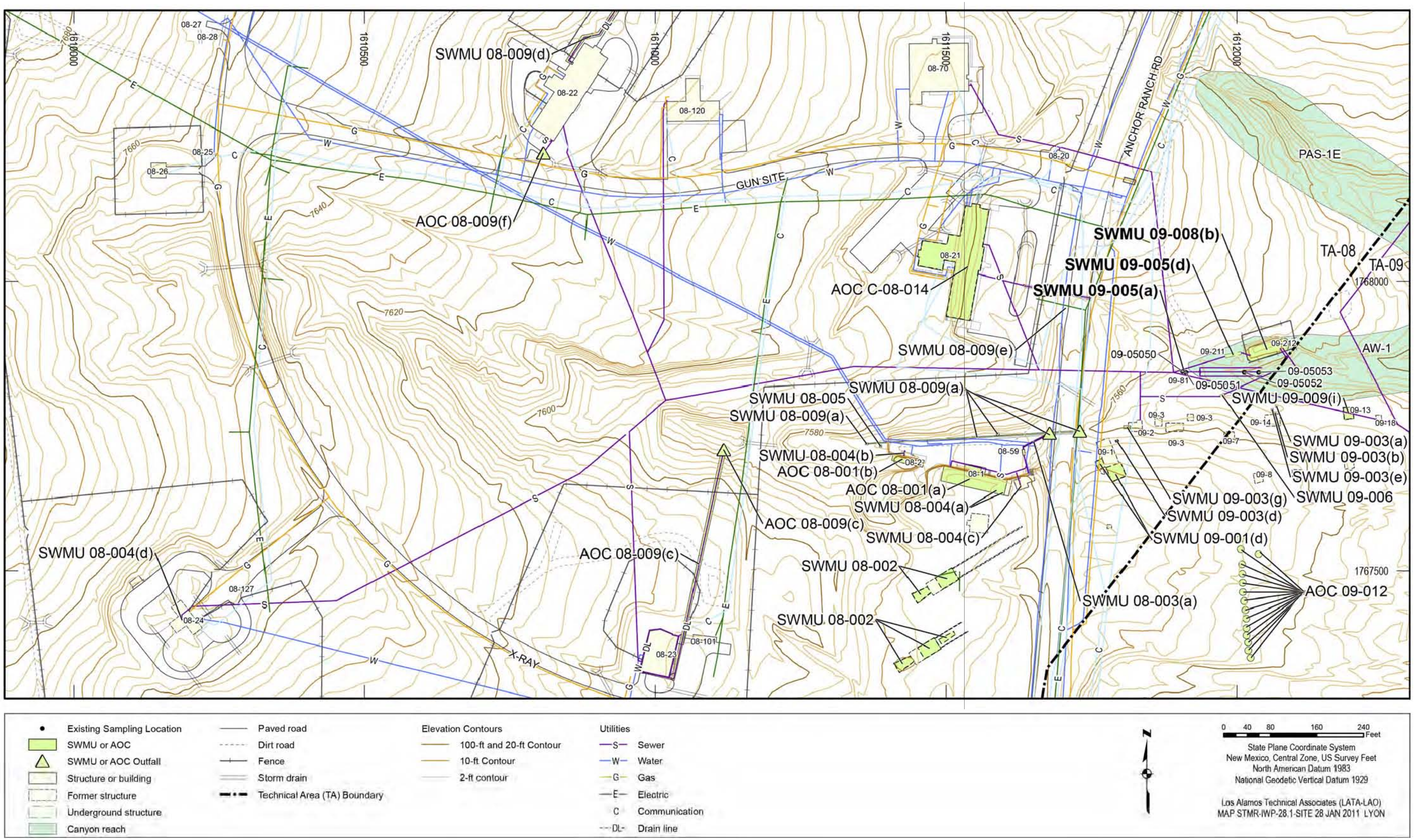

Figure 5.15-1 Site features of Consolidated Unit 09-008(b)-99 [SWMUs 09-005(a), 09-005(d), and 09-008(b)]

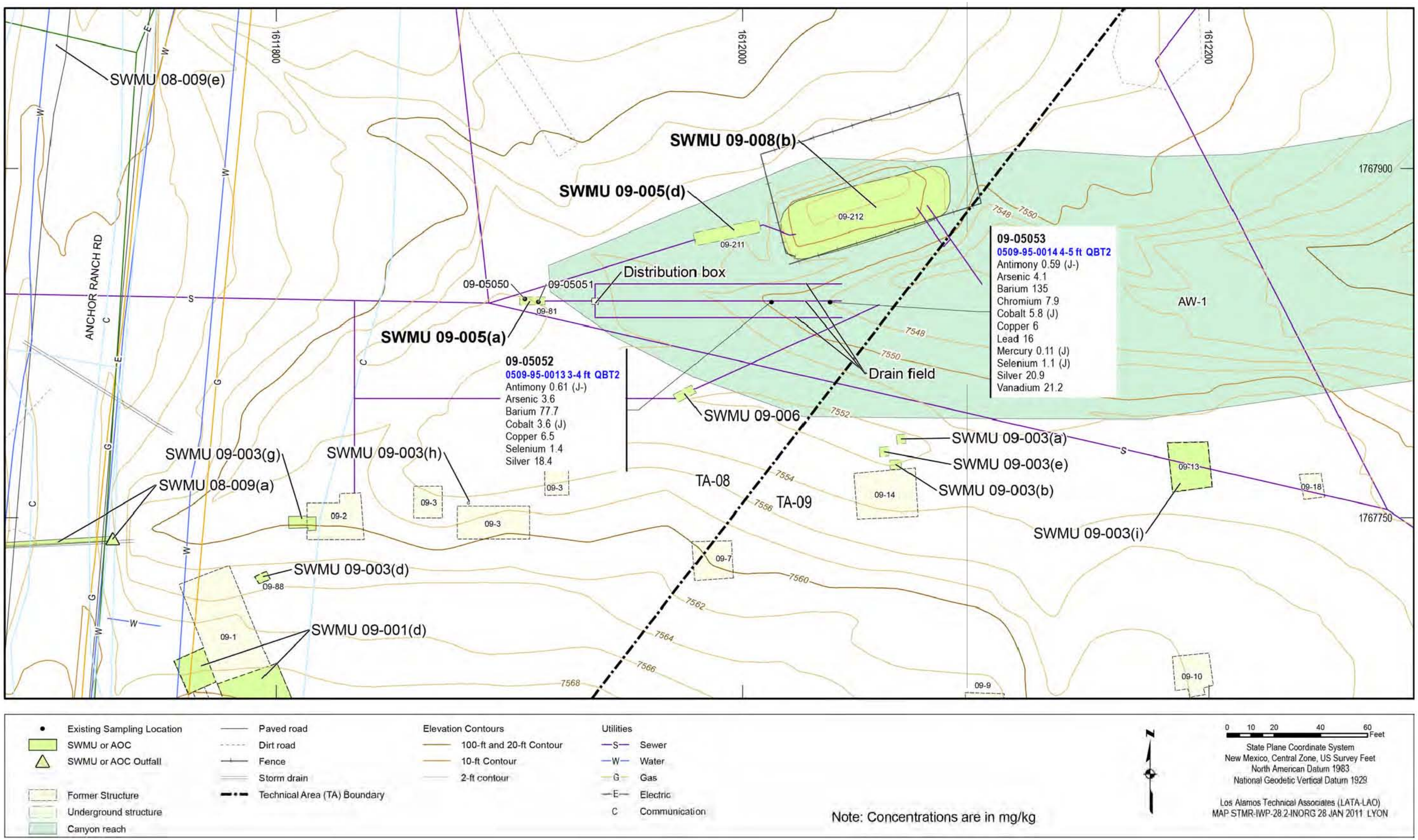

Figure 5.15-2 Inorganic chemicals detected above BVs at SWMU 09-005(a)

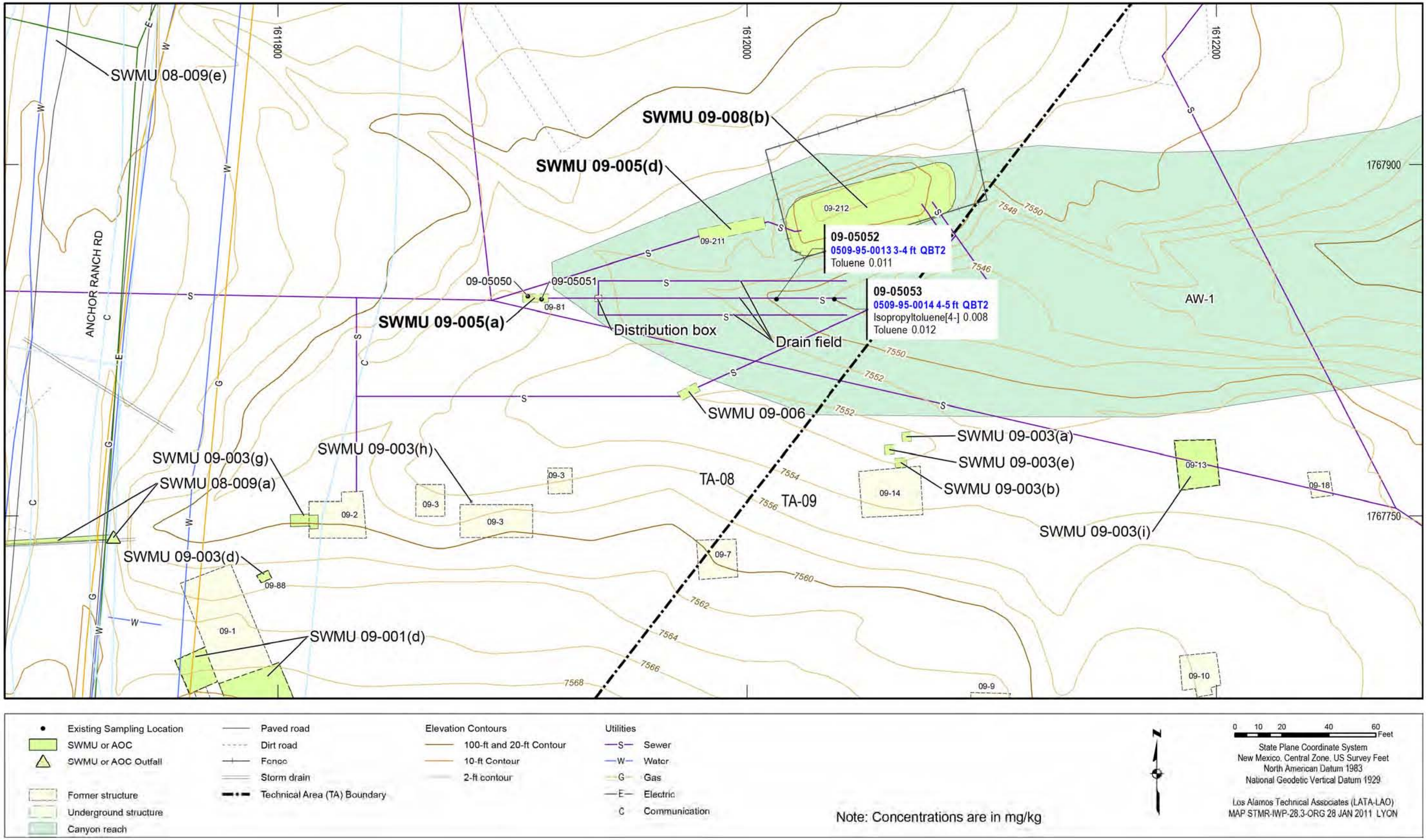

Figure 5.15-3 Organic chemicals detected at SWMU 09-005(a)

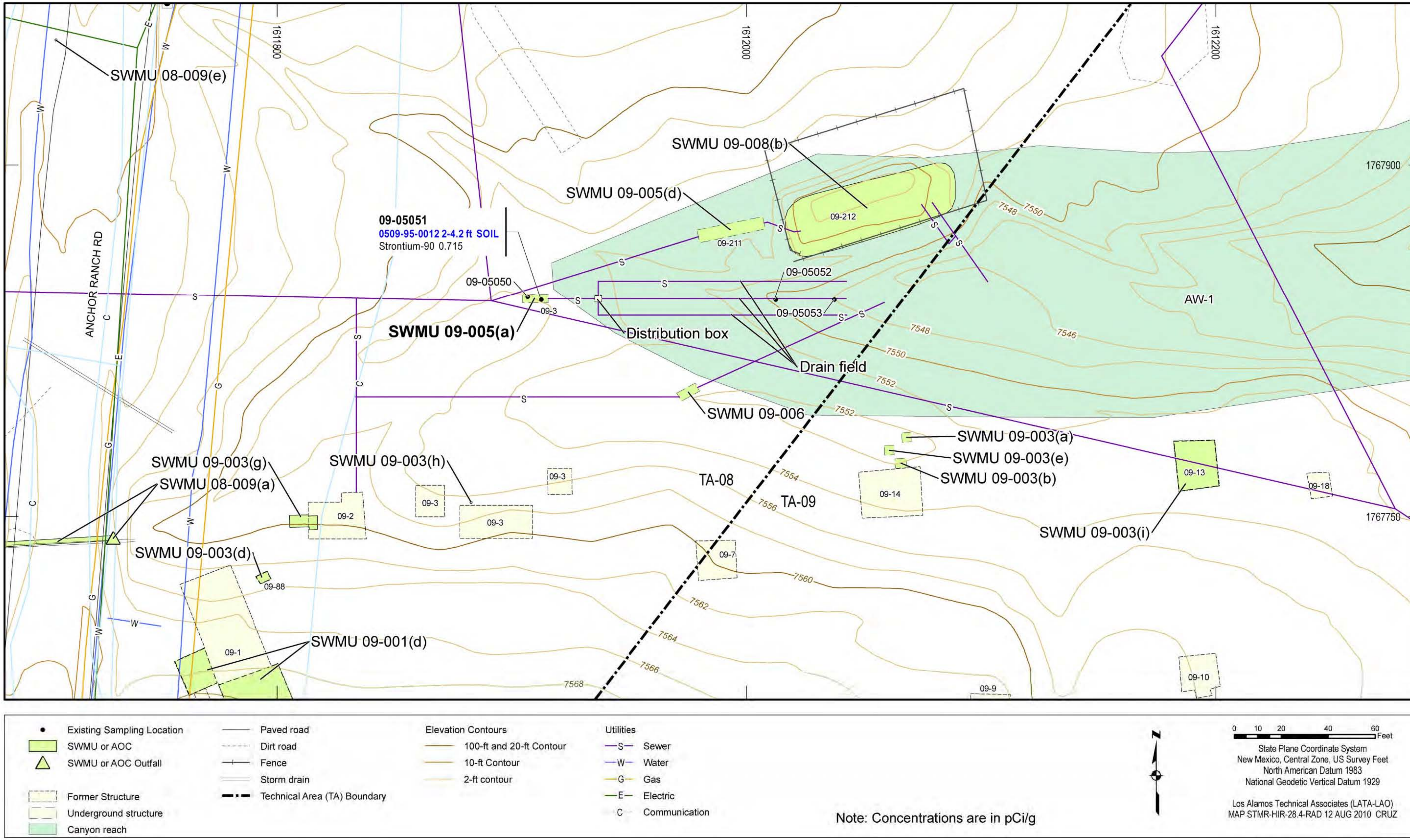

Figure 5.15-4 Radionuclides detected or detected above BVs/FVs at SWMU 09-005(a)

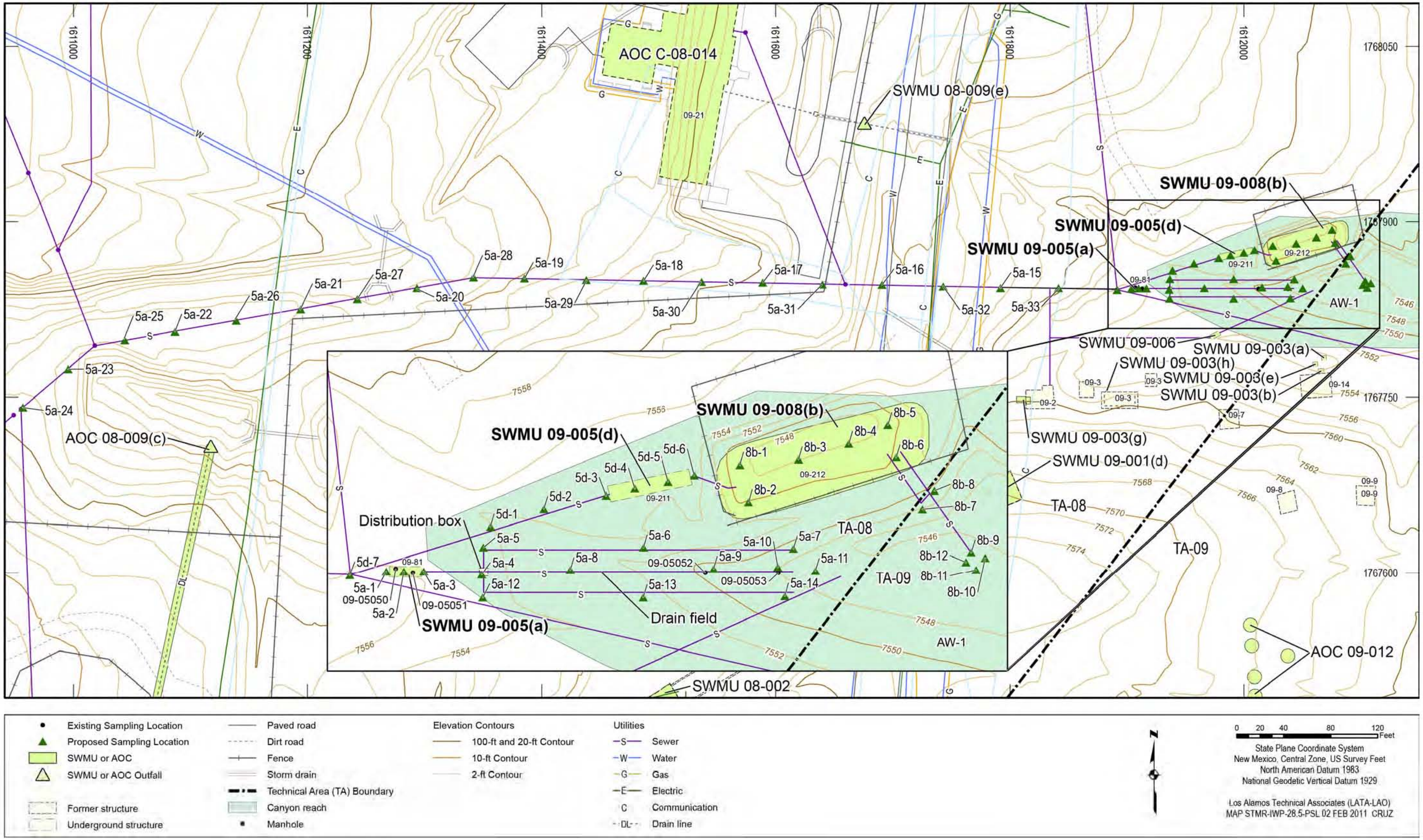

Figure 5.15-5 Proposed sampling locations for Consolidated Unit 09-008(b)-99 [SWMUs 09-005(a), 09-005(d), and 09-008(b)]

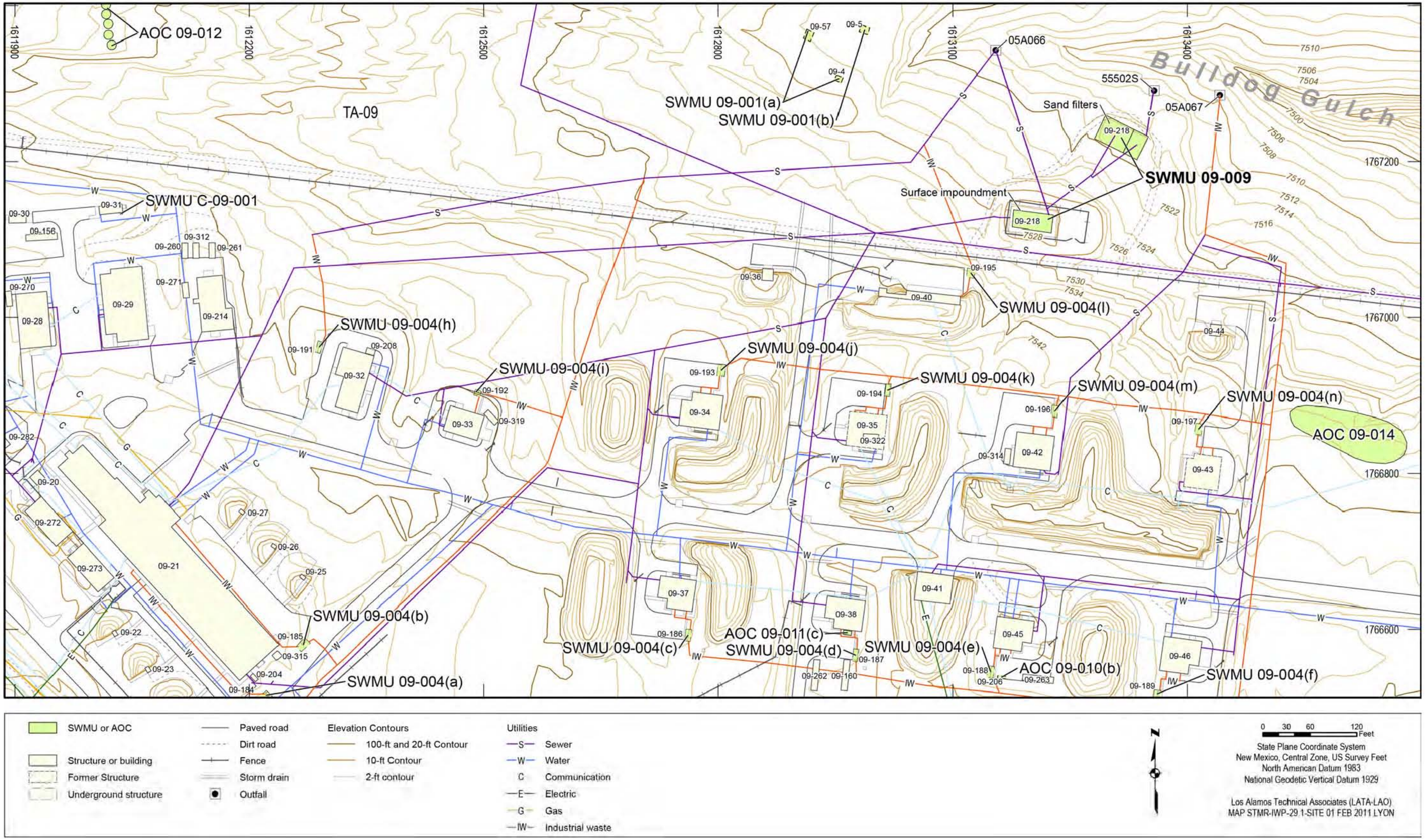

Figure 5.16-1 Site features of SWMU 09-009

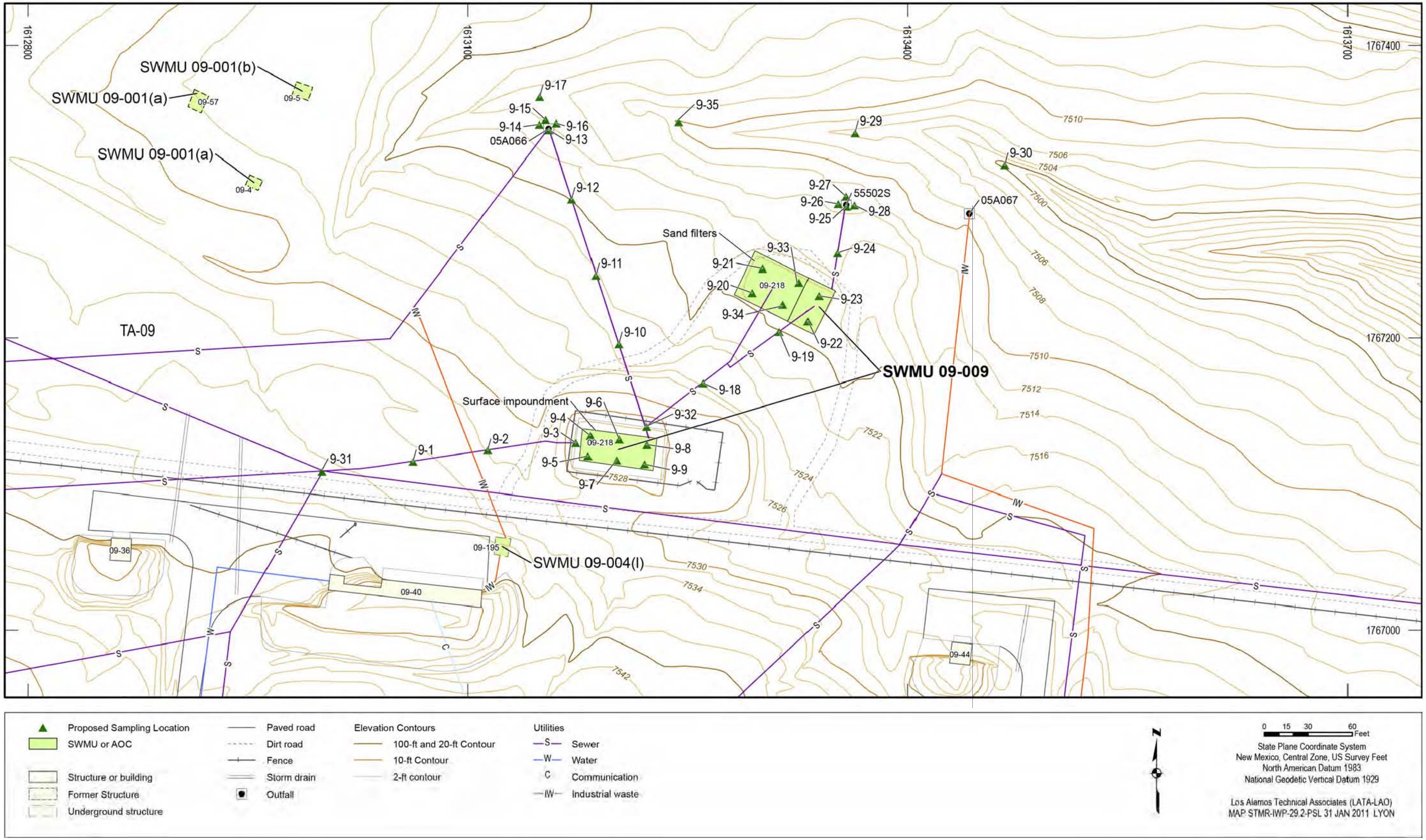

Figure 5.16-2 Proposed sampling locations for SWMU 09-009

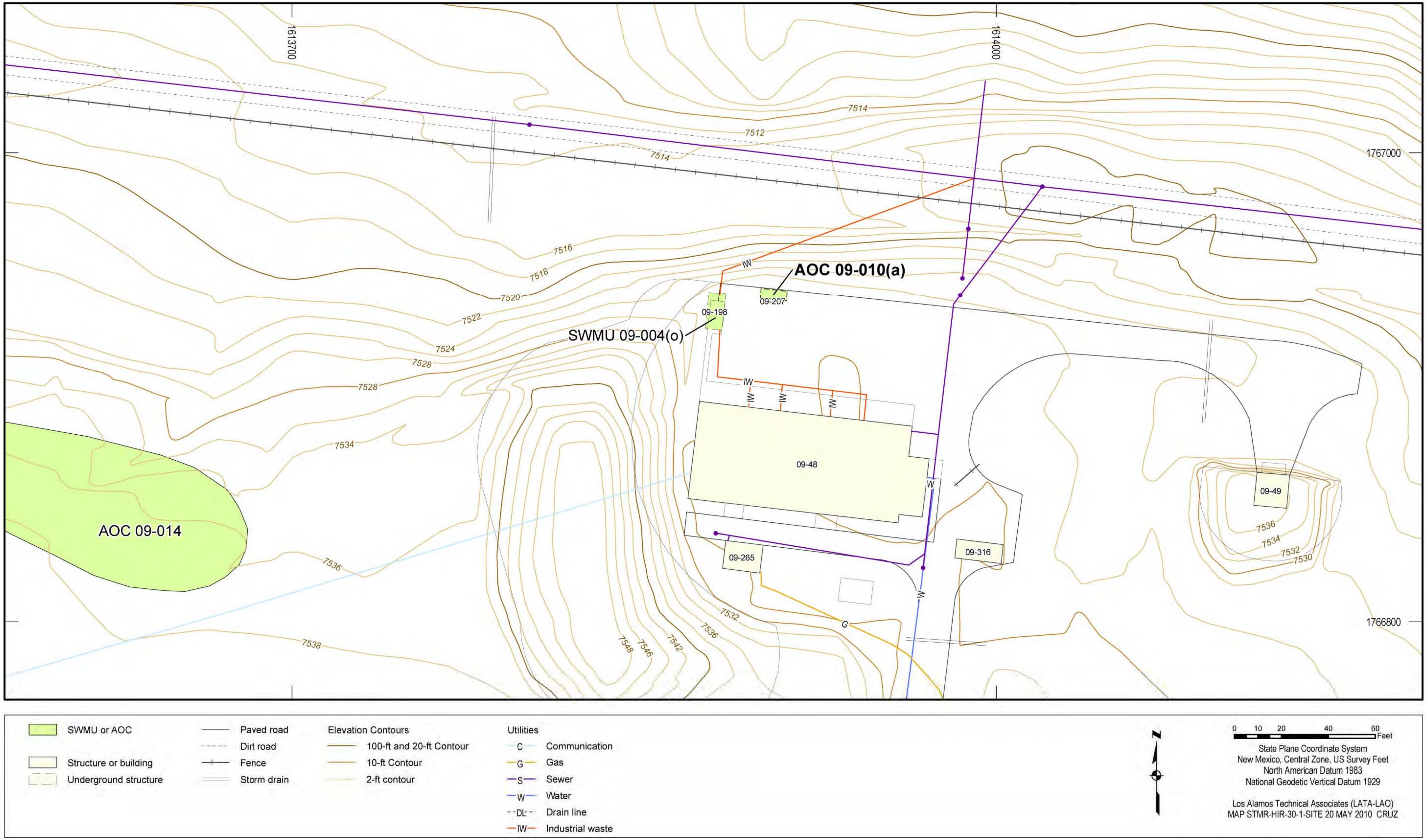

Figure 5.17-1 Site features of AOC 09-010(a)

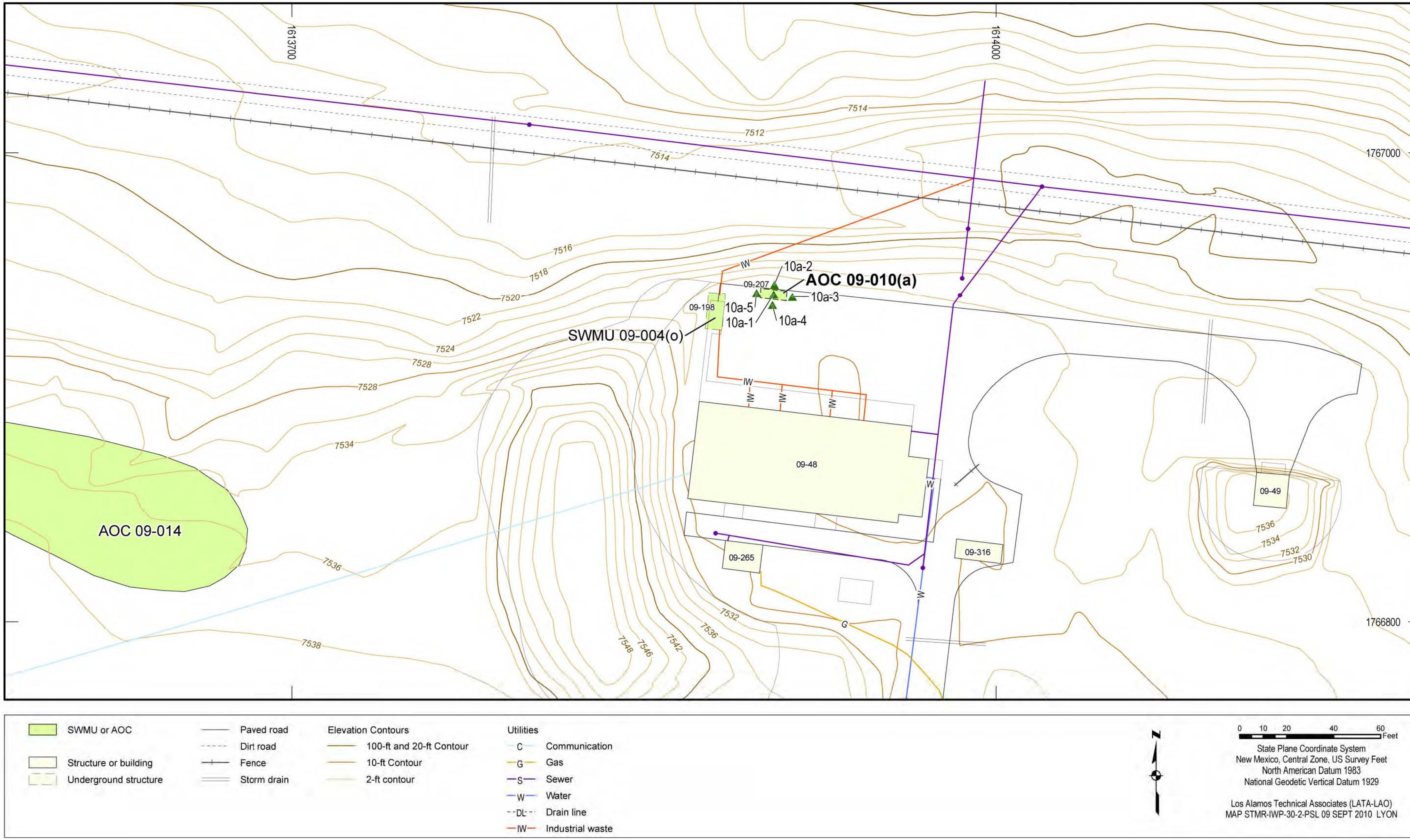

Figure 5.17-2 Proposed sampling locations for AOC 09-010(a)

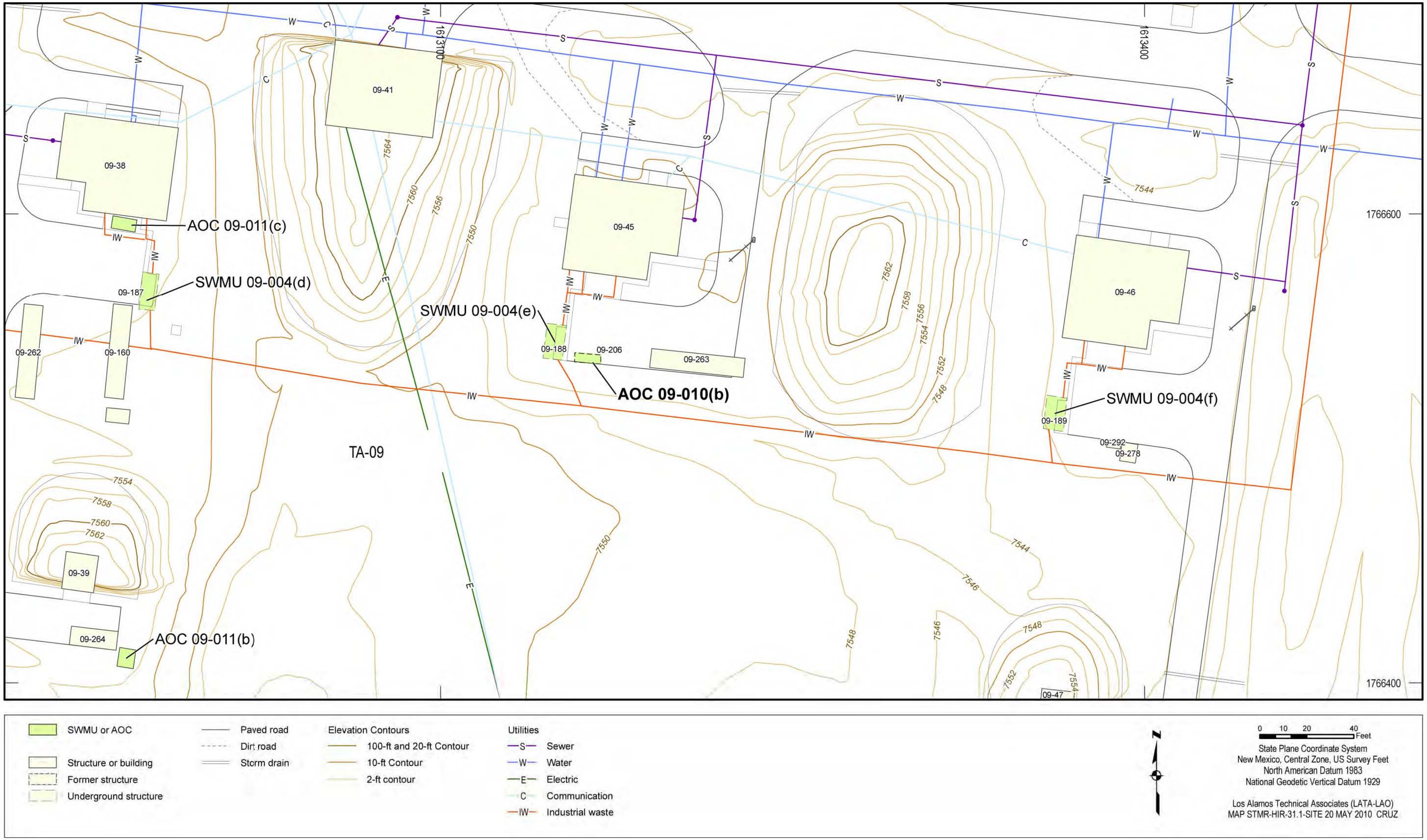

Figure 5.18-1 Site features of AOC 09-010(b)

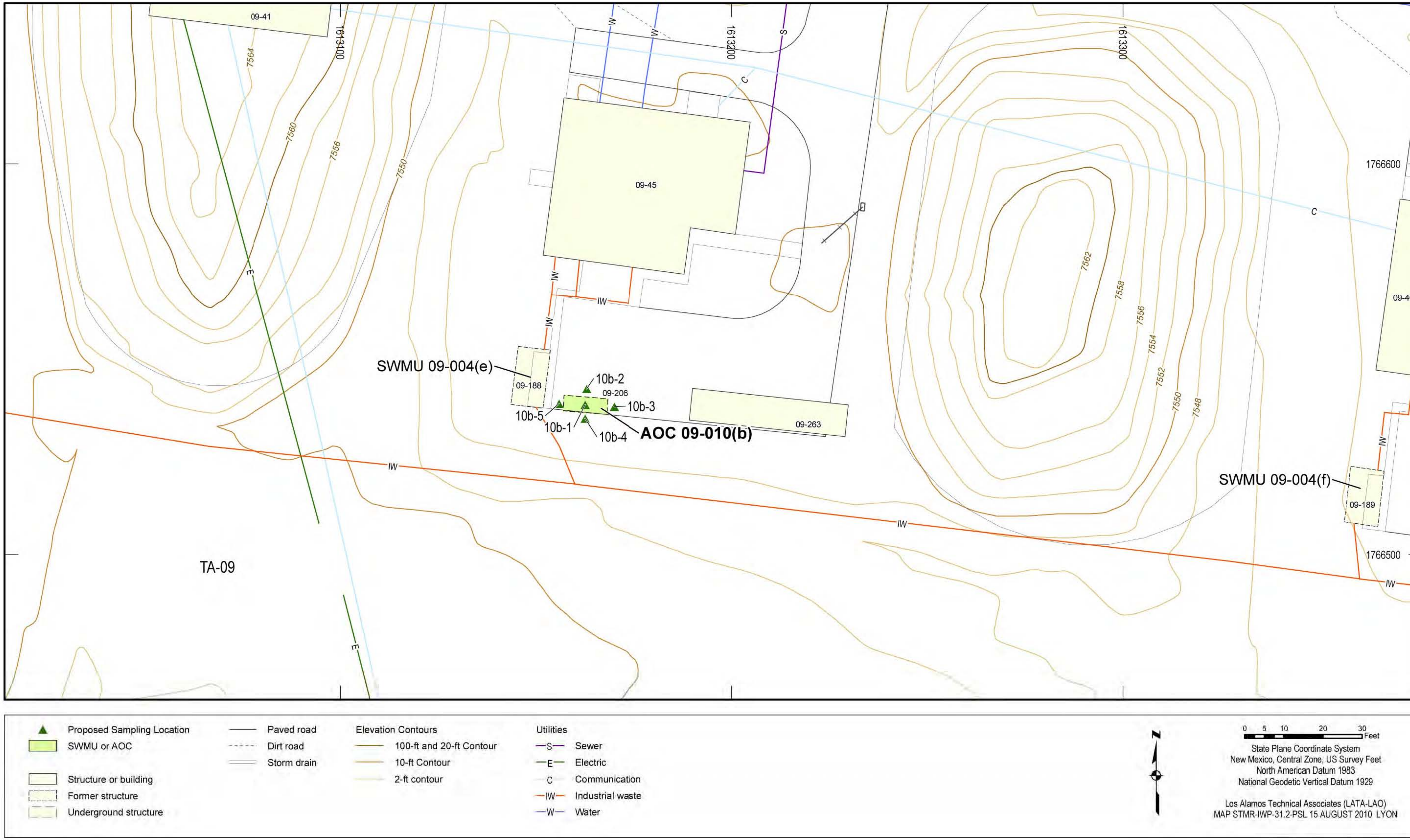

Figure 5.18-2 Proposed sampling locations for AOC 09-010(b)

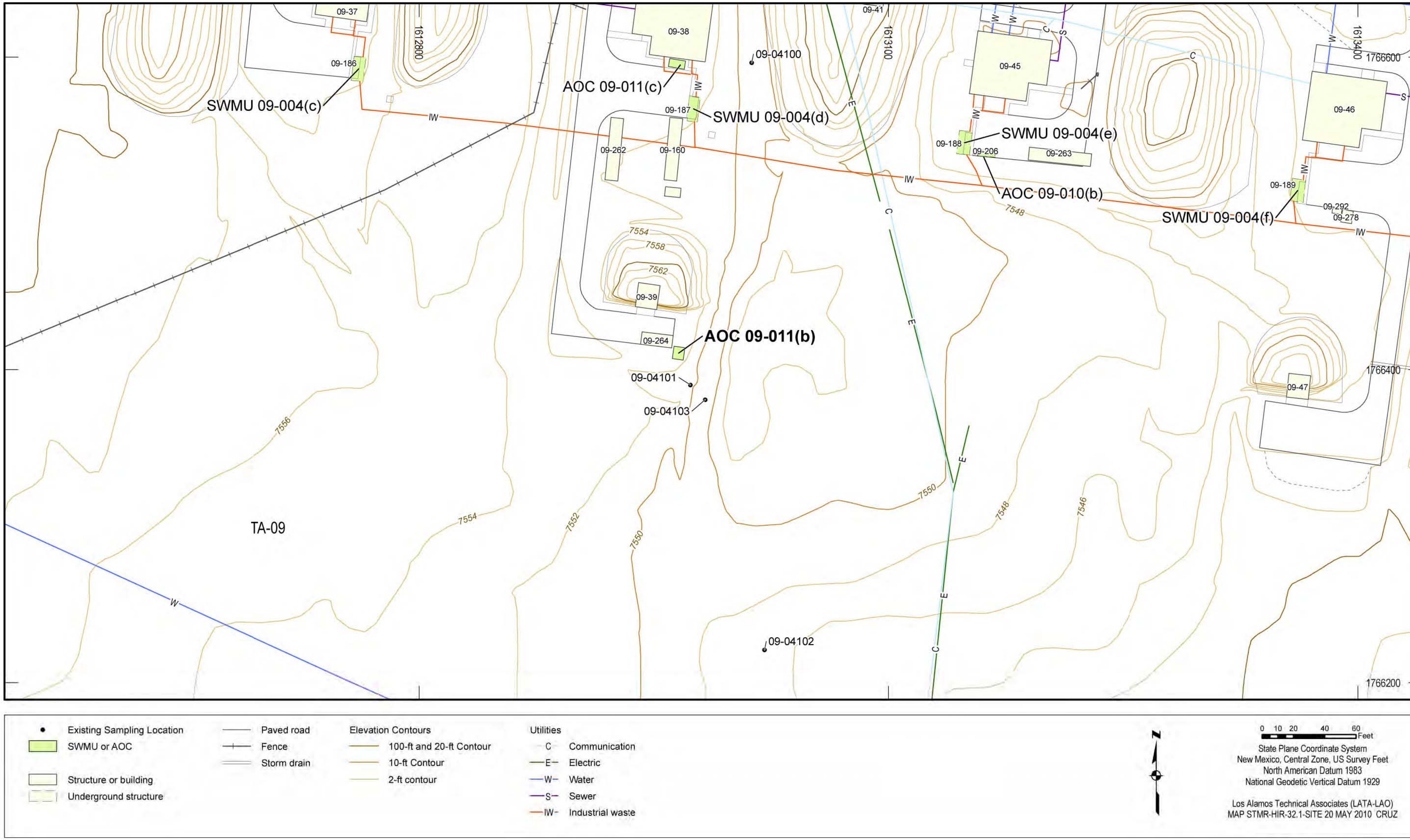

Figure 5.19-1 Site features of AOC 09-011(b)

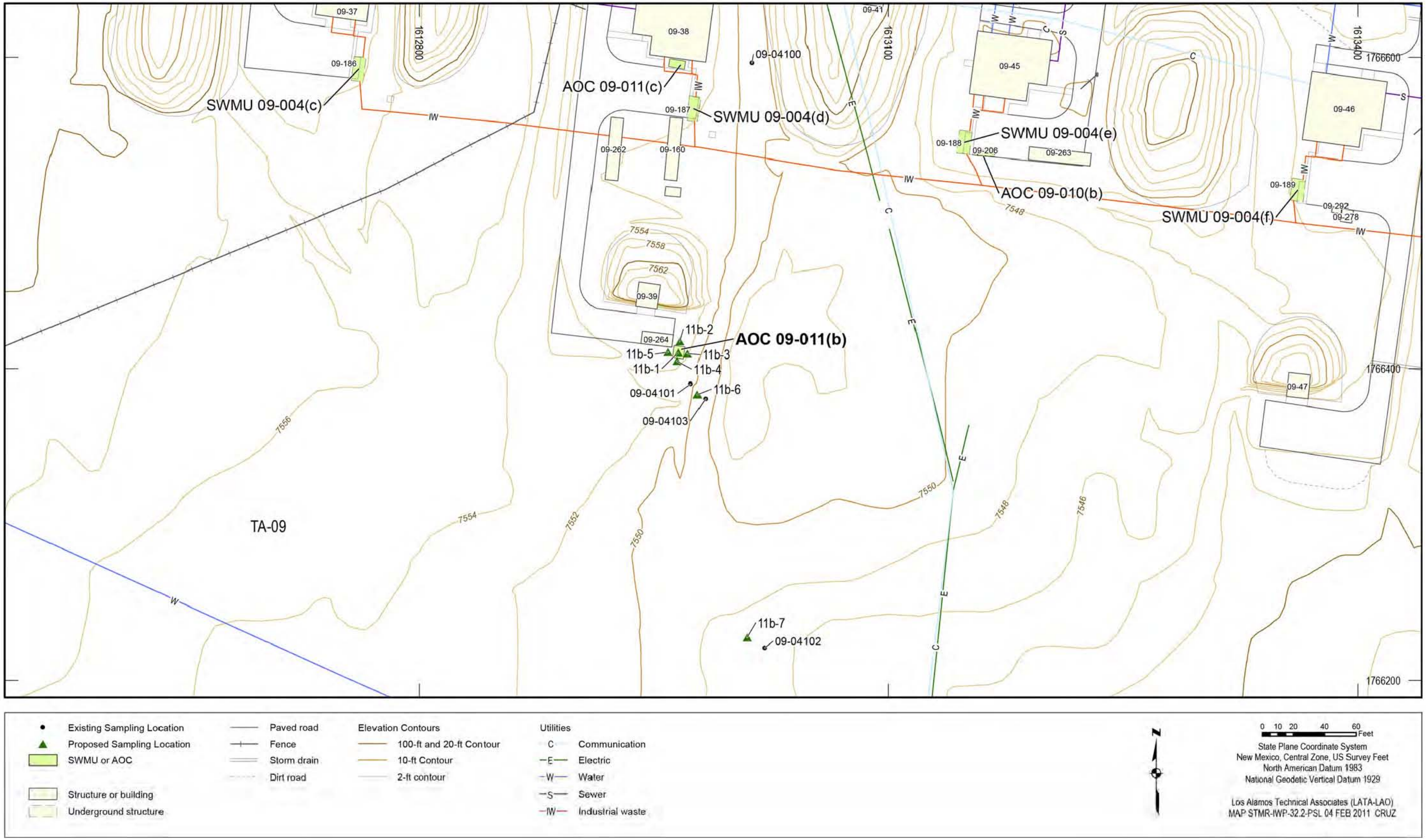

Figure 5.19-2 Proposed sampling locations for AOC 09-011(b)

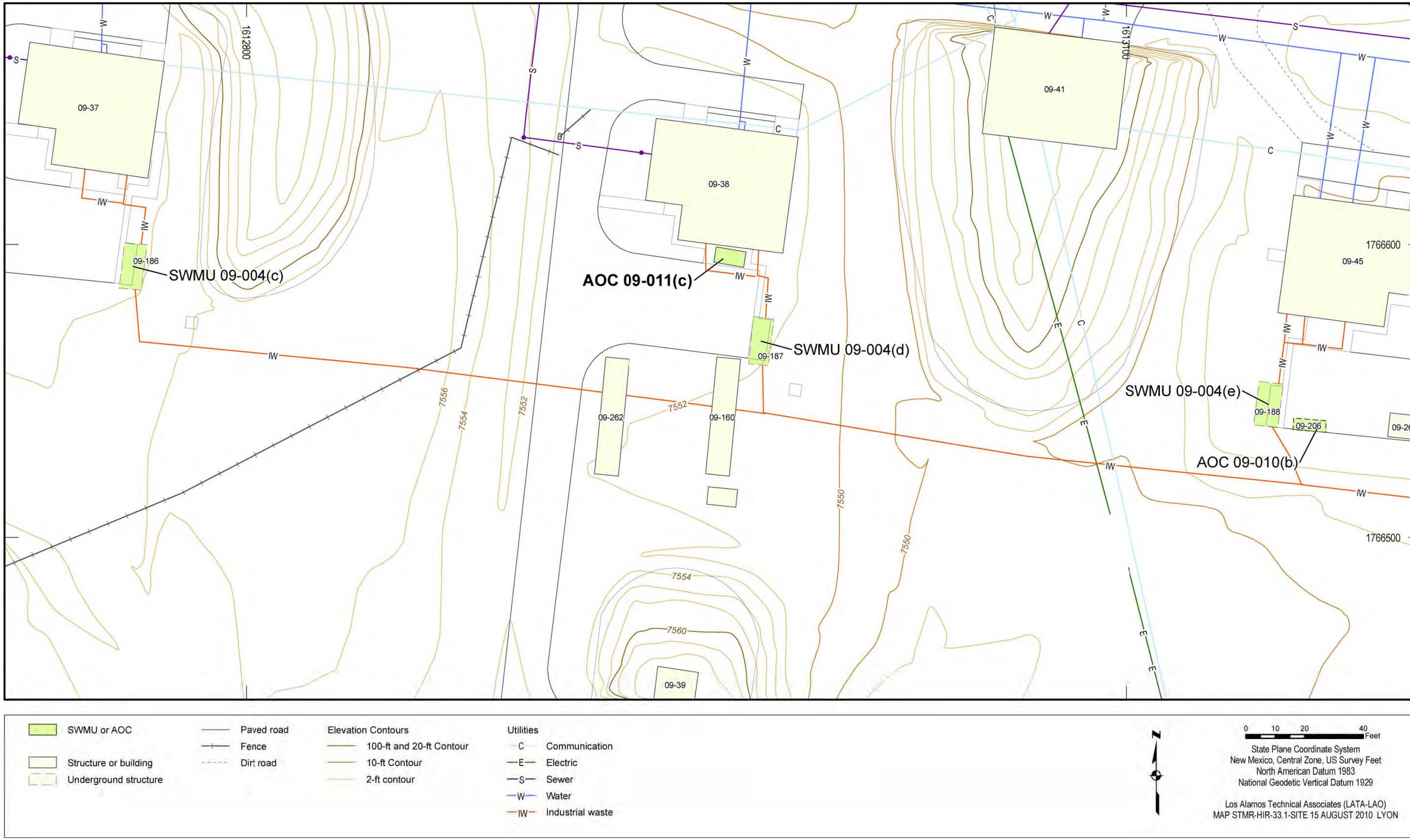

Figure 5.20-1 Site features of AOC 09-011(c)

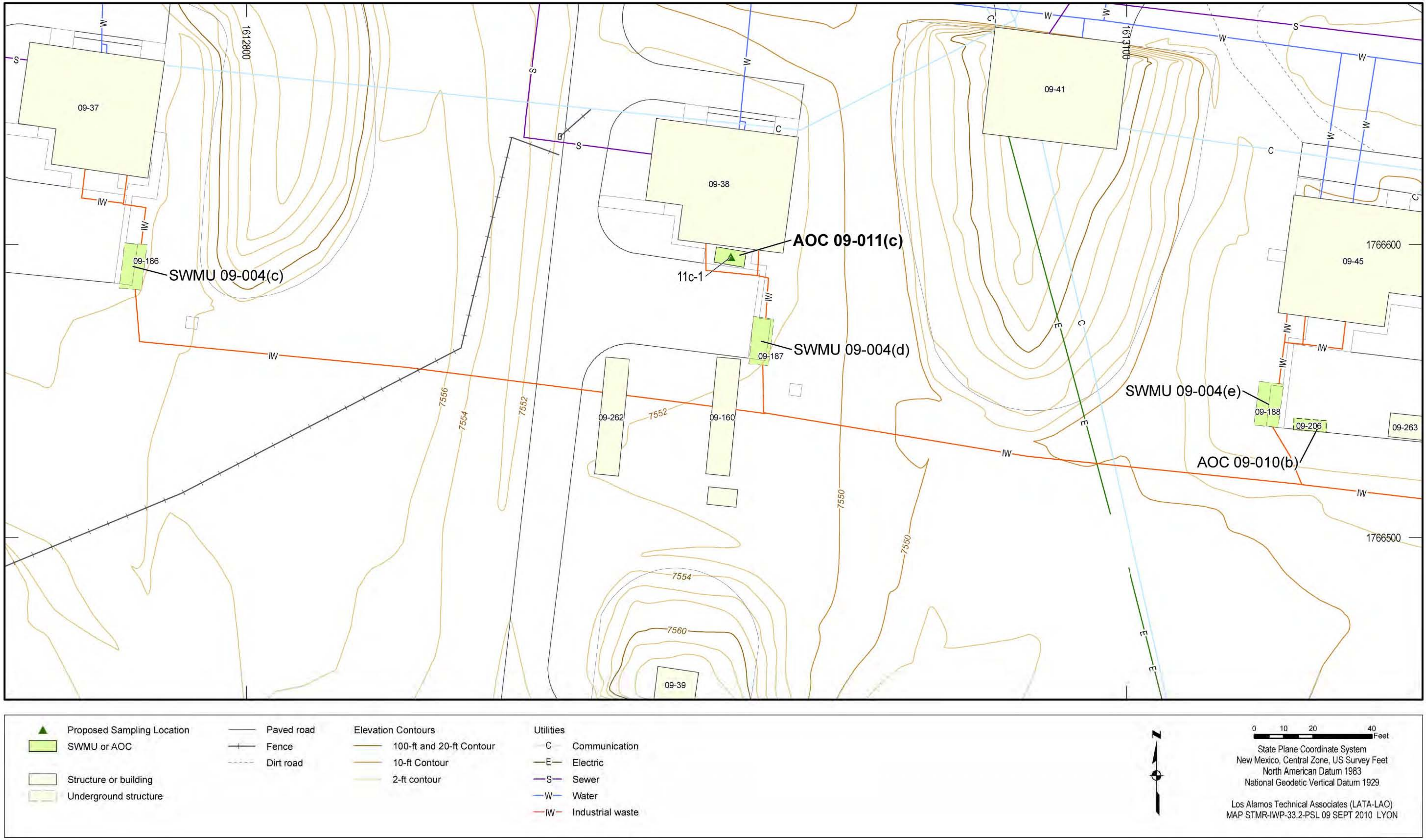

Figure 5.20-2 Proposed sampling locations for AOC 09-011(c)

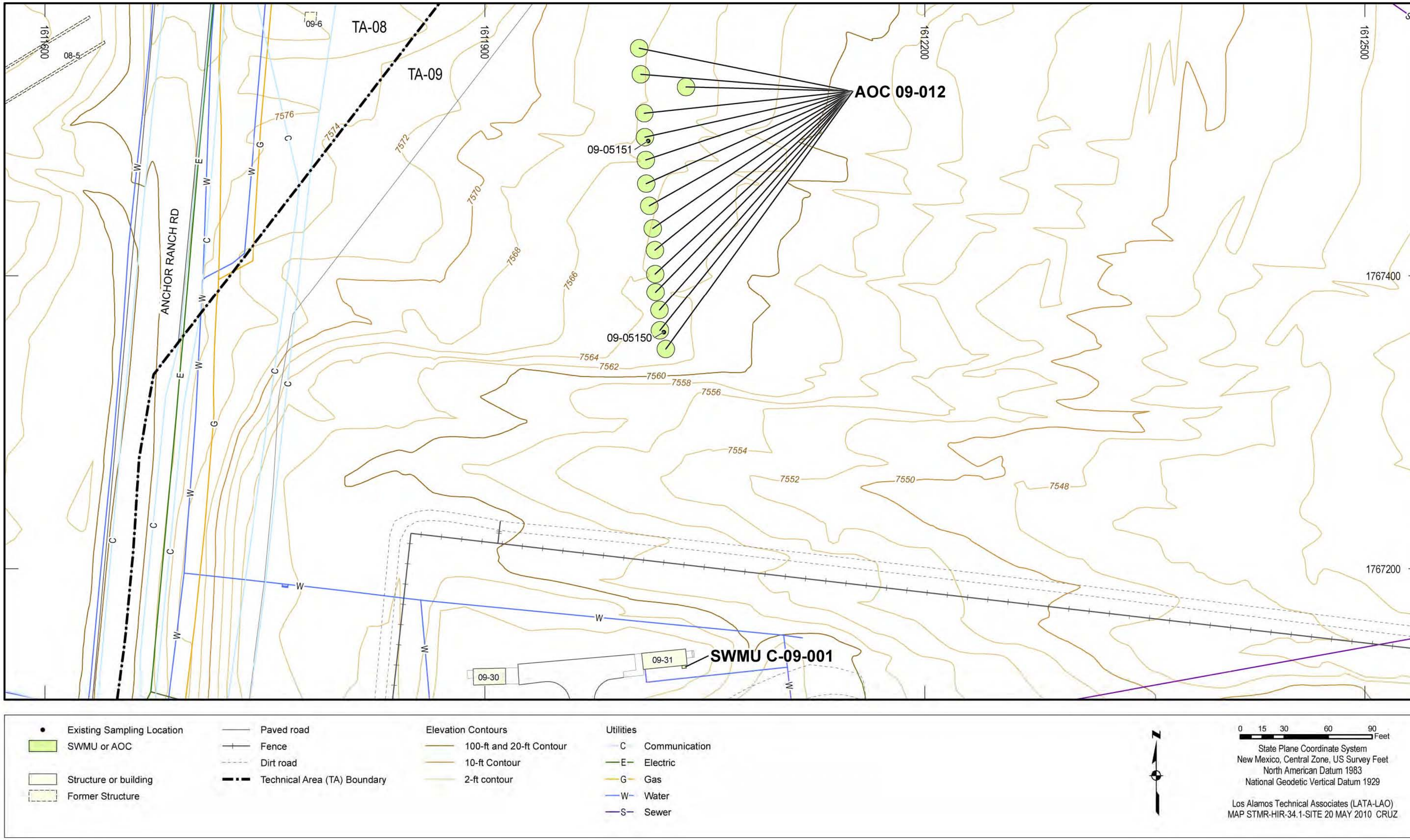

Figure 5.21-1 Site features of AOC 09-012

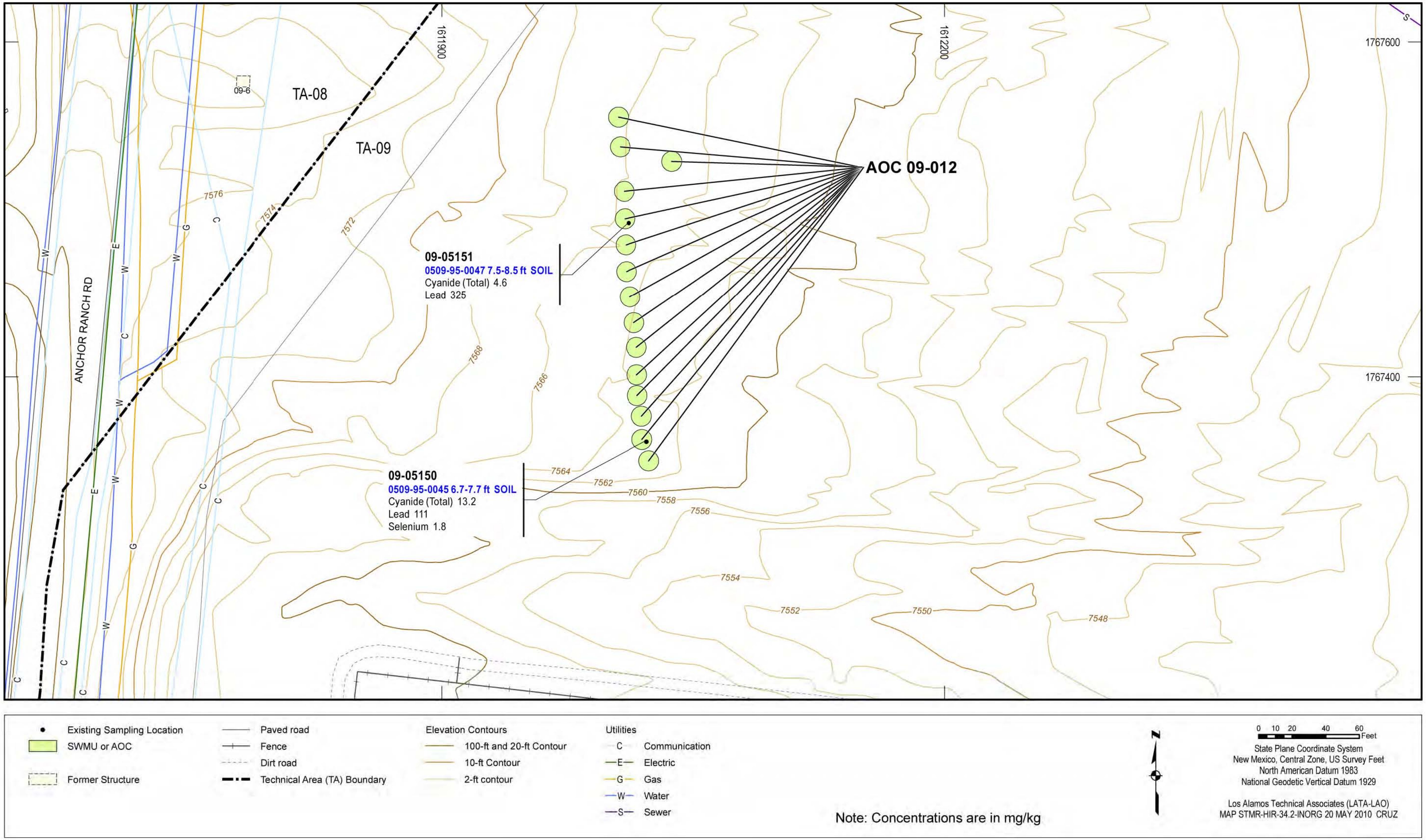

Figure 5.21-2 Inorganic chemicals detected above BVs at AOC 09-012

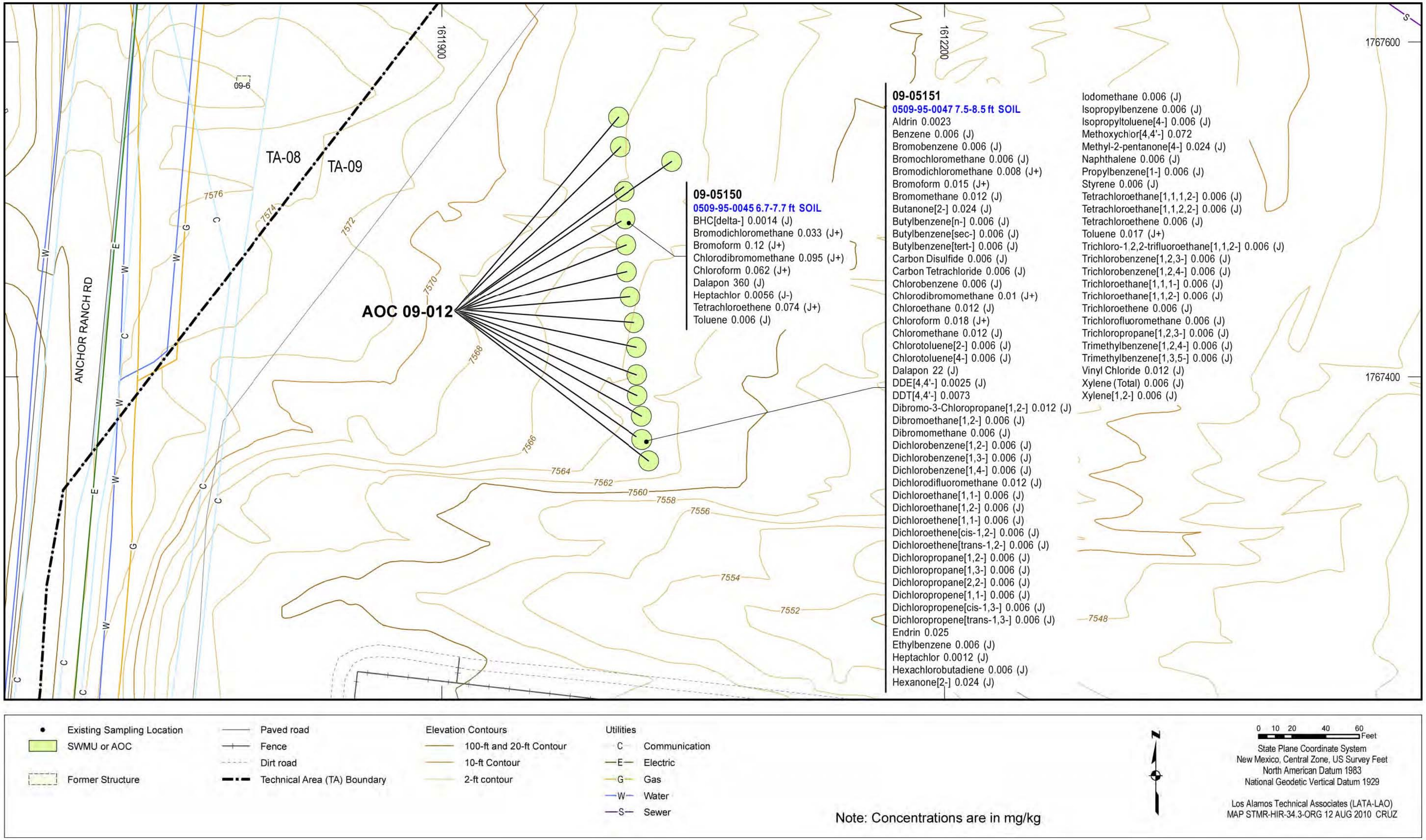

Figure 5.21-3 Organic chemicals detected at AOC 09-012

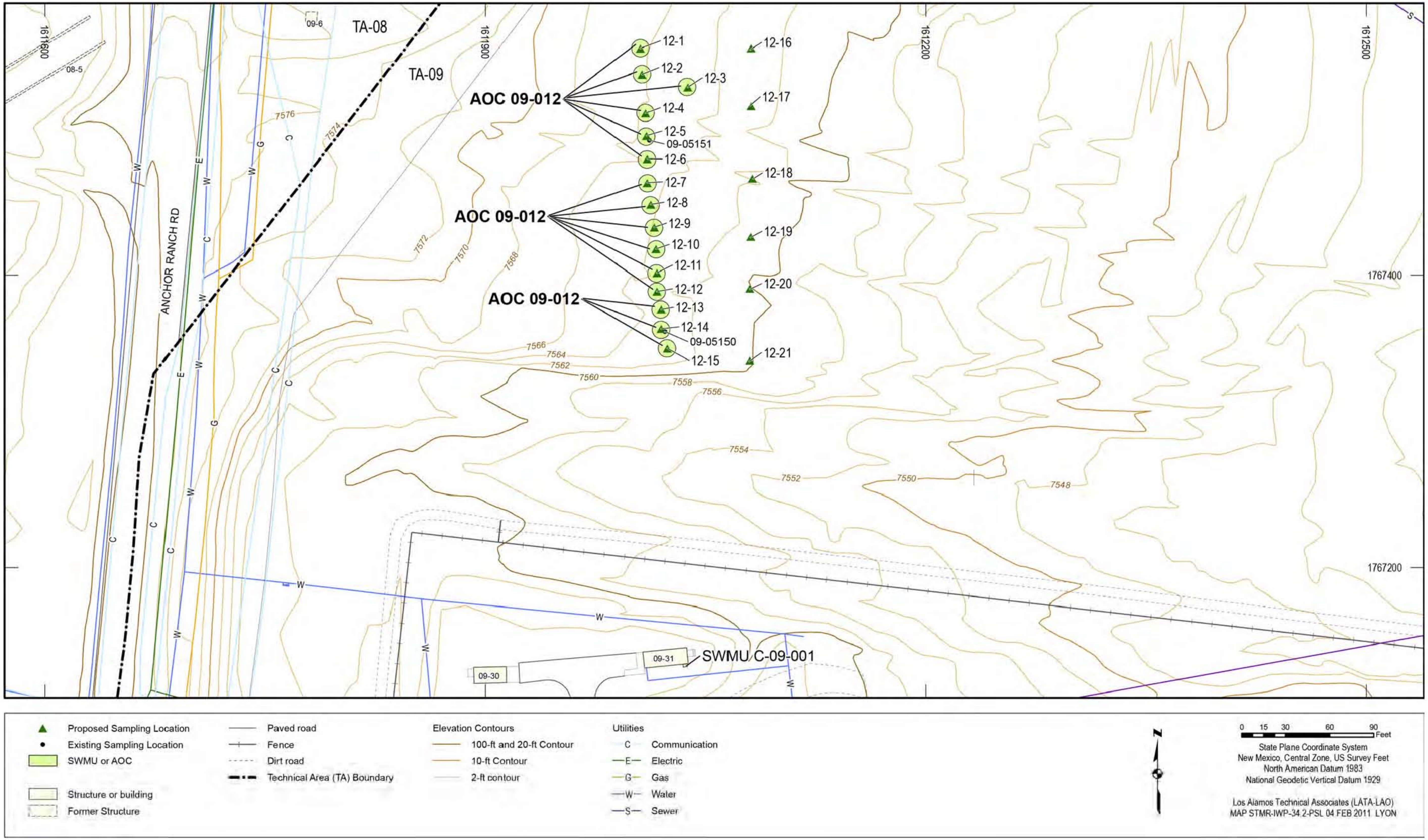

Figure 5.21-4 Proposed sampling locations for AOC 09-012

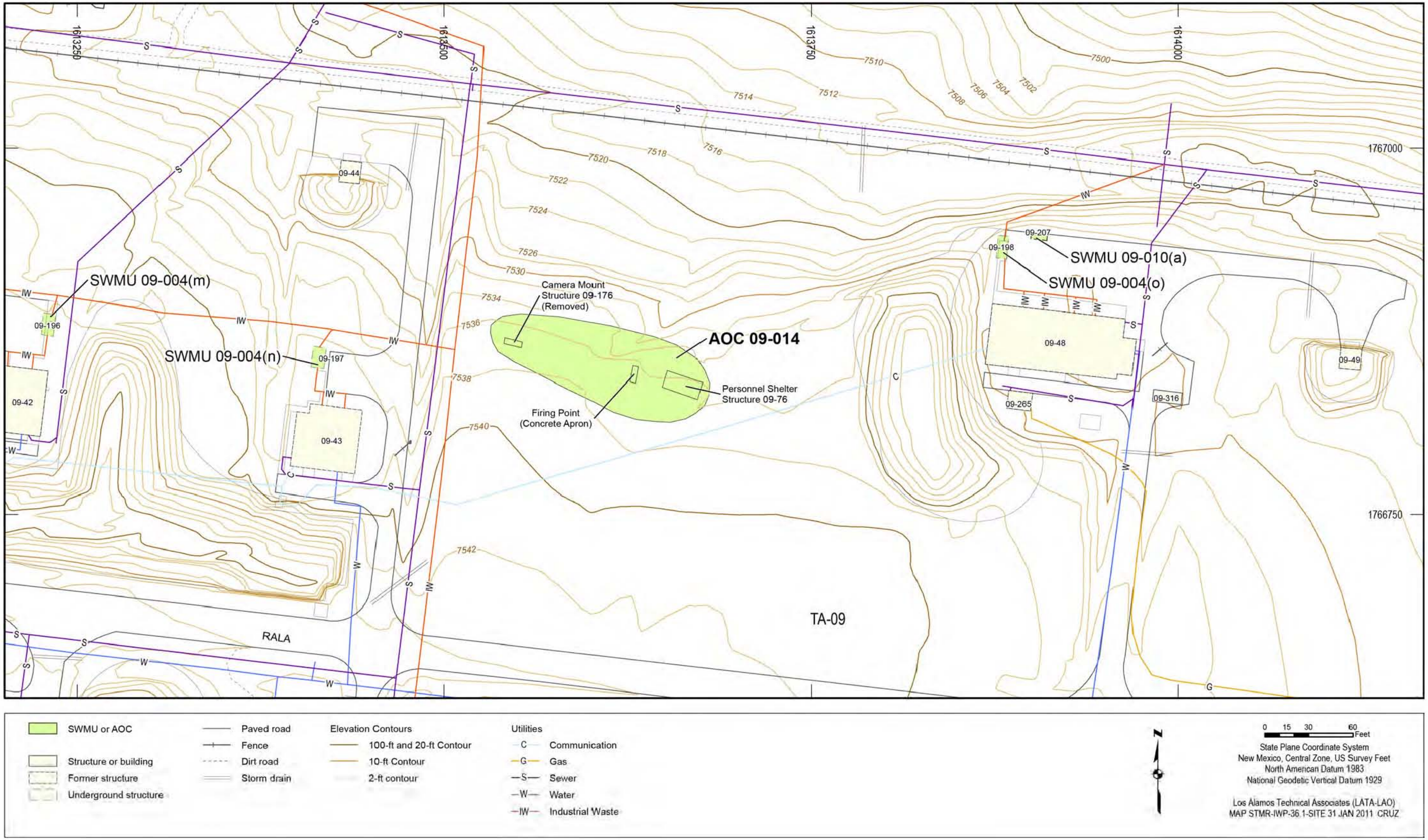

Figure 5.23-1 Site features of AOC 09-014

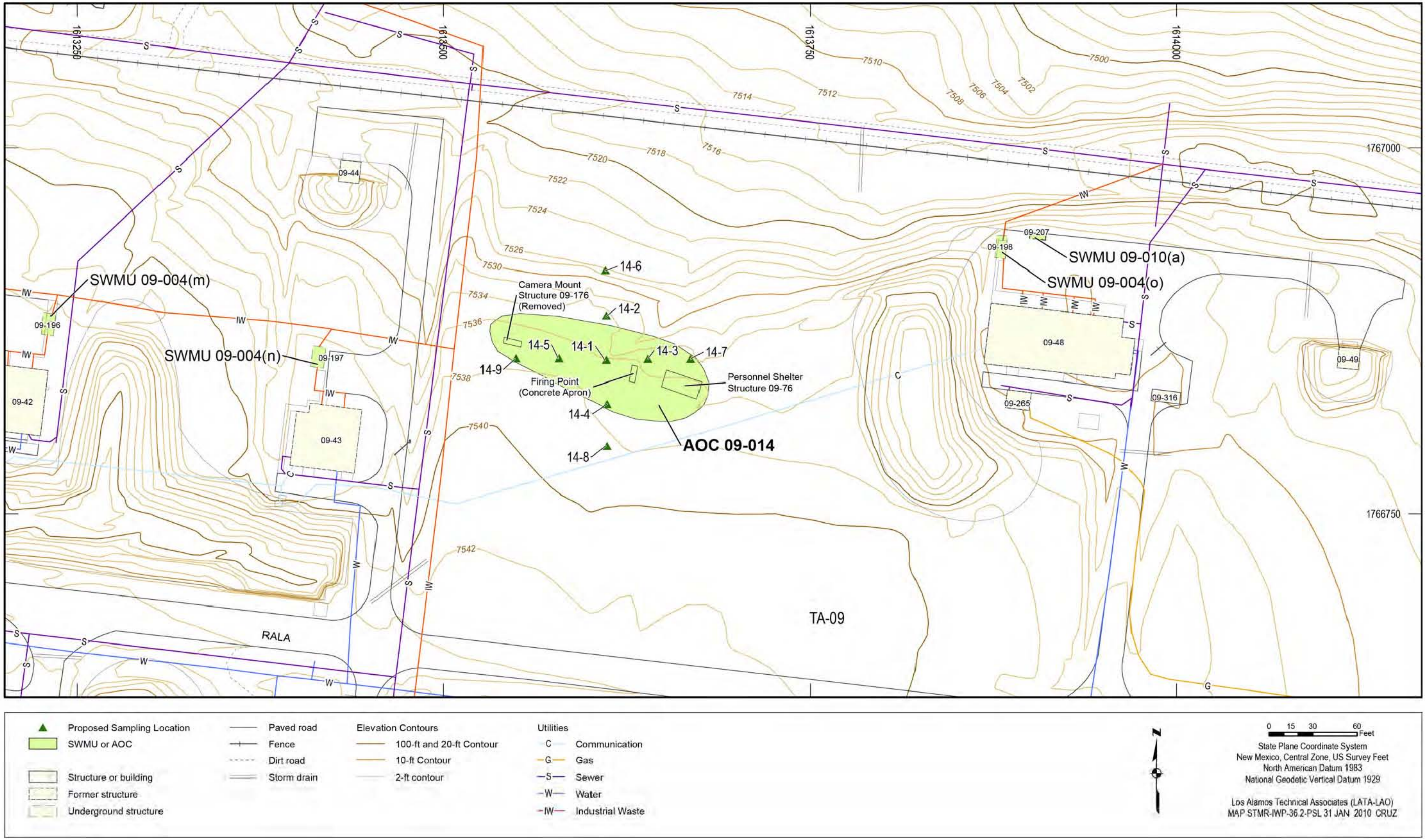

Figure 5.23-2 Proposed sampling locations for AOC 09-014

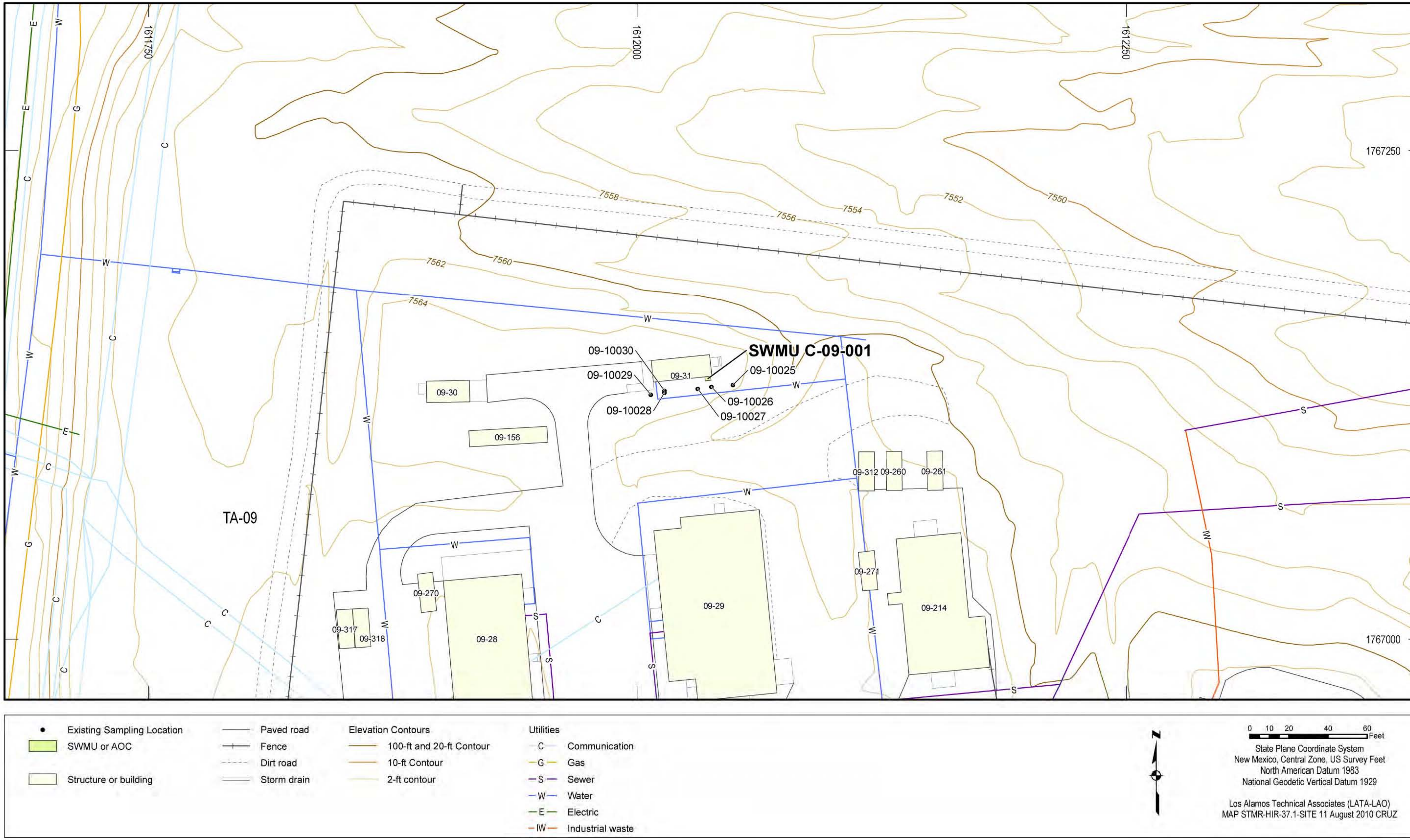

Figure 5.24-1 Site features of SWMU C-09-001

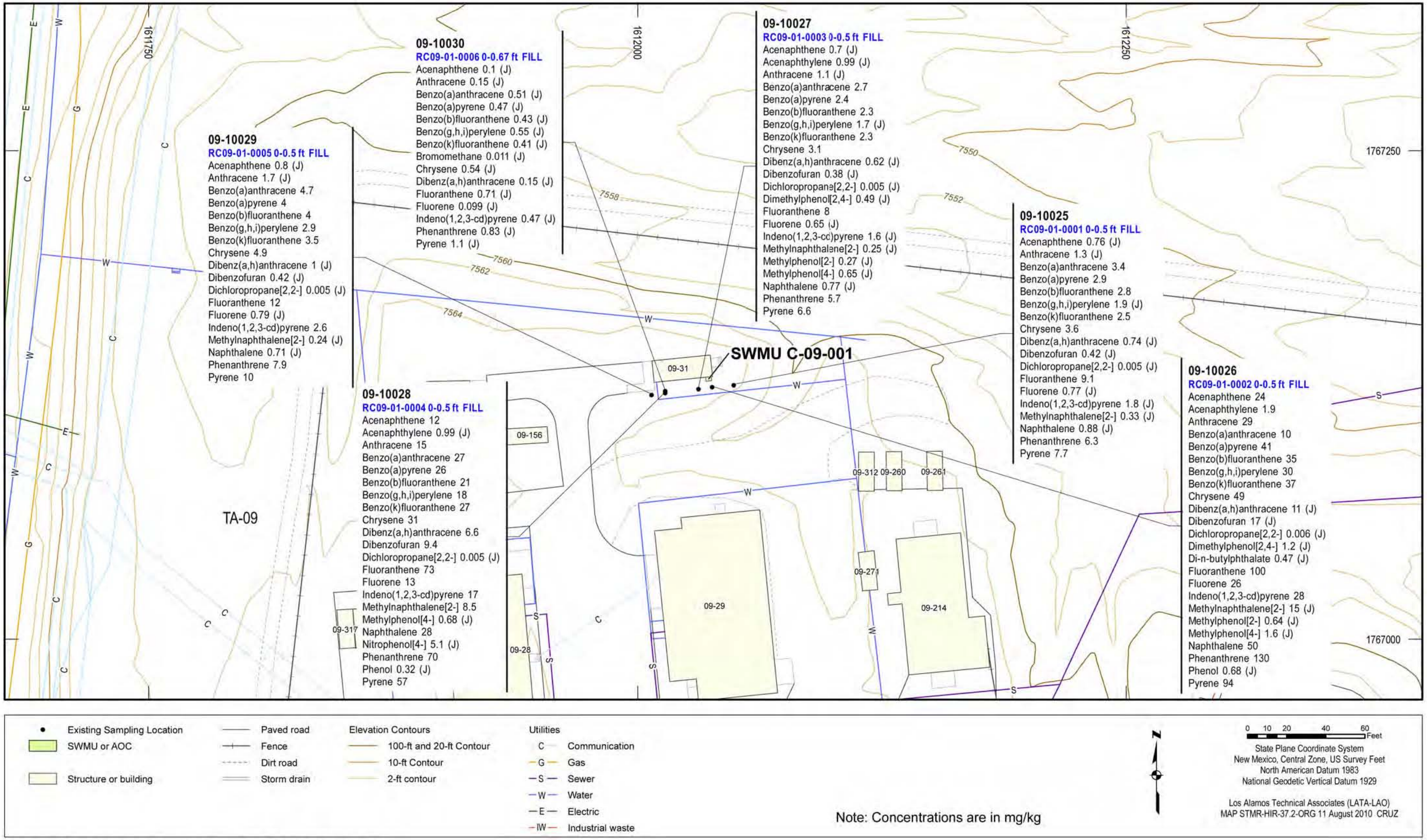

Figure 5.24-2 Organic chemicals detected at SWMU C-09-001

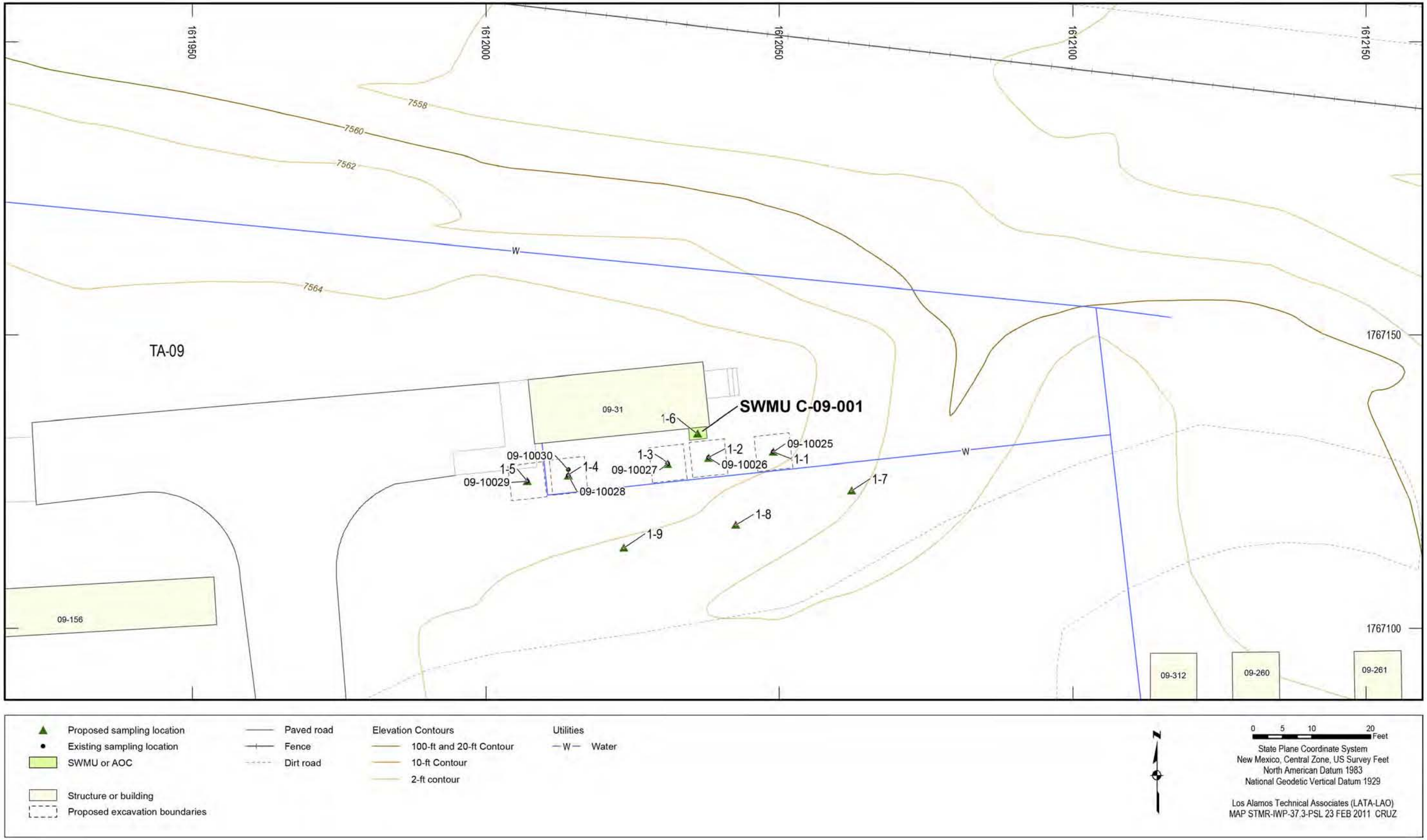

Figure 5.24-3 Proposed sampling locations for SWMU C-09-001

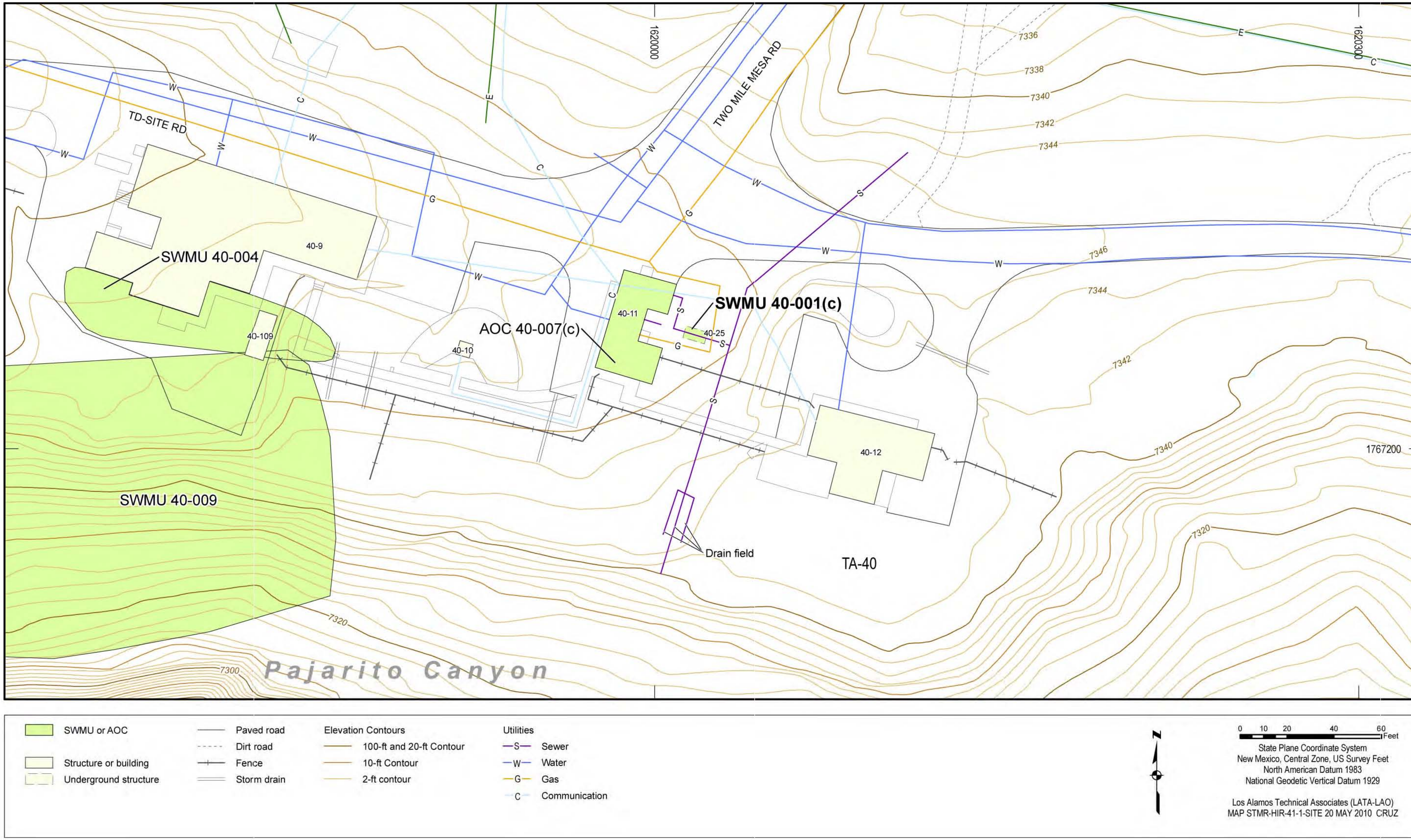

Figure 7.1-1 Site features of SWMU 40-001(c)

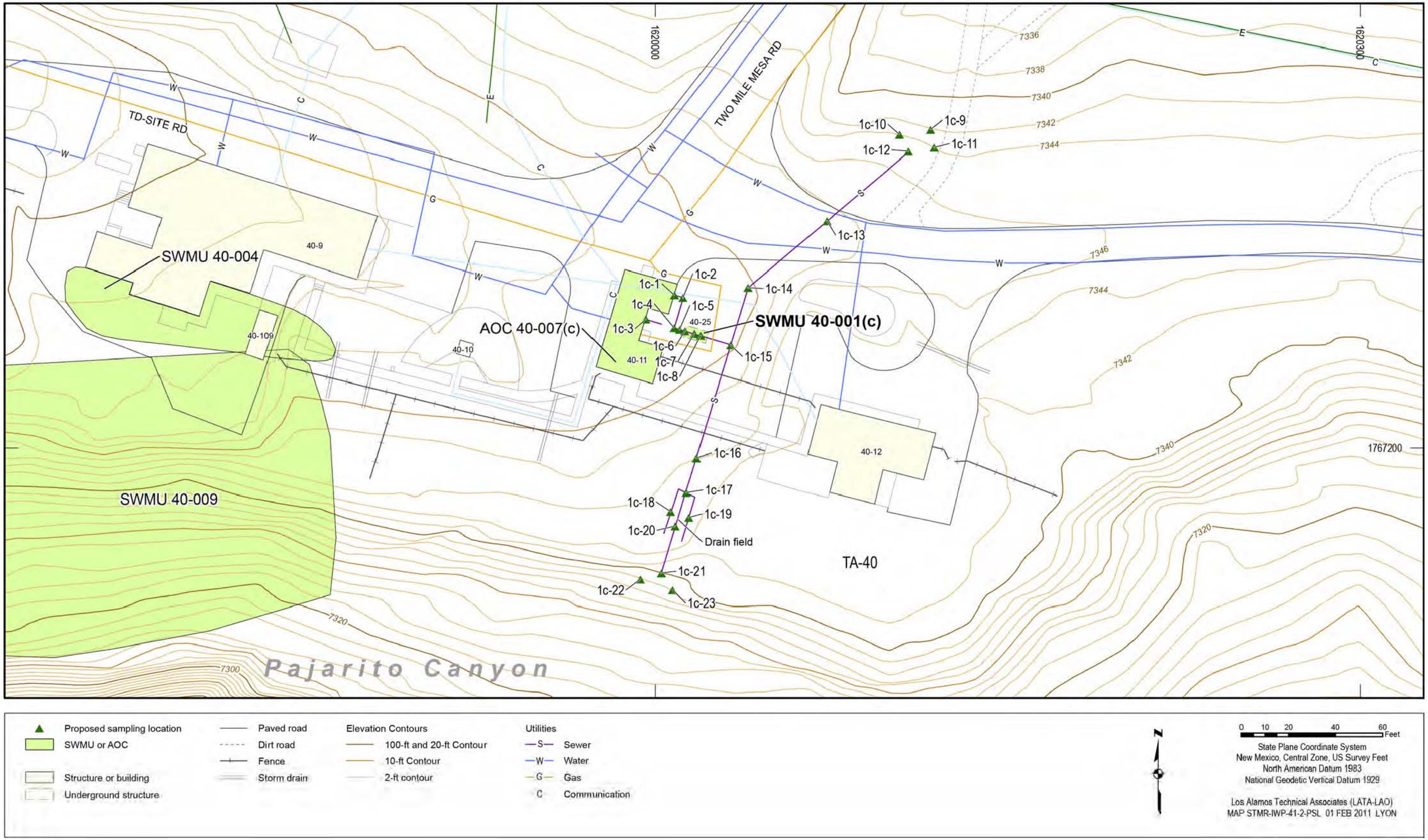

Figure 7.1-2 Proposed sampling locations for SWMU 40-001(c)

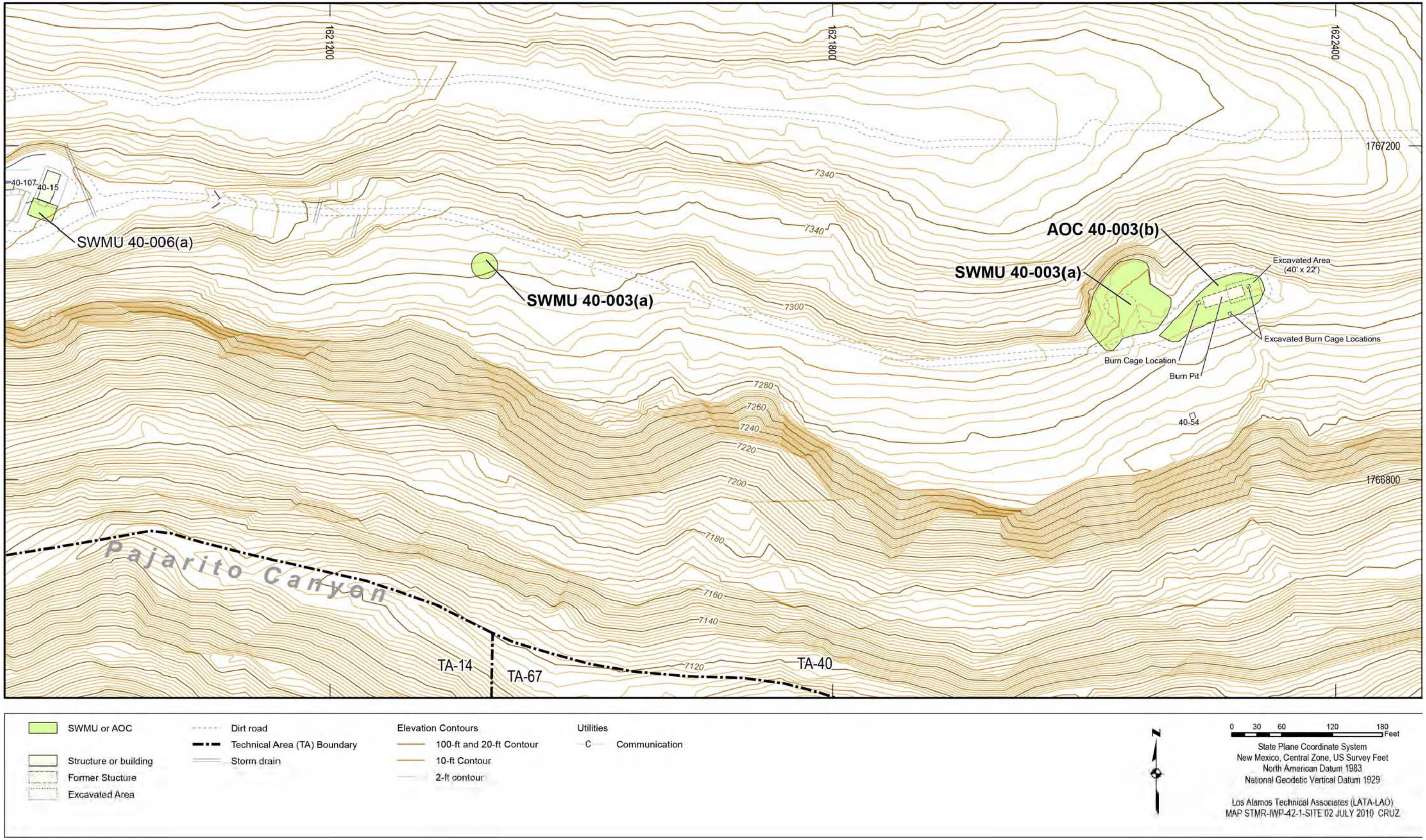

Figure 7.2-1 Site features of SWMUs 40-003(a) and 40-003(b)

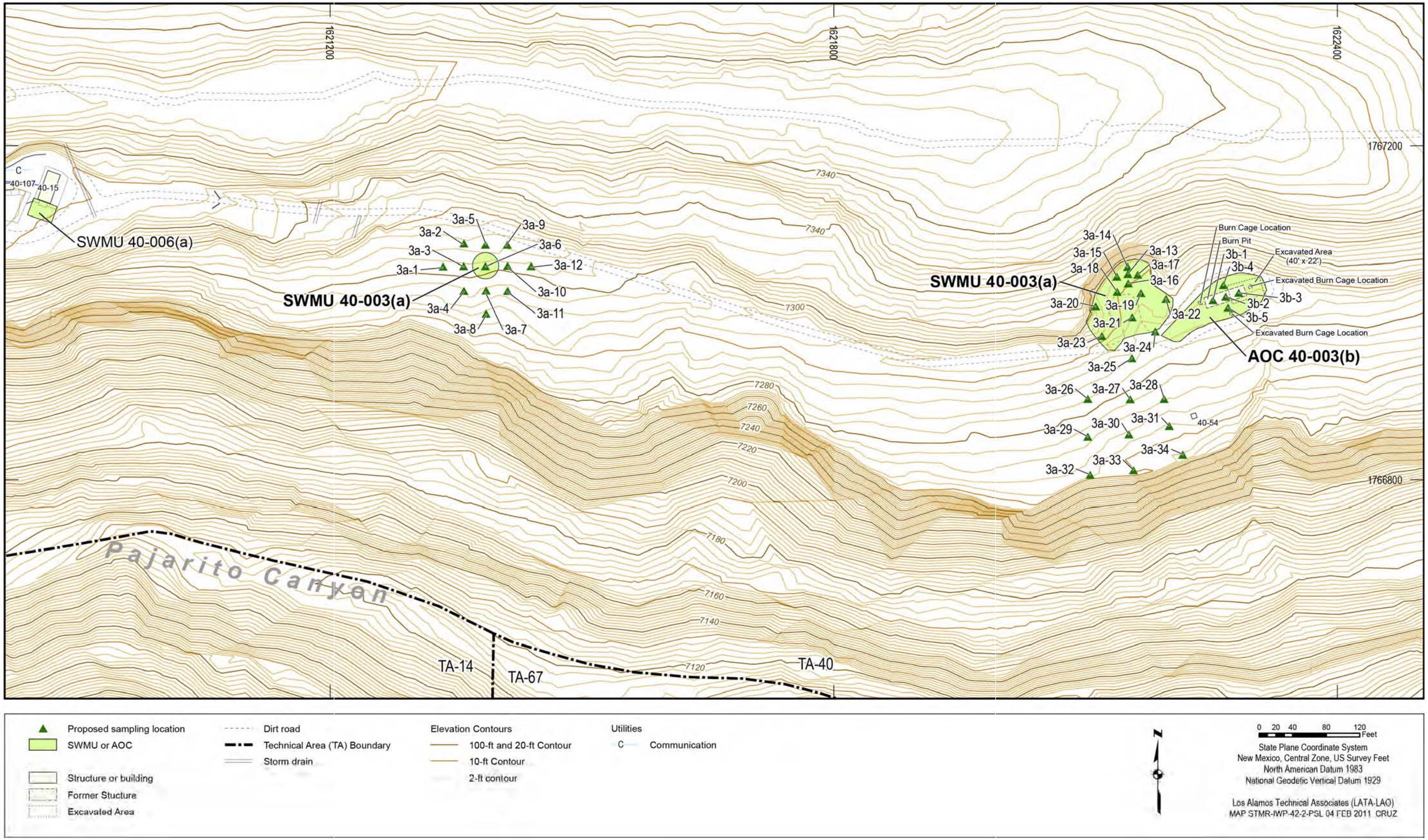

Figure 7.2-2 Proposed sampling locations for SWMUs 40-003(a) and 40-003(b)

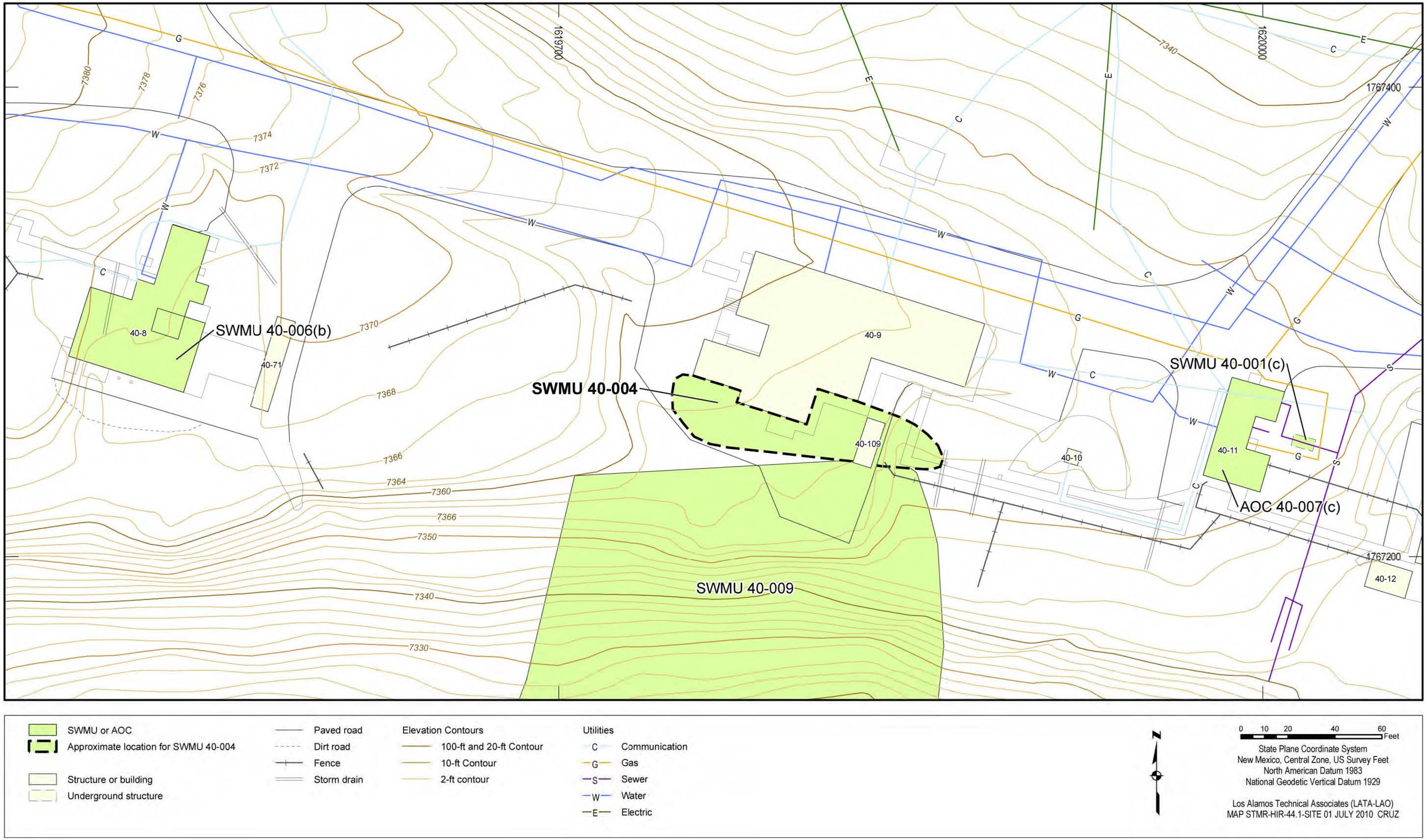

Figure 7.4-1 Site features of SWMU 40-004

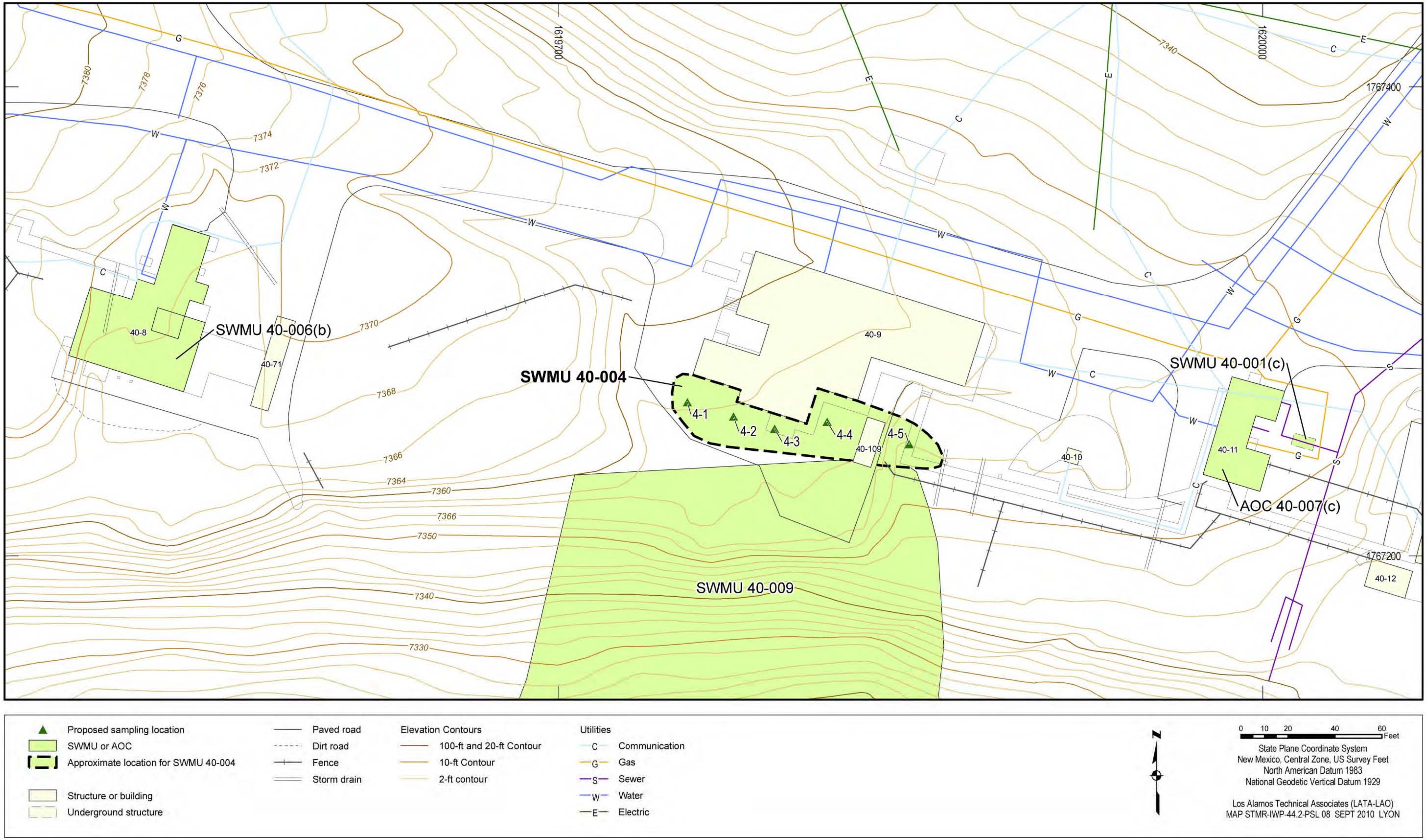

Figure 7.4-2 Proposed sampling locations for SWMU 40-004

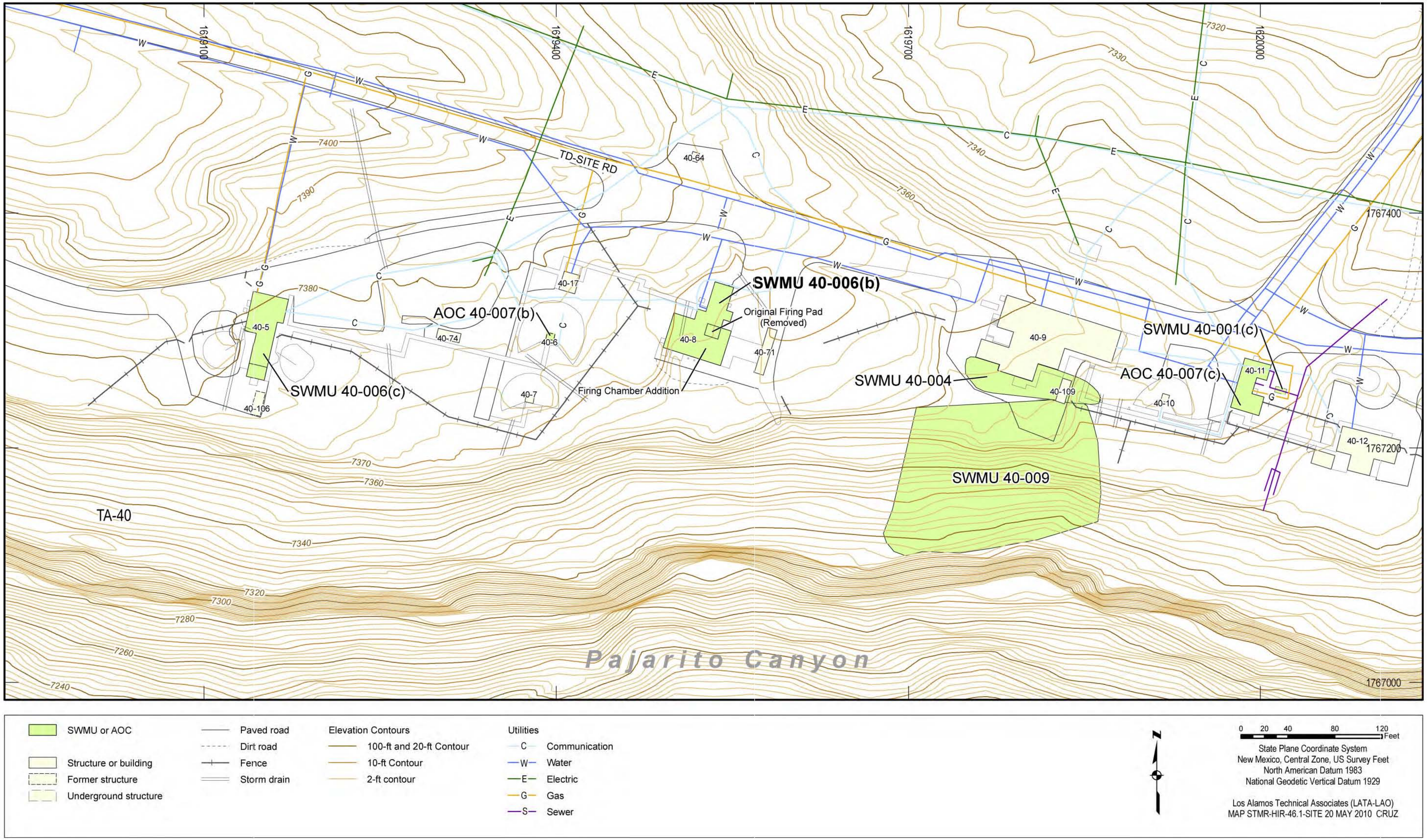

Figure 7.6-1 Site features of SWMU 40-006(b)

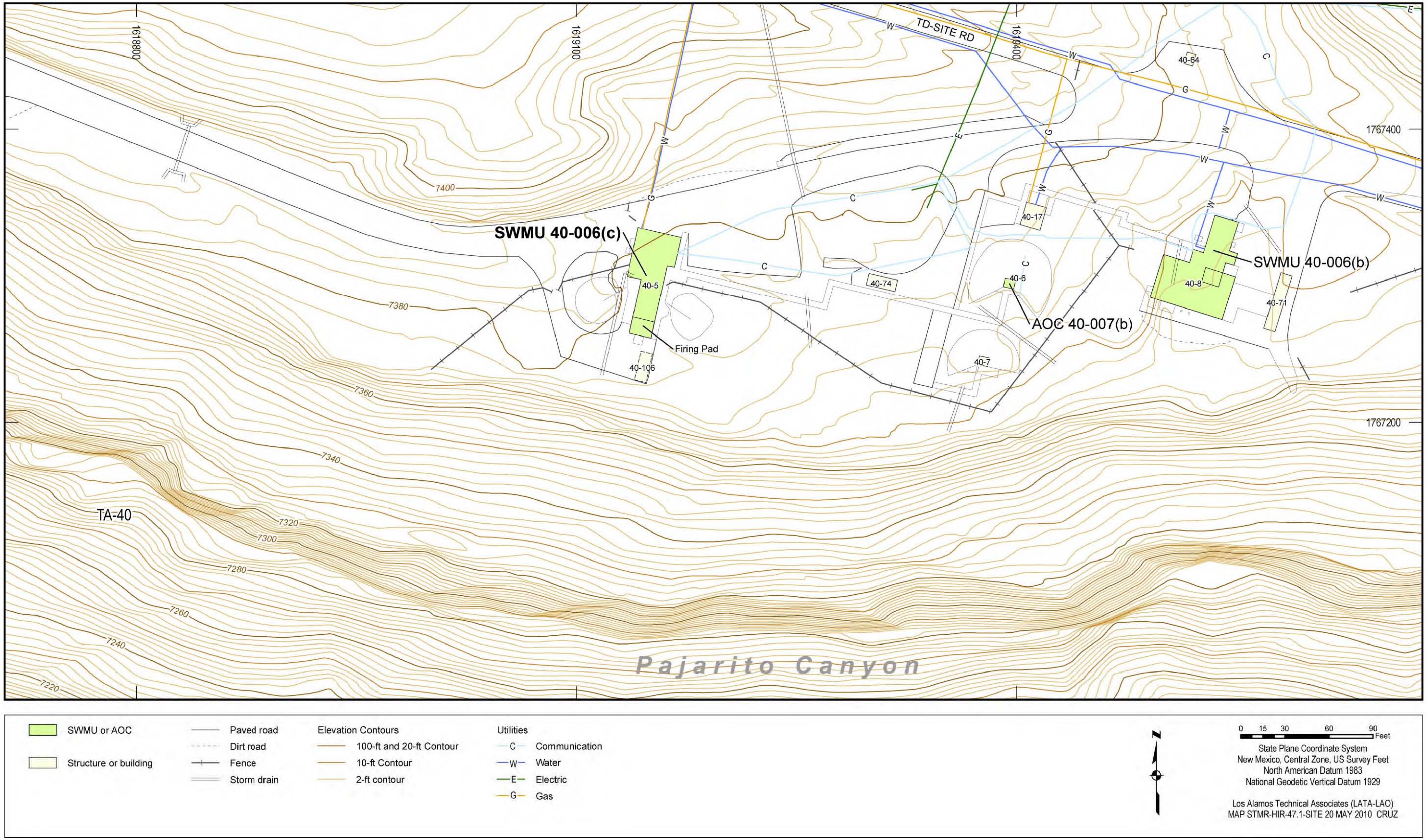

Figure 7.7-1 Site features of SWMU 40-006(c)

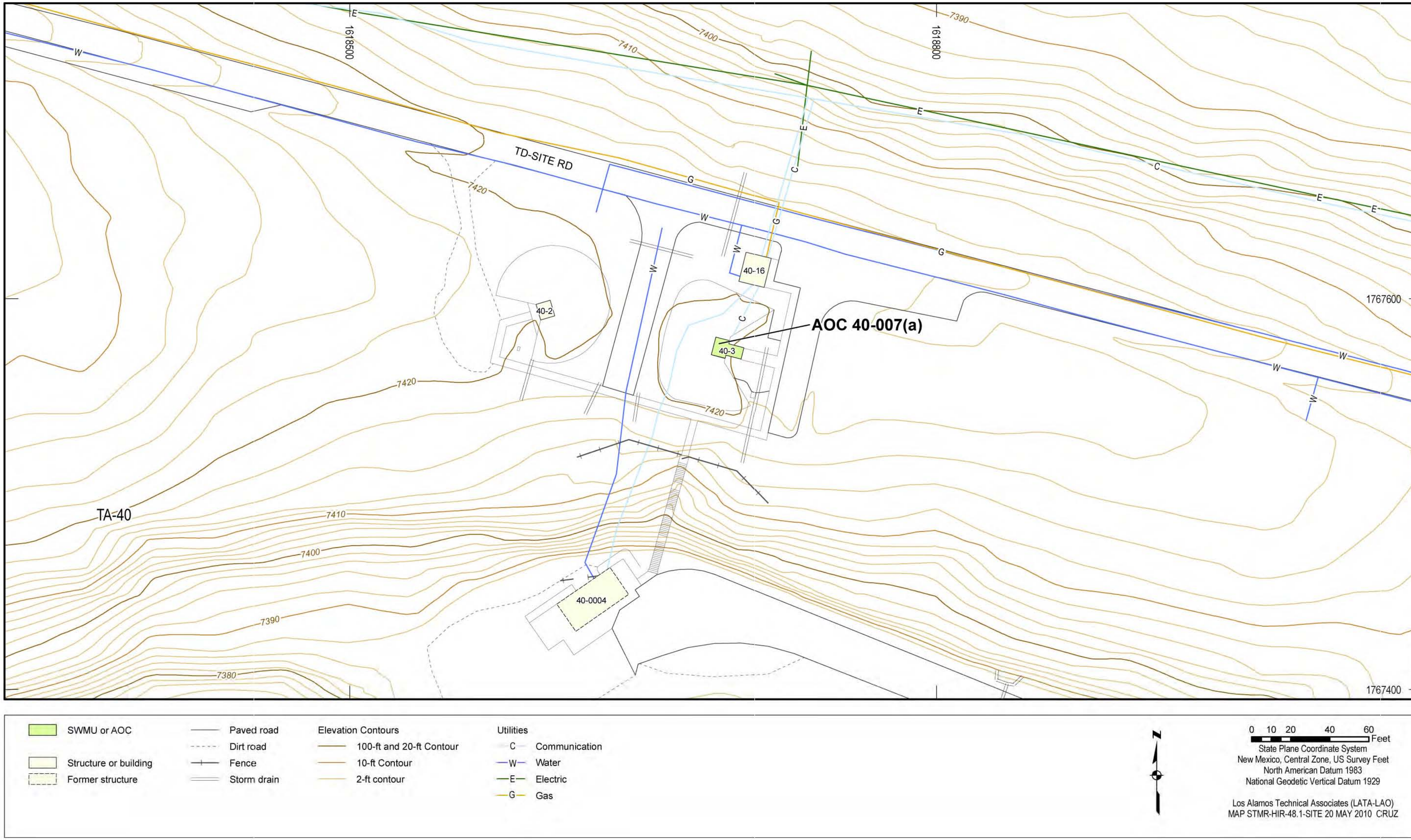

Figure 7.8-1 Site features of AOC 40-007(a)

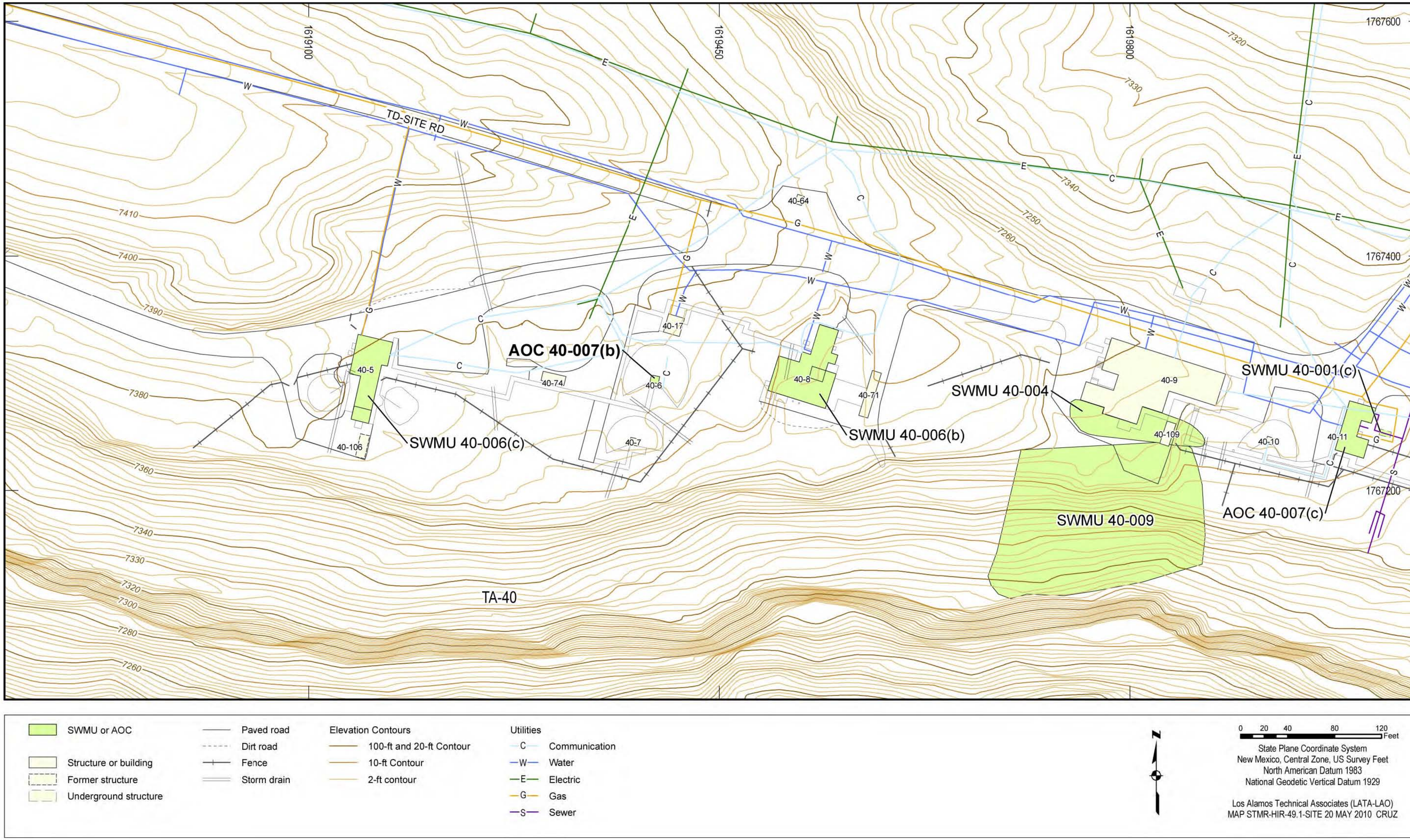

Figure 7.9-1 Site features of AOC 40-007(b)

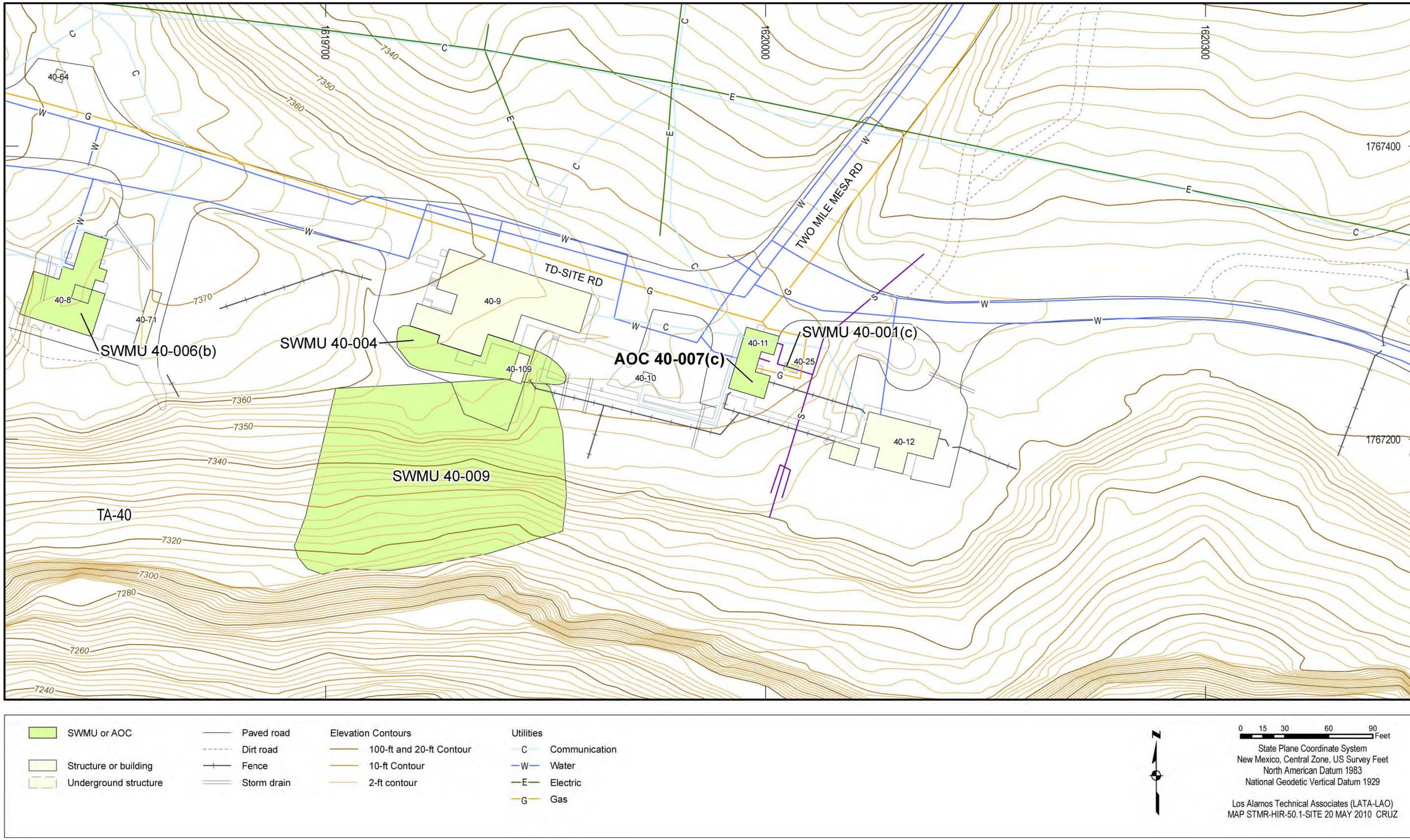

Figure 7.10-1 Site features of AOC 40-007(c)

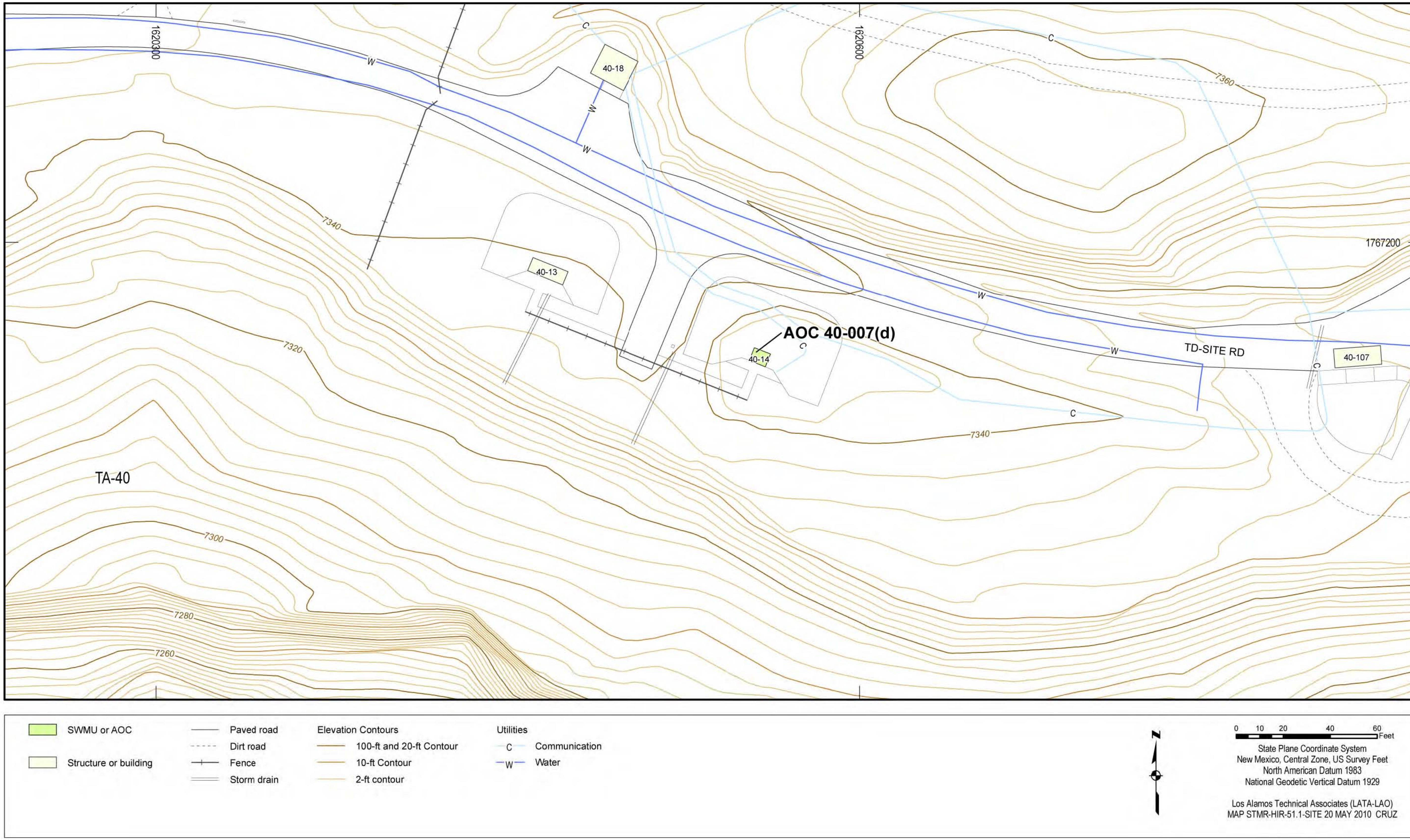

Figure 7.11-1 Site features of AOC 40-007(d)

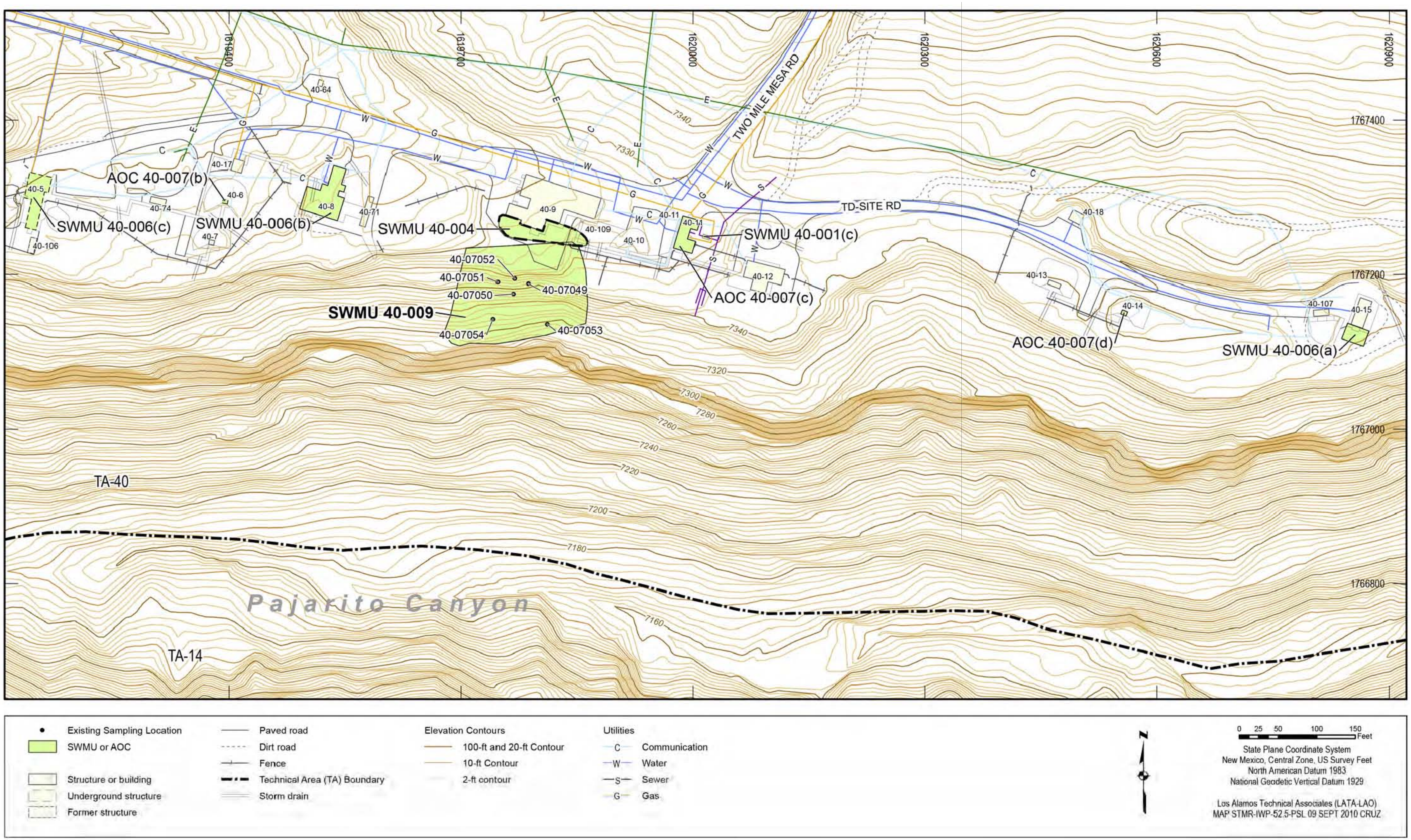

Figure 7.12-1 Site features of SWMU 40-009

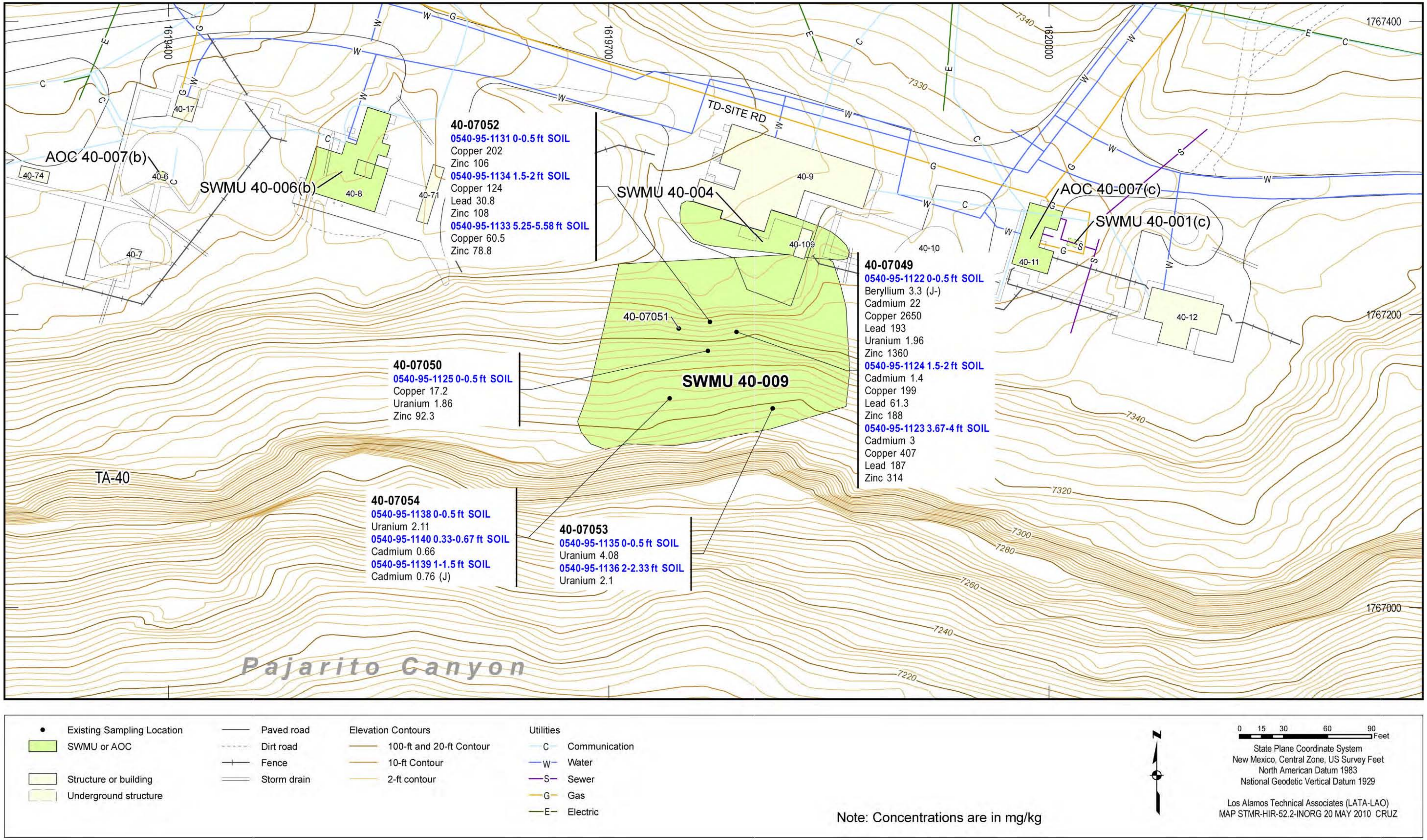

Figure 7.12-2 Inorganic chemicals detected above BVs at SWMU 40-009

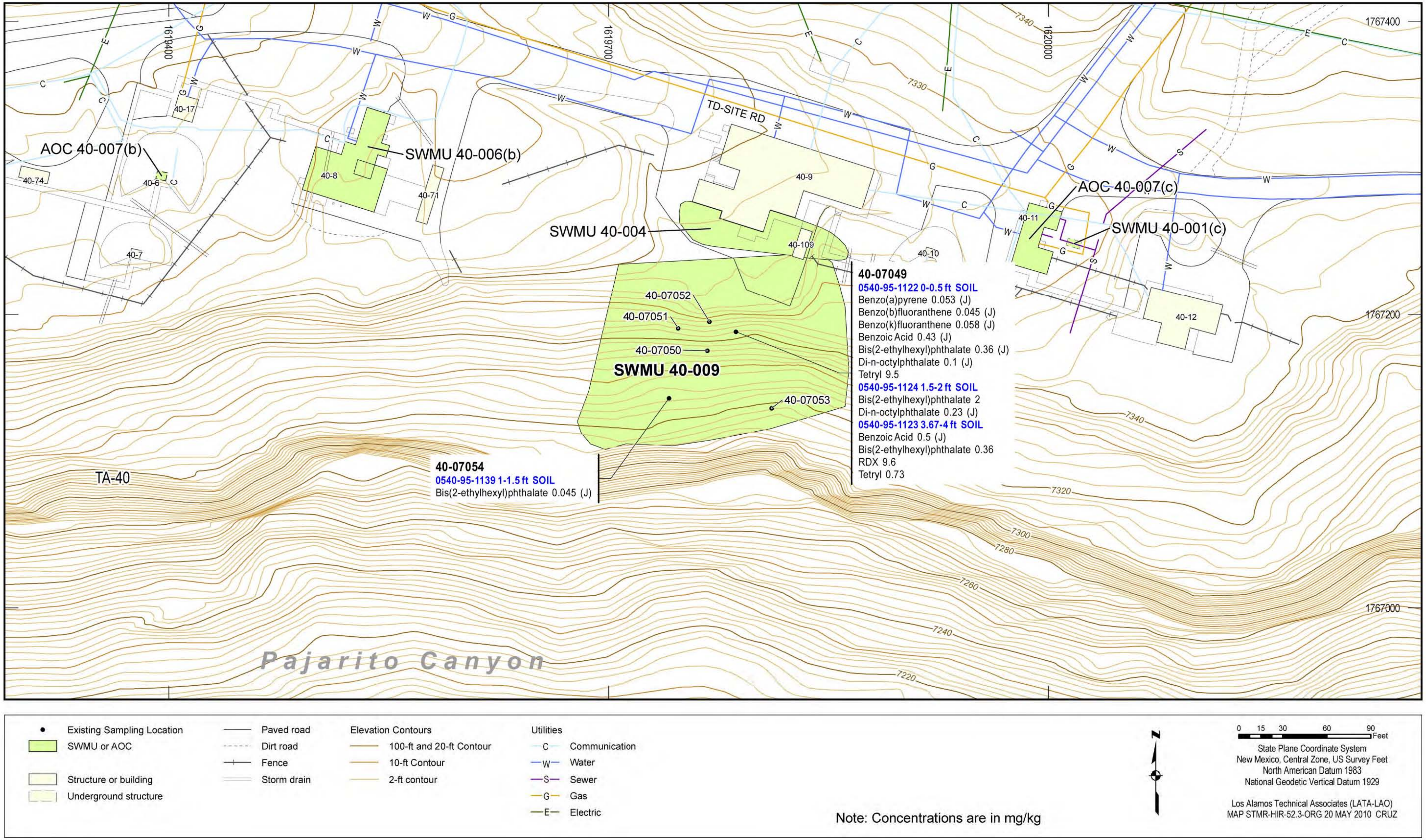

Figure 7.12-3 Organic chemicals detected at SWMU 40-009

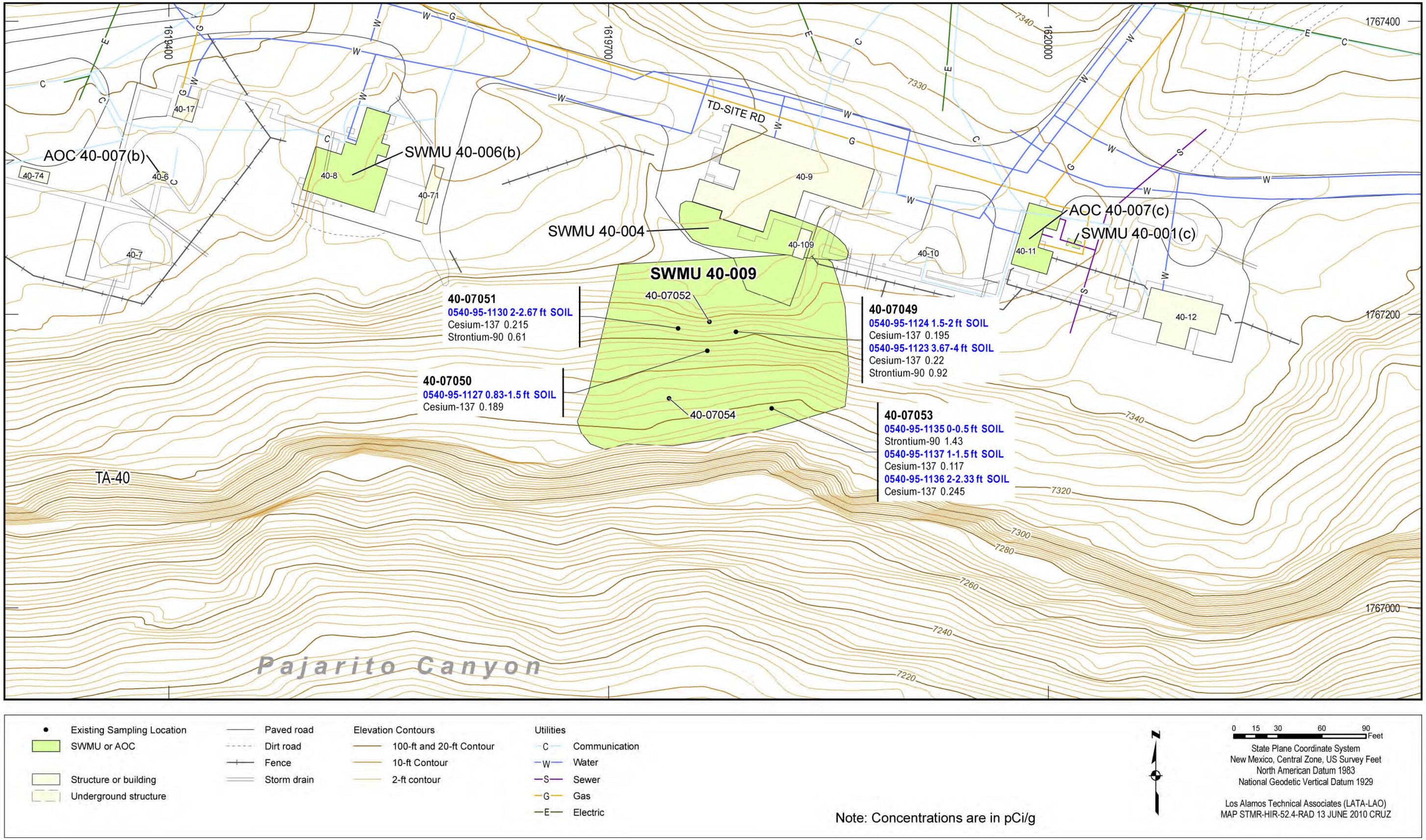

Figure 7.12-4 Radionuclides detected or detected above BVs/FVs at SWMU 40-009

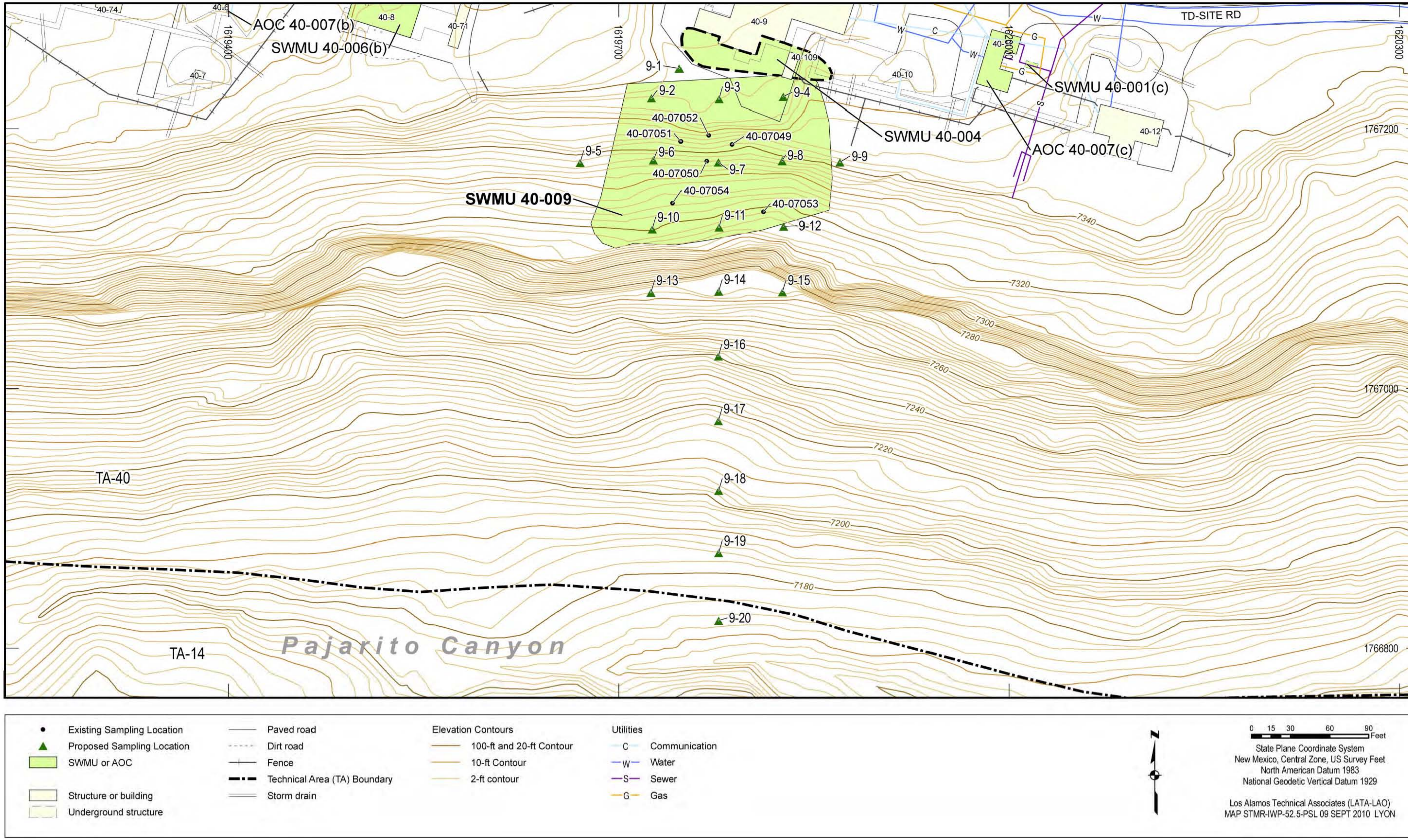

Figure 7.12-5 Proposed sampling locations for SWMU 40-009

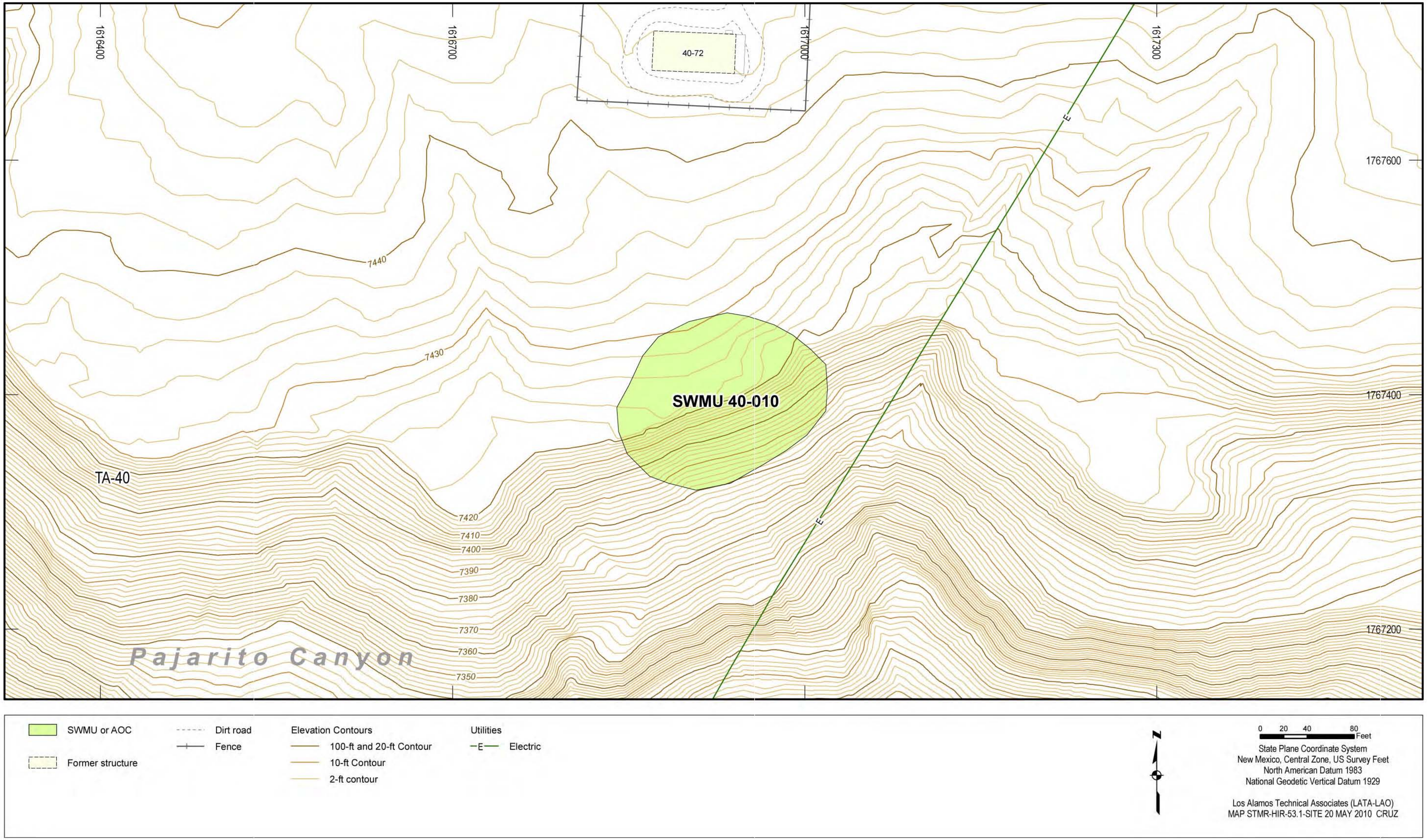

Figure 7.13-1 Site features of SWMU 40-010

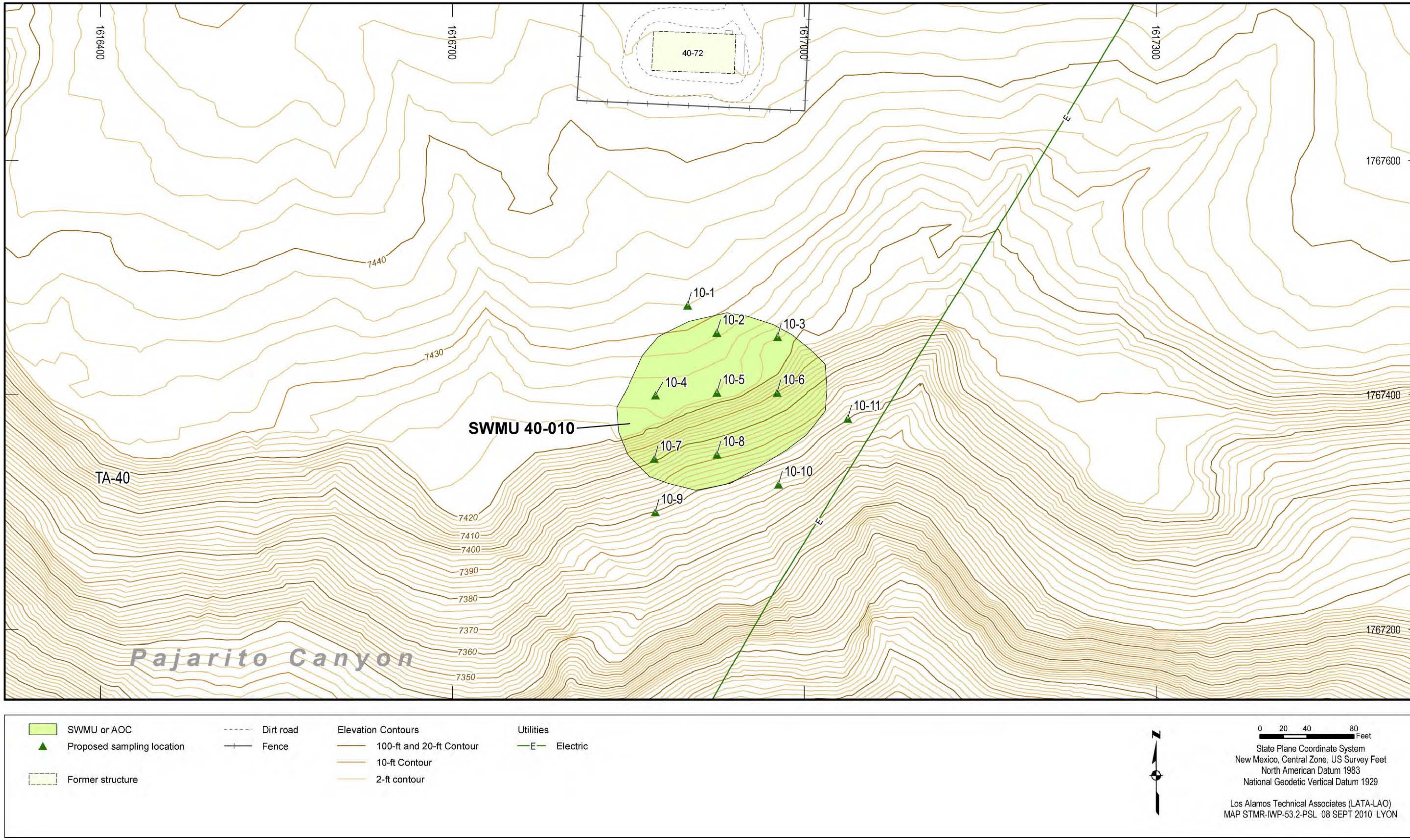

Figure 7.13-2 Proposed sampling locations for SWMU 40-010

Table 1.1-1
SWMUs and AOCs within the Starmer/Upper Pajarito Canyon Aggregate Area

Consolidated Unit	Site ID	Brief Description	Site Status	Reference
TA-08				
	AOC 08-001(a)	Off-Gas System	In progress	Work plan section 4.1
	AOC 08-001(b)	Off-Gas System	In progress	Work plan section 4.2
	SWMU 08-002	Gun Site	In progress	Work plan section 4.3
08-003(a)-00	SWMU 08-003(a)	Decommissioned Septic Tank	In progress	Work plan section 4.4.1
	SWMU 08-004(a)	Floor Drains	In progress	Work plan section 4.4.2
	SWMU 08-004(b)	Drainline	In progress	Work plan section 4.4.3
	SWMU 08-009(a)	Drainline and Outfall	In progress	Work plan section 4.4.4
	SWMU 08-003(b)	Septic Tank	Removed from the Laboratory's HWFP*, 12/23/98	NMED 1998, 063042
	SWMU 08-003(c)	Septic System	Removed from the Laboratory's HWFP, 12/23/98	NMED 1998, 063042
	SWMU 08-004(c)	Floor Drain and Sumps	In progress	Work plan section 4.5
	SWMU 08-004(d)	Drains	In progress	Work plan section 4.6
	SWMU 08-005	Former Crystal Growth Incubator	In progress	Work plan section 4.7
	SWMU 08-006(a)	MDA Q	In progress	Work plan section 4.8
	SWMU 08-006(b)	Landfill	Removed from the Laboratory's HWFP, 12/23/98	NMED 1998, 063042
	SWMU 08-007	Silver Recovery Unit	Removed from the Laboratory's HWFP, 12/23/98	NMED 1998, 063042
	AOC 08-008(a)	Storage Area	NFA approved	EPA 2005, 088464
	AOC 08-008(b)	Storage Area	NFA approved	EPA 2005, 088464
	AOC 08-008(c)	Storage Area	NFA approved	EPA 2005, 088464
	AOC 08-008(d)	Storage Area	NFA approved	EPA 2005, 088464
	AOC 08-009(b)	Outfall	NFA approved	EPA 2005, 088464
	AOC 08-009(c)	Drainline and Outfall	In progress	Work plan section 4.9
	SWMU 08-009(d)	Drains	In progress	Work plan section 4.10
	SWMU 08-009(e)	Outfall	In progress	Work plan section 4.11
	AOC 08-009(f)	Outfall	In progress	Work plan section 4.12
	AOC 08-010(a)	Storage Area	NFA approved	EPA 2005, 088464
	AOC 08-010(b)	Storage Area	NFA approved	EPA 2005, 088464
	AOC 08-010(c)	Storage Area	NFA approved	EPA 2005, 088464
	AOC 08-011(a)	Underground Tank	NFA approved	EPA 2005, 088464

Table 1.1-1 (continued)

Consolidated Unit	Site ID	Brief Description	Site Status	Reference
	AOC 08-011(b)	Underground Tank	NFA approved	EPA 2005, 088464
	AOC C-08-001	Former Building	NFA approved	EPA 2005, 088464
	AOC C-08-002	Former Building	NFA approved	EPA 2005, 088464
	AOC C-08-003	Former Building	NFA approved	EPA 2005, 088464
	AOC C-08-004	Former Building	NFA approved	EPA 2005, 088464
	AOC C-08-005	Former Building	NFA approved	EPA 2005, 088464
	AOC C-08-006	Former Building	NFA approved	EPA 2005, 088464
	AOC C-08-007	Former Building	NFA approved	EPA 2005, 088464
	AOC C-08-008	Former Building	NFA approved	EPA 2005, 088464
	AOC C-08-009	Former Building	NFA approved	EPA 2005, 088464
	SWMU C-08-010	Former Building	Removed from the Laboratory's HWFP, 04/22/07	NMED 2007, 095495
	AOC C-08-011	Former Building	NFA approved	EPA 2005, 088464
	AOC C-08-012	Former Building	NFA approved	EPA 2005, 088464
	AOC C-08-013	Former Building	NFA approved	EPA 2005, 088464
	AOC C-08-014	Building	In progress	Work plan section 4.13
	AOC C-08-015	Former Building	NFA approved	EPA 2005, 088464
	AOC C-08-016	Building	NFA approved	EPA 2005, 088464
	AOC C-08-017	Storage Area	NFA approved	EPA 2005, 088464
	AOC C-08-018	Storage Area	NFA approved	EPA 2005, 088464
	AOC C-08-019	Storage Area	NFA approved	EPA 2005, 088464
	AOC C-08-020	Disposal Area	NFA approved	EPA 2005, 088464
TA-09				
09-001(a)-99	SWMU 09-001(a)	Former Firing Site and Control Building	In progress	Work plan section 5.1.1
	SWMU 09-001(b)	Former Firing Site Control Building	In progress	Work plan section 5.1.2
	AOC C-09-005	Former X-Unit Chamber	NFA approved	EPA 2005, 088464
	SWMU 09-001(c)	Former Recovery Pit	In progress	Work plan section 5.2
	SWMU 09-001(d)	Former Firing Chambers	In progress	Work plan section 5.3
	SWMU 09-002	Burn Pit	In progress	Work plan section 5.4
09-003(a)-99	SWMU 09-003(a)	Former Sump	In progress	Work plan section 5.5.1
	SWMU 09-003(b)	Former Sump	In progress	Work plan section 5.5.2
	SWMU 09-003(e)	Former Basket Washing Pit	In progress	Work plan section 5.5.3
	SWMU 09-003(c)	Manhole	Removed from the Laboratory's HWFP, 12/23/98	NMED 1998, 063042

Table 1.1-1 (continued)

Consolidated Unit	Site ID	Brief Description	Site Status	Reference
	SWMU 09-003(d)	Former Sump	In progress	Work plan section 5.6
	SWMU 09-003(f)	Sump	Removed from the Laboratory's HWFP, 12/23/98	NMED 1998, 063042
	SWMU 09-003(g)	Former Sump and Pipes	In progress	Work plan section 5.7
	SWMU 09-003(h)	Former Sump and Pipes	In progress	Work plan section 5.8
	SWMU 09-003(i)	Former Sump and Pipes	In progress	Work plan section 5.9
09-004(a)-99	SWMU 09-004(a)	Sump	In progress	Work plan section 5.10.1
	SWMU 09-004(b)	Sump	In progress	Work plan section 5.10.2
	SWMU 09-004(c)	Sump	In progress	Work plan section 5.10.3
	SWMU 09-004(d)	Sump	In progress	Work plan section 5.10.4
	SWMU 09-004(e)	Sump	In progress	Work plan section 5.10.5
	SWMU 09-004(f)	Sump	In progress	Work plan section 5.10.6
	SWMU 09-004(h)	Sump	In progress	Work plan section 5.10.7
	SWMU 09-004(i)	Sump	In progress	Work plan section 5.10.8
	SWMU 09-004(j)	Sump	In progress	Work plan section 5.10.9
	SWMU 09-004(k)	Sump	In progress	Work plan section 5.10.10
	SWMU 09-004(l)	Sump	In progress	Work plan section 5.10.11
	SWMU 09-004(m)	Sump	In progress	Work plan section 5.10.12
	SWMU 09-004(n)	Sump	In progress	Work plan section 5.10.13
	SWMU 09-004(g)	Sump	In progress	Work plan section 5.11
	SWMU 09-004(o)	Sump	In progress	Work plan section 5.12
	SWMU 09-005(b)	Septic System	Removed from the Laboratory's HWFP, 12/23/98	NMED 1998, 063042
	SWMU 09-005(c)	Septic System	Removed from the Laboratory's HWFP, 12/23/98	NMED 1998, 063042
	SWMU 09-005(e)	Septic System	Removed from the Laboratory's HWFP, 12/23/98	NMED 1998, 063042
	SWMU 09-005(f)	Septic System	Removed from the Laboratory's HWFP, 12/23/98	NMED 1998, 063042
	SWMU 09-005(g)	Septic System	In progress	Work plan section 5.13

Table 1.1-1 (continued)

Consolidated Unit	Site ID	Brief Description	Site Status	Reference
	SWMU 09-005(h)	Septic System	Removed from the Laboratory's HWFP, 12/23/98	NMED 1998, 063042
	SWMU 09-006	Former Septic Tank	In progress	Work plan section 5.14
	SWMU 09-007	Basket Pit	Removed from the Laboratory's HWFP, 12/23/98	NMED 1998, 063042
	AOC 09-008(a)	Surface Impoundment	NFA approved	EPA 2005, 088464
09-008(b)-99	SWMU 09-005(a)	Former Septic System	In progress	Work plan section 5.15.1
	SWMU 09-005(d)	Septic Tank	In progress	Work plan section 5.15.2
	SWMU 09-008(b)	Oxidation Pond	In progress	Work plan section 5.15.3
	SWMU 09-009	Surface Impoundment	In progress	Work plan section 5.16
	AOC 09-010(a)	Storage Area	In progress	Work plan section 5.17
	AOC 09-010(b)	Storage Area	In progress	Work plan section 5.18
	AOC 09-010(c)	Storage Area	NFA approved	EPA 2005, 088464
	AOC 09-011(a)	Storage Area	NFA approved	EPA 2005, 088464
	AOC 09-011(b)	Storage Area	In progress	Work plan section 5.19
	AOC 09-011(c)	Storage Area	In progress	Work plan section 5.20
	AOC 09-012	Disposal Pit	In progress	Work plan section 5.21
	SWMU 09-013	MDA M	In progress	Work plan section 5.22
	AOC 09-014	Firing Site	In progress	Work plan section 5.23
	AOC 09-015	Manhole	NFA approved	EPA 2005, 088464
	AOC 09-016	Underground Storage Tank	NFA approved	EPA 2005, 088464
	SWMU C-09-001	Area of Soil Contamination	In progress	Work plan section 5.24
	AOC C-09-002	Former Buildings	NFA approved	EPA 2005, 088464
	AOC C-09-003	Former Buildings	NFA approved	EPA 2005, 088464
	AOC C-09-004	Former Building	NFA approved	EPA 2005, 088464
	AOC C-09-006	Former Buildings	NFA approved	EPA 2005, 088464
	AOC C-09-007	Former Building	NFA approved	EPA 2005, 088464
	AOC C-09-008	Underground Storage Tank	NFA approved	EPA 2005, 088464
	AOC C-09-009	Non-intentional Release	NFA approved	EPA 2005, 088464
	AOC C-09-010	Burn Site-doesn't exist	NFA approved	EPA 2005, 088464
	AOC C-09-011	Burn Site	NFA approved	EPA 2005, 088464
TA-22				
	AOC 22-001	Magazine	NFA approved	EPA 2005, 088464
	SWMU 22-011	Disposal Pit	In progress	Work plan section 6.1
	AOC 22-014(c)	Unit does not exist	NFA approved	EPA 2005, 088464

Table 1.1-1 (continued)

Consolidated Unit	Site ID	Brief Description	Site Status	Reference
	SWMU 22-015(c)	Drainline and Outfall	In progress	Work plan section 6.2
22-015(d)-99	SWMU 22-010(b)	Septic System	In progress	Work plan section 6.3.1
	SWMU 22-012	Wash Area	In progress	Work plan section 6.3.2
	SWMU 22-015(d)	Drain and Seepage Pit	In progress	Work plan section 6.3.3
	SWMU 22-015(e)	Sump	In progress	Work plan section 6.3.4
	SWMU 22-016	Septic Tank	In progress	Work plan section 6.3.5
TA-40				
	SWMU 40-001(c)	Septic Tank	In progress	Work plan section 7.1
	AOC 40-002(b)	SAA	NFA approved	EPA 2005, 088464
	AOC 40-002(c)	SAA	NFA approved	EPA 2005, 088464
	SWMU 40-003(a)	Open Detonation Area	In progress	Work plan section 7.2
	AOC 40-003(b)	Burn Site	In progress	Work plan section 7.3
	SWMU 40-004	Storage Area	In progress	Work plan section 7.4
	SWMU 40-006(a)	Firing Site	Deferred	Table IV-2 of the Consent Order
	SWMU 40-006(b)	Firing Site	Deferred	Table IV-2 of the Consent Order
	SWMU 40-006(c)	Firing Site	Deferred	Table IV-2 of the Consent Order
	AOC 40-007(a)	Storage Area	In progress	Work plan section 7.8
	AOC 40-007(b)	Storage Area	In progress	Work plan section 7.9
	AOC 40-007(c)	Storage Area	In progress	Work plan section 7.10
	AOC 40-007(d)	Storage Area	In progress	Work plan section 7.11
	AOC 40-008	HE Storage Area Decommissioned	NFA approved	EPA 2005, 088464
	SWMU 40-009	Landfill	In progress	Work plan section 7.12
	SWMU 40-010	Surface Disposal Area	In progress	Work plan section 7.13
	AOC C-40-001	Area of Potential Soil Contamination	NFA approved	EPA 2005, 088464

Note: Shading denotes NFA approved.

*HWFP = Hazardous Waste Facility Permit.

Table 4.1-1
Proposed Sampling at AOC 08-001(a)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	1a-1 and 1a-14	Atop building 08-1	0–1 ft bgs	X[a]	X	X	X	X	X	—[b]	X	X	X	X	X
Determine nature and extent of potential contamination	1a-2 through 1a-6	Directly in front of exhaust vents	0–1 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	1a-7 through 1a-13	Downwind of building 08-1	0–1 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 4.2-1
Proposed Sampling at AOC 08-001(b)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	SVOCs	Explosive Compounds	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	1b-1 and 1b-9	Atop building 08-2	0–1 ft bgs	X[a]	X	X	X	X	X	—[b]	X	X	X	X	X
Determine nature and extent of potential contamination	1b-2 through 1b-8	Downwind of building 08-2	0–1 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 4.3-1
Proposed Sampling at SWMU 08-002

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	2-1 and 2-2; 2-15 and 2-16	Sand bins	0–1 ft bgs	X[a]	X	X	X	X	—[b]	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	2-3 through 2-6; 2-17 through 2-20	Around perimeter of concrete pads	0–1 ft bgs	X	X	X	X	X	X	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	2-7 and 2-8; 2-21 and 2-22	Detonation impact areas	0–1 ft bgs	X	X	X	X	X	—	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	2-25	Sawdust bin	0–1 ft bgs	X	X	X	X	X	—	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	2-9 through 2-14; 2-23 and 2-24; 2-26 and 2-27	Exterior of rails	0–1 ft bgs	X	X	X	X	X	—	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	2-28 through 2-30	Drainage channels	0–1 ft bgs	X	X	X	X	X	X	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 4.4-1
Proposed Sampling at SWMU 08-003(a)

Objective Addressed	Location Number	Location	Starting Depth of Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	TPH-DRO	TPH-ORO	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	3a-1 through 3a-10	Inlet drainlines	0–1 ft below drainline	X[a]	X	X	X	X	—[b]	X	X	X	X	X	X	X	X	X
			5-6 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3a-11	Tank inlet	0–1 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X	X	X
			5-6 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3a-12 3a-13	Septic tank	0–1 ft below tank	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below tank	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3a-14	Tank outlet	0–1 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3a-15 3a-16	Outlet drainline	0–1 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 4.4-2
Proposed Sampling at SWMU 08-004(b)

Objective Addressed	Location Number	Location	Starting Depth of Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	4b-1	Drainline	0–1 ft below drainline	X[a]	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4b-2	Outfall	0–1 ft bgs	X	X	X	X	X	X	X	—[b]	X	X	X	X	X
	4b-3 4b-4 4b-5		2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 4.4-3
Samples Collected and Analyses Requested at SWMU 08-009(a)

Sample ID	Location ID	Depth (ft)	Media	HE	Metals	PCB	SVOC
0508-97-0008	08-03100	0–0.5	SED	3850R	3851R	3848R	3848R
0508-97-0009	08-03100	1–1.5	SED	3850R	3851R	3848R	3848R
0508-97-0010	08-03100	2–2.5	SED	3850R	3851R	3848R	3848R
0508-97-0011	08-03100	3–3.5	SED	3850R	3851R	3848R	3848R
0508-97-0012	08-03100	4–4.5	SED	3850R	3851R	3848R	3848R

Note: Numbers in analyte columns are request numbers.

Table 4.4-4
Inorganic Chemicals above BVs at SWMU 08-009(a)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Cobalt	Copper	Lead	Mercury	Selenium	Silver	Zinc
Sediment Background Value[a]				**0.83**	**0.4**	**4.73**	**11.2**	**19.7**	**0.1**	**0.3**	**1**	**60.2**
Construction Worker SSL[b]				**124**	**309**	**34.6[c]**	**12,400**	**800**	**92.9[c]**	**1550**	**1550**	**92,900**
Industrial SSL[b]				**454**	**1120**	**300[d]**	**45,400**	**800**	**310[d]**	**5680**	**5680**	**341,000**
Residential SSL[b]				**31.3**	**77.9**	**23[d]**	**3130**	**400**	**23[d]**	**391**	**391**	**23,500**
Recreational SSL[b]				**317**	**784**	**238**	**31,700**	**560**	**238**	**3960**	**3960**	**238,000**
0508-97-0008	08-03100	0–0.5	SED	—[e]	—	—	14.3	—	—	—	—	—
0508-97-0009	08-03100	1–1.5	SED	—	—	4.82 (J)	—	31.9	—	0.341 (U)	—	—
0508-97-0010	08-03100	2–2.5	SED	0.834 (J)	0.575	4.81 (J)	28.2	42.5	0.14	0.357 (U)	—	65
0508-97-0011	08-03100	3–3.5	SED	—	—	5.85	—	24.2	0.271	0.323 (U)	—	—
0508-97-0012	08-03100	4–4.5	SED	—	—	—	—	—	0.16	—	2.7	—

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

[a] BVs are from LANL 1998, 059730.

[b] SSLs are from NMED 2009, 108070, unless otherwise noted.

[c] Construction worker SSLs calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[d] SSLs are from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[e] — = Not detected or not above BV.

Table 4.4-5
Organic Chemicals Detected at SWMU 08-009(a)

Sample ID	Location ID	Depth (ft)	Media	Bis(2-ethylhexyl)phthalate	HMX	RDX	Trinitrotoluene[2,4,6-]
Construction Worker SSL[a]				**4760**	**11,900**	**715**	**141**
Industrial SSL[a]				**1370**	**34,200**	**174**	**469**
Residential SSL[a]				**347**	**3060**	**44.2**	**35.9**
Recreational SSL[a]				**1830**	**19,900**	**233**	**301**
0508-97-0008	08-03100	0–0.5	SED	0.05 (J)	—[b]	—	—
0508-97-0010	08-03100	2–2.5	SED	—	0.614	4.15	5.74
0508-97-0011	08-03100	3–3.5	SED	—	—	1.15	1.71
0508-97-0012	08-03100	4–4.5	SED	—	—	—	0.204

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

[a] SSLs are from NMED 2009, 108070.

[b] — = Not detected.

Table 4.4-6
Proposed Sampling at SWMU 08-009(a)

Objective Addressed	Location Number	Location	Starting Depth of Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	9a-1	Pipe Inlet	0–1 ft below drainline	X[a]	X	X	X	X	—[b]	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	9a-2 9a-4 through 9a-7	Drainline	0–1 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	9a-8	Discharge of SWMU 08-003(a)	0–1 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	9a-9 through 9a-12 (9a-11 adjacent to location 08-03100)	Outfall	0–1 ft bgs	X	X	X	X	X	X	X	—	X	X	X	X	X
			4–5 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	9a-13 9a-14 9a-15	Drainage	0–1 ft bgs	X	X	X	X	X	—	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 4.5-1
Proposed Sampling at SWMU 08-004(c)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	TPH-DRO	TPH-ORO	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	4c-1	Drainline	0–1 ft below drainline	X*	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

* X = Analysis will be performed.

Table 4.6-1
Proposed Sampling at SWMU 08-004(d)

Objective Addressed	Location Number	Location	Sample Interval	Strontium-90
Determine nature and extent of potential contamination	4d-1 through 4d-3	Around perimeter of concrete foundation	4–5 ft bgs	X*
			9–10 ft bgs	X
Determine nature and extent of potential contamination	4d-4 through 4d-22	Drainline	0–1 ft below drainline	X
			5–6 ft below drainline	X

* X = Analysis will be performed.

Table 4.7-1
Proposed Sampling at SWMU 08-005

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	5-1	Centered at former location of incubator	0–1 ft bgs	X[a]	X	X	X	X	X	—[b]	X
			4–5 ft bgs	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	5-2 through 5-5	Within SWMU boundary	0–1 ft bgs	X	X	X	X	X	X	—	X
			4–5 ft bgs	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.
[b] — = Analysis will not be performed.

Table 4.8-1
Proposed Sampling at SWMU 08-006(a)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	6a-1 through 6a-4	3 ft beyond SWMU boundary	0–1 ft bgs	X[a]	X	X	X	X	X	X	—[b]	X
			5–10 ft bgs	X	X	X	X	X	X	X	X	X
			15–20 ft bgs	X	X	X	X	X	X	X	X	X
			25–30 ft bgs	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.
[b] — = Analysis will not be performed.

Table 4.9-1
Samples Collected and Analyses Requested at AOC 08-009(c)

Sample ID	Location ID	Depth (ft)	Media	PCB
0508-97-0001	08-01100	0–0.5	SOIL	3848R
0508-97-0002	08-01101	0–0.5	SOIL	3848R
0508-97-0003	08-01102	0–0.5	SOIL	3848R
0508-97-0004	08-01103	0–0.5	SED	3848R
0508-97-0005	08-01104	0–0.5	SED	3848R
0508-97-0006	08-01105	0–0.5	SED	3848R
0508-97-0007	08-01106	0–0.5	SED	3848R

Note: Numbers in analyte columns are request numbers.

Table 4.9-2
Organic Chemicals Detected at AOC 08-009(c)

Sample ID	Location ID	Depth (ft)	Media	Aroclor-1260
Construction Worker SSL*				**7.58**
Industrial SSL*				**8.26**
Residential SSL*				**2.22**
0508-97-0001	08-01100	0–0.5	SOIL	0.12
0508-97-0002	08-01101	0–0.5	SOIL	0.038 (J)

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

* SSLs are from NMED 2009, 108070.

Table 4.9-3
Proposed Sampling at AOC 08-009(c)

Objective Addressed	Location Number	Location	Sample Interval	PCBs
Determine nature and extent of potential contamination	9c-1 through 9c-4	Outfall	0–1 ft bgs	X*
			2–3 ft bgs	X
Determine nature and extent of potential contamination	9c-5 through 9c-8	Drainage downgradient of outfall	0–1 ft bgs	X
			2–3 ft bgs	X
Determine nature and extent of potential contamination	9c-9 through 9c-16	Drainline	0–1 ft below drainline 5–6 ft below drainline	X X

* X = Analysis will be performed.

Table 4.10-1
Proposed Sampling at SWMU 08-009(d)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	9d-1 through 9d-4	Outfall	0–1 ft bgs	X[a]	X	X	X	X	X[b]	X	—[c]	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X[b]	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	9d-5 through 9d-13	Downgradient of outfall	0–1 ft bgs	X	X	X	X	X	X[d]	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X[d]	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	9d-14 through 9d-20	Drainline	0–1 ft below drainline	X	X	X	X	X	X[e]	X	—	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X[e]	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] PCB analyses at location 9d-1 only.

[c] — = Analysis will not be performed.

[d] PCB analyses at locations 9d-5 and 9d-11 only.

[e] PCB analyses at location 9d-15 only.

Table 4.11-1
Proposed Sampling at SWMU 08-009(e)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	9e-1, 9e-2, 9e-10 through 9e-15	Drainline	0–1 ft below drainline	X[a]	X	X	X	X	—[b]	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	9e-3 through 9e-6	Outfall	0–1 ft bgs	X	X	X	X	X	X	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	9e-7 through 9e-9	Downgradient of outfall	0–1 ft bgs	X	X	X	X	X	—	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 4.12-1
Proposed Sampling at AOC 08-009(f)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	9f-1	Drainline 5 ft from active building	0–1 ft below drainline	X[a]	X	X	X	X	X	X	—[b]	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	9f-2	Outfall	0–1 ft bgs	X	X	X	X	X	X	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
			4–5 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	9f-3 through 9f-5	Drainage	0–1 ft bgs	X	X	X	X	X	X	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.1-1
Proposed Sampling at SWMU 09-001(a)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Dioxins/Furans	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	1a-1 through 1a-3	Footprint of structure 9-4	0–1 ft bgs	X[a]	X	X	X	X	X	—[b]	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	1a-4 through 1a-6	Beneath the pad	0–1 ft bgs	X	X	X	X	X	X	X	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	1a-7 through 1a-14	Perimeter of the concrete firing pad	0–1 ft bgs	X	X	X	X	X	X	—	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X	X	X

[a] X = Analysis will be performed.
[b] — = Analysis will not be performed.

Table 5.1-2
Proposed Sampling at SWMU 09-001(b)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Dioxins/Furans	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	1b-1 through 1b-3	Footprint of former structure 09-5	0–1 ft bgs	X[a]	X	X	X	X	X	X	X	—[b]	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.
[b] — = Analysis will not be performed.

Table 5.2-1
Samples Collected and Analyses Requested at SWMU 09-001(c)

Sample ID	Location ID	Depth (ft)	Media	HE	Metals	Nitrate-Nitrite as Nitrogen
0509-95-0039	09-06050	8.5–10	QBT2	143	144	144
0509-95-0043	09-06054	8.5–10	QBT2	143	144	144
0509-95-0044	09-06055	8.5–9.5	QBT2	143	144	144

Note: Numbers in analyte columns are request numbers.

Table 5.2-2
Inorganic Chemicals above BVs at SWMU 09-001(c)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Calcium	Chromium	Cobalt	Copper	Lead	Nickel	Nitrate-Nitrite as Nitrogen	Selenium	Vanadium
Qbt 2, 3, 4 Background Value[a]				**7340**	**0.5**	**2.79**	**46**	**2200**	**7.14**	**3.14**	**4.66**	**11.2**	**6.58**	**na**[b]	**0.3**	**17**
Construction Worker SSL[c]				**40,700**	**124**	**65.4**	**4350**	**na**	**449**[d]	**34.6**[e]	**12,400**	**800**	**6190**	**na**	**1550**	**1550**
Industrial SSL[c]				**1,130,000**	**454**	**17.7**	**224,000**	**na**	**2920**[d]	**300**[f]	**45,400**	**800**	**22,700**	**na**	**5680**	**5680**
Residential SSL[c]				**78,100**	**31.3**	**3.9**	**15,600**	**na**	**219**[d]	**23**[f]	**3130**	**400**	**1560**	**na**	**391**	**391**
0509-95-0039	09-06050	8.5–10	QBT2	9510	0.54 (J-)	3.1	151	3750	7.6	4.8 (J)	11	44.8	10.2	9	0.88 (J)	17.3
0509-95-0043	09-06054	8.5–10	QBT2	10,900	0.53 (J-)	3.2	142	3830	7.4	6.4 (J)	5.9	14.4	—[g]	—	1 (J)	17.9
0509-95-0044	09-06055	8.5–9.5	QBT2	—	0.52 (J-)	—	75.4	8850	—	—	—	—	—	—	0.56 (J)	—

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

[a] BVs are from LANL 1998, 059730.

[b] na = not available.

[c] SSLs are from NMED 2009, 108070, unless otherwise noted.

[d] SSLs are for hexavalent chromium.

[e] Construction worker SSLs calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] SSLs are from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[g] — = Not detected or not above BV.

Table 5.2-3
Proposed Sampling at SWMU 09-001(c)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Dioxins/Furans	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	1c-1	Center beneath former structure 09-15	0–1 ft below pit, approximately 8 ft bgs	X[a]	X	X	X	X	X	X	X	—[b]	X	X	X	X	X
			5–6 ft below pit	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	1c-2 through 1c-5	Around the perimeter of former firing pit structure 09-15	0–1 ft below pit, approximately 8 ft bgs	X	X	X	X	X	X	X	X	—	X	X	X	X	X
			5–6 ft below pit	X	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.3-1
Proposed Sampling at SWMU 09-001(d)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Dioxins/Furans	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	1d-1 through 1d-5	Midway between center of two firing points	0–1 ft bgs	X[a]	X	X	X	X	X	X	X	—[b]	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	1d-6 though 1d-9	Radial distance of 30 ft	0–1 ft bgs	X	X	X	X	X	X	—	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	1d-10 through 1d-13	Radial distance of 45 ft	0–1 ft bgs	X	X	X	X	X	X	—	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.4-1
Proposed Sampling at SWMU 09-002

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Dioxins/Furans	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	2-1	Center of burn pit	0–1 ft bgs	X[a]	X	X	X	X	X	—[b]	X	—	X	X	X	X	X
			3–4 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X	X	X
			5–6 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	2-2 through 2-5	Burn pit	0–1 ft bgs	X	X	X	X	X	X	X	X	—	X	X	X	X	X
			3–4 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X	X	X
			5–6 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	2-6 through 2-9	Around perimeter of burn pit	0–1 ft bgs	X	X	X	X	X	X	—	X	—	X	X	X	X	X
			3–4 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X	X	X
			5–6 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.5-1
Samples Collected and Analyses Requested at SWMU 09-003(a)

Sample ID	Location ID	Depth (ft)	Media	H3	HE	Metals	VOC	Cyanide (Total)
0509-95-0018	09-05250	6.5–7.5	QBT2	—*	119	123	119	123
0509-95-0020	09-05251	8–9	QBT2	—	119	123	119	123
0509-95-0021	09-05252	6–7.25	QBT2	126	119	123	119	123
0509-95-0022	09-05253	6.5–7.5	QBT2	—	119	123	119	123
0509-95-0023	09-05254	7–8	QBT2	—	119	123	119	123
0509-95-0024	09-05255	7–8	QBT2	—	119	123	119	123

Note: Numbers in analyte columns are request numbers.

* — =Analysis not requested.

Table 5.5-2
Inorganic Chemicals above BVs at SWMU 09-003(a)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Calcium	Selenium
Qbt 2, 3, 4 Background Value[a]				**0.5**	**46**	**2200**	**0.3**
Construction Worker SSL[b]				**124**	**4350**	**na**[c]	**1550**
Industrial SSL[b]				**454**	**224,000**	**na**	**5680**
Residential SSL[b]				**31.3**	**15,600**	**na**	**391**
0509-95-0018	09-05250	6.5–7.5	QBT2	0.58 (J-)	—[d]	2220	0.44 (U)
0509-95-0020	09-05251	8–9	QBT2	0.58 (J-)	—	3130	0.44 (U)
0509-95-0021	09-05252	6–7.25	QBT2	0.64 (J-)	57.8	—	0.49 (U)
0509-95-0022	09-05253	6.5–7.5	QBT2	0.58 (J-)	—	—	0.44 (U)
0509-95-0023	09-05254	7–8	QBT2	0.58 (J-)	—	—	0.44 (U)
0509-95-0024	09-05255	7–8	QBT2	0.58 (J-)	—	—	0.44 (U)

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

[a] BVs are from LANL 1998, 059730.

[b] SSLs are from NMED 2009, 108070.

[c] na = Not available.

[d] — = Not detected or not above BV.

Table 5.5-3
Organic Chemicals Detected at SWMU 09-003(a)

Sample ID	Location ID	Depth (ft)	Media	RDX	Toluene
Construction Worker SSL[a]				**715**	**21,100**
Industrial SSL[a]				**174**	**57,900**
Residential SSL[a]				**44.2**	**5570**
0509-95-0018	09-05250	6.5–7.5	QBT2	—[b]	0.0017 (J)
0509-95-0020	09-05251	8–9	QBT2	1 (J+)	0.0014 (J)
0509-95-0021	09-05252	6–7.25	QBT2	1 (J+)	—
0509-95-0022	09-05253	6.5–7.5	QBT2	—	0.0016 (J)
0509-95-0023	09-05254	7–8	QBT2	—	0.0013 (J)

Notes: Results are in mg/kg. Data qualifiers are in Appendix A.
[a] SSLs are from NMED 2009, 108070.
[b] — = Not detected.

Table 5.5-4
Proposed Sampling at SWMU 09-003(a)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	3a-1	Footprint of former structure 9-83	4–5 ft bgs	X*	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3a-2 through 3a-5	Around perimeter of former structure 9-83	4–5 ft bgs	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X

* X = Analysis will be performed.

Table 5.5-5
Samples Collected and Analyses Requested at SWMU 09-003(b)

Sample ID	Location ID	Depth (ft)	Media	HE	Metals	VOC	Cyanide (Total)
0509-95-0025	09-05270	2.25–3.25	QBT2	127	128	127	128
0509-95-0026	09-05271	6.5–7.5	QBT2	127	128	127	128
0509-95-0027	09-05272	7–8	QBT2	127	128	127	128
0509-95-0029	09-05273	6.5–7.5	QBT2	127	128	127	128
0509-95-0030	09-05274	2.25–3.25	QBT2	127	128	127	128
0509-95-0031	09-05275	6.25–7.25	QBT2	127	128	127	128

Note: Numbers in analyte columns are request numbers.

Table 5.5-6
Inorganic Chemicals above BVs at SWMU 09-003(b)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Calcium	Copper	Lead	Mercury	Selenium
Qbt2, 3, 4 Background Value[a]				**7340**	**0.5**	**2.79**	**46**	**2200**	**4.66**	**11.2**	**0.1**	**0.3**
Construction Worker SSL[b]				**40,700**	**124**	**65.4**	**4350**	**na**[c]	**12,400**	**800**	**92.9**[d]	**1550**
Industrial SSL[b]				**1,130,000**	**454**	**17.7**	**224,000**	**na**	**45,400**	**800**	**310**[e]	**5680**
Residential SSL[b]				**78,100**	**31.3**	**3.9**	**15,600**	**na**	**3130**	**400**	**23**[e]	**391**
0509-95-0025	09-05270	2.25–3.25	QBT2	7410	1.6 (J-)	3.9 (U)	133	3690	12	26.2	0.14	1 (J)
0509-95-0026	09-05271	6.5–7.5	QBT2	—[f]	0.58 (J-)	—	—	—	—	—	—	0.44 (U)
0509-95-0027	09-05272	7–8	QBT2	—	0.6 (J-)	—	—	—	—	—	—	0.45 (U)
0509-95-0029	09-05273	6.5–7.5	QBT2	—	0.59 (J-)	—	—	—	—	—	—	0.45 (U)
0509-95-0030	09-05274	2.25–3.25	QBT2	13,900	0.65 (J-)	4.4	128	3490	11.6	24.4	—	0.51 (J)
0509-95-0031	09-05275	6.25–7.25	QBT2	—	0.58 (J-)	—	—	—	—	—	—	0.44 (U)

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

[a] BVs are from LANL 1998, 059730.

[b] SSLs are from NMED 2009, 108070, unless otherwise noted.

[c] na = not available.

[d] Construction worker SSLs calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[e] SSLs are from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[f] — = Not detected or not above BV.

Table 5.5-7
Organic Chemicals Detected at SWMU 09-003(b)

Sample ID	Location ID	Depth (ft)	Media	Chlorodibromethane	RDX	Toluene
Construction Worker SSL[a]				**1990**	**715**	**21,100**
Industrial SSL[a]				**61.3**	**174**	**57,900**
Residential SSL[a]				**11.9**	**44.2**	**5570**
0509-95-0025	09-05270	2.25–3.25	QBT2	—[b]	1.3 (J+)	0.002 (J)
0509-95-0026	09-05271	6.5–7.5	QBT2	—	—	0.001 (J)
0509-95-0027	09-05272	7–8	QBT2	—	—	0.001 (J)
0509-95-0029	09-05273	6.5–7.5	QBT2	—	—	0.001 (J)
0509-95-0030	09-05274	2.25–3.25	QBT2	—	—	0.009
0509-95-0031	09-05275	6.25–7.25	QBT2	0.005	—	—

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

[a] SSLs are from NMED 2009, 108070.

[b] — = Not detected.

Table 5.5-8
Proposed Sampling at SWMU 09-003(b)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	3b-1	Footprint of former structure 9-84	4–5 ft bgs	X*	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3b-2 through 3b-5	Around perimeter of former structure 9-84	4–5 ft bgs	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X

* X = Analysis will be performed.

Table 5.5-9
Samples Collected and Analyses Requested at SWMU 09-003(e)

Sample ID	Location ID	Depth (ft)	Media	HE	Metals	VOC	Cyanide (Total)
0509-95-0032	09-05256	6.5–7.5	QBT2	127	128	127	128
0509-95-0033	09-05257	6–7	QBT2	127	128	127	128
0509-95-0035	09-05259	6.5–7.5	QBT2	127	128	127	128
0509-95-0037	09-05260	6–7	QBT2	127	128	127	128
0509-95-0038	09-05261	6–7	QBT2	127-1	128	127	128

Note: Numbers in analyte columns are request numbers.

Table 5.5-10
Inorganic Chemicals above BVs at SWMU 09-003(e)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Selenium
Qbt 2, 3, 4 Background Value[a]				**0.5**	**0.3**
Construction Worker SSL[b]				**124**	**1550**
Industrial SSL[b]				**454**	**5680**
Residential SSL[b]				**31.3**	**391**
0509-95-0032	09-05256	6.5–7.5	QBT2	0.58 (J-)	0.44 (U)
0509-95-0033	09-05257	6–7	QBT2	0.58 (J-)	0.44 (U)
0509-95-0035	09-05259	6.5–7.5	QBT2	0.57 (U)	0.44 (U)
0509-95-0037	09-05260	6–7	QBT2	0.57 (J-)	0.43 (U)
0509-95-0038	09-05261	6–7	QBT2	0.58 (J-)	0.44 (U)

Notes: Results are in mg/kg. Data qualifiers are in Appendix A.
[a] BVs are from LANL 1998, 059730.
[b] SSLs are from NMED 2009, 108070.

Table 5.5-11
Organic Chemicals Detected at SWMU 09-003(e)

Sample ID	Location ID	Depth (ft)	Media	Styrene	Toluene
Construction Worker SSL[a]				**30,300**	**21,100**
Industrial SSL[a]				**51,200**	**57,900**
Residential SSL[a]				**8970**	**5570**
0509-95-0032	09-05256	6.5–7.5	QBT2	—[b]	0.002 (J)
0509-95-0033	09-05257	6–7	QBT2	—	0.002 (J)
0509-95-0038	09-05261	6–7	QBT2	0.005	—

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

[a] SSLs are from NMED 2009, 108070.

[b] — = Not detected.

Table 5.5-12
Proposed Sampling at SWMU 09-003(e)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	3e-1	Footprint of former structure 9-62	4–5 ft bgs	X*	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3e-2 through 3e-5	Around perimeter of former structure 9-62	4–5 ft bgs	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X

* X = Analysis will be performed.

Table 5.6-1
Samples Collected and Analyses Requested at SWMU 09-003(d)

Sample ID	Location ID	Depth (ft)	Media	HE	Metals	VOC	Cyanide (Total)
0509-95-0002	09-05280	6–7.25	QBT2	70	72	70	72
0509-95-0003	09-05281	6.5–7.5	QBT2	119	123	119	123
0509-95-0005	09-05283	3.5–4.5	QBT2	45	66	45	66
0509-95-0007	09-05284	5–6.5	QBT2	45	66	45	66
0509-95-0009	09-05285	7.5–8.5	QBT2	70	72	70	—*

Note: Numbers in analyte columns are request numbers.

* — = Analysis not requested.

Table 5.6-2
Inorganic Chemicals above BVs at SWMU 09-003(d)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Calcium	Cobalt	Copper	Iron	Lead	Magnesium	Nitrate	Selenium	Zinc
Qbt 2, 3, 4 Background Value[a]				**7340**	**0.5**	**2.79**	**46**	**2200**	**3.14**	**4.66**	**14,500**	**11.2**	**1690**	**na**[b]	**0.3**	**63.5**
Construction Worker SSL[c]				**40,700**	**124**	**65.4**	**4350**	**na**	**34.6**[d]	**12,400**	**217,000**	**800**	**na**	**496,000**	**1550**	**92,900**
Industrial SSL[c]				**1,130,000**	**454**	**17.7**	**224,000**	**na**	**300**[e]	**45,400**	**795,000**	**800**	**na**	**1,820,000**	**5680**	**341,000**
Residential SSL[c]				**78,100**	**31.3**	**3.9**	**15,600**	**na**	**23**[e]	**3130**	**54,800**	**400**	**na**	**125,000**	**391**	**23,500**
0509-95-0002	09-05280	6–7.25	QBT2	—[f]	1.3 (J-)	7.7	1440 (J-)	3560	—	5 (J)	—	83.2	—	1	0.5 (U)	72.2
0509-95-0003	09-05281	6.5–7.5	QBT2	—	0.6 (J-)	—	—	—	—	8.7	—	—	—	—	0.45 (U)	—
0509-95-0005	09-05283	3.5–4.5	QBT2	9150	1 (J-)	6	172	2600	—	6.9	—	23.6	—	12	0.49 (U)	—
0509-95-0007	09-05284	5–6.5	QBT2	10,400	0.59 (J-)	6.1	89.8	—	4.1 (J)	5.2 (J)	—	25.5	1880	1	0.45 (U)	—
0509-95-0009	09-05285	7.5–8.5	QBT2	—	1.1 (J)	6.5	—	—	—	—	14,800	14.9	—	NA[g]	0.47 (U)	—

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

[a] BVs are from LANL 1998, 059730.

[b] na = not available.

[c] SSLs are from NMED 2009, 108070, unless otherwise noted.

[d] Construction worker SSLs calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[e] SSLs are from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[f] — = Not detected or not above BV.

[g] NA = Not analyzed.

Table 5.6-3
Organic Chemicals Detected at SWMU 09-003(d)

Sample ID	Location ID	Depth (ft)	Media	Butanone[2-]	HMX	Methylene Chloride	RDX	Tetrachloroethene	Toluene	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
Construction Worker SSL[a]				**148,000**	**11,900**	**10600**	**715**	**338**	**21,100**	**8760[b]**	**141**
Industrial SSL[a]				**369,000**	**34,200**	**1090**	**174**	**36.4**	**57,900**	**27,000[c]**	**469**
Residential SSL[a]				**39,600**	**3060**	**199**	**44.2**	**6.99**	**5570**	**2200[c]**	**35.9**
0509-95-0002	09-05280	6–7.25	QBT2	—[d]	—	0.003 (J)	1.2 (J-)	—	—	1.1 (J-)	—
0509-95-0003	09-05281	6.5–7.5	QBT2	—	—	—	2.1	—	—	—	—
0509-95-0005	09-05283	3.5–4.5	QBT2	—	—	0.0026 (J)	—	—	0.0015 (J)	—	—
0509-95-0007	09-05284	5–6.5	QBT2	—	11	0.0027 (J)	190	0.001 (J)	0.0014 (J)	—	0.99
0509-95-0009	09-05285	7.5–8.5	QBT2	0.005 (J)	—	0.002 (J)	5.3 (J-)	—	—	5.1 (J-)	—

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

[a] SSLs are from NMED 2009, 108070, unless otherwise noted.

[b] Construction worker SSLs calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[c] SSLs are from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[d] — = Not detected.

Table 5.6-4
Proposed Sampling at SWMU 09-003(d)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	3d-1 and 3d-2	Footprint of former structure 9-88	4–5 ft bgs	X*	X	X	X	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3d-3 through 3d-6	Around perimeter of former structure 9-88	4–5 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X

* X = Analysis will be performed.

Table 5.7-1
Proposed Sampling at SWMU 09-003(g)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	3g-1 and 3g-2	Footprint of former sump	4–5 ft bgs	X*	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3g-3 through 3g-6	Around perimeter of sump	4–5 ft bgs	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3g-7 through 3g-10	Footprint of former building 09-2	4–5 ft bgs	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X

* X = Analysis will be performed.

Table 5.8-1
Proposed Sampling at SWMU 09-003(h)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	3h-1 and 3h-2	Footprint of former sump	4–5 ft bgs	X*	X	X	X	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3h-3 through 3h-6	Around perimeter of sump	4–5 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X

* X = Analysis will be performed.

Table 5.9-1
Proposed Sampling at SWMU 09-003(i)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	3i-1 and 3i-2	Footprint of former building	4–5 ft bgs	X*	X	X	X	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3i-3 through 3i-10	Around perimeter of building	4–5 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X

* X = Analysis will be performed.

Table 5.10-1
Samples Collected and Analyses Requested at SWMU 09-004(a)

Sample ID	Location ID	Depth (ft)	Media	HE	VOC
RE09-99-0001	09-04104	7–7.5	SOIL	5463R	5462R
RE09-99-0002	09-04105	9–9.5	SOIL	5463R	5462R

Note: Numbers in analyte columns are request numbers.

Table 5.10-2
Proposed Sampling at SWMU 09-004(a)

Objective Addressed	Location Number	Location	Starting Depth of Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	4a-1 through 4a-7	Inlet drainline	0–1 ft below drainline	X[a]	X	X	X	X	—[b]	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4a-8	Sump inlet	0–1 ft below drainline	X	X	X	X	X	—	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4a-9 4a-10	Sump	0–1 ft below sump	X	X	X	X	X	X	X	X	X
			5–6 ft below sump	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4a-11	Sump outlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4a-12 4a-13	Outlet drainline	0–1 ft below drainline	X	X	X	X	X	—	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.10-3
Proposed Sampling at SWMU 09-004(b)

Objective Addressed	Location Number	Location	Starting Depth of Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	4b-1 through 4b-5	Inlet drainline	0–1 ft below drainline	X[a]	X	X	X	X	—[b]	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4b-6	Sump inlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4b-7 4b-8	Sump	0–1 ft below sump	X	X	X	X	X	X	X	X	X
			5–6 ft below sump	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4b-9	Sump outlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X
			5-6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4b-10 through 4b-19	Outlet drainline	0–1 ft below drainline	X	X	X	X	X	—	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.10-4
Proposed Sampling at SWMU 09-004(c)

Objective Addressed	Location Number	Location	Starting Depth of Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	4c-1 4c-2 4c-3	Inlet drainline	0–1 ft below drainline	X[a]	X	X	X	X	—[b]	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4c-4	Sump inlet	0–1 ft below drainline	X	X	X	X	X	—	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4c-5 4c-6	Sump	0–1 ft below sump	X	X	X	X	X	X	X	X	X
			5–6 ft below sump	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4c-7	Sump outlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4c-8 through 4c-11	Outlet drainline	0–1 ft below drainline	X	X	X	X	X	—	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.10-5
Proposed Sampling at SWMU 09-004(d)

Objective Addressed	Location Number	Location	Starting Depth of Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	4d-1 4d-2 4d-3	Inlet drainline	0–1 ft below drainline	X[a]	X	X	X	X	—[b]	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4d-4	Sump inlet	0–1 below drainline	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4d-5 4d-6	Sump	0–1 ft below sump	X	X	X	X	X	—	X	X	X
			5–6 ft below sump	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4d-7	Sump outlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4d-8 4d-9 4d-10	Outlet drainline	0–1 ft below drainline	X	X	X	X	X	—	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.10-6
Proposed Sampling at SWMU 09-004(e)

Objective Addressed	Location Number	Location	Starting Depth of Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	4e-1 through 4e-4	Outlet drainline	0–1 ft below drainline	X*	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4e-5 through 4e-7	Drainline from building to sump	0–1 ft below drainline	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4e-8 through 4e-11	Around sump	0–1 ft below sump	X	X	X	X	X	X	X	X	X
			5–6 ft below sump	X	X	X	X	X	X	X	X	X

* X = Analysis will be performed.

Table 5.10-7
Proposed Sampling at SWMU 09-004(f)

Objective Addressed	Location Number	Location	Starting Depth of Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	4f-1 through 4f-9	Outlet drainline	0–1 ft below drainline	X*	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4f-10 through 4f-12	Drainline from building to sump	0–1 ft below drainline	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4f-13 through 4f-16	Around sump	0–1 ft below sump	X	X	X	X	X	X	X	X	X
			5–6 ft below sump	X	X	X	X	X	X	X	X	X

* X = Analysis will be performed.

Table 5.10-8
Proposed Sampling at SWMU 09-004(h)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	Tritium	Moisture	pH
Determine nature and extent of potential contamination	4h-1 through 4h-11, 4h-25 through 4h-32	Outlet drainline and the common drainline to outfall	0–1 ft below drainline	X[a]	X	X	X	X	—[b]	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4h-20 through 4h-24	Drainline from building to sump, sump inlet and outlet, around sump	0–1 ft below drainline or sump	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline or sump	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4h-12 through 4h-15	Outfall	0–1 ft bgs	X	X	X	X	X	—	X	—	X	X	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4h-16 through 4h-19	Drainage	0–1 ft bgs	X	X	X	X	X	X	X	—	X	X	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.10-9
Proposed Sampling at SWMU 09-004(i)

Objective Addressed	Location Number	Location	Starting Depth of Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	4i-1	Inlet drainline	0–1 ft below drainline	X[a]	X	X	X	X	—[b]	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4i-2	Sump inlet	0–1 ft below drainline	X	X	X	X	X	—	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4i-3 4i-4	Sump	0–1 ft below sump	X	X	X	X	X	X	X	X	X
			5–6 ft below sump	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4i-5	Sump outlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4i-6 through 4i-12	Outlet drainline	0–1 ft below drainline	X	X	X	X	X	—	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.10-10
Proposed Sampling at SWMU 09-004(j)

Objective Addressed	Location Number	Location	Starting Depth of Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	4j-1 4j-2 4j-3	Inlet drainline	0–1 ft below drainline	X[a]	X	X	X	X	—[b]	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4j-4	Sump inlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4j-5 4j-6	Sump	0–1 ft below sump	X	X	X	X	X	—	X	X	X
			5–6 ft below sump	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4j-7	Sump outlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4j-8 through 4j-10	Outlet drainline	0–1 ft below drainline	X	X	X	X	X	—	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.10-11
Proposed Sampling at SWMU 09-004(k)

Objective Addressed	Location Number	Location	Starting Depth of Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	4k-1 4k-2	Inlet drainline	0–1 ft below drainline	X[a]	X	X	X	X	—[b]	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4k-3	Sump inlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4k-4 4k-5	Sump	0–1 ft below sump	X	X	X	X	X	—	X	X	X
			5–6 ft below sump	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4k-6	Sump outlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4k-7 through 4k-11	Outlet drainline	0–1 ft below drainline	X	X	X	X	X	—	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.10-12
Proposed Sampling at SWMU 09-004(l)

Objective Addressed	Location Number	Location	Starting Depth of Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	4l-1 4l-2	Inlet drainline	0–1 ft below drainline	X[a]	X	X	X	X	—[b]	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4l-3	Sump inlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4l-4 4l-5	Sump	0–1 ft below sump	X	X	X	X	X	—	X	X	X
			5–6 ft below sump	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4l-6	Sump outlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4l-7 4l-8 4l-9	Outlet drainline	0–1 ft below drainline	X	X	X	X	X	—	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.10-13
Proposed Sampling at SWMU 09-004(m)

Objective Addressed	Location Number	Location	Starting Depth of Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	4m-1 4m-2 4m-3	Inlet drainline	0–1 ft below drainline	X[a]	X	X	X	X	—[b]	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4m-4	Sump inlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4m-5 4m-6	Sump	0–1 ft below sump	X	X	X	X	X	—	X	X	X	X	X	X	X
			5–6 ft below sump	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4m-7	Sump outlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4m-8 through 4m-10	Outlet drainline	0–1 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.10-14
Proposed Sampling at SWMU 09-004(n)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	4n-1 4n-2 4n-3	Inlet drainline	0–1 ft below drainline	X[a]	X	X	X	X	—[b]	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4n-4	Sump inlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4n-5 4n-6	Sump	0–1 ft below sump	X	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below sump	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4n-7	Sump outlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4n-8 4n-10 through 4n-19	Outlet drainline and the common drainline to Outfall 05A067	0–1 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4n-20 through 4n-23	Outfall 05A067	0–1 ft bgs	X	X	X	X	X	—	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4n-24 through 4n-27	Drainage	0–1 ft bgs	X	X	X	X	X	X	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4n-28 4n-29	Drainage	0–1 ft bgs	X	X	X	X	X	X	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4n-9 4n-30	Manhole inlet and outlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.11-1
Proposed Sampling at SWMU 09-004(g)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	4g-1 and 4g-3 through 4g-7	Drainlines	0–1 ft below drainline	X*	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4g-2	Sump	0–1 ft below sump	X	X	X	X	X	X	X	X	X
			5–6 ft below sump	X	X	X	X	X	X	X	X	X

* X = Analysis will be performed.

Table 5.12-1
Samples Collected and Analyses Requested at SWMU 09-004(o)

Sample ID	Location ID	Depth (ft)	Media	HE
RE09-99-0018	09-00005	0–0.5	SOIL	6127R
RE09-99-0019	09-00005	0.83–1.25	SOIL	6127R

Note: Numbers in analyte columns are request numbers.

Table 5.12-2
Organic Chemicals Detected at SWMU 09-004(o)

Sample ID	Location ID	Depth (ft)	Media	HMX
Construction Worker SSL*				**11,900**
Industrial SSL*				**34,200**
Residential SSL*				**3060**
RE09-99-0018	09-00005	0–0.5	SOIL	680
RE09-99-0019	09-00005	0.83–1.25	SOIL	25

Notes: Results are in mg/kg.
***** SSLs are from NMED 2009, 108070.

Table 5.12-3
Proposed Sampling at SWMU 09-004(o)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	4o-1	Outfall	0–1 ft bgs	X[a]	X	X	X	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4o-2 4o-3 4o-4	Outfall	0–1 ft bgs	X	X	X	X	X	—[b]	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4o-5 through 4o-9	Drainage downgradient of outfall	0–1 ft bgs	X	X	X	X	X	—	X	—	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4o-10 4o-11	Drainage downgradient of outfall	0–1 ft bgs	X	X	X	X	X	X	X	—	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4o-12 through 4o-16, 4o-20 through 4o-23	Drainlines	0–1 ft below drainline	X	X	X	X	X	—	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	4o-17 through 4o-19	Sump, inlet, and outlet	0–1 ft below drainline or sump	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline or sump	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.13-1
Proposed Sampling at SWMU 09-005(g)

Objective Addressed	Location Number	Location	Starting Depth of Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	5g-1 5g-2	Inside absorption trench	0–1 ft below trench bottom	X[a]	X	X	X	X	X	X	X	X
			5–6 ft below trench bottom	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	5g-3 5g-4 5g-5	Outside absorption trench	0–1 ft bgs	X	X	X	X	X	—[b]	X	X	X
			0–1 ft below trench bottom	X	X	X	X	X	—	X	X	X
			5–6 ft below trench bottom	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	5g-6 through 5g-15	Drainline	0–1 ft below drainline	X	X	X	X	X	—	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	5g-16	Outfall	0–1 ft bgs	X	X	X	X	X	X	X	—	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	5g-17 5g-18 5g-19	Outfall	0–1 ft bgs	X	X	X	X	X	—	X	—	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	5g-20 5g-21 5g-22	Drainage downgradient of outfall	0–1 ft bgs	X	X	X	X	X	—	X	—	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	5g-23 5g-24	Drainage downgradient of outfall	0–1 ft bgs	X	X	X	X	X	X	X	—	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	5g-25 through 5g-28, 5g-32	Drainline	0–1 ft below drainline	X	X	X	X	X	—	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	5g-29 through 5g-31	Septic tank, inlet and outlet drainlines	0–1 ft below drainline or tank	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline or tank	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.14-1
Samples Collected and Analyses Requested at SWMU 09-006

Sample ID	Location ID	Depth (ft)	Media	H3	HE	Metals	VOC	Cyanide (Total)
0509-95-0016	09-05060	7.5–8.5	QBT2	126	119	123	119	123
0509-95-0017	09-05061	6.5–7.5	QBT2	—*	119	123	119	123

Note: Numbers in analyte columns are request numbers.
*— = Analysis is not requested.

Table 5.14-2
Inorganic Chemicals above BVs at SWMU 09-006

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Nickel	Nitrate	Selenium	Silver	Zinc
Qbt 2, 3, 4 Background Value[a]				**7340**	**0.5**	**2.79**	**46**	**2200**	**7.14**	**3.14**	**4.66**	**14,500**	**11.2**	**1690**	**482**	**6.58**	**na**[b]	**0.3**	**1**	**63.5**
Construction Worker SSL[c]				**40,700**	**124**	**65.4**	**4350**	**na**	**449**[d]	**34.6**[e]	**12,400**	**217,000**	**800**	**na**	**463**	**6190**	**496,000**	**1550**	**1550**	**92,900**
Industrial SSL[c]				**1,130,000**	**454**	**17.7**	**224,000**	**na**	**2920**[d]	**300**[f]	**45,400**	**795,000**	**800**	**na**	**145,000**	**22,700**	**1,820,000**	**5680**	**5680**	**341,000**
Residential SSL[c]				**78,100**	**31.3**	**3.9**	**15,600**	**na**	**219**[d]	**23**[f]	**3130**	**54,800**	**400**	**na**	**10,700**	**1560**	**125,000**	**391**	**391**	**23,500**
0509-95-0016	09-05060	7.58.5	QBT2	9260	0.61 (J-)	3.5	183	2810	9.8	5 (J)	11.9	14900	101	2730	—[g]	9.3 (J)	7	0.99 (J)	1.1 (J)	137
0509-95-0017	09-05061	6.5-7.5	QBT2	—	0.6 (J-)	3.7	118	—	—	7.6 (J)	6.3	—	44.6	—	486	—	1	0.71 (J)	6.5	68.4

Notes: Results are in mg/kg. Data qualifiers are in Appendix A.
[a] BVs are from LANL 1998, 059730.
[b] na = Not available.
[c] SSLs are from NMED 2009, 108070, unless otherwise noted.
[d] SSLs are for hexavalent chromium.
[e] Construction worker SSLs calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).
[f] SSLs are from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).
[g] — = Not detected or not above BV.

Table 5.14-3
Organic Chemicals Detected at SWMU 09-006

Sample ID	Location ID	Depth (ft)	Media	Carbon Tetrachloride	Chloroform	Hexachlorobutadiene	Tetrachloroethene
Construction Worker SSL[a]				**199**	**671**	**238**	**338**
Industrial SSL[a]				**24.3**	**31.9**	**246**	**36.4**
Residential SSL[a]				**4.38**	**5.72**	**61.1**	**6.99**
0509-95-0016	09-05060	7.5–8.5	QBT2	0.007	0.035	—[b]	0.005
0509-95-0017	09-05061	6.5–7.5	QBT2	—	—	0.002 (J)	0.0014 (J)

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

[a] SSLs are from NMED 2009, 108070.

[b] — = Not detected.

Table 5.14-4
Proposed Sampling at SWMU 09-006

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	6-1 through 6-4, 6-8	Drainlines	0–1 ft below drainline	X*	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	6-5, 6-7	Septic tank inlet and outlet	0–1 ft below drainline	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	6-6	Below septic tank	0–1 ft below tank	X	X	X	X	X	X	X	X	X
			5–6 ft below tank	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	6-9 through 6-12	Outfall and downgradient	0–1 ft bgs	X	X	X	X	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X

* X = Analysis will be performed.

Table 5.15-1
Samples Collected and Analyses Requested at SWMUs 09-005(a)

Sample ID	Location ID	Depth (ft)	Media	H3	HE	Metals	Stronium-90	VOC	Cyanide (Total)
0509-95-0010	09-05050	2–6.2	FILL	—*	—	—	74	—	—
0509-95-0012	09-05051	2–4.2	SOIL	—	—	—	74	—	—
0509-95-0013	09-05052	3–4	QBT2	145	143	144	—	143	144
0509-95-0014	09-05053	4–5	QBT2	—	143	144	—	143	144

Note: Numbers in analyte columns are request numbers.
*— = Analysis not requested.

Table 5.15-2
Inorganic Chemicals above BVs at SWMU 09-005(a)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Arsenic	Barium	Chromium	Cobalt	Copper	Lead	Mercury	Selenium	Silver	Vanadium
Qbt 2, 3, 4 Background Value[a]				**0.5**	**2.79**	**46**	**7.14**	**3.14**	**4.66**	**11.2**	**0.1**	**0.3**	**1**	**17**
Construction Worker SSL[b]				**124**	**65.4**	**4350**	**449[c]**	**34.6[d]**	**12,400**	**800**	**92.9[d]**	**1550**	**1550**	**1550**
Industrial SSL[b]				**454**	**17.7**	**224,000**	**2920[c]**	**300[e]**	**45,400**	**800**	**310[e]**	**5680**	**5680**	**5680**
Residential SSL[b]				**31.3**	**3.9**	**15,600**	**219[c]**	**23[e]**	**3130**	**400**	**23[e]**	**391**	**391**	**391**
0509-95-0013	09-05052	3–4	QBT2	0.61 (J-)	3.6	77.7	—[f]	3.6 (J)	6.5	—	—	1.4	18.4	—
0509-95-0014	09-05053	4–5	QBT2	0.59 (J-)	4.1	135	7.9	5.8 (J)	6	16	0.11 (J)	1.1 (J)	20.9	21.2

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

[a] BVs are from LANL 1998, 059730.

[b] SSLs are from NMED 2009, 108070, unless otherwise noted.

[c] SSLs are for hexavalent chromium.

[d] Construction worker SSLs calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[e] SSLs are from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[f] — = Not detected or not above BV.

Table 5.15-3
Organic Chemicals Detected at SWMU 09-005(a)

Sample ID	Location ID	Depth (ft)	Media	Isopropyltoluene[4-]	Toluene
Construction Worker SSL[a]				**10,300**[b]	**21,100**
Industrial SSL[a]				**14,900**[b]	**57,900**
Residential SSL[a]				**3210**[b]	**5570**
0509-95-0013	09-05052	3–4	QBT2	—[c]	0.011
0509-95-0014	09-05053	4–5	QBT2	0.008	0.012

Notes: Results are in mg/kg.

[a] SSLs are from NMED 2009, 108070.

[b] Isopropylbenzene used as a surrogate.

[c] — = Not detected.

Table 5.15-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 09-005(a)

Sample ID	Location ID	Depth (ft)	Media	Strontium-90
Qbt 2, 3, 4 Background Value[a]				**na**[b]
Soil Background Value[a]				**1.31**[c]
Construction Worker SAL[d]				**800**
Industrial SAL[d]				**1900**
Residential SAL[d]				**5.7**
0509-95-0012	09-05051	2–4.2	SOIL	0.715
0509-95-0013	09-05052	3–4	QBT2	NA[e]
0509-95-0014	09-05053	4–5	QBT2	NA

Notes: Results are in pCi/g.

[a] BVs/FVs are from LANL 1998, 059730.

[b] na = Not available.

[c] FV applies only to samples collected from 0–1 ft.

[d] SALs from LANL 2009, 107655.

[e] NA = Not analyzed.

Table 5.15-5
Proposed Sampling at SWMU 09-005(a)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	Strontium-90	pH
Determine nature and extent of potential contamination	5a-1	Septic tank inlet	8–9 ft bgs	X[a]	X	X	X	X	—[b]	X	X	X	X	X	X	X	X
			13–14 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	5a-2	Below septic tank	8–9 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			13–14 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	5a-3	Septic tank outlet	8–9 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
			13–14 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	5a-4	Adjacent to distribution box	8–9 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			13–14 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	5a-5 through 5a-10 5a-12 5a-13 5a-14	50-ft intervals adjacent to drain field drainlines	8–9 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
			13–14 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	5a-11	10 ft downgradient of drain field	8–9 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			13–14 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	5a-15 through 5a-33	Along sewer line west of 4-way junction west to disconnection	0–1 ft below sewer line	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below sewer line	X	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.15-6
Proposed Sampling at SWMU 09-005(d)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	Strontium-90	pH
Determine nature and extent of potential contamination	5d-1 and 5d-2	20-ft intervals adjacent to drain field drainline	8–9 ft bgs	X*	X	X	X	X	X	X	X	X	X	X	X	X	X
			13–14 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	5d-3 and 5d-6	Septic tank inlet and outlet	8–9 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			13–14 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	5d-4 and 5d-5	Below septic tank	8–9 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			13–14 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	5d-7	Below sewer line junction	0–1 ft below sewer line	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below sewer line	X	X	X	X	X	X	X	X	X	X	X	X	X	X

* X = Analysis will be performed.

Table 5.15-7
Proposed Sampling at SWMU 09-008(b)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	Strontium-90	pH
Determine nature and extent of potential contamination	8b-1 8b-2 8b-5 8b-6	Within the oxidation pond	0–1ft below pond	X[a]	X	X	X	X	—[b]	X	—	X	X	X	X	X	X
			5–10 ft below pond	X	X	X	X	X	—	X	X	X	X	X	X	X	X
			15–20 ft below pond	X	X	X	X	X	—	X	X	X	X	X	X	X	X
			25–30 ft below pond	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	8b-3 8b-4	Within the oxidation pond	0–1ft below pond	X	X	X	X	X	X	X	—	X	X	X	X	X	X
			5–10 ft below pond	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			15–20 ft below pond	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			25–30 ft below pond	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	8b-7 8b-8	Drainline	0–1 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	8b-9 through 8b-12	Outfall	0–1 ft bgs	X	X	X	X	X	—	X	—	X	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.
[b] — = Analysis will not be performed.

Table 5.16-1
Proposed Sampling at SWMU 09-009

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs[a]	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	9-4 through 9-9	Surface Impoundment	0–1 ft below bottom of impoundment	X[b]	X	X	X	X	—[c]	X	—	X	X	X	X	X
			4–5 ft below bottom of impoundment	X	X	X	X	X	—	X	X	X	X	X	X	X
			9–10 ft below bottom of impoundment	X	X	X	X	X	—	X	X	X	X	X	X	X
			14–15 ft below bottom of impoundment	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	9-1 through 9-3; 9-10 through 9-12; 9-18 and 9-19; 9-24, 9-31, 9-32	Drainlines	0–1 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	9-20 through 9-23, 9-33, 9-34	Sand filters	0–1 ft below filter	X	X	X	X	X	—	X	—	X	X	X	X	X
			4–5 ft below filter	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	9-13 through 9-16; 9-25 through 9-28	Outfall	0–1 ft bgs	X	X	X	X	X	—	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	9-17, 9-29, 9-30, 9-35	Downgradient of outfall	0–1 ft bgs	X	X	X	X	X	—	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X

[a] PCB analysis will be performed for all samples if PCBs are detected in any samples from drainline locations.

[b] X = Analysis will be performed.

[c] — = Analysis will not be performed.

Table 5.17-1
Proposed Sampling at AOC 09-010(a)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	10a-1	Footprint	0–1 ft bgs[a]	X[b]	X	X	X	X	X	X	—[c]	X
			4–5 ft bgs[a]	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	10a-2 through 10a-5	Perimeter of the former storage area	0–1 ft bgs[a]	X	X	X	X	X	X	X	—	X
			4–5 ft bgs[a]	X	X	X	X	X	X	X	X	X

[a] If fill is encountered, only native material will be sampled; stated sample depths will be below the fill rather than below ground surface.

[b] X = Analysis will be performed.

[c] — = Analysis will not be performed.

Table 5.18-1
Proposed Sampling at AOC 09-010(b)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	10b-1	Footprint	0–1 ft bgs[a]	X[b]	X	X	X	X	X	X	—[c]	X
			4–5 ft bgs[a]	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	10b-2 through 10b-5	Perimeter of the former storage area	0–1 ft bgs[a]	X	X	X	X	X	X	X	—	X
			4–5 ft bgs[a]	X	X	X	X	X	X	X	X	X

[a] If fill is encountered, only native material will be sampled; stated sample depths will be below the fill rather than below ground surface.

[b] X = Analysis will be performed.

[c] — = Analysis will not be performed.

Table 5.19-1
Samples Collected and Analyses Requested at AOC 09-011(b)

Sample ID	Location ID	Depth (ft)	Media	HE
0509-97-0001	09-04100	0–0.5	SED	3849R
0509-97-0002	09-04101	0–0.5	SOIL	3849R
0509-97-0003	09-04102	0–0.5	SED	3849R
0509-97-0004	09-04103	0–0.5	SED	3849R

Note: Numbers in analyte columns are request numbers

Table 5.19-2
Proposed Sampling at AOC 09-011(b)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	11b-1	Footprint of former storage area	0–1 ft bgs	X[a]	X	X	X	X	X	X	—[b]	X
			4–5 ft bgs	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	11b-2 through 11b-5	Perimeter of the former storage area	0–1 ft bgs	X	X	X	X	X	X	X	—	X
			4–5 ft bgs	X	X	X	X	X	X	X	X	X
Define lateral extent of contamination	11b-6 11b-7	Drainage	0–1 ft bgs	X	X	X	X	X	X	X	—	X
			4–5 ft bgs	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.20-1
Proposed Sampling at AOC 09-011(c)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	11c-1	Footprint	0–1 ft bgs[a]	X[b]	X	X	X	X	X	X	—[c]	X
			4–5 ft bgs[a]	X	X	X	X	X	X	X	X	X

[a] If fill is encountered, only native material will be sampled; stated sample depths will be below the fill rather than below ground surface.

[b] X = Analysis will be performed.

[c] — = Analysis will not be performed.

Table 5.21-1
Samples Collected and Analyses Requested at AOC 09-012

Sample ID	Location ID	Depth (ft)	Media	Gamma Spectroscopy	Herbicides	HE	Metals	Pesticides, PCB	SVOC	VOC	Cyanide (Total)
0509-95-0045	09-05150	6.7–7.7	SOIL	145	143	143	144	143	143	143	144
0509-95-0047	09-05151	7.5–8.5	SOIL	145	143	143	144	143	143	143	144

Note: Numbers in analyte columns are request numbers.

Table 5.21-2
Inorganic Chemicals above BVs at AOC 09-012

Sample ID	Location ID	Depth (ft)	Media	Cyanide (Total)	Lead	Selenium
Soil Background Value[a]				**0.5**	**22.3**	**1.52**
Construction Worker SSL[b]				**6190**	**800**	**1550**
Industrial SSL[b]				**22,700**	**800**	**5680**
Residential SSL[b]				**1560**	**400**	**391**
0509-95-0045	09-05150	6.7–7.7	SOIL	13.2	111	1.8
0509-95-0047	09-05151	7.5–8.5	SOIL	4.6	325	—[c]

Notes: Results are in mg/kg.
[a] BVs are from LANL 1998, 059730.
[b] SSLs are from NMED 2009, 108070.
[c] — = Not detected or not above BV.

Table 5.21-3
Organic Chemicals Detected at AOC 09-012

Sample ID	Location ID	Depth (ft)	Media	Aldrin	Benzene	BHC[delta-]	Bromobenzene	Bromochloromethane	Bromodichloromethane	Bromoform	Bromomethane	Butanone[2-]	Butylbenzene[n-]	Butylbenzene[sec-]	Butylbenzene[tert-]	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane
Construction Worker SSL[a]				**7.15**	**471**	**83[b]**	**1750**	**na[c]**	**3500**	**4760**	**67.1**	**148,000**	**20,100[d]**	**18000[d]**	**19400[d]**	**5890**	**199**	**1580**	**1990**	**123,000**	**671**	**1130**
Industrial SSL[a]				**1.12**	**85.4**	**22.9[b]**	**410**	**na**	**29.2**	**2420**	**83.6**	**369,000**	**560[e]**	**420[e]**	**500[e]**	**7540**	**24.3**	**2140**	**61.3**	**137,000**	**31.9**	**198**
Residential SSL[a]				**0.284**	**15.5**	**5.17[b]**	**94**	**na**	**5.25**	**616**	**22.3**	**39,600**	**140[e]**	**110[e]**	**130[e]**	**1940**	**4.38**	**508**	**11.9**	**43,600**	**5.72**	**35.6**
0509-95-0045	09-05150	6.7–7.7	SOIL	—[f]	—	0.0014 (J)	—	—	0.033 (J+)	0.12 (J+)	—	—	—	—	—	—	—	—	0.095 (J+)	—	0.062 (J+)	—
0509-95-0047	09-05151	7.5–8.5	SOIL	0.0023	0.006 (J)	—	0.006 (J)	0.006 (J)	0.008 (J+)	0.015 (J+)	0.012 (J)	0.024 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.01 (J+)	0.012 (J)	0.018 (J+)	0.012 (J)

Table 5.21-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Chlorotoluene[2-]	Chlorotoluene[4-]	Dalapon	Dichloropheny/tricloroethylene (DDE) [4,4'-]	Dichlorodipheny/trichloroethene (DDT) [4,4'-]	Dibromo-3-Chloropropane[1,2-]	Dibromoethane[1,2-]	Dibromomethane	Dichlorobenzene[1,2-]	Dichlorobenzene[1,3-]	Dichlorobenzene[1,4-]	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]
Construction Worker SSL[a]				**6190**	**na**	**na**	**490**	**142**	**23**	**48.6**	**3100**	**9710**	**5780[d]**	**3780**	**1370**	**6880**	**751**	**1830**	**3100**	**814**	**117**
Industrial SSL[a]				**22,700**	**72,000[g]**	**18,000[g]**	**56.3**	**78.1**	**1.09**	**3.14**	**11,400**	**14,300**	**140[e]**	**180**	**1550**	**350**	**42.8**	**2220**	**11,400**	**995**	**81.7**
Residential SSL[a]				**1560**	**5500[g]**	**1800[g]**	**14.3**	**17.2**	**0.194**	**0.574**	**782**	**3010**	**69[e]**	**32.2**	**481**	**62.9**	**7.74**	**618**	**782**	**273**	**14.7**
0509-95-0045	09-05150	6.7–7.7	SOIL	—	—	360 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0509-95-0047	09-05151	7.5–8.5	SOIL	0.006 (J)	0.006 (J)	22 (J)	0.0025 (J)	0.0073	0.012 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.012 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)

Table 5.21-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Dichloropropane[1,3-]	Dichloropropane[2,2-]	Dichloropropene[1,1-]	Dichloropropene[cis-1,3-]	Dichloropropene[trans-1,3-]	Endrin	Ethylbenzene	Heptachlor	Hexachlorobutadiene	Hexanone[2-]	Iodomethane	Isopropylbenzene	Isopropyltoluene[4-]	Methoxychlor[4,4'-]	Methyl-2-pentanone[4-]	Naphthalene	Propylbenzene[1-]	Styrene
Construction Worker SSL[a]				**na**	**na**	**na**	**na**	**na**	**71.5**	**6630**	**36.8**	**238**	**na**	**na**	**10,300**	**10,300**[h]	**1190**[d]	**23,100**	**702**	**20,100**[d]	**30,300**
Industrial SSL[a]				**20,000**[g]	**na**	**na**	**na**	**na**	**205**	**385**	**4.26**	**246**	**1400**[g]	**na**	**14,900**	**14,900**[h]	**3100**[g]	**73,300**	**252**	**21,000**[g]	**51,200**
Residential SSL[a]				**1600**[g]	**na**	**na**	**na**	**na**	**18.3**	**69.7**	**1.08**	**61.1**	**210**[g]	**na**	**3210**	**3210**[h]	**310**[g]	**5950**	**45**	**3400**[g]	**8970**
0509-95-0045	09-05150	6.7–7.7	SOIL	—	—	—	—	—	—	—	0.0056 (J-)	—	—	—	—	—	—	—	—	—	—
0509-95-0047	09-05151	7.5–8.5	SOIL	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.025	0.006 (J)	0.0012 (J)	0.006 (J)	0.024 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.072	0.024 (J)	0.006 (J)	0.006 (J)	0.006 (J)

Table 5.21-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Tetrachloroethane[1,1,1,2-]	Tetrachloroethane[1,1,2,2-]	Tetrachloroethene	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichlorobenzene[1,2,3-]	Trichlorobenzene[1,2,4-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Trichloropropane[1,2,3-]	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Vinyl Chloride	Xylene (Total)	Xylene[1,2-]
Construction Worker SSL[a]				**2780**	**599**	**338**	**21,100**	**298,000**	**na**	**427**	**64,300**	**1240**	**4600**	**5820**	**31**	**688**[d]	**3100**[d]	**248**	**3130**	**27,500**
Industrial SSL[a]				**161**	**43.3**	**36.4**	**57,900**	**339,000**	**490**[g]	**525**	**77,100**	**94.3**	**253**	**6760**	**4.54**	**260**[g]	**10,000**[g]	**25.9**	**3610**	**31,500**
Residential SSL[a]				**29.2**	**7.98**	**6.99**	**5570**	**104,000**	**49**[g]	**143**	**21,800**	**17.2**	**45.7**	**2010**	**0.915**	**62**[g]	**780**[g]	**0.865**	**1090**	**9550**
0509-95-0045	09-05150	6.7–7.7	SOIL	—	—	0.074 (J+)	0.006 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—
0509-95-0047	09-05151	7.5–8.5	SOIL	0.006 (J)	0.006 (J)	0.006 (J)	0.017 (J+)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.012 (J)	0.006 (J)	0.006 (J)

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

[a] SSLs are from NMED 2009, 108070, unless otherwise noted.

[b] Benzene hexachloride (BHC) [gamma-] used as a surrogate based on structural similarity.

[c] na = Not available.

[d] Construction worker SSLs calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[e] SSLs are from EPA 2007, 099314.

[f] — = Not detected.

[g] SSLs are from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[h] Isopropylbenzene used as a surrogate based on structural similarity.

Table 5.21-4
Proposed Sampling at AOC 09-012

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	Herbicides	PCBs	Pesticides	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	12-1 through 12-15	Center of each of the 15 circular, non-vegetated disposal pits	0–1 ft bgs	X[a]	X	X	X	X	X	X	X	X	—[b]	X	X	X	X	X
			4–5 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			15–20 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.22-1
Proposed Sampling at SWMU 09-013

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	13-1 through 13-11	Northern MDA M	0–1 ft bgs	X[a]	X	X	X	X	X	X	—[b]	X	X	X	X	X
			4–5 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
			15–20 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	13-12 through 13-29	Southern MDA M	0–1 ft bgs	X	X	X	X	X	X	X	—	X	X	X	X	X
			4–5 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
			15–20 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	13-30 through 13-33	Canyon channel	0–1 ft bgs	X	X	X	X	X	X	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.23-1
Proposed Sampling at AOC 09-014

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Dioxins/Furans	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	14-1	Center of two firing points	0–1 ft bgs	X[a]	X	X	X	X	X	—[b]	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	14-2 through 14-4	Radial distance of 15 ft	0–1 ft bgs	X	X	X	X	X	X	X	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	14-5 through 14-9	Radial distance of 30 ft	0–1 ft bgs	X	X	X	X	X	X	—	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 5.24-1
Samples Collected and Analyses Requested at SWMU C-09-001

Sample ID	Location ID	Depth (ft)	Media	HE	SVOC	VOC
RC09-01-0001	09-10025	0–0.5	FILL	9458R	9457R	9457R
RC09-01-0002	09-10026	0–0.5	FILL	9458R	9457R	9457R
RC09-01-0003	09-10027	0–0.5	FILL	9458R	9457R	9457R
RC09-01-0004	09-10028	0–0.5	FILL	9458R	9457R	9457R
RC09-01-0005	09-10029	0–0.5	FILL	9458R	9457R	9457R
RC09-01-0006	09-10030	0–0.67	FILL	9458R	9457R	9457R

Note: Numbers in analyte columns are request numbers.

Table 5.24-2
Organic Chemicals Detected at SWMU C-09-001

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	Bromomethane	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Dichloropropane[2,2-]
Construction Worker SSL[a]				**18,600**	**6680**[b]	**66,800**	**213**	**21.3**	**213**	**6680**[b]	**2060**	**67.1**	**20,600**	**21.3**	**552**[c]	**na**[d]
Industrial SSL[a]				**36,700**	**18,300**[b]	**183,000**	**23.4**	**2.34**	**23.4**	**18,300**[b]	**234**	**83.6**	**2340**	**2.34**	**1000**[e]	**na**
Residential SSL[a]				**3440**	**1720**[b]	**17200**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**22.3**	**621**	**0.621**	**78**[e]	**na**
RC09-01-0001	09-10025	0-0.5	FILL	0.76 (J)	—[f]	1.3 (J)	3.4	2.9	2.8	1.9 (J)	2.5	—	3.6	0.74 (J)	0.42 (J)	0.005 (J)
RC09-01-0002	09-10026	0-0.5	FILL	24	1.9	29	10	41	35	30	37	—	49	11 (J)	17 (J)	0.006 (J)
RC09-01-0003	09-10027	0-0.5	FILL	0.7 (J)	0.99 (J)	1.1 (J)	2.7	2.4	2.3	1.7 (J)	2.3	—	3.1	0.62 (J)	0.38 (J)	0.005 (J)
RC09-01-0004	09-10028	0-0.5	FILL	12	0.99 (J)	15	27	26	21	18	27	—	31	6.6	9.4	0.005 (J)
RC09-01-0005	09-10029	0-0.5	FILL	0.8 (J)	—	1.7 (J)	4.7	4	4	2.9	3.5	—	4.9	1 (J)	0.42 (J)	0.005 (J)
RC09-01-0006	09-10030	0-0.67	FILL	0.1 (J)	—	0.15 (J)	0.51 (J)	0.47 (J)	0.43 (J)	0.55 (J)	0.41 (J)	0.011 (J)	0.54 (J)	0.15 (J)	—	—

Table 5.24-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Dimethylphenol[2,4-]	Di-n-butylphthalate	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylnaphthalene[2-]	Methylphenol[2-]	Methylphenol[4-]	Naphthalene	Nitrophenol[4-]	Phenanthrene	Phenol	Pyrene
Construction Worker SSL[a]				**4760**	**23,800**	**8910**	**8910**	**213**	**1240**[c]	**na**	**na**	**702**	**na**	**7150**	**68,800**	**6680**
Industrial SSL[a]				**13,700**	**68,400**	**24,400**	**24,400**	**23.4**	**4100**[e]	**34,000**[g]	**3400**[g]	**252**	**na**	**20,500**	**205,000**	**18,300**
Residential SSL[a]				**1220**	**6110**	**2290**	**2290**	**6.21**	**310**[e]	**3100**[g]	**310**[g]	**45**	**na**	**1830**	**18,300**	**1720**
RC09-01-0001	09-10025	0-0.5	FILL	—	—	9.1	0.77 (J)	1.8 (J)	0.33 (J)	—	—	0.88 (J)	—	6.3	—	7.7
RC09-01-0002	09-10026	0-0.5	FILL	1.2 (J)	0.47 (J)	100	26	28	15 (J)	0.64 (J)	1.6 (J)	50	—	130	0.68 (J)	94
RC09-01-0003	09-10027	0-0.5	FILL	0.49 (J)	—	8	0.65 (J)	1.6 (J)	0.25 (J)	0.27 (J)	0.65 (J)	0.77 (J)	—	5.7	—	6.6
RC09-01-0004	09-10028	0-0.5	FILL	—	—	73	13	17	8.5	—	0.68 (J)	28	5.1 (J)	70	0.32 (J)	57
RC09-01-0005	09-10029	0-0.5	FILL	—	—	12	0.79 (J)	2.6	0.24 (J)	—	—	0.71 (J)	—	7.9	—	10
RC09-01-0006	09-10030	0-0.67	FILL	—	—	0.71 (J)	0.099 (J)	0.47 (J)	—	—	—	—	—	0.83 (J)	—	1.1 (J)

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

[a] SSLs are from NMED 2009, 108070, unless otherwise noted.

[b] Pyrene used as a surrogate based on structural similarity.

[c] Construction worker SSLs calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[d] na = Not available.

[e] SSLs are from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[f] — = Not detected.

[g] SSLs are from EPA 2007, 099314.

Table 5.24-3
Proposed Sampling at SWMU C-09-001

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine vertical extent of contamination	1-1 (09-10025) 1-2 (09-10026) 1-3 (09-10027) 1-4 (09-10028) 1-5 (09-10029)	Previously sampled locations	2-3 ft bgs[a]	X[b]	X	X	X	X	X	X	X	X
			5-6 ft bgs[a]	X	X	X	X	X	X	X	X	X
Determine lateral extent of contamination	1-6	Next to building	0-1 ft bgs[a]	X	X	X	X	X	X	X	—[c]	X
			2-3 ft bgs[a]	X	X	X	X	X	X	X	X	X
			5-6 ft bgs[a]	X	X	X	X	X	X	X	X	X
Determine lateral extent of contamination	1-7 1-8 1-9	Downgradient	0-1 ft bgs[a]	X	X	X	X	X	X	X	—	X
			2-3 ft bgs[a]	X	X	X	X	X	X	X	X	X
			5-6 ft bgs[a]	X	X	X	X	X	X	X	X	X

[a] If fill is encountered, only native material will be sampled; stated sample depths will be below the fill rather than below ground surface.

[b] X = Analysis will be performed.

[c] — = Analysis will not be performed.

Table 6.2-1
Samples Collected and Analyses Requested at SWMU 22-015(c)

Sample ID	Location ID	Depth (ft)	Media	Hexavalent Chromium	Metals	VOC
0522-95-2000	22-02002	0–0.5	SOIL	—*	—	902
0522-95-2001	22-02002	0–0.67	SOIL	—	—	902
0522-95-2002	22-02006	0–0.5	SOIL	—	—	902
0522-95-2003	22-02006	0–2.5	QBT2	—	—	902
0522-95-2005	22-02008	0.17–0.5	SOIL	—	—	902
0522-95-2006	22-02008	0.67–2.5	QBT2	—	—	902
0522-95-2008	22-02008	1.83–2.5	QBT2	1020	1020	—
0522-95-2009	22-02069	0–0.5	SOIL	1020	1020	—
0522-95-2010	22-02070	0–0.5	SOIL	1020	1020	—
0522-95-2011	22-02071	0–0.5	SOIL	1020	1020	—
0522-95-2012	22-02072	0–0.5	SOIL	1020	1020	—
0522-95-2014	22-02073	0–0.5	SOIL	1020	1020	—
0522-95-2015	22-02074	2–2.5	SOIL	—	1153	—
0522-95-2016	22-02075	2–2.5	SOIL	—	1153	—
0522-95-2017	22-02076	2–2.5	SOIL	—	1153	—
0522-95-2018	22-02077	2–2	SOIL	—	1153	—
0522-95-2019	22-02077	2.5–3	SOIL	—	1153	—

Note: Numbers in analyte columns are request numbers.

* — = Analysis not requested.

Table 6.2-2
Inorganic Chemicals Detected above BV at SWMU 22-015(c)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Arsenic	Cadmium	Chromium	Chromium Hexavalent Ion	Cobalt	Copper	Iron	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Qbt 2, 3, 4 Background Value[a]				**0.5**	**2.79**	**1.63**	**7.14**	**na[b]**	**3.14**	**4.66**	**14,500**	**11.2**	**0.1**	**6.58**	**0.3**	**1**	**1.1**	**17**	**63.5**
Soil Background Value[a]				**0.83**	**8.17**	**0.4**	**19.3**	**na**	**8.64**	**14.7**	**21,500**	**22.3**	**0.1**	**15.4**	**1.52**	**1**	**0.73**	**39.6**	**48.8**
Construction Worker SSL[c]				**124**	**65.4**	**309**	**449[d]**	**449**	**34.6[e]**	**12,400**	**217,000**	**800**	**92.9[e]**	**6190**	**1550**	**1550**	**20.4**	**1550**	**92,900**
Industrial SSL[c]				**454**	**17.7**	**1120**	**2920[d]**	**2920**	**300[f]**	**45,400**	**795,000**	**800**	**310[f]**	**22,700**	**5680**	**5680**	**74.9**	**5680**	**341,000**
Residential SSL[c]				**31.3**	**3.9**	**77.9**	**219[d]**	**219**	**23[f]**	**3130**	**54,800**	**400**	**23[f]**	**1560**	**391**	**391**	**5.16**	**391**	**23,500**
0522-95-2008	22-02008	1.83–2.5	QBT2	9.9 (U)	—[g]	8.6	34.7	—	—	179 (J+)	—	—	—	110	0.73 (U)	1.4 (U)	—	—	—
0522-95-2009	22-02069	0–0.5	SOIL	10.8 (J)	—	139	394	—	8.7 (J)	1280 (J+)	—	103	0.36	1060	—	43.3	0.86 (U)	—	168
0522-95-2010	22-02070	0–0.5	SOIL	10 (U)	10.6	5.7	149	—	—	4330 (J+)	23,800	68.6	0.14	533	—	7.3	0.84 (U)	43.7	120
0522-95-2011	22-02071	0–0.5	SOIL	11.3 (U)	—	3.2 (U)	45.4	—	—	92.7 (J+)	—	25.4	—	143	—	4.6	0.95 (U)	—	58.8
0522-95-2012	22-02072	0–0.5	SOIL	12.2 (U)	21.3	42.8	442	0.17	—	11,500 (J+)	52,100	174	0.29	1160	—	13.2	1.9 (J)	87.7	214
0522-95-2014	22-02073	0–0.5	SOIL	11 (U)	—	22.8	588	—	—	3730 (J+)	—	288	0.56	1450	—	34.3	0.93 (U)	—	201
0522-95-2015	22-02074	2–2.5	SOIL	13 (J-)	—	2.4	120	NA[h]	—	410	—	28	0.13 (U)	72	—	5.1	—	—	—
0522-95-2016	22-02075	2–2.5	SOIL	14 (J-)	—	11	67	NA	—	190	—	—	0.14 (U)	100	—	8.3	—	—	—
0522-95-2017	22-02076	2–2.5	SOIL	14 (J-)	—	8.2	160	NA	—	1500	—	30	0.27	150	—	15	—	—	—
0522-95-2018	22-02077	2–2	SOIL	13 (J-)	—	1.9	—	NA	—	160	—	—	0.13 (U)	38	—	3.9	—	—	—
0522-95-2019	22-02077	2.5–3	SOIL	13 (J-)	—	1.8	—	NA	—	160	—	—	0.13 (U)	41	—	3.9	—	—	—

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

[a] BVs are from LANL 1998, 059730.

[b] na = Not available.

[c] SSLs are from NMED 2009, 108070, unless otherwise noted.

[d] SSLs are for hexavalent chromium.

[e] Construction worker SSLs calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] SSLs are from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[g] — = Not detected or not above BV.

[h] NA = Not analyzed.

Table 6.2-3
Organic Chemicals Detected at SWMU 22-015(c)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Benzene	Bromobenzene	Bromochloromethane	Bromodichloromethane	Bromoform	Bromomethane	Butanone[2-]	Butylbenzene[n-]	Butylbenzene[sec-]	Butylbenzene[tert-]	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane	Chlorotoluene[2-]	Chlorotoluene[4-]	Dibromo-3-Chloropropane[1,2-]
Construction Worker SSL[a]				**263,000**	**471**	**1750**	**na[b]**	**3500**	**4760**	**67.1**	**148,000**	**20100[c]**	**18,000[c]**	**19,400[c]**	**5890**	**199**	**1580**	**1990**	**123,000**	**671**	**1130**	**6190**	**na**	**23**
Industrial SSL[a]				**851,000**	**85.4**	**410**	**na**	**29.2**	**2420**	**83.6**	**369,000**	**560[d]**	**420[d]**	**500[d]**	**7540**	**24.3**	**2140**	**61.3**	**137,000**	**31.9**	**198**	**22,700**	**72,000[e]**	**1.09**
Residential SSL[a]				**67,500**	**15.5**	**94**	**na**	**5.25**	**616**	**22.3**	**39,600**	**140[d]**	**110[d]**	**130[d]**	**1940**	**4.38**	**508**	**11.9**	**43,600**	**5.72**	**35.6**	**1560**	**5500[e]**	**0.194**
0522-95-2000	22-02002	0–0.5	SOIL	—[f]	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.015 (J)	0.03 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.015 (J)	0.008 (J)	0.015 (J)	0.008 (J)	0.008 (J)	0.015 (J)
0522-95-2001	22-02002	0–0.67	SOIL	—	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.013 (J)	0.026 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.013 (J)	0.006 (J)	0.013 (J)	0.006 (J)	0.006 (J)	0.013 (J)
0522-95-2002	22-02006	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0522-95-2003	22-02006	0–2.5	QBT2	0.026 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.013 (J)	0.026 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.013 (J)	0.006 (J)	0.013 (J)	0.006 (J)	0.006 (J)	0.013 (J)
0522-95-2005	22-02008	0.17–0.5	SOIL	—	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.014 (J)	0.028 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.014 (J)	0.007 (J)	0.014 (J)	0.007 (J)	0.007 (J)	0.014 (J)
0522-95-2006	22-02008	0.67–2.5	QBT2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.2-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Dibromoethane[1,2-]	Dibromomethane	Dichlorobenzene[1,2-]	Dichlorobenzene[1,3-]	Dichlorobenzene[1,4-]	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dichloropropane[1,3-]	Dichloropropane[2,2-]	Dichloropropene[1,1-]	Dichloropropene[cis-1,3-]	Dichloropropene[trans-1,3-]	Ethylbenzene	Hexanone[2-]	Iodomethane	Isopropylbenzene
Construction Worker SSL[a]				**48.6**	**3100**	**9710**	**5780[c]**	**3780**	**1370**	**6880**	**751**	**1830**	**3100**	**814**	**117**	**na**	**na**	**na**	**na**	**na**	**6630**	**na**	**na**	**10,300**
Industrial SSL[a]				**3.14**	**11,400**	**14,300**	**140[d]**	**180**	**1550**	**350**	**42.8**	**2220**	**11,400**	**995**	**81.7**	**20,000[e]**	**na**	**na**	**na**	**na**	**385**	**1400[e]**	**na**	**14,900**
Residential SSL[a]				**0.574**	**782**	**3010**	**69[d]**	**32.2**	**481**	**62.9**	**7.74**	**618**	**782**	**273**	**14.7**	**1600[e]**	**na**	**na**	**na**	**na**	**69.7**	**210[e]**	**na**	**3210**
0522-95-2000	22-02002	0–0.5	SOIL	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.015 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.03 (J)	0.008 (J)	0.008 (J)
0522-95-2001	22-02002	0–0.67	SOIL	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.013 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.026 (J)	0.006 (J)	0.006 (J)
0522-95-2002	22-02006	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0522-95-2003	22-02006	0–2.5	QBT2	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.013 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.026 (J)	0.006 (J)	0.006 (J)
0522-95-2005	22-02008	0.17–0.5	SOIL	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.014 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.028 (J)	0.007 (J)	0.007 (J)
0522-95-2006	22-02008	0.67–2.5	QBT2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.2-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Isopropyltoluene[4-]	Methyl-2-pentanone[4-]	Propylbenzene[1-]	Styrene	Tetrachloroethane[1,1,1,2-]	Tetrachloroethane[1,1,2,2-]	Tetrachloroethene	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Trichloropropane[1,2,3-]	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Vinyl Chloride	Xylene (Total)	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**10,300[g]**	**23,100**	**20,100[c]**	**30,300**	**2780**	**599**	**338**	**21,100**	**298,000**	**64,300**	**1240**	**4600**	**5820**	**31**	**688[c]**	**3100[c]**	**248**	**3130**	**27,500**	**3130**
Industrial SSL[a]				**14,900[g]**	**73,300**	**21,000[e]**	**51,200**	**161**	**43.3**	**36.4**	**57,900**	**339,000**	**77,100**	**94.3**	**253**	**6760**	**4.54**	**260[e]**	**10000[e]**	**25.9**	**3610**	**31,500**	**3610**
Residential SSL[a]				**3210[g]**	**5950**	**3400[e]**	**8970**	**29.2**	**7.98**	**6.99**	**5570**	**104,000**	**21,800**	**17.2**	**45.7**	**2010**	**0.915**	**62[e]**	**780[e]**	**0.865**	**1090**	**9550**	**1090**
0522-95-2000	22-02002	0–0.5	SOIL	0.008 (J)	0.03 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.008 (J)	0.015 (J)	0.008 (J)	0.008 (J)	0.008 (J)
0522-95-2001	22-02002	0–0.67	SOIL	0.006 (J)	0.026 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.013 (J)	0.006 (J)	0.006 (J)	0.006 (J)
0522-95-2002	22-02006	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	0.002 (J)	—	—	—	—	—	—	—	0.006 (J)
0522-95-2003	22-02006	0–2.5	QBT2	0.006 (J)	0.026 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.013 (J)	0.006 (J)	0.006 (J)	0.006 (J)
0522-95-2005	22-02008	0.17–0.5	SOIL	0.007 (J)	0.028 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.002 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.007 (J)	0.014 (J)	0.007 (J)	0.007 (J)	0.007 (J)
0522-95-2006	22-02008	0.67–2.5	QBT2	—	—	—	—	—	—	—	—	—	—	—	0.005 (J)	—	—	—	—	—	—	—	NA[h]

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

[a] SSLs are from NMED 2009, 108070, unless otherwise noted.

[b] na = Not available.

[c] Construction worker SSLs calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[d] SSLs are from EPA 2007, 099314.

[e] SSLs are EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[f] — = Not detected.

[g] Isopropylbenzene used as a surrogate based on structural similarity.

[h] NA = Not analyzed.

Table 6.2-4
Proposed Sampling at SWMU 22-015(c)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	Strontium-90	pH
Determine nature and extent of potential contamination	15c-1	Outfall	0–1 ft bgs	X[a]	X	X	X	X	X	X	—[b]	X	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			4–5 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	15c-2 15c-3 15c-4	10 ft downgradient of outfall	0–1 ft bgs	X	X	X	X	X	—	X	—	X	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
			4–5 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	15c-5 15c-6	Drainage	0–1 ft bgs	X	X	X	X	X	—	X	—	X	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
			4–5 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	15c-7 15c-8 15c-10 15c-12 15c-14 15c-15 15c-16	Around pond	0–1 ft bgs or fill/tuff interface	X	X	X	X	X	—	X	—	X	X	X	X	X	X
			2–3 ft bgs or 2 ft below fill/tuff interface	X	X	X	X	X	—	X	X	X	X	X	X	X	X
			4–5 ft bgs or 4 ft below fill/tuff interface	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	15c-9 15c-11 15c-13	Within pond	0–1 ft bgs or fill/tuff interface	X	X	X	X	X	X	X	—	X	X	X	X	X	X
			2–3 ft bgs or 2 ft below fill/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			4–5 ft bgs or 4 ft below fill/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	15c-17 through 15c-32	Canyon slope	0–1 ft bgs	X	X	X	X	X	—	X	—	X	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	15c-33 through 15c-36	Bottom of slope	0–1 ft bgs	X	X	X	X	X	X	X	—	X	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	15c-37 15c-38	Drainline	0–1 ft below drainline	X	X	X	X	X	—	X	—	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.
[b] — = Analysis will not be performed.

Table 6.3-1
Proposed Sampling at SWMU 22-010(b)

Objective Addressed	Location Number	Location	Starting Depth of Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	Strontium-90	pH
Determine nature and extent of potential contamination	10b-1 through 10b-4, 10b-64, 10b-65	Tank inlet, two sides of the tank, and tank outlet, drainline from building to tank	0–1 ft below drainline or tank	X[a]	X	X	X	X	—[b]	X	X	X	X	X	X	X	X
			5–6 ft below drainline or tank	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	10b-5 through 10b-8 10b-23 10b-25 10b-37 10b-38	Drainline from tank Beyond end of leach fields[c]	0–1 ft below drainline or tank	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline or tank	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			10–11 ft below drainline or tank	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	10b-9 through 10b-22, 10b-24, 10b-26 through 10b-36, 10b-59 through 10b-62	Leach field	0–1 ft below depth of leach field drainlines	X	X	X	X	X	—	X	X	X	X	X	X	X	X
			5–6 ft below depth of leach field drainlines	X	X	X	X	X	—	X	X	X	X	X	X	X	X
			10–11 ft below depth of leach field drainlines	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	10b-39 through 10b-42 10b-51	Inlet and outlet drainlines of the sand filter	0–1 ft below drainline or tank	X	X	X	X	X	—	X	X	X	X	X	X	X	X
			5–6 ft below drainline or tank	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	10b-43 10b-50	Inlet and outlet drainlines of the sand filter	0–1 ft below drainline or tank	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline or tank	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	10b-44 through 10b-47	Around and within sand filter	0–1 ft bgs	X	X	X	X	X	—	X	—	X	X	X	X	X	X
			4–5 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
			14–15 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	10b-48 10b-49	Within sand filter	0–1 ft below sand filter	X	X	X	X	X	X	X	—	X	X	X	X	X	X
			4–5 ft below sand filter	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			9–10 ft below sand filter	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			14–15 ft below sand filter	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	10b-52 through 10b-55	Outfall	0–1 ft bgs	X	X	X	X	X	—	X	—	X	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
			4–5 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	10b-56 10b-58	Downgradient of outfall	0–1 ft bgs	X	X	X	X	X	—	X	—	X	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
			4–5 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	10b-57	Downgradient of outfall	0–1 ft bgs	X	X	X	X	X	X	X	—	X	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			4–5 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	10b-63	Drainage	0–1 ft bgs	X	X	X	X	X	X	X	—	X	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			4–5 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.
[b] — = Analysis will not be performed.
[c] Depths are below depth of leach field lines.

Table 6.3-2
Proposed Sampling at SWMU 22-012

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	12-1 12-2 12-3	Around the concrete pad	0–1 ft bgs	X[a]	X	X	X	X	X	X	—[b]	X
			4–5 ft bgs	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 6.3-3
Samples Collected and Analyses Requested at SWMU 22-015(d)

Sample ID	Location ID	Depth (ft)	Media	HEP	VOC
0522-97-0031	22-06069	9–10	FILL	3078R	3077R
0522-97-0032	22-06069	10.5–11.5	QBT4	3078R	3077R
0522-97-0033	22-06069	15–16	QBT4	3078R	3077R
0522-97-0034	22-06069	19–20	QBT4	3078R	3077R
0522-97-0035	22-06070	0–0.5	SOIL	3078R	3077R

Note: Numbers in analyte columns are request numbers.

Table 6.3-4
Organic Chemicals Detected at SWMU 22-015(d)

Sample ID	Location ID	Depth (ft)	Media	Bromobenzene	Bromochloromethane	Bromodichloromethane	Bromoform	Bromomethane	Butanone[2-]	Butylbenzene[n-]	Butylbenzene[sec-]	Butylbenzene[tert-]	Carbon Tetrachloride	Chlorobenzene	Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane	Chlorotoluene[2-]	Chlorotoluene[4-]	Dibromo-3-Chloropropane[1,2-]	Dibromoethane[1,2-]
Construction Worker SSL[a]				**1750**	**na**[b]	**3500**	**4760**	**67.1**	**148,000**	**20100**[c]	**18,000**[c]	**19,400**[c]	**199**	**1580**	**1990**	**123,000**	**671**	**1130**	**6190**	**na**	**23**	**48.6**
Industrial SSL[a]				**410**	**na**	**29.2**	**2420**	**83.6**	**369,000**	**560**[d]	**420**[d]	**500**[d]	**24.3**	**2140**	**61.3**	**137,000**	**31.9**	**198**	**22,700**	**na**	**1.09**	**3.14**
Residential SSL[a]				**94**	**na**	**5.25**	**616**	**22.3**	**39,600**	**140**[d]	**110**[d]	**130**[d]	**4.38**	**508**	**11.9**	**43,600**	**5.72**	**35.6**	**1560**	**na**	**0.194**	**0.574**
0522-97-0032	22-06069	10.5–11.5	QBT4	—[e]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0522-97-0035	22-06070	0–0.5	SOIL	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.012 (J)	0.023 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.012 (J)	0.006 (J)	0.012 (J)	0.006 (J)	0.006 (J)	0.012 (J)	0.006 (J)

Table 6.3-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Dibromomethane	Dichlorobenzene[1,2-]	Dichlorobenzene[1,3-]	Dichlorobenzene[1,4-]	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis/trans-1,2-]	Dichloropropane[1,2-]	Dichloropropane[1,3-]	Dichloropropane[2,2-]	Dichloropropene[1,1-]	Dichloropropene[cis-1,3-]	Dichloropropene[trans-1,3-]	Ethylbenzene	Hexanone[2-]	Iodomethane	Isopropylbenzene
Construction Worker SSL[a]				**3100**	**9710**	**5780**[c]	**3780**	**1370**	**6880**	**751**	**1830**	**na**	**117**	**na**	**na**	**na**	**na**	**na**	**6630**	**na**	**na**	**10,300**
Industrial SSL[a]				**11,400**	**14,300**	**140**[d]	**180**	**1550**	**350**	**42.8**	**2220**	**na**	**81.7**	**20,000**[f]	**na**	**na**	**na**	**na**	**385**	**1400**[f]	**na**	**14,900**
Residential SSL[a]				**782**	**3010**	**69**[d]	**32.2**	**481**	**62.9**	**7.74**	**618**	**na**	**14.7**	**1600**[f]	**na**	**na**	**na**	**na**	**69.7**	**210**[f]	**na**	**3210**
0522-97-0032	22-06069	10.5–11.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0522-97-0035	22-06070	0–0.5	SOIL	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.012 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.023 (J)	0.006 (J)	0.006 (J)

Table 6.3-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Isopropyltoluene[4-]	Methyl-2-pentanone[4-]	PETN	Propylbenzene[1-]	Styrene	Tetrachloroethane[1,1,1,2-]	Tetrachloroethane[1,1,2,2-]	Tetrachloroethene	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Trichloropropane[1,2,3-]	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Vinyl Chloride	Xylene (Total)
Construction Worker SSL[a]				**10,300**[g]	**23,100**	**na**	**20,100**[c]	**30,300**	**2780**	**599**	**338**	**21,100**	**298,000**	**64,300**	**1240**	**4600**	**5820**	**31**	**688**[c]	**3100**[c]	**248**	**3130**
Industrial SSL[a]				**14,900**[g]	**73,300**	**na**	**21,000**[f]	**51,200**	**161**	**43.3**	**36.4**	**57,900**	**339,000**	**77,100**	**94.3**	**253**	**6760**	**4.54**	**260**[f]	**10,000**[f]	**25.9**	**3610**
Residential SSL[a]				**3210**[g]	**5950**	**na**	**3400**[f]	**8970**	**29.2**	**7.98**	**6.99**	**5570**	**104,000**	**21,800**	**17.2**	**45.7**	**2010**	**0.915**	**62**[f]	**780**[f]	**0.865**	**1090**
0522-97-0032	22-06069	10.5–11.5	QBT4	—	—	311	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0522-97-0035	22-06070	0–0.5	SOIL	0.006 (J)	0.023 (J)	—	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.003 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.012 (J)	0.006 (J)

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

[a] SSLs are from NMED 2009, 108070, unless otherwise noted.

[b] na = Not available.

[c] Construction worker SSLs calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[d] SSLs are from EPA 2007, 099314.

[e] — = Not detected.

[f] SSLs are EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[g] Isopropylbenzene used as a surrogate based on structural similarity.

Table 6.3-5
Proposed Sampling at SWMU 22-015(d)

Objective Addressed	Location Number	Location	Starting Depth of Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	15d-1 15d-2 15d-3 15d-9	Inlet drainline	0–1 ft below drainline	X[a]	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	15d-4 15d-6 15d-7 15d-8	Around the pit; 15d-4 adjacent to the inlet	0–1 ft bgs	X	X	X	X	X	—[b]	X	—	X
			4–5 ft bgs	X	X	X	X	X	—	X	X	X
			10.5–11.5 ft bgs	X	X	X	X	X	—	X	X	X
			15–16 ft bgs	X	X	X	X	X	—	X	X	X
			19–20 ft bgs	X	X	X	X	X	—	X	X	X
			29–30 ft bgs	X	X	X	X	X	—	X	X	X
Determine nature and extent of potential contamination	15d-5	Center of the pit	10.5–11.5 ft bgs	X	X	X	X	X	X	X	X	X
			15–16 ft bgs	X	X	X	X	X	X	X	X	X
			19–20 ft bgs	X	X	X	X	X	X	X	X	X
			29–30 ft bgs	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 6.3-6
Proposed Sampling at SWMU 22-015(e)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	pH
Determine nature and extent of potential contamination	15e-1 15e-2	West and south sides of sump	0–1 ft bgs	X[a]	X	X	X	X	X	X	—[b]	X
			4–5 ft bgs	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	15e-3 through 15e-6	Drainline	0–1 ft below drainline	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	15e-7	Outfall	0–1 ft bgs	X	X	X	X	X	X	X	—	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X
			5–6 ft bgs	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	15e-8	10 ft downgradient to the west of the outfall	0–1 ft bgs	X	X	X	X	X	X	X	—	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 6.3-7
Proposed Sampling at SWMU 22-016

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	Strontium-90	pH
Determine nature and extent of potential contamination	16-1 through 16-4	Tank inlet, outlet, and two sides	0–1 ft below drainline or tank	X[a]	X	X	X	X	—[b]	X	X	X	X	X	X	X	X
			5–6 ft below drainline or tank	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	16-5 and beyond, every 50 ft along drainline[c]	Drainline	0–1 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	1 location at discharge point and 3 locations to bound	Outfall	0–1 ft bgs	X	X	X	X	X	—	X	—	X	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	At 30-ft intervals	Drainage	0–1 ft bgs	X	X	X	X	X	X	X	—	X	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

[c] If septic tank is connected to the SWMU 22-010(b) drainline, locations 10b-39 through 10b-58 will be used to characterize the portion of SWMU 22-016 downstream of the septic tank.

Table 7.1-1
Proposed Sampling at SWMU 40-001(c)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	1c-1 through 1c-8	Drainline from building, tank inlet and outlet, tank	0–1 ft below drainline or tank	X[a]	X	X	X	X	X	X	X	X	X	X	X	X
			5–6 ft below drainline or tank	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	1c-9 through 1c-12	Former Twomile Canyon Outfall	0–1 ft bgs	X	X	X	X	X	—[b]	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	1c-13 through 1c-15	Drainline to Twomile Canyon Outfall	0–1 ft below drainline	X	X	X	X	X	—	X	—	X	X	X	X	X
			5–6 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	1c-16 through 1c-20	Drainline to Pajarito Canyon, drain field	0–1 ft below drainline	X	X	X	X	X	—	X	—	X	X	X	X	X
			2–3 ft below drainline	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	1c-21 through 1c-23	Pajarito Canyon outfall	0–1 ft bgs	X	X	X	X	X	X	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 7.2-1
Proposed Sampling at SWMU 40-003(a)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Dioxins/Furans	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	3a-1 3a-2 3a-4 3a-8, 3a-9 3a-11, 3a-12	Outside detonation area (western)	0–1 ft bgs	X[a]	X	X	X	X	X	—[b]	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3a-3 3a-5 3a-6 3a-7 3a-10	Detonation point (western) and nearest locations to north, south, east, and west	0–1 ft bgs	X	X	X	X	X	X	X	X	—	X	X	X	X	X
			4–5 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3a-13 through 3a-17	Detonation point (eastern) and nearest locations to north, south, east, and west	0–1 ft bgs	X	X	X	X	X	X	X	X	—	X	X	X	X	X
			4–5 ft bg	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3a-18 3a-19	25 ft from detonation point	0–1 ft bgs	X	X	X	X	X	X	—	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3a-20 3a-21 3a-22	50 ft from detonation point	0–1 ft bgs	X	X	X	X	X	X	—	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3a-23 and 3a-24	75 ft from detonation point	0–1 ft bgs	X	X	X	X	X	X	—	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	—	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3a-25	100 ft from detonation point	0–1 ft bgs	X	X	X	X	X	X	X	X	—	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination from rock debris	3a-26 through 3a-34	South of detonation area to mesa edge	0–1 ft bgs	X	X	X	X	X	X	X	X	—	X	X	X	X	X
			4–5 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.
[b] — = Analysis will not be performed.

Table 7.3-1
Proposed Sampling at AOC 40-003(b)

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Dioxins/Furans	Explosive Compounds	PCBs	SVOCs	VOCs	TPH-DRO	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	3b-1 3b-2 3b-3	Within burn pit	0–1 ft below fill, in native material	X[a]	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			4–5 ft below fill, in native material	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3b-4 3b-5	North and south of the burn pit	0–1 ft bgs	X	X	X	X	X	X	X	X	—[b]	X	X	X	X	X	X
			4–5 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			9–10 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.
[b] — = Analysis will not be performed.

Table 7.4-1
Proposed Sampling at SWMU 40-004

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	TPH-DRO	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	Strontium-90	pH
Determine nature and extent of potential contamination	4-1 through 4-5	Within storage area	2–3 ft bgs	X*	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			4–5 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

* X = Analysis will be performed.

Table 7.5-1
Samples Collected and Analyses Requested at SWMU 40-006(a)

Sample ID	Location ID	Depth (ft)	Media	Gamma Spectroscopy	H3	HE	Metals	Stronium-90	SVOC	Uranium	Cyanide (Total)
0540-95-1000	40-07001	0–0.5	SOIL	323	323	320	322, 323	323	321	—*	—
0540-95-1002	40-07001	6.75–7.75	QBT3	323	—	320	322, 323	323	321	—	—
0540-95-1001	40-07001	13.5–14.5	QBT3	323	—	320	322, 323	323	321	—	—
0540-95-1003	40-07002	0–0.5	SOIL	323	—	320	322, 323	323	321	—	—
0540-95-1005	40-07002	2–3	SOIL	323	—	320	322, 323	323	321	—	—
0540-95-1004	40-07002	4–5	QBT3	323	—	320	322, 323	323	321	—	—
0540-95-1006	40-07003	0–0.5	SOIL	323	—	320	322	323	321	—	—
0540-95-1007	40-07003	0.5–1.5	QBT3	323	—	320	322, 323	323	321	—	—
0540-95-1008	40-07003	2.5–3.5	QBT3	323	—	320	322, 323	323	321	—	—
0540-95-1009	40-07004	0–0.5	SOIL	323	—	320	322, 323	323	321	—	—
0540-95-1012	40-07004	1.75–2.75	QBT3	323	—	320	322, 323	323	321	—	—
0540-95-1011	40-07004	3.5–4.5	QBT3	323	—	320	322, 323	323	321	—	—
0540-95-1013	40-07005	0–0.5	SOIL	327	—	326	325	327	324	327	—
0540-95-1015	40-07005	2–3	QBT3	327	—	326	325	327	324	327	—
0540-95-1014	40-07005	4–5	QBT3	327	—	326	325	327	324	327	—
0540-95-1016	40-07006	0–0.5	SOIL	327	—	326	325	327	324	327	—
0540-95-1018	40-07006	1.5–2.5	QBT3	327	—	326	325	327	324	327	—
0540-95-1017	40-07006	3–4	QBT3	327	—	326	325	327	324	327	—
0540-95-1019	40-07007	0–0.5	SOIL	327	—	326	325	327	324	327	—
0540-95-1021	40-07007	1.65–2.65	QBT3	327	—	326	325	327	324	327	—
0540-95-1020	40-07007	3.3–4.3	QBT3	327	—	326	325	327	324	327	—
0540-95-1022	40-07008	0–0.5	SOIL	327	—	326	325	327	324	327	—
0540-95-1025	40-07008	1.95–2.95	QBT3	327	—	326	325	327	324	327	—
0540-95-1024	40-07008	3.9–4.9	QBT3	327	—	326	325	327	324	327	—
0540-95-1026	40-07009	0–0.5	SOIL	351	—	348	350	351	349	351	—
0540-95-1028	40-07009	1.25–2.25	QBT3	351	—	348	350	351	349	351	—
0540-95-1027	40-07009	2.5–3.5	QBT3	351	—	348	350	351	349	351	—
0540-95-1029	40-07010	0–0.5	SOIL	351	—	348	350	351	349	351	—
0540-95-1031	40-07010	1.65–2.65	QBT3	351	—	348	350	351	349	351	—
0540-95-1030	40-07010	3.3–4.3	QBT3	351	—	348	350	351	349	351	—
0540-95-1032	40-07011	0–0.5	SOIL	351	—	348	350	351	349	351	—
0540-95-1034	40-07011	1.65–2.65	QBT3	351	—	348	350	351	349	351	—
0540-95-1033	40-07011	3.3–4.3	QBT3	351	—	348	350	351	349	351	—
0540-95-1035	40-07012	0–0.5	SOIL	351	—	348	350	351	349	351	—
0540-95-1038	40-07012	1.65–2.65	QBT3	351	—	348	350	351	349	351	—
0540-95-1037	40-07012	3.3–4.3	QBT3	351	—	348	350	351	349	351	—
0540-95-1039	40-07013	0–0.5	SOIL	366	—	364	365	366	363	366	—

Table 7.5-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Gamma Spectroscopy	H3	HE	Metals	Stronium-90	SVOC	Uranium	Cyanide (Total)
0540-95-1041	40-07013	1.55–2.55	QBT3	366	—	364	365	366	363	366	—
0540-95-1040	40-07013	3.1–4.1	QBT3	366	—	364	365	366	363	366	—
0540-95-1042	40-07014	0–0.5	SOIL	366	—	364	365	366	363	366	—
0540-95-1044	40-07014	2.15–3.15	QBT3	366	—	364	365	366	363	366	—
0540-95-1043	40-07014	4.3–5.3	QBT3	366	—	364	365	366	363	366	—
0540-95-1045	40-07015	0–0.5	SOIL	366	—	364	365	366	363	366	—
0540-95-1047	40-07015	1.4–2.8	QBT3	366	—	364	365	366	363	366	—
0540-95-1046	40-07015	2.8–3.8	QBT3	366	—	364	365	366	363	366	—
0540-95-1048	40-07016	0–0.5	SOIL	366	—	364	365	366	363	366	—
0540-95-1051	40-07016	1.45–2.9	QBT3	366	—	364	365	366	363	366	—
0540-95-1050	40-07016	2.9–3.9	QBT3	366	—	364	365	366	363	366	—
0540-95-1052	40-07017	0–0.5	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1054	40-07017	0.08–0.29	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1053	40-07017	0.42–0.58	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1055	40-07018	0–0.5	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1057	40-07018	1–1.5	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1056	40-07018	1.5–2	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1058	40-07019	0–0.5	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1060	40-07019	0.92–1.58	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1059	40-07019	3–3.25	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1064	40-07020	0–0.41	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1061	40-07020	0–0.5	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1063	40-07020	0.42–0.83	QBT3	655	—	652	654, 655	655	653	—	—
0540-95-1065	40-07021	0–0.5	SED	655	—	652	654, 655	655	653	—	—
0540-95-1067	40-07021	0.83–1.5	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1066	40-07021	3–3.67	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1068	40-07022	0–0.5	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1070	40-07022	0.83–1.5	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1069	40-07022	3–3.67	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1071	40-07023	0–0.5	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1073	40-07023	0.25–1	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1143	40-07023	0.25–1	SOIL	—	—	—	—	—	688	—	—
0540-95-1072	40-07023	1–1.67	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1077	40-07024	0–0.41	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1074	40-07024	0–0.5	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1076	40-07024	0.42–0.83	SOIL	655	—	652	654, 655	655	653	—	—
0540-95-1078	40-07025	0–0.5	SED	617	—	615	616, 617	617	615	—	—
0540-95-1080	40-07025	1–1.5	SOIL	617	—	615	616, 617	617	615	—	—
0540-95-1079	40-07025	1.5–1.92	SOIL	617	—	615	616, 617	617	615	—	—

Table 7.5-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Gamma Spectroscopy	H3	HE	Metals	Stronium-90	SVOC	Uranium	Cyanide (Total)
0540-95-1081	40-07026	0–0.5	SED	617	—	615	616, 617	617	615	—	—
0540-95-1083	40-07026	0.58–1.17	SED	617	—	615	616, 617	617	615	—	—
0540-95-1082	40-07026	1.17–1.67	SED	617	—	615	616, 617	617	615	—	—
0540-95-1084	40-07027	0–0.5	SED	617	—	615	616, 617	617	615	—	—
0540-95-1086	40-07027	0.25–0.67	SOIL	617	—	615	616, 617	617	615	—	—
0540-95-1085	40-07027	0.67–1.08	SOIL	617	—	615	616, 617	617	615	—	—
0540-95-1087	40-07028	0–0.5	SED	617	—	615	616, 617	617	615	—	—
0540-95-1090	40-07028	0.33–0.83	SOIL	617	—	615	616, 617	617	615	—	—
0540-95-1089	40-07028	0.83–1.67	SOIL	617	—	615	616, 617	617	615	—	—
0540-95-1091	40-07029	0–0.5	SOIL	617	—	615	616, 617	617	615	—	—
0540-95-1093	40-07029	0.25–0.58	SOIL	617	—	615	616, 617	617	615	—	—
0540-95-1092	40-07029	0.58–1.17	SOIL	617	—	615	616, 617	617	615	—	—
0540-95-1094	40-07030	0–0.5	SED	617	—	615	616, 617	617	615	—	—
0540-95-1096	40-07030	0.25–0.75	SOIL	617	—	615	616, 617	617	615	—	—
0540-95-1095	40-07030	0.75–1.33	SOIL	617	—	615	616, 617	617	615	—	—
0540-95-1097	40-07031	0–0.5	SED	617	—	615	616, 617	617	615	—	—
0540-95-1099	40-07031	1.13–1.75	SOIL	617	—	615	616, 617	617	615	—	—
0540-95-1098	40-07031	1.75–2.25	SOIL	617	—	615	616, 617	617	615	—	—
0540-95-1100	40-07032	0–0.5	SED	617	—	615	616, 617	617	615	—	—
0540-95-1103	40-07032	0.25–0.67	SOIL	617	—	615	616, 617	617	615	—	—
0540-95-1102	40-07032	0.67–1.17	SOIL	617	—	615	616, 617	617	615	—	—
0540-95-1104	40-07033	1.83–2.5	SOIL	568	—	567	568, 570	568	569	—	570
0540-95-1105	40-07034	0.17–1	SED	568	—	567	568, 570	568	569	—	570
0540-95-1106	40-07035	0.17–0.83	SED	568	—	567	568, 570	568	569	—	570
0540-95-1107	40-07036	0.33–0.83	SED	568	—	567	568, 570	568	569	—	570
0540-95-1109	40-07037	0.17–1	SED	568	—	567	568, 570	568	569	—	570
0540-95-1110	40-07038	1.33–2	SED	568	—	567	568, 570	568	569	—	570
0540-95-1111	40-07039	0.17–0.83	SED	568	—	567	568, 570	568	569	—	570
0540-95-1112	40-07040	1–2	SED	568	—	567	568, 570	568	569	—	570
0540-95-1113	40-07041	0–0.5	SOIL	594	—	589	592	594	589	594	—
0540-95-1115	40-07042	0–0.5	SOIL	594	—	589	592	594	589	594	—
0540-95-1116	40-07043	0–0.5	SOIL	594	—	589	592	594	589	594	—
0540-95-1117	40-07044	0–0.5	SOIL	594	—	589	592	594	589	594	—
0540-95-1118	40-07045	0–0.5	SOIL	594	—	589	592	594	589	594	—
0540-95-1119	40-07046	0–0.5	SOIL	594	—	589	592	594	589	594	—
0540-95-1120	40-07047	0–0.5	SOIL	594	—	589	592	594	589	594	—
0540-95-1121	40-07048	0–0.5	SOIL	594	—	589	592	594	589	594	—

Note: Numbers in analyte columns are request numbers.

* — = Analysis not requested.

Table 7.5-2
Inorganic Chemicals above BVs at SWMU 40-006(a)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Silver	Sodium	Thallium	Uranium	Zinc
Qbt 2, 3, 4 Background Value[a]				**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**na**[b]	**11.2**	**1690**	**482**	**0.1**	**6.58**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**63.5**
Sediment Background Value[a]				**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**19.7**	**2370**	**543**	**0.1**	**9.38**	**0.3**	**1**	**1470**	**0.73**	**2.22**	**60.2**
Soil Background Value[a]				**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**1.52**	**1**	**915**	**0.73**	**1.82**	**48.8**
Construction Worker SSL[c]				**124**	**65.4**	**4350**	**144**	**309**	**na**	**449**[d]	**34.6**[e]	**12,400**	**6190**	**800**	**na**	**463**	**92.9**[e]	**6190**	**1550**	**1550**	**na**	**20.4**	**929**	**92,900**
Industrial SSL[c]				**454**	**17.7**	**224,000**	**2260**	**1120**	**na**	**2920**[d]	**300**[f]	**45,400**	**22,700**	**800**	**na**	**145,000**	**310**[f]	**22,700**	**5680**	**5680**	**na**	**74.9**	**3410**	**341,000**
Residential SSL[c]				**31.3**	**3.9**	**15,600**	**156**	**77.9**	**na**	**219**[d]	**23**[f]	**3130**	**1560**	**400**	**na**	**10,700**	**23**[f]	**1560**	**391**	**391**	**na**	**5.16**	**235**	**23,500**
0540-95-1000	40-07001	0–0.5	SOIL	—[g]	—	—	—	1 (U)	—	—	10 (U)	41 (J+)	NA[h]	—	—	—	—	—	—	2.1 (U)	1000 (U)	2.1 (UJ)	2.3	160
0540-95-1002	40-07001	6.75–7.75	QBT3	—	—	48 (U)	—	—	—	—	12 (U)	6 (U)	NA	—	—	—	0.12 (U)	9.6 (U)	1.2 (U)	2.4 (U)	—	2.4 (UJ)	5.3	—
0540-95-1001	40-07001	13.5–14.5	QBT3	—	—	—	—	—	—	—	11 (U)	5.4 (U)	NA	—	—	—	0.11 (U)	8.7 (U)	1.1 (U)	2.2 (U)	—	2.2 (UJ)	3.2	—
0540-95-1003	40-07002	0–0.5	SOIL	—	—	—	—	1 (U)	—	—	10 (U)	42 (J+)	NA	—	—	—	—	—	—	2 (U)	1000 (U)	2 (UJ)	2	—
0540-95-1005	40-07002	2–3	SOIL	—	—	—	—	1 (U)	—	—	10 (U)	—	NA	—	—	—	—	—	—	2.1 (U)	1000 (U)	2.1 (UJ)	4	—
0540-95-1004	40-07002	4–5	QBT3	—	—	51 (U)	1.3 (U)	—	—	—	13 (U)	6.4 (U)	NA	—	—	—	0.13 (U)	10 (U)	1.3 (U)	2.6 (U)	—	2.6 (UJ)	3.6	—
0540-95-1006	40-07003	0–0.5	SOIL	—	—	—	—	1.3 (U)	—	—	13 (U)	100 (J+)	NA	—	—	—	0.13 (U)	—	—	2.5 (U)	1300 (U)	2.5 (UJ)	NA	81
0540-95-1007	40-07003	0.5–1.5	QBT3	—	—	330	1.3 (U)	—	19000	—	13 (U)	13 (J+)	NA	—	2200	—	0.13 (U)	10 (U)	1.3 (U)	2.5 (U)	—	2.5 (UJ)	3.2	—
0540-95-1008	40-07003	2.5–3.5	QBT3	—	—	52 (U)	1.3 (U)	—	2300	—	13 (U)	6.5 (U)	NA	—	—	—	0.13 (U)	10 (U)	1.3 (U)	2.6 (U)	—	2.6 (UJ)	3.3	—
0540-95-1009	40-07004	0–0.5	SOIL	—	—	—	—	1 (U)	—	—	10 (U)	72 (J+)	NA	—	—	—	—	—	—	2 (U)	1000 (U)	2 (UJ)	1.9	—
0540-95-1012	40-07004	1.75–2.75	QBT3	—	—	140	—	—	—	—	12 (U)	6 (U)	NA	—	—	—	0.12 (U)	9.6 (U)	1.2 (U)	2.4 (U)	—	2.4 (UJ)	5.4	—
0540-95-1011	40-07004	3.5–4.5	QBT3	—	3.3	50 (U)	1.3 (U)	—	—	—	13 (U)	6.3 (U)	NA	—	—	—	0.13 (U)	10 (U)	1.3	2.5 (U)	—	2.5 (UJ)	4	—
0540-95-1013	40-07005	0–0.5	SOIL	4.5 (U)	—	—	—	0.68 (U)	—	—	—	72.2 (J-)	NA	—	—	—	—	—	—	1.5 (U)	—	1.2 (U)	—	—
0540-95-1015	40-07005	2–3	QBT3	4.7 (U)	—	201	—	—	4290	—	—	41.8 (J-)	NA	—	—	—	—	—	0.94 (U)	1.6 (U)	—	1.3 (U)	—	—
0540-95-1014	40-07005	4–5	QBT3	4.6 (U)	—	198	—	—	—	—	—	5.8 (J-)	NA	—	—	—	—	—	0.93 (U)	1.5 (U)	—	1.3 (U)	—	—
0540-95-1016	40-07006	0–0.5	SOIL	4.4 (U)	—	—	—	0.66 (U)	—	—	—	106 (J-)	NA	—	—	—	—	—	—	1.5 (U)	—	1.2 (U)	—	—
0540-95-1018	40-07006	1.5–2.5	QBT3	4.5 (U)	—	218	—	—	4100	—	—	295 (J-)	NA	—	—	—	—	—	0.91 (U)	1.5 (U)	—	1.2 (U)	—	—
0540-95-1017	40-07006	3–4	QBT3	4.4 (U)	—	137	—	—	—	—	—	12.2 (J-)	NA	—	—	—	—	—	0.88 (U)	1.5 (U)	—	1.2 (U)	—	—
0540-95-1019	40-07007	0–0.5	SOIL	4.6 (U)	—	—	—	0.69 (U)	—	—	—	69.8 (J-)	NA	—	—	—	—	—	—	1.5 (U)	—	1.3 (U)	—	—
0540-95-1021	40-07007	1.65–2.65	QBT3	4.3 (U)	—	204	—	—	3510	—	—	34.7 (J-)	NA	—	—	—	—	—	0.87 (U)	1.4 (U)	—	1.2 (U)	—	—
0540-95-1020	40-07007	3.3–4.3	QBT3	4.5 (U)	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	0.9 (U)	1.5 (U)	—	1.2 (U)	—	—
0540-95-1022	40-07008	0–0.5	SOIL	4.5 (U)	—	—	—	0.67 (U)	6790	—	—	100 (J-)	NA	—	—	—	—	—	—	1.5 (U)	—	1.2 (U)	—	—
0540-95-1025	40-07008	1.95–2.95	QBT3	4.6 (U)	—	241	—	—	3670	—	—	59.7 (J-)	NA	13.6	—	—	—	—	0.92 (U)	1.5 (U)	—	1.3 (U)	—	—
0540-95-1024	40-07008	3.9–4.9	QBT3	4.7 (U)	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	0.94 (U)	1.6 (U)	—	1.3 (U)	—	—
0540-95-1026	40-07009	0–0.5	SOIL	6.4 (U)	—	—	—	0.85 (U)	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	—	—
0540-95-1028	40-07009	1.25–2.25	QBT3	5.9 (U)	—	751	—	—	2480	—	—	30.1	NA	20.9	—	—	—	—	—	—	—	—	—	—
0540-95-1027	40-07009	2.5–3.5	QBT3	6.7 (U)	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	—	—
0540-95-1029	40-07010	0–0.5	SOIL	5.6 (U)	—	—	—	0.74 (U)	—	—	—	28.3	NA	32.7	—	—	—	—	—	—	—	—	2.32	50.8
0540-95-1031	40-07010	1.65–2.65	QBT3	6.3 (U)	—	269	—	—	2780	—	—	26.6	NA	23.7	—	—	—	—	—	—	—	—	—	—
0540-95-1030	40-07010	3.3–4.3	QBT3	6.6 (U)	—	—	—	—	—	—	—	—	NA	30.8	—	—	—	—	—	—	—	—	—	—

Table 7.5-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Silver	Sodium	Thallium	Uranium	Zinc
Qbt 2, 3, 4 Background Value[a]				**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**na**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**63.5**
Sediment Background Value[a]				**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**19.7**	**2370**	**543**	**0.1**	**9.38**	**0.3**	**1**	**1470**	**0.73**	**2.22**	**60.2**
Soil Background Value[a]				**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**1.52**	**1**	**915**	**0.73**	**1.82**	**48.8**
Construction Worker SSL[c]				**124**	**65.4**	**4350**	**144**	**309**	**na**	**449[d]**	**34.6[e]**	**12,400**	**6190**	**800**	**na**	**463**	**92.9[e]**	**6190**	**1550**	**1550**	**na**	**20.4**	**929**	**92,900**
Industrial SSL[c]				**454**	**17.7**	**224,000**	**2260**	**1120**	**na**	**2920[d]**	**300[f]**	**45,400**	**22,700**	**800**	**na**	**145,000**	**310[f]**	**22,700**	**5680**	**5680**	**na**	**74.9**	**3410**	**341,000**
Residential SSL[c]				**31.3**	**3.9**	**15,600**	**156**	**77.9**	**na**	**219[d]**	**23[f]**	**3130**	**1560**	**400**	**na**	**10,700**	**23[f]**	**1560**	**391**	**391**	**na**	**5.16**	**235**	**23,500**
0540-95-1032	40-07011	0–0.5	SOIL	5.5 (U)	—	—	—	0.73 (U)	—	—	—	50	NA	—	—	—	—	—	—	—	—	—	2.24	—
0540-95-1034	40-07011	1.65–2.65	QBT3	5.5 (U)	—	192	—	—	2410	—	—	15.4	NA	—	—	—	—	—	—	—	—	—	—	—
0540-95-1033	40-07011	3.3–4.3	QBT3	6.8 (U)	—	—	—	—	—	—	—	—	NA	38	—	—	—	—	0.31 (U)	—	—	—	—	—
0540-95-1035	40-07012	0–0.5	SOIL	6.2 (U)	—	—	—	0.82 (U)	—	—	—	15400	NA	44.9	—	—	—	—	—	2 (J)	—	—	5.86	1480
0540-95-1038	40-07012	1.65–2.65	QBT3	6.8 (U)	—	270	—	—	—	—	—	40.9	NA	33	—	—	—	—	0.31 (U)	—	—	—	4.39	—
0540-95-1037	40-07012	3.3–4.3	QBT3	6.5 (U)	—	—	—	—	—	—	—	7.4	NA	—	—	—	—	—	—	—	—	—	—	—
0540-95-1039	40-07013	0–0.5	SOIL	0.88 (J)	—	—	—	0.41 (J)	—	—	—	186	NA	—	—	—	—	—	—	—	—	—	2.1	103
0540-95-1041	40-07013	1.55–2.55	QBT3	0.52 (U)	—	260	—	—	3210	—	—	22.3	NA	—	—	—	—	—	0.51 (J)	—	—	—	—	—
0540-95-1040	40-07013	3.1–4.1	QBT3	0.62 (U)	2.9	—	—	—	—	—	—	—	NA	—	—	—	—	—	1.5	—	—	—	—	—
0540-95-1042	40-07014	0–0.5	SOIL	—	—	—	—	—	—	—	—	255	NA	96.1	—	—	—	—	—	—	—	—	1.92	101
0540-95-1044	40-07014	2.15–3.15	QBT3	0.52 (U)	3.1	342	—	—	3450	—	3.2 (J)	106	NA	28	—	—	—	—	0.4 (U)	—	—	—	—	83.7
0540-95-1043	40-07014	4.3–5.3	QBT3	0.63 (U)	—	—	—	—	—	—	—	9.1	NA	—	—	—	—	—	0.84 (J)	—	—	—	—	—
0540-95-1045	40-07015	0–0.5	SOIL	—	—	—	—	—	—	—	—	58.4	NA	—	—	—	—	—	—	—	—	—	1.91	—
0540-95-1047	40-07015	1.4–2.8	QBT3	0.53 (U)	—	259	—	—	3310	—	—	180	NA	—	—	—	—	—	0.59 (J)	—	—	—	—	—
0540-95-1046	40-07015	2.8–3.8	QBT3	0.6 (U)	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	0.59 (J)	—	—	—	—	—
0540-95-1048	40-07016	0–0.5	SOIL	—	—	321	—	—	—	—	—	30.7	NA	—	—	—	—	—	—	—	—	—	6.06	—
0540-95-1051	40-07016	1.45–2.9	QBT3	0.52 (U)	—	329	—	—	2790	—	—	160	NA	—	—	—	—	—	0.42 (J)	—	—	—	18.1	—
0540-95-1050	40-07016	2.9–3.9	QBT3	0.57 (U)	—	141	—	—	—	—	—	33.6	NA	18.9	—	—	—	—	0.43 (U)	—	—	—	5.64	—
0540-95-1052	40-07017	0–0.5	SOIL	—	—	336	—	—	—	—	—	18.1 (J+)	NA	—	—	—	—	—	—	—	—	—	3.2	—
0540-95-1054	40-07017	0.08–0.29	SOIL	—	—	601	—	0.68	—	—	—	28.6 (J+)	NA	—	—	—	—	—	—	—	—	—	5.5	85.2 (J+)
0540-95-1053	40-07017	0.42–0.58	SOIL	—	—	—	—	0.5 (J)	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	3.8	—
0540-95-1055	40-07018	0–0.5	SOIL	—	—	351	—	—	—	—	—	70 (J+)	NA	—	—	—	—	—	—	—	—	—	3.4	55.5 (J+)
0540-95-1057	40-07018	1–1.5	SOIL	—	—	386	—	—	—	—	—	211 (J+)	NA	22.4	—	—	—	—	—	—	—	—	3	119 (J+)
0540-95-1056	40-07018	1.5–2	SOIL	—	—	—	—	0.64	—	—	—	19.8 (J+)	NA	—	—	—	—	—	—	—	—	—	3.9	50.7 (J+)
0540-95-1058	40-07019	0–0.5	SOIL	—	—	—	—	0.67	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	5	—
0540-95-1060	40-07019	0.92–1.58	SOIL	—	—	—	—	0.49 (J)	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	4.7	—
0540-95-1059	40-07019	3–3.25	SOIL	—	—	—	—	0.47 (J)	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	3.8	—
0540-95-1064	40-07020	0–0.41	SOIL	—	—	—	—	0.54	—	—	—	66.4 (J+)	NA	—	—	—	—	—	—	—	—	—	7.4	67.2 (J+)
0540-95-1061	40-07020	0–0.5	SOIL	—	—	—	—	0.8	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	8.4	52.2 (J+)
0540-95-1063	40-07020	0.42–0.83	QBT3	—	—	92.4	—	—	—	—	—	10.6 (J+)	NA	—	—	—	—	—	—	—	—	—	5.8	—
0540-95-1065	40-07021	0–0.5	SED	—	—	315	—	0.73	—	—	—	26.2 (J+)	NA	26.7	—	—	—	—	—	—	—	—	9.3	—

Table 7.5-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Silver	Sodium	Thallium	Uranium	Zinc
Qbt 2, 3, 4 Background Value[a]				**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**na**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**63.5**
Sediment Background Value[a]				**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**19.7**	**2370**	**543**	**0.1**	**9.38**	**0.3**	**1**	**1470**	**0.73**	**2.22**	**60.2**
Soil Background Value[a]				**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**1.52**	**1**	**915**	**0.73**	**1.82**	**48.8**
Construction Worker SSL[c]				**124**	**65.4**	**4350**	**144**	**309**	**na**	**449[d]**	**34.6[e]**	**12,400**	**6190**	**800**	**na**	**463**	**92.9[e]**	**6190**	**1550**	**1550**	**na**	**20.4**	**929**	**92,900**
Industrial SSL[c]				**454**	**17.7**	**224,000**	**2260**	**1120**	**na**	**2920[d]**	**300[f]**	**45,400**	**22,700**	**800**	**na**	**145,000**	**310[f]**	**22,700**	**5680**	**5680**	**na**	**74.9**	**3410**	**341,000**
Residential SSL[c]				**31.3**	**3.9**	**15,600**	**156**	**77.9**	**na**	**219[d]**	**23[f]**	**3130**	**1560**	**400**	**na**	**10,700**	**23[f]**	**1560**	**391**	**391**	**na**	**5.16**	**235**	**23,500**
0540-95-1067	40-07021	0.83–1.5	SOIL	—	—	—	—	0.55	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	5.5	—
0540-95-1066	40-07021	3–3.67	SOIL	—	—	—	—	0.52	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	5	—
0540-95-1068	40-07022	0–0.5	SOIL	—	—	—	—	0.63	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	5.7	—
0540-95-1070	40-07022	0.83–1.5	SOIL	—	—	—	—	0.59	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	3.8	—
0540-95-1069	40-07022	3–3.67	SOIL	—	—	—	—	0.53	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	4.7	—
0540-95-1071	40-07023	0–0.5	SOIL	—	—	—	—	0.53 (J)	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	4.8	49.2 (J+)
0540-95-1073	40-07023	0.25–1	SOIL	—	—	—	—	0.78	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	4.7	—
0540-95-1072	40-07023	1–1.67	SOIL	—	—	—	—	0.82	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	4.5	—
0540-95-1077	40-07024	0–0.41	SOIL	—	—	—	—	0.63	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	5.7	—
0540-95-1074	40-07024	0–0.5	SOIL	—	—	—	—	0.66	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	6.7	—
0540-95-1076	40-07024	0.42–0.83	SOIL	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	5.2	—
0540-95-1078	40-07025	0–0.5	SED	5.94 (U)	—	—	—	0.594 (U)	—	—	—	—	NA	—	—	—	—	—	0.302 (U)	—	—	—	3.42	—
0540-95-1080	40-07025	1–1.5	SOIL	5.09 (U)	—	—	—	0.509 (U)	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	2.37	—
0540-95-1079	40-07025	1.5–1.92	SOIL	5.09 (U)	—	—	—	0.509 (U)	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	2.11	—
0540-95-1081	40-07026	0–0.5	SED	6.93 (U)	—	—	—	0.693 (U)	—	—	—	15.3 (J-)	NA	—	—	—	—	13	0.345 (U)	1.66	—	—	—	—
0540-95-1083	40-07026	0.58–1.17	SED	6.72 (U)	—	—	—	0.672 (U)	—	—	—	—	NA	—	—	—	—	11.6	0.343 (U)	1.8	—	—	2.51	—
0540-95-1082	40-07026	1.17–1.67	SED	6.9 (U)	—	—	—	0.69 (U)	—	—	—	—	NA	—	—	—	—	9.83	0.346 (U)	—	—	—	2.39	—
0540-95-1084	40-07027	0–0.5	SED	6.86 (U)	—	—	—	1.86	—	—	—	27.2 (J-)	NA	—	—	—	0.11 (J)	33	0.335 (U)	5.37	—	—	3.73	—
0540-95-1086	40-07027	0.25–0.67	SOIL	5.23 (U)	—	—	—	0.921	—	—	—	—	NA	—	—	—	—	21.4	—	1.45	—	—	2.15	—
0540-95-1085	40-07027	0.67–1.08	SOIL	5.04 (U)	—	—	—	0.504 (U)	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	2.34	—
0540-95-1087	40-07028	0–0.5	SED	6.12 (U)	—	—	—	0.612 (U)	—	—	—	—	NA	—	—	—	—	10.2	0.306 (U)	1.24	—	—	2.56	—
0540-95-1090	40-07028	0.33–0.83	SOIL	5.88 (U)	—	—	—	1.02	—	—	—	15.7 (J-)	NA	—	—	—	—	18.6	—	2.38	—	—	2.49	—
0540-95-1089	40-07028	0.83–1.67	SOIL	6.25 (U)	—	—	—	0.638	—	—	—	17.5 (J-)	NA	—	—	—	—	18.6	—	1.16	—	—	2.83	—
0540-95-1091	40-07029	0–0.5	SOIL	6.13 (U)	—	—	—	1.67	—	20.4	10.1	16.9 (J-)	NA	—	—	726	—	35.8	—	2.33	—	—	2.68	—
0540-95-1093	40-07029	0.25–0.58	SOIL	6.72 (U)	—	—	—	2.55	—	—	—	17.6 (J-)	NA	—	—	—	—	46	—	4.84	—	—	2.82	—
0540-95-1092	40-07029	0.58–1.17	SOIL	6.06 (U)	—	—	—	0.93	—	—	—	—	NA	—	—	—	—	22.2	—	1.84	—	—	3.65	—
0540-95-1094	40-07030	0–0.5	SED	6.07 (U)	—	—	—	0.719	—	—	—	19.5 (J-)	NA	—	—	—	—	17.6	0.309 (U)	1.99	—	—	2.66	—
0540-95-1096	40-07030	0.25–0.75	SOIL	6.4 (U)	—	—	—	0.804	—	—	—	35.7 (J-)	NA	—	—	—	—	19.2	—	2.48	—	—	2.68	63.2
0540-95-1095	40-07030	0.75–1.33	SOIL	7.66 (U)	—	—	—	1.63	—	—	—	52 (J-)	NA	—	—	—	0.116 (J)	31.1	—	3.3	—	—	1.98	60.6
0540-95-1097	40-07031	0–0.5	SED	5.74 (U)	—	—	—	0.589	—	—	—	46.9 (J-)	NA	—	—	—	—	11.2	—	1.39	—	—	2.58	—
0540-95-1099	40-07031	1.13–1.75	SOIL	6.71 (U)	—	—	—	1	—	—	—	35.2 (J-)	NA	—	—	—	—	18.1	—	2.38	—	—	2.98	—

Table 7.5-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Silver	Sodium	Thallium	Uranium	Zinc
Qbt 2, 3, 4 Background Value[a]				**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**na**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**63.5**
Sediment Background Value[a]				**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**19.7**	**2370**	**543**	**0.1**	**9.38**	**0.3**	**1**	**1470**	**0.73**	**2.22**	**60.2**
Soil Background Value[a]				**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**1.52**	**1**	**915**	**0.73**	**1.82**	**48.8**
Construction Worker SSL[c]				**124**	**65.4**	**4350**	**144**	**309**	**na**	**449[d]**	**34.6[e]**	**12,400**	**6190**	**800**	**na**	**463**	**92.9[e]**	**6190**	**1550**	**1550**	**na**	**20.4**	**929**	**92,900**
Industrial SSL[c]				**454**	**17.7**	**224,000**	**2260**	**1120**	**na**	**2920[d]**	**300[f]**	**45,400**	**22,700**	**800**	**na**	**145,000**	**310[f]**	**22,700**	**5680**	**5680**	**na**	**74.9**	**3410**	**341,000**
Residential SSL[c]				**31.3**	**3.9**	**15,600**	**156**	**77.9**	**na**	**219[d]**	**23[f]**	**3130**	**1560**	**400**	**na**	**10,700**	**23[f]**	**1560**	**391**	**391**	**na**	**5.16**	**235**	**23,500**
0540-95-1098	40-07031	1.75–2.25	SOIL	7.12 (U)	—	—	—	1.63	—	—	—	37.9 (J-)	NA	—	—	—	—	24.2	—	2.2	—	—	2.82	51.5
0540-95-1100	40-07032	0–0.5	SED	5.7 (U)	—	137	—	0.57 (U)	—	—	6.53	—	NA	—	—	742	—	11.1	—	1.39	—	—	3.1	—
0540-95-1103	40-07032	0.25–0.67	SOIL	6.31 (U)	—	—	—	0.916	—	—	—	19.8 (J-)	NA	—	—	—	—	21	—	2.19	—	—	2.3	—
0540-95-1102	40-07032	0.67–1.17	SOIL	6.56 (U)	—	—	—	0.744	—	—	—	15.4 (J-)	NA	—	—	—	—	15.5	—	2.47	—	—	1.94	—
0540-95-1104	40-07033	1.83–2.5	SOIL	6.7 (U)	—	—	—	0.71 (U)	—	—	—	—	0.68 (U)	—	—	—	—	—	—	1.2 (J)	—	—	2.21	—
0540-95-1105	40-07034	0.17–1	SED	6.4 (U)	—	—	—	0.68 (U)	—	—	—	—	—	—	—	—	—	—	—	1.7 (J)	—	—	2.64	—
0540-95-1106	40-07035	0.17–0.83	SED	6.9 (U)	—	—	—	0.74 (U)	—	—	—	—	—	—	—	—	—	11.7	0.31 (U)	—	—	—	2.62	—
0540-95-1107	40-07036	0.33–0.83	SED	6.5 (U)	—	—	—	0.69 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.33	—
0540-95-1109	40-07037	0.17–1	SED	7.4 (U)	—	—	—	0.91 (J)	—	—	—	14.4	—	—	—	—	—	16	0.33 (U)	2.9	—	—	2.45	—
0540-95-1110	40-07038	1.33–2	SED	6.6 (U)	—	—	—	0.7 (U)	—	—	—	—	—	—	—	—	—	10.7	—	—	—	—	—	—
0540-95-1111	40-07039	0.17–0.83	SED	6.8 (U)	—	—	—	0.73 (U)	—	—	—	—	—	—	—	—	—	—	0.38 (U)	1.8 (J)	—	—	2.24	—
0540-95-1112	40-07040	1–2	SED	6.3 (U)	—	—	—	0.67 (U)	—	—	—	161	—	—	—	—	—	—	—	—	—	—	2.68	—
0540-95-1113	40-07041	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	3.55	—
0540-95-1115	40-07042	0–0.5	SOIL	—	—	—	—	—	9070	—	—	16.4 (U)	NA	31.9	—	1280 (J+)	—	—	2	—	—	—	4.47	—
0540-95-1116	40-07043	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	5.77	—
0540-95-1117	40-07044	0–0.5	SOIL	—	—	—	—	—	6910	—	—	—	NA	23.4	—	924 (J+)	—	—	1.7	—	—	—	3.48	—
0540-95-1118	40-07045	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	NA	27.2	—	745 (J+)	—	—	—	—	—	—	9.1	—
0540-95-1119	40-07046	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	NA	—	—	697 (J+)	—	—	—	—	—	—	3.38	—
0540-95-1120	40-07047	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	2.76	—
0540-95-1121	40-07048	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	3.83	—

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

[a] BVs are from LANL 1998, 059730.

[b] na = Not available.

[c] SSLs are from NMED 2009, 108070, unless otherwise noted.

[d] SSLs are for hexavalent chromium.

[e] Construction worker SSLs calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] SSLs are from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[g] — = Not detected or not above BV.

[h] NA = Not analyzed.

Table 7.5-3
Organic Chemicals Detected at SWMU 40-006(a)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	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	Chrysene	Dibenz(a,h)anthracene	Di-n-butylphthalate	Dinitrotoluene[2,4-]	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Phenol	Pyrene	Trinitrobenzene[1,3,5-]
Construction Worker SSL[a]				**18,600**	**601[b]**	**601[b]**	**66,800**	**213**	**21.3**	**213**	**6680[c]**	**2060**	**952,000[b]**	**4760**	**47,600[b]**	**20,600**	**21.3**	**23,800**	**476**	**8910**	**8910**	**11,900**	**213**	**702**	**7150**	**68,800**	**6680**	**8760[b]**
Industrial SSL[a]				**36,700**	**1900[d]**	**2000[d]**	**183,000**	**23.4**	**2.34**	**23.4**	**18,300[c]**	**234**	**2,500,000[d]**	**1370**	**9100[d]**	**2340**	**2.34**	**68,400**	**103**	**24,400**	**24,400**	**34,200**	**23.4**	**252**	**20,500**	**205,000**	**18,300**	**27,000[d]**
Residential SSL[a]				**3440**	**150[d]**	**150[d]**	**17,200**	**6.21**	**0.621**	**6.21**	**1720[c]**	**62.1**	**240,000[d]**	**347**	**2600[d]**	**621**	**0.621**	**6110**	**15.7**	**2290**	**2290**	**3060**	**6.21**	**45**	**1830**	**18,300**	**1720**	**2200[d]**
0540-95-1000	40-07001	0–0.5	SOIL	—[e]	—	—	—	—	—	—	—	—	—	—	—	—	—	0.097 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1002	40-07001	6.75–7.75	QBT3	—	—	—	—	—	—	—	—	—	0.033 (J)	—	—	—	—	0.065 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1001	40-07001	13.5–14.5	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.033 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1003	40-07002	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.099 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1005	40-07002	2–3	SOIL	—	—	—	—	—	—	—	—	—	0.031 (J)	—	—	—	—	0.063 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1004	40-07002	4–5	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.065 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1006	40-07003	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.099 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1007	40-07003	0.5–1.5	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.066 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1008	40-07003	2.5–3.5	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.071 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1009	40-07004	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.066 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1012	40-07004	1.75–2.75	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.065 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1011	40-07004	3.5–4.5	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.066 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1013	40-07005	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	0.32 (J)	—	—	—	—	—	—	—	5.4	—	—	—	—	—	—
0540-95-1016	40-07006	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	38	—	—	—	—	—	—
0540-95-1018	40-07006	1.5–2.5	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4.1	—	—	—	—	—	—
0540-95-1017	40-07006	3–4	QBT3	0.9	—	—	0.56	2	1.6	1.6	0.78	0.9	—	—	—	2	0.48	—	—	2.7	0.23 (J)	—	0.84	0.22 (J)	2.1	—	3	—
0540-95-1019	40-07007	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	0.18 (J)	—	—	—	—	—	—	—	0.0085	—	—	—	—	—	—
0540-95-1029	40-07010	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	0.057 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0540-95-1034	40-07011	1.65–2.65	QBT3	—	—	—	—	—	—	0.061 (J)	—	0.045 (J)	—	—	—	0.13 (J)	—	—	—	0.13 (J)	—	—	—	—	—	—	0.055 (J)	—
0540-95-1033	40-07011	3.3–4.3	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.234	—	—	—	—	—	—	—	—	—
0540-95-1035	40-07012	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.273	—	—	—	—	—	—
0540-95-1038	40-07012	1.65–2.65	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.643	—	—	—	—	—	—
0540-95-1039	40-07013	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	0.047 (J)	—	—	—	—	—	—	—	1.18	—	—	—	0.072 (J)	—	—
0540-95-1041	40-07013	1.55–2.55	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.546	—	—	—	—	—	—
0540-95-1042	40-07014	0–0.5	SOIL	—	0.091	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.358	—	—	—	—	—	—
0540-95-1043	40-07014	4.3–5.3	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.151	—	—	—	—	—	—	—	—	—

Table 7.5-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	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	Chrysene	Dibenz(a,h)anthracene	Di-n-butylphthalate	Dinitrotoluene[2,4-]	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Phenol	Pyrene	Trinitrobenzene[1,3,5-]
Construction Worker SSL[a]				**18,600**	**601**[b]	**601**[b]	**66,800**	**213**	**21.3**	**213**	**6680**[c]	**2060**	**952,000**[b]	**4760**	**47,600**[b]	**20,600**	**21.3**	**23,800**	**476**	**8910**	**8910**	**11,900**	**213**	**702**	**7150**	**68,800**	**6680**	**8760**[b]
Industrial SSL[a]				**36,700**	**1900**[d]	**2000**[d]	**183,000**	**23.4**	**2.34**	**23.4**	**18,300**[c]	**234**	**2,500,000**[d]	**1370**	**9100**[d]	**2340**	**2.34**	**68,400**	**103**	**24,400**	**24,400**	**34,200**	**23.4**	**252**	**20,500**	**205,000**	**18,300**	**27,000**[d]
Residential SSL[a]				**3440**	**150**[d]	**150**[d]	**17,200**	**6.21**	**0.621**	**6.21**	**1720**[c]	**62.1**	**240,000**[d]	**347**	**2600**[d]	**621**	**0.621**	**6110**	**15.7**	**2290**	**2290**	**3060**	**6.21**	**45**	**1830**	**18300**	**1720**	**2200**[d]
0540-95-1045	40-07015	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	0.039 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0540-95-1048	40-07016	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	0.04 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0540-95-1050	40-07016	2.9–3.9	QBT3	—	—	—	—	—	—	—	—	—	—	0.051 (J)	—	—	—	—	0.058	—	—	—	—	—	—	—	—	—
0540-95-1055	40-07018	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	0.12 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0540-95-1064	40-07020	0–0.41	SOIL	—	—	—	—	—	—	—	0.18 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0540-95-1065	40-07021	0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.056 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1067	40-07021	0.83–1.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.048 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1066	40-07021	3–3.67	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.037 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1068	40-07022	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.067 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1072	40-07023	1–1.67	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.045 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1077	40-07024	0–0.41	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.046 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1076	40-07024	0.42–0.83	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.065 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1078	40-07025	0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.046 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—
0540-95-1080	40-07025	1–1.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	0.038 (J)	—	—	0.036 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1079	40-07025	1.5–1.92	SOIL	—	—	—	—	—	—	—	—	—	—	—	0.041 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—
0540-95-1081	40-07026	0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.066 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—
0540-95-1083	40-07026	0.58–1.17	SED	—	—	—	—	—	—	—	—	—	—	—	0.048 (J)	—	—	—	—	—	—	0.193	—	—	—	—	—	—
0540-95-1082	40-07026	1.17–1.67	SED	—	—	—	—	—	—	—	—	—	—	—	0.049 (J)	—	—	0.061 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1084	40-07027	0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.052 (J)	—	—	—	—	—	—	—	—
0540-95-1090	40-07028	0.33–0.83	SOIL	—	—	—	—	—	—	—	—	—	0.14 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0540-95-1096	40-07030	0.25–0.75	SOIL	—	—	—	—	—	—	—	—	—	0.86 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0540-95-1095	40-07030	0.75–1.33	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.051 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1098	40-07031	1.75–2.25	SOIL	—	—	—	—	—	—	—	—	—	0.15 (J)	—	—	—	—	0.18 (J)	—	—	—	—	—	—	—	—	—	—
0540-95-1113	40-07041	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	0.13 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0540-95-1115	40-07042	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	0.35 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.37
0540-95-1116	40-07043	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	0.21 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0540-95-1117	40-07044	0–0.5	SOIL	—	1	1	—	—	—	—	—	—	0.14 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 7.5-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	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	Chrysene	Dibenz(a,h)anthracene	Di-n-butylphthalate	Dinitrotoluene[2,4-]	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Phenol	Pyrene	Trinitrobenzene[1,3,5-]
Construction Worker SSL[a]				**18,600**	**601[b]**	**601[b]**	**66,800**	**213**	**21.3**	**213**	**6680[c]**	**2060**	**952,000[b]**	**4760**	**47,600[b]**	**20,600**	**21.3**	**23,800**	**476**	**8910**	**8910**	**11,900**	**213**	**702**	**7150**	**68,800**	**6680**	**8760[b]**
Industrial SSL[a]				**36,700**	**1900[d]**	**2000[d]**	**183,000**	**23.4**	**2.34**	**23.4**	**18,300[c]**	**234**	**2,500,000[d]**	**1370**	**9100[d]**	**2340**	**2.34**	**68,400**	**103**	**24,400**	**24,400**	**34,200**	**23.4**	**252**	**20,500**	**205,000**	**18,300**	**27,000[d]**
Residential SSL[a]				**3440**	**150[d]**	**150[d]**	**17,200**	**6.21**	**0.621**	**6.21**	**1720[c]**	**62.1**	**240,000[d]**	**347**	**2600[d]**	**621**	**0.621**	**6110**	**15.7**	**2290**	**2290**	**3060**	**6.21**	**45**	**1830**	**18300**	**1720**	**2200[d]**
0540-95-1118	40-07045	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	0.29 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0540-95-1119	40-07046	0–0.5	SOIL	—	—	—	—	—	—	—	—	—	0.13 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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

[a] SSLs are from NMED 2009, 108070, unless otherwise noted.

[b] Construction worker SSLs calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[c] Pyrene used as a surrogate based on structural similarity.

[d] SSLs are from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[e] — = Not detected.

Table 7.5-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 40-006(a)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Cobalt-60	Strontium-90
Qbt 2, 3, 4 Background Value[a]				**na**	**na**[b]	**na**
Sediment Background Value[a]				**0.9**[c]	**na**	**1.04**[c]
Soil Background Value[a]				**1.65**[c]	**na**	**1.31**[c]
Construction Worker SAL[d]				**18**	**4.1**	**800**
Industrial SAL[d]				**23**	**5.1**	**1900**
Residential SAL[d]				**5.6**	**1.3**	**5.7**
0540-95-1018	40-07006	1.5–2.5	QBT3	—[e]	—	1
0540-95-1024	40-07008	3.9–4.9	QBT3	—	—	0.52
0540-95-1044	40-07014	2.15–3.15	QBT3	0.088	—	—
0540-95-1051	40-07016	1.45–2.9	QBT3	0.09	—	2.01
0540-95-1050	40-07016	2.9–3.9	QBT3	0.229	—	—
0540-95-1057	40-07018	1–1.5	SOIL	0.17	—	—
0540-95-1063	40-07020	0.42–0.83	QBT3	0.29	—	—
0540-95-1069	40-07022	3–3.67	SOIL	0.27	—	—
0540-95-1087	40-07028	0–0.5	SED	—	0.148	—
0540-95-1095	40-07030	0.75–1.33	SOIL	0.489	—	—
0540-95-1097	40-07031	0–0.5	SED	—	—	2.45
0540-95-1099	40-07031	1.13–1.75	SOIL	0.273	—	—
0540-95-1098	40-07031	1.75–2.25	SOIL	0.843	—	—
0540-95-1104	40-07033	1.83–2.5	SOIL	0.077	—	—
0540-95-1118	40-07045	0–0.5	SOIL	2.54	—	—

Notes: Results are in pCi/g.

[a] BVs/FVs are from LANL 1998, 059730.

[b] na = Not available.

[c] FV applies only to samples collected from 0–1 ft.

[d] SALs from LANL 2009, 107655.

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

Table 7.12-1
Samples Collected and Analyses Requested at SWMU 40-009

Sample ID	Location ID	Depth (ft)	Media	Gamma Spectroscopy	H3	HE	Metals	Stronium-90	SVOC	Uranium
0540-95-1122	40-07049	0–0.5	SOIL	531	531	529	530	531	528	531
0540-95-1124	40-07049	1.5–2	SOIL	531	—*	529	530	531	528	531
0540-95-1123	40-07049	3.67–4	SOIL	531	—	529	530	531	528	531
0540-95-1125	40-07050	0–0.5	SOIL	531	—	529	530	531	528	531
0540-95-1127	40-07050	0.83–1.5	SOIL	531	—	529	530	531	528	531
0540-95-1126	40-07050	2.33–3	SOIL	531	—	529	530	531	528	531
0540-95-1128	40-07051	0–0.5	SED	531	—	529	530	531	528	531
0540-95-1130	40-07051	2–2.67	SOIL	531	—	529	530	531	528	531
0540-95-1129	40-07051	3–3.5	SOIL	531	—	529	530	531	528	531
0540-95-1131	40-07052	0–0.5	SOIL	531	—	529	530	531	528	531
0540-95-1134	40-07052	1.5–2	SOIL	531	—	529	530	531	528	531
0540-95-1133	40-07052	5.25–5.58	SOIL	531	—	529	530	531	528	531
0540-95-1135	40-07053	0–0.5	SOIL	531	—	529	530	531	528	531
0540-95-1137	40-07053	1–1.5	SOIL	531	—	529	530	531	528	531
0540-95-1136	40-07053	2–2.33	SOIL	531	—	529	530	531	528	531
0540-95-1138	40-07054	0–0.5	SOIL	531	—	529	530	531	528	531
0540-95-1140	40-07054	0.33–0.67	SOIL	531	—	529	530	531	528	531
0540-95-1139	40-07054	1–1.5	SOIL	531	—	529	530	531	528	531

Note: Numbers in analyte columns are request numbers.
* — = Analysis not requested.

Table 7.12-2
Inorganic Chemicals Detected above BV at SWMU 40-009

Sample ID	Location ID	Depth (ft)	Media	Antimony	Beryllium	Cadmium	Copper	Lead	Silver	Uranium	Zinc
Soil Background Value[a]				**0.83**	**1.83**	**0.4**	**14.7**	**22.3**	**1**	**1.82**	**48.8**
Sediment Background Value[a]				**0.83**	**1.31**	**0.4**	**11.2**	**19.7**	**1**	**2.22**	**60.2**
Construction Worker SSL[b]				**124**	**144**	**309**	**12,400**	**800**	**1550**	**929**	**92,900**
Industrial SSL[b]				**454**	**2260**	**1120**	**45,400**	**800**	**5680**	**3410**	**341,000**
Residential SSL[b]				**31.3**	**156**	**77.9**	**3130**	**400**	**391**	**235**	**23,500**
0540-95-1122	40-07049	0–0.5	SOIL	11.3 (U)	3.3 (J-)	22	2650	193	1.2 (U)	1.96	1360
0540-95-1124	40-07049	1.5–2	SOIL	12.6 (U)	—[c]	1.4	199	61.3	1.4 (U)	—	188
0540-95-1123	40-07049	3.67–4	SOIL	11.8 (U)	—	3	407	187	1.3 (U)	—	314
0540-95-1125	40-07050	0–0.5	SOIL	12.7 (U)	—	0.69 (U)	17.2	—	1.4 (U)	1.86	92.3
0540-95-1127	40-07050	0.83–1.5	SOIL	11.8 (U)	—	0.65 (U)	—	—	1.3 (U)	—	—
0540-95-1126	40-07050	2.33–3	SOIL	NA[d]	NA	NA	NA	—	1.3 (U)	—	NA
0540-95-1128	40-07051	0–0.5	SED	11.7 (U)	—	0.64 (U)	—	—	1.3 (U)	—	—
0540-95-1130	40-07051	2–2.67	SOIL	12.7 (U)	—	0.7 (U)	—	—	1.4 (U)	—	—
0540-95-1129	40-07051	3–3.5	SOIL	12.2 (U)	—	0.67 (U)	—	—	1.3 (U)	—	—
0540-95-1131	40-07052	0–0.5	SOIL	11.4 (U)	—	0.62 (U)	202	—	1.2 (U)	—	106
0540-95-1134	40-07052	1.5–2	SOIL	12.4 (U)	—	0.68 (U)	124	30.8	1.4 (U)	—	108
0540-95-1133	40-07052	5.25–5.58	SOIL	11.8 (U)	—	0.65 (U)	60.5	—	1.3 (U)	—	78.8
0540-95-1135	40-07053	0–0.5	SOIL	11.8 (U)	—	0.65 (U)	—	—	1.3 (U)	4.08	—
0540-95-1137	40-07053	1–1.5	SOIL	11.6 (U)	—	0.64 (U)	—	—	1.3 (U)	—	—
0540-95-1136	40-07053	2–2.33	SOIL	11.8 (U)	—	0.65 (U)	—	—	1.3 (U)	2.1	—
0540-95-1138	40-07054	0–0.5	SOIL	12.2 (U)	—	0.67 (U)	—	—	1.3 (U)	2.11	—
0540-95-1140	40-07054	0.33–0.67	SOIL	12 (U)	—	0.66	—	—	1.3 (U)	—	—
0540-95-1139	40-07054	1–1.5	SOIL	11.7 (U)	—	0.76 (J)	—	—	1.3 (U)	—	—

Notes: Results are in mg/kg. Data qualifiers are in Appendix A.
[a] BVs are from LANL 1998, 059730.
[b] SSLs are from NMED 2009, 108070.
[c] — = Not detected or not above BV.
[d] NA = Not analyzed.

Table 7.12-3
Organic Chemicals Detected at SWMU 40-009

Sample ID	Location ID	Depth (ft)	Media	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Di-n-octylphthalate	RDX	Tetryl
Construction Worker SSL[a]				**21.3**	**213**	**2060**	**952,000**[b]	**4760**	**4760**[b]	**715**	**953**
Industrial SSL[a]				**2.34**	**23.4**	**234**	**2,500,000**[c]	**1370**	**25,000**[d]	**174**	**2740**
Residential SSL[a]				**0.621**	**6.21**	**62.1**	**240,000**[c]	**347**	**2400**[d]	**44.2**	**244**
0540-95-1122	40-07049	0–0.5	SOIL	0.053 (J)	0.045 (J)	0.058 (J)	0.43 (J)	0.36 (J)	0.1 (J)	—[e]	9.5
0540-95-1124	40-07049	1.5–2	SOIL	—	—	—	—	2	0.23 (J)	—	—
0540-95-1123	40-07049	3.67–4	SOIL	—	—	—	0.5 (J)	0.36	—	9.6	0.73
0540-95-1139	40-07054	1–1.5	SOIL	—	—	—	—	0.045 (J)	—	—	—

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

[a] SSLs are from NMED 2009, 108070, unless otherwise noted.

[b] Construction worker SSLs calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[c] SSLs are from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[d] SSLs are from EPA 2007, 099314.

[e] — = Not detected.

Table 7.12-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 40-009

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Strontium-90
Soil Background Value[a]				**1.65**[b]	**1.31**[b]
Construction Worker SAL[c]				**18**	**800**
Industrial SAL[c]				**23**	**1900**
Residential SAL[c]				**5.6**	**5.7**
0540-95-1124	40-07049	1.5–2	SOIL	0.195	—[d]
0540-95-1123	40-07049	3.67–4	SOIL	0.22	0.92
0540-95-1127	40-07050	0.83–1.5	SOIL	0.189	—
0540-95-1130	40-07051	2–2.67	SOIL	0.215	0.61
0540-95-1135	40-07053	0–0.5	SOIL	—	1.43
0540-95-1137	40-07053	1–1.5	SOIL	0.117	—
0540-95-1136	40-07053	2–2.33	SOIL	0.245	—

Notes: Results are in pCi/g.

[a] BVs/FVs are from LANL 1998, 059730.

[b] FV applies only to samples collected from 0–1 ft.

[c] SALs from LANL 2009, 107655.

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

Table 7.12-5
Proposed Sampling at SWMU 40-009

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Americium-241	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	Strontium-90	pH
Determine nature and extent of potential contamination	9-1 through 9-12	Within and around perimeter of disposal area	9–10 ft bgs	X[a]	X	X	X	X	X	X	X	X	X	X	X	X	X
			19–20 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			24–25 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	9-13 through 9-20	Downgradient of disposal area to toe of slope	0–1 ft bgs	X	X	X	X	X	—[b]	X	—	X	X	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	—	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.
[b] — = Analysis will not be performed.

Table 7.13-1
Proposed Sampling at SWMU 40-010

Objective Addressed	Location Number	Location	Sample Interval	TAL Metals	Nitrate	Perchlorate	Total Cyanide	Explosive Compounds	PCBs	SVOCs	VOCs	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium	pH
Determine nature and extent of potential contamination	10-1 through 10-11	50-ft intervals within and around perimeter of disposal area	0–1 ft bgs	X[a]	X	X	X	X	X	X	—[b]	X	X	X	X
			2–3 ft bgs	X	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.
[b] — = Analysis will not be performed.

Table 8.0-1
Summary of Investigation Methods

Method	Summary
Geodetic Surveys	This method describes the methodology for coordinating and evaluating geodetic surveys and establishing quality assurance (QA) and quality control (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.
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.
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.
Handling, Packaging, and Shipping of Samples	Field team members seal and label samples before packing and ensure that the sample containers and the containers used for transport are free of external contamination. Field team members package all samples so as to minimize the possibility of breakage during transportation. 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.
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 SMO (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.

Table 8.0-1 (continued)

Method	Summary
Sample Control and Field Documentation	The collection, screening, and transport of samples are documented on standard forms generated by the SMO. These include sample 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 Sample Management Database.
Field Quality Control Samples	Field quality control samples are collected 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.
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) 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.
Management, Characterization, and Storage of IDW	IDW 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.

Table 8.9-1
Summary of Analytical Methods

Analyte	Analytical Method
TAL Metals	SW-846:6010B; SW-846:6020
Nitrate	EPA:300.0
Perchlorate	SW-846:6850
Total Cyanide	SW-846:9012A
Explosive Compounds	SW-846:8321A_MOD
PCBs	SW-846:8082
SVOCs	SW-846:8270C
VOCs	SW-846:8260B
Americium-241	HASL-300:AM-241
Gamma-emitting radionuclides	EPA:901.1
Isotopic Plutonium	HASL-300:ISOPU
Isotopic Uranium	HASL-300:ISOU
Strontium-90	EPA 90.5.0
Tritium	Liquid Scintillation
pH	SW-846:9045C

Appendix A

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

A-1.0 ACRONYMS AND ABBREVIATIONS

amsl	above mean sea level
AK	acceptable knowledge
AOC	area of concern
bgs	below ground surface
BHC	benzene hexachloride
BMP	best management practice
BV	background value
CEARP	Comprehensive Environmental Assessment and Response Program
Consent Order	Compliance Order on Consent
CST	Chemical Science and Technology
D&D	decontamination and decommissioning
DDE	dichlorophenyltrichloroethylene
DDT	dichlorodiphenyltrichloroethane
DOE	Department of Energy [U.S.]
DRO	diesel range organic
EC	expedited cleanup
ELAN	elemental analysis
EP	Environmental Programs [Directorate]
EPA	Environmental Protection Agency [U.S.]
ER ID	Environmental Remediation and Surveillance Program identification number
FV	fallout value
GIS	geographic information system
GPS	global positioning system
HE	high explosives
HIR	historical investigation report
HMX	high-melting explosive or 1,3,5,7-tetranitro-1,3,5,7-tetrazocine
HWFP	Hazardous Waste Facility Permit
IDW	investigation-derived waste
LANL	Los Alamos National Laboratory (the Laboratory)
LLW	low-level waste
MDA	material disposal area
MLLW	mixed low-level waste

NFA	no further action
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
ORO	oil range organic
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PETN	pentaerythritol tetranitrate
PID	photoionization detector
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RDX	research department explosive or hexahydro-1,3,5-trinitro-1,3,5-triazine
RFI	Resource Conservation and Recovery Act Facility Investigation
RPF	Records Processing Facility
SAL	screening action level
SMA	surface monitoring area
SMO	Sample Management Office
SOP	standard operating procedure
SOW	statement of work
SSL	soil screening level
SVOC	semivolatile organic compound
SWMU	solid waste management unit
SWSC	Sanitary Wastewater Systems Consolidation
TA	technical area
TAL	target analyte list
TD	Trap Door (site)
TNT	2,4,6-trinitrotoluene
TPH	total petroleum hydrocarbons
UXO	unexploded ordnance
VCA	voluntary corrective action
VCP	vitrified-clay pipe
VOC	volatile organic compound
WAC	waste acceptance criteria
WCSF	waste characterization strategy form

A-2.0 METRIC CONVERSION TABLE

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

A-3.0 DATA QUALIFIER DEFINITIONS

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

Appendix B

Management Plan for Investigation-Derived Waste

B-1.0 INTRODUCTION

This appendix describes how investigation-derived waste (IDW) generated during the Starmer/Upper Pajarito Canyon Aggregate Area investigation will be managed. IDW may include, but is not limited to, drill cuttings, excavated media, contact waste, decontamination fluids, and all other waste that has potentially come into contact with contaminants.

B-2.0 IDW

Area of Contamination request(s) may be submitted for approval to the New Mexico Environment Department (NMED) for remediation sites in which excavation is planned.

All IDW generated during investigation activities will be managed in accordance with applicable standard operating procedures (SOPs). These SOPs incorporate the requirements of all applicable U.S. Environmental Protection Agency and New Mexico Environment Department regulations, U.S. Department of Energy orders, and Laboratory requirements. The SOP applicable to the characterization and management of IDW is SOP-5238, Characterization and Management of Environmental Program Waste, (http://www.lanl.gov/environment/all/qa.shtml).

The most recent version of Los Alamos National Laboratory's (the Laboratory's or LANL's) Hazardous Waste Minimization Report will be implemented during the investigation to minimize waste generation. The report is updated annually as a requirement of Module VIII of the Laboratory's Hazardous Waste Facility Permit.

A waste characterization strategy form (WCSF) will be prepared and approved per requirements of SOP-5238, Characterization and Management of Environmental Program Waste. The WCSF will provide detailed information on IDW characterization methods, management, containerization, and potential volumes. IDW characterization is completed through review of investigation data and/or documentation or by direct sampling. Waste characterization may include a review of historical information and process knowledge to identify whether listed hazardous waste may be present (i.e., due diligence reviews). If low levels of listed hazardous waste are identified, a "contained in" determination may be submitted for approval to NMED.

Wastes will be containerized and placed in clearly marked and appropriately constructed waste accumulation areas. If IDW is generated within the boundary of an area of contamination, it will be managed as nonhazardous within those boundaries in designated, properly constructed waste management areas. If hazardous, the IDW will be managed in accordance with hazardous waste requirements once it is removed from the area of contamination. If IDW is generated outside of area of contamination boundaries, the initial management of the waste will rely on the data from previous investigations and/or process knowledge. If the analytical data changes the expected waste category, the waste will be managed in accumulation areas appropriate to the final waste determination. Waste accumulation area postings, regulated storage duration, and inspection requirements will be based on the type of IDW and its classification. Container and storage requirements, as well as transportation and disposal requirements, will be detailed in the WCSF and approved before waste is generated. Table B-2.0-1 summarizes the estimated IDW waste streams, waste types, waste volumes, and other data.

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

B-2.1 Drill Cuttings

This waste stream consists of soil and rock chips generated by the drilling of boreholes with the intent to sample. Drill cuttings include excess core sample not submitted for analysis and any returned samples sent for analysis. Drill cuttings will be containerized in 20 yd^3 rolloff containers, 55 gal. drums, B-12 containers, or other appropriate containers at the point of generation.

This waste stream will be characterized based either on direct sampling of the waste in each container or on the results from core samples collected during drilling. If directly sampled, the following analyses will be performed: volatile organic compounds (VOCs); semivolatile organic compounds (SVOCs); cyanide, nitrate, explosive compounds and perchlorate (if screening and/or process knowledge indicates the presence of explosives); radionuclides as identified for each site in the work plan; total metals; and, if needed, toxicity characteristic metals. If process knowledge, odors, or staining indicates the cuttings may be contaminated with petroleum products, the material will also be analyzed for total petroleum hydrocarbons (TPH) and polychlorinated biphenyls (PCBs). Other constituents may be analyzed as necessary to meet the waste acceptance criteria (WAC) for a receiving facility or if visual observations indicate that additional contaminants may be present. Cuttings will be land applied if they meet the criteria in the NMED-approved Notice of Intent Decision Tree for Land Application of Investigation-Derived Waste Solids from Construction of Wells and Boreholes. The Laboratory expects that cuttings will be land applied or treated/disposed of at an authorized on-site or off-site facility appropriate for the waste classification.

B-2.2 Excavated Environmental Media

Layback and overburden spoils will consist of soil and rock removed from within or next to areas within the solid waste management unit that is to be excavated. The excavated material will be field-screened and examined for high explosives (HE), radioactivity, and/or VOCs during the excavation process. If the contamination is not detected during screening, the spoils will be stored either in rolloff bins, other suitable containers, or on the ground surface with appropriate best management practices. If field screening indicates the potential for contamination, the layback and overburden spoils will be placed in rolloff bins or other suitable containers. The excavated material will remain within the boundary of the site from which it was excavated.

Incremental samples of the spoils will be collected as the spoils area excavated or the media may be sampled in piles or containers. A minimum of one direct sample will be collected from each 50 yd^3 or each container of material excavated and will be submitted for laboratory analyses for VOCs, SVOCs, cyanide, nitrate, explosive compounds and perchlorate (if screening and/or process knowledge indicates the presence of explosives); radionuclides as identified for each site in the work plan; total metals; and, if needed, toxicity characteristic metals. If process knowledge, odors, or staining indicates the cuttings may be contaminated with petroleum products, the material will also be analyzed for TPH and PCBs. Other constituents may be analyzed as necessary to meet the WAC for a receiving facility. If the spoils are determined to be suitable for reuse (i.e., meets residential cleanup standards as determined by using NMED’s and DOE’s soil screening guidance), the Laboratory may use the soil to backfill the bottom of the excavations. If the spoils are not suitable for reuse, they will be treated/disposed of at an authorized facility appropriate for the waste regulatory classification. The Laboratory expects most of the excavated environmental media to be designated as nonhazardous, nonradioactive waste.

B-2.3 Contact Waste

The contact waste stream consists of potentially contaminated materials that “contacted” waste during sampling and excavation. This waste stream consists primarily of, but is not limited to, personal protective equipment such as gloves; decontamination wastes such as paper wipes; and disposable sampling supplies. Contact waste will be stored in containers and managed in accordance with the applicable Laboratory waste management requirements based on the waste characterization results.

Characterization of this waste stream will use acceptable knowledge (AK) based on data from the media with which it came into contact (e.g., drill cuttings, soil, sumps, etc.). The Laboratory expects most of the contact waste to be designated as nonhazardous, nonradioactive waste that will be disposed of at an authorized on-site or off-site facility.

B-2.4 Decontamination Fluids

Decontamination fluids consist of liquid wastes generated from decontamination of excavation, sampling, and drilling equipment. All sampling and measuring equipment, including but not limited to stainless-steel sampling tools and split-barrel or core samplers, will be decontaminated in accordance with SOP-5061, Field Decontamination of Equipment.

Consistent with waste minimization practices, the Laboratory uses dry decontamination methods to the extent possible. If dry decontamination cannot be preformed, liquid decontamination wastes will be collected in containers at the point of generation. The fluids will be characterized through AK of the waste materials, the level of contamination measured in the environmental media (e.g., the results of the associated drill cuttings), and, if necessary, direct sampling of the containerized waste. If directly sampled, the following analyses will be performed: VOCs, SVOCs, radionuclides (as identified for each site in the work plan), total metals, and, if needed, toxicity characteristic metals and other analytes required by the receiving facility (i.e., total suspended solids, Microtox, chemical oxygen demand, oil and grease, pH, nitrates). The Laboratory expects most of these wastes to be nonhazardous liquid waste that will be sent to one of the Laboratory’s wastewater treatment facilities where the WAC allows the waste to be received.

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

Waste Stream	Expected Waste Type	Expected Disposition
Drill Cuttings	Industrial, hazardous, PCB, low-level waste (LLW), or mixed low-level waste (MLLW)	Land application or treatment/disposal at an authorized on-site or off-site facility
Excavated Environmental Media	Industrial, hazardous, PCB, LLW or MLLW	Reused as fill at the excavation location or treated/disposed of at an authorized on-site or off-site facility
Contact Waste	Industrial, hazardous, PCB, LLW or MLLW	Disposal at an approved on-site or off-site facility
Decontamination Fluids	Industrial waste or LLW	Treatment at an on-site wastewater treatment facility