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Investigation Work Plan for Upper Los Alamos Canyon Aggregate Area

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Prepared by
Environmental Stewardship Division–
Environmental Remediation and Surveillance Program

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EXECUTIVE SUMMARY

The Upper Los Alamos Canyon Aggregate Area is located within and south of the Los Alamos townsite in Technical Areas (TAs) 00, -01, -03, -32, -41, -43, and -61 of Los Alamos National Laboratory (the Laboratory) and includes a total of 115 solid waste management units (SWMUs) and areas of concern (AOCs). Details of previous investigations and analytical results for all 115 sites are provided in the historical investigation report for Upper Los Alamos Canyon Aggregate Area. Of these sites, 54 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 61 sites, this work plan describes the operational history, evaluates existing analytical data, and proposes characterization and/or remediation activities.

Of the 61 SWMUs and AOCs in the Upper Los Alamos Canyon Aggregate Area that require some additional characterization and/or remediation activities, 5 fall within TA-00, 34 fall within TA-01, 5 fall within TA-03, 5 fall within TA-32, 6 fall within TA-41, 5 fall within TA-43, and 1 falls within TA-61. These sites include

- septic tanks and outfalls;
- sanitary waste lines and sewage treatment facilities;
- industrial waste lines, drains, and outfalls;
- storm drains and outfalls;
- soil contamination areas from Laboratory operations;
- landfills and surface disposal areas;
- transformer sites; and
- incinerators.

The main objective of this work plan is to present the evaluation of historical data and, based on that evaluation, to propose any activities necessary to define the nature and extent of contamination associated with each SWMU/AOC. In addition, the work plan identifies, where appropriate, inactive site-related structures for removal to reduce risk associated with a site.

All field activities proposed in this work plan will be conducted using a phased approach. The sites in this work plan are related to some of the earliest activities at the Laboratory and have been subjected to various investigation, remediation, demolition, and construction activities, particularly within TA-00 and TA-01. These activities have resulted in significant changes to the SWMUs and AOCs relative to their operational conditions and complicate the selection of valid sampling locations. The proposed sampling locations presented in this work plan are preliminary. A variety of methods, singly or in combination, may be used to identify the final sampling locations. These methods include research of engineering or other drawings, nonintrusive geophysical surveys, and trenching. Field screening will also be conducted during all field activities, primarily for health and safety purposes, but also to assist with selection of sample locations.

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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 the University of California (UC). 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. The location of Upper Los Alamos Canyon Aggregate Area with respect to the Laboratory technical areas (TAs) and surrounding land holdings is shown in Figure 1.0-1. Sites within the aggregate area are shown in Plate 1.

The Laboratory's Environmental Stewardship–Environmental Remediation and Surveillance (ENV-ERS) Program, formerly the Environmental Restoration (ER) 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 ENV-ERS Program 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 ENV-ERS Program investigates sites potentially contaminated by past Laboratory operations.

The sites addressed in this work plan contain hazardous constituents and radionuclides. New Mexico Environment Department (NMED) has authority under the New Mexico Hazardous Waste Act over cleanup of sites with hazardous waste or certain hazardous constituents, including the hazardous waste portion of mixed waste (i.e., waste contaminated with both radioactive and hazardous constituents). DOE has authority over clean up of sites with radioactive contamination. Radionuclides are regulated under DOE Order 5400.5, "Radiation Protection of the Public and the Environment," and DOE Order 435.1, "Radioactive Waste Management."

A Resource Conservation and Recovery Act (RCRA) Hazardous Waste Facility Permit was issued to the Laboratory by the U.S. Environmental Protection Agency (EPA) in 1989. Under the Hazardous and Solid Waste Amendments (HSWA), EPA issued Module VIII to the Permit in 1990 (EPA 1990, 01585) and revised it in 1994 (EPA 1994, 44146). The Module VIII of the Hazardous Waste Facility Permit listed individual sites to be investigated and specified conditions and requirements for cleanup activities. In 1996, regulatory authority for Laboratory cleanup activities was conveyed to NMED, which assumed enforcement of Module VIII of the Hazardous Waste Facility Permit. On March 1, 2005, NMED, DOE, and the Regents of UC signed a Compliance Order on Consent (hereafter, the Consent Order) that addresses corrective action activities at the Laboratory. In accordance with Consent Order requirements, a permit modification is in progress that replaces the corrective action requirements of Module VIII of the Hazardous Waste Facility Permit with those of the Consent Order. Historical documents refer to some sites as Module VIII solid waste management units (SWMUs), areas of concern (AOCs), or non-Module VIII SWMUs or AOCs, and the same convention is used in this report.

1.1 Work Plan Overview

The Upper Los Alamos Canyon Aggregate Area SWMUs and AOCs are located in TAs 00, 01, 03, 32, 41, 43, and 61 of the Laboratory (Figure 1.0-2). A total of 115 sites are in the Upper Los Alamos Canyon Aggregate Area (Table 1.1-1). Historical details of previous investigations and data results for all 115 sites are provided in the historical investigation report (HIR) for the Upper Los Alamos Canyon Aggregate Area (LANL 2006, 91915). Among the 115 sites, 54 have previously been investigated and/or remediated and given no further action (NFA) status (NFA-approval documents are listed in Table 1.1-1); they are included in the HIR and are not discussed further in this work plan. This work plan addresses the remaining 61 sites using the available information from previous field investigations or removal actions (described in the HIR [LANL 2006, 91915]) to evaluate current conditions at each site.

Because of the large number and vast spread of the sites in Upper Los Alamos Canyon Aggregate Area, the sites in this work plan are organized by TAs. Section 1 gives an overview of the 61 sites addressed and the two objectives of this work plan. Phase approach of field activities and data overview, which apply generally to every TA and to each site of this work plan, are also provided in Section 1. Section 2 presents the surface and subsurface conditions of the Upper Los Alamos Canyon Aggregate Area. Sections 3 through 9 provide summaries of previous investigations and data and present the scope of activities for each site in each respective TA. Each TA section also includes background information on operational history; summary of releases, transport mechanisms, and potential receptors; and current site usage and status of the sites in the TA. Section 10 provides investigation methods for field activities. Section 11 describes the monitoring and sampling program. Section 12 gives the schedule of the investigation report. Appendix A of this work plan includes a list of acronyms and abbreviations, a glossary, and a metric conversion table. Appendix B describes the management of investigation-derived waste. Appendix C contains the data sources for the figures in this work plan.

1.2 Work Plan Objectives

The first objective is to define the nature and extent of contamination associated with the sites and to propose additional sampling to complete the characterization of the sites addressed in this work plan. The second objective is to remove inactive structures related to the sites, where appropriate, and to propose confirmatory sampling after removing the structures.

To accomplish the objectives, this work plan

- presents background information,
- summarizes previous investigations of the sites,
- describes proposed sample collection and/or field activities, and
- describes appropriate investigation methods and protocols for field activities.

1.3 Phased Approach of Field Activities

The sites included in this work plan are related to some of the earliest activities at the Laboratory. The sites have been subjected to various investigation, remediation, demolition, and construction activities. Sites TAs-00 and -01 in particular have changed greatly from their original conditions. Most of the mesa-top sites in the Los Alamos townsite have been developed as commercial or residential properties. As a result, many sites addressed in this work plan, or portions of them, are inaccessible. In addition, because many of the previous activities were poorly documented in terms of exact locations and volumes of material excavated or placed as fill, the locations or even the existence of some Laboratory-related structures is not well known. Therefore, a variety of methods, singly or in combination, were used to identify or select sampling locations, depending on the availability and quality of documentation of past activities, operational history, the degree of prior characterization, and the accessibility of each site.

For lines or structures that have been previously removed but that require additional characterization samples, engineering drawings may provide the best evidence of the locations of the former structures and may guide the selection of sample locations. Similarly, for structures believed to still be in place, engineering drawings provide the best estimate for proposed sample locations and may in some cases be confirmed by visible evidence in the field (outfall pipes, vent pipes, etc.).

For removed structures, engineering drawings may be used with descriptions from previous reports regarding the depth below grade of the removed structures; the documented depth would then be used as the assumed starting depth for proposed new samples. In cases where engineering drawings and previous documentation are unavailable or insufficient, additional surveys may be used to attempt to locate the feature of interest.

If site conditions permit, geophysical methods may be used to locate buried structures, depending on the nature of the structure (e.g., steel or cast-iron pipe may be readily located by geophysics). In many developed locations, geophysical methods may be hampered by a high density of active underground utilities.

If the previously described methods fail to locate the structure of interest, trenching may be used to expose the structure. In many cases, this method will depend on obtaining property access and approval of the property holder(s) to perform invasive exploration.

When the proposed sample locations are identified on the ground (using global positioning system coordinates, visual identification of structures or site features, or other surveys or exploration), samples will be collected using the most efficient and least disruptive method appropriate to the conditions at the site. Shallow soil, fill, and tuff samples will be collected using a hand auger or spade and scoop wherever practical. Where deeper samples are required, the samples may be collected using a drill rig to extract intact core, depending on the accessibility of the locations to heavy equipment. Details regarding sampling are provided in Section 10.2, Sampling.

Sediment samples from outfalls and drainage channels typically will be collected using a spade-and-scoop method. A geomorphologist will select sediment sample locations in clearly defined drainages by using geomorphic characterization methods to target post-1943 sediment. Post-1943 sediment will be collected with a bias toward sediment units that are most likely to have been impacted by Laboratory activities. At sediment sample locations, at least two depth intervals will be sampled: at least one in the appropriate sediment unit(s) and one below the sediment/tuff interface. Sediment profiles that are sampled will be characterized by properties such as particle-size distribution, color, stratification, sorting, inclusions, and estimated age recorded on a geomorphic characterization log.

For health and safety purposes, during sample collection, all samples will be field screened for volatile organic compounds (VOCs) and radioactivity. These screening results will be recorded on the corresponding sample collection logs. If elevated readings are recorded, the field team may adjust the locations, depths, or numbers of samples collected. Additional headspace screening may be performed using a photoionization detector (PID) if the normal screening results are not certain.

Site conditions and operational history of individual sites may indicate the need for additional surveys or methods to refine the proposed sampling approach once field activities have begun. Individual sites and specific survey and sampling needs are discussed in Sections 3 through 9.

At some sites, structures such as pipes or septic tanks may be removed in conjunction with the investigation sampling activities. Pipes, where accessible, may be removed to inspect for signs of leakage and to determine the optimum locations beneath the pipe for sampling. The decision to remove structures will be made based on site conditions and in consultation with the project leader.

1.4 Data Overview

Samples from previous investigations were analyzed for inorganic chemicals, organic chemicals, and/or radionuclides either on-site by the Chemical Sciences and Technology (CST) Division at the Laboratory by off-site by fixed laboratories, or by both. Data obtained at on-site CST Division laboratories are screening-level quality data and are used only to select sampling locations and analytical suites; these data are not discussed and are not reported. Only data obtained from off-site fixed laboratories are discussed further. Concentrations of detected inorganic chemicals are compared with background values (BVs) and the ranges of the background concentrations (LANL 1998, 59730). Concentrations of detected organic chemicals are presented. Activities of detected radionuclides are compared with BVs or fallout values (FVs) and the ranges of the background/fallout activities for radionuclides (LANL 1998, 59730). These data are presented in their entirety in the Upper Los Alamos Canyon Aggregate Area HIR (LANL 2006, 91915). This work plan summarizes these data to determine whether the nature and extent of contamination are defined for each site. Furthermore, this work plan discusses the locations where the nature and extent of contamination have not been defined, and the work plan presents sampling activities and analytical suites.

2.0 SITE CONDITIONS

2.1 Surface Conditions

2.1.1 Soils

Soils on the Pajarito Plateau were initially mapped and described by Nyhan et al. (1978, 05702). The soils on the slopes between the mesa tops and canyon floors have been mapped as mostly steep rock outcrops consisting of approximately 90% bedrock outcrop and patches of shallow, weakly developed colluvial soils. South-facing canyon walls are generally steep and usually have shallow soils in limited, isolated patches between rock outcrops. In contrast, the north-facing canyon walls generally have more extensive areas of shallow dark-colored soils under thicker forest vegetation. The canyon floors generally contain poorly developed, deep, well-drained soils on floodplain terraces or small alluvial fans (Nyhan et al. 1978, 05702).

The soils on the mesa top in the Upper Los Alamos Canyon Aggregate Area generally belong to either the Carjo or Pogna soil series (Nyhan et al. 1978, 05702). Carjo soils consist of moderately deep, well-drained, and moderately developed soils with an A-B-C horizon sequence. Soil textures can range from clay loams to fine, sandy loams. The Pogna soils consist of shallow, well-drained, and weakly developed soils with an A-C horizon sequence. The soil texture of Pogna soil is usually fine sandy loam. The parent material of these soils may range from Bandelier Tuff to sequences of alluvium/colluvium interstratified with moderately developed to well-developed buried soils.

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

2.1.2 Surface Water

The Rio Grande is the primary river in north-central New Mexico. All surface-water drainage and groundwater discharge from the plateau ultimately arrive at the Rio Grande. 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, 11787; Stoker 1993, 56021). These springs discharge water perched in the Bandelier Tuff and Tschicoma Formation at rates from 2 to 135 gal./min (Abeele et al. 1981, 06273).

The volume of flow from the springs maintains natural perennial reaches of varying lengths in each of the canyons.

Perennial flow occurs in the upper reaches of Los Alamos Canyon (west of the Los Alamos Reservoir). Typically, the overflow of water from the reservoir during spring snowmelt results in nearly continuous surface-water flow between the western Laboratory boundary and TA-02 for several weeks to several months each year (LANL 1995, 50290). Surface water in Los Alamos Canyon rarely flows across the entire length of the Laboratory. Most often, surface waters are depleted by infiltration into canyon alluvium, creating saturated zones of seasonally variable extent (LANL 1995, 50290).

The mesa-top portion of TA-01 is now a commercially developed area. No natural surface water is present at this site. Ashley Pond is a closed water body maintained as a Los Alamos County beautification project. During summer thunderstorms and spring snowmelt, runoff flows from the mesa top down the hillsides and into the ephemeral stream in Los Alamos Canyon. Surface runoff from the TA-01 mesa top enters Los Alamos Canyon by way of several primary drainages. Laboratory studies have indicated that relatively little surface water has infiltrated into the underlying tuff at TA-01 because of low infiltration and high evaporation rates (LANL 1992, 43454, pp. 3-6, 3-7).

2.1.3 Land Use

Currently, TA-01 is a residential, commercial, and industrial-use area made up of private, Los Alamos County, and DOE lands. It includes both mesa-top and canyon-wall areas. The mesa-top portion of TA-01 is situated outside the Laboratory's boundary, includes a portion of the Los Alamos townsite, and is located on the north and south sides of Trinity Drive. The mesa-top area of TA-01 is owned by Los Alamos County and private parties. The wall and floor of Los Alamos Canyon in TA-01 lie within the Laboratory's boundary and are owned by DOE.

TA-03 comprises the core operational and administrative complex of the Laboratory. It is highly developed with numerous office and Laboratory buildings, parking facilities, roads, and other paved areas. Most of TA-03 is located on the mesa top south of Los Alamos Canyon, but limited portions extend into the canyons. The canyon areas of TA-03 are less developed but are within Laboratory boundaries.

TA-32 is located within the Los Alamos townsite south of Trinity Drive and extends southward onto the north slope of Los Alamos Canyon. The mesa-top portion is a developed area that includes commercial properties and facilities owned by Los Alamos County. This area is almost entirely paved or covered by buildings. The canyon-slope area is undeveloped and largely unusable because of the steepness of the slope.

TA-41 is entirely within Laboratory boundaries in the bottom of Los Alamos Canyon. The TA-41 facilities include Laboratory/industrial buildings and structures that are currently in use or planned for reactivation or that are inactive and planned for demolition.

TA-43 is on the mesa top adjacent to Diamond Drive in the Los Alamos townsite and includes active Laboratory facilities (Bioscience [B] Division's Health Research Laboratory [HRL]) and the site of the Los Alamos Medical Center (LAMC). The area is highly developed and is mostly covered by buildings and pavement. Immediately south of the facilities is the steep north slope of Los Alamos Canyon.

TA-61 is located on the mesa top between Los Alamos Canyon to the north and Sandia Canyon to the south. The major facility in the area is the Los Alamos County landfill on the south side of East Jemez Road and adjacent to Sandia Canyon. The remainder of the area, consisting of the narrow mesa top adjacent to East Jemez Road, is undeveloped.

2.2 Subsurface Conditions

2.2.1 Anticipated Stratigraphic Units

The stratigraphy of the Upper Los Alamos Canyon Aggregate Area is summarized in this section. Additional information on the geologic setting of the area and information on the Pajarito Plateau can be found in the ER Project installation work plan (LANL 2000, 66802), the TA-01 operable unit (OU) work plan (LANL 1992, 43454), and the Hydrogeologic Workplan (LANL 1998, 59599).

The bedrock at or near the surface of the mesa top is the Bandelier Tuff. There are approximately 1250 ft of volcanic and sedimentary materials between any potential contaminant-bearing units at the mesa surface and the regional aquifer. The stratigraphy of the upper rock units (tuff) can be observed directly in excellent exposures of outcrops on canyon walls and slopes to the south of TA-01. The descriptions begin with the oldest (deepest) outcrops and proceed to the youngest (topmost). The stratigraphic units that may be encountered during investigation of the Upper Los Alamos Canyon Aggregate Area are described briefly in the following sections.

The Bandelier Tuff

The Bandelier Tuff consists of the Otowi and Tshirege members, which are stratigraphically separated in many places by the tephras and volcaniclastic sediments of the Cerro Toledo interval. 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 Reneau 1995, 49726).

Otowi Member. Griggs (1964, 08795), Smith, and Bailey (1966, 21584), Bailey et al. (1969, 21498), and Smith et al. (1970, 09752) describe the nature and extent of the Otowi Member. It consists of moderately consolidated (indurated), porous, and nonwelded vitric tuff (ignimbrite) that forms gentle colluvium-covered slopes along the base of canyon walls. The Otowi ignimbrites contain light gray to orange pumice that is supported in a white to tan ash matrix (Broxton et al. 1995, 50119; Broxton et al. 1995, 50121; Goff 1995, 49682). The ash matrix consists of glass shards, broken pumice, crystal fragments, and fragments of perlite.

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, 21498; Self et al. 1986, 21579) contains well-sorted pumice fragments whose mean size varies between 0.8 and 1.6 in. Its thickness averages approximately 28 ft below most of the plateau, with local areas of thickening and thinning. Its distinctive white color and texture make it easily identifiable in borehole cuttings and core, and it is an important marker bed for the base of the Bandelier Tuff.

Tephras and Volcaniclastic Sediments of the Cerro Toledo Interval. The Cerro Toledo interval is an informal name given to a sequence of volcaniclastic sediments and tephras of mixed provenance that separates the Otowi and Tshirege members of the Bandelier Tuff (Broxton et al. 1995, 50121; Goff 1995, 49682; Broxton and Reneau 1995, 49726). Although it is located between the two members of the Bandelier Tuff, it is not considered part of that formation (Bailey et al. 1969, 21498). Outcrops of the Cerro Toledo interval generally occur wherever the top of the Otowi Member appears in Los Alamos Canyon and in canyons to the north. The unit contains primary volcanic deposits described by Smith et al. (1970, 09752), as well as reworked volcaniclastic sediments. The occurrence of the Cerro Toledo interval is widespread; however, its thickness varies, ranging between several feet and more than 100 ft.

The predominant rock types in the Cerro Toledo interval are rhyolitic tuffaceous sediments and tephras (Stix et al. 1988, 49680; Heiken et al. 1986, 48638; Broxton et al. 1995, 50121; Goff 1995, 49682). The tuffaceous sediments are the reworked equivalents of Cerro Toledo rhyolite tephra. Oxidation and clay-rich horizons indicate that at least two periods of soil development occurred within the Cerro Toledo deposits. Because these soils are rich in clay, they may act as barriers to the movement of vadose zone moisture. Some of the deposits contain both crystal-poor and crystal-rich varieties of pumice. The pumice deposits tend to form porous and permeable horizons within the Cerro Toledo interval, and locally, 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 and Reneau 1996, 55429; Broxton et al. 1995, 50121; Goff 1995, 49682).

Tshirege Member. The Tshirege Member is the upper member of the Bandelier Tuff and is the most widely exposed bedrock unit of the Pajarito Plateau (Griggs 1964, 08795; Smith and Bailey 1966, 21584; Bailey et al. 1969, 21498; Smith et al. 1970, 09752). Emplacement of this unit occurred during eruptions of the Valles Caldera approximately 1.2 million years ago (Izett and Obradovich 1994, 48817; Spell and McDougall 1996, 55542). The Tshirege Member is a multiple-flow, ash-and-pumice sheet that forms the prominent cliffs in most of the canyons on the Pajarito Plateau. It is a chemical cooling unit whose physical properties vary vertically and laterally. The consolidation in this member is largely from compaction and welding at high temperatures after the tuff was emplaced. Its light brown, orange-brown, purplish, and white cliffs have numerous, mostly vertical fractures that may extend from several feet up to several tens of feet. The Tshirege Member includes thin but distinctive layers of bedded, sand-sized particles called surge deposits that demark separate flow units within the tuff. The Tshirege Member is generally over 200 ft thick.

The Tshirege Member differs from the Otowi Member most notably in its generally greater degree of welding and compaction. Time breaks between the successive emplacement of flow units caused the tuff to cool as several distinct cooling units. For this reason, the Tshirege Member consists of at least four cooling subunits that display variable physical properties vertically and horizontally (Smith and Bailey 1966, 21584; Crowe et al. 1978, 05720; Broxton et al. 1995, 50121). The welding and crystallization variability in the Tshirege Member produces 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, 50121) 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 Qbt1g is the lowermost tuff subunit of the Tshirege Member. It consists of porous, nonwelded, and poorly sorted ash-flow tuffs. 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 tuffs. A thin (4 to 10 in.), pumice-poor surge deposit commonly occurs at the base of this unit.

Subunit Qbt1v forms alternating clifflike and sloping outcrops composed of porous, nonwelded, crystallized tuffs. The base of this unit is a thin, horizontal zone of preferential weathering that marks the abrupt transition from glassy tuffs below (in Unit Qbt1g) to the crystallized tuffs above. This feature forms a widespread marker horizon (locally termed the vapor-phase notch) throughout the Pajarito Plateau, which is readily visible in canyon walls in parts of Los Alamos Canyon. The lower part of Qbt1v 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 tuffs of Qbt1v are commonly nonwelded (pumices and shards retain their initial equant shapes) and have an open, porous structure.

Subunit Qbt2 forms a distinctive, medium-brown, vertical cliff that stands out in marked contrast to the slope-forming, lighter-colored tuffs above and below. It displays the greatest degree of welding in the Tshirege Member. A series of surge beds commonly mark its base. It typically has low porosity and permeability relative to the other units of the Tshirege Member.

Subunit Qbt3 is a nonwelded to partially welded, vapor-phase altered tuff, which forms the upper cliffs in Los Alamos 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 Qbt2. Abundant fractures extend through the upper units of the Bandelier Tuff, including the Tshirege Unit 3 ignimbrite. 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, 09995; Wohletz 1995, 54404).

2.2.2 Hydrogeology

The hydrogeology of the Pajarito Plateau is generally separable in terms of mesas and canyons forming the plateau. Mesas are generally devoid of water, both on the surface and within the rock forming the mesa. Canyons range from wet to relatively dry; the wettest canyons contain continuous streams and contain perennial groundwater in the canyon-bottom alluvium. Dry canyons have only occasional streamflow and may lack alluvial groundwater. Intermediate perched groundwater has been found at certain locations on the plateau at depths ranging between 100 and 400 ft (30 and 122 m). The regional aquifer is found at depths of about 600 to 1200 ft (180 and 360 m).

The hydrogeologic conceptual model 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 deeper into mesas, further inhibiting downward flow.

2.2.2.1 Groundwater

In the Los Alamos area, groundwater occurs as (1) water in shallow alluvium in some of the larger canyons, (2) intermediate perched groundwater (a perched groundwater body lies above a less permeable layer and is separated from the underlying aquifer by an unsaturated zone), and (3) the regional aquifer of the Los Alamos area. Numerous wells have been installed over the past several decades 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 near the Upper Los Alamos Canyon Aggregate Area are shown in Figure 2.2-1.

The Laboratory formulated a comprehensive groundwater protection plan (LANL 1995, 50124) for an enhanced set of characterization and monitoring activities. The Hydrogeologic Workplan (LANL 1998, 59599) details the implementation of extensive groundwater characterization across the Pajarito Plateau within an area potentially affected by past and present Laboratory operations.

Alluvial Groundwater

Intermittent and ephemeral streamflows in the canyons of the Pajarito Plateau have deposited alluvium that can be as thick as 100 ft. The alluvium in canyons of the Jemez Mountains is generally composed of sands, gravels, pebbles, cobbles, and boulders derived from the Tschicoma Formation and Bandelier Tuff. The alluvium in canyons on the plateau is comparatively finer grained, consisting of clays, silts, sands, and gravels derived from the Bandelier Tuff.

In contrast to the underlying volcanic tuff and sediments, alluvium is relatively permeable. Ephemeral runoff in some canyons infiltrates the alluvium until downward movement is impeded by the less permeable tuff and sediments, which results in the buildup of a shallow alluvial groundwater body. Depletion by evapotranspiration and movement into the underlying rocks limit the horizontal and vertical extent of the alluvial water (Purtymun et al. 1977, 11846). 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.

Two saturated zones are known to exist in the alluvium of Los Alamos Canyon. The first is in the upper part of Los Alamos Canyon and extends eastward from the Los Alamos Reservoir to the vicinity of observation well LAO-4.5, west of State Highway 4. The second is in the lower part of Los Alamos Canyon and extends from Basalt Spring to the Rio Grande. In middle and upper Los Alamos Canyon, the saturated thickness in the alluvium varies seasonally from a few feet in the winter months to 25 ft in the spring and summer months when recharge is the greatest (Environmental Protection Group 1992, 45363).

Intermediate Perched Water

Two intermediate perched zones (between the alluvial water and the regional aquifer), one beneath the other, have been encountered in Los Alamos Canyon between TA-02 and the confluence with Delta Prime (DP) Canyon (Figure 2.2-2). The upper intermediate perched zone occurs within the Guaje Pumice Bed. This zone was encountered in boreholes LADP-3 (at 325 ft) and LAOI(A)-1.1 (at 295 ft) (Broxton et al. 1995, 50119; Longmire et al. 1996, 54168). The saturated thickness of this zone decreases from west to east, ranging between 22 ft at LAOI(A)-1.1 and 5 ft at LADP-3. A deeper intermediate perched zone was encountered in LAOI(A)-1.1 in the Puye Formation at approximately 317 ft. However, no deeper intermediate perched zone was found at LADP-3 in the approximately 19 ft of the Puye Formation that was penetrated. Although no perched aquifers are known to exist in the immediate vicinity of TA-01, a perched aquifer has been located at an intermediate depth (325 ft below Los Alamos Canyon) in drill hole LADP-3 at TA-21, approximately 2 mi (3 k) east of the site (Broxton et al. 1995, 50119; Longmire et al. 1996, 54168).

Regional Aquifer

The regional aquifer of the Los Alamos area is the only aquifer capable of a large-scale municipal water supply (Purtymun 1984, 06513). 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. Figure 8 in the 2005 General Facility Information report (LANL 2005, 91139) shows the location of wells and generalized water-level contours on top of the regional aquifer. 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 (Environmental Protection Group 1993, 23249).

The regional aquifer beneath East Mesa is at an elevation of approximately 6000 ft in the sediments of the Puye and Totavi formations. At mesa-top sites of the Upper Los Alamos Canyon Aggregate Area, the surface is separated from the regional aquifer by an unsaturated zone that is 1000 to 1300 ft thick.

The direction of groundwater flow in the regional aquifer is to the east-southeast toward the Rio Grande. The velocity of groundwater flow ranges from about 20 to 250 ft/yr (LANL 1998, 58841, p. 2-7). Details of depths to the regional aquifer, flow directions and rates, and well locations are presented in various Laboratory documents (LANL 1997, 55622; LANL 2000, 66802; Purtymun 1995, 45344).

2.2.2.2 Vadose Zone

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

Although water moves slowly through the unsaturated tuff matrix, it can move relatively rapidly through fractures if nearly saturated conditions exist (LANL 1997, 63131). Fractures may provide conduits for fluid flow but probably only in discrete, disconnected intervals of the subsurface. Because they are open to the passage of both air and water, fractures can have both wetting and drying effects, depending on the relative abundance of water in the fractures and in the tuff matrix.

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

The various units of the Bandelier Tuff tend to have relatively high porosities. Porosity ranges between 30% and 60% by volume, generally decreasing for more highly welded tuff. Permeability varies for each cooling unit of the Bandelier Tuff. The moisture content of native tuff is low, generally less than 5% by volume throughout the profile (Purtymun and Stoker 1990, 07508; Kearl et al. 1986, 15368).

3.0 TA-00

3.1 Background

TA-00 includes all Laboratory-related operations and sites outside former or current Laboratory boundaries. These sites are geographically separated and scattered across the Pajarito Plateau in the northern part of Los Alamos County and in adjacent Santa Fe County. The TA-00 sites included in Upper Los Alamos Canyon Aggregate Area are located in Los Alamos Canyon and the Los Alamos townsite.

One SWMU and four AOCs located in TA-00 are addressed in this work plan.

- SWMU 00-017 consists of industrial waste lines.
- AOC 00-031(a) is the potentially contaminated soil beneath a former service station of the Zia Company.
- AOC 00-031(b) is the potentially contaminated soil beneath two USTs of the former Zia Company motor pool facility.
- AOC 00-034(b) is an aboveground surface disposal area.
- AOC C-00-042 is the site of a 2500-gal. steel waste-oil UST of the former Zia Company motor pool facility.

These SWMUs and AOCs in TA-00 are shown in Figure 3.1-1.

3.1.1 Operational History

SWMU 00-017 is part of the underground industrial waste lines and AOCs 00-031(a), 00-031(b), and C-00-042 are associated with the operations of the Zia Company. The operational history is presented separately for these two categories of sites. No operational history is associated with AOC 00-034(b).

3.1.1.1 Underground Industrial Waste Lines

In 1943, the Laboratory began to install underground industrial waste lines. Throughout the Laboratory, 39,000 ft of underground liquid waste lines and associated sumps and pumps were used to transport waste generated by Laboratory operations to various treatment facilities. The lines and associated structures became contaminated. Leaks occurred in the sumps and waste lines. The estimated operation period for the majority of these waste lines is from the 1950s to the 1970s.

TA-00 was decommissioned, the industrial waste lines became inactive, and the removal of the inactive industrial waste lines began in 1964. Details of the removal of the industrial waste lines are presented in Section 3.1.1 of the HIR (LANL 2006, 91915). Lines 170 and 171 were the only sections of the industrial waste line known to remain in the townsite. Former line 167, former manhole (Unassigned Land Reserve) (ULR) 33, and lines 170 and 171 are designated as SWMU 00-017 (LANL 1999, 64029, pp. 4–6).

3.1.1.2 The Zia Company Motor Pool Facility and Service Station

The Zia Company motor pool facility was located between Central Avenue and Trinity Drive east of 15th Street (Figure 3.1-1). In 1958, the motor pool facilities consisted of an automotive maintenance hangar and three other buildings (LANL 1990, 07511; LANL 1995, 46051, pp. 1, 4). The service station operated from approximately 1959 through the mid-1960s. More information on the motor pool facility is presented in Section 3.1.1 of the HIR (LANL 2006, 91915). In 1962, the automotive maintenance hangar was decommissioned and removed. The motor pool and service station property were transferred to Los Alamos County in 1967 and subsequently to private ownership between 1978 and 1980. In 1995, the Los Alamos National Bank (LANB) purchased a majority of the property and began construction of the current LANB building.

Another service station operated by the Zia Company was located east of the Hilltop House Hotel on Trinity Drive at 4th Street (Figure 3.1-1). The service station operated through the early 1960s until the land was transferred to private ownership.

3.1.2 Summary of Releases, Transport Mechanisms, and Potential Receptors

A summary of contaminant releases, transport mechanisms, and potential receptors is presented separately, based on operational histories, to address SWMU 00-017, which is part of the underground industrial waste lines. This summary also addresses AOCs 00-031(a), 00-031(b), and C-00-042, which are associated with the operations of the Zia Company. There is no contaminant release or transport, hence no potential receptors, associated with AOC 00-034(b).

3.1.2.1 Underground Industrial Waste Lines

Summary of Releases. The waste lines and associated sumps and pumps were used to transport contaminated liquid wastes generated by Laboratory operations to various treatment facilities. These waste lines were constructed of either a vitrified clay pipe (VCP) or a cast-iron pipe. Both types of pipe have the potential for leaking at connections. Releases from VCP may have occurred because of the fragility of the clay material and the nature of the connections. Contamination had been found while excavating the pipes and associated structures such as manholes (DOE 1979, 08897, pp. 24–36). As a result of these potential releases, the soil and/or tuff in the surrounding environment may have been contaminated.

Transport Mechanisms. Potential contaminants from former line 167, which was located in the canyon, could have migrated to the surface water and to the alluvial groundwater in Los Alamos Canyon.

Other potential transport mechanisms that may lead to exposure of potential receptors include

- infiltration of water through the vadose zone,
- continued dissolution and advective/dispersive transport of potential chemical and radiological contaminants contained in subsurface soil and bedrock,
- erosion of contaminated surface soil,
- disturbance and uptake of potential contaminants in shallow soil by plants and animals, and
- site disturbance through human activities.

Potential Receptors. Potential receptors to potential contaminant exposure include

- commercial and laboratory workers,
- trail users in the canyons below the mesa top, and
- ecological receptors in the nondeveloped areas (i.e., hillsides).

Specifically, the potential receptors for former line 167 are trail users, construction workers, and terrestrial animals. Because the lines for potential receptors for lines 170 and 171 are buried at such depths, no complete pathway exists.

3.1.2.2 The Zia Company Motor Pool Facility and Service Station

Summary of Releases. Contaminants including fuel, oil, solvents, and detergents may have been released to the environment through leaks from the underground fuel tanks. As a result, contaminants may be present in the soil and/or tuff.

Transport Mechanisms. The former Zia Company motor pool facility and the service station of the Zia Company are currently under asphalt pavement and concrete sidewalk. No complete pathway exists for contaminant transport.

Potential Receptors. Potential receptors to potential contaminant exposure include commercial workers. Specifically, exposure to the soil could occur through significant disturbance of the asphalt and concrete (e.g., trenching) by construction workers.

3.1.3 Current Site Usage and Status

Lines 170 and 171 of SWMU 00-017 lie entirely in a trench excavated into the Tshirege Member of the Bandelier Tuff and remain 15 to 20 ft under asphalt parking lots and the LAMC. The canyon slopes and bottom where former line 167 was located remain undeveloped with the exception of Omega Road. Trail users could access the area.

AOCs 00-031(a), 00-031(b), and C-00-042 are entirely commercially developed. AOC 00-034(b) has several residences built on it.

3.2 SWMU 00-017, Waste Lines

SWMU 00-017 includes former line 167, former manhole ULR-33, and lines 170 and 171 (LANL 1999, 64029, pp. 4–6).

- Former line 167 and former manhole ULR-33: A cast-iron line extended from the south edge of Los Alamos Canyon, just west of Omega Bridge, to former manhole ULR-33 at the bottom of the canyon, then up the north side of the canyon wall. It was completely removed except for nine concrete anchors and 3-ft-long sections of pipe that are encased in each of the anchors. The anchors and the sections of pipe were left in place in 1984 and 1985 (Cox 1984, 30811; Montoya 1985, 07295) and are still there.
- Line 170: A 200-ft section of VCP that runs east of the HRL to manhole ULR-61. It was left in place after removal operations in 1977.
- Line 171: A 365-ft section of VCP that runs east from manhole ULR-61 under the north wing of the LAMC and then from the parking lot to the location of former manhole ULR-60 (removed in 1977).

The site map of SWMU 00-017 is shown in Figure 3.2-1. Currently, the location of former line 167 on the canyon wall beneath the Omega Bridge is undeveloped. The location of line 170 is covered with an asphalt parking lot and narrow landscaped areas in the medians. The location of line 171 is entirely covered by an asphalt parking lot and the LAMC.

3.2.1 Summary of Previous Investigations for SWMU 00-017

A Phase I RFI was conducted in 1998 and 1999 to characterize potential contamination associated with former lines 167, 170, and 171, and former manhole ULR-33. Based on investigation results, the RCRA facility investigation (RFI) report recommended NFA for SWMU 00-017 (LANL 1999, 64029, pp. ES-2, 68, and 69). However, in its request for supplemental information, NMED stated that SWMU 00-017 should include the entire underground acid/industrial waste line system and associated sumps and pumps (LANL 2000, 66408, p. 1). The Laboratory withdrew the NFA proposal "until the specific location(s) and components of PRS 0-017 are identified and documented as part of a joint LANL/NMED drainline consolidation effort to be undertaken in the near future" (LANL 2000, 66408, p. 1). Section 3.2.1 of the HIR provides details of the investigation (LANL 2006, 91915).

Samples analyzed at off-site fixed laboratories included 40 soil, fill, sediment, and tuff samples collected from 26 locations at SWMU 00-017 (Figure 3.2-1, Table 3.1-1). Samples from the 11 locations (00-10141, 00-10143 through 00-10146, and 00-10179 through 00-10184) at former line 167 were collected from depths of 0.1 to 9 ft. Samples from the 15 locations at line 170 and line 171 (00-10126 through 00-10140) were collected from depths of 12.5 to 27.5 ft, depending on the depth of the pipe. The suites analyzed for each sample are provided in Table 3.1-1.

3.2.2 Summary of Data for SWMU 00-017

A summary of data for SWMU 00-017 is presented below. Section 3.2.2, Figures 3.2-2 through 3.2-5, and Tables 3.2-1 and 3.2-2 of the HIR provide details of data evaluation (LANL 2006, 91915).

- Samples from 20 locations (00-10126 through 00-10141 and 00-10143 through 00-10146) were analyzed for cyanide and metals; samples from six locations (00-10179 through 00-10184) were analyzed only for lead. Analytical results indicated that aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, mercury, nickel, and vanadium were detected at concentrations greater than BVs in at least one sample between 0.1 and 27.5 ft below ground surface (bgs). Arsenic, beryllium, chromium, iron, and vanadium were detected within the range of the background concentrations. Aluminum, barium, calcium, copper, lead, magnesium, and nickel were detected greater than the range of the background concentrations.
- Samples from 20 locations (00-10126 through 00-10141 and 00-10143 through 00-10146) were analyzed for polychlorinated biphenyls (PCBs), pesticides, and semivolatile organic compounds (SVOCs); samples from 17 locations (00-10126 through 00-10141, and 00-10146) were analyzed for VOCs. No organic chemicals were detected.
- Samples from 20 locations (00-10126 through 00-10141 and 00-10143 through 00-10146) were analyzed for isotopic plutonium, isotopic uranium, and tritium and by gamma spectroscopy. Analytical results indicated that americium-241, plutonium-238, plutonium-239, and tritium (soil FV not available) were detected at depths in soil/fill/tuff where FVs do not apply or were greater than the sediment FV (all depths); uranium-235 was detected at an activity greater than BV in at least one sample between 0.1 and 27.5 ft bgs. Uranium-235 was detected at activities within the range of the background activities. Plutonium-239 and tritium were detected at activities greater than the range of the fallout activities.

Vertical extent of contamination on the mesa-top portion of SWMU 00-017 was not defined for aluminum, barium, calcium, cobalt, copper, lead, magnesium, mercury, and nickel. Lateral extent along the path of the pipeline on the mesa top is defined for all chemicals and radionuclides except mercury, americium-241, plutonium-238, and plutonium-239 at the northeastern end of the pipeline.

Vertical extent of contamination for the canyon portion of SWMU 00-017 was not defined for lead, plutonium-239, and tritium. Lateral extent along the path of the pipeline is defined for all chemicals and radionuclides, except for tritium at the northern end of the pipeline and plutonium-239 at the southern end of the pipeline.

3.2.3 Scope of Activities for SWMU 00-017

The proposed sample locations at SWMU 00-017 are shown in Figure 3.2-1. Table 3.2-1 provides a summary of the proposed sample locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 00-017 will consist of the following activities:

- Mesa-top portion of SWMU 00-017 (lines 170 and 171). No sampling activities are proposed for the pipelines of the mesa-top portion of SWMU 00-017 because they are 15–20 ft beneath an asphalt parking lot and the hospital building. Photographs of the mesa-top portion of SWMU 00-017 (Figure 3.2-2) show the current site status. There is no pathway for contaminant transport at that depth and no complete pathway for exposure to humans or ecological receptors.
- Canyon portion of SWMU 00-017 (former line 167). Samples will be collected at the bed of the previously excavated pipe from the 0- to 1.0-ft, 2.0- to 3.0-ft, and 4.0- to 5.0-ft-depth intervals.

Zero depth is defined as immediately beneath the bed of the previously excavated pipe or manhole. A total of five locations will be sampled. Two locations will be situated on the south wall of Los Alamos Canyon (Figure 3.2-1, locations 1 and 2). A third location will be situated at the location of former manhole ULR-33 (Figure 3.2-1, location 3). Two more locations will be situated on the north wall of Los Alamos Canyon (Figure 3.2-1, locations 4 and 5).

Samples will be analyzed at off-site fixed laboratories for target analyte list (TAL) metals, cyanide, nitrates, perchlorate, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. PCBs, SVOCs, and VOCs will not be analyzed because they were not detected previously. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to the historical operations of the industrial waste lines.

3.3 AOC 00-031(a), Soil Contamination beneath Former Service Station

AOC 00-031(a) was designated as the potentially contaminated soil beneath a former service station east of the Hilltop House Hotel on Trinity Drive at 4th Street. The service station was operated by the Zia Company property then owned by the Atomic Energy Commission until the early 1960s (LANL 1990, 07511, p. 0-031; LANL 1992, 07667, p. 5-115). In the 1960s, the land was transferred from the Atomic Energy Commission to private ownership (LANL 1995, 50053). The Hilltop House was renovated in the late 1980s, and three fiberglass tanks were installed northwest of the hotel to support new gas pumps at the north end of the hotel.

The Laboratory and the DOE sent a letter to the EPA in November 1995 requesting a deviation from the OU 1071 work plan (LANL 1992, 07667) 00-031(a) (LANL 1995, 50053). The letter indicated that an investigation of 00-031(a) was not warranted because after transfer of the subject land into private ownership, the land was subsequently used commercially for 20 yr (1968 to 1988) for storing substances now regulated by UST laws (LANL 1995, 50053). The EPA responded with a letter to the DOE indicating that 00-031(a) was not listed on Module VIII of the RCRA permit and confirming that it was more appropriate that the USTs be addressed by the NMED UST Bureau (EPA 1995, 85498). The Laboratory listed 00-031(a) as one of 73 sites identified for NFA (LANL 1998, 59689, Table 2). The DOE concurred with the NFA recommendation (DOE 1998, 59694).

The site map of AOC 00-031(a) is shown in Figure 3.3-1. Currently, the USTs are located completely beneath an asphalt parking lot.

3.3.1 Summary of Previous Investigations for AOC 00-031(a)

No previous investigations have been conducted at AOC 00-031(a).

3.3.2 Summary of Data for AOC 00-031(a)

No off-site fixed laboratory data are available for this AOC.

3.3.3 Scope of Activities for AOC 00-031(a)

No sampling activities are proposed for AOC 00-031(a) because the land was transferred into private ownership, and the land was subsequently used commercially for 20 yr (1968 to 1988) for the storage of substances now regulated by UST laws (LANL 1995, 50053). A photograph of AOC 00-031(a) (Figure 3.3-2) shows the current site status.

3.4 AOC 00-031(b), Soil Contamination beneath Former Motor Pool

AOC 00-031(b) is the potentially contaminated soil associated with the service station (Building 3) of the Zia Company motor pool facility. The service station, which operated from approximately 1959 to the mid-1960s, was located on Wall Street (currently Knecht Street) between Central Avenue and Trinity Drive. The two USTs were located to the east of the service station at approximately 12 ft bgs. The 1994 RFI determined that Building 3 was not a service station but a vehicle and machinery maintenance and repair facility (LANL 1996, 54913, p. 22).

The site map of AOC 00-031(b) is shown in Figure 3.4-1. Currently, the area formerly occupied by the AOC is located to the east of the LANB and is covered by asphalt and concrete paving.

3.4.1 Summary of Previous Investigations for AOC 00-031(b)

A Phase I RFI was conducted for AOC 00-031(b) in 1994. Field activities included excavating and removing two 10,000-gal. USTs, the auxiliary pipe, the distribution line associated with UST-2, and the soil within the concrete curb east of Building 3 (Figure 3.4-1). Verification samples were collected at the bottom and walls of the excavations of both tanks. Sample results obtained at CST on-site laboratories indicated that the petroleum hydrocarbons detected before excavation had been removed to nondetectable or very low levels (LANL 1996, 54913, p. 73). NMED UST Bureau has completed its review of this investigation and does not require any additional work to be performed at this site (NMED 1994, 58861). Based on investigation results, the RFI report recommended NFA for AOC 00-031(b) (LANL 1996, 54913, pp. i, 73). Section 3.4.1 of the Upper Los Alamos Canyon Aggregate Area HIR provides details of the investigation (LANL 2006, 91915).

Samples analyzed at off-site fixed laboratories included 10 soil and tuff samples collected from five locations after excavation of the vicinities of the two USTs at depths from 0.33 to 80 ft (Figure 3.4-1, Table 3.1-1). Sample locations 00-01588 and 00-01589 are located at former UST-2 distribution line. Sample locations 00-01602, 00-01613, and 00-01614 are located at the concrete curb east of Building 3. The suites analyzed for each sample are provided in Table 3.1-1.

3.4.2 Summary of Data for AOC 00-031(b)

A summary of data for AOC 00-031(b) is presented below. Section 3.4.2, Figure 3.4-2, and Tables 3.4-1 and 3.4-2 of the HIR provides details of data evaluation (LANL 2006, 91915).

- Samples from three locations (00-01588, 00-01589, and 00-01602) were analyzed for lead only, and samples from the other two locations (00-01613 and 00-01614) were analyzed for metals. Analytical results indicated that only cadmium was detected at a concentration greater than BV in two samples between 1.8 and 2.2 ft bgs. Cadmium concentrations were within the range of the background concentrations.
- Samples from two locations (00-01613 and 00-01614) were analyzed for SVOCs. Analytical results indicated that benzo(a)pyrene, benzo(g,h,i)perylene, benzo(k)fluoranthene, fluoranthene, phenanthrene, and pyrene were detected in the only depth sampled at 1.8 ft bgs at location 00-01614.

Vertical and lateral extent of contamination have not been defined for AOC 00-031(b) because samples collected only at location 00-01589 were at the boundary of the AOC; the rest of the samples analyzed off-site were not collected within the AOC boundaries.

3.4.3 Scope of Activities for AOC 00-031(b)

No sampling activities are proposed for AOC 00-031(b). The two USTs and associated devices have been excavated along with contaminated soil. Analytical data indicate that low levels of a few polycyclic aromatic hydrocarbons (PAHs) remain after removal of structures. If residual contaminants were present, there is no pathway for contaminant transport and no complete pathway for exposure to humans or ecological receptors. The area is privately owned and is currently commercially developed with buildings, concrete, and asphalt covering the ground. A photograph of AOC 00-031(b) (Figure 3.4-2) shows the current site status.

3.5 AOC 00-034(b), Landfill, Western Area

AOC 00-034(b) was a suspected pit identified from a 1946 aerial photograph; it was located on private property between Trinity Drive and Fairway Drive, east of 43rd Street. The pit was included in the OU 1071 RFI work plan, although no Laboratory documentation of the pit had been found (LANL 1992, 07667, p. 5-133).

The site map of AOC 00-034(b) is shown in Figure 3.5-1. Currently, the land to the east of 43rd Street, between Trinity Drive and Fairway Drive, is a residential area.

3.5.1 Summary of Previous Investigations for AOC 00-034(b)

An NFA report (LANL 1997, 59367) stated that based on interviews and aerial photograph examination, the identified pit was actually a staging area for soil or tuff fill material used for building roads and home sites in the privately owned western housing area and was not used for land disposal of solid waste; therefore, the site was recommended for NFA (LANL 1997, 59367. p. 7). The Laboratory listed 00-034(b) in 1998 as one of 73 sites identified for NFA (LANL 1998, 59689, Table 2). The DOE concurred with the NFA recommendations for the 73 sites (DOE, 1998, 59694).

3.5.2 Summary of Data for AOC 00-034(b)

No off-site fixed Laboratory data are available for this AOC.

3.5.3 Scope of Activities for AOC 00-034(b)

No sampling activities are proposed for AOC 00-034(b). The site was used for staging fill material for residential construction, not for waste disposal. It is now a residential area.

3.6 AOC C-00-042, Tank (Formerly Part of SWMU 00-032)

AOC C-00-042 was a 2500-gal. steel waste-oil UST associated with the former automotive maintenance hangar at the Zia Company motor pool facility. The facility was located on Trinity Drive between 15th Street and the Los Alamos Credit Union. The automotive maintenance hangar was decommissioned and removed in 1962, and the land subsequently was transferred to Los Alamos County in 1967. After the demolition of the automotive maintenance hangar, the area was covered with fill material and asphalt. The UST was located at approximately 10 ft bgs adjacent to a current building, but it was undiscovered until construction activities at the site in 1995 for building the LANB. There is no indication that subsequent landowners used the UST.

The site map of AOC C-00-042 is shown in Figure 3.4-1. Currently, the site is covered with an asphalt parking lot.

3.6.1 Summary of Previous Investigations for AOC C-00-042

The UST was found in 1995 and a voluntary corrective action (VCA) was conducted to remove the tank in the same year. The tank and surrounding soil were removed and confirmatory soil samples were collected from the excavation. All organic chemicals detected in confirmatory samples were below their respective screening action levels, and all metals were below background upper tolerance limits (LANL 1996, 54618, p. 9). Based on the results of the confirmation samples, the area of the former UST was released to the construction contractor (LANL 1996, 54618, pp. 6, 9). Section 3.6.1 of the HIR provides details of the investigation (LANL 2006, 91915).

3.6.2 Summary of Data for AOC C-00-042

No off-site fixed laboratory data are available for this AOC.

3.6.3 Scope of Activities for AOC C-00-042

No sampling activities are proposed for AOC C-00-042. The UST has been excavated along with contaminated soil. If residual contaminants were present, no pathway for contaminant transport and no complete pathway for exposure to humans or ecological receptors exist. The area is privately owned and is currently commercially developed with buildings, concrete, and asphalt covering the ground. A photograph of AOC C-00-042 (Figure 3.6-1) shows the current site status.

4.0 TA-01, FORMER MAIN TECHNICAL AREA

4.1 Background

TA-01 is located on the southern portion of East Mesa and encompasses a portion of present-day Los Alamos townsite, roughly demarcated by Los Alamos Canyon (on the southern boundary), Central Avenue (on the northern boundary), 15th Street (on the eastern boundary), and the western reach of Timber Ridge Road (on the western boundary). The approximately 50-acre mesa-top area was the location of the initial Los Alamos Scientific Laboratory (LASL) from 1943 to 1965.

This work plan addresses AOC 01-003(c), SWMU 01-003(d), AOC 01-007(k), and 31 SWMUs/AOCs of Consolidated Unit 01-001(a)-99. Consolidated Unit 01-001(a)-99 consists of 40 SWMUs and AOCs, nine of which are administratively complete and addressed in the HIR (LANL 2006, 91915). The following is a brief description of the 34 sites addressed in the work plan.

- SWMUs 01-001(a,b,c,d,e,f,g,o,s,t,u) are septic tanks and sanitary waste lines. Seven are septic tanks [01-001(a,b,c,d,e,f,g)], and four are sanitary waste lines [01-001(o,s,t,u)].
- SWMU 01-002 is the industrial waste line. It consisted of an extensive network of underground drains and pipelines that collected fluids from process buildings.
- SWMUs 01-003(a,b,d,e) and AOC 01-003(c) are landfills. SWMU 01-003(a) is the Bailey Bridge landfill located at the head of Bailey Bridge Canyon. SWMU 01-003(b) and AOC 01-003(c) are the surface-disposal sites for construction debris reported that may have been below the north rim of Los Alamos Canyon. SWMU 01-003(d) is the Can Dump Site located on the hillside above the Los Alamos Canyon just south of the current U.S. West Communications Facility.

SWMU 01-003(e) is the surface-disposal site southeast of Los Alamos Inn and is partly on the mesa top and partly on the Los Alamos Canyon hillside.

- SWMUs 01-006(a,b,c,d,h,n,o) and AOCs 01-006(e,g) are drain lines, storm drains, and their outfalls. Five are drain lines [01-006(a,b,c,d,e)] and four are storm drains [01-006(h,g,n,o)]. They either discharged directly into Los Alamos Canyon or released effluent onto the ground surface near the buildings they served.
- SWMUs 01-007(a,b,c,d,e,j,l) and AOC 01-007(k) are areas of suspected subsurface soil contamination. Subsurface contamination may be present in soil beneath and adjacent to former TA-01 structures. Most of these locations are currently beneath paved roads, parking lots, commercial buildings, or townhouses, which comprise a major portion of the present-day Los Alamos townsite. The suspected soil contamination could have resulted from original Laboratory operations or from demolition and removal of buildings.

These SWMUs/AOCs in TA-01 are shown in Plate 2.

4.1.1 Operational History

Activities to establish a nuclear weapon facility started on March 15, 1943. Section 4.1.1 of the HIR presents more detailed information of the histories of operation, decommissioning, and decontamination of TA-01 (LANL 2006, 91915). Between 1943 and 1965, research work on nuclear weapons was carried out in TA-01. Basic chemical operations that occurred at TA-01 included wet chemistry experimentation and wet and dry chemistry processing, including purification and recovery processes for uranium and plutonium. TA-01 also housed several physical operations, such as casting, machining, powder metallurgy, and metallurgical and solid materials procedures for shaping metals (radioactive as well as nonradioactive) and high explosives.

Activities at TA-01 generated various hazardous and radioactive wastes. The waste management practices during the early years of the Laboratory were conducted in accordance with standard practices of the time. The industrial liquid waste of TA-01 was collected by a dedicated industrial waste line that was separate from sanitary waste lines. The sanitary waste of TA-01 was collected by three sanitary systems that collectively served the western, northern, and eastern sections of TA-01. Additionally, individual septic tanks served several of the outlying buildings and were discharged into Los Alamos Canyon.

Nonradioactive solid waste was burned in two on-site incinerators at TA-01. At least one incinerator located outside TA-01 was used for combustion of TA-01 nonradioactive solid waste. Noncombustible and nonradioactive solid waste was transported to a landfill located outside of TA-01 near the present-day Los Alamos Airport [SWMU 73-001(a)]. No record exists of any radioactive solid waste landfill on the mesa top within the perimeter of TA-01.

It was recognized that facilities at TA-01 would be unable to process larger quantities of uranium and plutonium, so a new processing plant was constructed at the DP site (TA-21). In September 1945, all plutonium-processing and recovery operations, with the exception of secondary recovery, were relocated to DP site. Large quantities of weapons-grade plutonium were never processed at TA-01.

Operations at TA-01 gradually relocated to new TAs from 1945 to 1965. Phased decontamination and decommissioning (D&D) activities began at TA-01 in 1953 and continued through 1976 (Ahlquist et al. 1977, 05710, p. 21).

The Ahlquist Radiological Survey began in 1974 and decontamination was carried out in the entire TA-01 area. By the end of the decontamination activities, approximately 15,000 m^3 of materials was removed from all TA-01 excavations and buried at LASL solid radioactive waste disposal site (Ahlquist et al. 1977, 05710, p. 13). A fence along the DOE property line was constructed to prevent public entry to some contamination that remained on DOE property adjacent to the TA-01 site. After the 1974–1976 Ahlquist Radiological Survey, intense residential and commercial development formed the townsite of Los Alamos and development continues today.

Under new environmental laws and regulations, TA-01 was evaluated to determine the effectiveness of previous Laboratory decontamination efforts. Based on the SWMU report (LANL 1990, 07511), an RFI work plan was completed in 1992 that identified 68 SWMUs and AOCs in TA-01 (LANL 1992, 43454). The 68 SWMUs were organized into 16 aggregates (A through P) based on geographic location, conceptual exposure model and receptors, and/or common drainage area. During the 1990s, Phase I RFIs, VCAs, and interim actions were conducted throughout the TA-01 area.

4.1.2 Summary of Releases, Transport Mechanisms, and Potential Receptors

Summary of Releases. Releases from septic systems, the industrial waste line, drain lines, and storm-water drainages occurred as a result of normal site operations (e.g., discharges from outfalls) and accidental spills or releases. No documentation exists to estimate the volumes or rates of the flow of the effluent from septic system outlet pipes, industrial waste line, drain lines, or storm-water drainages to outfalls.

Releases from septic tanks and sanitary waste lines [SWMUs 01-001(a,b,c,d,e,f,g,o,s,t,u)] may have occurred as a result of leaks that may have caused subsurface contamination. Discharges from outfalls, as a result of normal site operation, may have caused surface and subsurface contamination on the hillside of Los Alamos Canyon.

Releases from the industrial waste line (SWMU 01-002) may have occurred as a result of leaks and may have caused subsurface contamination. Although the entire industrial waste line had been removed, contamination may still remain in the former location of the industrial waste line. The discharge location from the industrial waste line is part of the scope of the Pueblo Canyon Aggregate Area work plan (LANL 2005, 90579).

Placement of contaminated materials at landfills [SWMUs 01-003(a,b,d,e) and AOC 01-003(c)] may have caused surface and subsurface contamination on the hillside of Los Alamos Canyon.

Contamination from drain lines, storm drains, and their outfalls [SWMUs 01-006(a,b,c,d,h,n,o) and AOCs 01-006(e,g)] may have occurred as a result of leaks and intentional discharges.

Contamination at the areas of suspected subsurface soil contamination [SWMUs 01-007(a,b,c,d,e,j,l) and AOC 01-007(k)] may be a direct result of spills or releases that may have caused surface and subsurface contamination.

Transport Mechanisms. No natural surface-water bodies are present in TA-01. Ashley Pond is a closed water body maintained by Los Alamos County. During summer thunderstorms and spring snowmelt, runoff from the mesa top flows down the hillsides and into an ephemeral stream in Los Alamos Canyon. Surface-water runoff and erosion of contaminated surface soil could lead to contamination of bench areas on the hillside and contamination of surface waters 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, the intensity and frequency of precipitation, and seismic activity.

The thickness of the unsaturated zone beneath TA-01 indicates that migration of contaminants from the mesa top to the regional aquifer is unlikely. Studies have shown that infiltration of natural precipitation cannot provide enough water to sustain downward movement of contaminants (Nylander et al. 2003, 76059.49, pp. 5-2 to 5-5). Therefore, groundwater is not a viable pathway for contaminant transport from TA-01.

Other potential transport mechanisms that may lead to exposure of potential receptors include

- airborne transport of contaminated surface soils,
- infiltration through vadose zone,
- continued dissolution and advective/dispersive transport of chemical and radiological contaminants contained in subsurface soil and bedrock,
- disturbance and uptake of contaminants in shallow soil by plants and animals, and
- site disturbance through human activities.

Potential Receptors. Potential receptors to possible contaminant transport include

- mesa-top residents;
- recreational users;
- commercial, county, or Laboratory workers; and
- ecological receptors in the nondeveloped areas (i.e., hillsides).

4.1.3 Current Site Usage and Status

Property transfer of land from DOE to Los Alamos County and private parties began in 1976. Since then, TA-01 has been regarded and recontoured and has undergone significant coverage from backfill and construction. These activities have greatly altered the landscape and there are few exposed areas of native soil or tuff are evident on the mesa. No remnant evidence of TA-01 Laboratory structures exists in the area. The Los Alamos Community Center (formerly the Laboratory Communication Center), located east of Ashley Pond, is the only building remaining from TA-01.

4.2 SWMU 01-001(a), Septic Tank 134

Septic tank 134, 5 ft by 9 ft by 5.67 ft deep, made of reinforced concrete and installed in 1945 (LANL 2001, 69946, p. 35), was located south of the sheet metal shop (01-104). It served Warehouse 19 (01-103) and the sheet metal shop from 1949 to 1964. Warehouse 19 was used to store unknown nonradioactive materials. The concrete floor of the sheet metal shop was radioactively contaminated and was removed to the Bailey Bridge Canyon and covered with dirt (Montoya 1965, 03711). Part of the floor drain of the sheet metal shop was dug out and found to have no radiological contamination; the rest of the floor drain was left in place (Montoya 1965, 03711). Two separate sanitary waste lines from the two buildings fed into the septic tank and the effluent discharged through an outfall to Bailey Bridge Canyon.

The site map of SWMU 01-001(a) is shown in Figure 4.2-1. Currently, the location of the former pipelines is landscaped with grass and trees.

4.2.1 Summary of Previous Investigations for SWMU 01-001(a)

The tank was removed in 1975 during the Ahlquist Radiological Survey (Ahlquist et al. 1977, 05710, p. 119). During the Phase I RFI in 1992, samples were collected along the Bailey Bridge Canyon rim, but no samples were collected at the outfall area. The RFI report recommended NFA for SWMU 01-001(a) (LANL 1996, 54461, pp. i, 81). Section 4.2.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

4.2.2 Summary of Data for SWMU 01-001(a)

No off-site fixed Laboratory data are available for this SWMU.

4.2.3 Scope of Activities for SWMU 01-001(a)

The proposed sampling locations at SWMU 01-001(a) are shown in Figure 4.2-1. Table 4.2-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 01-001(a) will be contingent upon access and permission by the landowner and will consist of the following activities:

- *Septic System Pipelines.* Because no record exists that the pipelines were removed completely, any pipelines encountered will be removed and inspected for leaks. Samples will be collected where elevated levels of VOCs and/or radioactivity are present, as determined by field screening, or where other evidence of a leak (i.e., odor, staining) is found. At a minimum, samples will be collected from the 0- to 1.0-ft- and 2.0- to 3.0-ft-depth intervals where the path of the pipeline turns (Figure 4.2-1, locations 1 and 2) and at the location of the joint (Figure 4.2-1, location 3). Zero depth is defined as immediately beneath the bed of the excavated pipe. A photograph of SWMU 01-001(a) mesa top (Figure 4.2-2) shows the current site status.
- *Septic Tank.* Samples will be collected from the 0- to 1.0-ft- and the 4.0-to 5.0-ft-depth intervals at the center of the floor of the excavation of the former septic tank (Figure 4.2-1, location 4). Zero depth is defined as the floor of the tank excavation.
- *Outfall.* Samples will be collected from the 0- to 0.5-ft-, 1.5- to 2.0-ft-, and 4.0- to 5.0-ft -depth intervals at the mouth of the outfall (Figure 4.2-1, location 5). Additional samples will be collected from a location 7 ft downslope from the mouth of the outfall, preferably in a discernible drainage (Figure 4.2-1, location 6), and 7 ft to the west and east of that location (Figure 4.2-1, locations 7 and 8). Outfall sampling locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

4.3 SWMU 01-001(b), Septic Tank 135

Septic tank 135, 7 ft by 3.5 ft by 5 ft deep, made of reinforced concrete, was installed in 1950 (LANL 2001, 69946, p. 35). It served Buildings FP and M-1 and discharged into Los Alamos Canyon. Building FP, a wood-frame and steel building, 40 ft by 122 ft by 20 ft high, constructed in 1945 (LANL

2001, 69946), was a foundry for nonradioactive and nonferrous metals (Ahlquist et al. 1977, 05710, p. 129). Building M-1, 70 ft by 32 ft with a concrete floor (LANL 2001, 69946), was completed in 1950 to machine lithium and later to machine uranium-238 (Ahlquist et al. 1977, 05710, p. 133).

The site map of SWMU 01-001(b) is shown in Figure 4.3-1. Currently, the locations of pipelines are under the pavement and buildings of Ridge Park Village.

4.3.1 Summary of Previous Investigations for SWMU 01-001(b)

The tank was removed during the Ahlquist Radiological Survey (Ahlquist et al. 1977, 05710, pp. 119–120). A Phase I RFI was conducted in 1992, and samples were collected along the canyon rim and hillside areas near the outfall. Based on investigation results, the RFI report recommended NFA for SWMU 01-001(b) (LANL 1996, 54467, pp. ii, 84). Section 4.3.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

Samples analyzed at off-site fixed laboratories included three soil samples collected from three locations at SWMU 01-001(b) (Figure 4.3-1, Table 4.1-1). These locations were clustered around the location of the former septic tank and were sampled from only one depth interval (between 0 and 0.5 ft bgs). The suites analyzed for each sample are provided in Table 4.1-1.

4.3.2 Summary of Data for SWMU 01-001(b)

A summary of data for SWMU 01-001(b) is presented below. Section 4.3.2, Figure 4.3-2, and Tables 4.3-1 and 4.3-2 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from three locations (01-01162, 01-01168, and 01-01174) were analyzed for metals. Analytical results indicated that chromium, lead, and mercury were detected at concentrations greater than BVs in at least one sample between 0 and 0.5 ft bgs. Chromium and lead were detected at concentrations greater than the range of the background concentrations.
- Samples from three locations (01-01162, 01-01168, and 01-01174) were analyzed for SVOCs. Analytical results indicated that acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene were detected in at least one sample between 0 and 0.5 ft bgs.
- Samples from three locations (01-01162, 01-01168, and 01-01174) were analyzed for isotopic plutonium. No isotopic plutonium was detected or was detected at activities greater than FV.

Vertical extent of contamination at the location of the former septic tank of SWMU 01-001(b) has not been defined because samples were collected at only one depth at each of the three sample locations. Lateral extent has been defined for metals, SVOCs, and isotopic plutonium at the location of the former septic tank.

Vertical and lateral extent of contamination have not been defined along the path of the pipeline or at the outfall of SWMU 01-001(b) because no samples have been collected in those areas.

4.3.3 Scope of Activities for SWMU 01-001(b)

The proposed sampling locations at SWMU 01-001(b) are shown in Figure 4.3-1. Table 4.3-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 01-001(b) will be contingent upon access and permission by the landowner and will consist of the following activities:

- *Septic System Pipelines.* The pipelines probably were removed during the construction of current residential buildings. Some locations of the former pipelines are now under buildings and pavement. Soil samples will be collected at the origin of the north branch under the asphalt road (Figure 4.3-1, location 1). A second location will be at the eastern end of the pipeline (Figure 4.3-1, location 2). Samples will be collected from the 0- to 1.0-ft- and 2.0- to 3.0-ft-depth intervals. Zero depth is defined as beneath the bed of the excavated pipe. Care will be taken that debris containing roadbed material or asphalt is not inadvertently included in these samples. A photograph of SWMU 01-001(b) mesa top (Figure 4.3-2) shows the current site status.
- *Septic Tank.* Samples will be collected from the 0- to 1.0-ft- and 4- to 5.0-ft-depth intervals at the center of the floor of the excavation of the former septic tank location (Figure 4.3-1, location 3). Zero depth is defined as the floor of the tank excavation.
- *Outfall.* Samples will be collected from the 0- to 0.5-ft-, 1.5- to 2.0-ft, and 4.0- to 5.0-ft-depth intervals at the mouth of the outfall (Figure 4.3-1, location 4). Additional samples will be collected from a location 7 ft downslope from the mouth of the outfall, preferably in a discernible drainage (Figure 4.3-1, location 5), and 7 ft to the west and east of that location (Figure 4.3-1, locations 6 and 7). Outfall sampling locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

4.4 SWMU 01-001(c), Septic Tank 137

Septic tank 137, 3 ft by 6 ft by 5 ft deep, made of reinforced concrete, was installed in 1947 (LANL 2001, 69946, p. 36; Ahlquist et al. 1977, 05710, p. 49) to serve Building D-2, an electronic shop (Ahlquist et al. 1977, 05710, p. 128). Building D-2 had been used as a laundry for radioactively contaminated clothing and recyclable equipment until the laundry operations were relocated to TA-21 in 1945 (Ahlquist et al. 1977, 05710, p. 49). The outfall discharged over the canyon rim and the hillside is now designated Hillside 137.

The site map of SWMU 01-001(c) is shown in Figure 4.4-1. Currently, this area is undeveloped.

4.4.1 Summary of Previous Investigations for SWMU 01-001(c)

The tank was located in 1975 and found to be a cylindrical metal tank containing water and sludge (Ahlquist et al. 1977, 05710, p. 47). The tank and its outfall pipe were removed (LASL 1976, 08935, pp. 3, 5). Contaminated soil in the areas around Building D-2, septic tank 137, and drain lines were also removed (Ahlquist et al. 1977, 05710, pp. 47–49). A Phase I RFI was conducted in 1992 and 1993, and samples were collected on both mesa-top and hillside areas near SWMU 01-001(c). However, most of the samples were analyzed at CST on-site laboratories. Based on investigation results, the RFI report recommended NFA for SWMU 01-001(c) (LANL 1996, 54465, pp. iv, 119). Section 4.4.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

Samples analyzed at off-site fixed laboratories included three surface soil and fill samples (0–0.5 ft) collected from three locations at SWMU 01-001(c), near the tank and in the outfall area (Figure 4.4-1, Table 4.1-1). These samples were analyzed for metals only.

4.4.2 Summary of Data for SWMU 01-001(c)

A summary of data for SWMU 01-001(c) is presented below. Section 4.4.2, Figure 4.4-2, and Table 4.4-1 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from three locations (01-03003, 01-03015, and 01-03023) were analyzed for metals. Analytical results indicated that lead and selenium were detected at concentrations greater than BVs and also greater than the range of the background concentrations in at least one sample between 0 and 0.5 ft bgs.

Vertical extent of contamination has not been defined because samples were collected at only one depth at each of the three sample locations. Lateral extent has been defined for lead but not for selenium.

Vertical and lateral extent of contamination have not been defined along the path of the pipeline or at the immediate area of the outfall because no samples have been collected in those areas.

4.4.3 Scope of Activities for SWMU 01-001(c) and Adjacent SWMUs 01-006(c,d) and 01-007(b)

The proposed sampling activities for SWMU 01-001(c) are combined with adjacent SWMUs 01-006(c,d) and 01-007(b) because of proximity of these sites. The background information and previous investigation on SWMUs 01-006(c,d) and 01-007(b) are given in Sections 4.20, 4.21, and 4.29, respectively. The proposed sampling locations at SWMUs 01-001(c), 01-006(c), 01-006(d), and 01-007(b) are shown in Figure 4.4-2. Table 4.4-1 provides a summary of the proposed sample locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMUs 01-001(c), 01-006(c), 01-006(d), and 01-007(b) will consist of the following activities:

- *SWMU 01-001(c) Septic System Pipeline, Septic Tank, and Outfall.* Samples will be collected from the 0- to 1.0-ft- and 2.0- to 3.0-ft-depth intervals from where the north end of the pipe was located (Figure 4.4-2, location 1). Zero depth is defined as immediately beneath the bed of the excavated pipe. At the center of the floor of the excavation of the former septic tank location, samples will be collected from the 0- to 1.0-ft- and the 4.0-to 5.0-ft-depth intervals (Figure 4.4-2, location 2). Zero depth is defined as the floor of the tank excavation. At the mouth of the outfall, samples will be collected from the 0- to 0.5-ft-, 1.5-to 2.0-ft-, and 4.0 to 5.0-ft -depth intervals (Figure 4.4-2, location 3). Outfall soil samples will be located 7 ft downslope from the mouth of the outfall, preferably in a discernible drainage (Figure 4.4-2, location 4), and 7 ft to the west and east of that location (Figure 4.4-2, locations 5 and 6). Outfall sample locations will be selected by a geomorphologist, and at least two depth intervals will be sampled; one in the appropriate sediment unit(s) and one below the sediment/tuff interface.
- *Areas of SWMUs 01-006(c, d) and 01-007(b).* Because the entire area has been excavated along with the drain lines during the 1974–1976 Ahlquist Survey (Ahlquist et al. 1977, 05710, pp. 64–70) and the septic system occupied the middle area, additional samples will be situated close to the boundaries of SWMU 01-007(b) (Figure 4.4-2, locations 7 through 12). Location 7 will be approximately 50 ft west of location 1. Location 8 will be 1 ft downslope from previous sample location 01-04044. Location 9 will be near the ends of the two drainlines on the southwest side of the building. Location 10 will be near the end of drain line 01-006(d) (the two drain lines on the southeast side of the buildings were never found; see Section 4.22). Location 11 will be 1 ft

downslope from previous sample location 01-03125. Location 12 will be approximately 60 ft south of location 10. Sediment sample locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.

- *Hillside 137.* Four lines of samples approximately 40–50 ft apart and with three locations per line will be collected downgradient of the outfalls on Hillside 137 (Figure 4.4-2, locations 13 through 15, locations 16 through 18, 19 through 21, and 22 through 24). Locations 14, 20, and 21 will be 1 ft downslope from previous sample locations 01-03023, 01-03045, and 01-03051, respectively. Sediment sampling locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

4.5 SWMU 01-001(d), Septic Tank 138

Septic tank 138, 3 ft by 6 ft by 5 ft deep, made of reinforced concrete, was installed in 1943. It was located southeast of Building Y and served K, V, and Y. Building K was a chemical stock room that contained a mercury still. Building V housed the original uranium and beryllium machine shop at TA-01. Dry-grinding of boron was also conducted in V. Building Y housed a physics laboratory that handled tritium, uranium-238, and polonium-210. The buildings were connected to septic tank 138 by one sanitary waste line. The outfall was located east of Y and discharged over the rim of Los Alamos Canyon. This outfall area is known as Hillside 138.

The site map of SWMU 01-001(d) is shown in Figure 4.5-1. Currently, the location of the former pipelines and septic tank is privately owned and commercially developed with buildings and an asphalt parking lot. The outfall is on undeveloped land owned by the DOE.

4.5.1 Summary of Previous Investigations for SWMU 01-001(d)

The tank and surrounding soil were removed during the Ahlquist Radiological Survey (Ahlquist et al. 1977, 05710, p. 79). A Phase I RFI was conducted in 1992 and 1994 and both the canyon rim area and Hillside 138 were extensively sampled. However, most of the samples were analyzed at CST on-site laboratories. Based on investigation results, the RFI report recommended NFA for SWMU 01-001(d) (LANL 1995, 49703, pp. vii, 95).

An interim action was implemented in 1996 and 1997 to remove contaminated soil on Hillside 138 in order to reduce the potential migration of contaminants from the site to the stormwater drainage and ultimately to Los Alamos Canyon (LANL 1997, 56908, p. 1). Section 4.5.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

Among the samples collected in Phase I RFI, three soil samples were analyzed at off-site fixed laboratories. They were collected from two locations in the outfall at SWMU 01-001(d) at depths of 0 to 1.83 ft (Figure 4.5-1, Table 4.1-1). The suites analyzed for each sample are provided in Table 4.1-1.

4.5.2 Summary of Data for SWMU 01-001(d)

A summary of data for SWMU 01-001(d) is presented below. Section 4.5.2, Figure 4.5-2, and Table 4.5-1 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- The sample from location 01-05028 was analyzed only for mercury. Mercury was not detected at a concentration greater than BV.
- Samples from location 01-05219 were analyzed for isotopic plutonium. Analytical results indicated that plutonium-239 was detected greater than FV or at depths where FV does not apply between 0 and 1.83 ft bgs. Activities decreased with depth.

Vertical and lateral extent of contamination have not been defined at SWMU 01-001(d) because a limited number of samples were collected from a limited number of locations and depths and analyzed only for mercury or isotopic plutonium.

4.5.3 Scope of Activities for SWMU 01-001(d) and Adjacent SWMU 01-006(h)

The proposed sampling locations at SWMU 01-001(d) and adjacent SWMU 01-006(h) are shown in Figure 4.5-2. Table 4.5-1 provides a summary of the proposed sample locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 01-001(d) will be contingent upon access and permission by the landowner and will consist of the following activities:

- *Septic System Pipeline.* Because no record exists that the mesa-top portion of the pipeline of SWMU 01-001(d) was removed completely, any pipeline encountered will be removed and inspected for leaks. Samples will be collected where elevated levels of VOCs and/or radioactivity are present, as determined by field screening, or where other evidence of a leak (i.e., odor, staining) is found. At a minimum, samples will be collected from the 0- to 1.0-ft and 2.0- to 3.0-ft depth intervals at where the pipeline turns (Figure 4.5-2, location 1). Zero depth is defined as immediately beneath the bed of the excavated pipe. A photograph of SWMU 01-001(d) mesa top (Figure 4.5-3) shows the current site status.
- *SWMU 01-001(d) Septic Tank.* The location of the former septic tank is now under a building. No samples can be collected at the location of the previously excavated tank.
- *Outfall.* Samples will be collected from the 0- to 0.5-ft-, 1.5- to 2.0-ft-, and 4.0- to 5.0-ft-depth intervals at the mouth of the outfall (Figure 4.5-2, location 2). Outfall samples will be collected from a location 7 ft downslope from the mouth of the outfall, preferably in a discernible drainage (Figure 4.5-2, location 3) and 7 ft to the west and east of that location (Figure 4.5-2, locations 4 and 5). Because the location of SWMU 01-006(h), including its outfall, has been completely built over, the downslope area on Hillside 138 will be sampled. Outfall sampling locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.
- *Hillside 138.* Samples will be collected on the hillside beginning approximately 60 ft from the outfall (Figure 4.5-2, locations 6 through 8) and then approximately every 70 ft before reaching a steep cliff (Figure 4.5-2, locations 9 through 11, and 12 through 14). Locations 7 and 10 will be 1 ft downslope from previous sample locations 01-05028 and 01-05219, respectively. Below the cliff, samples will be collected downslope every 80 ft until the canyon bottom is reached (Figure 4.5-2, locations 15 through 17, 18 through 20, and 21 through 23). Sediment sample locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface. Samples at

location 10 will be collected from the 0- to 0.5-ft-, 1.5- to 2.0-ft-, and 4.0- to 5.0-ft-depth intervals because previous data indicated the presence of plutonium-239 with activity of three orders of magnitude higher than the FV in the 0.5- to 1.8-ft-depth interval (LANL 2006, 91915) (Figure 4.5-2).

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

4.6 SWMU 01-001(e), Septic Tank 139

Septic tank 139, 3 ft by 6 ft by 5 ft deep, made of reinforced concrete and installed in 1944 (LANL 2001, 69946, p. 36), served D-5 Sigma vault, Building I, and Delta. D-5 Sigma vault was used to store plutonium-239 and uranium-235. Building I was used to store and machine beryllium between 1947 and 1958. Delta was used as a meeting place and a laboratory where fission-product tracers were used. The outfall of the tank discharged southeast of Building I and D-5 Sigma vault at the head of Bailey Bridge Canyon. The tank became inactive and was left in place in 1965 (Ahlquist 1977, 03270, p. 135).

The site map of SWMU 01-001(e) is shown in Figure 4.6-1. Currently, the entire SWMU area is under Oppenheimer Drive or residential buildings and their yards, driveways, and sidewalks.

4.6.1 Summary of Previous Investigations for SWMU 01-001(e)

The tank was not found during the Ahlquist Radiological Survey, and area inspection led to the conclusion that the tank had been removed (Ahlquist 1977, 03270, p. 113). A Phase I RFI was not conducted because the SWMU is inaccessible. Based on investigation results, the RFI report recommended NFA for SWMU 01-001(e) (LANL 1996, 54461, pp. i, 81). Section 4.6.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

4.6.2 Summary of Data for SWMU 01-001(e)

No off-site fixed-laboratory data are available for this SWMU.

4.6.3 Scope of Activities for SWMU 01-001(e)

Sampling is proposed where accessible because the entire area of the SWMU has been developed and the outfall area no longer exists. The proposed sampling locations at SWMU 1-001(e) are shown in Figure 4.6-1. Table 4.6-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 1-001(e) will be contingent upon access and permission by the landowner and will consist of the following activities:

- *Septic System Pipelines.* The pipelines probably were removed during the construction of current buildings. Samples will be collected from the 0- to 1.0-ft- and 2.0- to 3.0-ft-depth intervals at the turn of the pipeline (Figure 4.6-1, location 1) and at the pipe joint (Figure 4.6-1, location 2). Zero depth is defined as immediately beneath the bed of the excavated pipe. Photographs of SWMU 01-001(e) (Figure 4.6-2) show the current site status.
- *Septic Tank.* The location of the former septic tank is now under a building. No samples can be collected at the location of the previously excavated tank.

- *Outfall.* The outfall area will be sampled during the sampling activities of SWMU 01-003(a); no additional sampling is proposed for the outfall of SWMU 01-001(e) because it is the same as proposed in Section 4.14.3.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs, SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

4.7 SWMU 01-001(f), Septic Tank 140

Septic tank 140, 3 ft by 6 ft by 5 ft deep, made of reinforced concrete and installed in 1945 (LANL 2001, 69946, p. 36), was located west of Building K-1 and served Buildings HT and FP. Building HT was used to heat-treat and machine natural and enriched uranium. The heat treatment operations could have contributed radioactive waste to the tank. FP was a foundry for nonradioactive and nonferrous metals and was not radiologically contaminated (Buckland 1964, 04810; Ahlquist et al. 1977, 05710, p. 39). The septic system outfall discharged into Los Alamos Canyon. The outfall area is known as Hillside 140.

The site map of SWMU 01-001(f) is shown in Figure 4.7-1. Currently, the entire mesa-top area of the SWMU is developed, and the locations of the former pipelines are under the pavement and buildings of Ridge Park Village. Currently, the location of the former septic tank is partially covered by a building. The outfall is on undeveloped land owned by the DOE.

4.7.1 Summary of Previous Investigations for SWMU 01-001(f)

The tank, its inlet and outlet lines, and surrounding soil were removed in 1975 during the Ahlquist Radiological Survey (Ahlquist et al. 1977, 05710, pp. 40, 111). A Phase I RFI was conducted in 1992 and 1993 and both the canyon rim area and Hillside 140 were extensively sampled; however, most of the samples were analyzed at CST on-site laboratories. Based on investigation results, the RFI report recommended NFA for SWMU 01-001(f) (LANL 1996, 54467, pp. ii, 84).

A VCA was conducted as a best management practice (BMP) in 1996 to remove elevated total uranium on Hillside 140. Contaminated soil identified by real-time field screening was excavated. The VCA report formally requested regulatory concurrence to remove the site from Module VIII of the Hazardous Waste Facility Permit and requested DOE concurrence that this site no longer be considered a potential release site for radiological contamination (LANL 1996, 53797, p. 3). Section 4.7.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

Among the samples collected in Phase I RFI, six surface soil samples (0–0.5 ft) were analyzed at off-site fixed laboratories. They were collected from six locations in the outfall area of SWMU 01-001(f) at depths of 0 to 0.5 ft (Figure 4.7-1, Table 4.1-1). The suites analyzed for each sample are provided in Table 4.1-1. These sample locations were not excavated during the 1996 VCA activities.

4.7.2 Summary of Data for SWMU 01-001(f)

A summary of data for SWMU 01-001(f) is presented below. Section 4.7.2, Figures 4.7-2 and 4.7-3, and Tables 4.7-1 and 4.7-2 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from six locations (01-01083, 01-01090, 01-01095, 01-01096, 01-01110, and 01-01112) were analyzed for metals. Analytical results indicated that cadmium, lead, mercury, selenium, thallium, and uranium were detected greater than BVs in at least one sample between 0 and 0.05 ft bgs. Cadmium was detected at a concentration within the range of the background concentrations. Lead, selenium, thallium, and uranium were detected at concentrations greater than the range of the background concentrations.

- Samples from six locations (01-01083, 01-01090, 01-01095, 01-01096, 01-01110, and 01-01112) were analyzed for SVOCs; none were detected.
- Samples from three locations (01-01083, 01-01090, and 01-01110) were analyzed for isotopic plutonium. Analytical results indicated that plutonium-239 was detected at an activity greater than FV and the range of the fallout activities in the only depth sampled between 0 and 0.5 ft bgs at one location (01-01110).

Vertical extent of contamination at these six locations has not been defined because samples were collected at only one depth (surface). Lateral extent has been defined for SVOCs and plutonium-238. Lateral extent has not been defined for cadmium, lead, mercury, selenium, thallium, uranium, and plutonium-239.

Vertical and lateral extent of contamination have not been defined along the path of the pipeline or in the drainage on Hillside 140 because no samples have been collected in those areas. Only surface samples have been collected at the outfall area and analyzed for a limited number of suites.

4.7.3 Scope of Activities for SWMU 01-001(f)

The proposed sampling locations at SWMU 01-001(f) are shown in Figure 4.7-1. Table 4.7-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 01-001(f) will be contingent upon access and permission by the landowner and will consist of the following activities:

- *Septic System Pipelines.* The pipelines probably were removed during the construction of current buildings. The locations of the former pipelines have been regraded and developed. Samples will be collected from the 0- to 1.0-ft- and 2.0- to 3.0-ft-depth intervals where accessible: at the south end of the pipe at an asphalt parking lot (Figure 4.7-1, location 1) and along the former pipeline in the asphalt road (Figure 4.7-1, location 2). Zero depth is defined as beneath the bed of the excavated pipe. Care will be taken that debris containing roadbed material or asphalt is not inadvertently included in these samples. Photographs of SWMU 01-001(f) mesa top (Figure 4.7-2) show the current site status.
- *Septic Tank.* The location of the former septic tank is too close to a building (Figure 4.7-1); therefore, no sampling is proposed.
- *Outfall.* Samples will be collected from the 0- to 0.5-ft-, 1.5- to 2.0-ft-, and 4.0- to 5.0-ft -depth intervals at the mouth of the outfall (Figure 4.7-1, location 3). Outfall samples will be collected from a location 7 ft downslope from the mouth of the outfall, preferably in a discernible drainage (Figure 4.7-1, location 4), and 7 ft to the north and south of that location (Figure 4.7-1, locations 5 and 6). Location 7 will be 1 ft downslope from previous sample location 01-01095, approximately 30 ft downslope from location 4 (Figure 4.7-1), because 1996 RFI results showed elevated concentrations of thallium and total uranium. Additional samples will be collected 15 ft to the north and south of this location (Figure 4.7-1, locations 8 and 9). Extent farther downslope from the outfall will be defined by sampling the drainage of Hillside 140. Outfall sampling locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.
- *Drainage of Hillside 140.* Locations 10 and 12 will be 1 ft downslope from previous sample locations 01-01112 and 01-01110, respectively (Figure 4.7-1), because 1996 RFI results showed

elevated concentrations of thallium and total uranium. Another location will be sampled 15 ft north to location 10 (Figure 4.7-1, location 11). To determine the downslope extent of potential contamination along the drainage of Hillside 140, samples will be collected approximately every 40 to 65 ft following the main drainage. Because the drainage at Hillside 140 is obvious, samples will be collected along the center of the drainage (Figure 4.7-1, locations 13 through 21). Sediment sampling locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

4.8 SWMU 01-001(g), Septic Tank 141

Septic tank 141, 3 ft by 6 ft by 5 ft deep, installed in 1943 (LANL 2001, 69946, p. 37), was located south of Building X near the edge of Los Alamos Canyon and served X. Radioactive targets were tested in X. The tank received sanitary waste from Building X through one sanitary waste line. The outfall discharged over the rim of the canyon.

The site map of SWMU 01-001(g) is shown in Figure 4.8-1. Currently, the location of the former inlet pipeline is under a building of the Los Arboles townhouses, and the outfall area is undeveloped land owned by the DOE.

4.8.1 Summary of Previous Investigations for SWMU 01-001(g)

The tank, its inlet, and outlet lines were removed in 1975 during the Ahlquist Radiological Survey (Ahlquist et al. 1977, 05710, pp. 113–114). A Phase I RFI was conducted in 1992, and samples were collected along the canyon rim and on hillside; however, most of the samples were analyzed at CST on-site laboratories. Based on investigation results, the RFI report recommended NFA for SWMU 01-001(g) (LANL 1996, 54465, pp. iii, 49). Section 4.8.1 of the HIR provides details of previous investigations (LANL 2006, 91915) (Table 4.8-1).

A sample analyzed at an off-site fixed laboratory is a surface fill sample (0–0.5 ft) that was collected near the location of the former septic tank (Figure 4.8-1, Table 4.1-1). This sample was analyzed for metals.

4.8.2 Summary of Data for SWMU 01-001(g)

Data of the sample from location 01-06069 indicated that no metals were detected (LANL 2006, 91915) (Table 4.8-1.

Vertical and lateral extent have not been defined because only one sample at one depth was analyzed and it was analyzed only for metals.

4.8.3 Scope of Activities for SWMU 01-001(g)

The proposed sampling locations at SWMU 01-001(g) are shown in Figure 4.8-1. Table 4.8-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 01-001(g) will be contingent upon access and permission by the landowner and will consist of the following activities:

- *Septic System Pipelines.* The inlet pipeline was removed and its former location currently is partially under a building and partially in a private yard. No sampling is proposed at the former location of the inlet pipeline of the septic tank.
- *Septic Tank.* Samples will be collected from the 0- to 1.0-ft- and the 4.0- to 5.0-ft-depth intervals at the center of the floor of the excavation of the former septic tank location (Figure 4.8-1, location 1). Zero depth is defined as the floor of tank excavation.
- *Outfall.* Samples will be collected from the 0- to 0.5-ft-, 1.5- to 2.0-ft-, and 4.0- to 5.0-ft-depth intervals at the mouth of the outfall (Figure 4.8-1, location 2). Outfall samples will be collected from a location 7 ft downslope from the mouth of the outfall, preferably in a discernible drainage (Figure 4.8-1, location 3), and 7 ft to the west and east of that location (Figure 4.8-1, locations 4 and 5). Outfall sampling locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

4.9 SWMU 01-001(o), Sanitary Waste Line

SWMU 01-001(o) is the former sanitary waste line located east of Bailey Bridge and served Buildings J and ML: J housed a laboratory and ML was a medical laboratory. The line discharged directly into Bailey Bridge Canyon.

The site map of SWMU 01-001(o) is shown in Figure 4.9-1. Currently, the location of the pipeline runs across Loma Vista Drive and under a building of the Los Arboles townhouses.

4.9.1 Summary of Previous Investigations for SWMU 01-001(o)

The sanitary waste line was removed in 1959 (Buckland 1959, 03426). The Ahlquist Radiological Survey indicated part of the line still existed and was subsequently removed (Ahlquist et al. 1977, 05710, p. 126). A Phase I RFI was conducted and samples were collected at the outfall area of SWMU 01-001(o). Based on investigation results, the RFI report recommended NFA for SWMU 01-001(o) (LANL 1996, 54461, pp. i, 81). Section 4.9.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

Samples analyzed at off-site fixed laboratories included six surface soil, fill, and sediment samples (0–0.5 ft) collected from six locations at SWMU 01-001(o) (Figure 4.9-1, Table 4.1-1). The suites analyzed for each sample are provided in Table 4.1-1.

4.9.2 Summary of Data for SWMU 01-001(o)

A summary of data for SWMU 01-001(o) is presented below. Section 4.9.2, Figures 4.9-2 and 4.9-3, and Tables 4.9-1, 4.9-2, and 4.9-3 HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from six locations (01-02064, 01-02073, 01-02075, 01-02080, 01-02095, and 01-02096) were analyzed for metals. Analytical results indicated that chromium, lead, mercury, nickel, silver, and uranium were detected at concentrations greater than BVs in at least one sample between 0 and 0.5 ft bgs. Chromium, lead, nickel, and uranium were detected at concentrations greater than the range of the background concentrations.

- Samples from six locations (01-02064, 01-02073, 01-02075, 01-02080, 01-02095, and 01-02096) were analyzed for SVOCs. Analytical results indicated that anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were detected in at least one sample between 0 and 0.5 ft bgs.
- Samples from six locations (01-02064, 01-02073, 01-02075, 01-02080, 01-02095, and 01-02096) were analyzed for isotopic plutonium. Analytical results indicated that plutonium-239 was detected at activities greater than FVs in at least one sample between 0 and 0.5 ft bgs. Plutonium-239 was detected at activities greater than the range of the fallout activities.

Vertical extent of contamination at these six locations has not been defined because samples were collected at only one depth (surface). Lateral extent has been defined for chromium, silver, and plutonium-238. Lateral extent has not been defined for lead, mercury, nickel, uranium, SVOCs, and plutonium-239.

Vertical and lateral extent of contamination have not been defined along the path of the pipeline or at the immediate area of the outfall because no samples have been collected in those areas.

4.9.3 Scope of Activities for SWMU 01-001(o)

The proposed sampling locations at SWMU 01-001(o) are shown in Figure 4.9-1. Table 4.9-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 01-001(o) will be contingent upon access and permission by the landowner and will consist of the following activities:

- *Septic System Pipelines.* Samples will be collected from the 0- to 1.0-ft- and 2.0- to 3.0-ft-depth intervals at the turn of the pipe (Figure 4.9-1, location 1). The location of the east end will be sampled during investigation of SWMU 01-002 (Section 4.13.3). Zero depth is defined as immediately beneath the bed of the excavated pipe. A photograph of SWMU 01-001(o) mesa top (Figure 4.9-2) shows the current site status.
- *Outfall.* Samples will be collected from the 0- to 0.5-ft-, 1.5- to 2.0-ft-, and 4.0- to 5.0-ft-depth intervals at the mouth of the outfall (Figure 4.9-1, location 2). Outfall samples will be collected from a location 7 ft downslope from the mouth of the outfall, preferably in a discernible drainage (Figure 4.9-1, location 3), and 7 ft to the north and south of that location (Figure 4.9-1, locations 4 and 5). Outfall sampling locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.
- *Confirming Previous Sampling Results.* Soil samples will be collected from the 0- to 0.5-ft- and 2.0- to 3.0-ft-depth intervals 1 ft downslope from previous sample location 01-02080 (Figure 4.9-1, location 6) because previous data indicated the presence of plutonium-239 with activity of 18 pCi/g in the 0- to 0.5-ft-depth interval (LANL 2006, 91915, Figure 4.9-3). To determine the extent of potential contamination, another location will be situated 10 ft downslope from location 6 (Figure 4.9-1, location 7), and 10 ft to the north and south of that location (Figure 4.9-1, locations 8 and 9). Sediment sampling locations will be selected by a

geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

4.10 SWMU 01-001(s) Western Sanitary Waste Line, Main Line

SWMUs 01-001(s,u) constitute the western sanitary waste line (WSWL). The buildings that were served by SWMU 01-001(s) housed most of the processing and production operations in the early days of the Laboratory. SWMU 01-001(s) served Buildings A, B; Boiler House 2; and Buildings C, D, G, M, V, and Sigma.

- Building A housed administrative offices.
- Building B had administrative offices and electronic and metallurgical laboratories. Small amounts of radionuclide foils were stored in a concrete vault in the building (Ahlquist et al. 1977, 05710, p. 128).
- Boiler House 2 supplied steam to TA-01 buildings.
- Building C had a uranium machine shop and other machining (e.g., graphite machining) operations. Before its removal in 1964, Building C was found to be free of radioactive contamination, except for the concrete building pad. The contaminated concrete pad was removed to an unspecified material disposal area (MDA).
- Building D was used to process plutonium.
- Building G housed the Sigma Pile, a small pile of graphite and uranium. Leak-testing of radium sources was also performed in Building G. In 1959, the building structure was found to be uncontaminated and was removed. The concrete floor was found to be slightly contaminated with radioactivity and, along with drain lines, was taken to an unspecified MDA (Ahlquist et al. 1977, 05710, p. 125).
- Building M was used to process and recover enriched uranium.
- Building V contained offices and a toolmaker's shop. It was the original machine shop for machining uranium and beryllium and for dry-grinding boron at TA-01.
- The Sigma Building was used for machining radionuclides for casting and powder metallurgy.

SWMU 01-001(s) exited from Building D, ran parallel to most of the main industrial waste line [SWMU 01-002], and passed near the southwest corner of Building C. It then proceeded west along the former Finch Street and turned north between former Buildings T-221 and T-225. This sanitary waste line connected to septic tank 6 [SWMU 00-030(g)] and discharged into Acid Canyon.

The site map of SWMU 01-001(s) is shown in Figure 4.10-1. Currently, the entire SWMU area has been developed. The location of majority of the western section of SWMU 01-001(s) is under the Trinity Village apartments. The location of the eastern section of SWMU 01-001(s) is under a number of streets and various buildings.

4.10.1 Summary of Previous Investigations for SWMU 01-001(s)

The portion of the WSWL leading from Building C to the east end of the eastern building of the Trinity Village apartments had been removed in the 1960s (Buckland 1973, 58138). The lines beneath the central and western Trinity Village buildings were probably removed before building construction, but the line beneath the eastern building may still be there. A Phase I RFI was conducted in 1994 and 1996. Thirteen locations (Figure 4.10-1) were physically accessible for field investigation (LANL 1993, 38753, pp. 8–9). A 210-ft portion of the WSWL at location 1A (from near Timber Ridge to Trinity Drive) was removed in 1994 (LANL 1995, 66456, p. iii, Section 3.0). The portion of the WSWL at location 13 was removed in 1994 (LANL 1997, 56660.112, p. 52).

Geophysical surveys were conducted at location 2 (Figure 4.12-1) and location 8 and boreholes were drilled to assess contamination associated with soils outside of the WSWL (LANL 1997, 56660.112, pp. 9, 58). For locations 1B, 4, 5, 6, 7, and 12, only geophysical surveys were conducted (LANL 1997, 56660.112, p. 9). In 1996, approximately 250 ft of the WSWL was removed from locations 9, 10, and 11, and an additional 12 ft of the WSWL was removed from location 1A during the interim action (LANL 1996, 62538, p. 3). Based on investigation results, the RFI report recommended NFA for SWMU 01-001(s) (LANL 1997, 56660.112, pp. ii, 131). In 2000, NMED issued final approval that no additional investigation was needed at the location 1A portion of the WSWL (NMED 2000, 68647). The approval, however, did not grant NFA for the entire SWMU. Section 4.10.1 of the HIR provides details of previous investigations (LANL 2006, 91915). Portions of the WSWL that may still be in place are at locations 1B, 4, 7, 8, and 12 (LANL 1997, 56660.112, p. 7).

Samples analyzed at off-site fixed laboratories included four soil samples collected from four locations along the pipeline path at SWMU 01-001(s) at depths of 0 to 7.5 ft (Figure 4.10-1, Table 4.1-1). The suites analyzed for each sample are provided in Table 4.1-1.

4.10.2 Summary of Data for SWMU 01-001(s)

A summary of data for SWMU 01-001(s) is presented below. Section 4.10.2, Figures 4.10-2 and 4.10-3, and Tables 4.10-1 and 4.10-2 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from three locations (01-04109, 01-04120, and 01-04260) were analyzed for metals. Analytical results indicated that copper, lead, and mercury were detected at concentrations greater than BVs in at least one sample between 0 and 7.5 ft bgs. Lead was detected at a concentration within the range of the background concentrations. Copper was detected at a concentration greater than the range of the background concentrations.
- The sample from one location (01-04105) was analyzed for PCBs and pesticides; the sample from another location (01-04260) was analyzed for PCBs, pesticides, and SVOCs. No organic chemicals were detected.
- Samples from two locations (01-04105 and 01-04109) were analyzed for isotopic plutonium and isotopic uranium; the sample from location 01-04260 was analyzed by gamma spectroscopy for isotopic plutonium, isotopic uranium, and tritium. Analytical results indicated that plutonium-238 and plutonium-239 were detected at depths where FVs do not apply, and uranium-234 was detected at an activity greater than BV in at least one sample between 0 and 6.5 ft bgs. Uranium-34 was detected at an activity greater than the range of the background activities at location 01-04-109.

Vertical and lateral extent of contamination have not been defined at SWMU 01-001(s) because a limited number of samples were collected from a limited number of locations and depths and analyzed for only a limited number of suites.

4.10.3 Scope of Activities for SWMU 01-001(s)

Among the 13 locations identified in the 1993 sampling and analysis plan (LANL 1993, 38753, pp. 8–9), location 1A was granted NFA in 2000 (NMED 2000, 68647); therefore, no sampling will be proposed west of Timber Ridge Road (Figure 4.10-1). Locations 2 and 3 will be addressed in the scope of activities for SWMU 01-001(u) in Section 4.12.3.

The proposed sampling locations at SWMU 01-001(s) are shown in Figure 4.10-1. Table 4.10-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 01-001(s) will be contingent upon access and permission by the landowner and will consist of the following activity:

- *Waste Line.* A total of 13 locations will be sampled along the waste line. Sampling locations 1 through 3 are at the Trinity Village apartments. Sampling locations 1 and 2 are pebble-landscaped areas. Sample location 3 is at an asphalt road. Sampling locations 4 and 5 are at the asphalt parking/road surrounding the Duratek and Oppenheimer buildings. Sampling location 6 is to the east of the intersection of Oppenheimer Drive and Short Drive. Sampling location 7 is at the landscaped areas beside the sidewalk. Sampling locations 8 through 13 are at paved roads or parking areas. Samples will be collected at the bed of the excavated pipe from the 0- to 1.0-ft- and 2.0- to 3.0-ft-depth intervals. Zero depth is defined as immediately beneath the bed of the excavated pipe. Care will be taken when collecting samples located under paved areas that debris containing roadbed material or asphalt is not inadvertently included in the sample. Photographs of SWMU 01-001(s) (Figure 4.10-2) show the current site status.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs, SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

4.11 SWMU 01-001(t), Eastern Sanitary Waste Line

SWMU 01-001(t), known as the eastern sanitary waste line, served Gamma, M, P-Prime, R, S, S-1, T, U, V, W, and Z buildings:

- Gamma housed offices and a physics laboratory.
- M was used to process and recover enriched uranium.
- P-Prime was used for supply and property offices.
- R housed electrical, glass blowing, carpentry, and plumbing shops.
- S was used as a technical warehouse and stock building.
- S-1 served as Garage 1 and later was used to store nonradioactive materials.
- T housed the Theoretical Division and contained offices, a silver-soldering operation, and a photography laboratory.
- U contained physics laboratories where radionuclides were used.

- V contained offices and a toolmaker's shop. It was the original TA-01 machine shop for machining uranium and beryllium and for dry-grinding boron.
- W housed the Van de Graaff accelerator.
- Z housed two high-voltage accelerators that were used for research on atomic nuclei.

Pipelines from the buildings connected to septic tank 1 [SWMU 00-030(b)] that discharged into a drain field southeast of the intersection of DP Road and Trinity Drive. Later, effluent was routed to the central wastewater treatment plant until it was decommissioned and then to other Los Alamos County treatment plants. TA-01 was fully decommissioned by 1966, and the ESWL was left in place.

The site map of SWMU 01-001(t) is shown in Figure 4.11-1. Currently, the entire SWMU area is either landscaped (around Ashley Pond) or beneath various streets, parking lots, and commercial buildings.

4.11.1 Summary of Previous Investigations for SWMU 01-001(t)

A Phase I RFI was conducted at SWMU 01-001(t) in 1993. Subsurface samples were collected during the construction of office buildings west of the Los Alamos Inn to determine if any contamination was present that could adversely affect the construction project. Based on archival information and the results of the Phase I RFI, the RFI report recommended NFA for SWMU 01-001(t) (LANL 1996, 54463, pp. i, 55). NMED rejected the RFI report for SWMUs that included 01-001(t) in a letter to DOE-Los Alamos Office (LAO) and the Laboratory on November 18, 1997 (NMED 1997, 57000). Section 4.11.1 of HIR provides details of the investigation (LANL 2006, 91915).

4.11.2 Summary of Data for SWMU 01-001(t)

No off-site fixed-laboratory data are available for this SWMU.

4.11.3 Scope of Activities for SWMU 01-001(t), AOC 01-006(e), and AOC 01-007(k)

The proposed sampling activities for SWMU 01-001(t) are combined with adjacent AOCs 01-006(e) and 01-007(k) because of physical vicinity of these sites. The background information and previous investigation on AOCs 01-006(e) and 01-007(k) are given in Sections 4.23 and 4.34, respectively. The proposed sampling locations at 01-001(t), 01-006(e), and 01-007(k) are shown in Figure 4.11-2. Table 4.11-1 provides a summary of the proposed sample locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling will be contingent upon access and permission by the landowner and will consist of the following activities:

- *Waste Line of SWMU 01-001(t).* A total of 10 locations will be sampled along the waste line. Sample locations 1 through 5 are at the grass area surrounding Ashley Pond. The pipe branch under Trinity Drive will not be sampled because there is no complete pathway for potential contaminant transport. In addition, the area has been extensively regraded for preparation of the roadbed, and thus the original bed surface of the pipe is not expected to be there. Data from samples collected from under the road would not represent SWMU 01-001(t). Sample locations 6 through 10 are at the heavily developed area to the south of Trinity Drive, and all these locations are under either paved parking lots or driveways. Samples will be collected at the bed of the pipe from the 0- to 1.0-ft- and 2.0- to 3.0-ft-depth intervals. Zero depth is defined as immediately beneath the bed of the pipe. Where the drain lines of 01-006(e) and the pipeline of 01-001(t) intersect (Figure 4.11-2, locations 1, 3, and 5), zero depth is defined as immediately beneath the bed of the lower pipe. Care will be taken when collecting samples located under the parking lot or driveway that debris containing asphalt is not inadvertently included in the sample.

- *Drain Lines of AOC 01-006(e).* This AOC will be characterized by sampling activities at locations 1, 3, and 5 (Figure 4.11-2).
- *AOC 01-007(k).* This AOC will be characterized by sampling activities at locations 8, 9, and 10 (Figure 4.11-2).

Photographs of SWMU 01-001(t), AOC 01-006(e), and AOC 01-007(k) (Figure 4.11-3) show the current site status.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs, SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

4.12 SWMU 01-001(u), Western Sanitary Waste Line, Branch Line

SWMU 01-001(u) is a branch of the WSWL that served Building J-2, built in 1949 for radiochemistry work and it was connected to the main WSWL [SWMU 01-001(s)] through SWMU 01-001(u). SWMU 01-001(u) was not removed during TA-01 D&D because it was not considered contaminated based on the soil- sample data and portable beta-gamma instrument survey (Ahlquist et al. 1977, 05710, pp. 92, 127).

The site map of SWMU 01-001(u) is shown in Figure 4.12-1. Currently, the location of the southern portion of the pipeline is under a building of the Timber Ridge condominiums, the middle section is at a wooded area behind the condominium, and the northern portion of the pipeline is under the parking lot and between two buildings of the Trinity Village apartments.

4.12.1 Summary of Previous Investigations for SWMU 01-001(u)

The Timber Ridge condominiums were built over and around SWMU 01-001(u) in the 1970s. Geophysical survey and borehole drilling were conducted at SWMU 01-001(u) in 1994 (location 2 on Figure 4.12-1), and no piping was encountered (LANL 1997, 56660.112, p. 58). Based on investigation results, the RFI report recommended NFA for SWMU 01-001(u) (LANL 1997, 56660.112, pp. ii, 131). Section 4.12.1 of the HIR provides details of the investigation (LANL 2006, 91915).

A sample analyzed at off-site fixed laboratories is a soil sample collected from the wooded area behind a condominium at SWMU 01-001(u) at the depth interval from 1 to 3 ft (Figure 4.12-1, Table 4.1-1). It was analyzed for metals, PCBs, pesticides, SVOCs, VOCs, isotopic plutonium, and isotopic uranium.

4.12.2 Summary of Data for SWMU 01-001(u)

A summary of data for SWMU 01-001(u) is presented below. Section 4.12.2, Figure 4.12-2, and Tables 4.12-1 and 4.12-2 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- One sample at location 01-04129 was analyzed for metals. Analytical results indicated that lead was detected at a concentration greater than BV but within the range of the background concentrations at a depth interval between 1.0 and 3.0 ft bgs.
- One sample at location 01-04129 was analyzed for PCBs, pesticides, SVOCs, and VOCs. Acetone was detected at a depth interval sampled between 1.0 and 3.0 ft bgs.

- One sample at location 01-04129 was analyzed for isotopic plutonium and isotopic uranium. No radionuclides were detected or detected at activities greater than BV/FV.

Vertical and lateral extent of contamination have not been defined at SWMU 01-001(u) because only one sample was collected from one location at the SWMU.

4.12.3 Scope of Activities for SWMU 01-001(u)

The proposed sampling locations at SWMU 1-001(u) are shown in Figure 4.12-1. Table 4.12-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 1-001(u) will be contingent upon access and permission by the landowner and will consist of the following activity:

- *Waste Line*. The pipeline probably was removed during the construction of the condominiums. Samples will be collected where accessible along the excavated pipeline (Figure 4.12-1, sample locations 1 and 2). Samples will be collected from the 0- to 1.0-ft- and 2.0- to 3.0-ft-depth intervals. Zero depth is defined as immediately beneath the bed of the excavated pipe. Sample location 1 is at the asphalt parking lot of the Trinity Village condominiums. Care will be taken when collecting samples located under a road that debris containing roadbed material or asphalt is not inadvertently included in the sample. Sample location 2 is at a wooded area behind a residential building. A photograph of SWMU 01-001(u) (Figure 4.12-2) shows the current site status.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs, SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

4.13 SWMU 01-002, Industrial Waste Line

SWMU 01-002 is located in the southern and western portion of TA-01. From 1943 to 1951, chemical and radioactive process wastes passed through this section of pipe en route to discharge to Acid Canyon, a small branch of Pueblo Canyon. SWMU 01-002 includes the area around former Boiler House 2, Buildings D, H, J-2, M, ML, Q, Sigma, and several properties north of Trinity Drive extending to Canyon Road (near the location of TA-45). These buildings were the sources of major process discharges from TA-01 (Ahlquist et al. 1977, 05710, p. 15).

- Boiler House 2 supplied steam for TA-01.
- Building D was used to process plutonium.
- Building H was used for source preparation of polonium-210.
- Building J-2 was used for radiochemistry work.
- Building M was used to recover enriched uranium-235.
- Building ML was a medical laboratory.
- Building Q was used to calibrate laboratory equipment using radium-226 as a check source.
- Sigma Building was used for machining radionuclides for casting and powder metallurgy.

The industrial waste line had two sections: The main industrial waste line south of Trinity Drive ran from Building D and the western industrial waste line ran from building J-2 to its junction with the main industrial waste line outside the TA-01 boundary. From the junction, the line ran north as a single unit to the TA-45 waste treatment plant.

The site map of SWMU 01-002 is shown in Figure 4.13-1. Currently, the entire SWMU area has been developed. The location of the western section is under pavement and buildings of the Timber Ridge condominiums. The location of the eastern section is under pavement and various commercial and residential buildings.

4.13.1 Summary of Previous Investigations for SWMU 01-002

The industrial waste line in TA-01 was completely removed along with a substantial amount of contaminated soil associated with the industrial waste line during the Ahlquist Radiological Survey (Ahlquist et al. 1977, 05710, pp. 83, 90, 92, 94). In 1985, the last remnants of the industrial waste line between TA-01 and the Acid Canyon outfall near TA-45 were removed (Elder et al. 1986, 06666, p. 37). An interim action was conducted in 1990 at the route of former industrial waste line between Central Avenue and Rose Street at the Central School site in response to a request from Los Alamos schools (LANL 1990, 07501). No contamination was found. A Phase I RFI was conducted in 1993 and 1994, and subsurface samples were collected at former Buildings D, U, M, and Z and Loma Vista Drive properties. Based on investigation results, the RFI report recommended NFA for SWMU 01-002 (LANL 1996, 54463, pp. i, 44). NMED rejected the RFI report for SWMUs that included 01-002 in a letter to DOE-Los Alamos Area Office (LAAO) and LANL on November 18, 1997 (NMED 1997, 57000). Section 4.13.1 of the Upper Los Alamos Canyon Aggregate Area HIR provides details of previous investigations (LANL 2006, 91915).

Samples analyzed at off-site fixed laboratories included 17 soil, fill, and tuff samples collected from 11 locations along the path of the pipeline at SWMU 01-002 at depths of 1.42 to 20.5 ft (Figure 4.12-1, Table 4.1-1). The suites analyzed for each sample are provided in Table 4.1-1.

4.13.2 Summary of Data for SWMU 01-002

A summary of data for SWMU 01-002 is presented below. Section 4.13.2, Figures 4.13-2 and 4.13-3, and Tables 4.13-1, 4.13-2, and 4.13-3 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from eight locations (01-04219, 01-04220, and 01-04222 through 01-04227) were analyzed for metals. Analytical results indicated that barium, calcium, lead, mercury, uranium, zinc were detected at concentrations greater than BVs in at least one sample between 1.42 and 20.5 ft bgs. Uranium was detected at a concentration within the range of the background concentrations in the only sample analyzed for uranium at one location (01-04222). Barium, calcium, lead, and zinc were detected at concentrations greater than the range of the background concentrations.

- Samples from six locations (01-04219, 01-04220, and 01-04222 through 01-04225) were analyzed for SVOCs. Analytical results indicated that only bis(2-ethylhexyl)phthalate was detected in the deepest depth interval sampled between 9.0 and 9.5 ft bgs at location 01-04220.

- Samples from three locations (01-04021, 01-04022, and 01-04026) were analyzed for isotopic plutonium and isotopic uranium and the sample from one location (01-04222) was analyzed by gamma spectroscopy. Analytical results indicated that only plutonium-239 was detected in one sample at 01-04026 between 4.0 and 8.0 ft bgs.

Vertical extent of contamination has not been defined at 6 of the 11 locations because only one depth interval was sampled. At the five locations sampled at multiple depths and analyzed for metals and SVOCs, vertical extent was not defined for mercury, uranium, and bis(2-ethylhexyl)phthalate.

Vertical and lateral extent of contamination have not been defined at SWMU 01-002 because a limited number of samples were collected from a limited number of locations and depths and analyzed for a limited number of suites.

4.13.3 Scope of Activities for SWMU 01-002 and Adjacent SWMU 01-007(c)

The proposed sampling activities for SWMU 01-002 are combined with adjacent SWMU 01-007(c) because of physical vicinity of these sites. The background information and previous investigation on SWMU 01-007(c) are given in Section 4.30. The proposed sample locations at SWMUs 01-002 and 01-007(c) are shown in Figure 4.13-2. Table 4.13-1 provides a summary of the proposed sample locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMUs 01-002 and 01-007(c) will be contingent upon access and permission by the landowner and will consist of the following activities:

- *Industrial Waste Line.* A total of 18 locations will be sampled along the waste line. Locations 1 through 3 are at the western section of the industrial waste line. The western end is at a private yard and no sampling is proposed there. Location 1 is at a wooded area. Locations 2 and 3 are at the asphalt parking area west and north of the Duratek building. Locations 4 through 18 are at the eastern section along the main line and pipe branches that served Buildings Sigma, H, Q, ML, M, and D. These locations are at either landscaped areas or paved roads/parking lots. Samples will be collected along the main industrial waste line (Figure 4.13-2, locations 4, 5, 9–12, and 17), at the branches that served Sigma (Figure 4.13-2, locations 6–8), at the branches that served ML (Figure 4.13-2, locations 13 and 14), at the branches that served M (Figure 4.13-2, locations 15 and 16), and at the branches that served D (Figure 4.13-2, location 18). Samples will be collected at the bed of the previously excavated pipe from the 0- to 1.0-ft- and 2.0- to 3.0-ft depth intervals. Zero depth is defined as immediately beneath the bed of the previously excavated pipe. Care will be taken when collecting samples located under the road that debris containing roadbed material or asphalt is not inadvertently included in the sample.
- *SWMU 01-007(c).* This SWMU will be characterized by sampling activities at locations 12, 14, 15, and 17 (Figure 4.13-2).

Photographs of SWMUs 01-002 and 01-007(c) (Figure 4.13-3) show the current site status.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs, SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

4.14 SWMU 01-003(a), Bailey Bridge Landfill

Bailey Bridge landfill was used for disposal of demolition debris between 1964 and 1978. A September 1964 Zia Company memorandum regarding disposal of TA-01 debris from demolition activities specified that concrete walls and flooring from Sigma Building with activity less than 2500 cpm of surface alpha contamination were broken up and disposed of in Bailey Bridge Canyon and covered with 4 ft of earthen fill (Hill 1964, 04821). Additional fill was deposited when the area was developed for housing. Demolition debris with less than 2500 cpm of surface alpha contamination from several other buildings (D-5 vault, HT, Warehouse 19, and sheet metal shop) located in the western portion of TA-01 was also disposed of in Bailey Bridge Canyon and covered with soil (Ahlquist et al. 1977, 05710, p. 122; DOE 1987, 08662).

The site map of SWMU 01-003(a) is shown in Figure 4.14-1. The Bailey Bridge no longer exists, and the head of Bailey Bridge Canyon (the location of the landfill) has received fill material and been regraded. The mesa-top portion of the SWMU is under pavement and under one building of the Loma Vista condominium complex. The area downslope from the landfill is undeveloped DOE land.

4.14.1 Summary of Previous Investigations for SWMU 01-003(a)

A Phase I RFI was conducted in 1992 and samples were collected at the landfill and on the hillside. Debris mapping and screening were conducted in 1994, and no radioactivity was observed greater than background. Based on investigation results, the RFI report recommended NFA for SWMU 01-003(a) (LANL 1996, 54461, pp. i, 81). Section 4.14.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

Samples analyzed at off-site fixed laboratories included five surface soil, fill, and sediment samples (0–0.5 ft) collected from five locations within and downslope from SWMU 01-003(a) (Figure 4.14-1, Table 4.1-1). The suites analyzed for each sample are provided in Table 4.1-1.

4.14.2 Summary of Data for SWMU 01-003(a)

A summary of data for SWMU 01-003(a) is presented below. Section 4.14.2, Figures 4.14-2 and 4.14-3, and Tables 4.14-1 and 4.14-2 of the Upper Los Alamos Canyon Aggregate Area HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from five locations (01-02058, 01-02114, 01-02122, 01-02133, and 01-06064) were analyzed for metals. Analytical results indicated that antimony, cadmium, lead, mercury, and selenium were detected at concentrations greater than BVs in at least one sample between 0 and 0.5 ft bgs. Cadmium was detected at concentrations within the range of the background concentrations. Antimony, lead, and selenium were detected at concentrations greater than the range of the background concentrations.
- The sample from one location (01-02058) was analyzed for SVOCs. No SVOCs were detected.
- A sample from one location (01-02058) was analyzed for isotopic plutonium, and samples from three locations (01-02114, 01-02122, and 01-02133) were analyzed for isotopic plutonium and isotopic uranium. Analytical results indicated that plutonium-238 and plutonium-239 were detected at activities greater than FVs, and uranium-234 and uranium-238 were detected at activities greater than BVs in at least one sample between 0 and 0.5 ft bgs. Plutonium-238 and plutonium-239 were detected greater than the range of the fallout activities. Uranium-234 and uranium-238 were detected greater than the range of the background activities.

Vertical extent of contamination at these five locations has not been defined because samples were collected only at one depth (surface). Lateral extent has been defined for antimony, cadmium, mercury, selenium, plutonium-238, and isotopic uranium. Lateral extent has not been defined for lead, SVOCs, and plutonium-239.

Vertical and lateral extent of contamination have not been defined at SWMU 01-003(a) because a limited number of samples were collected from a limited number of locations and depths and analyzed for a limited number of suites.

4.14.3 Scope of Activities for SWMU 01-003(a)

The proposed sampling locations at SWMU 01-003(a) are shown in Figure 4.14-1. Table 4.14-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 01-003(a) will be contingent upon access and permission by the landowner and will consist of the following activities:

- *Area of Landfill.* Because the northern portion of the SWMU is currently under building and pavement, no samples will be collected in the northern portion of the SWMU. Samples will be collected at the back of the building and on a hillside near the former bridge/old perimeter road (Figure 4.14-1, locations 1 and 2). Two sampling locations will be situated approximately 50 ft downgradient of locations 1 and 2 (Figure 4.14-1, locations 3 and 4). Samples will be collected from the 0- to 0.5-ft- and 2.0- to 3.0-ft-depth intervals. The eastern portion of the SWMU area will be sampled during the sampling activities of the outfalls of SWMU 01-001(o) (Section 4.9.3) and SWMU 01-006(o) (Section 4.27.3).
- *Drainage.* Samples will be collected in the discernible drainage on the hillside approximately every 50 ft (Figure 4.14-1, locations 5, 6, 8, and 10 through 18). Locations 7 and 9 will be 1 ft downslope from previous sampling locations 01-02114 and 01-02133, respectively (Figure 4.14-1), because the 1996 RFI results indicated radionuclides with concentrations greater than BVs/FVs. Locations 15 and 16 will be 1 ft downslope from previous sample locations 01-02171 and 01-02172, respectively (Figure 4.14-1), to confirm past screening-level data. Sediment sample locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

4.15 SWMU 01-003(b), Surface Disposal Area

SWMU 01-003(b) is the former surface disposal site for construction debris reported to be below the north rim of Los Alamos Canyon approximately 450 ft east of Bailey Bridge Canyon (LANL 1990, 07511).

The approximate location of SWMU 01-003(b) is shown in Figure 4.15-1. Currently, the area is undeveloped DOE land.

4.15.1 Summary of Previous Investigations for SWMU 01-003(b)

During the preparation of the 1992 work plan, several trips were made to locate the site, but the disposal area was not evident although several pieces of metal piping were found. The pipes appeared to be components of the aboveground carriage supporting the steam lines that once traversed TA-01. The site was proposed for NFA in the work plan (LANL 1992, 43454, p. 2-20).

During the preparation of the RFI report, several additional attempts were made to locate this site. A few objects were found scattered over more than an acre on the hillside, and the portable beta/gamma instruments used to screen each object registered only background radiation. No evidence of objects that contain hazardous constituents was found. Therefore, SWMU 01-003(b) was proposed for NFA in the RFI report (LANL 1996, 54465, pp. iii, 49).

4.15.2 Summary of Data for SWMU 01-003(b)

No off-site fixed laboratory data are available for this SWMU.

4.15.3 Scope of Activities for SWMU 01-003(b)

In an attempt to locate and characterize this SWMU, a walkover geophysical survey will be conducted. If no geophysical anomalies indicating a concentrated area of disposal are found, it will be assumed that no disposal site exists and no sampling will be conducted. If the walkover geophysical survey produces anomalies indicating a concentrated area of disposal, sampling will be conducted to define the nature and extent of potential contamination. Sampling will consist of one location in the middle of the anomaly, one to the north, east, south, and west of the perimeter of the anomaly at depths of 0–0.5 ft and 2–3 ft.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, furans, PCBs, VOCs, and SVOCs will not be analyzed because this surface disposal area was only for demolition debris from TA-01.

4.16 AOC 01-003(c), Surface Disposal Site

AOC 01-003(c) was a surface disposal area located below the north rim of Los Alamos Canyon and west of Bailey Bridge Canyon (LANL 1990, 07511).

The approximate location of AOC 01-003(c) is shown in Figure 4.16-1. Currently, the area is behind the backyard of a condominium and on a cliff of Los Alamos Canyon.

4.16.1 Summary of Previous Investigations for AOC 01-003(c)

A site visit was conducted in 1988 and no debris was observed. According to the OU 1078 RFI work plan, no record of any radioactive waste disposal at AOC 01-003(c) was found (LANL 1992, 43454, p. 2-20). Therefore, the site was recommended for NFA. In 1996, a Phase I RFI did not locate the surface disposal site. An area to the southeast of the originally described site location was identified. The RFI report for AOC 01-003(c) stated that a few scattered pieces of solid, nonhazardous debris were found at a site near the canyon rim, but the site did not qualify as a SWMU (LANL 1996, 54467, p. 27). Therefore, the site was proposed for NFA again (LANL 1996, 54467, pp. ii, 27). In a 1998 letter to DOE, the Laboratory listed AOC 01-003(c) as 1 of 73 sites identified for NFA (LANL 1998, 59689, Table 2). The site was never listed on the Laboratory's HSWA permit.

4.16.2 Summary of Data for AOC 01-003(c)

No off-site fixed laboratory data are available for this AOC.

4.16.3 Scope of Activities for AOC 01-003(c)

No sampling activities are proposed for AOC 01-003(c). A site visit revealed that the area is bare with boulders and no debris on the steep cliff. The site does not exist anymore. A photograph of AOC 01-003(c) (Figure 4.16-2) shows the current site status.

4.17 SWMU 01-003(d), Surface Disposal Site—Can Dump Site

SWMU 01-003(d) was used for surface disposal of empty solvent and paint cans during the operations of Zia Company (paint, carpentry, furniture repair, and sign shops). No radioactive materials were handled in these warehouses because they were outside the TA-01 security fence. The SWMU is located on the undeveloped hillside of Los Alamos Canyon just south of the current U.S. West Communications Facility.

The site map of SWMU 01-003(d) is shown in Figure 4.17-1. Currently, the area is undeveloped DOE land.

4.17.1 Summary of Previous Investigations for SWMU 01-003(d)

A Phase I RFI was conducted in 1992, and samples were collected across the entire area of the SWMU. Because a paint spill was discovered during the investigation, a VCA was conducted in 1995 to remove decomposing paint cans and the paint spill. The majority of the paint and contaminated soil were excavated; however, some material was considered to be unsafe to remove because of the topography and was left in place and covered with erosion control matting (LANL 1996, 55029). The submission letter for the VCA report requested NMED concurrence to remove SWMU 01-003(d) from Module VIII of the Laboratory's Hazardous Waste Facility Permit (LANL 1996, 55029, p. 1). Section 4.17.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

Samples analyzed at off-site fixed laboratories included three surface soil samples (0–0.5 ft) collected from three locations on the hillside within SWMU 01-003(d) (Figure 4.17-1, Table 4.1-1). The suites analyzed for each sample are provided in Table 4.1-1.

4.17.2 Summary of Data for SWMU 01-003(d)

A summary of data for SWMU 01-003(d) is presented below. Section 4.17.2, Figures 4.17-2 and 4.17-3, and Tables 4.17-1 and 4.17-2 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from three locations (01-06005, 01-06014, and 01-06023) were analyzed for metals. Analytical results indicated that antimony, barium, lead, mercury, and uranium were detected greater than BVs in at least one sample between 0 and 0.5 ft bgs. Barium was detected within the range of the background concentrations. Antimony, lead, and uranium were detected greater than the range of the background concentrations.
- Samples from three locations (01-06005, 01-06014, and 01-06023) were analyzed for SVOCs; none were detected.
- Samples from three locations (01-06005, 01-06014, and 01-06023) were analyzed for isotopic plutonium. Analytical results indicated that plutonium-239 was detected greater than the range of the fallout activities in the only depth sampled between 0 and 0.5 ft bgs at one location (01-06023).

Vertical extent of contamination at these three locations has not been defined because samples were collected only at one depth (surface). Lateral extent downgradient has been defined for antimony, barium, lead, uranium, SVOCs, and isotopic plutonium but not defined for mercury.

Vertical and lateral extent of contamination have not been defined at SWMU 01-003(d) because a limited number of samples were collected from a limited number of locations and depths and were analyzed for a limited number of suites.

4.17.3 Scope of Activities for SWMU 01-003(d)

The proposed sampling locations at SWMU 01-003(d) are shown on Figure 4.17-1. Table 4.17-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 01-003(d) will consist of the following activities:

- *Area of Landfill.* Visible and extruding foreign objects, if any, will be removed from the landfill area. Samples will be collected across the midsection of the landfill (Figure 4.17-1, locations 1 through 3). Samples will be collected from the 0- to 0.5-ft- and 2.0- to 3.0-ft-depth intervals.
- *Nature and Extent of Contamination Determination.* A line of three sample locations will be situated approximately 25 ft downgradient of the south boundary of the SWMU (Figure 4.17-1, locations 4 through 6). Samples will be collected from the 0- to 0.5-ft- and 2.0- to 3.0-ft-depth intervals.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because this landfill was used for disposal of solvent and paint containers.

4.18 SWMU 01-003(e), Surface Disposal Site Southeast of Los Alamos Inn

SWMU 01-003(e) was located along the northern wall of Los Alamos Canyon. In the early 1990s, the private land owner significantly altered the original canyon rim landscape by pushing the rim farther south using fill material. Before the alteration, discarded materials observed at the disposal area included utility boxes, concrete construction debris, piping, and other miscellaneous objects (DOE 1987, 08662). No documentation on radioactive contamination is available.

The site map of SWMU 01-003(e) is shown in Figure 4.18-1. Currently, a major portion of this SWMU is under the fill material, and the mesa-top portion of the SWMU does not contain any of the previously discarded materials.

4.18.1 Summary of Previous Investigations for SWMU 01-003(e)

A Phase I RFI was conducted in 1992 and samples were collected across the SWMU area. Based on investigation results, the RFI report recommended NFA for SWMU 01-001(e) (LANL 1996, 54461, pp. i, 92). Section 4.18.1 of the HIR provides details of the investigation (LANL 2006, 91915).

Samples analyzed at off-site fixed laboratories included two surface samples (0–0.5 ft), one soil and one sediment, collected from two locations immediately downslope from SWMU 01-003(e) (Figure 4.18-1, Table 4.1-1). The suites analyzed for each sample are provided in Table 4.1-1.

4.18.2 Summary of Data for SWMU 01-003(e)

A summary of data for SWMU 01-003(e) is presented below. Section 4.18.2, Figure 4.18-2, and Table 4.18-1 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from two locations (01-05041 and 01-05046) were analyzed for metals. Analytical results indicated that cadmium and lead were detected greater than BVs but within the range of the background concentrations in one sample between 0 and 0.5 ft bgs at location 01-05041.

- Two samples from two locations (01-05041 and 01-05046) were analyzed for isotopic plutonium and isotopic uranium. No radionuclides were detected greater than FVs or BVs.

Vertical extent of contamination at these two locations has not been defined because samples were collected only at one depth (surface). Lateral extent downgradient has been defined for cadmium, lead, isotopic plutonium, and isotopic uranium.

Vertical and lateral extent of contamination have not been defined at SWMU 01-003(e) because a limited number of samples were collected from a limited number of locations and depths, and these samples were analyzed for a limited number of suites.

4.18.3 Scope of Activities for SWMU 01-003(e)

Because the hillside SWMU has been resurfaced with fill material of unknown origin by the private landowner, and because the original canyon rim does not exist anymore, sampling activities will be conducted on the current hillside to characterize potential migration of contaminants. The proposed sampling locations at SWMU 01-003(e) are shown in Figure 4.18-1. Table 4.18-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 01-003(e) will be contingent upon access and permission by the landowner and will consist of the following activities:

- No sampling is proposed on the mesa top because it has been converted to a parking lot. A photograph of SWMU 01-003(e) mesa top (Figure 4.18-2) shows the current site status.
- *Soil Sampling on Hillside.* Samples will be collected 20–35 ft downslope from the canyon rim (Figure 4.18-1, locations 1 through 3). Samples will be collected from the 0- to 0.5-ft- and 2.0- to 3.0-ft-depth intervals.
- *Nature and Extent of Contamination Determination.* Samples will be collected from the 0- to 0.5-ft- and 2.0- to 3.0-ft-depth intervals downslope from the south boundary of the SWMU (Figure 4.18-1, locations 4 through 6).

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are unlikely to present in the landfill materials.

4.19 SWMU 01-006(a), Cooling Tower Drain Line and Outfall

SWMU 01-006(a) served Cooling Tower 80. The drain line and outfall were located on the east side of the cooling tower and south of Building X near the north rim of Los Alamos Canyon.

The site map of SWMU 01-006(a) is shown in Figure 4.19-1. Currently, the location of the former pipeline is under a building of the Los Arboles townhouses. Although no record can be found on the removal of the pipeline, it probably was removed during the construction of the residential building.

4.19.1 Summary of Previous Investigations for SWMU 01-006(a)

One soil sample was collected in 1987 during the DOE verification survey to search for chromium contamination. The sample results indicated no contamination (LANL 1987, 02956, p. 4).

A Phase I RFI was conducted in 1992 and samples were collected at the canyon rim and on the hillside. However, most of the samples were analyzed at CST on-site laboratories. Based on investigation results, the RFI report recommended NFA for SWMU 01-006(a) (LANL 1996, 54465, pp. iii, 49). Section 4.19.1 of the HIR provides details of the investigation (LANL 2006, 91915).

Among the samples collected in Phase I RFI, three surface soil samples (0–0.5 ft) were analyzed at off-site fixed laboratories. They were collected from three locations in the drainage downgradient of SWMU 01-006(a) (Figure 4.19-1, Table 4.1-1). These samples were analyzed for metals.

4.19.2 Summary of Data for SWMU 01-006(a)

A summary of data for SWMU 01-006(a) is presented below. Section 4.19.2, Figure 4.19-2, and Table 4.19-1 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from three locations (01-03083, 01-03088, and 01-03093) were analyzed for metals. Analytical results indicated that antimony, lead, and selenium were detected greater than BVs and were also greater than the range of background concentrations in at least one sample between 0 and 0.5 ft bgs.

Vertical extent of contamination at these three locations has not been defined because samples were collected only at one depth (surface). Lateral extent downgradient has been defined for antimony, lead, and selenium.

Vertical and lateral extent of contamination have not been defined at SWMU 01-006(a) because a limited number of samples were collected from a limited number of locations and depths and were analyzed for a limited number of suites.

4.19.3 Scope of Activities for SWMU 01-006(a)

The proposed sampling locations at SWMU 01-006(a) are shown in Figure 4.19-1. Table 4.19-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 01-006(a) will be contingent upon access and permission by the landowner and will consist of the following activities:

- *Drain Line.* The location of the former drain line is currently under a building. No sample can be collected along the location of the former drain line.
- *Outfall.* Samples will be collected from the 0- to 0.5-ft-, 1.5- to 2.0-ft-, and 4.0- to 5.0-ft-depth intervals at the mouth of the outfall or as close to the building as possible in a discernible drainage (Figure 4.19-1, location 1). Outfall samples will be collected from a location 7 ft immediately downslope from the mouth of the outfall (Figure 4.19-1, location 2), and 7 ft to the west and east of that location (Figure 4.19-1, locations 3 and 4). Outfall sampling locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.
- *Drainage.* Locations 5, 6, and 8 will be 1 ft downslope from previous sample locations 01-03088, 01-03093, and 01-03083, respectively (Figure 4.19-1). Two more locations will be situated in a discernible drainage, one approximately 60 ft downslope from location 6 (Figure 4.19-1, location 7) and the other approximately 30 ft downslope from location 8 (Figure 4.19-1, location 9), to define the extent of potential contamination. Sediment sampling locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

4.20 SWMU 01-006(b), Drain Line and Outfall

SWMU 01-006(b) served Building D, which was primarily used to process plutonium. The drain line exited the southwest side of the building and extended southwest and then south before discharging into Los Alamos Canyon. The types and quantities of fluids handled by this drain line are unknown. During the excavation of Buildings D and D-2 areas, all drain lines were removed along with areas of elevated radioactivity (Ahlquist et al. 1977, 05710, p. 64).

The site map of SWMU 01-006(b) is shown in Figure 4.20-1. Currently, the area is undeveloped.

4.20.1 Summary of Previous Investigations for SWMU 01-006(b)

The drain line was removed during the Ahlquist Radiological Survey (Ahlquist et al. 1977, 05710, p. 64). In 1992 and 1993, a Phase I RFI was conducted in the area of SWMU 01-007(a), within which SWMU 01-006(b) lies. Based on investigation results, the RFI report recommended NFA for SWMU 01-006(b) (LANL 1996, 54465, pp. iii, 119). Section 4.20.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

4.20.2 Summary of Data for SWMU 01-006(b)

No off-site fixed-laboratory data are available for this SWMU.

4.20.3 Scope of Activities for SWMU 01-006(b)

Proposed sampling for SWMU 01-006(b) is discussed with the sampling activities of SWMU 01-007(a) in Section 4.28.3.

4.21 SWMU 01-006(c), Drain Lines and Outfalls

SWMU 01-006(c) consists of possibly four drain lines and outfalls that served Building D-2. The drain lines exited the southwest side of the building and discharged directly onto Hillside 137. The two drain lines at the southeast end of the building were indicated on engineering drawings but were not located when trenching was conducted in the Building D-2 area (Ahlquist et al. 1977, 05710, p. 49). The two drain lines at the southwest end of the building were encountered during trenching (Ahlquist et al. 1977, 05710, p. 49). All four drain lines are shown in Figure 4.21-1.

The site map of SWMU 01-006(c) is shown in Figure 4.21-1. Currently, the site has been covered with fill material by the private owner in anticipation of redevelopment.

4.21.1 Summary of Previous Investigations for SWMU 01-006(c)

The drain lines were removed during the Ahlquist Radiological Survey (Ahlquist et al. 1977, 05710, p. 49). In 1992 and 1993, a Phase I RFI was conducted in the area of SWMU 01-007(b), within which SWMU 01-006(c) lies. Based on investigation results, the RFI report recommended NFA for

SWMU 01-006(c) (LANL 1996, 54465, pp. iv, 119). Section 4.21.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

4.21.2 Summary of Data for SWMU 01-006(c)

No off-site fixed-laboratory data are available for this SWMU.

4.21.3 Scope of Activities for SWMU 01-006(c)

Proposed sampling for SWMU 01-006(c) is presented along with the sampling activities of SWMU 01-001(c) in Section 4.4.3.

4.22 SWMU 01-006(d), Drain Line and Outfall

SWMU 01-006(d) served Building D-3 and discharged to Hillside 137 in the same area as the Building D-2 drain lines [SWMU 01-006(c)]. Activities at Building D-3 included counting radioactive filter papers from Building H-1 (Ahlquist et al. 1977, 05710, p. 128). During the decontamination of areas of Buildings D and D-2, all drain lines were removed along with areas of elevated radioactivity (Ahlquist et al. 1977, 05710, p. 64). Because the main portion of the drain line of Building D-3 was located in the Building D-2 area, this drain line was most likely removed during the excavation of Buildings D and D-2.

The site map of SWMU 01-006(d) is shown in Figure 4.22-1. Currently, the area is undeveloped.

4.22.1 Summary of Previous Investigations for SWMU 01-006(d)

In 1992 and 1993, a Phase I RFI was conducted at the area of SWMU 01-007(b) within which SWMU 01-006(d) lies. Because no contaminants of concern were identified, the RFI report recommended NFA for SWMU 01-006(d) (LANL 1996, 54465, pp. iii, 119).

4.22.2 Summary of Data for SWMU 01-006(d)

No off-site fixed-laboratory data are available for this SWMU.

4.22.3 Scope of Activities for SWMU 01-006(d)

Proposed sampling for SWMU 01-006(d) is presented along with the sampling activities of SWMU 01-001(c) in Section 4.4.3.

4.23 AOC 01-006(e), Drain Lines and Outfalls to Ashley Pond

AOC 01-006(e) consists of two drain lines and two outfalls to Ashley Pond. One drain line originated at Building P (structure 01-46); the other drain line served the cleaning plant. Building P was used for personnel offices, and no radioactive materials or hazardous chemicals, except toluene, were used in the building. Cleaning solvents were probably used at the cleaning plant. Building P drain line was a 4-in.-diameter pipe that extended northeast from the building for approximately 100 ft underground to the southwest side of the pond. The drain line from the cleaning plant originated at the northwest corner of the building and extended underground to the southeast side of the pond. The cleaning plant was replaced by a parking lot during decommission activities in the 1960s (LANL 1992, 43454, pp. 6-46, 6-47).

The site map of AOC 01-006(e) is shown in Figure 4.23-1. Currently, the locations of former pipelines are either landscaped or under pavement. The site is currently owned and operated by Los Alamos County.

4.23.1 Summary of Previous Investigations for AOC 01-006(e)

The water in Ashley Pond has been replaced several times and the sediment was removed at least once (IT Corporation 1991, 04816). In 1992, surface water and bottom sediment samples were collected to determine whether radiological and/or hazardous contaminants were present in the water and/or sediment (LANL 1996, 54461, pp. 110–112). No contamination was found exceeding applicable regulatory levels. The RFI report recommended NFA for AOC 01-006(e) (LANL 1996, 54461, pp. i, 122). Section 4.23.1 of the HIR provides a detailed chronology about the history of the Ashley Pond (LANL 2006, 91915).

4.23.2 Summary of Data for AOC 01-006(e)

The 1996 RFI report compared sludge results with the Laboratory soil BVs (LANL 1996, 54461, pp. 112–121). Inorganic chemicals, plutonium-238, and plutonium-239/240 were detected at concentrations greater than soil BVs/FVs. Acetone, 2-butanone, and 1,2,3- trimethylbenzene were detected. Results of water samples were compared with applicable regulatory levels at that time, and no constituents exceeded those levels (LANL 1996, 54461, pp. 118–120).

Vertical and lateral extent of contamination have not been defined because samples were not collected along the drain line.

4.23.3 Scope of Activities for AOC 01-006(e)

Proposed sampling for AOC 01-006(e) is presented along with the sampling activities of SWMU 01-001(t) in Section 4.11.3.

No sampling is proposed for Ashley Pond because the pond water has been previously drained out and the sediment removed (IT Corporation 1991, 04816). Therefore, evidence of historical laboratory operations would not be present in the water and sediment currently in the pond.

4.24 AOC 01-006(g), Stormwater-Drainage System

AOC 01-006(g) is the stormwater-drainage system that served ML, Q, X, D, D-4, and D-7 buildings:

- ML was a medical laboratory.
- Q was used to calibrate equipment, using radium-226 as a check source.
- X was used to test radioactive targets.
- D was used primarily to process plutonium.
- D-4 was storage.
- D-7 was used for hydrofluoric gas analysis.

The stormwater-drain system consisted of three buried conduits that emptied into one open north-south main drain. The main drain discharged approximately 20 ft south of the east side of Building X into Los Alamos Canyon.

The site map of AOC 01-006(g) is shown in Figure 4.24-1. Currently, locations of the pipelines are under either the pavement or residential buildings. The outfall is on the hillside of Los Alamos Canyon.

4.24.1 Summary of Previous Investigations for AOC 01-006(g)

The Ahlquist Radiological Survey found no radioactive contamination in the water drainage areas near Buildings ML, Q, X, D, D-4, and D-7 (Ahlquist et al. 1977, 05710, p. 42). In 1992, a Phase I RFI was conducted downgradient of AOC 01-006(g) at the canyon rim and the outfall area on the hillside. No contaminants of concern were identified. The RFI report recommended NFA for AOC 01-006(g) (LANL 1996, 54465, pp. iii, 49).

4.24.2 Summary of Data for AOC 01-006(g)

No off-site fixed-laboratory data are available for this AOC.

4.24.3 Scope of Activities for AOC 01-006(g)

The proposed sampling locations at AOC 01-006(g) are shown in Figure 4.24-1. Table 4.24-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at AOC 01-006(g) will be contingent upon access and permission by the landowner and will consist of the following activities:

- *Drain Lines.* AOC 01-006(g) is a stormwater-drain system, and the entire area where it was located has been regraded and developed. Residual contamination related to the building function could have been carried through the stormwater-drain system; however, it would have been diluted, and the amount of potential contamination would be extremely low. Thus, no sample activities are proposed for the stormwater-drain system on the mesa top.
- *Outfall.* Samples will be collected from the 0- to 0.5-ft-, 1.5- to 2.0-ft-, and 4.0- to 5.0-ft-depth intervals at the mouth of the outfall or as close to the residential building of the Los Arboles townhouses as possible (Figure 4.24-1, location 1). Outfall samples will be collected from a location 7 ft immediately downslope from the mouth of the outfall, preferably at a discernible drainage (Figure 4.24-1, location 2), and 7 ft to the west and east of that location (Figure 4.24-1, locations 3 and 4). Outfall sampling locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

4.25 SWMU 01-006(h), Stormwater-Drainage System

SWMU 01-006(h) is the stormwater-drainage system that served the northwest side of Building R and the east side of Building Y. Building R housed model, glass, carpentry, and plumbing shops. Building Y housed a physics laboratory that handled tritium, uranium-238, and polonium-210. The outfall was located 25 ft south of Building Y on the north rim of Los Alamos Canyon, immediately west of Hillside 138.

The site map of SWMU 01-006(h) is shown in Figure 4.25-1. Currently, the entire SWMU area is under commercial buildings.

4.25.1 Summary of Previous Investigations for SWMU 01-006(h)

The Ahlquist Radiological Survey found no radioactive contamination in the water drainage areas near Buildings R and Y (Ahlquist et al. 1977, 05710, p. 42). The SWMU was not sampled during the Phase I RFI in part because of inaccessibility along the majority of the former storm drain and outfall and also because results of the investigation conducted on Hillside 138 [the outfall area of SWMU 01-001(d)] would reveal any potential contamination (LANL 1995, 49703, p. 30). The RFI report recommended NFA for SWMU 01-006(h) (LANL 1995, 49703, pp. vii, 93–95). Section 4.25.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

4.25.2 Summary of Data for SWMU 01-006(h)

No off-site fixed-laboratory data are available for this SWMU.

4.25.3 Scope of Activities for SWMU 01-006(h)

Proposed sampling for SWMU 01-006(h) is presented along with the sampling activities of SWMU 01-001(d) in Section 4.5.3.

4.26 SWMU 01-006(n), Stormwater-Drainage System

SWMU 01-006(n) is the stormwater-drainage system that served Building D that was used to process plutonium. It originated near the east corner of the building and extended along the southeast side of the building to an outfall into Los Alamos Canyon. No information on the excavation of this specific drain line can be located, although during the excavation of Buildings D and D-2 areas, all drain lines were removed, along with areas of elevated radioactivity (Ahlquist et al. 1977, 05710, p. 64).

The site map of SWMU 01-006(n) is shown in Figure 4.26-1. Currently, the location of the pipeline is under a paved parking lot.

4.26.1 Summary of Previous Investigations for SWMU 01-006(n)

The Ahlquist Radiological Survey found no radioactive contamination in the water-drainage area near Building D (Ahlquist et al. 1977, 05710, p. 42). In 1992 and 1993, a Phase I RFI was conducted in the area of SWMU 01-007(a), which is downgradient of SWMU 01-006(n). No contaminants of concern were identified (LANL 1996, 54465, p. 110). The RFI report recommended NFA for SWMU 01-006(n) (LANL 1996, 54465, pp. iv, 118–119).

4.26.2 Summary of Data for SWMU 01-006(n)

No off-site fixed-laboratory data are available for this SWMU.

4.26.3 Scope of Activities for SWMU 01-006(n)

Proposed sampling for SWMU 01-006(n) is presented along with the sampling activities of SWMU 01-007(a) in Section 4.28.3.

4.27 SWMU 01-006(o), Stormwater-Drainage System

SWMU 01-006(o) is the stormwater-drainage system that served Buildings A, B, C, H, and Sigma 4. Buildings A and B contained administrative offices; C was used as shops; H was used for polonium-210 preparation; and Sigma 4 was used for storage. In 1964, the foundation of Building C was determined to be radiologically contaminated and was subsequently demolished and disposed of at an unspecified MDA. The storm drain near the H-Theta Building area was excavated (Ahlquist et al. 1977, 05710, p. 83). The entire area has been completely regraded and rebuilt.

The site map of SWMU 01-006(o) is shown in Figure 4.27-1. Currently, the majority of the SWMU area is under pavement and residential buildings.

4.27.1 Summary of Previous Investigations for SWMU 01-006(o)

The Ahlquist Radiological Survey found no radioactive contamination in the water drainage areas near Buildings A, B, C, and Sigma 4 (Ahlquist et al. 1977, 05710, p. 42). However, the water drainage from the H-Theta Building area was found contaminated with radioactivity and the associated storm drain was removed because of its potential for contamination (Ahlquist et al. 1977, 05710, p. 83). During the Phase I RFI in 1992, SWMU 01-006(o) was not sampled because the discharge end of the drainage system lies beneath the Los Arboles townhouses and several feet of fill material (LANL 1996, 54461, p. 50). However, an investigation was conducted at SWMU 01-003(a), which is downgradient of SWMU 01-006(o). The RFI report recommended NFA for SWMU 01-006(o) (LANL 1996, 54461, pp. i, 81).

4.27.2 Summary of Data for SWMU 01-006(o)

No off-site fixed-laboratory data are available for this SWMU.

4.27.3 Scope of Activities for SWMU 01-006(o)

The proposed sampling locations at SWMU 01-006(o) are shown in Figure 4.27-1. Table 4.27-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 01-006(o) will be contingent upon access and permission by the landowner and will consist of the following activities:

- *Drain Line.* SWMU 01-006(o) is a storm-drain system, and the entire area where it was located has been regraded and developed. Residual contamination related to the building function could have been carried through the storm-drain system; however, it would have been diluted and the amount of potential contamination would be extremely low. Thus, no sample activities are proposed for the storm-drain system on the mesa top.
- *Outfall.* Samples will be collected from the 0- to 0.5-ft-, 1.5- to 2.0-ft-, and 4.0- to 5.0-ft-depth intervals at the mouth of the outfall (Figure 4.27-1, location 1). Outfall samples will be collected from a location 7 ft immediately downslope from the mouth of the former outfall (Figure 4.27-1, location 2), and 7 ft to the west and east of that location (Figure 4.27-1, locations 3 and 4). Outfall sampling locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

4.28 SWMU 01-007(a), Suspected Subsurface Soil Radiological Contamination

SWMU 01-007(a) is the area of suspected subsurface soil radiological contamination near Building D, which was primarily used for processing plutonium (Ahlquist et al. 1977, 05710, p. 11).

The site map of SWMU 01-007(a) is shown in Figure 4.28-1. Currently, the mesa-top portion of the SWMU area is a parking lot, and the hillside portion is undeveloped.

4.28.1 Summary of Previous Investigations for SWMU 01-007(a)

During the Ahlquist Radiological Survey between 1974 and 1976, almost 9000 m^3 of soil was removed from Buildings D and D-2 areas (Ahlquist et al. 1977, 05710, p. 40). In 1992 and 1993, a Phase I RFI was conducted and samples were collected at the mesa-top area of the former Building D footprint and the hillside downgradient of the SWMU; however, most of the samples were analyzed at CST on-site laboratories. The RFI report recommended NFA for SWMU 01-007(a) (LANL 1996, 54465, pp. iv, 119). Section 4.28.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

Samples analyzed at off-site fixed laboratories included 16 soil, fill, and sediment samples collected from 16 locations on the mesa top and hillside area downgradient of SWMU 01-007(a) at depths of 0 to 12 ft (Figure 4.28-1, Table 4.1-1). The suites analyzed for each sample are provided in Table 4.1-1.

4.28.2 Summary of Data for SWMU 01-007(a)

A summary of data for SWMU 01-007(a) is presented below. Section 4.28.2, Figures 4.28-2 and 4.28-3, and Tables 4.28-1 and 4.28-2 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from 10 locations (01-03053, 01-03065, 01-03069, 01-03074, 01-03081, 01-03103, 01-03106, 01-03113, 01-03114, and 01-03117) were analyzed for metals. Analytical results indicated that antimony, cadmium, lead, selenium, and thallium were detected greater than BVs in at least one sample between 0 and 0.5 ft bgs. Antimony, cadmium, lead, selenium, and thallium were detected greater than the range of the background concentrations.
- Samples from six locations (01-04024, 01-04025, 01-04027, 01-04029, 01-04030, and 01-04035) were analyzed for isotopic plutonium and isotopic uranium. Analytical results indicated that only plutonium-239 was detected in at least one sample between 2.0 and 12.0 ft bgs where FVs do not apply.

Vertical extent of contamination at these 16 locations has not been defined because samples were collected at only one depth interval. Lateral extent downgradient has been defined for all the suites analyzed.

Vertical and lateral extent of contamination have not been defined at SWMU 01-007(a) because samples were collected at only one depth interval and were analyzed for a limited number of suites.

4.28.3 Scope of Activities for SWMU 01-007(a) and Adjacent SWMUs 01-006(b,n)

The proposed sampling activities for SWMU 01-007(a) are combined with adjacent SWMUs 01-006(b,n) because of physical vicinity of these sites. The background information and previous investigation on

SWMUs 01-006(b,n) are given in Sections 4.20 and 4.26, respectively. The proposed sampling locations SWMUs 01-007(a) and 01-006(b,n) are shown in Figure 4.28-2. Table 4.28-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling will be contingent upon access and permission by the landowner and will consist of the following activities:

- *Area of SWMU 01-007(a).* The northwest portion of SWMU 01-007(a) will be sampled as part of the SWMU 01-002 sampling (Figure 4.13-2, locations 17 and 18). Locations 1 and 2 will be near previous sampling locations 01-04024 and 01-04025, respectively (Figure 4.28-2). Samples will be collected at depths from 5.0- to 6.0-ft, 8.0- to 9.0-ft, 11.0- to 12.0-ft, and 14.0- to 15.0-ft-depth intervals, similar to previous sampling depths taken during the Phase I RFI (Table 4.28-2 of LANL 2006, 91915). Care will be taken when collecting samples located under the paved area that debris containing asphalt is not inadvertently included in the sample. The southwest portion of the SWMU area will be sampled during the following sampling activities.
- *Drain Line and Outfall of SWMU 01-006(b).* Samples will be collected at the origin of the drain line from the 0- to 1.0-ft- and 2.0- to 3.0-ft-depth intervals (Figure 4.28-2, location 3). Zero depth is defined as immediately beneath the bed of the excavated pipe. Samples will be collected from the 0- to 0.5-ft-, 1.5- to 2.0-ft-, and 4.0- to 5.0-ft-depth intervals at the mouth of the outfall (Figure 4.28-2, location 4). Additional samples will be collected from a location 7 ft immediately downslope from the mouth of the outfall (Figure 4.28-2, location 5) and 7 ft to the west and east of that location (Figure 4.28-2, locations 6 and 7). Outfall sampling locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.
- *Outfall of SWMU 01-006(n).* As with the sampling strategy of the storm drains in TA-01, only the outfall will be sampled. Samples will be collected from the 0- to 0.5-ft-, 1.5- to 2.0-ft-, and 4.0- to 5.0-ft-depth intervals at the mouth of the outfall (Figure 4.28-2, location 8). Additional samples will be collected from a location 7 ft immediately downslope from the mouth of the outfall, preferably in a discernible drainage (Figure 4.28-2, location 9), and 7 ft to the west and east of that location (Figure 4.28-2, locations 10 and 11). Outfall sampling locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.
- *Drainage.* Samples will be collected on the hillside every 70 ft along a discernible drainage (Figure 4.28-2, locations 12 through 18). Locations 12 and 13 will be 1 ft downslope from previous samples locations 01-03106 and 01-03069, respectively. Sediment sampling locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.

Samples in the area of SWMU 01-007(a) will be analyzed for TAL metals, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH. They will not be analyzed for cyanide, nitrates, perchlorate, and organic chemicals because this area was designated a SWMU solely because of the past presence of radionuclides. Samples collected at the pipeline and outfall of SWMU 01-006(b), at the outfall of SWMU 01-006(n), and on the hillside will be analyzed for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

4.29 SWMU 01-007(b), Suspected Subsurface Soil Radiological Contamination

SWMU 01-007(b) is the area of suspected subsurface soil radiological contamination associated with the drain lines and outfalls from Building D-2 laundry facility (Ahlquist et al. 1977, 05710, p. 11). Building D-2 served as the laundry facility for radioactively contaminated clothing and recyclable equipment for the entire technical area from 1943 to 1945 when the laundry facility was moved to TA-21. Drain lines from the laundry facility discharged directly onto Hillside 137 southwest of Building D-2.

The site map of SWMU 01-007(b) is shown in Figure 4.29-1. Currently, the mesa-top portion of the site has been covered with fill material by the private owner in anticipation of redevelopment.

4.29.1 Summary of Previous Investigations for SWMU 01-007(b)

During the Ahlquist Radiological Survey between 1974 and 1976, almost 9000 m^3 of soil was removed from Buildings D and D-2 areas (Ahlquist et al. 1977, 05710, p. 40). In 1992 and 1993, a Phase I RFI was conducted and samples were collected at the mesa-top area of the former building D-2 footprint and the hillside downgradient of the SWMU; however, most of the samples were analyzed at CST on-site laboratories. The RFI report recommended NFA for SWMU 01-007(b) (LANL 1996, 54465, pp. iv, 119). Section 4.29.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

Samples analyzed at off-site fixed laboratories included 12 soil, fill, sediment surface samples (0–0.5 ft) collected from 12 locations at SWMU 01-007(b) (Figure 4.29-1, Table 4.1-1). These samples were analyzed for metals.

4.29.2 Summary of Data for SWMU 01-007(b)

A summary of data for SWMU 01-007(b) is presented below. Section 4.29.2, Figure 4.29-2, and Table 4.29-1 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from 12 locations (01-03007, 01-03033, 01-03045, 01-03051, 01-03110, 01-03124 through 01-03128, 01-06073, and 01-06074) were analyzed for metals. Analytical results indicated that antimony, arsenic, barium, cadmium, lead, mercury, and selenium were detected greater than BVs in at least one sample between 0 and 0.5 ft bgs. Barium and cadmium were detected at concentrations within the range of the background concentrations. Antimony, arsenic, lead, and selenium were detected greater than the range of the background concentrations.

Vertical extent of contamination at these 12 locations has not been defined because samples were collected only at one depth (surface). Lateral extent downgradient has been defined for metals.

Vertical and lateral extent of contamination have not been defined at SWMU 01-007(b) because samples were collected at only one depth interval and were analyzed only for metals.

4.29.3 Scope of Activities for SWMU 01-007(b)

Proposed sampling for SWMU 01-007(b) is presented along with the sampling activities of SWMU 01-001(c) in Section 4.4.3.

4.30 SWMU 01-007(c), Suspected Subsurface Soil Radiological Contamination

SWMU 01-007(c) is an area of spotty, shallow, gross alpha soil contamination north and west of Building D (Ahlquist et al. 1977, 05710, p. 11).

The site map of SWMU 01-007(c) is shown in Figure 4.30-1. Currently, the entire area is under pavement and residential buildings.

4.30.1 Summary of Previous Investigations for SWMU 01-007(c)

During the Ahlquist Radiological Survey between 1974 and 1976, approximately 1300 m^3 of soil was removed from the area of the SWMU (Ahlquist et al. 1977, 05710, p. 40). In 1992 and 1993, a Phase I RFI was conducted and samples were collected at the mesa-top area of the former Building D footprint and its vicinity, although no samples were collected within the boundary of SWMU 01-007(c). The RFI report recommended NFA for SWMU 01-007(c) (LANL 1996, 54465, pp. iv, 119). Section 4.30.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

4.30.2 Summary of Data for SWMU 01-007(c)

No off-site fixed-laboratory data are available for this SWMU.

4.30.3 Scope of Activities for SWMU 01-007(c)

Proposed sampling for SWMU 01-007(c) is presented along with the sampling activities of SWMU 01-002 in Section 4.13.3.

4.31 SWMU 01-007(d), Suspected Subsurface Soil Radiological Contamination

SWMU 01-007(d) refers to four areas of subsurface soil radiological contamination between Buildings H and Theta and west of Theta because of an overflow of the industrial waste line in 1946. After the overflow, all the contaminated soil that could be removed was taken away, and a load of gravel and binder was spread to a depth of 4 in. over the area (Ahlquist et al. 1977, 05710, p. 80).

The site map of SWMU 01-007(d) is shown in Figure 4.31-1. Currently, the two areas to the west are landscaped with grass and trees, and the two areas to the east are under pavement and buildings of Los Ventanas.

4.31.1 Summary of Previous Investigations for SWMU 01-007(d)

During the Ahlquist Radiological Survey between 1974 and 1976, two contaminated lateral connections from Building H to the main line were removed along with approximately 610 yd^3 of contaminated soil (Ahlquist et al. 1977, 05710, pp. 80, 83). SWMU 01-007(d) was sampled as part of the Phase I RFI of the Loma Vista Drive property in 1994. Based on investigation results, the RFI report recommended NFA for SWMU 01-007(d) (LANL 1996, 54461, pp. i, 45). Section 4.31.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

Samples analyzed at off-site fixed laboratories included 13 soil, fill, and tuff samples collected from nine locations at SWMU 01-007(d) at depths of 2.67 to 20 ft (Figure 4.31-1, Table 4.1-1). The suites analyzed for each sample are provided in Table 4.1-1.

4.31.2 Summary of Data for SWMU 01-007(d)

A summary of data for SWMU 01-007(d) is presented below. Section 4.31.2, Figure 4.31-2, and Table 4.31-1 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from nine locations (01-04211 through 01-04218, and 01-04221) were analyzed for metals. Analytical results indicated that aluminum, calcium, chromium, copper, lead, and mercury were detected greater than BVs in at least one sample between 2.67 and 20.0 ft bgs. Aluminum was detected within the range of the background concentrations. Calcium, chromium, copper, and lead were detected greater than the range of the background concentrations.

- Samples from one location (01-04221) were analyzed for SVOCs; none were detected.

Vertical extent of contamination has not been defined for the five locations where only one depth interval was sampled. At the four locations where multiple depths were sampled, vertical extent has been defined for metals at 01-04217 and for SVOCs at 01-04221.

Vertical and lateral extent of contamination have not been defined at SWMU 01-007(d) because samples were analyzed for a limited number of suites and part of the samples were collected from only one depth interval.

4.31.3 Scope of Activities for SWMU 01-007(d)

The proposed sampling locations at SWMU 01-007(d) are shown in Figure 4.31-1. Table 4.31-1 provides a summary of the proposed sampling locations, the depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 01-007(d) will be contingent upon access and permission by the landowner and will consist of the following activity:

- *Soil Samples.* Samples will be collected from the 0- to 1.0-ft and 2.0- to 3.0-ft-depth intervals at locations accessible to sampling at the community area east of a building of Los Ventanas (Figure 4.31-1, location 1) and in Short Drive (Figure 4.31-1, locations 2 and 3). Zero depth is defined as the undisturbed tuff. Care will be taken when collecting samples located under paved area that debris containing asphalt is not inadvertently included in the sample. Photographs of SWMU 01-007(d) (Figure 4.31-2) show the current site status.

Samples in the area of SWMU 01-007(d) will not be analyzed for cyanide, nitrates, perchlorate, and organic chemicals because this area was designated a SWMU solely because of the past presence of radionuclides. Samples will be analyzed for TAL metals, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy.

4.32 SWMU 01-007(e), Suspected Subsurface Soil Radiological Contamination

SWMU 01-007(e) is a suspected subsurface soil radiological contamination in the former Sigma Building footprint (Ahlquist et al. 1977, 05710, p. 12). Sigma was used for machining plutonium, uranium, and thorium and for casting and metallurgy.

The site map of SWMU 01-007(e) is shown in Figure 4.32-1. Currently, the entire area is under pavement and residential buildings.

4.32.1 Summary of Previous Investigations for SWMU 01-007(e)

During the Ahlquist Radiological Survey between 1974 and 1976, approximately 150 m^3 of contaminated soils was excavated from three small areas in the Sigma Building footprint (Ahlquist et al. 1977, 05710, p. 40). During the Phase I RFI in 1994, SWMU 01-007(e) was not sampled because it was located beneath buildings and was not accessible (LANL 1996, 54461, p. 30). The RFI report recommended NFA for SWMU 01-007(e) (LANL 1996, 54461, pp. i, 45). Section 4.32.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

4.32.2 Summary of Data for SWMU 01-007(e)

No off-site fixed-laboratory data are available for this SWMU.

4.32.3 Scope of Activities for SWMU 01-007(e)

The proposed sampling locations at SWMU 01-007(e) are shown in Figure 4.32-1. Table 4.32-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 01-007(e) will be contingent upon access and permission by the landowner and will consist of the following activity:

- *Soil Samples.* Samples will be collected from the 0- to 1.0-ft- and 2.0- to 3.0-ft-depth intervals at locations accessible to sampling west of the intersection of Oppenheimer Drive and Loma Vista Drive (Figure 4.32-1, location 1) and west of the north end of the building west of the intersection of Oppenheimer and Loma Vista drives (Figure 4.32-1, location 2). No sampling activities are proposed for the subarea of SWMU 01-007(e) south of the intersection of Oppenheimer and Short drives because it is at a major intersection. The area downgradient of this subarea will be sampled during sampling activities of SWMU 01-002 (Figure 4.13-1, location 8). Location 1 is at a grass area. Location 2 is at a paved area. Zero depth is defined as the undisturbed tuff. Care will be taken when collecting samples located under paved area that debris containing asphalt is not inadvertently included in the sample. Photographs of SWMU 01-007(e) mesa top (Figure 4.32-2) show the current site status.

Samples near SWMU 01-007(e) will not be analyzed for inorganic and organic chemicals because this area was designated a SWMU solely because of the past presence of radionuclides. Samples will be analyzed for americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy.

4.33 SWMU 01-007(j), 12 Areas of Suspected Subsurface Soil Radiological Contamination

SWMU 01-007(j) consists of 12 areas of suspected subsurface soil radiological contamination. These areas, which were called "spots" when they were located during the Ahlquist Radiological Survey, are isolated small areas across TA-01. Toward the end of the TA-01 D&D, a radiological survey of the entire TA-01 area was undertaken to determine whether any spots of contamination had been missed in preceding cleanup operations. The survey was conducted in March–April 1976 using a phosphor sandwich (phoswich) detector and 17 contaminated spots (numbered 1 through 17) were located (Ahlquist et al. 1977, 05710, p. 113).

Three spots (nos. 10, 11, and 12; Ahlquist et al. 1977, 05710, p. 118) were designated as AOC 01-007(i) (LANL 1992, 43454, p. 6-18). AOC 01-007(i) was granted NFA status in 1994 (see Section 2.2.30 in the HIR [LANL 2006, 91915]).

Two spots (nos. 16 and 17; Ahlquist et al. 1977, 05710, p. 118) were determined to be the result of false positive readings during the survey (Ahlquist et al. 1977, 05710, p.117) and were dismissed.

SWMU 01-007(j) consists of the remaining 12 spots (nos. 1 through 9 and no, 13 through 15), and they are shown in Figure 4.33-1. Currently, these spots are in areas that are highly developed with buildings, sidewalks, and roads.

4.33.1 Summary of Previous Investigations and Current Status for SWMU 01-007(j)

Spot no. 1 and 8 are two areas of soil contamination northeast of Building J-2 at the location of the industrial waste line SWMU 01-002. One area of contamination resulted from a leak in the industrial waste line from J-2 in 1957. An unspecified quantity of plutonium-contaminated soil was removed from the area immediately after the leak and the line was repaired.

- 1974 to 1976: During the Ahlquist Radiological Survey, cesium-137 was found where the leak occurred (Ahlquist et al. 1977, 05710, pp. 92–94). During the survey, a 121-ft section of the line located beneath a paved parking lot was removed. Additional trenching was conducted along the J-2 industrial waste line trench to remove cesium-137-contaminated soil. Much of the contaminated soil was removed from the trench; however, soil containing activity to a level of 168 pCi/g was left in the floor of the trench in one location because the depth of the trench (approximately 13 ft deep) prevented removal with available equipment (Ahlquist et al. 1977, 05710, p. 94). Contamination was confined to a 10-cm-wide, soil-filled fracture that did not extend up the trench walls.
- 1992: These areas were not sampled during the RFI because buildings make the site no longer accessible, and related drainage and outfall area samples indicated no potential contamination (LANL 1996, 54467, pp. 87–88).
- 1996: The RFI report recommended NFA for this portion of SWMU 01-007(j) (LANL 1996, 54467, pp. ii, 84).
- Current: One spot is completely overlain by a building; the other spot has also been regraded and developed. Part of it is under a residential building and associated landscaping, and the rest of it is under a parking lot.

Spot no. 2 through 7 are six small areas of uranium-238 soil contamination, which are located north and northwest of the Sigma Building footprint.

- 1974 to 1976: The contaminated soil was removed by hand-shoveling and disposed of at MDA G during the Ahlquist Radiological Survey (Ahlquist et al. 1977, 05710, p. 113).
- 1994: These areas were not sampled during the Phase I RFI because they were remediated during the Ahlquist Radiological Survey (LANL 1996, 54461, p. 30).
- 1996: The RFI report recommended NFA for this portion of SWMU 01-007(j) (LANL 1996, 54467, pp. ii, 102).
- Present: This part of the SWMU has been regraded and under either buildings or pavement.

Spot no. 9 is the area of soil contamination located west of the K-1 footprint.

- 1974 to 1976: During the Ahlquist Radiological Survey, one area showed 5000 cpm (using a phoswich detector) and gross alpha activity of 980 pCi/g (Ahlquist et al. 1977, 05710, p. 117). The source was thought to be the residual uranium from septic tank 140 excavation and cleanup. The soil was removed by hand-shoveling.
- 1992: This area was not sampled during the RFI because an existing structure overlies the SWMU location (LANL 1996, 54467, p. 28).
- 1996: The RFI on Hillside 140, which is downgradient of spot no 9, identified lead, total uranium, and isotopic uranium as chemicals of potential concern (COPCs). The results of the human risk assessment indicated that potential exposure to COPCs in soil at Hillside 140 should not result in adverse noncarcinogenic health effects or an unacceptable radiation dose to trail users (LANL

1996, 54467, p. 84). The RFI report recommended NFA for this portion of SWMU 01-007(j) (LANL 1996, 54467, pp. ii, 84).

- 1996: A VCA was conducted on Hillside 140 to remove total uranium at the outfall area of SWMU 01-001(f) as a BMP because of the site's proximity to the Ridge Park Village condominiums. The contaminated soil identified by real-time screening was excavated. Excavation was conducted at the surface and at depths where contamination was found. The total volume of soil removed from Hillside 140 was approximately 15 yd^3. The VCA report formally requested that SWMU 01-001(f) no longer be considered a SWMU (LANL 1996, 53797, p. 3).
- Present: This spot is completely overlain by a building.

Spots no. 13, 14, and 15 are scattered contamination areas located on the mesa top near Bailey Bridge Canyon. Spot no. 13 is located approximately 200 ft southwest of the D-5 Sigma vault footprint. Spot no. 14 is approximately 70 ft south of the footprint of D-5. Spot no. 15 is approximately 85 ft northeast of the footprint of D-5.

- 1974 to 1976: These areas were excavated and disposed of at MDA G during the Ahlquist Radiological Survey (Ahlquist et al. 1977, 05710, p. 113).
- 1992: These areas were not sampled during the Phase I RFI at the Bailey Bridge Canyon area because investigation of the downgradient SWMU 01-003(a) would reveal any potential contamination and because these areas were remediated during the Ahlquist Radiological Survey (LANL 1996, 54461, p. 50). Samples were also collected along the Bailey Bridge Canyon rim, which is downgradient of spot no. 13. Samples analyzed at off-site fixed laboratories included four surface fill samples (0–0.5 ft) collected from four locations downslope from SWMU 01-007(j) (Figure 4.33-1, Table 4.1-1). The suites analyzed for each sample are provided in Table 4.1-1.
- 1996: The RFI report recommended NFA for this portion of SWMU 01-007(j) (LANL 1996, 54467, pp. ii, 102).
- Present: These spots are completely overlain by buildings.

4.33.2 Summary of Data for SWMU 01-007(j)

A summary of data for SWMU 01-007(j) is presented below. Section 4.33.2, Figure 4.33-2, and Tables 4.33-1 and 4.33-2 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from four locations (01-02034 through 01-2036 and 01-02038) were analyzed for metals. Analytical results indicated that chromium and uranium were detected greater than BVs in at least one sample between 0 and 0.5 ft bgs. Chromium was detected within the range of the background concentrations. Uranium was detected greater than the range of the background concentrations.
- Samples from four locations (01-02034 through 01-2036, and 01-02038) were analyzed for SVOCs. Butylbenzylphthalate was detected in the only depth interval sampled (0 to 0.5 ft bgs) at one location (01-02038).
- Samples from four locations (01-02034 through 01-2036, and 01-02038) were analyzed for isotopic plutonium. No isotopic plutonium was detected at activities greater than FV.

Vertical and lateral extent of contamination have not been defined at SWMU 01-007(j) because previous samples were not collected within the SWMU areas.

4.33.3 Scope of Activities for SWMU 01-007(j)

No additional sampling is proposed except for one spot (no. 2) at SWMU 01-007(j) because the contaminated soil was removed and the original spots no longer exist. However, the approximate location of spot no. 2 is accessible. Sampling and analysis of spot no. 2 will verify that no contamination was left at levels of concern because contamination was removed during the Ahlquist Radiological Survey and the subsequent regrading occurred during the construction of buildings and pavement and landscaping activities. The proposed sampling location at SWMU 01-007(j) is shown in Figure 4.33-1. Table 4.33-1 provides a summary of the proposed sampling location, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 01-007(j) will consist of the following activity:

- *Nature and Extent of Contamination Determination.* Samples will be collected from the 0- to 1.0-ft- and 2.0- to 3.0-ft-depth intervals at the location of spot no. 2 (Figure 4.33-1, location 1). The first interval will begin at the soil/tuff interface.

Photograph of SWMU 01-007(j), spot no. 2 (Figure 4.33-2) shows its current site status.

Although previous data indicated that concentrations of chromium and uranium were greater than BVs and butylbenzylphthalate was detected, these samples were collected outside of the SWMU area. Proposed samples collected within the area of SWMU 01-007(j) will not be analyzed for inorganic and organic chemicals because this area was designated a SWMU solely because of the past presence of radionuclides. Samples will be analyzed for americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy.

4.34 AOC 01-007(k), Soil-Contamination Area

AOC 01-007(k) was a suspected soil-contamination area located near the U and W buildings (LANL 1992, 43454, p. 1-13). In 1959, Buildings U and W were removed from service (Ahlquist et al. 1977, 05710, p. 131).

The site map of AOC 01-007(k) is shown in Figure 4.34-1. Currently, the area is developed with the structures and parking lots of the Los Alamos Inn.

4.34.1 Summary of Previous Investigations for AOC 01-007(k)

The site was investigated in 1993 as part of the SWMU 01-001(t) sampling activities (LANL 1996, 54463, p. 49). SWMU 01-007(k) was subsequently recommended for NFA in the RFI report (LANL 1996, 54463, p. 63). The report concluded that there was no reason to add this site to Module VIII for the Hazardous Waste Facility Permit. In 1998, DOE granted NFA status to AOC 01-007(k) (DOE 1998, 59694).

4.34.2 Summary of Data for AOC 01-007(k)

No off-site fixed laboratory data are available for this AOC.

4.34.3 Scope of Activities for AOC 01-007(k)

Proposed sampling for AOC 01-007(k) is presented along with the sampling activities of SWMU 01-001(t) in Section 4.11.3.

4.35 SWMU 01-007(l), Suspected Subsurface Soil Contamination

SWMU 01-007(l) is the fill material under Trinity Drive that is bounded by 24th Street to the east and the road into the Timber Ridge condominiums development to the west. The fill material is suspected of containing construction debris and other potentially contaminated fill from the Building D area. Approximately 1308 to 1760 yd^3 of fill and other debris is reported to have been transported from the former location of the Building D during the Trinity Drive widening and repaving project in 1966 (Ahlquist et al. 1977, 05710, pp. 120–121). Building D housed a facility for plutonium chemistry, metallurgy, and processing, and the fill may be contaminated with uranium, fission products, and plutonium, because it contained soil, concrete fragments, pipe insulation, and other debris.

The site map of SWMU 01-007(l) is shown in Figure 4.35-1. Currently this site is overlain with the pavement of Trinity Drive.

4.35.1 Summary of Previous Investigations for SWMU 01-007(l)

The pavement prevented sampling during the Ahlquist Radiological Survey between 1974 and 1976, but it also precludes any potential radioactivity in the fill from being manifested at the surface. The Ahlquist Report concluded that any remaining concentrations of potentially contaminated soil used as fill material for the 1966 Trinity Drive project would have been significantly reduced by mixing the fill material from the Building D area with the fill material from off-site sources (Ahlquist et al. 1977, 05710, p. 121).

A Phase I RFI was conducted in 1993 when the opportunity became available during construction activities along the south side of Trinity Drive. Three subsurface grab samples were collected and field screened for radiation and organic vapors. No elevated levels of radiological activity or organic chemicals were detected.

Another Phase I RFI was conducted in 1996. Subsurface samples were collected at three locations from depth intervals associated with fill material (LANL 1997, 56660.112, p. 134). Field screening for radiation was conducted and no elevated levels of radioactivity were detected. The RFI found no chemical constituents in concentrations sufficient to indicate adverse human health effects. The RFI report recommended NFA for SWMU 01-007(l) (LANL 1997, 56660.112, pp. ii, 142).

Three soil samples collected during the 1996 Phase I RFI from three locations under the pavement of Trinity Drive (0.5 to 4 ft) at SWMU 01-007(l) were analyzed at off-site fixed laboratories (Figure 4.35-1, Table 4.1-1). The RFI report indicated that these depths were associated with the fill material (LANL 1997, 56660.112, p. 134). The suites analyzed for each sample are provided in Table 4.1-1.

4.35.2 Summary of Data for SWMU 01-007(l)

A summary of data for SWMU 01-007(l) is presented below. Section 4.35.2, Figures 4.35-2 and 4.35-3, and Tables 4.35-1 and 4.35-2 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from three locations (01-10131 through 01-10133) were analyzed for metals. Analytical results indicated that cadmium, calcium, chromium, copper, lead, mercury, nickel, silver, and thallium were detected greater than BVs in at least one sample between 0.5 and 4.0 ft bgs. Cadmium and calcium were detected within the range of the background concentrations. Chromium, copper, lead, nickel, and thallium were detected greater than the range of the background concentrations.

- Samples from three locations (01-10131 through 01-10133) were analyzed for isotopic plutonium and isotopic uranium and by gamma spectroscopy. Analytical results indicated that americium-241 and plutonium-239 were detected in at least one sample between 0.5 and 4.0 ft bgs where FVs do not apply.

Vertical and lateral extent of contamination are defined at SWMU 01-007(l) because contamination is from the fill material deposited beneath the road and is therefore limited to the depth and width of the fill material beneath the road.

4.35.3 Scope of Activities for SWMU 01-007(l)

No sampling activities are proposed for SWMU 01-007(l). The volume of the fill, 1760 yd^3 or 47520 ft^3 at maximum, is within an approximate area of 140,000 ft^2 under the road. The extent of contamination is confined to this layer of fill under the road. No complete pathway for contaminant transport or human/ecological exposure exists.

5.0 TA-03, SOUTH MESA SITE

5.1 Background

TA-03 is located on the western end of South Mesa and is almost completely developed. It contains the core of operational facilities at the Laboratory. Several buildings dominate the site: the Administrative Building (03-043), the Otowi Building (03-261), the Chemistry and Metallurgy Research (CMR) Building (03-029), the Physics Building complex (03-040 and 03-215), the main shops building (03-039), and the central warehouse (03-030). Medium-sized and smaller buildings and transportable buildings are interspersed throughout the site. A gas-fired electrical generating plant, gas station and garage, and sewage treatment plant are also located at TA-03.

Four SWMUs and one AOC located in TA-03 are addressed in this work plan.

- SWMU 03-009(j) is a surface disposal site under a parking lot of the Laboratory's Wellness Center.
- SWMU 03-038(a) is the site of a pump house and two concrete underground tanks that was the central collection point for industrial wastes from various Laboratory buildings.
- SWMU 03-038(b) is the site of a 28,500-gal. steel waste-holding tank north of the pump house. SWMUs 03-038(a,b) are Consolidated Unit 03-038(a)-00.
- SWMU 03-055(c) is the outfall of an active storm-drain system near the fire station.
- AOC 03-008(a) was a decommissioned firing site.

These SWMUs and the AOC in TA-03 are shown in Figure 5.1-1.

5.1.1 Operational History

TA-03 was originally built as a firing site before 1945. The site was decommissioned and cleared in 1949. In the summer of 1950, construction began on the major buildings at the South Mesa Site, which was built to replace the operational facilities in Los Alamos townsite (i.e., TA-01). The buildings became operational between summer 1950 and autumn 1952, which included the Van de Graaff accelerator, the communication buildings, and the CMR Building. The initial development of TA-03 also included the general warehouse, the chemical warehouse, the cryogenics facility, shops, a fire station, and the Physics Building. A wastewater treatment plant, service station and maintenance garage, and a gas-fired electrical generating plant were constructed to service facilities in TA-03. An asphalt concrete plant was moved to TA-03 in 1953. The Administrative Building was completed in 1956. The Sigma Building was completed in 1959. Constructions of new facilities continued through the 1960s and 1970s. Office buildings, shops, storage areas, an addition to the wastewater treatment plant, a cement batch plant, and numerous transportable buildings filled the areas between the initial buildings. More recent constructions included the Oppenheimer Study Center in 1977, the Otowi Building, an annex to the Administrative Building, in 1981, a computer facility, and several national centers for various scientific activities in the 1990s.

5.1.2 Summary of Releases, Transport Mechanisms, and Potential Receptors

Summary of Releases. Despite diverse activities, facilities at TA-03 have never contained or released significant amounts of hazardous constituents. No production facilities at TA-03 existed. Radionuclides were and are used in experimental amounts. Releases to the environment have been only occasional, short-term spills of low concentrations that were quickly cleaned up. However, potential contaminants at TA-03 may have been released into the environment through drainages, outfalls, or landfill areas; may have been inadvertently released as liquid spills, leaks, or spattering to surface soil from storage areas, storage tanks; or may have been released as surface impoundments.

Transport Mechanisms. No natural surface-water bodies are present in TA-03. During summer thunderstorms and spring snowmelt, runoff from the mesa top flows down the hillsides and into an ephemeral stream in Los Alamos Canyon. Surface water runoff and erosion of contaminated surface soil could lead to contamination of bench areas on the hillside and contamination of surface waters off-site. Surface water may also access subsurface contamination 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, the intensity and frequency of precipitation, and seismic activity.

The thickness of the unsaturated zone beneath TA-03 indicates that migration of contamination from the mesa top to the regional aquifer is unlikely. Studies have shown that infiltration of natural precipitation cannot provide enough water to sustain downward movement of contaminants (Nylander et al. 2003, 76059.49, pp. 5-2–5-5). Therefore, groundwater is not a viable pathway for contaminant transport from TA-03.

Other potential transport mechanisms that may lead to exposure of potential receptors include

- airborne transport of contaminated surface soils,
- infiltration through vadose zone,
- continued dissolution and advective/dispersive transport of chemical and radiological contaminants contained in subsurface soil and bedrock,
- disturbance and uptake of contaminants in shallow soil by plants and animals, and
- site disturbance through human activities.

Potential Receptors. Potential receptors to possible contaminant transport include

- county or Laboratory workers,
- recreational users, and
- ecological receptors in the nondeveloped areas (i.e., hillsides).

5.1.3 Current Site Usage and Status

TA-03 is almost completely developed. Roads and large paved parking lots surround the buildings. Unpaved areas are landscaped. Approximately one-third of the area, including the Administration and the CMR buildings, is enclosed within a security fence. Several other building complexes are also fenced for controlled access.

5.2 AOC 03-008(a), Firing Site

AOC 03-008(a) was a decommissioned firing site located at the original LASL South Mesa site (LANL 1990, 07511, p. 3-008). Between 1943 and1949, the area housed a production shop, storage building, hutments, and magazines and was used to manufacture and test detonators (LANL 1990, 07511; LANL 1995, 57590, p. 6-38).

The site map of AOC 03-008(a) is shown in Figure 5.2-1. Currently, the area is a parking garage.

5.2.1 Summary of Previous Investigations for AOC 03-008(a)

During the research for the writing of the RFI work plan for OU 1114, Addendum 1 (LANL 1995, 57590), engineering drawings and aerial photographs were reviewed, and it was concluded that the site would have been located near the current intersection of Diamond Drive and Jemez Road and that the site is no longer discernible (LANL 1995, 57590, p. 6-38). Therefore, AOC 03-008(a) was proposed for NFA.5.2.2

5.2.2 Summary of Data for AOC 03-008(a)

No off-site fixed laboratory data are available for this AOC.

5.2.3 Scope of Activities for AOC 03-008(a)

No sampling activities are proposed for AOC 03-008(a). The firing site at TA-03 was decommissioned in 1949 and the site is currently overlain by a parking garage.

5.3 SWMU 03-009(j), Surface Disposal Site

SWMU 03-009(j) is a soil-fill area located west of a warehouse (03-142). Interviews with site workers indicated that the soil fill contained construction debris consisting of tuff, concrete, rock, and other construction-related items (Griggs 1993, 76167). The SWMU report notes that an old water tank could have been used for the fill material (LANL 1990, 07511). The site was never used to manage hazardous wastes or constituents, and no contaminants are suspected at the site.

SWMU 03-009(j) was proposed for NFA in the addendum 1 to the OU 1114 RFI work plan (LANL 1995, 57590, p. 6-4). NMED requested a sampling and analysis plan to confirm that hazardous waste was not disposed of at the site (NMED 1997, 56369). The Laboratory withdrew the NFA proposal for SWMU 03-009(j) in a letter to NMED dated February 11, 2002 (LANL 2002, 71447).

This site map of SWMU 03-009(j) is shown in Figure 5.3-1. Currently, the area is partially under a paved road/parking to the Laboratory's Wellness Center (03-1663).

5.3.1 Summary of Previous Investigations for SWMU 03-009(j)

No previous field investigations are available for SWMU 03-009(j).

5.3.2 Summary of Data for SWMU 03-009(j)

No off-site fixed laboratory data are available for this SWMU.

5.3.3 Scope of Activities for SWMU 03-009(j)

The proposed sampling locations at SWMU 03-009(j) are shown in Figure 5.3-1. Table 5.3-1 provides a summary of the proposed sampling locations, the depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 03-009(j) will consist of the following activity:

- *Nature and Extent of Contamination Determination.* Samples will be collected from the 0- to 1.0-ft- and 2.0- to 3.0-ft-depth intervals in the soil-fill area (Figure 5.3-1, locations 1 and 2). Zero depth is defined as the interface of the fill material and the original tuff.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs, SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because the fill material contained only construction debris.

5.4 SWMUs 03-038(a,b), Acid Tanks

SWMUs 03-038(a,b) comprise the Consolidated Unit 03-038(a)-00, which is located near the southwest end of Omega Bridge. SWMU 03-038(a) was the site of the acid-neutralizing and pumping building (former 03-700). The building was constructed in 1952 and consisted of a 16-ft by 22-ft by 11-ft concrete-block pump house and two 14-ft by 22-ft by 14-ft concrete underground tanks. The pumping building was the central collection point for industrial wastes from the CMR Building (03-29), the Sigma Building (03-66), and other Laboratory buildings. Once collected, wastes were pumped from the tanks into a waste line (former line 167 of SWMU 00-017) leading to the TA-50 radioactive liquid waste treatment facility. TA-03-700 with associated portions of waste lines, manholes, the pump station, and the underground concrete tanks was removed in 1981 and 1982 as part of the radioactive liquid waste lines removal project of 1981–1986 and disposed of at TA-54 (Elder et al. 1986, 06666, p. 41).

SWMU 03-038(b) was the site of a 28,500-gal. steel waste-holding tank (03-738) located north of former 03-700. The tank was constructed in 1952 and was 11 ft in diameter, 44 ft long and was partially buried on the upper south wall of Los Alamos Canyon. The tank was removed as a single unit in 1982 as part of the radioactive liquid waste lines removal project of 1981–1986 (Elder et al. 1986, 06666, p. 41). The tank apparently did not leak; soil samples collected beneath were below guidelines (Elder et al. 1986, 06666, p. 41).

The site map of SWMUs 03-038(a,b) is shown in Figure 5.4-1. Currently, the site is undeveloped.

5.4.1 Summary of Previous Investigations for SWMUs 03-038(a,b)

Previous investigations were conducted concurrently for SWMU 03-038(a) and SWMU 03-038(b). The areas around 03-700 and 03-738 were remediated by the Zia Company in 1975 (LANL 1993, 20947, p. 6-8). In 1976 radioactive contamination was discovered near 03-700. Several areas were tested for radionuclides in soil. One-third of the 72 samples taken at 5 ft intervals out 12 to 14 ft from the west, south, and east sides were positive for gross-alpha; portions of the site were excavated before sampling (LANL 1993, 20947, p. 6-8; Stoker 1976, 04118). In 1982, as part of the industrial waste line removal project, the tanks and building of the two SWMUs were removed. The tanks had never leaked; soil samples taken beneath them were below guideline levels. All pipelines leading into and out of the SWMUs were removed, except for 100 ft and 150 ft sections of 8-in.-diameter VCP, which were left under the West Jemez Road at the Diamond Drive intersection. The 1993 RFI work plan for OU 1114 recommended both SWMUs for deferred action because the unexcavated sections are beneath an active area that has no credible off-site pathways and because disturbance of the site may result in unnecessary exposure to the public (LANL 1993, 20947, p. 6-9). Section 5.4.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

5.4.2 Summary of Data for SWMUs 03-038(a,b)

No off-site fixed laboratory data are available for these SWMUs.

5.4.3 Scope of Activities for SWMUs 03-038(a,b)

The proposed sampling locations at SWMUs 03-038(a) and 03-038(b) are shown in Figure 5.4-1. Table 5.4-1 provides a summary of the proposed sample locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMUs 03-038(a,b) will consist of the following activities:

- Soil Sampling. Samples will be collected at the bed of the previously excavated areas and the surrounding area of 03-700 from the 0- to 0.5-ft-, 1.5- to 2.0-ft-, and 4.0- to 5.0-ft-depth intervals (Figure 5.4-1, locations 1 through 6). Zero depth is defined as the ground surface or the bed of the previously excavated area.
- Downgradient of SWMUs 03-038(a,b) will be characterized in sampling activities of former line 167 of SWMU 00-017 (Section 3.2.2 Scope of Activities for SWMU 00-017, Figure 3.2-1).

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to the historical operations of the industrial waste lines.

5.5 SWMU 03-055(c), Outfall

SWMU 03-055(c) is identified as an outfall located northeast of the fire station (03-41). This system channels stormwater toward Los Alamos Canyon. Previously, the storm drain was connected to building floor drains but currently it collects and channels only stormwater runoff from parking lots located in the northern portion of TA-03.

The site map of SWMU 03-055(c) is shown in Figure 5.5-1. Currently, the site is in an undeveloped wooded area.

5.5.1 Summary of Previous Investigations for SWMU 03-055(c)

The RFI work plan for OU 1114, Addendum 1 states that no outfall but only a stormwater-drainage channel was observed during a site visit (LANL 1995, 57590, p. 6-39). The stormwater-drainage channel was sampled by Environmental Management (EM-8) Division in 1992 as part of a reconnaissance survey associated with the construction of the Industrial Partnership Center at TA-03. No contaminants of concern were identified. SWMU 03-055(c) was proposed for NFA in the addendum to the OU 1114 RFI work plan based on the rationale that no outfall existed in the identified location (LANL 1995, 57590, p. 6-39). The NFA proposal was found deficient by EPA (EPA 1995, 55161.51). Section 5.5.1 of the HIR provides details of the investigation (LANL 2006, 91915).

5.5.2 Summary of Data for SWMU 03-055(c)

No off-site fixed laboratory data are available for this SWMU.

5.5.3 Scope of Activities for SWMU 03-055(c)

The proposed sampling locations at SWMU 03-055(c) are shown in Figure 5.5-1. Table 5.5-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 03-055(c) will consist of the following activity:

- *Outfall.* Samples will be collected from the 0- to 0.5-ft-, 1.5- to 2.0-ft-, and 4.0- to 5.0-ft-depth intervals at the mouth of the outfall (Figure 5.5-1, location 1). Outfall samples will be collected from a location 7 ft downslope from the mouth of the outfall (Figure 5.5-1, location 2) and 7 ft to the west and east of that location (Figure 5.5-1, locations 3 and 4). Outfall sampling locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, explosive compounds, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Explosive compounds will be analyzed because the fire station is close to the historical operations at TA-03 as a fire site. Dioxins and furans will not be analyzed because they are not related to the past operations at TA-03.

6.0 TA-32, MEDICAL RESEARCH LABORATORY

6.1 Background

The site of former TA-32 is located on the south side of East Mesa at an elevation of 7260 ft. The site is bounded approximately by 9th Street to the east, Knecht Street to the west, Trinity Drive to the north, and to the rim of Los Alamos Canyon to the south. Between 1944 and 1954, the medical research and training facilities for the Laboratory were located at TA-32. The area consisted of laboratories, an office building, warehouses, an incinerator, two septic tanks, a valve house, and a transformer station. All the structures at TA-32 were removed after 1954. The Los Alamos County Roads Division currently uses the site to store equipment and materials for road work and road maintenance.

Three SWMUs and two AOCs located in TA-32 are addressed in this work plan.

- SWMU 32-001 is the former location of the incinerator.
- SWMU 32-002(a) is the former septic tank and its associated drain line.
- SWMU 32-002(b) is the other former septic tank and its associated drain line and outfall.
- AOC 32-003 is the former location of the transformer station.
- AOC 32-004 is a former drain line and outfall.

These SWMUs and AOCs are shown in Figure 6.1-1.

6.1.1 Operational History

The Medical Research Facility was established in 1944 to develop a urinalysis method to monitor radionuclide accumulation in Laboratory personnel. The research group expanded, and by 1949 the research group activities included organic chemistry, radiobiology, and biochemistry (LASL 1950, 04681). In 1953, operations were moved to HRL at TA-43. TA-32 was decommissioned in 1954. All structures were razed as part of the 1954 site clearing.

6.1.2 Summary of Releases, Transport Mechanisms, and Potential Receptors

Summary of Releases. It is possible that the animal carcasses and excrement waste streams were incinerated at the on-site incinerator (32-009). However, contaminated waste (e.g., animal carcasses and Laboratory pack material) was picked up from TA-32 on an on-call basis. Between 1948 and 1953, waste from TA-32 was taken to pits 1, 2, and 3 in MDA C at TA-50. No industrial waste line served TA-32; therefore, it is possible that chemical and radioactive wastes may have been disposed of in lab sinks and drains connected to the septic system.

Transport Mechanisms. No natural surface-water bodies are present in TA-32. During summer thunderstorms and spring snowmelt, runoff from the mesa top flows down the hillsides and into an ephemeral stream in Los Alamos Canyon. Surface-water runoff and erosion of contaminated surface soil could lead to contamination of bench areas on the hillside and contamination of surface waters off-site. Surface water may also access subsurface contamination 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, the intensity and frequency of precipitation, and seismic activity.

The thickness of the unsaturated zone beneath TA-32 indicates that migration of contamination from the mesa top to the regional aquifer is unlikely. Studies have shown that infiltration of natural precipitation cannot provide enough water to sustain a downward movement of contamination (Nylander et al. 2003, 76059, pp. 5-2–5-5). Therefore, groundwater is not a viable pathway for contaminant transport from TA-32.

Other potential transport mechanisms that may lead to exposure of potential receptors include

- infiltration through vadose zone,
- continued dissolution and advective/dispersive transport of chemical and radiological contaminants contained in subsurface soil and bedrock, and
- site disturbance through human activities.

Potential Receptors. Potential receptors to possible contaminant transport include

- construction workers,
- recreational users, and
- ecological receptors in the nondeveloped areas (i.e., hillsides).

6.1.3 Current Site Usage and Status

The site of former TA-32 is mostly covered with asphalt pavement and is currently used by the Los Alamos County Roads Division to store and maintain road work equipment, materials for road construction, and salted sand for winter road treatment. Maintenance activities may include the use of solvents, lubricants, and fuels.

6.2 SWMU 32-001, Incinerator

This SWMU is the former location of an incinerator that adjoined the northeast corner of the medical research and training facility's main building (32-1). The incinerator was constructed of brick and was 2.5 ft wide by 2.5 ft long by 10 ft high (LANL 1990, 07513, p. 32-2). The incinerator received combustible wastes from the medical research facility, and the ash was disposed of off-site by the Zia Company (LANL 1996, 52928, p. 10). The incinerator operated from 1948 to 1954; it was removed in 1954.

The site map of SWMU 32-001 is shown in Figure 6.2-1. Currently, SWMU 32-001 is located beneath asphalt in the current working area of the Los Alamos County Public Works Department Pavement Management Division.

6.2.1 Summary of Previous Investigations for SWMU 32-001

A Phase I RFI was conducted in 1993 and two soil samples were collected at locations corresponding with fractures in the asphalt pavement: one was beneath the former base of the incinerator and one located downslope (ICF Kaiser Engineers 1993, 85513, p. 6) (Figure 6.2-1). Sample results indicated low levels of PCBs at 11 in. bgs (LANL 1995, 48944, p. viii). Subsequently, a Phase II RFI was conducted in 1996 to determine the extent of PCB contamination and to confirm that the former incinerator location had been adequately characterized. Eighteen samples from nine locations (0–10- and 10–15-in.-depth intervals) were analyzed for PCBs by the on-site mobile chemistry analytical laboratory (MCAL). The results were all less than 1 mg/kg or nondetect (LANL 1996, 59178, p. 6). Two additional samples were collected at locations downgradient of the incinerator ((32-06447 and 32-06447) and analyzed for metals, organic chemicals at an off-site laboratory, and radionuclides at the mobile radiological analytical laboratory (LANL 1996, 59178, p. 8). No contaminants of concern were identified. Based on investigation results, the Phase II and VCA report recommended NFA for SWMU 32-001 (LANL 1996, 59178, p. 13). Section 6.2.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

One fill sample and one soil sample collected during the Phase II RFI were analyzed at off-site fixed laboratories. They were collected from two locations immediately downslope from the incinerator location at SWMU 32-001 at depths of 0.17–0.92 ft (Figure 6.2-1, Table 6.1-1). The suites analyzed for each sample are provided in Table 6.1-1.

6.2.2 Summary of Data for SWMU 32-001

A summary of data for SWMU 32-001 is presented below. Section 6.2.2, Figure 6.2-2, and Tables 6.2-1 and 6.2-2 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from two locations (32-06446 and 32-06447) were analyzed for metals. Analytical results indicated that cobalt, copper, lead, manganese, mercury, sodium, and zinc were detected greater than BVs in at least one sample between 0.17 and 0.92 ft bgs. Lead, manganese, and sodium were detected within the range of the background concentrations. Cobalt, copper, and zinc were detected greater than the range of the background concentrations.

- Samples from two locations (32-06446 and 32-06447) were analyzed for SVOCs and VOCs. Analytical results indicated that [cis-1,2-]dichloroethene, methylene chloride, and trichloroethene were detected in at least one sample between 0.17 and 0.92 ft bgs.

Vertical extent has not been defined because samples were collected at only one depth interval at each location.

Lateral extent has not been defined because only two samples were collected on the south side of the incinerator location.

6.2.3 Scope of Activities for SWMU 32-001

The proposed sampling locations at SWMU 32-001 are shown in Figure 6.2-1. Table 6.2-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 32-001 will consist of the following activity:

- *Incinerator Location.* One sample location will be situated approximately 6 ft to the north, south, east, and west of the incinerator pad for a total of four locations (Figure 6.6-1, locations 1 through 4). Samples will be collected from the 0- to 1.0-ft- and 2.0- to 3.0-ft-depth intervals for a total of eight samples. The first interval will begin at 0.5 ft, or deeper, to avoid collecting the asphalt pavement.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs, SVOCs, PCBs, dioxins, furans, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Explosive compounds will not be analyzed because it is unlikely these chemicals would have been burned in the incinerator.

6.3 SWMU 32-002(a), Septic Tank (Former Location) and Drain Lines

SWMU 32-002(a) is a septic tank (32-7) of wood frame construction, 4 ft by 8 ft by 4 ft deep (LANL 1990, 07513, p. 32-3). The septic tank received waste from a laboratory (-2-01) through a 6-in. septic line constructed of orangeburg (a material similar to tar paper), as well as a cast-iron pipe and VCP (LANL 1996, 59178, p. 1). Research activities at the site involved plutonium-238, plutonium-239, americium-241, and carbon-14. Inorganic and organic chemicals also may have been used at the facility. The laboratory (32-01) operated from 1944 to 1953 and was decommissioned in 1954. The septic tank was initially thought to have been left in place and was removed sometime later. No archival records are available that indicate the deposition of the tank. The 4-in. VCP outfall pipe was left in place at the edge of Los Alamos Canyon. It discharged directly onto the hillside (LANL 1996, 59178, p. 2).

The site map of SWMU 32-002(a) is shown in Figure 6.3-1. Currently, the mesa-top portion of the SWMU (inlet line footprint) is located beneath asphalt in the current working area of the Los Alamos County Public Works Department Pavement Management Division, and the outfall area is on undeveloped hillside.

6.3.1 Summary of Previous Investigations for SWMU 32-002(a)

A Phase I RFI was conducted in 1993, and samples were collected in a drainage that was thought to be the outfall area of SWMU 32-002(a). This was later found to be incorrect. The location of SWMU 32-002(a) is substantially southeast of the area where samples were collected.

The Phase II RFI and VCA were conducted in 1996. Approximately 195 ft of the drain line and its contents were removed during the VCA and confirmation samples were collected from the base of the trench (LANL 1996, 59178, p. 12). Samples were also collected at the septic tank footprint and just outside the footprint. Remedial activities included excavation to a depth of approximately 18 in. bgs and removal of approximately 4 yd^3 of soil from an area of 12 ft by 8 ft that included the Phase II sampling locations. Confirmation samples were collected at the base of the excavation. Excavation was backfilled with clean fill, compacted, and seeded (LANL 1996, 59178, p. 26). The Phase II and VCA report for TA-32 recommended NFA for the site (LANL 1996, 59178, p. iv). Section 6.3.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

Ten soil and tuff samples collected during the Phase II RFI were analyzed at off-site fixed laboratories. They were collected from 10 locations at the base of the pipeline trench at SWMU 32-002(a) at depths of 0–4.67 ft (Figure 6.3-1, Table 6.1-1). The suites analyzed for each sample are provided in Table 6.1-1.

6.3.2 Summary of Data for SWMU 32-002(a)

A summary of data for SWMU 32-002(a) is presented below. Section 6.3.2, Figures 6.3-2 and 6.3-3, and Tables 6.3-1, 6.3-2, and 6.3-3 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from 10 locations (32-06367 through 32-06375, and 32-06380) were analyzed for metals. Analytical results indicated that aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, mercury, nickel, silver, sodium, and zinc were detected greater than BVs in at least one sample between 0 and 4.67 ft bgs. Aluminum and nickel were detected within the range of the background concentrations. Arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, sodium, and zinc were detected greater than the range of the background concentrations.
- Samples from nine locations (32-06367 through 32-06372, 32-06374, 32-06375, and 32-06380) were analyzed for SVOCs and VOCs. Analytical results indicated that acenaphthene, acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, carbazole, chrysene, dibenz(a,h)anthracene, dibenzofuran, dichlorodifluoromethane, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, methylene chloride, naphthalene, phenanthrene, pyrene, and trichlorofluoromethane were detected in at least one sample between 0 and 4.67 ft bgs. The orangeburg pipe removed from the site could have been the source of the PAHs. An analysis indicated no potential unacceptable risk (LANL 1996, 59178, p. 19).
- Samples from seven locations (32-06367 through 32-06372, and 32-06374) were analyzed by gamma spectroscopy and for isotopic uranium; samples from nine locations (32-06367 through 32-06372, 32-06374, 32-06375, and 32-06380) were analyzed for isotopic plutonium and tritium. Analytical results indicated that plutonium-238, plutonium-239, and tritium (soil FV not available) were detected greater than FVs. These results were detected at depths where FVs do not apply or in tuff. Uranium-235 was detected greater than BV in at least one sample between 0 and 4.67 ft bgs. Plutonium-238 and plutonium-239 were detected greater than the range of the fallout activities. Uranium-235 was detected greater than the range of the background values.

Vertical extent has not been defined because samples were collected at only one depth interval at each location.

Lateral extent has not been defined because the concentrations of all the analytes in the downslope direction did not show a decreasing trend.

6.3.3 Scope of Activities for SWMU 32-002(a)

The proposed sampling locations at SWMU 32-002(a) are shown in Figure 6.3-1. Table 6.3-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 32-002(a) will consist of the following activities:

- *Drain Line.* Previous samples were collected at only one depth at each location. Therefore, to determine extent, deeper sampling id proposed. Samples will be collected immediately adjacent to previous sample locations: 32-06375 (location of the second highest lead concentration), 32-06368 (location of the highest mercury concentration), 32-06369 (location of the highest lead concentration), 32-06371 (location of highest concentrations of plutonium-239 and PAHs) (Figure 6.3-1, locations 1 through 4, respectively). Samples will be collected from the 1.0- to 1.5-ft- and 4.5- to 5.0-ft-depth intervals. Zero depth is defined as immediately beneath the bed of the previously excavated pipe. Care will be taken that debris containing parking lot material or asphalt is not inadvertently included in the sample.
- *Septic Tank Location.* One sample will be collected in the center of the excavation at a depth immediately beneath the fill (approximately 18-in. bgs) that was deposited at the excavation during the 1996 VCA and a second sample collected 2 ft deeper (Figure 6.3-1, location 5). Samples will also be collected on the perimeter of the 12 ft by 8 ft excavation in the four directions (north, east, south, and west) at the 0–0.5 ft- and 2.0–3.0 ft-depth intervals (Figure 6.3-1, locations 6 through 9, respectively).
- *Outfall.* The outfall is discussed under SWMU 32-002(b) [Section 6.4.3 Scope of Activities for SWMU 32-002(b)].

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, dioxins, furans, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Samples will not be analyzed for explosive compounds because it is unlikely these products would have been present in the sanitary sewage system of the medical facility.

6.4 SWMU 32-002(b), Septic System

SWMU 32-002(b) is a former reinforced concrete tank (32-8), 9-ft wide by 5-ft long by 6-ft deep, as well as the associated drain line and outfall. The septic tank and influent drain line from 32-2 were installed when SWMU 32-002(a) septic system could no longer meet the usage requirement of the laboratory (32-1). The influent septic line for septic tank 32-7 was then diverted to septic tank 32-8. The outfall was at the edge of Los Alamos Canyon. Septic tank 32-8 was decommissioned in 1954 (LANL 1992, 07668, p. 3-73). In 1988, septic tank 32-8 was removed to MDA L and later pulverized and disposed of in MDA G. The sludge was disposed of at MDA L (LANL 1992, 07668, p. 3-71). The drain lines remained in place (LANL 1990, 07513, p. 32-3). The Phase II and VCA report for TA-32 recommended NFA for the site (LANL 1996, 59178, p. iv).

The site map of SWMU 32-002(b) is shown in Figure 6.4-1. Currently, the mesa-top portion of the SWMU (inlet line footprint) is located beneath asphalt in the current working area of the Los Alamos County Public Works Department Pavement Management Division, and the septic tank and outfall areas are on an undeveloped hillside.

6.4.1 Summary of Previous Investigations for SWMU 32-002(b)

A Phase I RFI was conducted in 1993 and samples were collected at the location of the former septic tank and at the outfall (ICF Kaiser Engineers 1993, 85513, p. 3). Trenches were excavated to locate the septic system inlet lines and samples were collected from the trenches (LANL 1995, 48944, pp. 35–37).

A Phase II RFI was conducted and samples were collected at the outfall area in 1996 (LANL 1996, 59178, p. 28). Because of PCB contamination (17 mg/kg) discovered during the Phase I RFI near the mouth of the outfall pipe, 13 ft of soil was removed and the mouth of the outfall pipe was grouted. Confirmation samples were collected from the base of the excavation and analyzed at the MCAL for PCBs. Sample results indicated that no PCBs remained in the soil at levels greater than the 1-mg/kg cleanup level. The Phase II RFI at the drain line confirmed the presence of elevated levels of hazardous constituents and radionuclides in the contents of the drain line (dry sludge). A VCA was conducted to remove the drain line. A total of 116 ft of drain line was removed (LANL 1996, 59178, p. 13). Confirmation samples were collected from the base of the trench. The Phase II and VCA report for TA-32 recommended NFA for the site (LANL 1996, 59178, p. iv). Section 6.4.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

Sixteen soil and tuff samples collected during the Phase II RFI were analyzed at off-site fixed laboratories. They were collected from 14 locations either from the base of the trench beneath the drain line or in the outfall area at SWMU 32-002(b) at depths of 0 to 5.5 ft (Figure 6.4-1, Table 6.1-1). The suites analyzed for each sample are provided in Table 6.1-1.

6.4.2 Summary of Data for SWMU 32-002(b)

A summary of data for SWMU 32-002(b) is presented below. Section 6.4.2, Figures 6.4-2 and 6.4-3, and Tables 6.4-1, 6.4-2, and 6.4-3 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from 14 locations (32-06312 through 32-06315, 32-06323, 32-06325, 32-06342, 32-06344, 32-06353, 32-06357, 32-06358, 32-06365, 32-06366, and 32-06377) were analyzed for metals. Analytical results indicated that arsenic, barium, cadmium, calcium, chromium, cobalt, copper, lead, manganese, mercury, selenium, silver, thallium, and zinc were detected greater than BVs in at least one sample between 0 and 5.25 ft bgs. Arsenic and cadmium were detected within the range of the background concentrations. Barium, calcium, chromium, copper, lead, manganese, selenium, and zinc were detected greater than the range of the background concentrations.
- Samples from 10 locations (32-06312, 32-06313, 32-06315, 32-06323, 32-06325, 32-06342, 32-06344, 32-06365, 63-06366, and 32-06377) were analyzed for SVOCs; samples from three locations (32-06365, 32-06366, and 32-06377) were analyzed for VOCs. Analytical results indicated that anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, bis(2-ethylhexyl)phthalate, carbazole, chrysene, di-n-butylphthalate, fluoranthene, indeno(1,2,3-cd)pyrene, methylene chloride, phenanthrene, pyrene, and trichlorofluoromethane were detected in at least one sample between 0 and 5.25 ft bgs.
- Samples from five locations (32-06312, 32-06313, 32-06315, 32-06323, and 32-06325) were analyzed for americium-241; samples from seven locations (32-06314, 32-06353, 32-06357, 32-06358, 32-06365, 32-06366, and 32-06377) were analyzed by gamma spectroscopy; samples from all 14 locations (32-06312 through 32-06315, 32-06323, 32-06325, 32-06342, 32-06344, 32-06353, 32-06357, 32-06358, 32-06365, 32-06366, and 32-06377) were analyzed for isotopic

plutonium; samples from eight locations (32-06312, 32-06313, 32-06315, 32-06323, 32-06325, 32-06365, 63-06366, and 32-06377) were analyzed for isotopic uranium and tritium. Analytical results indicated that americium-241, cesium-137, plutonium-239, and tritium were detected greater than soil FVs or at depths where soil FVs do not apply or in tuff. Uranium-234 and uranium-238 were detected greater than BVs in at least one sample between 0 and 5.25 ft bgs. Americium-241, cesium-137, and plutonium-239 were detected greater than the range of the fallout activities. Uranium-234 and uranium-238 were detected greater than the range of the background activities.

Vertical extent has not been defined for the drain line or septic tank location because samples were collected at only one depth interval. Vertical extent has been defined in the outfall with analyte concentrations demonstrating a decreasing trend with depth.

Lateral extent has been defined for SVOCs and radionuclides but not inorganic chemicals in the downgradient direction for samples along the drain line. Lateral extent has not been defined in the septic tank area because samples were collected from a limited number of locations. Lateral extent has been defined in the outfall with analytes concentrations demonstrating a decreasing trend with distance from the outfall.

6.4.3 Scope of Activities for SWMU 32-002(b)

The proposed sampling locations at SWMU 32-002(b) are shown in Figure 6.4-1. Table 6.4-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 32-002(b) will consist of the following activities:

- *Drain Line.* The SWMU 32-002(b) drain-line confirmation samples were collected from only one depth and had metals and radionuclides greater than background levels and detections of organic chemicals. Therefore, to determine extent, samples will be collected immediately adjacent to previous sample locations: 32-06365 (location of the highest concentrations of lead, mercury, silver, thallium and zinc and trace amounts of organic chemicals and radionuclides), 32-06366 (location of low concentrations of PAHs and other organic chemicals), and 32-06377 (location of low concentrations of PAHs and other organic chemicals) (Figure 6.4-1, locations 1, 2, and 3). Two additional sampling locations are proposed: one will be approximately 50 ft downgradient of location 3 in the drain-line path and the other will be at the end of the pipeline near the mesa edge (Figure 6.4-1, locations 4 and 5). Samples will be collected from the 1.0- to 1.5-ft- and 4.0- to 4.5-ft-depth intervals. Zero depth is defined as immediately beneath the bed of the previously excavated pipe. Care will be taken that debris containing parking lot material or asphalt is not inadvertently included in the sample.
- *Septic Tank.* One sampling location will be situated in the center of the septic tank excavation and a sample will be collected at a depth immediately beneath the fill. A second sample will be collected 2 ft deeper (Figure 6.4-1, location 6). Samples will be collected on the perimeter of the excavation in the four directions) at the soil/tuff interface (approximately 4 to 6-in. bgs) and 1 ft deeper (Figure 6.4-1, locations 7 through 10, respectively).
- *Outfall Area.* No sampling is proposed for the outfall area because the 1996 sample results indicated that the extent was defined for all analytes by a decreasing trend in concentrations.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs, SVOCs, PCBs, dioxins, furans, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Samples will not be analyzed for explosive compounds because it is unlikely these products would have been present in the sanitary sewage system of the medical facility.

6.5 AOC 32-003, Transformer Site

AOC 32-003, the location of a former transformer station (32-10), consists of three transformers on a wooden platform, approximately 20 ft aboveground on poles (LASL 1948, 91749). AOC 32-003 was discovered in 1993 during a Phase I RFI in the immediate area.

The site map of AOC 32-003 is shown in Figure 6.5-1. Currently, the former transformer location is beneath the asphalt parking area of the Los Alamos County Roads Division.

6.5.1 Summary of Previous Investigations for AOC 32-003

Samples were collected at the site immediately above the bedrock and in the drainage immediately downslope during a Phase I RFI in 1993. Aroclor-1260 was retained as a COPC by the human health and ecological screening assessments (LANL 1995, 48944, p. 34). In 1996, a Phase II RFI was conducted to determine the extent of PCB contamination. Samples were collected and analyzed at the MCAL for PCBs. Based on sample results, a VCA was conducted to remove approximately 100 yd^3 of contaminated soil from a 38 ft by 30 ft area. The depth of the excavation ranged from 2 to 5 ft with a narrow zone along the west, north, and east sides of the main excavation removed down to approximately 10 in. bgs (LANL 1996, 59178, p. 50). Confirmation samples were collected, analyzed at the MCAL, and sampling results indicated that the PCB cleanup goal of 10 mg/kg had been met (LANL 1996, 59178, p. 51). The excavation was backfilled with clean fill. The Phase II and VCA report for TA-32 recommended NFA for the site (LANL 1996, 59178, p. iv). Section 6.5.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

6.5.2 Summary of Data for AOC 32-003

No off-site fixed-laboratory data are available for this AOC.

6.5.3 Scope of Activities for AOC 32-003

The proposed sampling locations at AOC 32-003 are shown in Figure 6.5-1. Table 6.5-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at AOC 32-003 will consist of the following activity:

- Samples will be collected at two depths (0–0.5-ft and 2–2.-ft bgs) around the perimeter of the 32-003 excavation (Figure 6.5-1, locations 1 through 5) to bound the lateral extent of PCB contamination. Samples will be collected within the excavated area to bound the vertical extent at depths immediately beneath the fill and one ft deeper (Figure 6.5-1, locations 6 through 11). These samples will be collected immediately downslope from six previous PCB screening locations that had the highest PCB concentrations detected (1.62 to 4.83 mg/kg). The final location (Figure 6.5-1, location 12) is positioned in the center of where the wood pile had been located, and samples will also be collected beneath the fill and 1 ft deeper.

Samples will be analyzed at off-site fixed laboratories for PCBs, pH, and SVOCs. Other analyte suites will not be analyzed because these chemicals are not associated with transformers.

6.6 AOC 32-004, Drain Line and Outfall

AOC 32-004 is a former drain line and outfall from a former office building (32-03). 32-03 included a vault room where a radioactive source was stored. The drain line led directly to an outfall located at the edge of the mesa and did not pass through a septic tank. AOC 32-004 was discovered in 1993 during a Phase I RFI in the immediate area, and further investigation was recommended (LANL 1995, 48944, p. 52).

The site map of AOC 32-004 is shown in Figure 6.6-1. Currently, the mesa-top portion of the AOC is beneath the asphalt parking area of the Los Alamos County Roads Division, and the outfall portion of the AOC is located on undeveloped DOE property.

6.6.1 Summary of Previous Investigations for AOC 32-004

A Phase II RFI was conducted in 1996 because further investigation was recommended for AOC 32-004 as a result of a Phase I RFI in the immediate area (LANL 1996, 59178, p. 54). The radiation source vault was located and samples were collected from the corners of the vault footprint and analyzed at on-site laboratory for radionuclides. Part of the drain line was excavated during a VCA and samples were collected from inside the pipe (swipe) and at the base of the excavation trench. Because no contamination was found within the pipe that was removed, approximately 50 ft of the drain line that is on DOE property was left in place and each end was grouted (LANL 1996, 59178, p. 58). Samples were also collected at the outfall area and in the drainage pathway from the mesa edge to the bottom of the hillside in Los Alamos Canyon.

To address potential contamination from an industrial area along Knecht Street (including two auto repair shops, a car wash, a gas station, and a paint and body shop) northwest and upgradient of the site, one sample (sample 0132-96-0351) was collected upgradient of the outfall pipe (location 32-06340) and analyzed off-site for metals and SVOCs (LANL 1996, 59178, p. 68). The Phase II RFI in the outfall area did not indicate the presence of radiological or hazardous contamination at concentrations that would pose an unacceptable human health risk, and NFA was recommended. Section 6.6.1 of the HIR provides details of previous investigations (LANL 2006, 91915).

The Phase II RFI and VCA samples analyzed at off-site fixed laboratories included nine soil and tuff samples collected from seven locations at AOC 32-004 (Figure 6.6-1, Table 6.1-1). The suites analyzed for each sample are provided in Table 6.1-1.

6.6.2 Summary of Data for AOC 32-004

A summary of data for AOC 32-004 is presented below. Section 6.6.2, Figures 6.6-2 and 6.6-3, and Tables 6.6-1, 6.6-2, and 6.6-3 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from seven locations (32-06326, 32-06331, 32-06336, 32-06338, 32-06340, 32-06363, and 32-06364) were analyzed for metals. Location 32-06340 was in an upgradient drainage that eventually meets the AOC 32-004 outfall drainage and will be discussed separately from the AOC samples to illustrate the contaminant contribution from off-site.
    - *AOC 32-004 -Only Sample Results.* The analytical results from the two samples collected beneath the pipe (locations 32-06363 and 32-06364) indicated that mercury was detected at concentrations greater than BV, and zinc was detected at concentrations greater than the range of the background concentrations at 32-06364 and was detected within the range of the background concentrations at 32-06263.

- *Upgradient Non-AOC Sample Results.* The analytical results from the upgradient sample (32-06340) indicated that cadmium, copper, lead, and zinc were detected at concentrations greater than the BVs. Cadmium was detected at a concentration within the background concentrations. Copper, lead, and zinc were detected at concentrations greater than the range of the background concentrations. Of all the samples collected at the AOC, this location had the highest concentrations of cadmium, copper, lead, and zinc.
- *Postconfluence Sample Results.* The analytical results from the drainage samples downgradient of the confluence of the off-site drainage and the AOC outfall (32-06326, 32-06331, 32-06336, and 32-06338) indicated that cadmium, chromium, copper, lead, mercury, silver, and zinc were detected at concentrations greater than the BVs. Lead and zinc were detected at concentrations greater than the range of the background concentrations.

- Samples from seven locations (32-06326, 32-06331, 32-06336, 32-06338, 32-06340, 32-06363, and 32-06364) were analyzed for SVOCs; samples from two locations (32-06363 and 32-06364) were analyzed for VOCs. Location 32-06340 was located in an upgradient drainage that joins the AOC 32-004 outfall drainage and will be analyzed separately from the AOC samples to show the contaminant contribution from off-site.
  - *AOC 32-004-Only Sample Results.* The analytical results from the two samples collected beneath the pipe (locations 32-06363 and 32-06364) indicated that acetone, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, butylbenzylphthalate, chrysene, di-n-octylphthalate, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were detected in at least one sample.
  - *Upgradient Non-AOC Sample Results.* The analytical results from the upgradient sample (32-06340, analyzed only for SVOCs) indicated that anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, butylbenzylphthalate, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were detected. Of all the samples collected at the AOC, this location had the highest concentrations of each of these SVOCs. The Phase II VCA report stated that the contaminant sources are likely both the current and historical activities in the industrial area along Knecht Street (LANL 1996, 59178, p. 68).
  - *Postconfluence Sample Results.* The analytical results from the drainage samples downgradient of the confluence of the off-site drainage and the AOC outfall (32-06326, 32-06331, 32-06336, and 32-06338) indicated that acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, butylbenzylphthalate, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene were detected, and all were detected.

- Samples from four locations (32-06326, 32-06331, 32-06336, and 32-06338) were analyzed for americium-241; samples from two locations (32-06363 and 32-06364) were analyzed by gamma spectroscopy; samples from six locations (32-06326, 32-06331, 32-06336, 32-06338, 32-06363, and 32-06364) were analyzed for isotopic plutonium, isotopic uranium, and tritium. The non-AOC sample was not analyzed for radionuclides. Analytical results indicated that only americium-241 was detected greater than FV and was also greater than the range of fallout activities in one sample between 0 and 0.5 ft bgs.

Vertical extent of contamination under the pipe (locations 32-06363 and 32-06364) has not been defined for mercury and zinc because only one depth interval was sampled. Vertical extent of inorganic chemicals, organic chemicals, and radionuclides from both the AOC and off-site sources has been defined in the outfall by two locations with samples collected at two depths each (locations 32-06326 and 32-06338). Inorganic chemicals and radionuclides were not detected above BV in the deeper sample. Butylbenzylphthalate, chrysene, fluoranthene, and pyrene were detected in one deeper sample at concentrations less than those in the shallower sample.

Lateral extent has been defined for all analytes in downgradient samples.

6.6.3 Scope of Activities for AOC 32-004

The proposed sample location at AOC 32-004 is shown in Figure 6.6-1. Table 6.6-1 provides a summary of the proposed sample location, depths, the objective the sample addresses, and the proposed analytical suites. Sampling at AOC 32-004 will consist of the following activities:

- *Former Radiation Source Vault Location.* To confirm previous screening-level data that indicated no radioactive contamination existed at the site, one location will be at the center of the vault room's former location (Figure 6.6-1, location 1). Samples will be collected from the 1.0- to 2.0- and 4.0- to 4.5 ft-depth intervals.
- *Drain Line.* No sampling is proposed for the drain line because previous sampling determined that no releases had occurred from the drain line and that low concentrations of detected PAHs were associated with runoff from the Los Alamos County Public Work Department Pavement Management Division's paved parking lot (LANL 1996, 59178, p. 58). The sample locations are currently 2.5 to 3 ft beneath asphalt and no pathway for contaminant transport or for a exposure route to humans or ecological receptors exists.
- *Outfall.* No sampling is proposed for the outfall because sample results from locations upgradient of the site indicated the contaminant source of inorganic and organic chemicals was from the industrial area not associated with the site, and the extent of contamination by radionuclides has been defined.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs, SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because these chemicals are not associated with the radiation source vault.

7.0 TA-41, W SITE

7.1 Background

TA-41 is located in Los Alamos Canyon at elevations between 6900 and 7000 ft. Los Alamos Canyon is approximately 1350 ft wide at the top and varies in depth from 350 ft to 360 ft. The sides of the canyon are rough and rocky and are partially covered by trees, particularly on the south canyon walls. The bottom of the canyon is wooded and relatively flat with a width of approximately 400–460 ft. A small stream passes along the bottom of the canyon. The Los Alamos Canyon Reservoir, located upstream from TA-41, provides a source of surface water to the stream. Los Alamos Canyon also receives intermittent stream flow from snowmelt and rainfall. Infiltration of treated effluents and natural runoff maintain a shallow body of water in the alluvium of Los Alamos Canyon. Omega Road, which is paved, provides access to TA-41.

Four SWMUs and two AOCs located in TA-41 are addressed in this work plan.

- SWMU 41-001 is a septic system that served a guardhouse from 1949 to 1953.
- SWMUs 41-002(a), 41-002(b), and 41-002(c) are the Imhoff tank, the chlorine contact tank, and the sludge drying bed, respectively, of the wastewater treatment facility. SWMUs 41-002(a,b,c) comprise Consolidated Unit 41-002(a)-99.
- AOC 41-003 is an inactive sump pit that discharged to Los Alamos Canyon.
- AOC C-41-004 is a storm-drain system surrounding a laboratory (TA-41-004).

These SWMUs and AOCs are shown in Figure 7.1-1.

7.1.1 Operational History

TA-41 has been continuously used from the early 1940s to present for testing, monitoring, assembling, and storing nuclear weapon components; for weapons subsystems and boosting systems development; and for long-term studies on weapons subsystems. Most of the past work with plutonium at TA-41 involved metal alloys clad with an inert metal so no alpha activity could escape. From 1954 to 1973, isotopic analyses of Nevada Test Site samples containing plutonium and uranium were performed with two mass spectrometers that were located on the bottom floor at the west and east ends of 41-004.

In addition to these radioactive samples, isotopic analyses were also performed on plutonium-238, resulting in several instances of contamination, primarily in the hood area. One of the original mass spectrometers became alpha-contaminated and was removed. Operations at TA-41 required use of radioactive materials, toxic gases, mercury, and various organic chemicals. Materials used or stored at the site included uranium, plutonium, tritium, lithium isotopes, mercury, beryllium, lead, and cadmium for shielding; nickel-cadmium and mercury batteries; explosives; and thermite-type heat generators. Office and photographic laboratory facilities were also located in the area.

7.1.2 Summary of Releases, Transport Mechanisms, and Potential Receptors

Summary of Releases. Not much liquid radioactive waste has been generated by the work done at TA-41. Dispersion of uranium alpha contamination occurred when workers swiped Laboratory surfaces with swabs (Kimwipes) moistened with solvent. The swabs were placed in special containers for radioactivity that were then collected and removed from the site. This general procedure of segregating and collecting waste is followed with all wastes.

Tritium gas is kept in special containers, often double or triple contained. Special efforts are expended for the recovery and conservation of tritium. However, essentially every surface contacting tritium becomes contaminated to some extent. Some releases of tritium gas into hoods and subsequently into the ventilation effluent stack have also occurred; all such releases are kept to a minimum and are monitored and recorded.

Based on known or suspected releases and past monitoring results, the primary COPCs at TA-41 are tritium, uranium, plutonium, beryllium, lead, and mercury.

Transport Mechanisms. TA-41 is located within the floor of Los Alamos Canyon. The ephemeral stream in the canyon could carry the contamination discharged to soils and sediments. TA-41 lies approximately 800 ft above the regional aquifer within the Santa Fe Group sediments. The alluvial groundwater is present in Los Alamos Canyon only a few feet below land surface. Perched groundwater within the basalt-Puye Formation may be present at approximately 250–300 ft below the canyon bottom. The Rendija Canyon fault is exposed within TA-41. The fault may be a pathway for water to reach the perched and regional aquifers; if so, the fault might also be migration conduits for waterborne contaminants present in Los Alamos Canyon. Potential exposure points for receptors within Los Alamos Canyon include springs, seeps, gaining stream reaches, wetland areas, and possibly discharging wells.

Other potential transport mechanisms that may lead to exposure of potential receptors include

- airborne transport of contaminated surface soils,
- infiltration through vadose zone,
- continued dissolution and advective/dispersive transport of chemical and radiological contaminants contained in subsurface soil and bedrock,
- disturbance and uptake of contaminants in shallow soil by plants and animals,
- site disturbance through human activities, and
- flooding.

Potential Receptors. TA-41 is fenced to prevent public contact. The site is continually used by a number of employees involved in weapons research. Site workers represent the potential exposed population at TA-41. Laboratory service, environmental surveillance, and ENV-ECR personnel as well as other incidental visitors are also on-site occasionally.

7.1.3 Current Site Usage and Status

Currently, access to buildings at TA-41 is controlled by gates present at the site. The technical area is protected by 8- to 10-ft security fences. The land use of TA-41 probably will remain industrial.

7.2 SWMU 41-001, Septic System

SWMU 41-001 is an inactive septic tank (structure 41-11) that received sanitary waste from a guardhouse (41-2) from 1949 to 1953. The tank is connected through a 4-in. VCP to the guardhouse. The original guardhouse has been replaced, but the sewer pipe and septic tank are believed to remain in place. The overflow from the tank emptied into a single 4-in. drain-tile line that is approximately 60 ft long. The drain-tile line runs from west to east, beginning at the fence gate to the west. Archival information from 1986 indicates that a septic tank at TA-41 was contaminated with plutonium, uranium, and tritium (Balo and Warren 1986, 07419, p. 61). It is not known if the septic tank referred to was 41-11 or to another septic tank at TA-41. It is unlikely that sewage from a guardhouse would contain radioactive contamination. It is more likely that contamination would be affiliated with Building 41-004 where radioactive material was handled. It appears that fill has been placed over the septic system area (LANL 1993, 15314, p. 7-14.1).

The site map of SWMU 41-001 is shown in Figure 7.2-1. Currently, the guardhouse is not being used and is designated as a historical building. The pipeline path is partially under asphalt pavement, partially in undeveloped land; the septic tank is in undeveloped land. The nearby TA-41-004 and the underground storage vault (41-1) are used daily.

7.2.1 Summary of Previous Investigations for SWMU 41-001

A Phase I RFI was conducted in 1995 at SWMU 41-001. Samples analyzed at off-site fixed laboratories included five tuff samples collected from two locations adjacent to or downgradient of the septic tank (Figure 7.2-1, Table 7.1-1). These samples were analyzed for VOCs, SVOCs, isotopic plutonium, isotopic uranium, and tritium. Sample results indicated no COPCs were present.

A surface radiation survey was conducted in or adjacent to the eastern portion of TA-41 on October 17 and 18, 2000. The surveys did not reveal any surface contamination (LANL 2000, 91505).

7.2.2 Summary of Data for SWMU 41-001

A summary of data for SWMU 41-001 is presented below. Section 7.2.2, Figures 7.2-2 and 7.2-3, and Tables 7.2-1 and 7.2-2 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from two locations (41-01007 and 41-01008) were analyzed for SVOCs and VOCs. Analytical results indicated that di-n-butylphthalate, fluoranthene, indeno(1,2,3-cd)pyrene, pyrene, and toluene were detected in at least one sample between 0 and 10.0 ft bgs.
- Samples from two locations (41-01007 and 41-01008) were analyzed for isotopic plutonium, isotopic uranium, and tritium. Analytical results indicated that plutonium-239 and tritium were detected in tuff in at least one sample between 0 and 10.0 ft bgs.

Vertical extent of contamination has been defined for all organic chemicals, except toluene at 41-01007, and for all radionuclides except plutonium-239 at 41-01007.

Vertical and lateral extent of contamination have not been defined along the path of the pipeline because no samples were collected beneath the pipe. Vertical extent in the outfall was defined for organic chemicals and for a limited number of radionuclides (tritium, isotopic plutonium, and uranium) that were analyzed by decreasing trends or by essentially the same concentrations with depth. However, since only two locations were sampled in the outfall, lateral extent of contamination is not defined.

7.2.3 Scope of Activities for SWMU 41-001

The proposed sampling locations at SWMU 41-001 are shown in Figure 7.2-1. Table 7.2-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 41-001 will consist of the following activities:

- *Excavation of Sewer Line and Sampling Excavation Trench.* The sewer pipeline will be excavated and inspected for evidence of leaks. Samples will be collected from the 0- to 1.0-ft- and 2.0- to 3.0-ft-depth intervals along the excavation trenches (Figure 7.2-1, locations 1 and 2). Zero depth is defined as immediately beneath the bed of the excavated pipe.
- *Excavation of Septic Tank and Sampling Excavated Area.* The septic tank will be excavated and inspected for evidence of leaks (e.g., stained soil, holes in the tank). At the septic tank excavation, samples will be collected from the 0- to 1.0-ft- and 4.0- to 5.0-ft-depth intervals at the center of the floor of the excavation (Figure 7.2-1, location 4). Zero depth is defined as the floor of tank excavation. Additional soil samples will be collected immediately beneath the septic tank inlet (Figure 7.2-1, location 3) and outlet (Figure 7.2-1, location 5) from the 0- to 1.0-ft- and 2.0- to 3.0-ft-depth intervals.

- *Outfall.* The drain-tile line, into which the tank emptied, cannot be visually located at the site. Samples will be collected from the 0- to 0.5-ft-, 1.5- to 2.0-ft-, and 4.0- to 5.0-ft-depth intervals at the end of the outlet pipe (Figure 7.2-1, location 6). Zero depth is defined at the depth of the outlet pipe. Outfall samples will be collected from a location 7 ft downslope from location 6 (Figure 7.2-1, location 7), and 7 ft to the west and east of that location (Figure 7.2-1, locations 8 and 9). Another line of samples will be collected 20 ft downslope from location 7 (Figure 7.2-1, location 10) and 15 ft to the west and east of that location (Figure 7.2-1, locations 11 and 12). Samples will be collected from the 0- to 0.5-ft- and 2.0- to 3.0-ft-depth intervals. Zero depth is defined at immediately beneath the fill.
- If the drain-tile line is found below the outlet pipe during excavation, it will be removed and samples will be collected at the two ends of the drain tile line from the 0- to 0.5-ft- and 2.0- to 3.0-ft-depth intervals. Zero depth is defined at immediately beneath the fill.

Samples will be analyzed at off-site fixed laboratories for TAL metals, cyanide, nitrates, perchlorate, VOCs, SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to the functions at TA-41.

7.3 SWMUs 41-002(a,b,c), TA-41 Sewage Treatment Plant

SWMUs 41-002(a), 41-002(b), and 41-002(c) comprise Consolidated Unit 41-002(a)-99. SWMU 41-002(a) consists of an Imhoff tank and a 10 ft by 8 ft by 10 ft chlorinator (structure 41-7). SWMU 41-002(b) is a chlorine contact tank (41-8). SWMU 41-002(c) is a sludge drying bed (41-9). These SWMUs were components of a small sanitary sewage treatment plant at TA-41. The treatment plant was built in 1951 and received sanitary waste from TA-41 and TA-02 until 1987. It discharged to Los Alamos Canyon through the National Pollutant Discharge Elimination System (NPDES)-permitted outfall SSS06S (removed from the Laboratory's NPDES permit effective December 14, 1990). The plant received sewage from TA-02 from the mid-1970s until 1987. After 1987, wastes were pumped to TA-03 for treatment [Consolidated Unit 03-014(a)-99] until 1992 and to TA-46 after that time. The TA-41 treatment plant was retained as a standby unit in case of a lift pump failure. These SWMUs are all components of the treatment plant and are interconnected by a network of drain lines. They were consolidated in 1999 and are completely inactive.

The site map of SWMUs 41-002(a,b,c) is shown in Figure 7.3-1. Currently, the sewage treatment plant is located on DOE property behind locked gates.

7.3.1 Summary of Previous Investigations for SWMUs 41-002(a,b,c)

Samples were collected from wastes entering the Imhoff tank and exiting the chlorine contact tank in 1955. Sample results showed alpha radiation counts ranging from 216 to 244 dpm/L (Buckland 1955, 07686). Detailed records have been found on radiation testing of the liquid effluent and dried sludge from 1978 to 1986 and results are summarized in Section 7.3.1 of the HIR (LANL 2006, 91915).

A Phase I RFI was conducted at SWMUs 41-002(a,b,c) in 1995 and samples were collected near the SWMUs. Samples analyzed at off-site fixed laboratories included 11 soil samples collected from 6 locations adjacent to the Imhoff tank and chlorinator at depths of 0 to 10 ft; 6 surface soil samples (0–1.0 ft) collected from 6 locations adjacent to and downgradient of the chlorine contact tank, and 7 soil samples collected from 6 locations within and adjacent to the sludge drying bed at depths of 0 to 3 ft (Figure 7.3-1, Table 7.1-1). The suites analyzed for each sample are provided in Table 7.1-1.

A radiation walkover survey was conducted in or adjacent to the eastern portion of TA-41 on October 17 and 18, 2000. The surveys did not reveal any surface contamination (LANL 2000, 91507; LANL 2000, 91508; LANL 2000, 91509).

7.3.2 Summary of Data for SWMUs 41-002(a,b,c)

A summary of data for SWMUs 41-002(a, b, c) is presented below. Section 7.3.2, Figures 7.3-2 and 3.2-3, and Tables 7.3-1 through 7.3-8 HIR provide the details of data evaluation (LANL 2006, 91915).

At SWMU 41-002(a)

- Samples from six locations (41-01009 through 41-01012, 41-01025, and 41-01026) were analyzed for total uranium. Analytical results indicated that uranium was detected greater than BV in at least one sample between 0 and 10.0 ft bgs. Uranium was detected at concentrations greater than the range of the background concentrations at all six locations.
- Samples from five locations (41-01009 through 41-01011, 41-01025, and 41-01026) were analyzed for SVOCs. Analytical results indicated that bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, phenanthrene, and pyrene were detected in at least one sample between 0 and 1.0 ft bgs.
- Samples from six locations (41-01009 through 41-01012, 41-01025, and 41-01026) were analyzed for isotopic plutonium, isotopic uranium, and tritium and by gamma spectroscopy. Analytical results indicated that plutonium-238, plutonium-239, and tritium (soil FV not available) were detected at depths where FVs do not apply or in tuff, in at least one sample between 0 and 10.0 ft bgs. Uranium-234 was detected greater than BV in one sample between 0 and 1.0 ft bgs at location 41-01010 and was also greater than the range of the background activities. Vertical extent has been defined for isotopic plutonium at locations 41-01009 and 41-01012 but not defined at location 41-01010. Vertical extent has not been defined for tritium at all three locations. Vertical extent has been defined for isotopic uranium at all three locations.

Three of the six locations were sampled at multiple depth intervals (41-01009, 41-01010, and 41-01012). Vertical extent has not been defined for total uranium at these three locations. Vertical extent has been defined for SVOCs only at 41-01009.

Lateral extent has not been defined for all suites analyzed, as can be seen by SWMU 41-001(b) downgradient samples in Figures 7.3.2 and 7.3.3 in the HIR (LANL 2006, 91915).

At SWMU 41-002(b)

- Samples from six locations (41-01019 through 41-01024) were analyzed for total uranium. Analytical results indicated that uranium was detected greater than BV in at least one sample between 0 and 1.0 ft bgs. Uranium was detected at concentrations greater than the range of the background concentrations in the only depth interval sampled at five locations (41-01019 through 41-01023).
- Samples from six locations (41-01019 through 41-01024) were analyzed for SVOCs. Analytical results indicated that benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene were detected in at least one sample between 0 and 1.0 ft bgs.
- Samples from six locations (41-01019 through 41-01024) were analyzed for isotopic plutonium, isotopic uranium, and tritium and by gamma spectroscopy. Analytical results indicated that

plutonium-239 and tritium (soil FV not available) were detected in the only depth interval sampled between 0 and 1.0 ft bgs at all six locations (41-01019 through 41-01024).

Vertical extent for all suites analyzed has not been defined because samples were collected only from one depth interval.

Lateral extent downgradient has been defined for all suites analyzed by decreasing trends in concentrations or nondetects in the most downgradient sample location (41-01024).

At SWMU 41-002(c)

- Samples from six locations (41-01013 through 41-01018) were analyzed for total uranium. Analytical results indicated that uranium was detected greater than BV in at least one sample between 0 and 3.0 ft bgs. Uranium was detected at concentrations greater than the range of the background concentrations at all six locations.
- Samples from six locations (41-01013 through 41-01018) were analyzed for SVOCs. No SVOCs were detected.
- Samples from six locations (41-01013 through 41-01018) were analyzed for isotopic plutonium, isotopic uranium, and tritium and by gamma spectroscopy. Analytical results indicated that plutonium-239 and tritium (soil FV not available) were detected at depths where FVs do not apply in at least one sample between 0 and 3.0 ft bgs.

Only one location was sampled at multiple depth intervals (41-01013). Vertical extent has been defined for all suites analyzed at this location.

Lateral extent has not been defined for total uranium. Lateral extent has been defined for SVOCs by no detections of SVOCs. Lateral extent of radionuclides has been demonstrated by lower concentrations outside the drying bed than inside the bed.

7.3.3 Scope of Activities for SWMUs 41-002(a,b,c)

No sampling activities are proposed for SWMUs 41-002(a,b,c). Site characterization and investigation will be deferred until future D&D of the sewage treatment plant when structures are removed and access to the site with a drill rig is improved.

7.4 AOC 41-003, Sump

AOC 41-003 is an inactive sump pit (41-10) that discharged to Los Alamos Canyon. The pit measured 3.66 ft by 2 ft by 2.5 ft deep and received effluent from floor and sink drains at the underground storage vault (41-1), stormwater, and rinse water from the storage tunnel. The tunnel was occupied in 1949 and used to store transuranic wastes and tritium. In 1988, the sump and associated pipes were excavated, removed, and reburied approximately 20 ft south of their original location to make room for a concrete pad, retaining wall, and structures supporting a ventilation system upgrade for 41-1.

The site map of AOC 41-003 is shown in Figure 7.4-1. Currently, the sump is located beneath the ventilation system that is situated on concrete.

7.4.1 Summary of Previous Investigations for AOC 41-003

When the sump was relocated in 1988, the drain sump lines exterior to 41-1 and the sump structure were monitored and were not found to be radioactively contaminated. Subsequently, the drain lines were extended to the new location where the sump structure was placed (Larson 1992, 44022). A Phase I RFI was conducted in 1995, and samples were collected near the AOC.

Samples analyzed at off-site fixed laboratories included seven soil samples collected from seven locations downgradient of AOC 41-003 at depths of 0–9.5 ft (Figure 7.4-1, Table 7.1-1). The suites analyzed for each sample are provided in Table 7.1-1.

A radiation walkover survey was conducted in or adjacent to the eastern portion of TA-41 on October 17 and 18, 2000. The surveys did not reveal elevated surface contamination (LANL 2000, 91510).

7.4.2 Summary of Data for AOC 41-003

A summary of data for AOC 41-003 is presented below. Section 7.4.2, 7.4-2 and 4.2-3, and Tables 7.4-1 and 7.4-2 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- Samples from seven locations (41-01027 through 41-01033) were analyzed for total uranium. Analytical results indicated that uranium was detected greater than BV in at least one sample between 0 and 9.5 ft bgs. Uranium was detected at concentrations greater than the range of the background concentrations in the only depth interval sampled at four locations (41-01027 through 41-01029, and 41-01031).
- Samples from seven locations (41-01027 through 41-01033) were analyzed for isotopic plutonium and tritium. Analytical results indicated that plutonium-239 and tritium (soil FV not available) were detected at depths where FVs do not apply in at least one sample between 0 and 9.5 ft bgs. Plutonium-239 was detected in the only depth interval sampled at one location (41-01033). Tritium was detected in the only depth interval sampled at all seven locations.

Vertical extent has not been defined because samples were collected only from one depth interval.

Lateral extent downgradient has not been defined for total uranium, plutonium-239, and tritium.

7.4.3 Scope of Activities for AOC 41-003

No sampling activities are proposed for AOC 41-003. The sump is located beneath the ventilation system stationed on concrete and is not accessible for characterization sampling. Additionally, the sump actively serves the storage tunnel (41-001), which is still in use along with the ventilation system. Characterizing the sump and its surrounding is deferred until the storage tunnel is decommissioned.

7.5 AOC C-41-004, Storm Drains

AOC C-41-004 is the storm-drain system surrounding a laboratory (41-004). The system has seven storm drainage catch basins/manholes (41-22 through 41-28). There are no indications of contaminant releases to the system, and no monitoring of the storm drains or outfalls has been done in the past. Operational tritium releases from the emission stacks located between 41-004 and 41-30 (office building) may have resulted in surface contamination of the storm-drain system.

The site map of AOC C-41-004 is shown in Figure 7.5-1. Currently, 41-004 is in use and the catch basins/manholes are located within and under the asphalt pavement that surrounds the building.

7.5.1 Summary of Previous Investigations for AOC C-41-004

A Phase I RFI was conducted in 1995. A sample analyzed at off-site fixed laboratories is a surface sediment sample (0–1 ft) collected at the storm-drain outfall (Figure 7.5-1, Table 7.1-1) and analyzed for metals, isotopic plutonium, and tritium.

7.5.2 Summary of Data for AOC C-41-004

A summary of data for AOC C-41-004 is presented below. Section 7.5.2, Figures 7.5-2 and 7.5-3, and Tables 7.5-1 and 7.5-2 of the HIR provide the details of data evaluation (LANL 2006, 91915).

- One sample from location 41-01034 was analyzed for total uranium. Analytical results indicated that uranium was detected at a concentration greater than BV between 0 and 1.0 ft bgs. Uranium was detected at a concentration greater than the range of the background concentrations in the only depth interval sampled at this location.
- One sample from location 41-01034 was analyzed for isotopic plutonium and tritium. Analytical results indicated that plutonium-239 and tritium were detected at activities greater than FV between 0 and 1.0 ft bgs. Both radionuclides were detected at activities greater than the range of the fallout activities in the only depth interval sampled at this location.

Lateral and vertical extent have not been defined because only one sample was collected from this AOC.

7.5.3 Scope of Activities for AOC C-41-004

No sampling activities are proposed for AOC C-41-004. Building 41-004 is an active facility, and characterization of the storm-drain system will be deferred until the facility is decommissioned.

8.0 TA-43, HEALTH RESEARCH LABORATORY

8.1 Background

TA-43 is on the north rim of Los Alamos Canyon, bounded on the north and west by Diamond Drive and on the east by the parking lot between the HRL and the LAMC. The area is paved except for a lawn and natural vegetation along the canyon edge.

Two SWMUs and three AOCs located in TA-43 are addressed in this work plan.

- SWMU 43-001(a) is the sanitary waste line that served the HRL before 1981.
- SWMU 43-002 is an incinerator that was used at the HRL.
- AOC 43-001(a2) is the sanitary waste system that has been serving TA-43 since 1981.
- AOC 43-001(b2) is a storm-drain outfall that was permitted in the mid- to late 1970s under NPDES permit (Outfall 03A040).
- AOC C-43-001 is a storm-drain outfall that collects runoff from the HRL building (TA-43-01) loading dock and functions as the overflow from the lift station (-43-10).

These SWMUs and AOCs are shown in Figure 8.1-1.

8.1.1 Operational History

TA-43 was established in 1953 when the Laboratory's former Health Division, which conducted biomedical and industrial hygiene research, first occupied HRL (43-001) (DOE 1987, 08662). The work conducted at the HRL was a mix of basic and applied research to assess the health effects of radiation and materials associated with Laboratory operations (DOE 1987, 08662). Industrial hygiene activities were relocated to TA-59 in 1966. Since then, the focus at the HRL has been on biomedical research conducted by the Life Sciences Division (now B Division). Work includes diverse experiments at the molecular, cellular, and whole-body levels.

8.1.2 Summary of Releases, Transport Mechanisms, and Potential Receptors

Summary of Releases. Trace amounts of a wide range of radionuclides, including carbon-14, cobalt-60, phosphorus-32, plutonium-238, plutonium-239, polonium-210, promethium-147, sulphur-35, and tritium, have been used in many animal studies. Low-level radioactive waste was poured down the drain during the early operations of the Laboratory until 1975; after that time, containers were provided for the transfer of contaminated liquid wastes to the Laboratory's industrial waste treatment plant in TA-50.

The liquid waste was carried through the industrial waste line to the TA-45 wastewater treatment facility from 1953 to 1963. In 1963, contamination in wastewater from TA-43 was considered sufficiently low to be diverted to the Los Alamos County sanitary sewer system. In 1981, the sanitary waste lines were connected to the TA-03 sanitary treatment plant. Treated cooling water, once-through cooling water, and wastes from photoprocessing were routed to the sanitary system at various times. Subsequently, cooling water effluent was routed to outfalls. After 1987, photoprocessing chemicals were processed through silver recovery units (LANL 1990, 07513; Potter 1994, 58454). Contamination may have been released to the environment through drains or outfalls or by leaking from sewer lines.

Transport Mechanisms. No natural surface-water bodies are present in TA-43. During summer thunderstorms and spring snowmelt, runoff from the mesa top flows down the hillsides and into an ephemeral stream in Los Alamos Canyon. Surface-water runoff and erosion of contaminated surface soil could lead to contamination of bench areas on the hillside and contamination of surface waters 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, the intensity and frequency of precipitation, and seismic activity.

The thickness of the unsaturated zone beneath TA-43 indicates that migration of contamination from the mesa top to the regional aquifer is unlikely. Studies have shown that infiltration of natural precipitation cannot provide enough water to sustain a downward movement of contaminants (Nylander et al. 2003, 76059.49, pp. 5-2 to 5-5). Therefore, groundwater is not a viable pathway for contaminant transport from TA-43.

Other potential transport mechanisms that may lead to exposure of potential receptors include

- airborne transport of contaminated surface soils,
- infiltration through vadose zone,
- continued dissolution and advective/dispersive transport of chemical and radiological contaminants contained in subsurface soil and bedrock,
- disturbance and uptake of contaminants in shallow soil by plants and animals on the hillside, and
- site disturbance through human activities.

Potential Receptors. Potential receptors to possible contaminant transport include

- construction workers,
- recreational users, and
- ecological receptors in the nondeveloped areas (i.e., hillsides).

8.1.3 Current Site Usage and Status

Biomedical research continues at TA-43. The B Division is required to follow all Laboratory requirements for the disposal of hazardous waste, and recycling programs have been established for many types of nonhazardous material. The sanitary system is connected to the Laboratory sanitary wastewater system consolidation facility at TA-46.

8.2 SWMU 43-001(a1), Waste Lines (Pre-1981)

SWMU 43-001(a1) is a disconnected 4-in. cast-iron sanitary sewer line that served the health research building (43-1), now called the HRL. The line runs from a lift station (43-10) at the south side of the HRL to a Los Alamos County manhole 315 ft to the northeast. The sewer line is approximately 30 ft bgs at 43-10 and reaches a joint to the east at a depth of approximately 10 ft, where gravity carries the effluent to the county manhole. This SWMU addresses the sewer line until 1981 when the sewer lines were redirected to the TA-03 sanitary sewer system (Emility 1981, 08081). AOC 43-001(a2) addresses the sewer line post-1981.

The site map of SWMU 43-001(a1) is shown in Figure 8.2-1. Currently, the site is under pavement at the HRL and under LAMC (see Figure 3.2-2 a).

8.2.1 Summary of Previous Investigations for SWMU 43-001(a1)

No previous investigations have been conducted at SWMU 43-001(a1).

8.2.2 Summary of Data for SWMU 43-001(a1)

No off-site fixed laboratory data are available for this SWMU.

8.2.3 Scope of Activities for SWMU 43-001(a1)

No sampling activities are proposed for SWMU 43-001(a1). Investigation is being deferred pending deactivation of nearby utilities and the removal of associated buildings to allow access. Once these conditions have been met, the Laboratory will prepare a supplemental work plan to investigate the AOC to determine the nature and extent of any contamination present and to determine if the levels of contamination would be protective of human health and the environment for the intended land use. If the levels of contamination are not acceptable, the Laboratory will remediate the AOC to conditions protective of human health and the environment for the intended use.

8.3 AOC 43-001(a2), Waste Lines (Post-1981)

AOC 43-001(a2) is the post-1981 sanitary waste disposal system serving TA-43. In 1981, the effluent flow was redirected from the Los Alamos County treatment facility in Bayo Canyon to the Laboratory's TA-03 sanitary sewer system. After 1987, recovery units, collection points, and the types of photochemicals being used were upgraded in an attempt to eliminate hazardous constituents. However, some photochemicals were still discharged to the sanitary sewer (LANL 1990, 07513)

In 1992, sanitary waste was redirected to the Laboratory sanitary waste system consolidation facility (LANL 1994, 34754, p. 6-3). Effluent in the system included sanitary waste, once through cooling water, treated cooling water, and photoprocessing chemicals.

This AOC was proposed for deferred action in the 1994 OU 1136 work plan (LANL 1994, 34754, p. 6-4), pending site decommissioning because the existing sanitary waste collection and disposal system is part of and serves an active experimental site. In addition, no known leaks in the sanitary waste line that currently serve TA-43 have been documented, and the site does not present a human health or environmental risk (LANL 1993, 26078).

The site map of AOC 43-001(a2) is shown in Figure 8.3-1. Currently, the lines are located under pavement of the HRL.

8.3.1 Summary of Previous Investigations for AOC 43-001(a2)

No previous investigations have been conducted at AOC 43-001(a2).

8.3.2 Summary of Data for AOC 43-001(a2)

No off-site fixed laboratory data are available for this AOC.

8.3.3 Scope of Activities for AOC 43-001(a2)

No sampling activities are proposed for AOC 43-001(a2). Investigation is being deferred pending deactivation of nearby utilities and removal of associated buildings to allow access. Once these conditions have been met, the Laboratory will prepare a supplemental work plan to investigate the SWMU to determine the nature and extent of any contamination present and to determine if the levels of contamination would be protective of human health and the environment for the intended land use. If the levels of contamination are not acceptable, the Laboratory will remediate the SWMU to conditions protective of human health and the environment for the intended use.

8.4 AOC 43-001(b2), Outfall

AOC 43-001(b2) is a storm-drain outfall permitted in the mid-to-late 1970s under NPDES permit Outfall 03A040 and was removed from the Laboratory's NPDES permit on January 11, 1999. The outfall received effluent from 6 floor drains in the subbasement at the HRL (building 43-1), blow-down from the evaporative cooler, and storm water from 13 roof drains on the west side of the HRL (Santa Fe Engineering, Ltd. 1992, 58455). The effluent discharged west of the HRL through a 130-ft long, 12-in.-diameter corrugated metal pipe to Los Alamos Canyon. The outfall may have historically discharged radioactively contaminated water and/or once-through and treated cooling water (DOE 1987, 08662). No quantitative information is available about possible residual contamination as a result of the discharges from this outfall.

The site map of AOC 43-001(b2) is shown in Figure 8.4-1. Currently, the outfall is located on the undeveloped slope west of the HRL.

8.4.1 Summary of Previous Investigations for AOC 43-001(b2)

No previous investigations have been conducted at AOC 43-001(b2).

8.4.2 Summary of Data for AOC 43-001(b2)

No off-site fixed laboratory data are available for this AOC.

8.4.3 Scope of Activities for AOC 43-001(b2)

The proposed sampling locations at AOC C-43-001 are shown in Figure 8.4-1. Table 8.4-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at AOC C-43-001 will consist of the following activity:

- *Outfall Investigation.* Samples will be collected from the 0- to 0.5-ft-, 1.5- to 2.0-ft-, and 4.0- to 5.0-ft-depth intervals at the mouth of the outfall (Figure 8.4-1, location 1). Outfall samples will be collected from a location 7 ft downslope from the mouth of the outfall, preferably in a discernible drainage (Figure 8.4-1, location 2), and 7 ft to the west and east of that location (Figure 8.4-1, locations 3 and 4). Outfall sample locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.

Samples will be analyzed at an off-site fixed laboratory for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, dioxins, furans, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Explosive compounds will not be analyzed because these chemicals are not associated with the operations at HRL.

8.5 SWMU 43-002, Incinerator

SWMU 43-002 was an incinerator installed in Room B-137 of the HRL (building 43-1) to dispose of wastes generated by health research activities in 1952. It was a 400,000-BTU/h gas burner with a 100-lb/h pathological organic waste capacity. Daily throughput was 5 to 10 lb of rats and mice and 8 to 12 lb of paper with small amounts of animal-cage wood shavings (Mitchell 1967, 08074). The animal carcasses were contaminated with tracer quantities of nontransuranic isotopes. A number of isotopes were used (antimony, arsenic, barium, cadmium, cesium, cobalt, copper, gallium, iron, lead, mercury, nickel, niobium, rubidium, selenium, silver, strontium, thallium, tin, yttrium, and zinc) in pico-curie quantities (10–12) over a period of approximately 15 yr between 1960 and 1975 (Watanabe 1993, 58460; Watanabe 1993, 58452).

The incinerator was removed in 1992 (Watanabe 1993, 58453) and Room B-137 was remodeled. During remodeling, the room was submitted to a swipe survey. The health monitor found 1000 dpm fixed on the interior surfaces (direct frisk) and the large area swipes indicated no detectable activity (LANL 1992, 58457). The passage to the stack was sealed off with concrete mortar and the top of the stack was blocked with a stack cover. The ash pit remains and the cleanout door is located on the east wall of the HRL. The ash was analyzed by the Laboratory's Analytical Chemistry Group, and the results indicated the presence of cesium-137 (Watanabe 1993, 58464).

The OU 1136 work plan recommended deferred action at SWMU 43-002 until the site is decommissioned because the remaining system components (the stack and the ash pit) are within an active Laboratory site and within 43-1 (LANL 1994, 34754, p. 6-5). Characterization of the inactive SWMU would disrupt active operations, and neither the stack nor the ash pit presents a human health or environmental risk (LANL 1993, 26078).

The site map of SWMU 43-002 is shown in Figure 8.5-1. Currently, the location of the removed incinerator is inside an active facility.

8.5.1 Summary of Previous Investigations for SWMU 43-002

No previous investigations have been conducted at SWMU 43-002.

8.5.2 Summary of Data for SWMU 43-002

No off-site fixed laboratory data are available for this SWMU.

8.5.3 Scope of Activities for SWMU 43-002

No sampling activities are proposed for SWMU 43-002. Investigation is being deferred pending D&D of the HRL (Building 43-1). Once these conditions have been met, the Laboratory will prepare a supplemental work plan to investigate the SWMU to determine the nature and extent of any contamination present and to determine if levels of contamination would be protective of human health and the environment for the intended land use. If levels of contamination are not acceptable, the Laboratory will remediate the SWMU to conditions protective of human health and the environment for the intended use.

8.6 AOC C-43-001, Outfall

AOC C-43-001 is a storm-drain outfall that flows into Los Alamos Canyon. It collects runoff from the HRL (43-1) loading dock and also functions as the overflow from the lift station (43-10). The overflow line is an 8-in. VCP that extends from 43-10 130 ft south to a manhole. A 12-in. corrugated metal pipe, which receives discharge from two storm drains and any effluent from the overflow, flows southwest for 160 ft, and drains into the canyon south of the HRL. The sanitary waste lines for the HRL [SWMU 43-001(a1) and AOC 43-001(a2)] may have become clogged at some time, causing an overflow. Any sanitary waste carried through the sewer lines could have discharged into the storm drains. Although no documentation was found about any routine releases into the storm drains, the outfall may have received radioactive, nonsanitary cooling water.

The site map of AOC C-43-001 is shown in Figure 8.6-1. Currently, the outfall is located on the undeveloped north slope of Los Alamos Canyon.

8.6.1 Summary of Previous Investigations for AOC C-43-001

No previous investigations have been conducted at AOC C-43-001.

8.6.2 Summary of Data for AOC-43-001

No off-site fixed laboratory data are available for this AOC.

8.6.3 Scope of Activities for AOC C-43-001

The proposed sampling locations at AOC C-43-001 are shown in Figure 8.6-1. Table 8.6-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at AOC C-43-001 will consist of the following activity:

- *Storm Drain Outfall Investigation.* Samples will be collected from the 0- to 0.5-ft-, 1.5- to 2.0-ft-, and 4.0- to 5.0-ft-depth intervals at the mouth of the outfall (Figure 8.6-1, location 1). Samples will be collected from a location 7 ft downslope from the mouth of the outfall, preferably in a discernible drainage (Figure 8.6-1, location 2), and 7 ft to the west and east of that location (Figure 8.6-1, locations 3 and 4). Outfall sampling locations will be selected by a geomorphologist, and at least two depth intervals will be sampled: one in the appropriate sediment unit(s) and one below the sediment/tuff interface.

Samples will be analyzed at an off-site fixed laboratory for TAL metals, cyanide, nitrates, perchlorate, VOCs (in samples deeper than 0.5 ft bgs), SVOCs, PCBs, dioxins, furans, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH and by gamma spectroscopy. Samples will not be analyzed for explosive compounds because these chemicals are not associated with the operations at HRL.

9.0 TA-61, EAST JEMEZ SITE

9.1 Background

TA-61 is bounded on the north by Los Alamos Canyon and on the south by Sandia Canyon. East Jemez Road traverses the north edge of the site near the rim of Los Alamos Canyon. A major feature at TA-61 is the Los Alamos County municipal sanitary landfill, which is still in use. A few small support buildings are located at the northern end of TA-61. The privately owned 1 mi^2 of land for the Royal Crest Trailer Court, established when Los Alamos became a permanent community after World War II, is located at the northeast corner of TA-61. Two privately owned cement-mixing plants operate on land leased from the DOE. The remainder of TA-61 is naturally vegetated with ponderosa pine forest.

Only one SWMU is addressed in this work plan. SWMU 61-007 is a former transformer-staging site along the south side of East Jemez Road. SWMU 61-007 is shown in Figure 9.1-1.

9.1.1 Operational History

TA-61 was created during the Laboratory's TA redesignation in 1989. TA-61 is used for physical support and infrastructure facilities, including the municipal sanitary landfill. Nine facilities are located at TA-61: sewer pump stations, computer model shop, general storage sheds, blower house, and general warehouse storage for maintenance activities performed throughout the laboratory.

9.1.2 Summary of Releases, Transport Mechanisms, and Potential Receptors

Summary of Releases. It is thought that the subsurface soil was contaminated by releases of PCB-containing oils from a transformer-staging site operated by an electrical contracting firm. The firm is no longer in business, and the years of operation are not known (LANL 1990, 07511).

Transport Mechanisms. No transport mechanisms have been identified for subsurface PCB contaminants; PCBs are unlikely to migrate to groundwater because of strong binding to soil (DHHS 2000, 91520, p. 487). Erosion potential is low for flat mesa-top sites.

Potential Receptors. Potential receptors to potential contaminant exposure include construction workers. Specifically, exposure to the soil could occur through significant disturbance of the soil (e.g., trenching) by construction workers.

9.1.3 Current Site Usage and Status

The site is located along the south side of East Jemez Road and is not occupied or near any industrial area or residence.

9.2 SWMU 61-007, Transformer Site—Systematic Leak—PCB-Only Site

SWMU 61-007 is thought to be the location of a transformer-staging site of an electrical contracting firm that once operated in the vicinity. While excavating a trench for a new sewer line along the south side of East Jemez Road, approximately 0.75 mi east of the intersection of East Jemez Road and Diamond Drive in 1989, workers detected an organic odor. Chemical analysis of the soil determined that the soil was contaminated with PCBs and 1,2,4-trichlorobenzene (a VOC) (LANL 1989, 62843).

The site map of SWMU 61-007 is shown in Figure 9.2-1. Currently, the site is under a dirt road and parking lot area and is not occupied or near any industrial area or residence.

9.2.1 Summary of Previous Investigations for SWMU 61-007

The site was cleaned up under the Toxic Substances Control Act by the Laboratory's Health, Safety, and Environment (HSE) Division in 1989 and regulatory closure was verbally approved by EPA Region 6 (LANL 1997, 55510). Section 9.2.1 of the HIR provides details of previous investigation (LANL 2006, 91915).

9.2.2 Summary of Data for SWMU 61-007

No off-site fixed-laboratory data are available for this SWMU.

9.2.3 Scope of Activities for SWMU 61-007

The proposed sampling locations at SWMU 61-007 are shown in Figure 9.2-1. Table 9.2-1 provides a summary of the proposed sampling locations, depths, the objectives each sample addresses, and the proposed analytical suites. Sampling at SWMU 61-007 will consist of the following activity:

- *Transformer-Staging Site.* Samples will be collected in the center of the previous excavation and to the north, east, south, and west of the previous excavation (Figure 9.2-1, locations 1, 2, 3, 4, and 5, respectively). Samples will be collected from the center of the previous excavation starting immediately beneath a plastic liner that marked the depth of the previous excavation. Samples will be collected from the 0- to 1.0-ft-, 4.0- to 5.0-ft-, and 9.0- to 10.0-ft-depth intervals beneath the plastic. Samples will be collected from the north, east, south, and west of the previous excavation starting approximately 0.5 ft bgs in order to avoid collecting road and parking lot debris. Samples to the north, east, south, and west of the previous excavation will be collected from the 0- to 1.0-ft-, 4.0- to 5.0-ft-, 9.0- to 10.0-ft-, 14.0- to 15.0-ft, 19.0- to 20.0-ft-, and 24.0- to 25.0-ft-depth intervals bgs.

Samples will be analyzed at off-site fixed laboratories for VOCs, SVOCs, PCBs, and pH. Inorganic chemicals, dioxins, explosive compounds, furans, and radionuclides will not be analyzed because this area was designated a SWMU solely because of past presence of PCBs.

10.0 INVESTIGATION METHODS

The current versions of ENV-ECR standard operating procedures (SOPs) and quality procedures (QPs) presented below apply to the investigation methods proposed in this plan. The methods are summarized in Table 10.0-1.

- SOP-01.01, General Instructions for Field Investigations
- SOP-01.02, Sample Containers and Preservation
- SOP-01.03, Handling, Packaging, and Shipping of Samples
- SOP-01.04, Sample Control and Field Documentation
- SOP-01.05, Field Quality Control Samples
- SOP-01.06, Management of Environmental Restoration Project Waste
- SOP-01.08, Field Decontamination of Drilling and Sampling Equipment
- SOP-01.10, Waste Characterization
- SOP-03.11, Coordination and Evaluating Geodetic Surveys
- SOP-06.09, Spade and Scoop Method for the Collection of Soil Samples
- SOP-06.10, Hand Auger and Thin-Wall Tube Sampler
- SOP-06.26, Core Barrel Sampling for Subsurface Earth Materials
- SOP-06.33, Headspace Vapor Screening with a Photoionization Detector
- SOP-15.09, Chain of Custody for Analytical Data Packages
- QP-02.2, Personnel Training Management
- QP-04.4, Records Transmittal to the Records Processing Facility
- QP-05.3, Readiness Planning and Review
- QP-05.7, Notebook Documentation for Environmental Restoration Technical Activities

The procedures listed above are available at the following address: http://erproject.lanl.gov/documents/procedures.html. Additional procedures may be added as necessary or appropriate to describe and document activities. All work will be performed in accordance with applicable SOPs, QPs, and the ENV-ECR quality management program.

10.1 Establish Sampling Locations

Subsurface structures (septic tank, inlet and outlet piping, etc.) may be located using engineering drawings and site visual inspections. If the drawings and inspections do not establish locations with confidence, the field team may elect to use appropriate geophysical techniques to attempt to locate structures. These geophysical techniques that may be used include metal detectors, geomagnetics, ground-penetrating radar, or others as appropriate to the known characteristics of the structure(s) to be located. If structures cannot be located through these methods, limited exploratory excavation may be attempted, depending on site topography, accessibility, buried utilities, and property owner's permission.

10.2 Sampling

Soil and rock 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 the topography, the nature of the material to be sampled, the depth intervals required, accessibility, obtaining the property owner's permission, and level of disruption to the public or property owners. Typically, samples will be collected using spade and scoop (SOP-06.09) or hand auger (SOP-06.10) method unless site conditions require other methods (Table 10.0-1).

Sample paperwork (sample collection logs, container labels, chain-of-custody forms, and custody seals) and sample containers will be obtained through the Sample Management Office (SMO). The SMO will provide the appropriate number, type, and size of containers based on the type of samples and analyses required.

Samples will be field screened for radioactivity and VOCs at they are collected. VOC screening may be performed through direct reading of the sample as it is collected or by using a headspace screening method in accordance with SOP-06.33 (Table 10.0-1). All pertinent information regarding each sample will be recorded on sample collection logs provided by the SMO, in accordance with SOP-01.04. Samples will be maintained under chain of custody and preserved according to the requirements for each sample type and analysis until they are delivered to the SMO for processing.

If conditions require using a drill rig, core samples will be collected per SOP-06.26, examined for lithologic and structural features, field screened for radioactivity and organic vapors, and photographed. All pertinent characteristics of core samples will be recorded on the corresponding sample collection log.

All samples (surface and subsurface) will be shipped for analysis through the SMO to off-site fixed laboratories on the ENV-ECR–approved suppliers' list. All samples will be collected and handled according to SOP-01.03. The analytical suites for each sample location are described in the sections pertaining to the individual sites and are listed in the corresponding proposed soil sampling tables.

Quality assurance/quality control samples will include field duplicate, equipment blank, and field trip blank samples collected in accordance with SOP-01.05. Field duplicate samples will be collected at a frequency of at least one for every 10 regular samples as directed by Section IX.C.3.b of the Consent Order.

10.3 Equipment Decontamination

Following investigation activities, project personnel will decontaminate all equipment. Sampling equipment will be decontaminated after each sample is collected. Residual material adhering to the equipment will be removed using dry decontamination methods, including wire-brushing and scraping (SOP-01.08). Dry decontamination of sampling equipment may include use of a nonphosphate detergent such as Fantastik.

10.4 Waste Management

Materials identified as waste will be segregated into their specific waste types for appropriate disposal. Investigation activities will minimize the waste generated by following the Laboratory's Hazardous Waste Minimization Awareness Report (LANL 2005, 91291). Methods for managing investigation-derived waste, including soil, tuff, concrete and other structural material, protective personal equipment, and other miscellaneous materials used, are described in Appendix B.

11.0 MONITORING AND SAMPLING PROGRAM

No monitoring is currently performed at any of the sites. It is anticipated that no monitoring will be required at any of these sites after these work plan activities are completed.

12.0 SCHEDULE

This investigation work plan will be submitted to the NMED by April 28, 2006. Assuming a 120-day period for NMED review and comment resolution, the work plan will be approved by approximately August 31, 2006. Preparation for investigation activities is scheduled to start by September 30, 2006. Fieldwork is expected to start in January 2007 and will take approximately 18 months to complete, with a scheduled finish date of July 31, 2008. The investigation report will be delivered to NMED on or before May 31, 2009.

13.0 REFERENCES

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

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; and the ENV-ERS Program. 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.

Abeele, W., M. Wheeler, and B. Burton, October 1981. "Geohydrology of Bandelier Tuff," Los Alamos National Laboratory report LA-8962-MS, Los Alamos, New Mexico. (Abeele et al. 1981, 06273)

Ahlquist, A.J., September 1977. "Removed Structures, TA-1," Los Alamos Scientific Laboratory memorandum H8-77-740 to J.B. Montoya from A.J. Ahlquist, Los Alamos, New Mexico. (Ahlquist 1977, 03270)

Ahlquist, A.J., A.K. Stoker, and L.K. Trocki, December 1977. "Radiological Survey and Decontamination of the Former Main Technical Area (TA-1) at Los Alamos, New Mexico," Los Alamos Scientific Laboratory report LA-6887, Los Alamos New Mexico. (Ahlquist et al. 1977, 05710)

Bailey, R., R. Smith, and C. Ross, 1969. "Stratigraphic Nomenclature of Volcanic Rocks in the Jemez Mountains, New Mexico," in *Contributions to Stratigraphy, U.S. Geological Survey Bulletin* 1274-P, p. 1, Washington, D.C. (Bailey et al. 1969, 21498)

Balo, K.A. and J.L. Warren, March 1986. "1985 Waste Management Site Plan," Los Alamos National Laboratory document, Los Alamos, New Mexico. (Balo and Warren 1986, 07419)

Broxton, D., G. Heiken, S. Chipera, and F. Byers, Jr., June 1995. "Stratigraphy, Petrography, and Mineralogy of Bandelier Tuff and Cerro Toledo Deposits," in *Earth Science Investigation for Environmental Restoration—Los Alamos National Laboratory Technical Area 21*, D. Broxton and P.G. Eller, Eds., Los Alamos National Laboratory report LA-12934-MS, Los Alamos, New Mexico. (Broxton et al. 1995, 50121)

Broxton, D., P. Longmire, P. Eller, and D. Flores, June 1995. "Preliminary Drilling Results for Boreholes LADP-3 and LADP-4," in *Earth Science Investigations for Environmental Restoration—Los Alamos National Laboratory Technical Area 21*, D.E. Broxton and P.G. Eller, Eds., Los Alamos National Laboratory report LA-12934-MS, Los Alamos, New Mexico (Broxton et al. 1995, 50119)

Broxton, D., and S. Reneau, August 1995. "Stratigraphic Nomenclature of the Bandelier Tuff for the Environmental Restoration Project at Los Alamos National Laboratory," Los Alamos National Laboratory report LA-13010-MS, Los Alamos, New Mexico. (Broxton and Reneau 1995, 49726)

Broxton, D.E., and S. Reneau, 1996. "Buried Early Pleistocene Landscapes beneath the Pajarito Plateau, Northern New Mexico," in *New Mexico Geological Society Guidebook, 47th Field Conference, Jemez Mountains Region*, New Mexico, pp. 325–334. (Broxton and Reneau 1996, 55429)

Buckland, C.W. March 15, 1955. "Results of Sewage Samples from W-1 Site," Los Alamos Scientific Laboratory memorandum to E. MacMann from C. Buckland, Los Alamos, New Mexico. (Buckland 1955, 07686)

Buckland, C.W., September 15, 1959. "Final Radioactive Contamination Health Clearance of the Eastern Sector of TA-01 South of Trinity Drive and the J-2 Area," Los Alamos Scientific Laboratory memorandum to J. Hill from C.W. Buckland, Los Alamos, New Mexico. (Buckland 1959, 03426)

Buckland, C.W., April 21, 1964. "Final Radioactive Contamination Survey of Certain Structures in TA-1," Los Alamos Scientific Laboratory memorandum to S.E. Russo (ENG-3) from C.W. Buckland (H-1), Los Alamos, New Mexico. (Buckland 1964, 04810)

Buckland, C.W., February 16, 1973. "Summary of Records Search for Radioactivity Remaining in TA-1, Acid Waste Lines, TA-10, TA-45, and Acid Canyon Below TA-45," Los Alamos Scientific Laboratory memorandum to D.D. Meyer from C.W. Buckland, Los Alamos, New Mexico. (Buckland 1973, 58138)

Cox, J., 1984. "Line 167: Concrete Anchors Left in Place on North Side of Los Alamos Canyon," Los Alamos National Laboratory memorandum HSE-1-84 to R. Garde from J. Cox, Los Alamos, New Mexico. (Cox 1984, 30811)

Crowe, B., G. Linn, G. Heiken, and M. Bevier, April 1978. "Stratigraphy of the Bandelier Tuff in the Pajarito Plateau, Applications to Waste Management," Los Alamos Scientific Laboratory report LA-7225-MS, Los Alamos, New Mexico. (Crowe et al. 1978, 05720)

DOE (U.S. Department of Energy), April 1979. "Formerly Utilized MED AEC Sites Remedial Action Program, Removal of a Contaminated Industrial Waste Line, Los Alamos, New Mexico." Los Alamos Scientific Laboratory document prepared for the U.S. Department of Energy, Division of Environmental Control Technology, Los Alamos, New Mexico. (DOE 1979, 08897)

DOE (U.S. Department of Energy), October 1987. "Phase I: Installation Assessment, Los Alamos National Laboratory," Vol. 1 and 2 (Draft), Comprehensive Environmental Assessment and Response Program report, Albuquerque Operations Office, Albuquerque, New Mexico. (DOE 1987, 08662)

DOE (U.S. Department of Energy), October 11, 1995. "NFA Permit Modification, March 1995 (DOE Concurrence in Determination of NFA for AOCs Non-HSWA Units)," U.S. Department of Energy memorandum LAAMEP:CGF:NFA Approval to H. Jansen (EM/ER) from T. Taylor (DOE LAAO), Los Alamos, New Mexico. (DOE 1995, 50023)

DOE (U.S. Department of Energy), September 21, 1998. "Acceptance of Performance Measures," U.S. Department of Energy memorandum to J. Canepa (EM/ER) from T. Taylor (DOE LAAO), Los Alamos, New Mexico. (DOE 1998, 59694)

DHHS (U.S. Department of Health and Human Services), November 2000. "Toxicological Profile for Polychlorinated Biphenyls (PCBs)," U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Washington, D.C. (DHHS 2000, 91520)

Elder, J.C., E.J. Cox, D.P. Hohner, and A.M. Valentine, September 1986. "Radioactive Liquid Waste Lines Removal Project at Los Alamos (1981–1986)," Los Alamos National Laboratory report LA-10821-MS, Los Alamos National Laboratory, Los Alamos, New Mexico. (Elder et al. 1986, 06666)

Emility, L.A., December 15, 1981. "Monthly Major Achievements Report, Group H-7," Los Alamos National Laboratory memorandum to G.A. Voelz (H-DO) from L.A. Emility (H-7), Los Alamos, New Mexico. (Emility 1981, 08081)

Environmental Protection Group, January 1992. "Environmental Surveillance at Los Alamos during 1992," Los Alamos National Laboratory report LA-12764-ENV, Los Alamos, New Mexico. (Environmental Protection Group January 1992, 45363)

Environmental Protection Group, August 1, 1993. "Environmental Surveillance at Los Alamos during 1991," Los Alamos National Laboratory report LA-12572-ENV, Los Alamos, New Mexico. (Environmental Protection Group 1993, 23249)

EPA (U.S. Environmental Protection Agency), April 10, 1990. "Module VIII of RCRA Permit No. NM0890010515, EPA Region VI," Issued to Los Alamos National Laboratory, Los Alamos, New Mexico, effective May 23, 1990, EPA Region VI, Hazardous Waste Management Division, Dallas, Texas. (EPA 1990, 01585)

EPA (U.S. Environmental Protection Agency), January 28, 1994. "24 No Further Action Proposals LANL NM0890010515," Environmental Protection Agency letter to J.C. Vozella (DOE LAAO), from W.K. Honker (EPA, Region 6), Dallas Texas. (EPA 1994, 38816)

EPA (U.S. Environmental Protection Agency), April 19, 1994. Module VIII of RCRA Permit No. NM0890010515, EPA Region VI, New Requirements Issued to Los Alamos National Laboratory, Los Alamos, New Mexico, Effective May 19, 1994, EPA Region VI, Hazardous Waste Management Division, Dallas, Texas. (EPA 1994, 44146)

EPA (U.S. Environmental Protection Agency), November 1, 1995. "Notice of Deficiency, Addendum 1 to the Work Plan for Operable Unit (OU) 1114, Los Alamos National Laboratory," U.S. Environmental Protection Agency letter to T. Taylor (DOE LAAO) from D. Neleigh (EPA Region 6), Dallas, Texas. (EPA 1995, 55161.51)

EPA (U.S. Environmental Protection Agency), December 6, 1995. "Operable Unit 1071, SWMU 0-031(a), Los Alamos National Laboratory (NM0890010515)," U.S. Environmental Protection Agency letter to T. Taylor (DOE LAAO) from D. Neleigh (EPA, Region 6), Dallas, Texas. (EPA 1995, 85498)

EPA (U.S. Environmental Protection Agency), January 21, 2005. "EPA's Prior Decisions on SWMU/AOC Sites at Los Alamos National Laboratory (LANL), the Revised List Now Contains 542 AOCs," U.S. Environmental Protection Agency letter 90-7-3-16854 to J. Bearzi (NMED HWB) from L.F. King (EPA, Region 6), Dallas. Texas. (EPA 2005, 88464)

Goff, F., June 1995. "Geologic Map of Technical Area 21," in *Earth Science Investigations for Environmental Restoration–Los Alamos National Laboratory Technical Area 21*, D.E. Broxton and P.G. Eller, Eds., Los Alamos National Laboratory report LA-12934-MS, Los Alamos, New Mexico, pp. 7–18. (Goff 1995, 49682)

Griggs, R., 1964. "Geology and Ground-Water Resources of the Los Alamos Area New Mexico," U.S. Geological Survey Water-Supply Paper 1753, Washington, D.C. (Griggs 1964, 08795)

Griggs, E., June 2, 1993. "Debris Piles East of TA-3-170 and Northwest of TA-03-142," Los Alamos National Laboratory memorandum CLS-ER/EG-93:061 to M. Bailey (JCI/JENV) from E. Griggs (CLS-DO), Los Alamos, New Mexico. (Griggs 1993, 76167)

Heiken, G., F. Goff, J. Stix, S. Tamanyu, M. Shafiqullah, S. Garcia, and R. Hagan, February 10, 1986. "Intracaldera Volcanic Activity, Toledo Caldera and Embayment, Jemez Mountains, New Mexico," in *Journal of Geophysical Research*, Vol. 91, No. B2, pp. 1799–1815. (Heiken et al. 1986, 48638)

Hill, J.F., August 15, 1964. "Disposal of Debris from TA-1 Demolition," Zia Company memorandum ZTA-3103 from J.F. Hill (Zia Company), Los Alamos, New Mexico. (Hill 1964, 04821)

ICF Kaiser Engineers, October 1993. "Field Sampling Activities at TA-32," ICF Kaiser Engineers report prepared for Los Alamos National Laboratory, Los Alamos, New Mexico. (ICF Kaiser Engineers 1993, 85513)

IT (International Technology Corporation), October 21, 1991. "Ashley Pond Chronology," IT Corporation letter to R. Conrad (EM-8) from P.S. Den-Baars (IT Corporation), Los Alamos, New Mexico. (IT 1991, 04816)

Izett, G.A., and J.D. Obradovich, February 10, 1994. "$^{40}Ar/^{39}Ar$ Age Constraints for the Jaramillo Normal Subchron and the Matuyama-Brunhes Geomagnetic Boundary," *Journal of Geophysical Research*, Vol. 99, No. B2, pp. 2925–2934. (Izett and Obradovich 1994, 48817)

Kearl, P., J. Dexter, and M. Kautsky, March 1986. "Vadose Zone Characterization of Technical Area 54, Waste Disposal Areas G and L, Los Alamos National Laboratory, New Mexico, Report 3: Preliminary Assessment of the Hydrogeologic System," Bendix Field Engineering Corporation report GJ-44, Grand Junction, Colorado. (Kearl et al. 1986, 15368)

LANL (Los Alamos National Laboratory), May 1987. "Analytical Results of Verification Sampling Former Main Technical Area (TA-1) Los Alamos National Laboratory," Environmental Surveillance Group (HSE-8) and Health and Environmental Chemistry Group (HSE-9) report, Los Alamos, New Mexico. (LANL 1987, 02956)

LANL (Los Alamos National Laboratory), September 1989. "PCB Spill along East Jemez Road," Los Alamos National Laboratory informal memorandum from C. Nylander, Los Alamos, New Mexico. (LANL 1989, 62843)

LANL (Los Alamos National Laboratory), November 1990. "Solid Waste Management Units Report," Vol. I of IV (TA-0 through TA-9), Los Alamos National Laboratory document LA-UR-90-3400, Los Alamos, New Mexico. (LANL 1990, 07511)

LANL (Los Alamos National Laboratory), November 1990. "Solid Waste Management Units Report," Vol. III of IV (TA-26 through TA-50), Los Alamos National Laboratory document LA-UR-90-3400, prepared by International Technology Corporation under Contract 9-XS8-0062R-1, Los Alamos, New Mexico. (LANL 1990, 07513)

LANL (Los Alamos National Laboratory), March 1990. "Report of Results from Verification Sampling at Old Central School Site," Los Alamos National Laboratory document LA-UR-90-939, Los Alamos, New Mexico. (LANL 1990, 07501)

LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1078 Environmental Restoration Program," Los Alamos National Laboratory document LA-UR-92-838, Los Alamos, New Mexico. (LANL 1992, 43454)

LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1071 Environmental Restoration Program," Los Alamos National Laboratory document LA-UR-92-810, Los Alamos, New Mexico. (LANL 1992, 07667)

LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1079 Environmental Restoration Plan," Los Alamos National Laboratory document LA-UR-92-850, Los Alamos, New Mexico. (LANL 1992, 07668)

LANL (Los Alamos National Laboratory), September 1992. "Large Area Swipe Survey Report," Los Alamos National Laboratory document, Los Alamos, New Mexico. (LANL 1992, 58457)

LANL (Los Alamos National Laboratory), October 1992. "RFI Work Plan for Operable Unit 1071," Los Alamos National Laboratory document LA-UR-92-810, Los Alamos, New Mexico. (LANL 1992, 07667)

LANL (Los Alamos National Laboratory), June 1993. "RFI Work Plan for Operable Unit 1098," Los Alamos National Laboratory document LA-UR-92-3825, Los Alamos, New Mexico. (LANL 1993, 15314)

LANL (Los Alamos National Laboratory), July 1993. "RFI Work Plan for Operable Unit 1114," Los Alamos National Laboratory document LA-UR-93-1000, Los Alamos, New Mexico. (LANL 1993, 20947)

LANL (Los Alamos National Laboratory), August 1993. "Western Sanitary Waste Line Sampling Plan for FY 93," Los Alamos National Laboratory document, Los Alamos, New Mexico. (LANL 1993, 38753)

LANL (Los Alamos National Laboratory), November 1993. "Installation Work Plan for Environmental Restoration, Vol. II, Revision 3," Los Alamos National Laboratory document LA-UR-93-3987, Los Alamos, New Mexico. (LANL 1993, 26078)

LANL (Los Alamos National Laboratory), May 1994. "RFI Work Plan for Operable Unit 1136," Los Alamos National Laboratory document LA-UR-94-1244, Los Alamos, New Mexico. (LANL 1994, 34754)

LANL (Los Alamos National Laboratory), April 7, 1995. "RCRA Facility Investigation Sampling Program Field Unit 1, Technical Area 1, SWMU 1-001(s), Western Sanitary Waste Line Location 1A, Summer 1994 Field Summary Report," prepared by ERM Program Management Company and Golder Federal Services for Los Alamos National Laboratory, Environmental Restoration Program, Los Alamos, New Mexico. (LANL 1995, 66456)

LANL (Los Alamos National Laboratory), May 3, 1995. "Resource Conservation and Recovery Act Facility Investigation Report for Potential Release Site 0-032, Field Unit 1," Los Alamos National Laboratory document LA-UR-95-932, Los Alamos, New Mexico. (LANL 1995, 46051)

LANL (Los Alamos National Laboratory), June 30, 1995. "Resource Conservation and Recovery Act Facility Investigation Report for Potential Release Sites 32-001, 32-002(a,b), 32-003, 32-004, Field Unit 1," Los Alamos National Laboratory document LA-UR-95-2231, Los Alamos, New Mexico. (LANL 1995, 48944)

LANL (Los Alamos National Laboratory), July 1995. "RFI Work Plan for Operable Unit 1114, Addendum 1," Los Alamos National Laboratory document LA-UR-95-731, Los Alamos, New Mexico. (LANL 1995, 57590)

LANL (Los Alamos National Laboratory), July 27, 1995. "RFI Report for Solid Waste Management Units, TA-1, Aggregate F, Field Unit 1," Los Alamos National Laboratory document LA-UR-95-2680, Los Alamos, New Mexico. (LANL 1995, 49703)

LANL (Los Alamos National Laboratory), October 25, 1995. "Groundwater Protection Management Program Plan, Revision 2.0 (Draft)," Los Alamos National Laboratory document, Los Alamos, New Mexico. (LANL 1995, 50124)

LANL (Los Alamos National Laboratory), November 1995. "Task/Site Work Plan for Operable Unit 1049, Los Alamos Canyon and Pueblo Canyon," Los Alamos National Laboratory document LA-UR-95-2053, Los Alamos, New Mexico. (LANL 1995, 50290)

LANL (Los Alamos National Laboratory), November 9, 1995. "Operable Unit (OU) 1071, Solid Waste Management Unit (SWMU) 0-031(a), Request for Work Plan Deviation," Los Alamos National Laboratory letter EM/ER:96-086 to D. Neleigh (EPA, Region 6) from J. Jansen (ER Project) and T. Taylor (DOE LAAO), Los Alamos, New Mexico. (LANL 1995, 50053)

LANL (Los Alamos National Laboratory), February 27, 1996. "Response to the Notice of Deficiency (NOD) for Operable Unit (OU) 1079 Concerning 32-001, 32-002(a,b), 32-003, and 32-004," Los Alamos National Laboratory letter EM/ER:96-086 to B. Driscoll (EPA, Region), from J. Jansen (EM/ER) and T. Taylor (DOE LAAO), Los Alamos, New Mexico. (LANL 1996, 52928)

LANL (Los Alamos National Laboratory), February 1996. "Voluntary Corrective Action Completion Report for Potential Release Site 1-001(f), Hillside 140 Septic Outfall," Los Alamos National Laboratory document LA-UR-96-473, Los Alamos, New Mexico. (LANL 1996, 53797)

LANL (Los Alamos National Laboratory), March 1996. "RFI Report for Potential Release Sites 1-007(d), 1-007(e), 1-007(j), 1-001(a), 1-001(e), 1-001(o), 1-003(a), 1-006(o), 1-003(e), 1-001(m), 1-003(d), 1-006(e), Aggregates A, B, H, I, J, Former Operable Unit 1078, Field Unit 1," Los Alamos National Laboratory document LA-UR-95-3379, Los Alamos, New Mexico. (LANL 1996, 54461)

LANL (Los Alamos National Laboratory), March 1996. "RFI Report for Potential Release Sites 1-001(b, d), 1-003(c), and 1-007(j), TA-1, Aggregates C and D, Field Unit 1," Los Alamos National Laboratory document LA-UR-96-962, Los Alamos, New Mexico. (LANL 1996, 54467)

LANL (Los Alamos National Laboratory), March 1996. "RFI Report for Potential Release Sites 1-001(g), 1-001(c), 1-003(b), 1-006(b), 1-006(a), 1-006(c), 1-006(g), 1-006(d), 1-006(n), 1-007(a), 1-007(b), 1-007(c), 1-007(j), Aggregates E, G, Field Unit 1," Los Alamos National Laboratory document LA-UR-96-1019, Los Alamos, New Mexico. (LANL 1996, 54465)

LANL (Los Alamos National Laboratory), April 1996. "RFI Report for Potential Release Sites, 1-002, 1-001(t), 1-007(k), TA-1, Aggregates K, L, M, and O, Field Unit 1," Los Alamos National Laboratory document LA-UR-96-1264, Los Alamos, New Mexico. (LANL 1996, 54463)

LANL (Los Alamos National Laboratory), April 1996. "Voluntary Corrective Action Completion Report for Potential Release Site C-0-042 Zia Motor Pool Waste Oil Underground Storage Tank, Field Unit 1" Los Alamos National Laboratory document LA-UR-96-1319, Los Alamos, New Mexico. (LANL 1996, 54618)

LANL (Los Alamos National Laboratory), August 1996. "RFI Report for Potential Release Sites in TA-00-031(b) Former Zia Motor Pool Area (Located in Former Operable Unit 1071), Field Unit 1," Los Alamos National Laboratory document LA-UR-96-2746, Los Alamos, New Mexico. (LANL 1996, 54913)

LANL (Los Alamos National Laboratory), August 1996. "Voluntary Corrective Action Report for Solid Waste Management Unit 1-003(d) at TA-1, Can Dump Site, Field Unit 1," Los Alamos National Laboratory document LA-UR-96-1561, Los Alamos, New Mexico. (LANL 1996, 55029)

LANL (Los Alamos National Laboratory), September 1996. "Interim Action Report for a Potential Release Site at TA-1, 1-001(s), Western Sanitary Waste Line, Locations 9, 10, 11, and 1A, Field Unit 1," Los Alamos National Laboratory document LA-UR-96-3352, Los Alamos, New Mexico. (LANL 1996, 62538)

LANL (Los Alamos National Laboratory), September 1996. "Phase II and Voluntary Corrective Action Report for Potential Release Sites at TA-32," Los Alamos National Laboratory document LA-UR-96-3128, Los Alamos, New Mexico. (LANL 1996, 59178)

LANL (Los Alamos National Laboratory), January 1997. "Interim Action Report for Potential Release Site 1-001(d) at TA-1, Hillside 138, Field Unit 1," Los Alamos National Laboratory document LA-UR-97-1363, Los Alamos, New Mexico. (LANL 1997, 56908)

LANL (Los Alamos National Laboratory), March 1997. "Performance Assessment and Composite Analysis for Los Alamos National Laboratory Material Disposal Area G," Los Alamos National Laboratory document LA-UR-97-85, Los Alamos, New Mexico. (LANL 1997, 63131)

LANL (Los Alamos National Laboratory), March 5, 1997. "Response to Notice of Determination for Requests for Permit Modification: Units Proposed for No Further Action, March and September 1995," Los Alamos National Laboratory document LA-UR-97-763, Los Alamos, New Mexico. (LANL 1997, 55510)

LANL (Los Alamos National Laboratory), April 1997. "Core Document for Canyons Investigations," Los Alamos National Laboratory document LA-UR-96-2083, Los Alamos, New Mexico. (LANL 1997, 55622)

LANL (Los Alamos National Laboratory), August 1997. "RFI Report for Phase I Investigation, TA-1 Aggregates N and P," Los Alamos National Laboratory document LA-UR-97-3320, Los Alamos, New Mexico. (LANL 1997, 56660.112)

LANL (Los Alamos National Laboratory), September 1997. "NFA Report for Potential Release Sites 0-034(a), 0-034(b), 73-001(b), 73-004(c), 73-004(d)," Los Alamos National Laboratory document LA-UR-97-3864, Los Alamos, New Mexico. (LANL 1997, 59367)

LANL (Los Alamos National Laboratory), May 22, 1998. "Hydrogeologic Workplan Los Alamos National Laboratory," Los Alamos National Laboratory document, Los Alamos, New Mexico. (LANL 1998, 59599)

LANL (Los Alamos National Laboratory), June 1998. "RFI Work Plan and SAP for Potential Release Sites 53-002(a) 53-002(b) and Associated Piping and Drainages at TA-53," Los Alamos National Laboratory document LA-UR-98-2547, Los Alamos, New Mexico. (LANL 1998, 58841)

LANL (Los Alamos National Laboratory), September 15, 1998. "Documentation of Ecological Risk Assessment and Other Applicable Regulations and Standards for 73 Administrative NFA Proposals (Functional Area A.2 Performance Measure)," Los Alamos National Laboratory letter to T. Taylor (DOE LAAO) from J. Canepa (ER), Los Alamos, New Mexico. (LANL 1998, 59689)

LANL (Los Alamos National Laboratory), September 22, 1998. "Inorganic and Radionuclide Background Data for Soils, Canyon Sediments, and Bandelier Tuff at Los Alamos National Laboratory," Los Alamos National Laboratory document LA-UR-98-4847, Los Alamos, New Mexico. (LANL 1998, 59730)

LANL (Los Alamos National Laboratory), July 1, 1999, "RFI Report for Potential Release Site 0-017 (Former Line 167, Line 170, Line 171)," Los Alamos National Laboratory document LA-UR-99-3354, Los Alamos, New Mexico. (LANL 1999, 64029)

LANL (Los Alamos National Laboratory), March 2000. "Installation Work Plan for Environmental Restoration Project, Revision 9," Los Alamos National Laboratory report LA-UR-00-1336, Los Alamos, New Mexico. (LANL 2000, 66802)

LANL (Los Alamos National Laboratory), March 2000. "Environmental Restoration (ER) Project Cerro Grande Fire Accelerated Action Information Sheet, Potential Release Site (PRS) 41-002(a) Wastewater Treatment Facility," Los Alamos National Laboratory report, LA-LP-00-206, Los Alamos, New Mexico. (LANL 2000, 91507)

LANL (Los Alamos National Laboratory), March 2000. "Environmental Restoration (ER) Project Cerro Grande Fire Accelerated Action Information Sheet, Potential Release Site (PRS) 41-002(b) Wastewater Treatment Facility," Los Alamos National Laboratory report, LA-LP-00-207, Los Alamos, New Mexico. (LANL 2000, 91508)

LANL (Los Alamos National Laboratory), March 2000. "Environmental Restoration (ER) Project Cerro Grande Fire Accelerated Action Information Sheet, Potential Release Site (PRS) 41-002(c) Wastewater Treatment Facility," Los Alamos National Laboratory report, LA-LP-00-208, Los Alamos, New Mexico. (LANL 2000, 91509)

LANL (Los Alamos National Laboratory), March 2000. "Environmental Restoration (ER) Project Cerro Grande Fire Accelerated Action Information Sheet, Potential Release Site (PRS) 41-003 Sump," Los Alamos National Laboratory report, LA-LP-00-209, Los Alamos, New Mexico. (LANL 2000, 91510)

LANL (Los Alamos National Laboratory), April 12, 2000, "Response to Request for Supplemental Information (RSI), RFI Report PRS 0-017," Supplement to LA-UR-99-3354, Los Alamos, New Mexico. (LANL 2000, 66408)

LANL (Los Alamos National Laboratory), August 2000. "Environmental Restoration (ER) Project Cerro Grande Fire Accelerated Action Information Sheet, Potential Release Site (PRS) 41-001 Septic System," Los Alamos National Laboratory report LA-LP-00-205, Los Alamos, New Mexico. (LANL 2000, 91505)

LANL (Los Alamos National Laboratory), May 21, 2001. "Los Alamos National Laboratory Structure History Book TA-01," Los Alamos, New Mexico. (LANL 2001, 69946)

LANL (Los Alamos National Laboratory), February 11, 2002. "Withdrawal of SWMUs from the March 1995, September 1995, and September 1996 Requests for Permit Modification (LA-UR-95-767, LA-UR-95-3319, and LA-UR-96-3357, Respectively)," Los Alamos National Laboratory letter to J. Young (NMED) from J.A. Canepa (LANL) and M. Johansen (DOE), Los Alamos, New Mexico. (LANL 2002, 71447)

LANL (Los Alamos National Laboratory), March 2005. "General Facility Information," Los Alamos National Laboratory document LA-UR-05-1913, Los Alamos, New Mexico. (LANL 2005, 91139)

LANL (Los Alamos National Laboratory), May 2005. "Pueblo Canyon Aggregate Area Investigation Work Plan," Los Alamos National Laboratory document LA-UR-05-2366, Los Alamos, New Mexico. (LANL 2005, 90579)

LANL (Los Alamos National Laboratory), November 2005. "Los Alamos National Laboratory Hazardous Waste Minimization Report," Los Alamos National Laboratory document LA-UR-05-8650, Los Alamos, New Mexico. (LANL 2005, 91291)

LANL (Los Alamos National Laboratory), April 2006, "Historical Investigation Report for Upper Los Alamos Canyon Aggregate Area," Los Alamos National Laboratory document LA-UR-06-2465, Los Alamos, New Mexico. (LANL 2006, 91915)

Larson, R. E., October 6, 1992. "Solid Waste Management Unit (SWMU) 41-003," Los Alamos National Laboratory memorandum WX-5-92-0807-U to P.A. Longmire (INC-9) from R.E. Larson (EX-5), Los Alamos, New Mexico. (Larson 1992, 44022)

LASL (Los Alamos Scientific Laboratory), April 9, 1948. The TA-32-2 MRL-2 Electrical Plan and Details, Medical Research Annex, Engineering Drawing A5-C117, 4/14/48, Los Alamos, New Mexico. (LASL 1948, 91749)

LASL (Los Alamos Scientific Laboratory), February 28, 1950. "Health Division Annual Report, 1949," Los Alamos Scientific Laboratory report LA-1072, Los Alamos, New Mexico. (LASL 1950, 04681)

LASL (Los Alamos Scientific Laboratory), January 1976. "Status and Plans Report for Former Technical Area One at Los Alamos Scientific Laboratory," Los Alamos Scientific Laboratory document, Los Alamos, New Mexico. (LASL 1976, 08935)

Longmire, P.A., S. Kung, J.M. Boak, A.I. Adams, F. Caporuscio, and R.N. Gray, 1996. "Aqueous Geochemistry of Upper Los Alamos Canyon, Los Alamos, New Mexico," *New Mexico Geological Society Guidebook, 47th Field Conference, Jemez Mountains Region*, New Mexico, pp. 473–480. (Longmire et al. 1996, 54168)

Mitchell, R.N., April 20, 1967. "Incinerator, Health Research Laboratory Bldg TA-43," Los Alamos Scientific Laboratory memorandum to H.F. Schulte (H-5) from R.N. Mitchell (H-5). Los Alamos, New Mexico. (Mitchell 1967, 08074)

Montoya, T., October 11, 1965. "Removal of Radioactive Contaminated Concrete and Drain Pipe from TA-1-104," Los Alamos Scientific Laboratory memorandum to C. Buckland from T. Montoya, Los Alamos, New Mexico. (Montoya 1965, 03711)

Montoya, G.M., November 25, 1985. "Line 167: Concrete Anchors Left in Place on South Side of Los Alamos Canyon," Los Alamos National Laboratory memorandum to A. Valentine (Radiation Protection Group) from G. Montoya (HSE-1), Los Alamos, New Mexico. (Montoya 1985, 07295)

NMED (New Mexico Environment Department), August 24, 1994. "No Further Action Required for the Underground Storage Tank Release at the Shannon Corporation Site, 1240 Trinity Drive, Los Alamos, New Mexico," New Mexico Environment Department memorandum to E. Ode Baca, Santa Fe, New Mexico. (NMED 1994, 58861)

NMED (New Mexico Environment Department), June 6, 1997. "Notice of Determination; Notice of Deficiency and Approval Requests for Permit Modification Units Proposed for No Further Action September 1996 Los Alamos National Laboratory," New Mexico Environment Department letter to J. Jansen (ER) and T. Taylor(DOE LAAO) from B. Garcia, (NMED HRMB), Santa Fe, New Mexico. (NMED 1997, 56369)

NMED (New Mexico Environment Department), November 18, 1997. "Rejection of RCRA Facility Investigation Report Potential Release Sites 1-002, 1-001(t) & 1-007(k), Technical Area 1, Aggregates K, L, M & O," New Mexico Environment Department letter to T. Taylor (DOE LAAO) and S. Hecker (LANL) from R. Dinwiddie (NMED HRMB), Santa Fe, New Mexico. (NMED 1997, 57000)

NMED (New Mexico Environment Department), December 23, 1998. "Approval: Class III Permit Modification to Remove Ninety-Nine (99) Solid Waste Management Units from the Department of Energy/Los Alamos National Laboratory RCRA permit NM 0890010515," New Mexico Environment Department letter to T. Taylor (DOE LAAO) and J. Browne (LANL) from E. Kelley (NMED), Santa Fe, New Mexico. (NMED 1998, 63042)

NMED (New Mexico Environment Department), August 28, 2000. "Final Approval of the Location 1A Portion of the RFI Report for Phase I Investigation of TA-1 Aggregates N and P for the Potential Release Site 1-001(s)," New Mexico Environment Department letter to J. Browne (LANL) and T. Taylor (DOE LAAO) from J. Kieling(NMED HRMB), Santa Fe, New Mexico. (NMED 2000, 68647)

NMED (New Mexico Environment Department), November 29, 2000. "Approval of No Further Action for Potential Release Site 01-001(m), Septic Tank 275, Los Alamos National Laboratory," New Mexico Environment Department letter to J. Browne (LANL) and T. Taylor (DOE LAAO) from J. Young (NMED HWB), Santa Fe, New Mexico. (NMED 2000, 68552)

NMED (New Mexico Environment Department), May 2, 2001. "Approval of Class III Permit Modification to Remove Thirty (30) Solid Waste Management Units from the Department of Energy/Los Alamos National Laboratory RCRA Permit," New Mexico Environment Department letter to D. Gurule (DOE LAAO) and J. Browne (LANL) from G. Lewis (NMED), Santa Fe, New Mexico. (NMED 2001, 70010)

NMED (New Mexico Environment Department), January 30, 2002. "Approval of VCA Completion Report for Consolidated Unit 00-003-99 (PRS 0-003 and PRS 0-012) and PRS 0-030(i)," New Mexico Environment Department letter to J. Browne (LANL) and M. Johansen (DOE LAAO) from J. Young (NMED HWB), Santa Fe, New Mexico. (NMED 2002, 73096)

Nyhan, J., L. Hacker, T. Calhoun, and D. Young, June 1978. "Soil Survey of Los Alamos County, New Mexico," Los Alamos Scientific Laboratory report LA-6779-MS, Los Alamos, New Mexico. (Nyhan et al. 1978, 05702)

Nylander, C.L., K.A. Bitner, G. Cole, E.H. Keating, S. Kinkead, P. Longmire, B. Robinson, D.B. Rogers, and D. Vaniman, March 2003. "Groundwater Annual Status Report for Fiscal Year 2002," Los Alamos National Laboratory document LA-UR-03-0244, Los Alamos, New Mexico. (Nylander et al. 2003, 76059.49)

Potter, E., January 1994. "Interview with J. Wilson, HRL," Los Alamos National Laboratory memorandum to ESH-file from E. Potter, Los Alamos, New Mexico. (Potter 1994, 58454)

Purtymun, W., 1975. "Geohydrology of the Pajarito Plateau with Reference to Quality of Water, 1949–1972," Los Alamos Scientific Laboratory informal report LA-5744, Los Alamos, New Mexico. (Purtymun 1975, 11787)

Purtymun, W., January 1984. "Hydrologic Characteristics of the Main Aquifer in the Los Alamos Area: Development of Ground Water Supplies," Los Alamos National Laboratory report LA-9957-MS, Los Alamos, New Mexico. (Purtymun 1984, 06513)

Purtymun, W., January 1995. "Geologic and Hydrologic Records of Observation Wells, Test Holes, Test Wells, Supply Wells, Springs, and Surface Water Stations in the Los Alamos Area," Los Alamos National Laboratory report LA-12883-MS, Los Alamos, New Mexico. (Purtymun 1995, 45344)

Purtymun, W., and A. Stoker, September 1990. "Perched Zone Monitoring Well Installation," Los Alamos National Laboratory report LA-UR-90-3230, Los Alamos, New Mexico. (Purtymun and Stoker 1990, 07508)

Purtymun, W., J. Buchholz, and T. Hakonson, 1977. "Chemical Quality of Effluents and Their Influence on Water Quality in a Shallow Aquifer," *Journal of Environmental Quality*, Vol. 6, No. 1, pp. 29–32. (Purtymun et al. 1977, 11846)

Santa Fe Engineering, Ltd., November 1992. "Wastewater Stream Characterization for TA-43 at Los Alamos National Laboratory–An Environmental Study, (Draft)" prepared by Santa Fe Engineering, Ltd., under Contract 9-XG8-2874P-1, Santa Fe, New Mexico. (Santa Fe Engineering 1992, 58455)

Self, S., F. Goff, J. Gardner, J. Wright, and W. Kite, 1986. "Explosive Rhyolitic Volcanism in the Jemez Mountains: Vent Locations, Caldera Development, and Relation to Regional Structure," *Journal of Geophysical Research*, Vol. 91, pp. 1779–1798. (Self et al. 1986, 21579)

Smith, R., and R. Bailey, 1966. "The Bandelier Tuff: A Study of Ash-Flow Eruption Cycles from Zoned Magma Chambers," *Bulletin Volcanologique*, Vol. 29, pp. 83–104. (Smith and Bailey 1966, 21584)

Smith, R., R. Bailey, and C. Ross, 1970. "Geologic Map of Jemez Mountains, New Mexico," U.S. Geological Survey Miscellaneous Investigations Series Map I-571, Washington, D.C. (Smith et al. 1970, 09752)

Spell, T.L., and I. McDougall, December 1996. "Cerro Toledo Rhyolite, Jemez Volcanic Field, New Mexico: $^{40}Ar/^{39}Ar$ Geochronology of Eruptions between Two Caldera-Forming Events," *Geological Society of America Bulletin*, Vol. 108, pp. 1549–1566. (Spell and McDougall 1996, 55542)

Stix, J., F. Goff, M.P. Gorton, G. Heiken, and S. Garcia, June 10, 1988. "Restoration of Compositional Zonation in the Bandelier Silicic Magma Chamber Between Two Caldera-Forming Eruptions: Geochemistry and Origin of the Cerro Toledo Rhyolite, Jemez Mountains, New Mexico," *Journal of Geophysical Research*, Vol. 93, No. B6, pp. 6129–6147. (Stix et al. 1988, 49680)

Stoker, A.K., July 14, 1976. "SM-700 Soil Sample Results," Los Alamos Scientific Laboratory memorandum H8-330-76 to L. Emelity (H-7) from A.K. Stoker (H-8), Los Alamos, New Mexico. (Stoker 1976, 04118)

Stoker, A., March 31, 1993. "Direct Testimony of Alan K. Stoker on Behalf of Petitioners," before the New Mexico Water Quality Control Commission, Los Alamos, New Mexico. (Stoker 1993, 56021)

Vaniman, D., July 29, 1991. "Revisions to Report EES1-SH90-17," Los Alamos National Laboratory memorandum EES1-SH91-12 to J. Gardner (EES-1) from D. Vaniman (EES-1), Los Alamos, New Mexico. (Vaniman 1991, 09995)

Watanabe, S., January 15, 1993. "Interview with J. Wilson Concerning SWMU 43-003 Photo Processor and 43-002 Incinerator TA-43, OU1136," Los Alamos National Laboratory memorandum to file from S. Watanabe (CLS-ER), Los Alamos, New Mexico. (Watanabe 1993, 58460)

Watanabe, S., January 12, 1993. "Removal of Incinerator TA-43, 43-002, OU 1136," Los Alamos National Laboratory memorandum to file from S. Watanabe (CLS-ER), Los Alamos, New Mexico. (Watanabe 1993, 58453)

Watanabe, S., January 25, 1993. "Interview with J. Wilson Concerning SWMU 43-002 Incinerator," Los Alamos National Laboratory memorandum to file from S. Watanabe (CLS-ER), Los Alamos, New Mexico. (Watanabe 1993, 58452)

Watanabe, S., September 9, 1993. "Incinerator Summaries: 43-002," Los Alamos National Laboratory memorandum to file from S. Watanabe (CLS-ER), Los Alamos, New Mexico. (Watanabe 1993, 58464)

Wohletz, K., June 1995. "Measurement and Analysis of Rock Fractures in the Tshirege Member of the Bandelier Tuff along Los Alamos Canyon Adjacent to Technical Area-21," in *Earth Science Investigations for Environmental Restoration—Los Alamos National Laboratory Technical Area 21*, D.E. Broxton and P.G. Eller, Eds., Los Alamos National Laboratory report LA-12934-MS, Los Alamos, New Mexico. (Wohletz 1995, 54404)

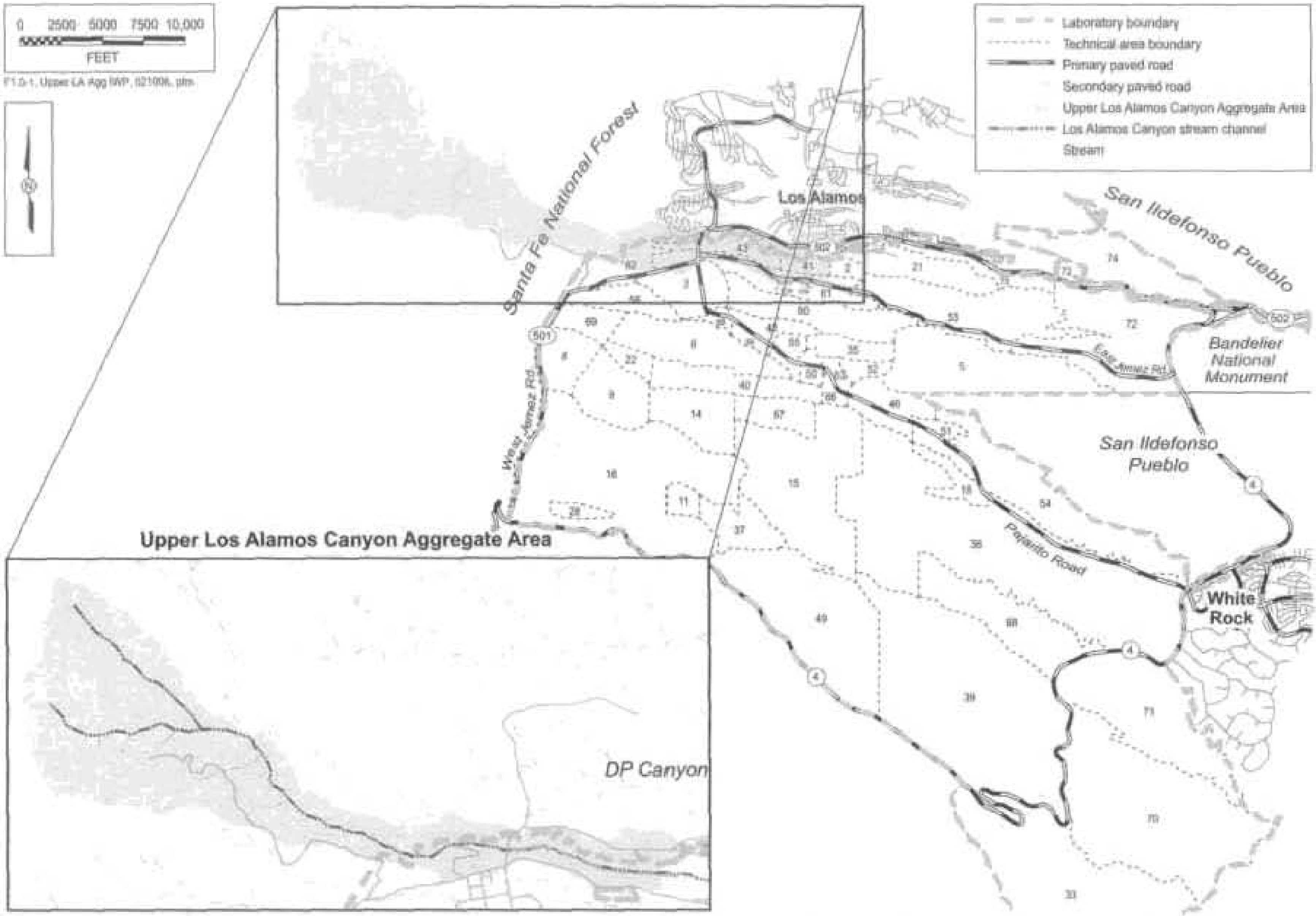

Figure 1.0-1. Location of Upper Los Alamos Canyon Aggregate Area with respect to Laboratory TAs and surrounding land holdings

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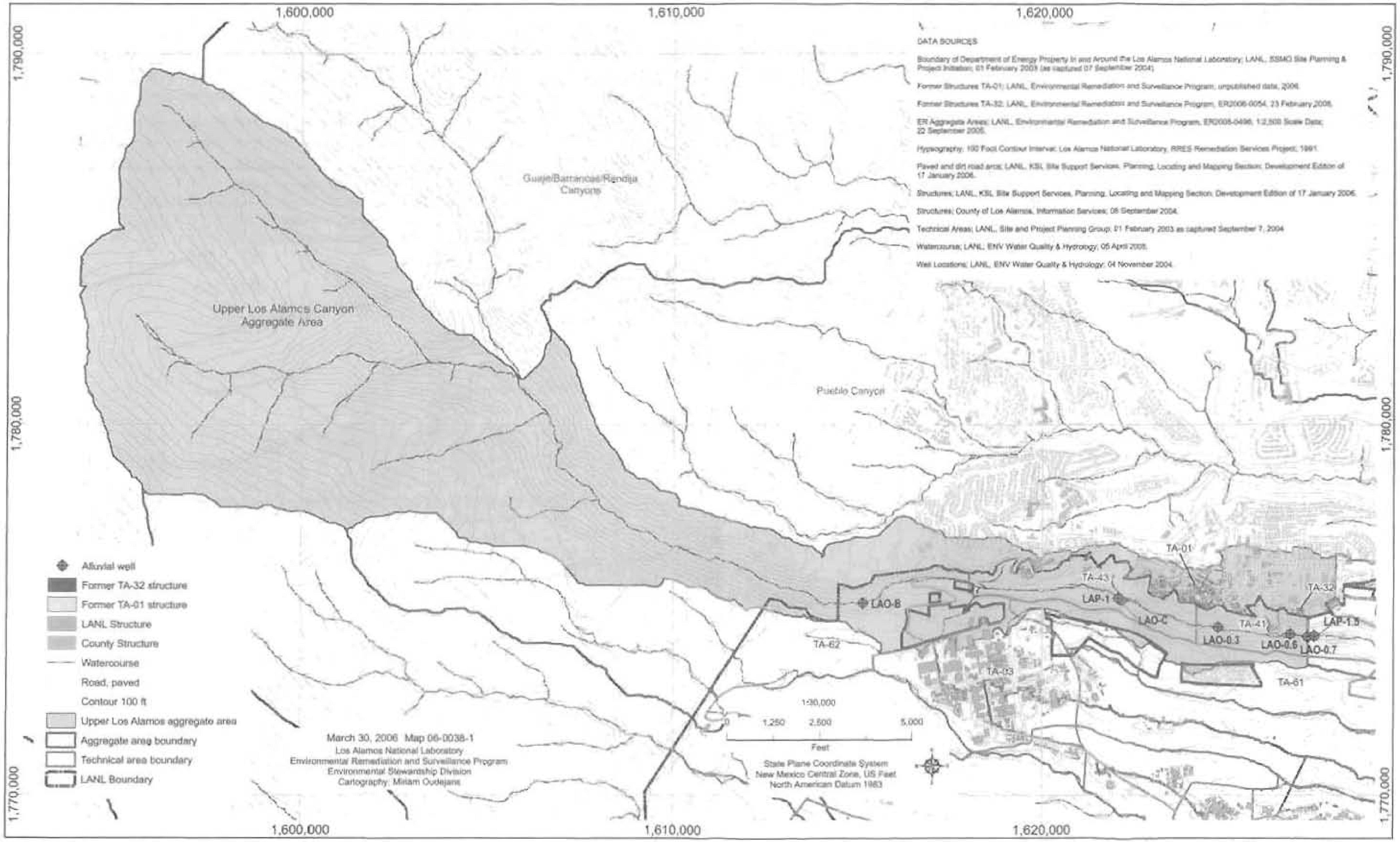

Figure 2.2-1. Alluvial wells in Upper Los Alamos Canyon Aggregate Area

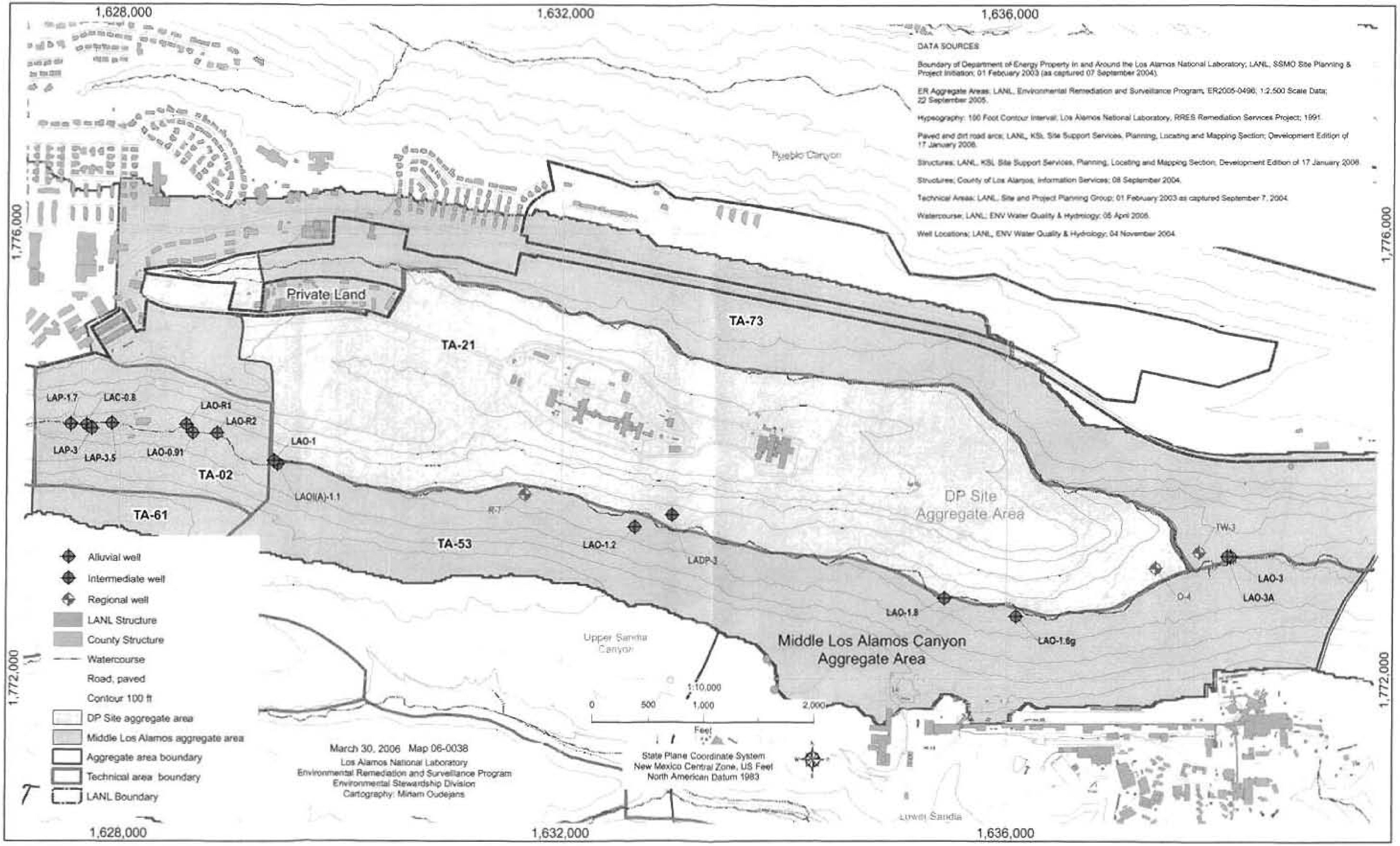

Figure 2.2-2. Alluvial, intermediate, and regional wells in Middle Los Alamos Canyon Aggregate Area

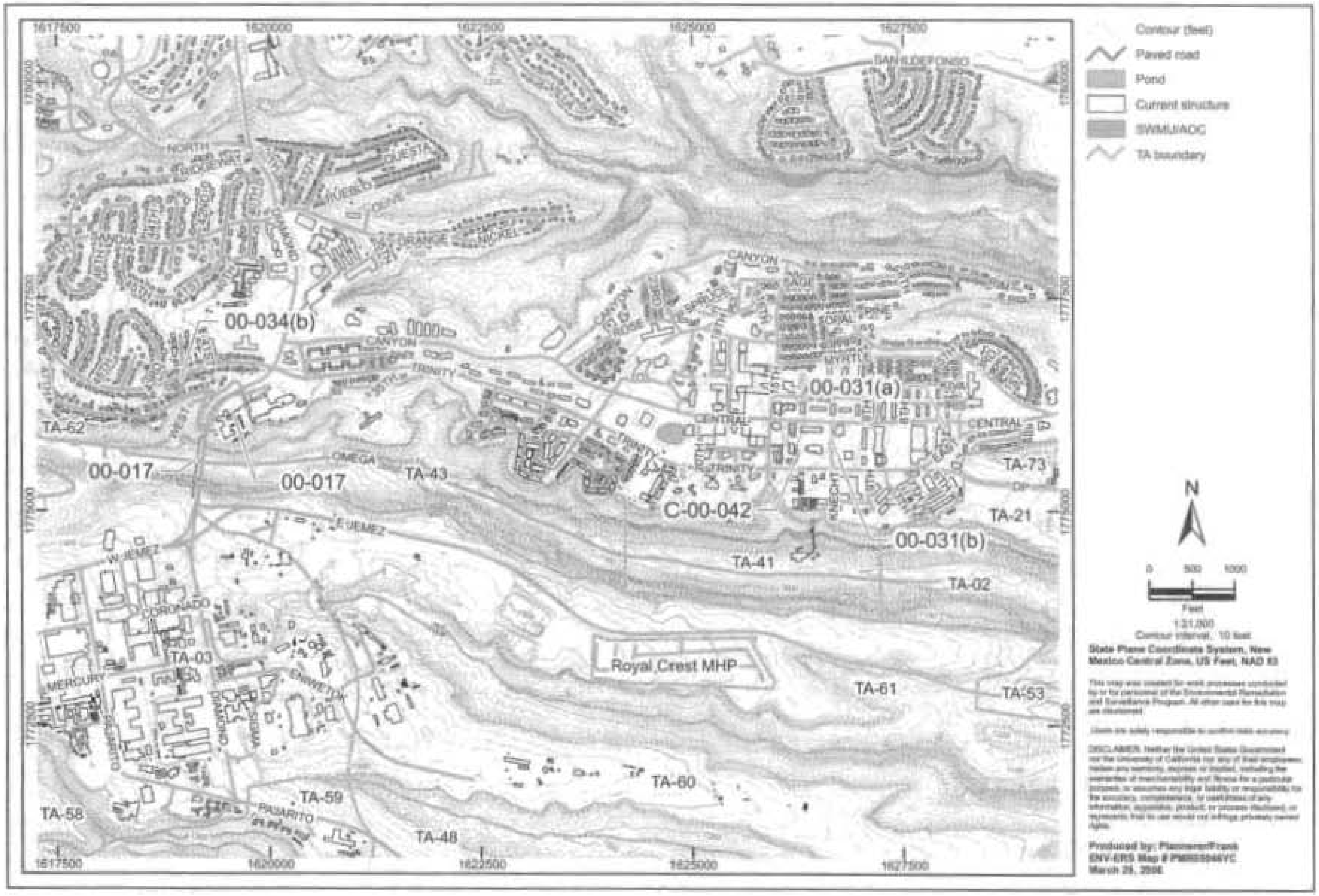

Figure 3.1-1. TA-00 site map

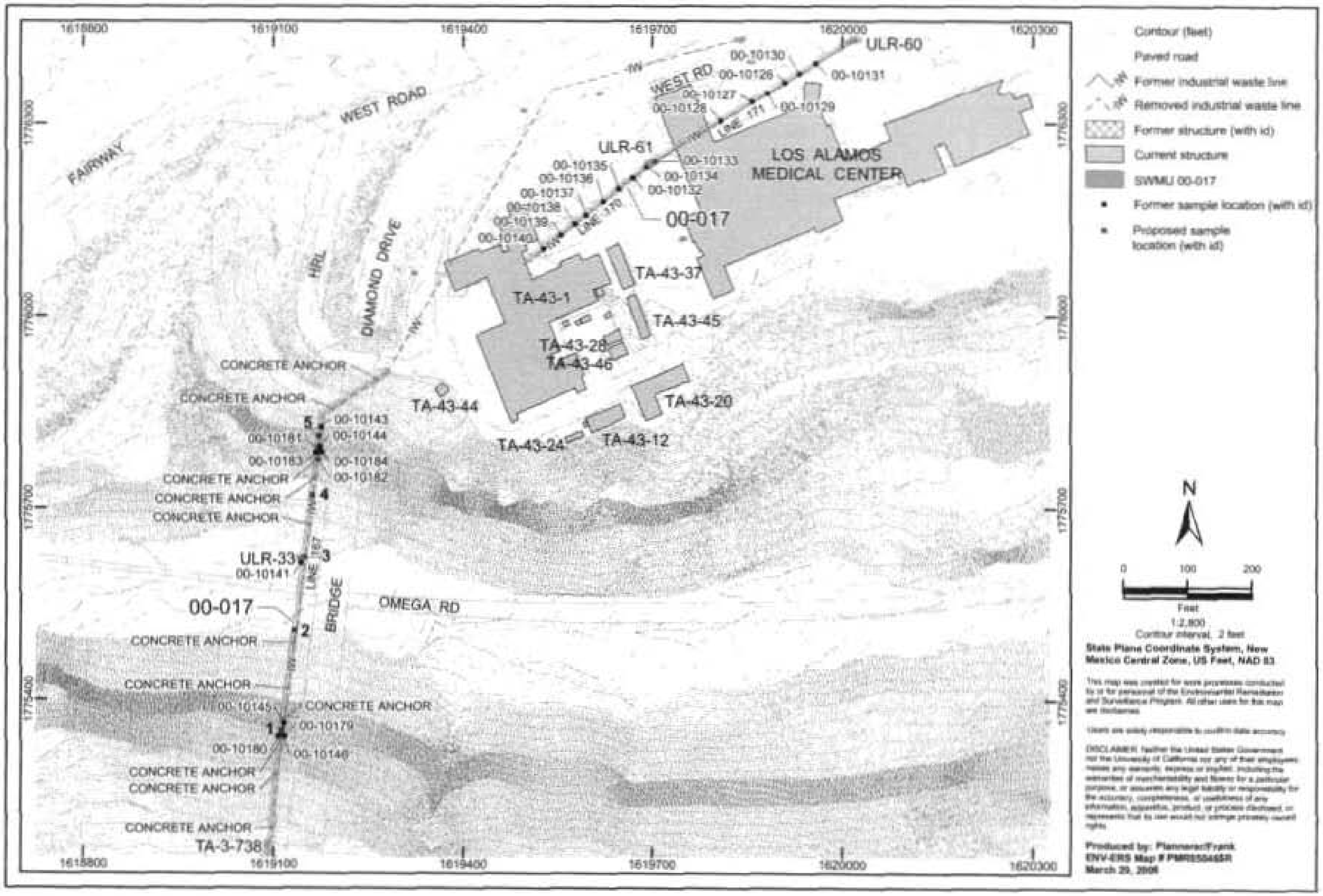

Figure 3.2-1. SWMU 00-017 site map and proposed sample locations

a) Looking south, line 170 runs beneath parking between LAMC (building on left) and HRL (building on right)

b) Looking south, line 171 runs beneath parking north of LAMC

Figure 3.2-2. SWMU 00-017 mesa-top site photographs

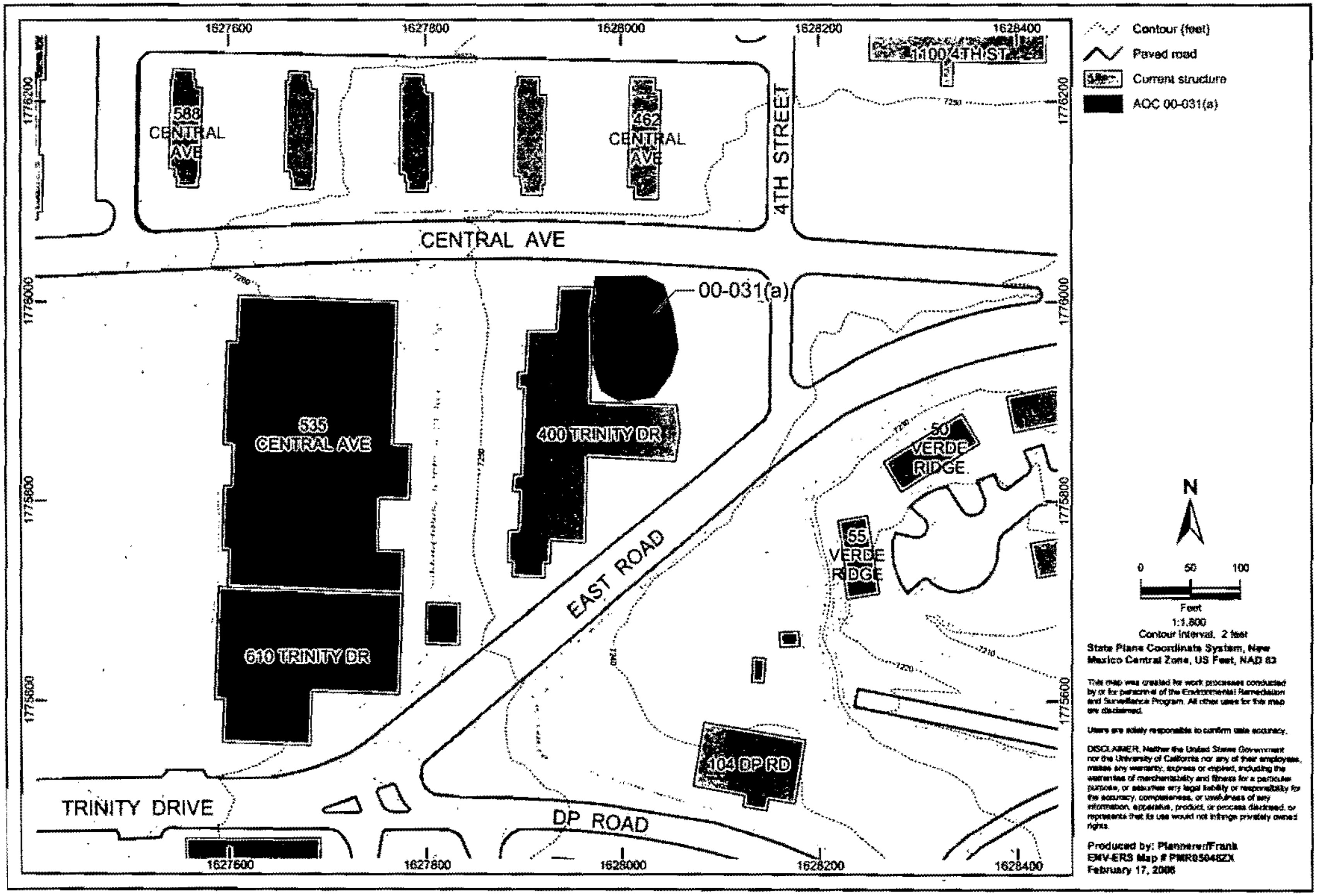

Figure 3.3-1. AOC 00-031(a) site map

Figure 3.3-2. AOC 00-031(a) site photograph (looking south)

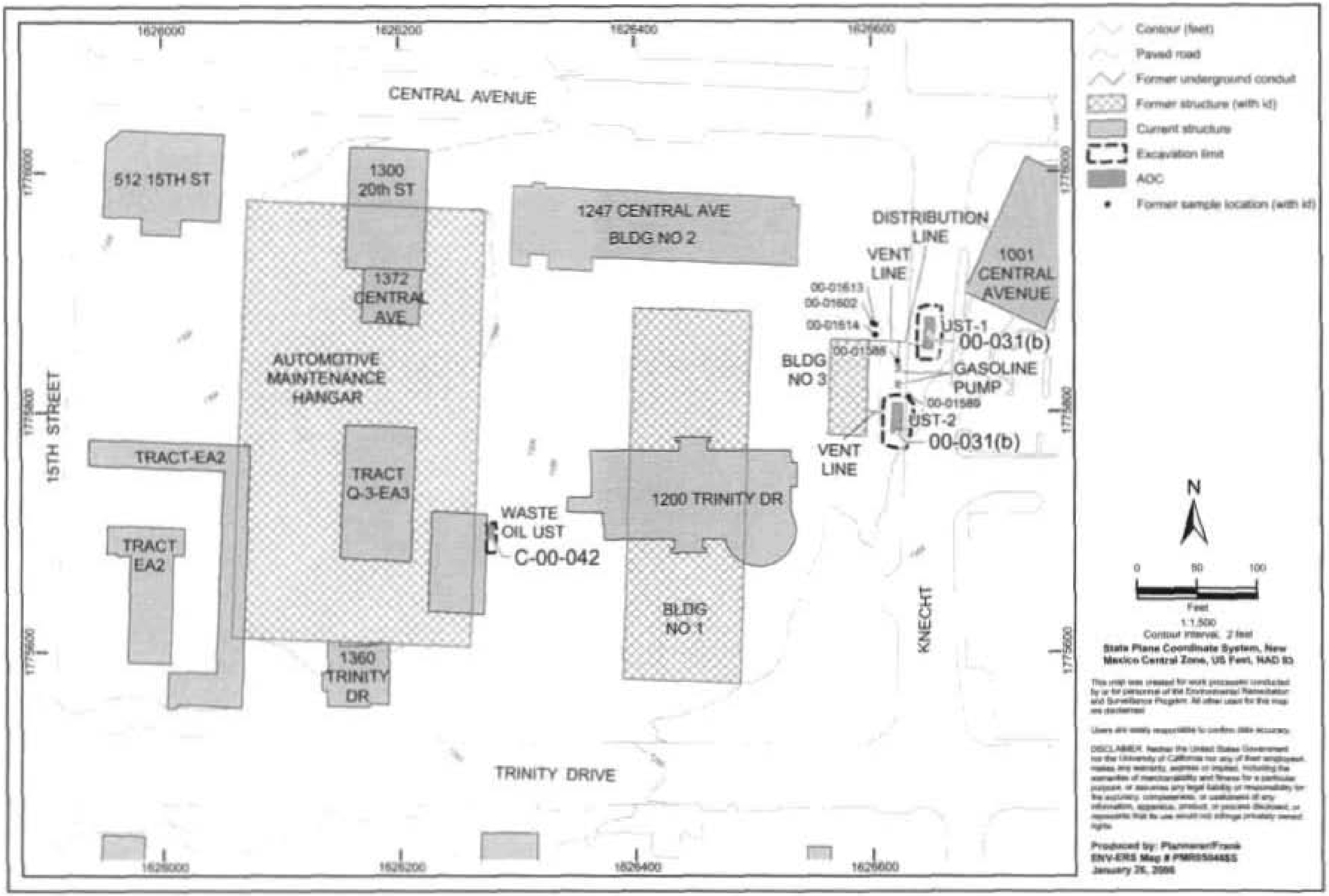

Figure 3.4-1. AOCs 00-031(b) and C-00-042 site map

Figure 3.4-2. AOC 00-031(b) site photograph (looking south)

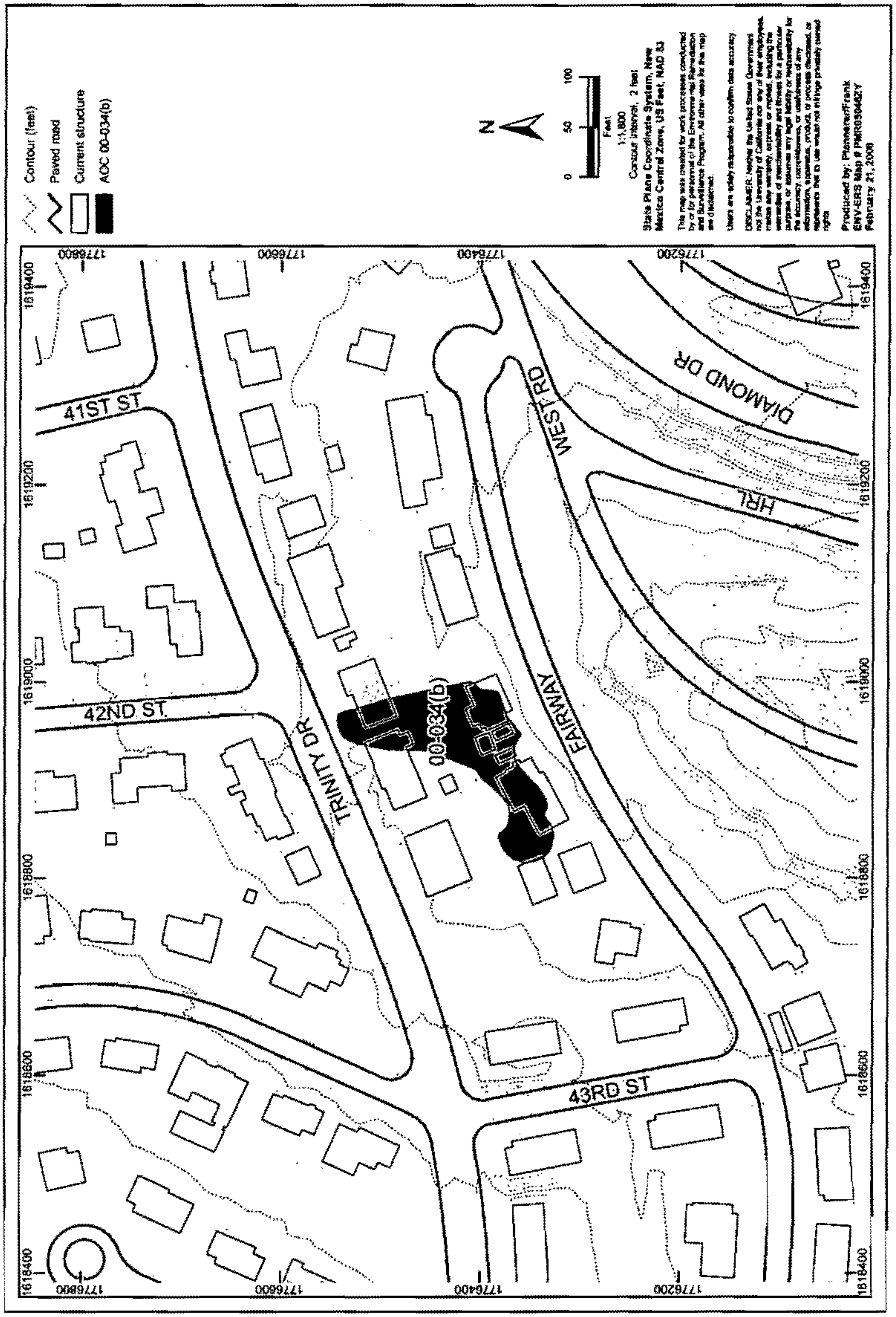

Figure 3.5-1. AOC 00-034(b) site map

Figure 3.6-1. **AOC C-00-042 site photograph (looking south)**

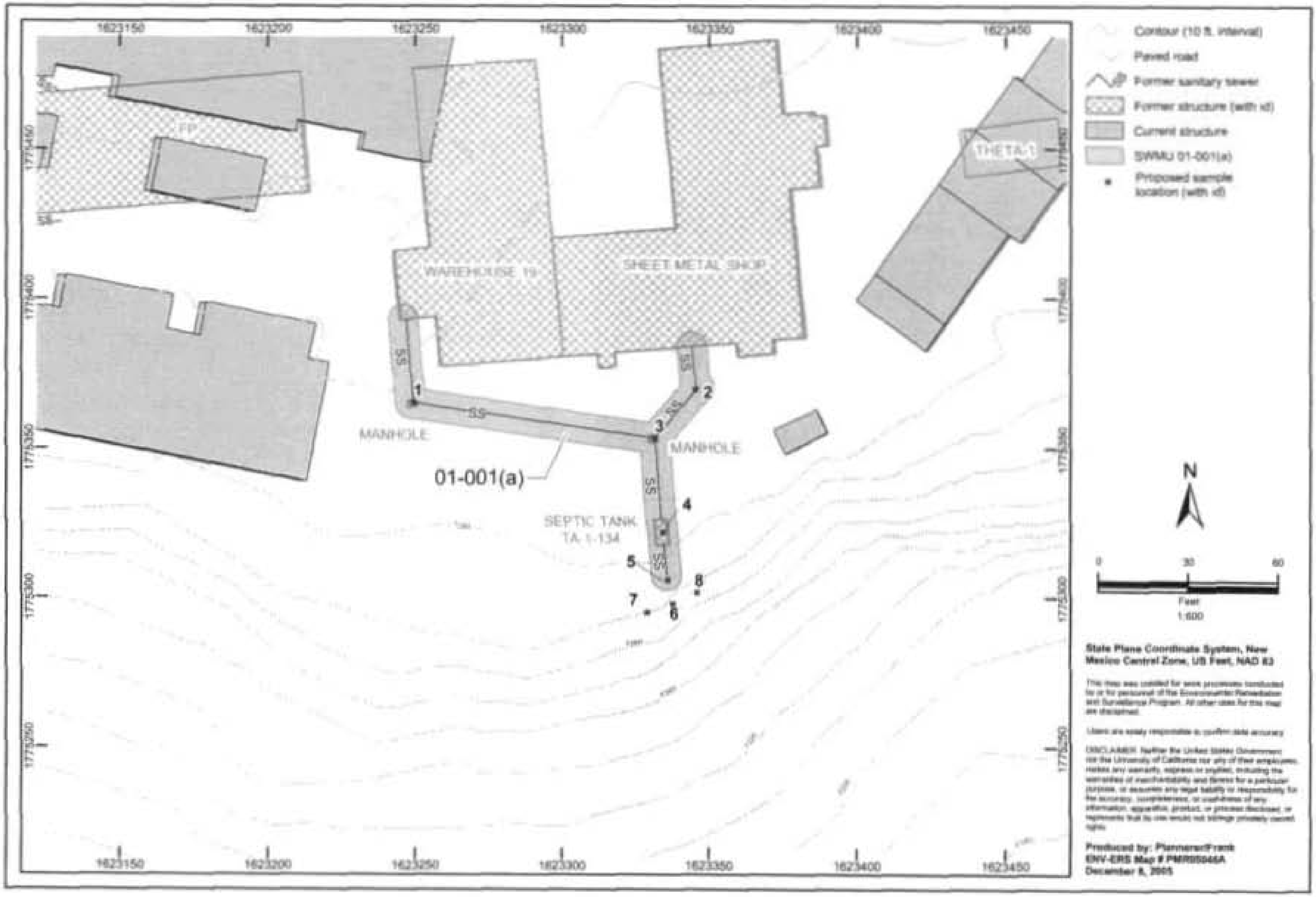

Figure 4.2-1. SWMU 01-001(a) site map and proposed sample locations

Figure 4.2-2 SWMU 01-001(a) mesa top site photograph (looking south)

Figure 4.3-1. SWMU 01-001(b) site map and proposed sample locations

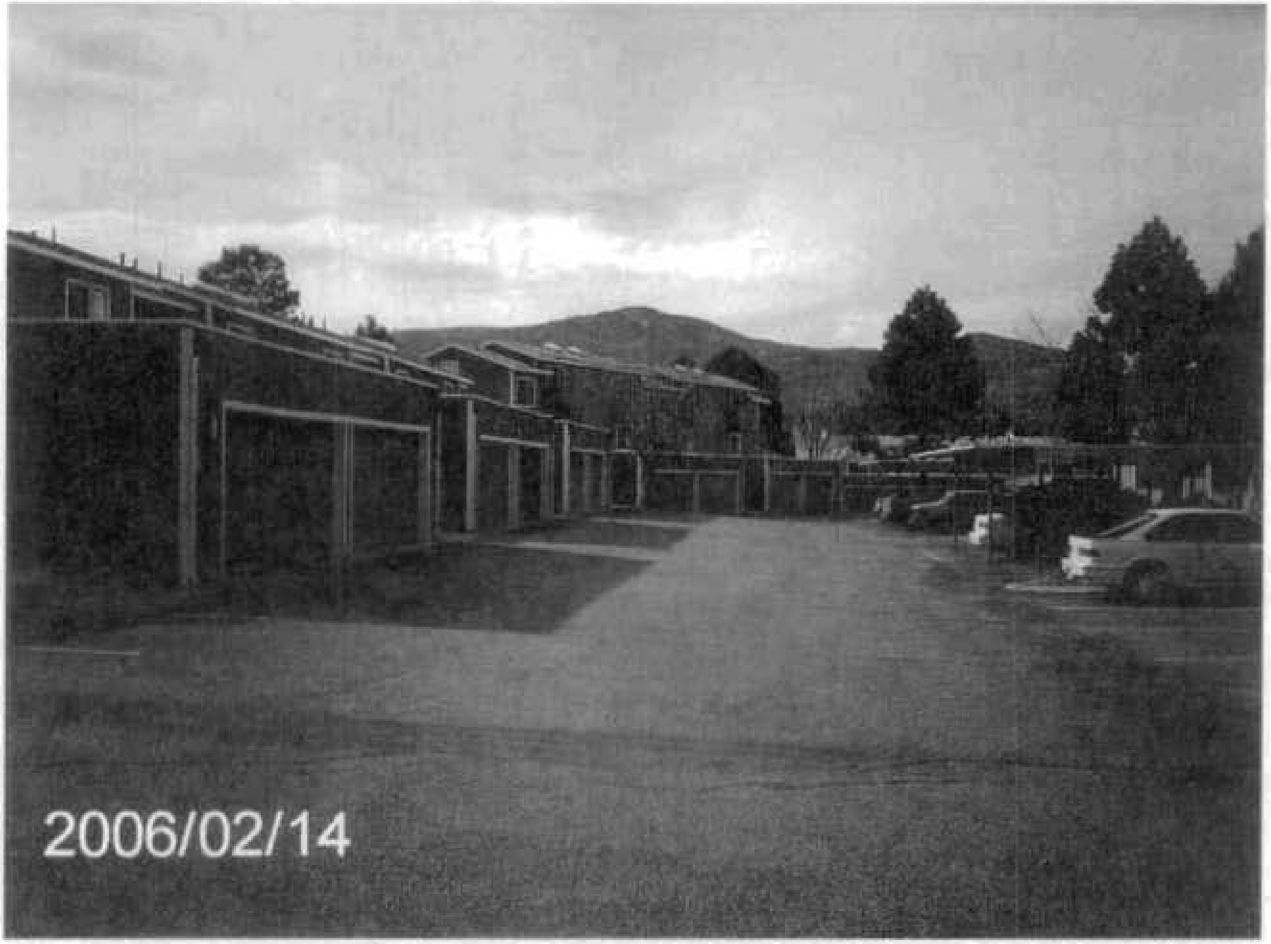

Figure 4.3-2. SWMU 01-001(b) mesa top site photograph (looking west)

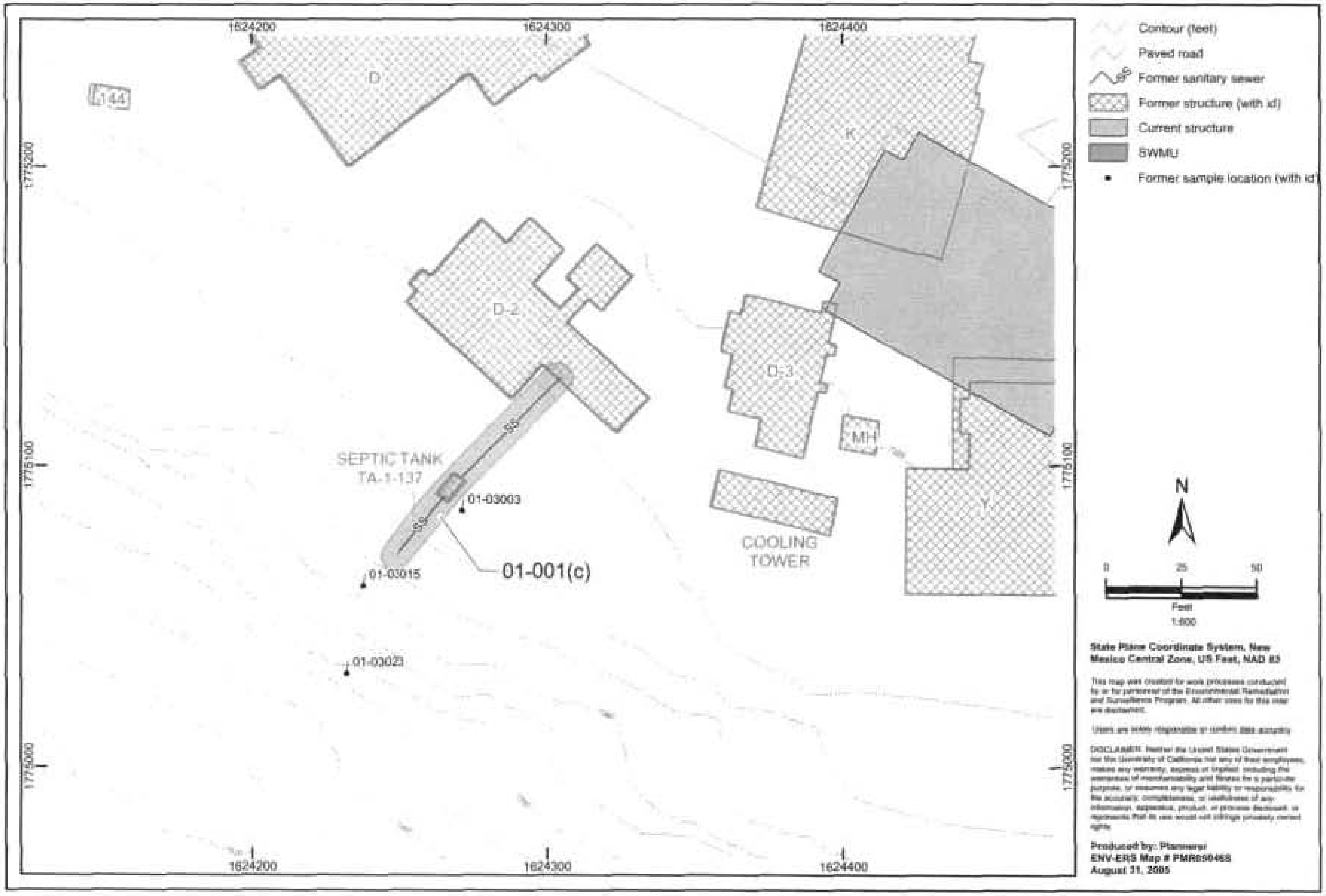

Figure 4.4-1. SWMU 01-001(c) site map

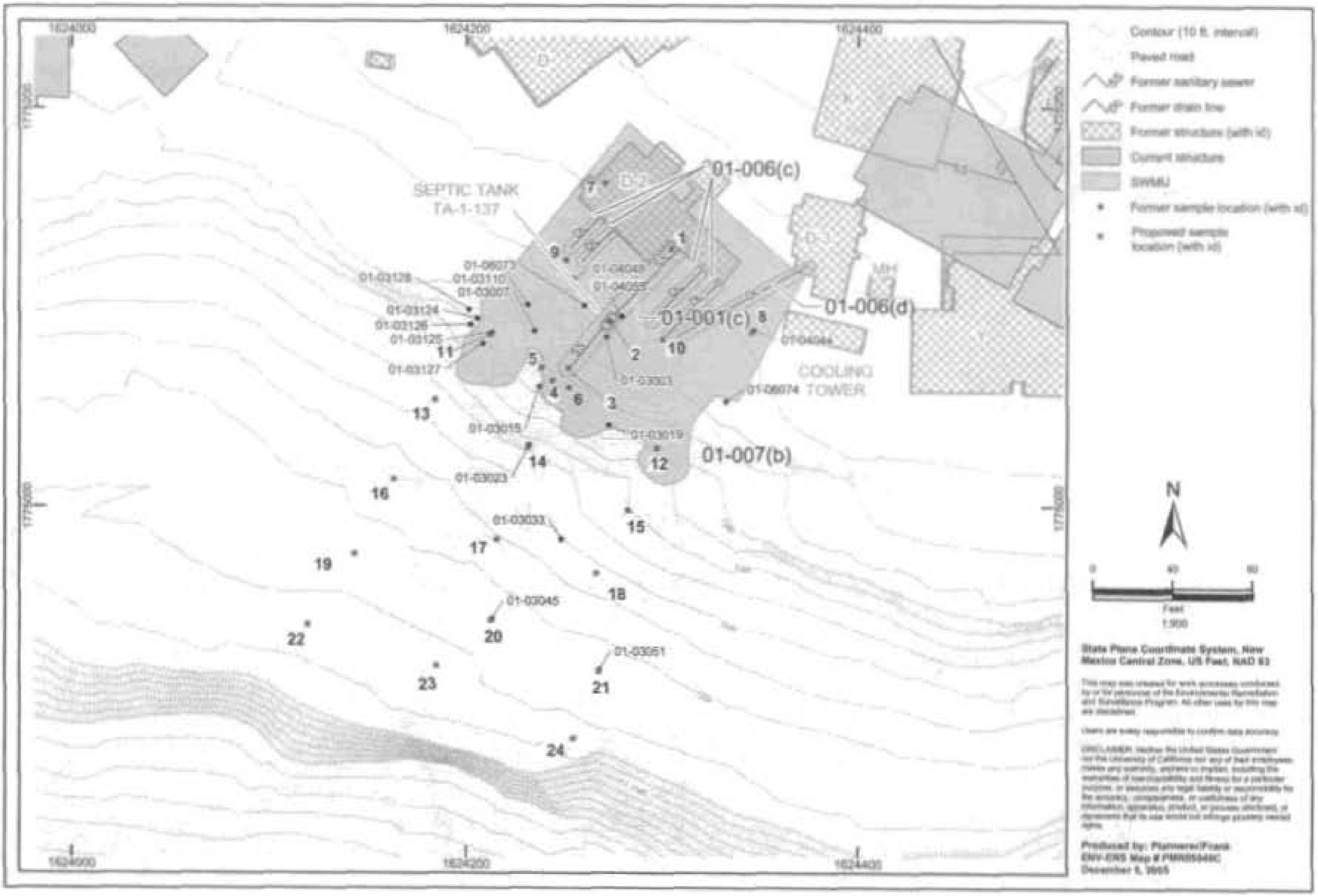

Figure 4.4-2. SWMUs 01-001(c), 01-006(c), 01-006(d), and 01-007(b) proposed sample locations

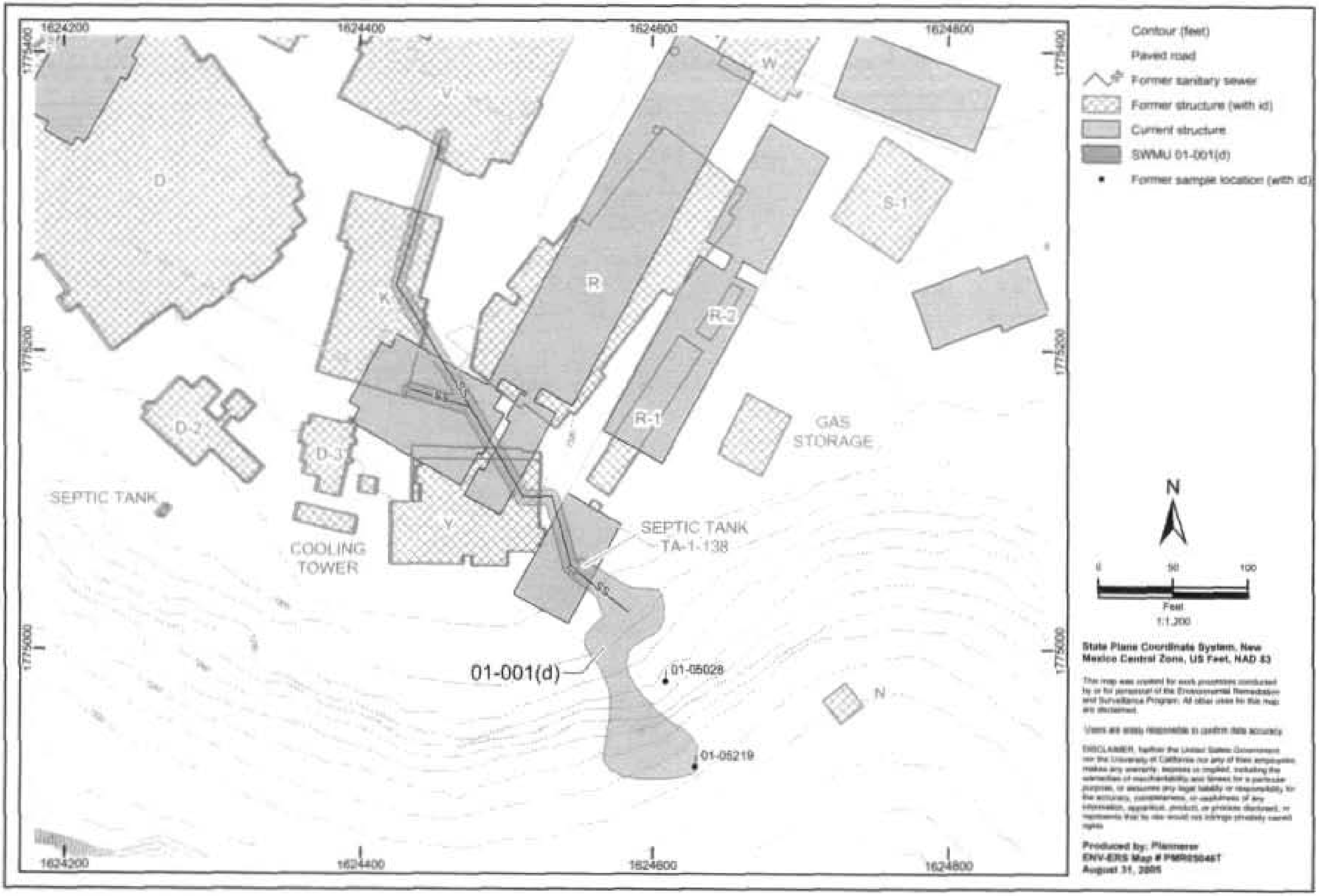

Figure 4.5-1. SWMU 01-001(d) site map

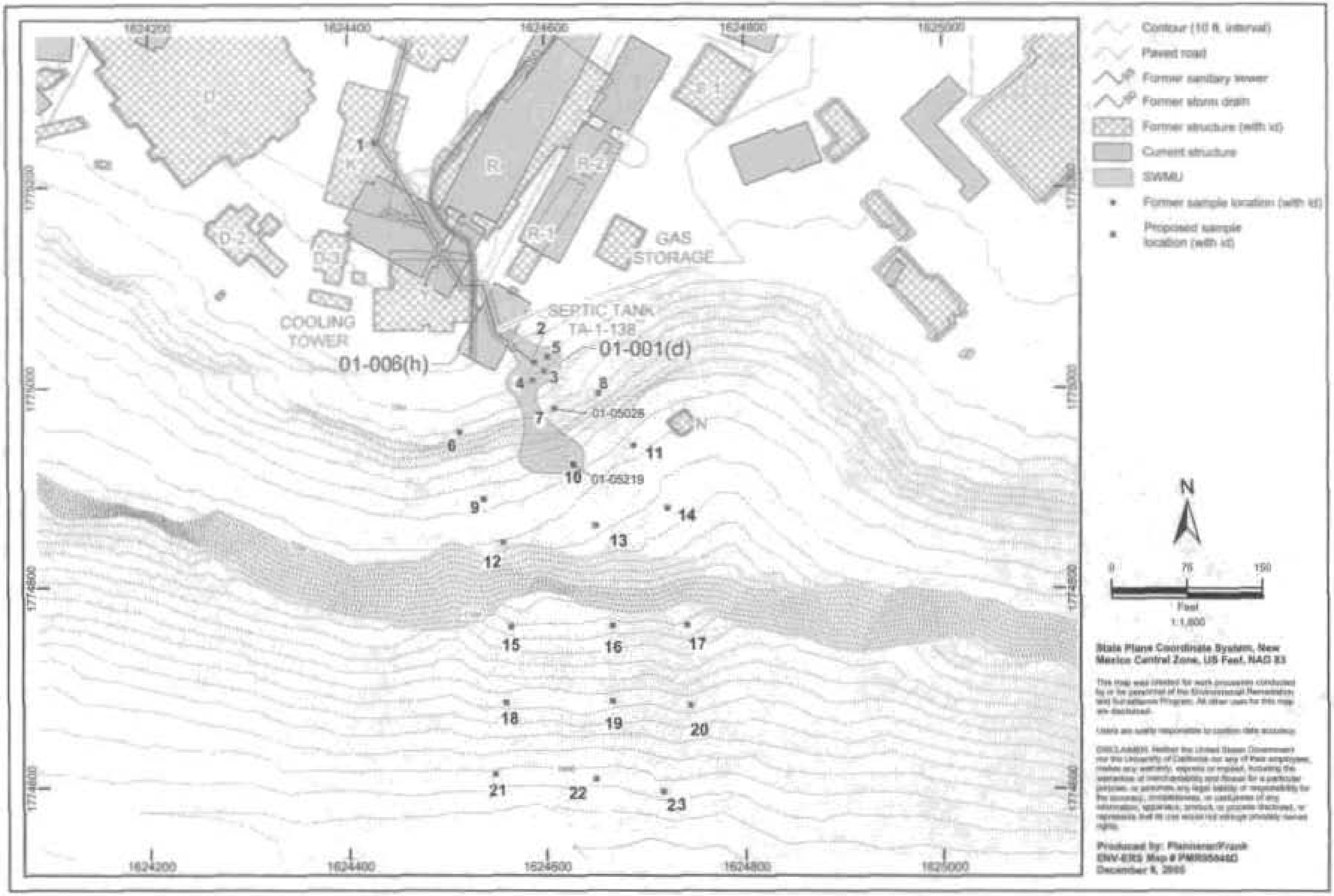

Figure 4.5-2. SWMUs 01-001(d) and 01-006(h) proposed sample locations

Figure 4.5-3. **SWMU 01-001(d) mesa top site photograph (looking north)**

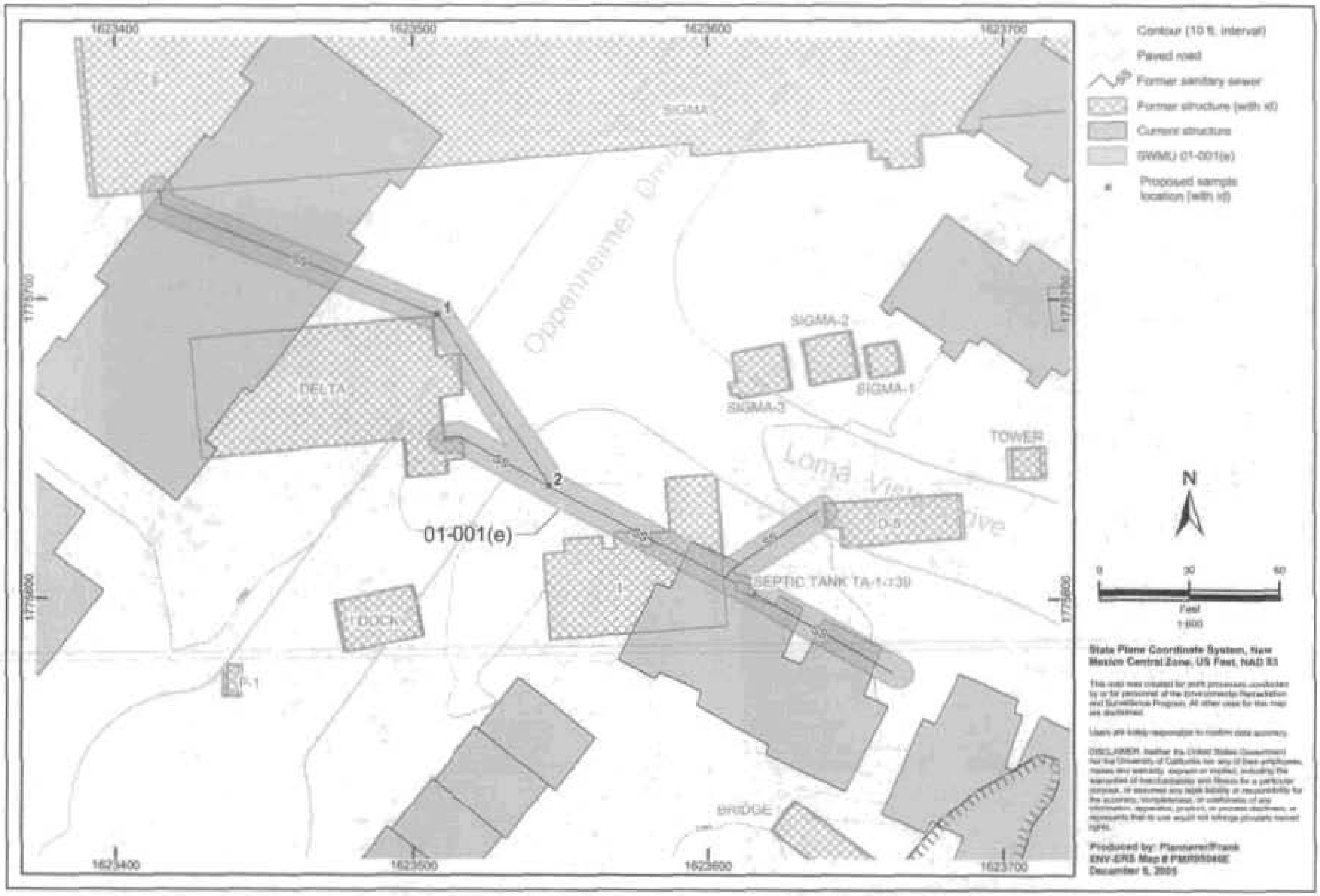

Figure 4.6-1. **SWMU 01-001(e) site map and proposed sample locations**

a) Looking southwest at proposed sample location 1

b) Looking southeast at proposed sample location 2

Figure 4.6-2. SWMU 01-001(e) site photographs

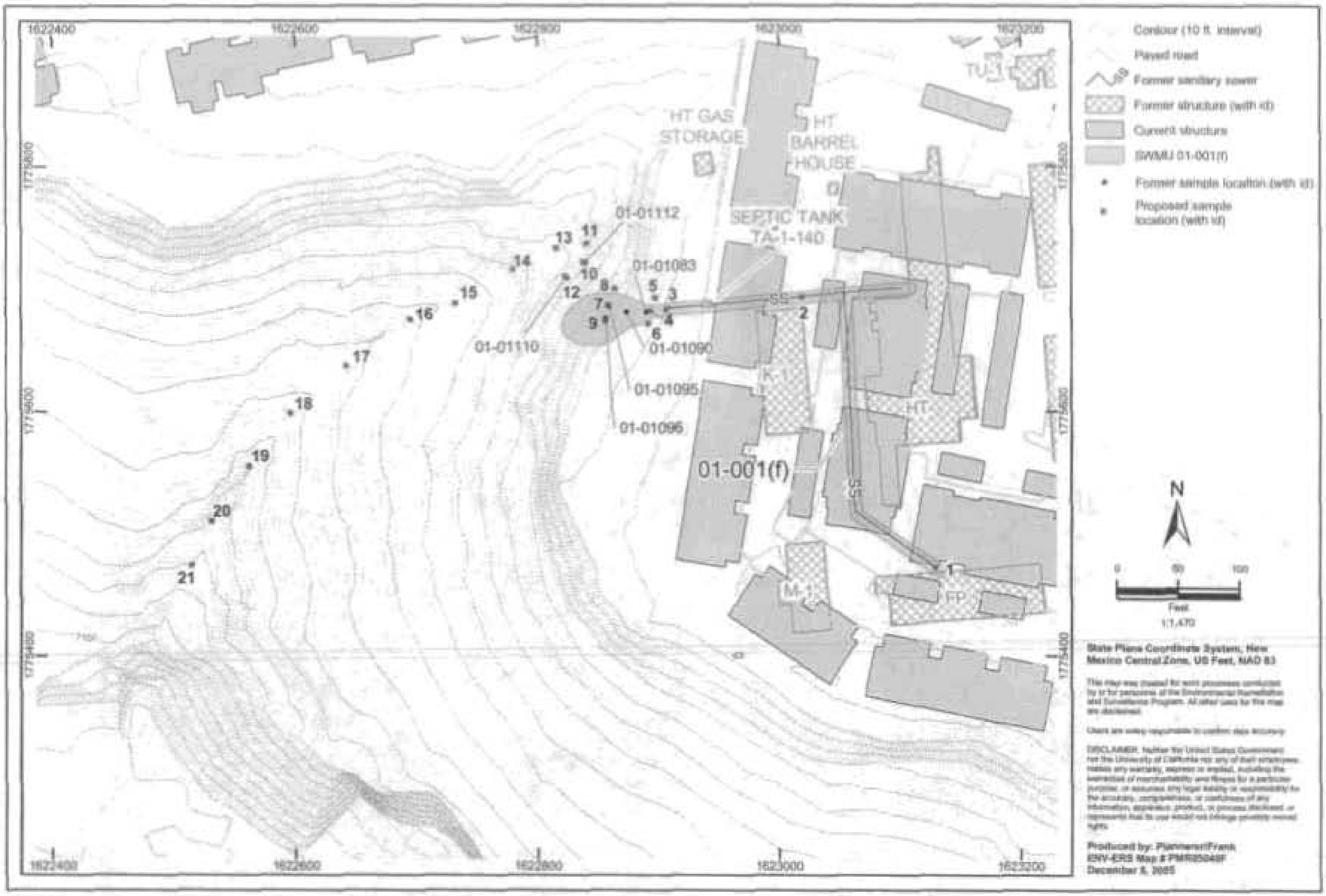

Figure 4.7-1. SWMU 01-001(f) site map and proposed sample locations

a) Looking east at proposed sample location 1

b) Looking north at proposed sample location 2

Figure 4.7-2. SWMU 01-001(f) mesa top site photographs

Figure 4.8-1. SWMU 01-001(g) site map and proposed sample locations

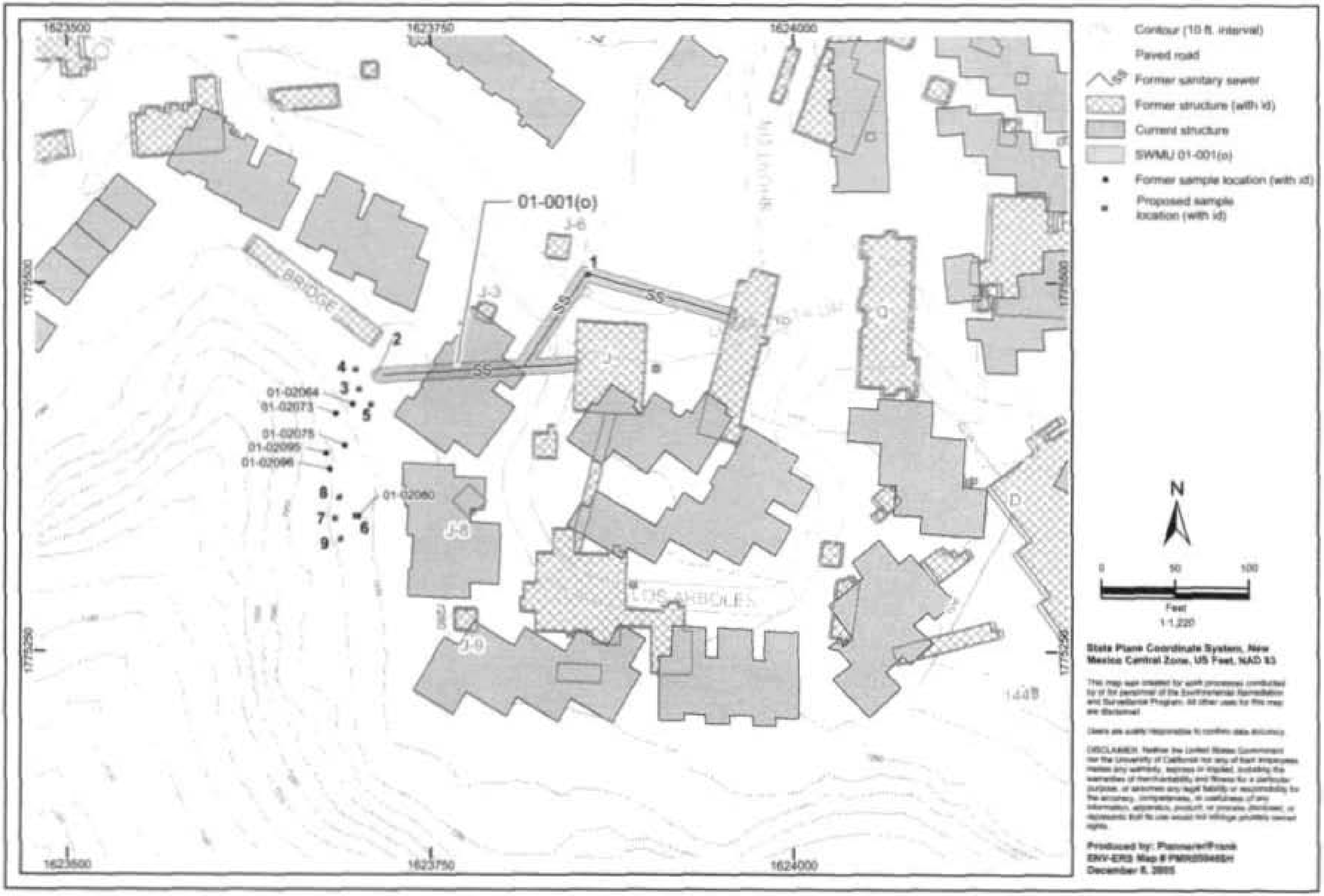

Figure 4.9-1. SWMU 01-001(o) site map and proposed sample locations

Figure 4.9-2. SWMU 01-001(o) mesa top site photograph (looking north at proposed sample location 1)

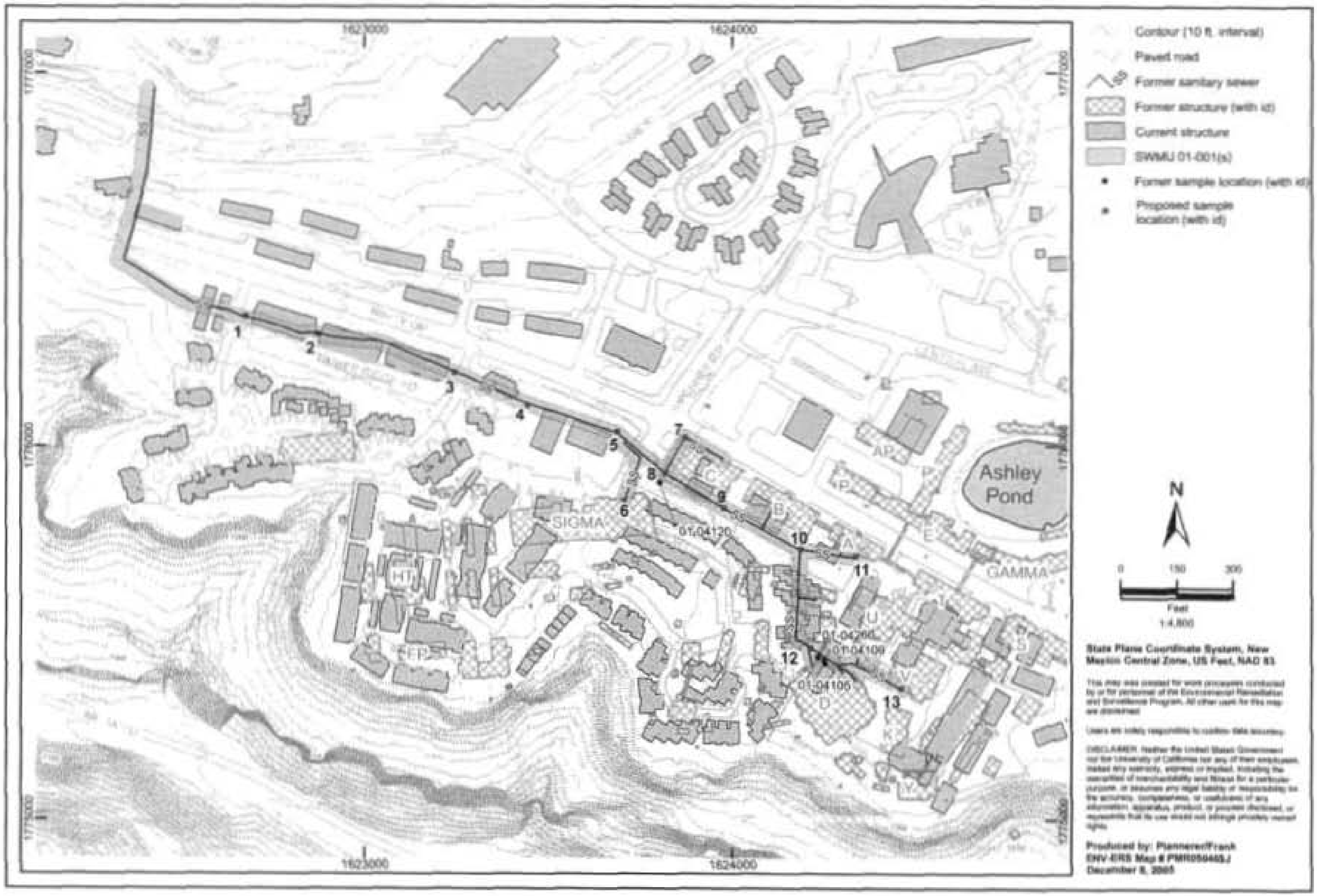

Figure 4.10-1. SWMU 01-001(s) site map and proposed sample locations

a) Looking north at proposed sample location 1

b) Looking north at proposed sample location 2

c) Looking north at proposed sample location 3

d) Looking north at proposed sample location 4

Figure 4.10-2. SWMU 01-001(s) site photographs

e) Looking north at proposed sample location 5

f) Looking southwest at proposed sample location 6

g) Looking east at proposed sample locations 7 and 8

h) Looking south at proposed sample location 9

Figure 4.10-2 (continued). SWMU 01-001(s) site photographs

i) Looking south at proposed sample location 10

j) Looking south at proposed sample location 11

k) Looking northeast at proposed sample location 12

l) Looking north at proposed sample location 13

Figure 4.10-2 (continued).   SWMU 01-001(s) site photographs

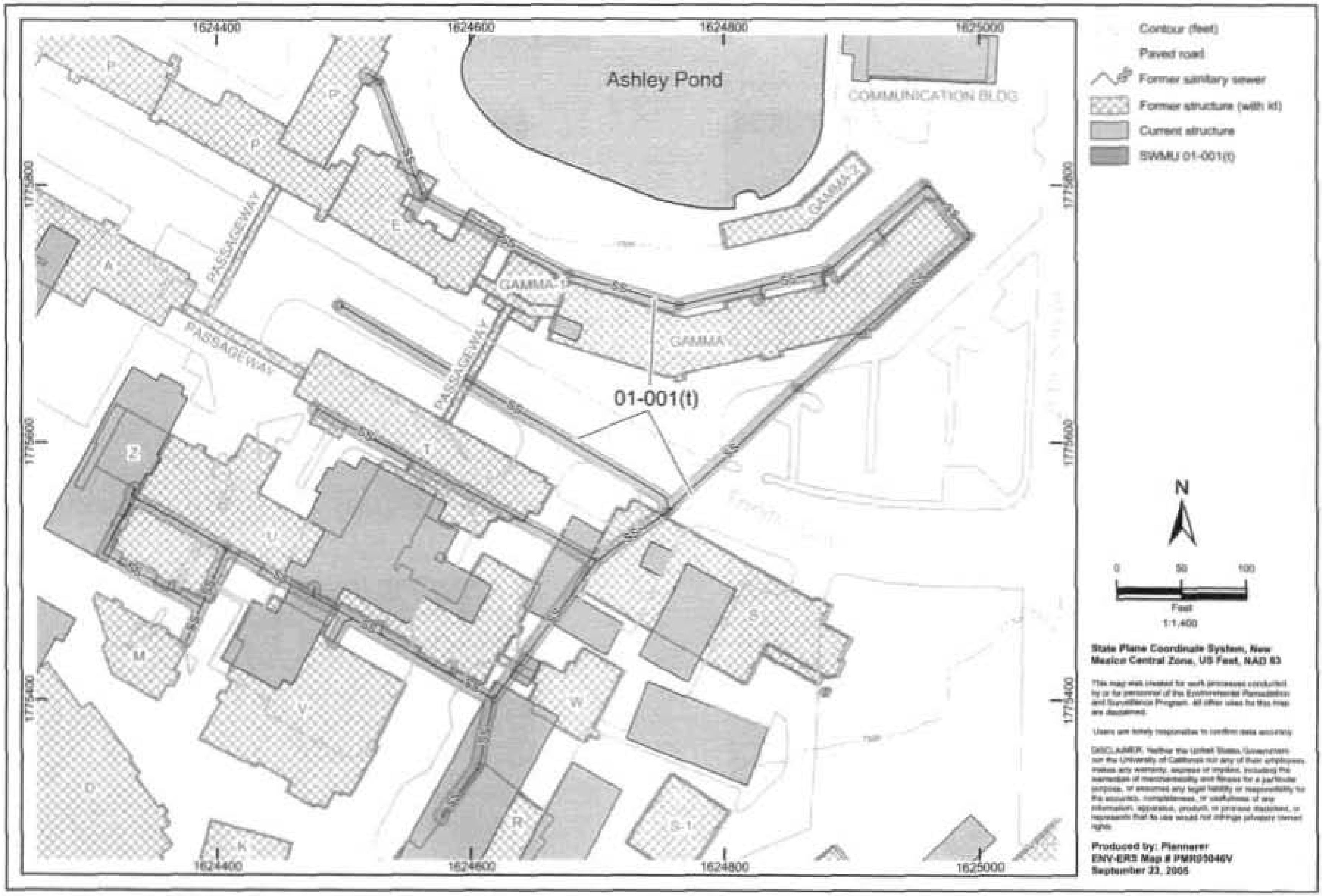

Figure 4.11-1. SWMU 01-001(t) site map

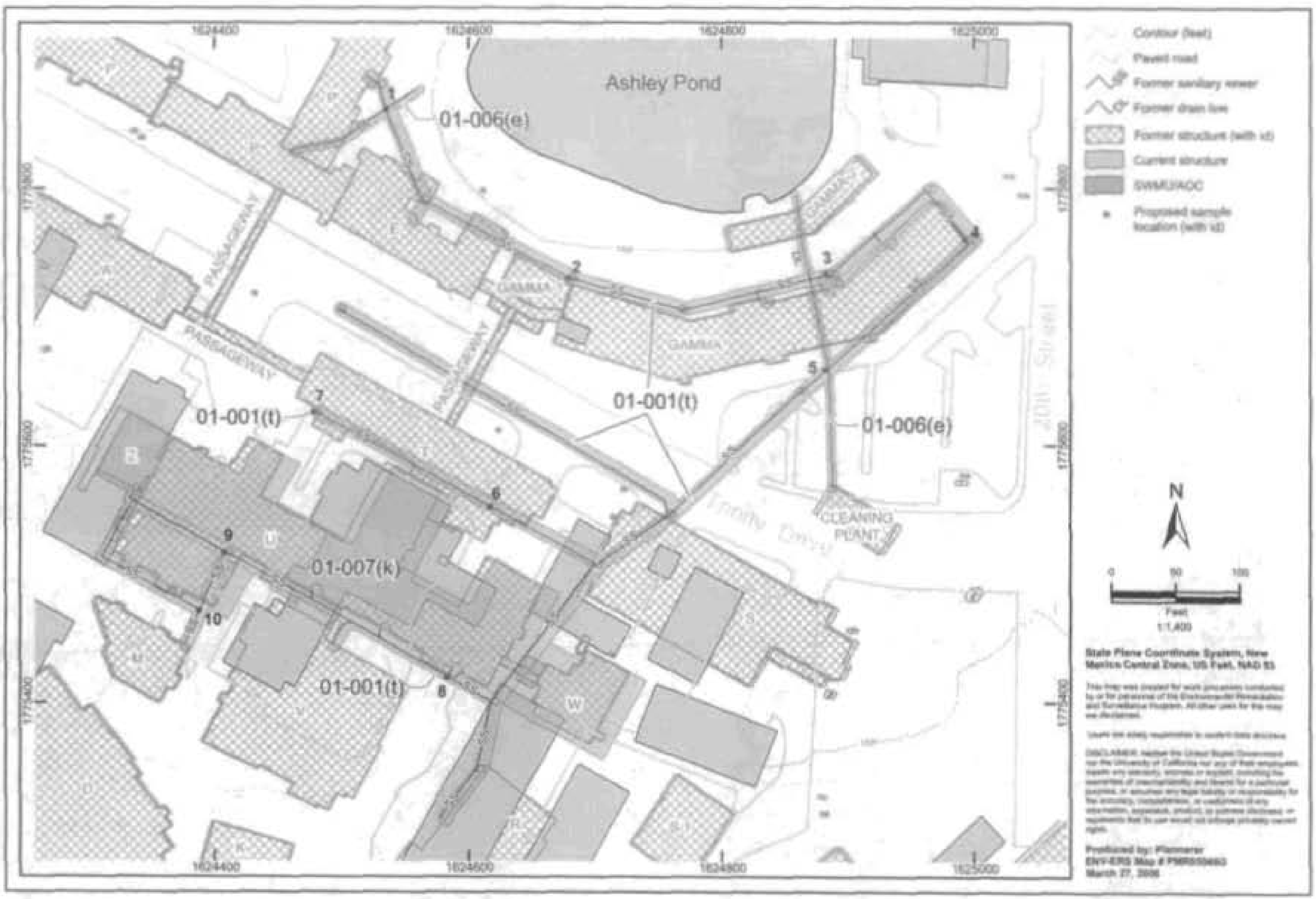

Figure 4.11-2. SWMU 01-001(t), AOC 01-006(e), and AOC 01-007(k) proposed sample locations

a) Looking north at proposed sample locations 1 and 2

b) Looking east at proposed sample locations 3 and 4

c) Looking southeast at proposed sample location 5

d) Looking north at proposed sample locations 6 and 8

Figure 4.11-3. SWMU 01-001(t), AOC 01-006(e), and AOC 01-007(k) site photographs

e) Looking south at proposed sample location 7

f) Looking north at proposed sample locations 9 and 10

Figure 4.11-3 (continued). SWMU 01-001(t), AOC 01-006(e), and AOC 01-007(k) site photographs

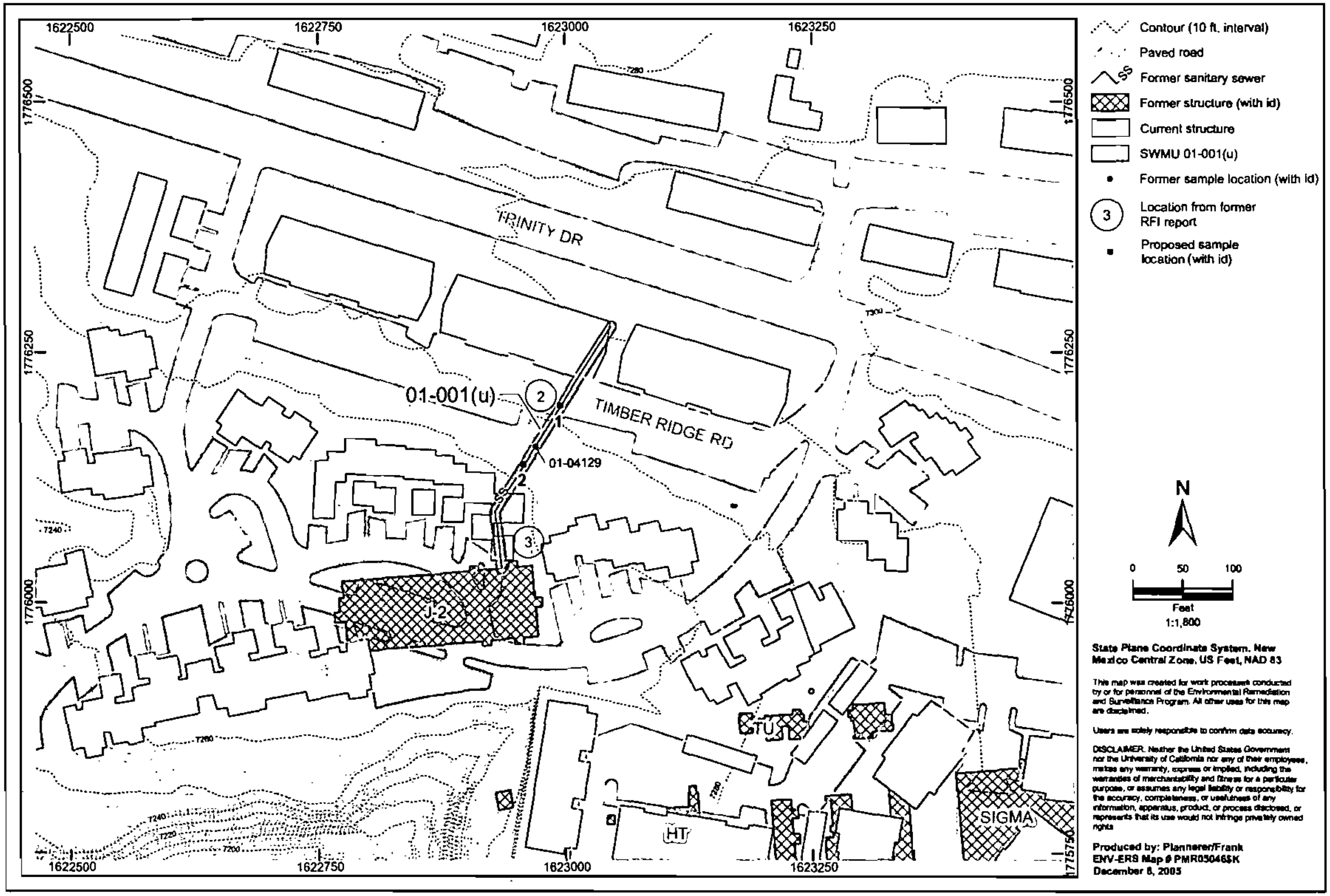

Figure 4.12-1. SWMU 01-001(u) site map and proposed sample locations

Figure 4.12-2 SWMU 01-001(u) site photograph (looking west)

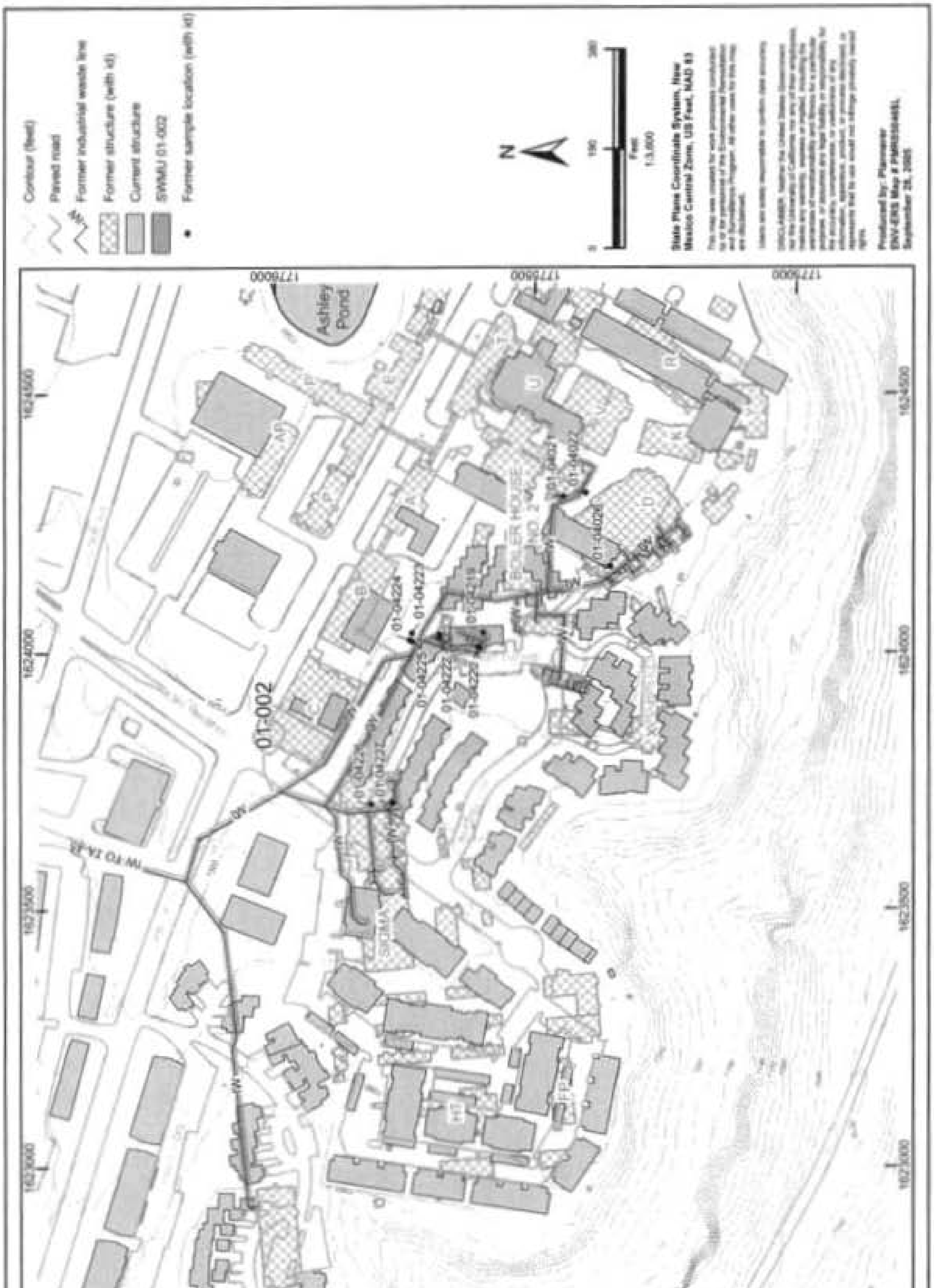

Figure 4.13-1. SWMU 01-002 site map

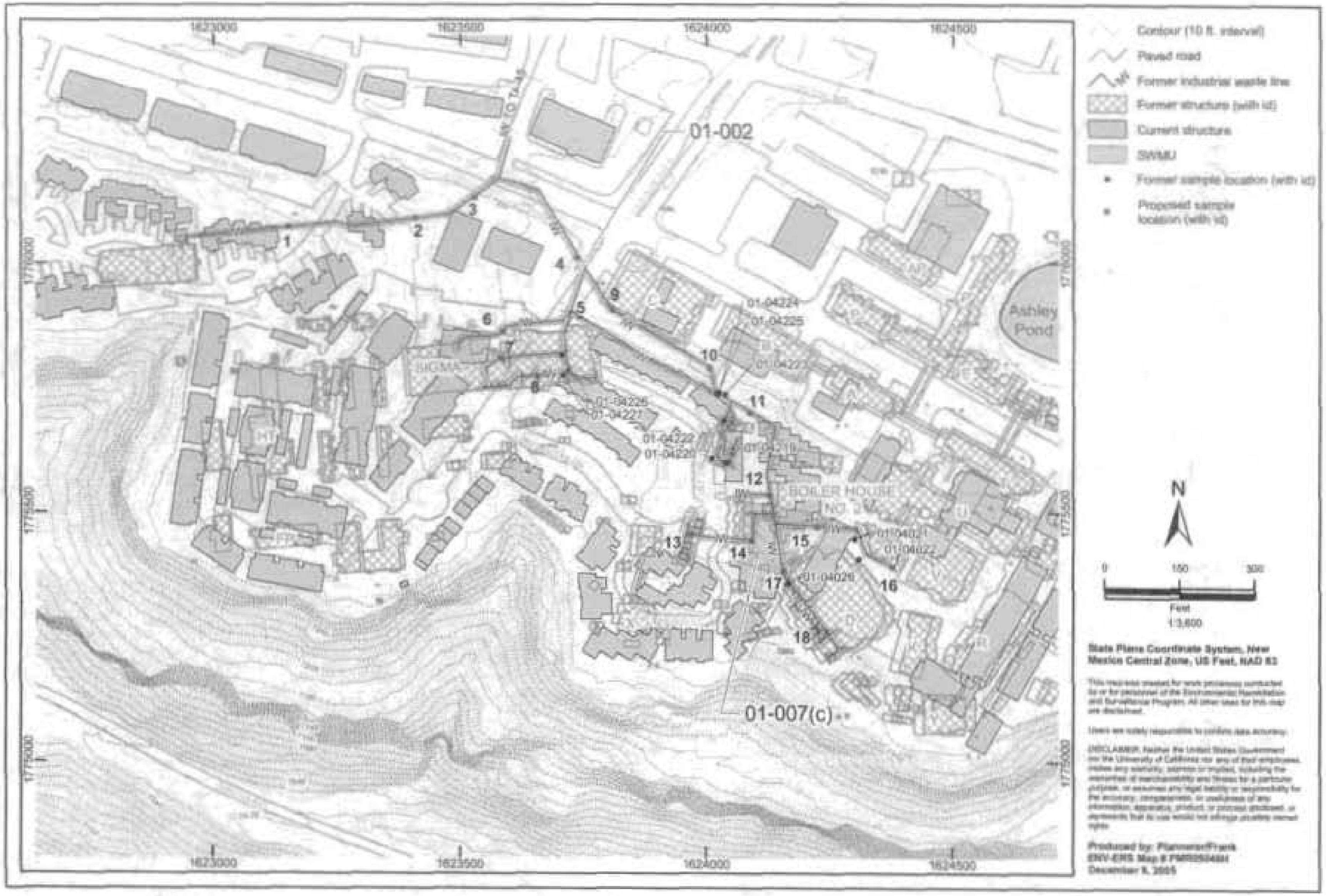

Figure 4.13-2. SWMUs 01-002 and 01-007(c) proposed sample locations

a) Looking north at proposed sample location 1

b) Looking north at proposed sample location 2

c) Looking north at proposed sample location 3

d) Looking north at proposed sample location 4

Figure 4.13-3. SWMUs 01-002 and 01-007(c) site photographs

e) Looking east at proposed sample locations 5 and 9

f) Looking west at proposed sample location 6

g) Looking southwest at proposed sample location 7

h) Looking southeast at proposed sample location 8

Figure 4.13-3 (continued). SWMUs 01-002 and 01-007(c) site photographs

i) Looking west at proposed sample locations 10 and 11

j) Looking east at proposed sample location 12

k) Looking northwest at proposed sample location 13

l) Looking southeast at proposed sample location 14

Figure 4.13-3 (continued). SWMUs 01-002 and 01-007(c) site photographs

m) Looking northeast at proposed sample location 15

n) Looking north at proposed sample location 16

o) Looking southeast at proposed sample location 17

p) Looking west at proposed sample location 18

Figure 4.13-3 (continued). **SWMUs 01-002 and 01-007(c) site photographs**

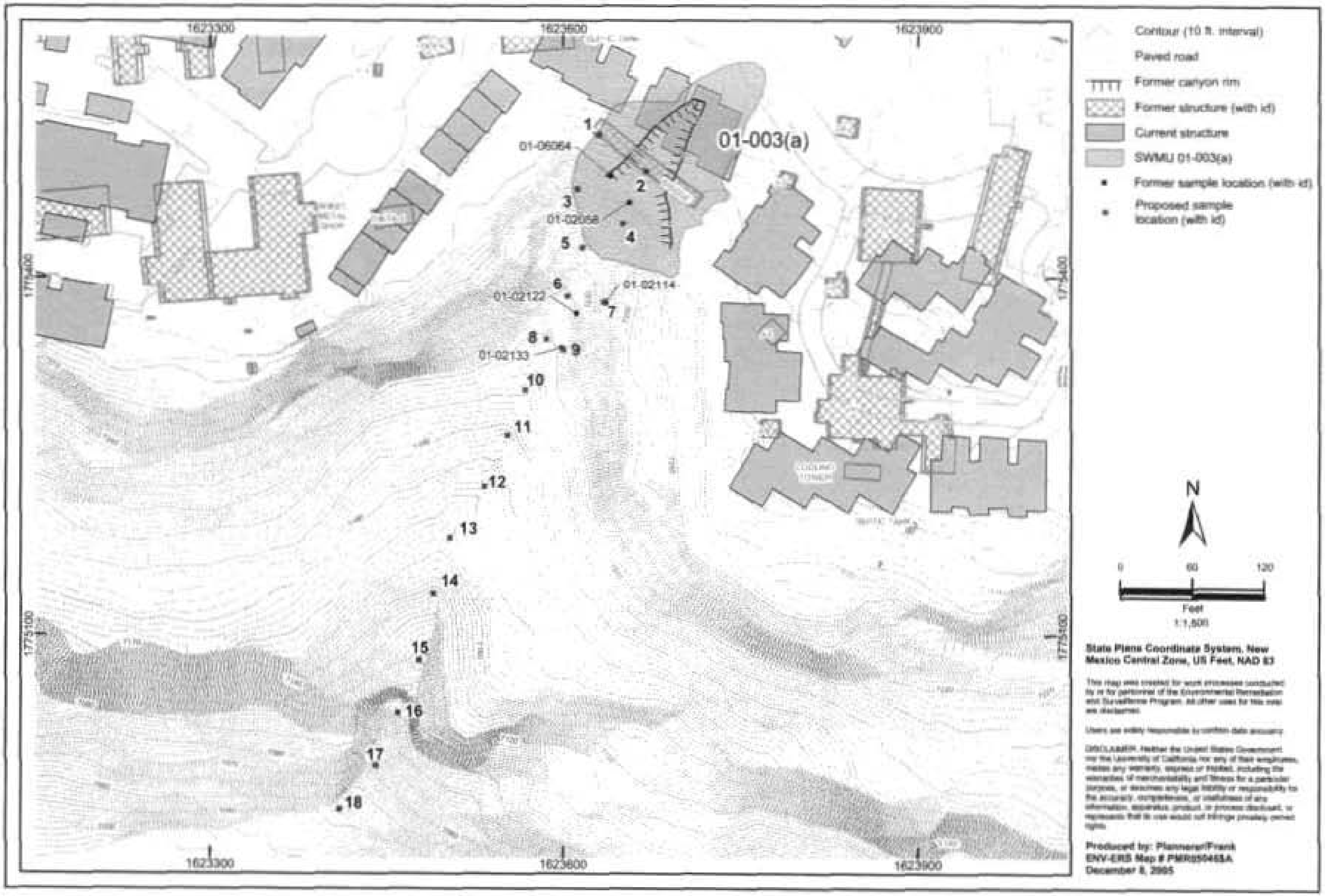

Figure 4.14-1. SWMU 01-003(a) site map and proposed sample locations

Figure 4.15-1. SWMU 01-003(b) site map

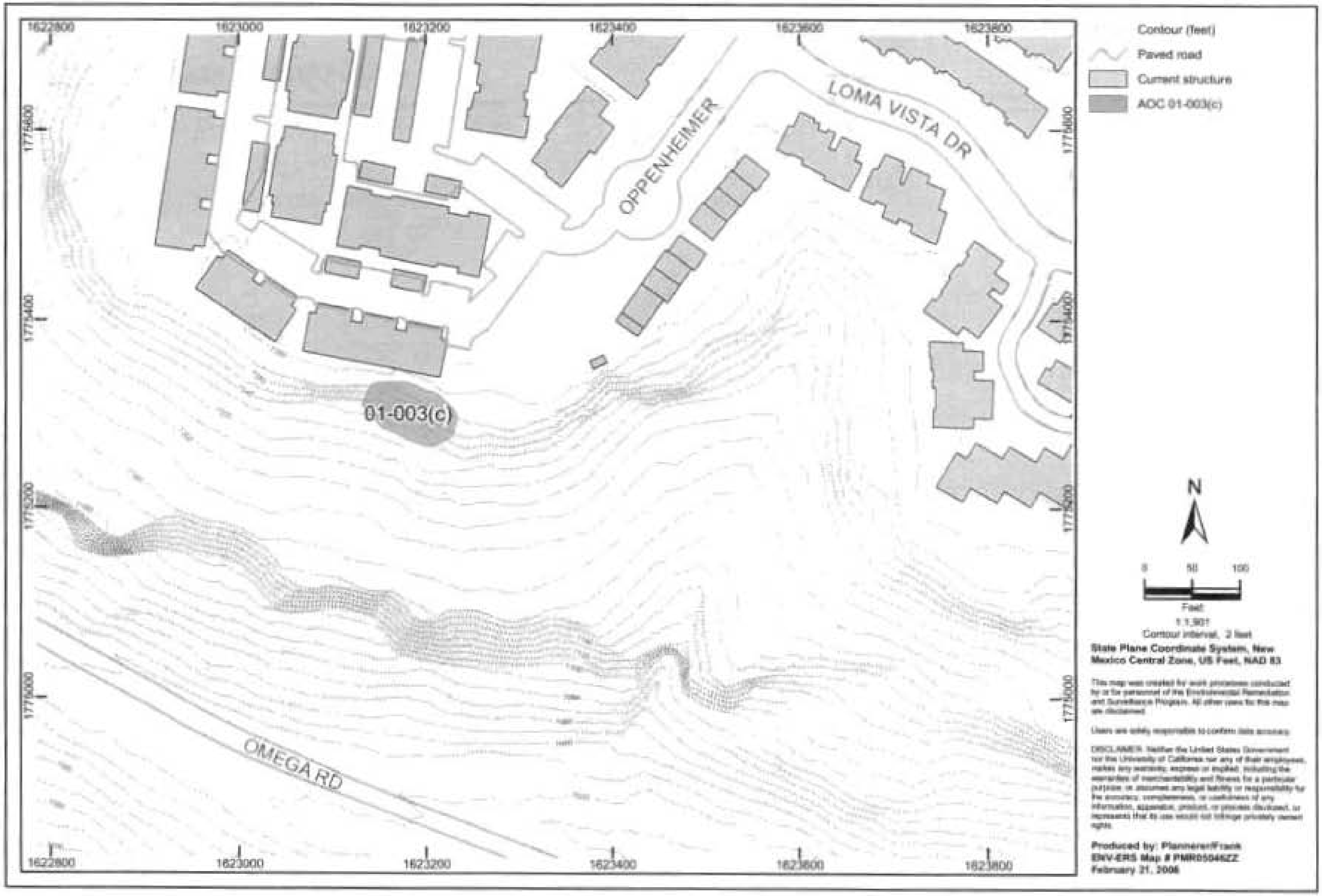

Figure 4.16-1. AOC 01-003(c) site map

Figure 4.16-2. AOC 01-003(c) site photograph (looking south)

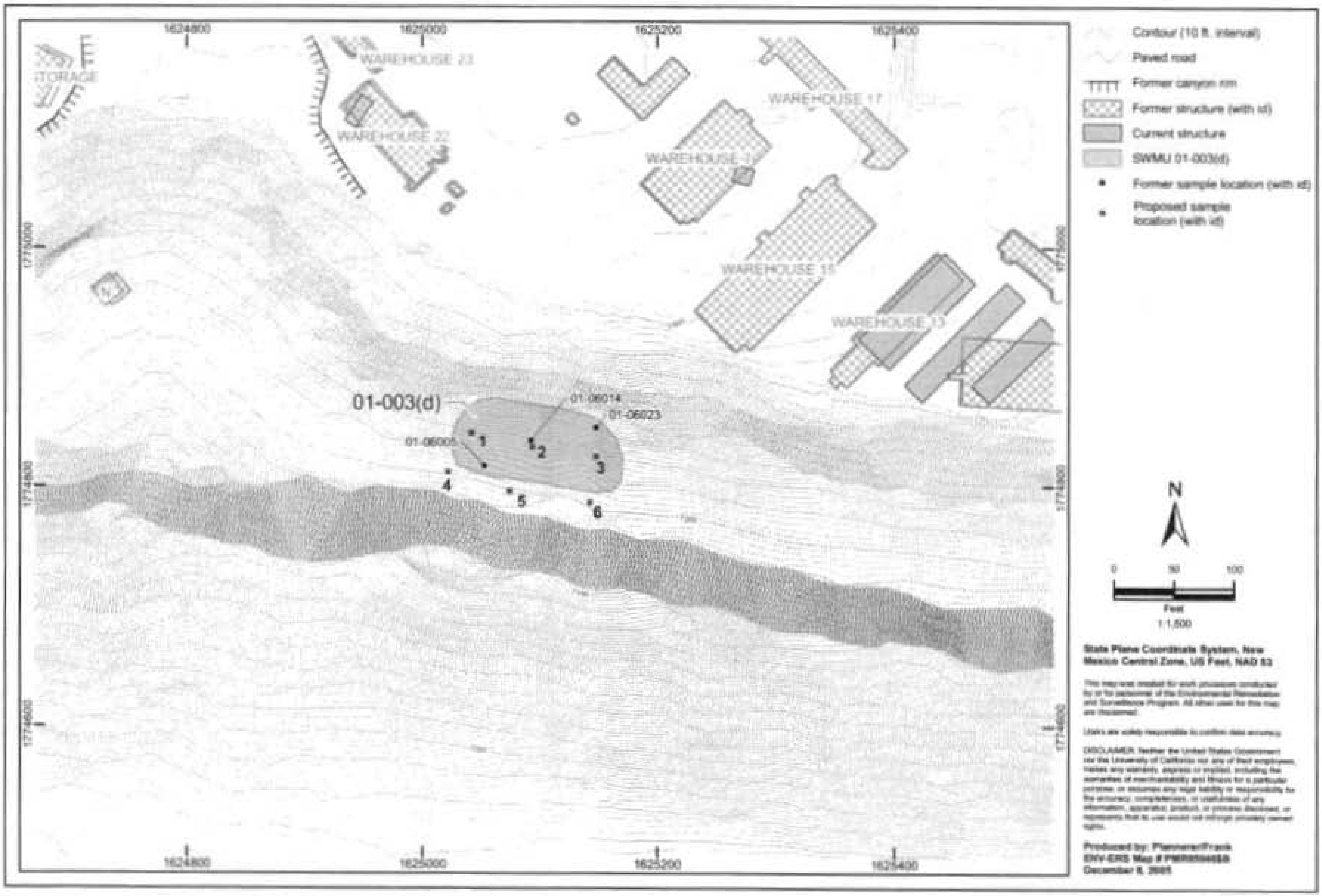

Figure 4.17-1. SWMU 01-003(d) site map and proposed sample locations

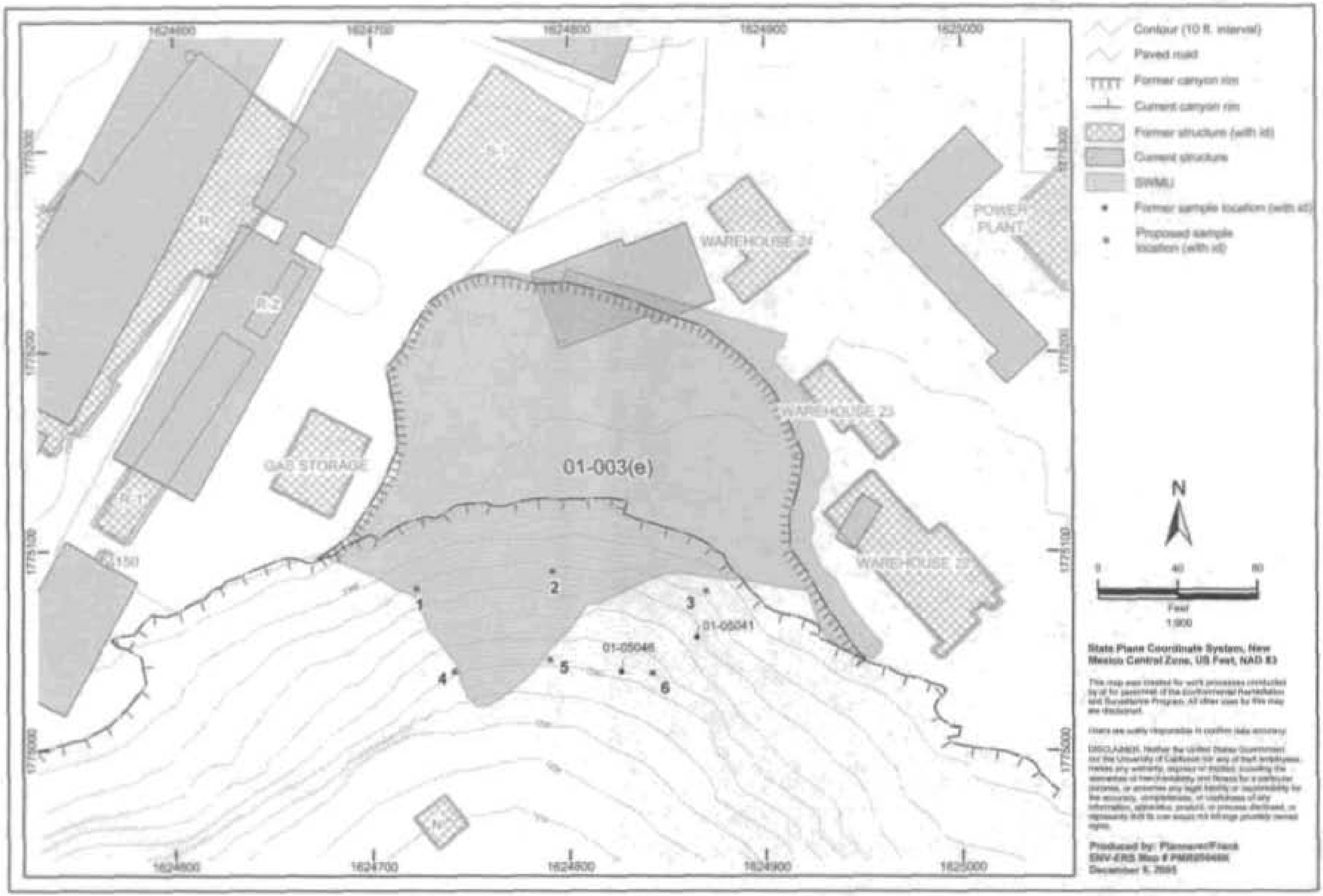

Figure 4.18-1. SWMU 01-003(e) site map and proposed sample locations

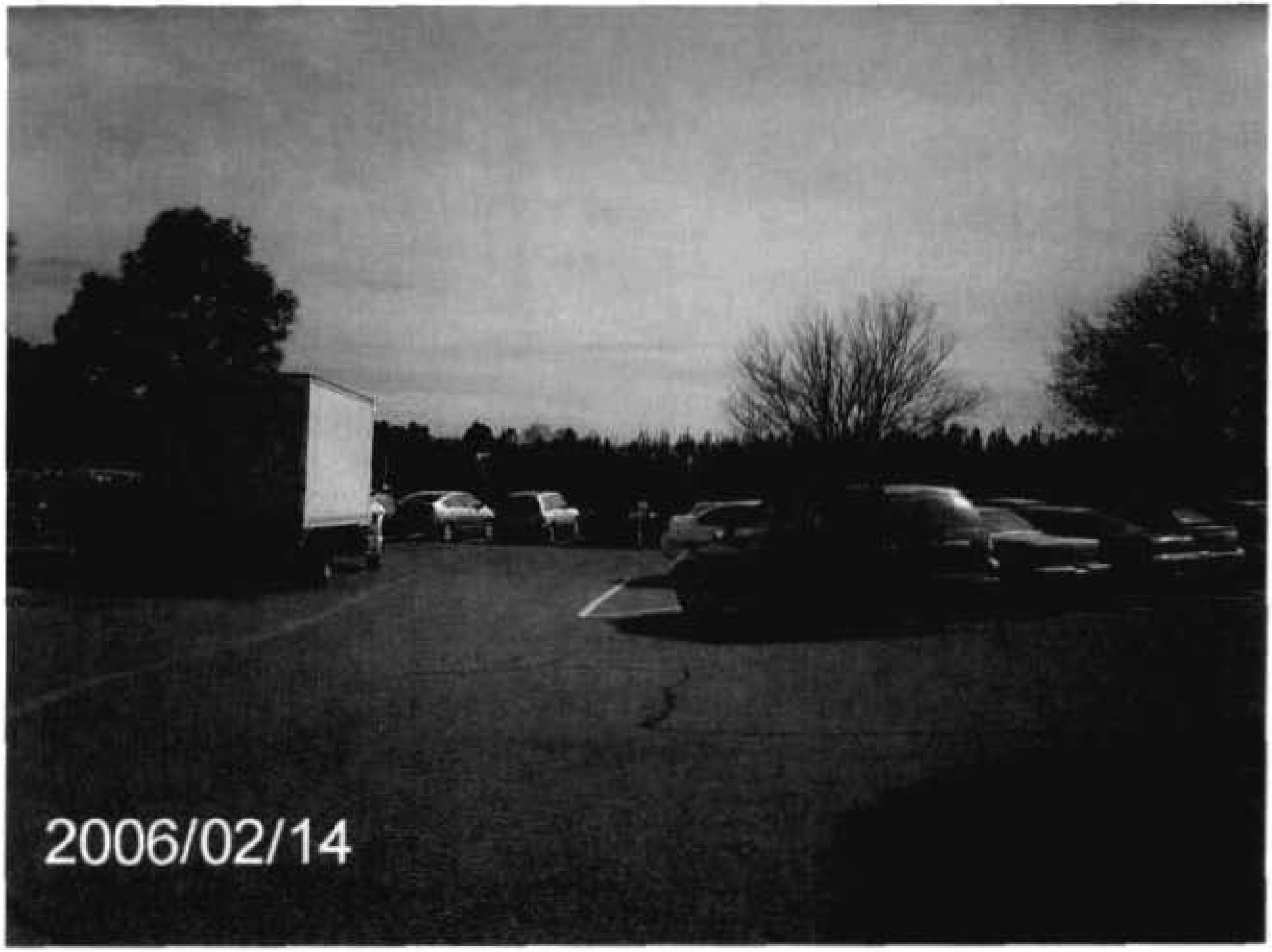

Figure 4.18-2. SWMU 01-003(e) mesa top site photograph (looking south)

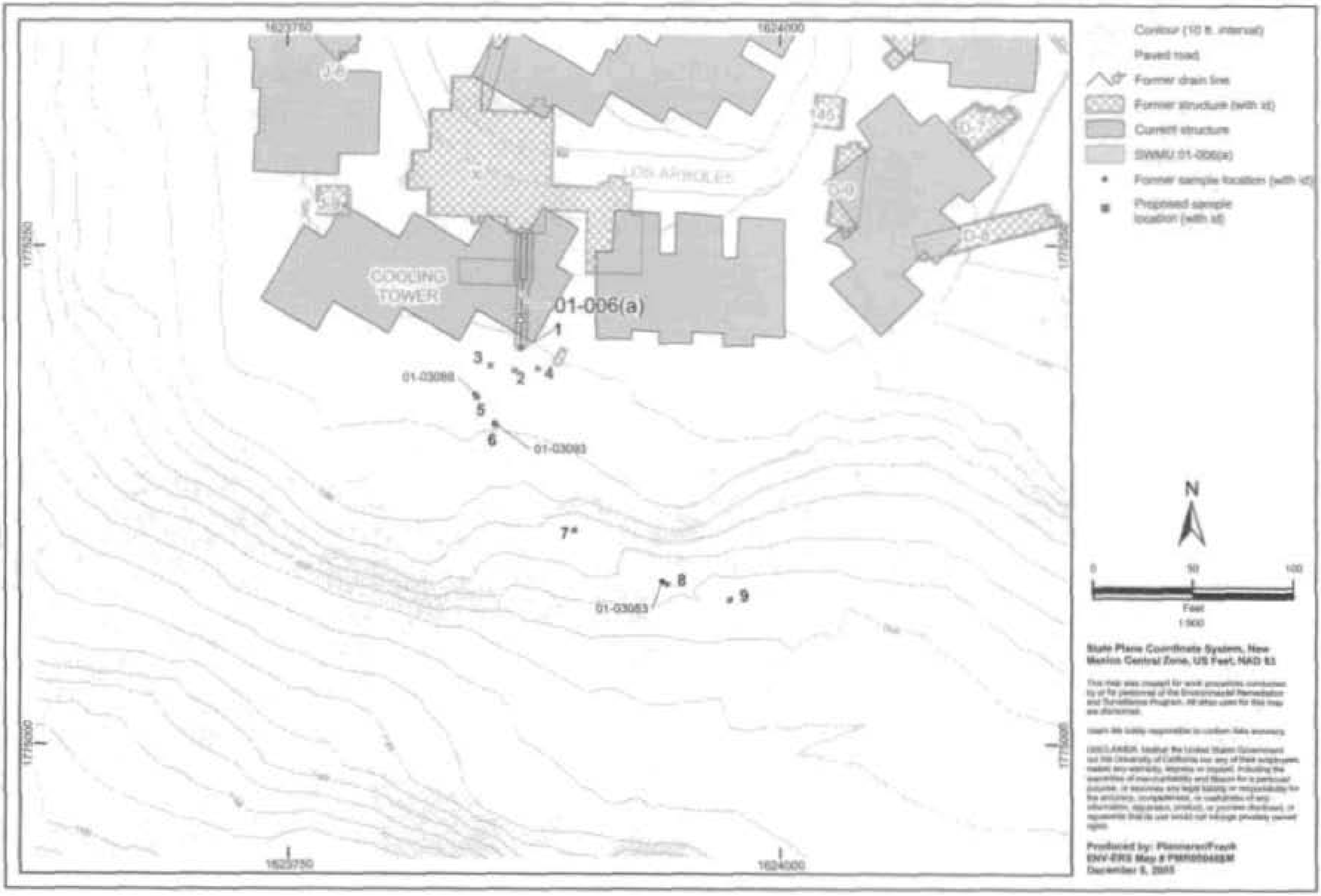

Figure 4.19-1. **SWMU 01-006(a) site map and proposed sample locations**

Figure 4.20-1.   SWMU 01-006(b) site map

Figure 4.21-1. SWMU 01-006(c) site map

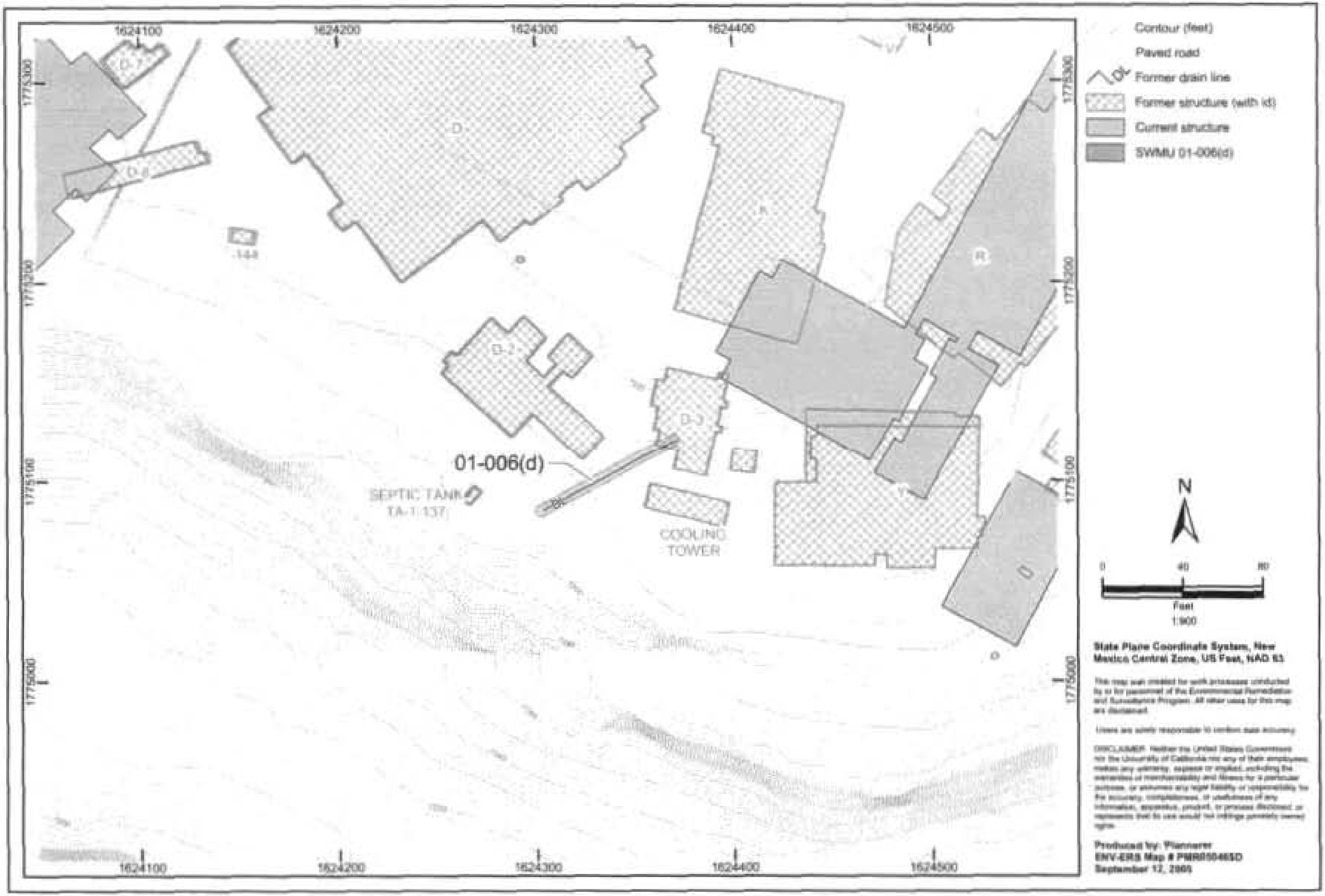

Figure 4.22-1. SWMU 01-006(d) site map

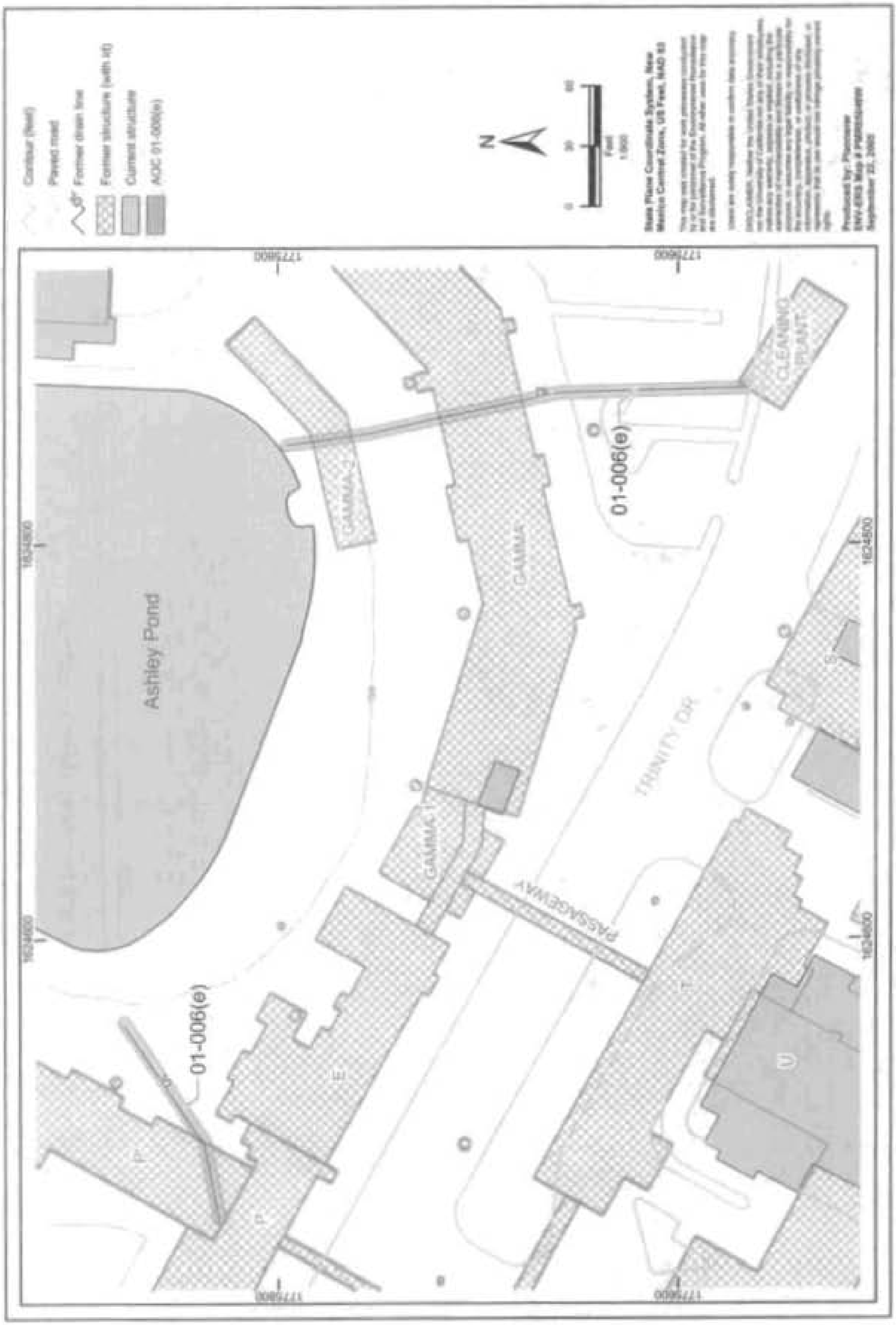

Figure 4.23-1. AOC 01-006(e) site map

Figure 4.24-1. AOC 01-006(g) site map and proposed sample locations

Figure 4.25-1. SWMU 01-006(h) site map

Figure 4.26-1. SWMU 01-006(n) site map

Figure 4.27-1. SWMU 01-006(o) site map and proposed sample locations

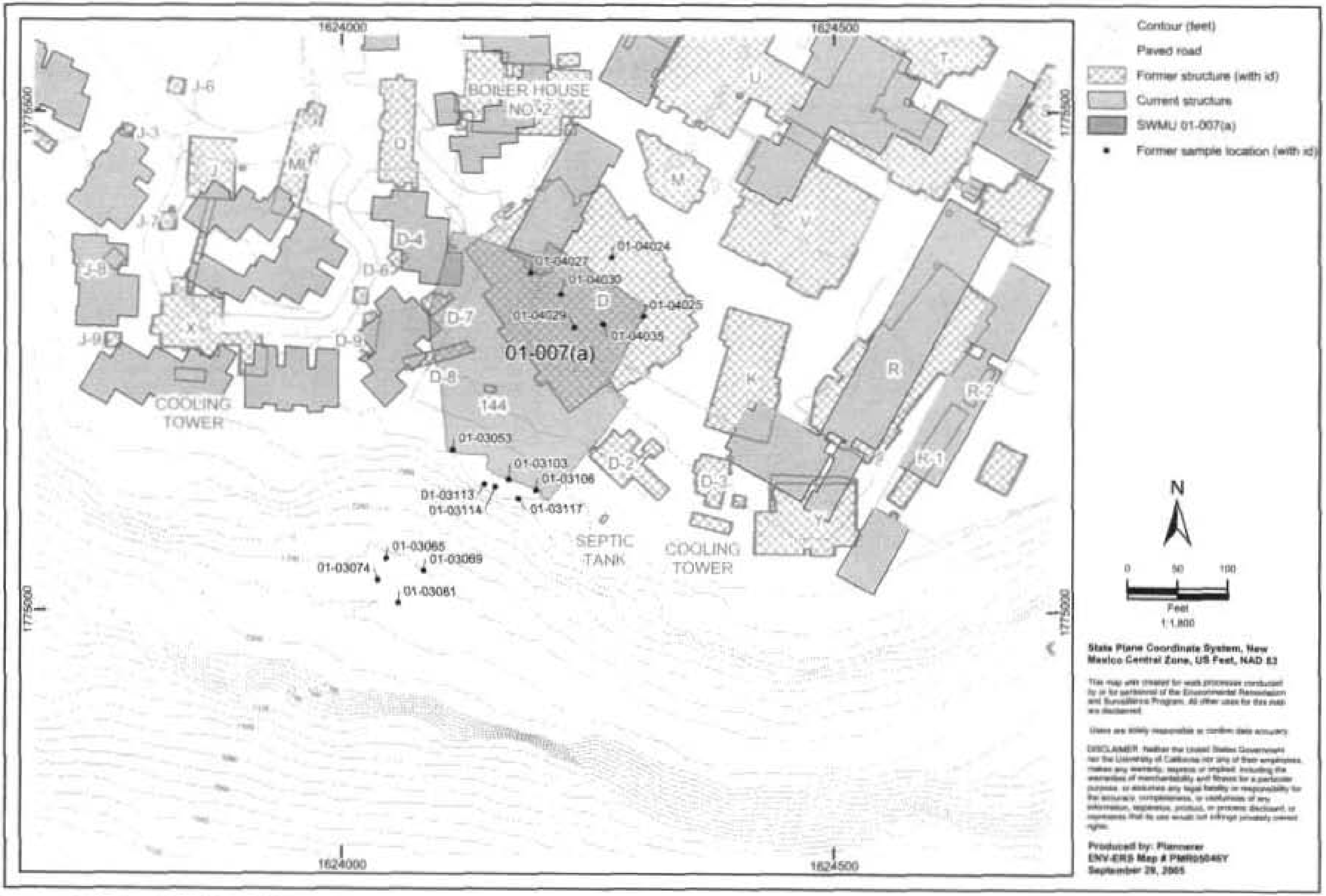

Figure 4.28-1. SWMU 01-007(a) site map

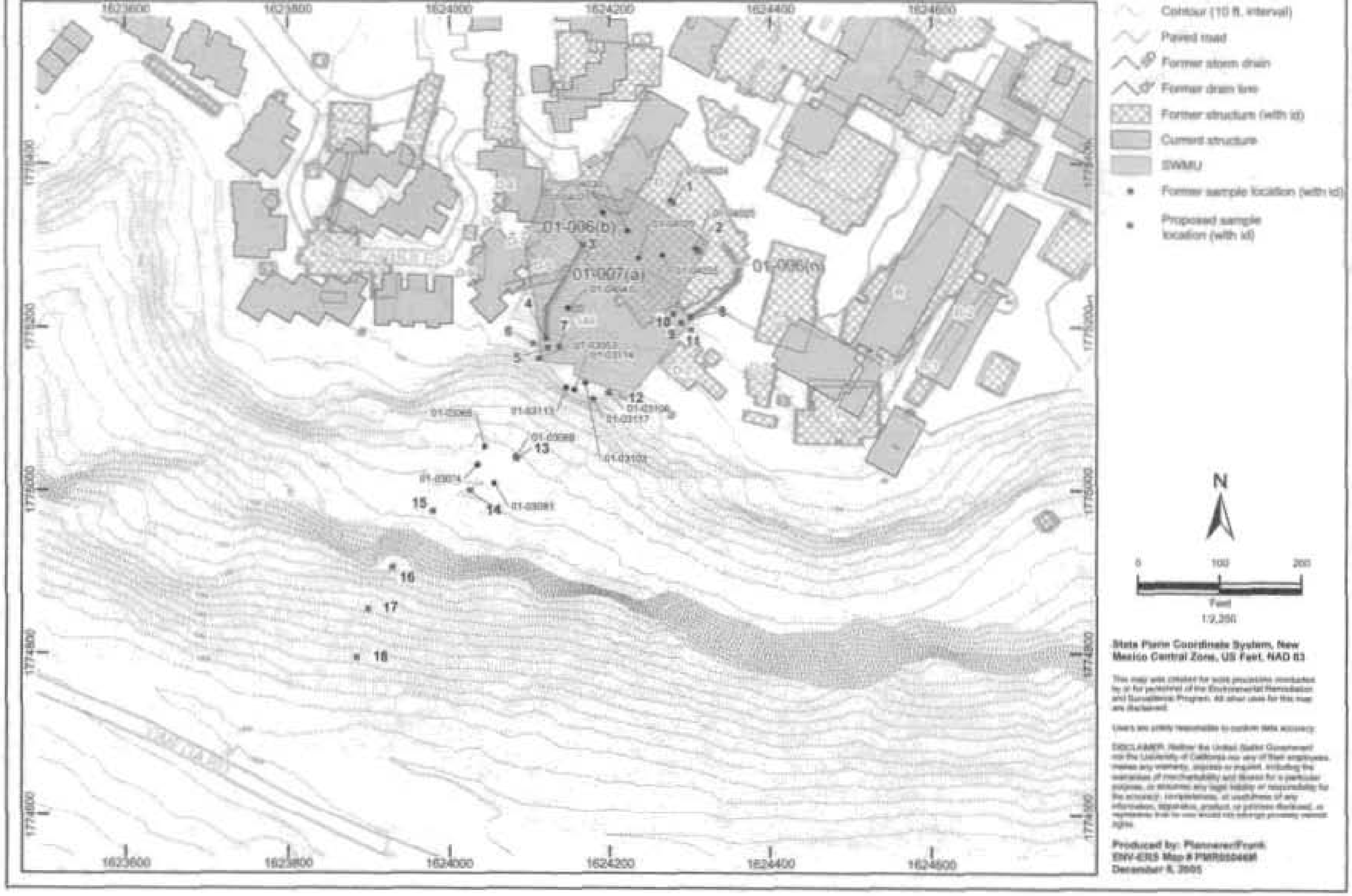

Figure 4.28-2. SWMUs 01-007(a), 01-006(b), and 01-006(n) proposed sample locations

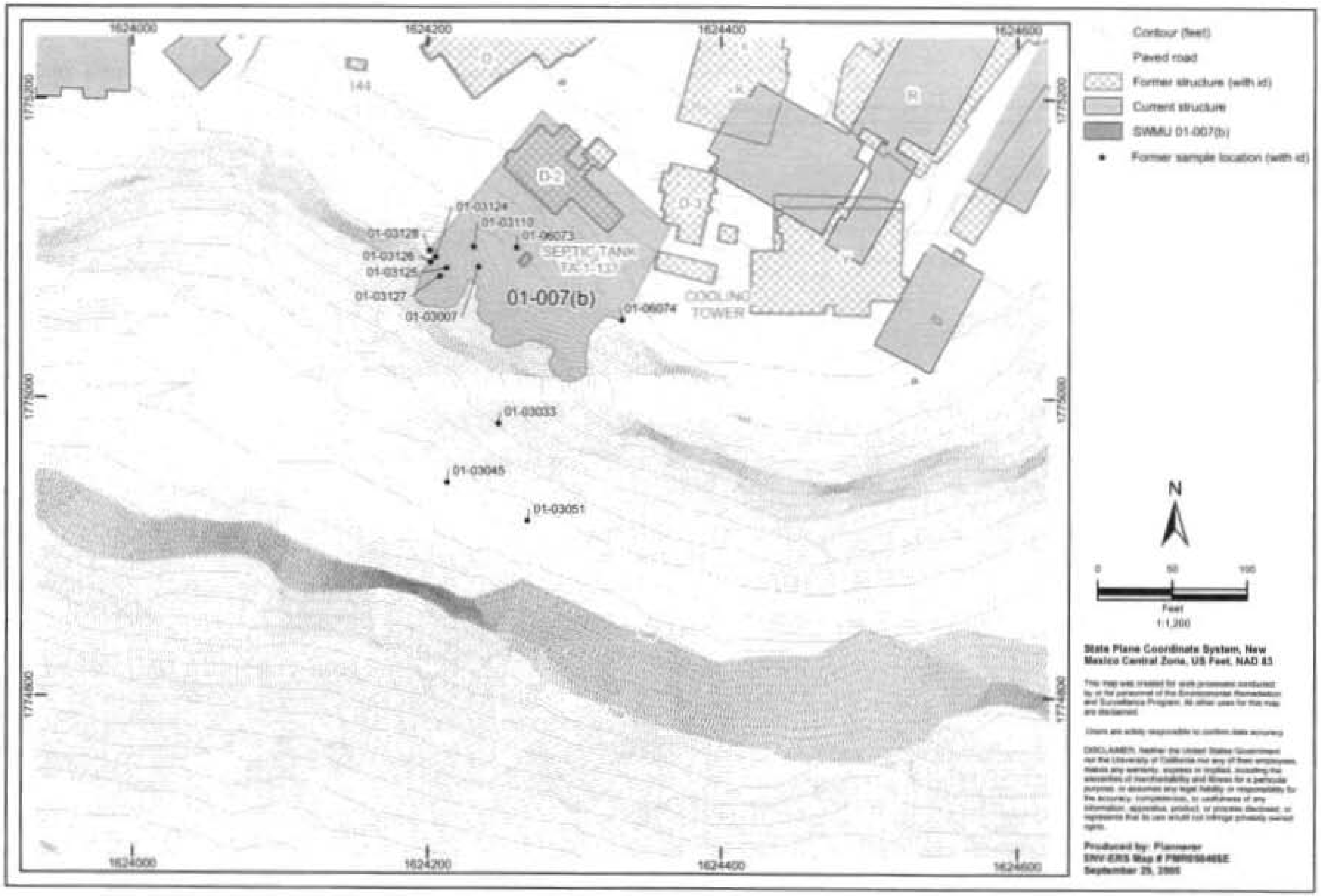

Figure 4.29-1. SWMU 01-007(b) site map

Figure 4.30-1. SWMU 01-007(c) site map

Figure 4.31-1. SWMU 01-007(d) site map and proposed sample locations

a) Looking north at proposed sample location 1

b) Looking northeast at proposed sample locations 2 and 3

Figure 4.31-2. SWMU 01-007(d) site photographs

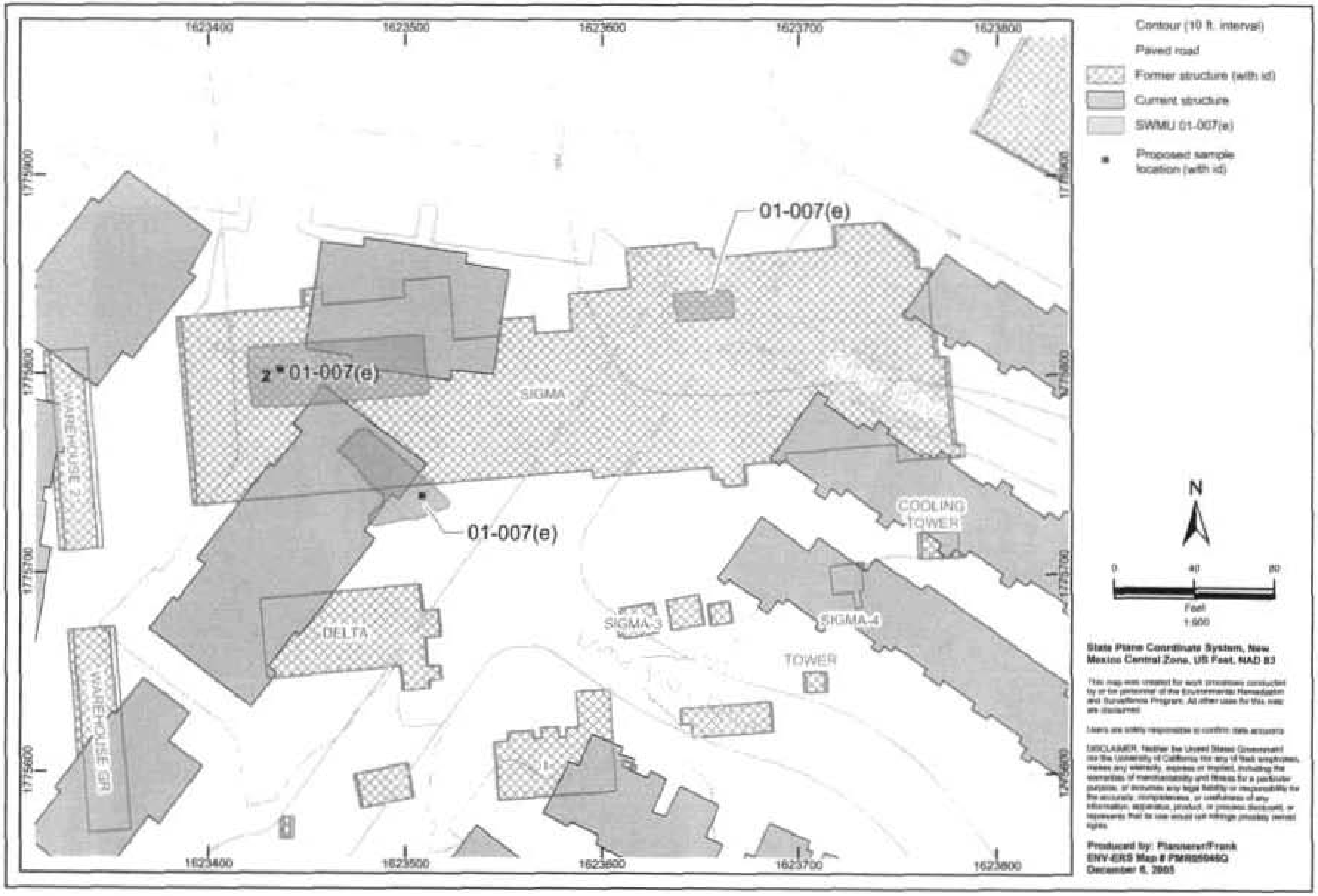

Figure 4.32-1. SWMU 01-007(e) site map and proposed sample locations

a) Looking southwest at proposed sample location 1

b) Looking south at proposed sample location 2

Figure 4.32-2. SWMU 01-007(e) site photographs

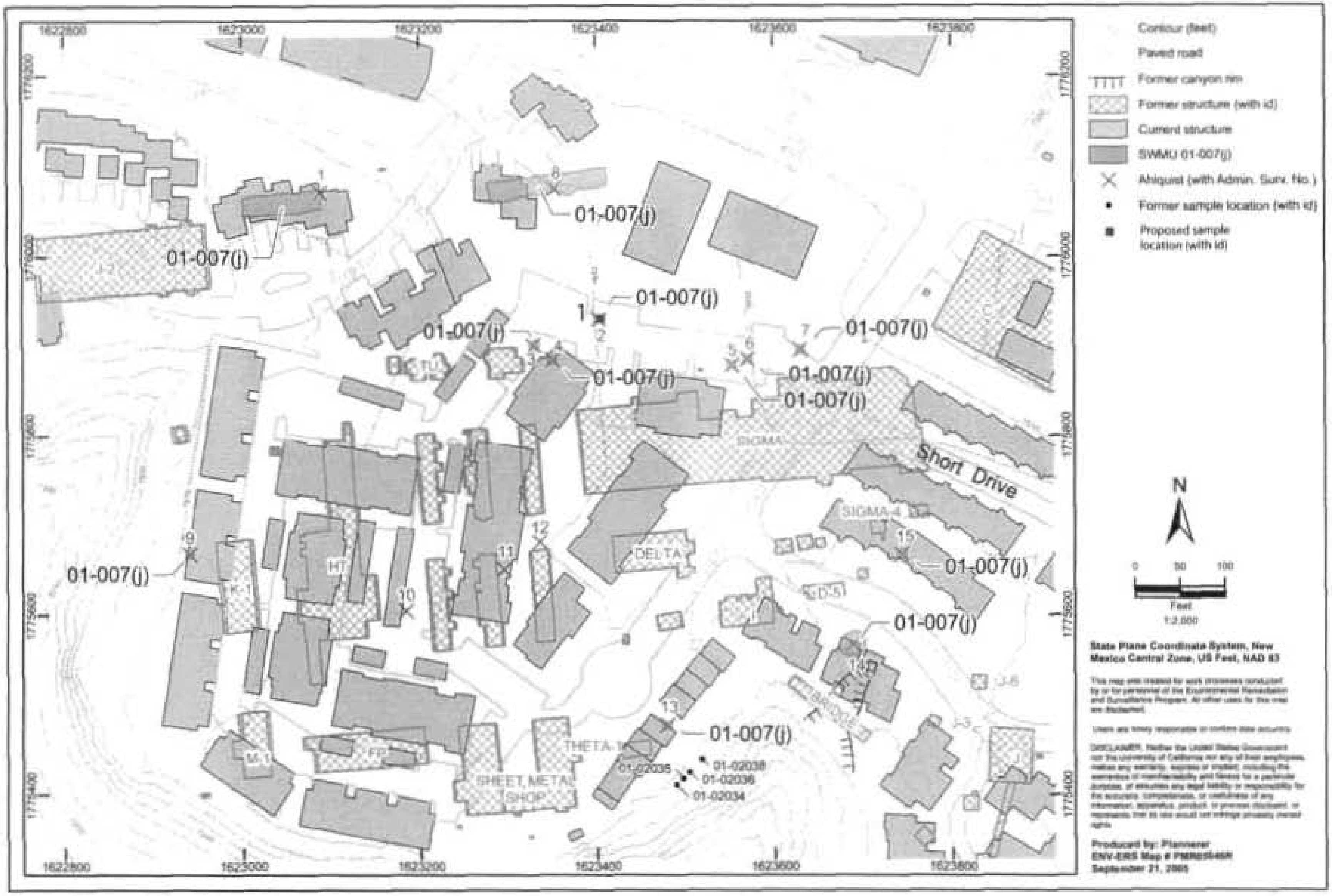

Figure 4.33-1. SWMU 01-007(j) site map and proposed sample location

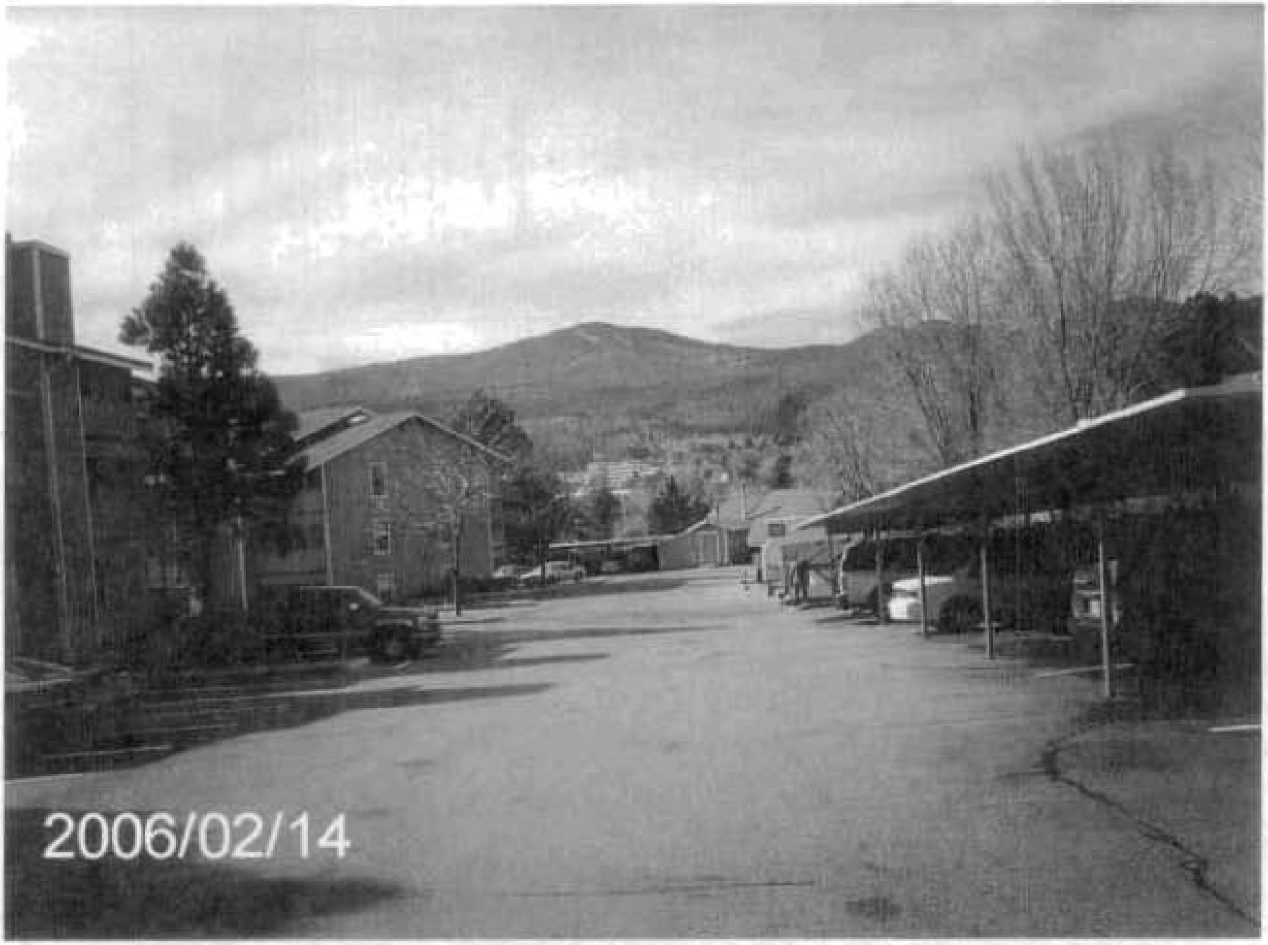

Figure 4.33-2. SWMU 01-007(j), spot No. 2 site photograph (looking west)

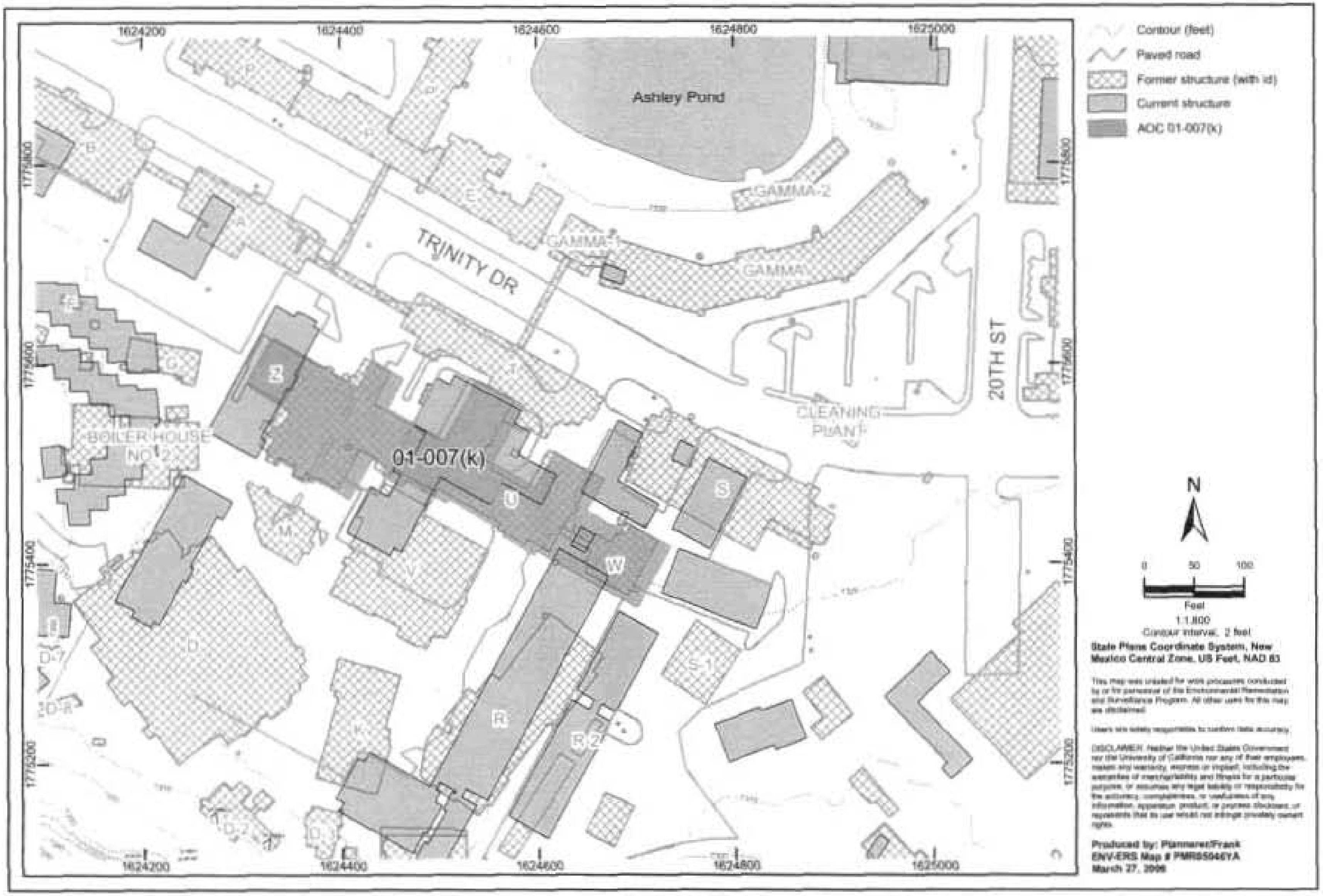

Figure 4.34-1. AOC 01-007(k) site map

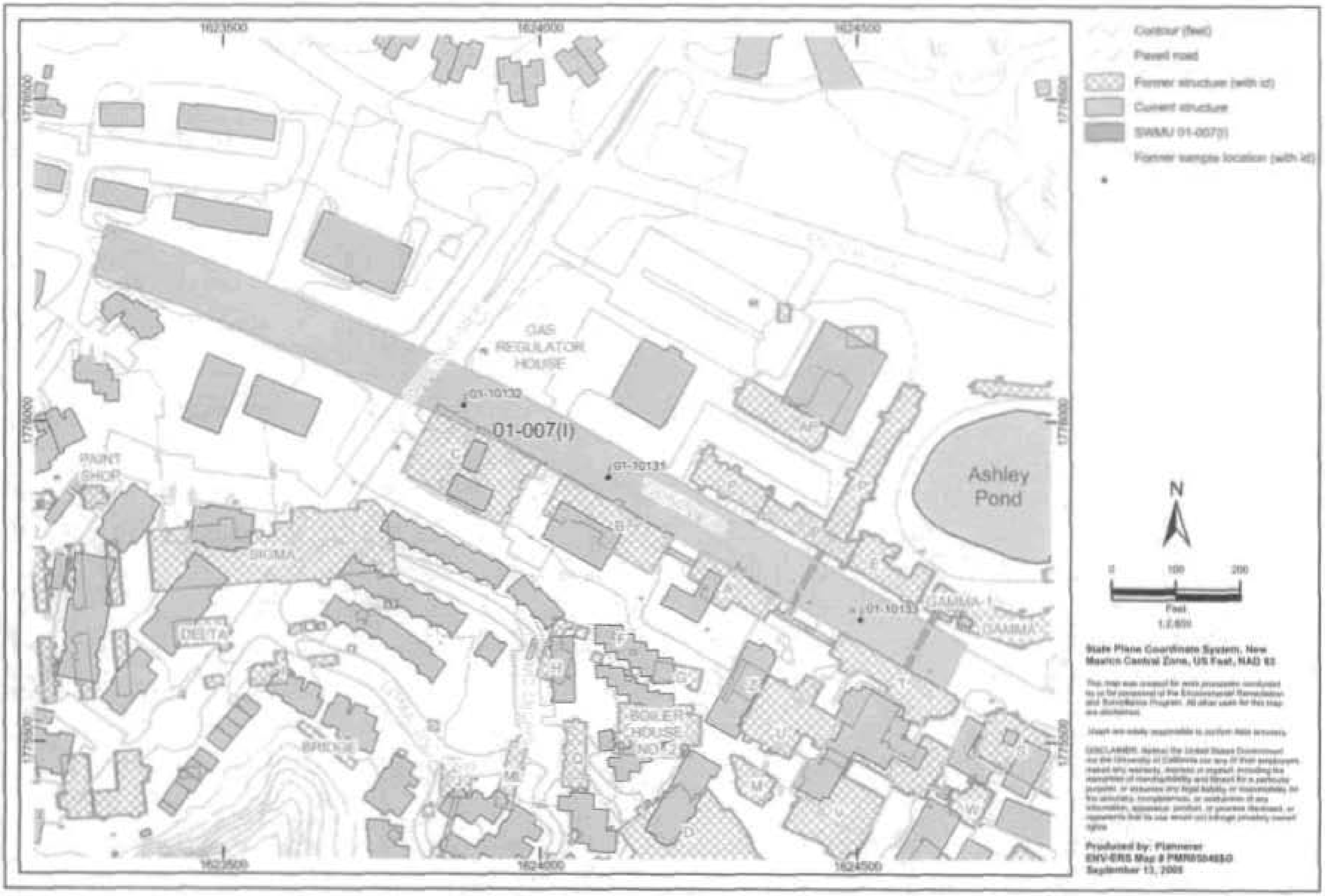

Figure 4.35-1. SWMU 01-007(l) site map

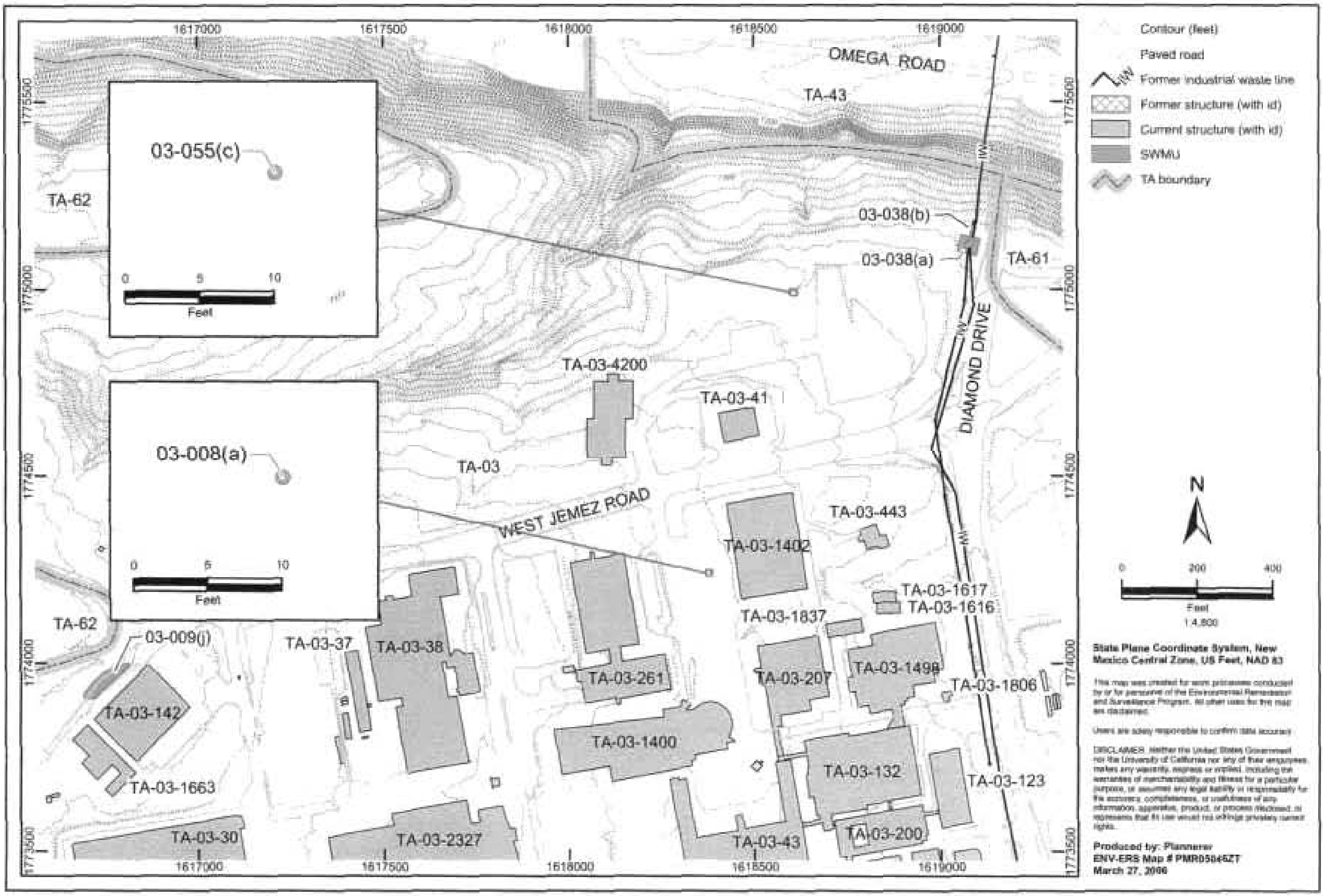

Figure 5.1-1. TA-03 site map

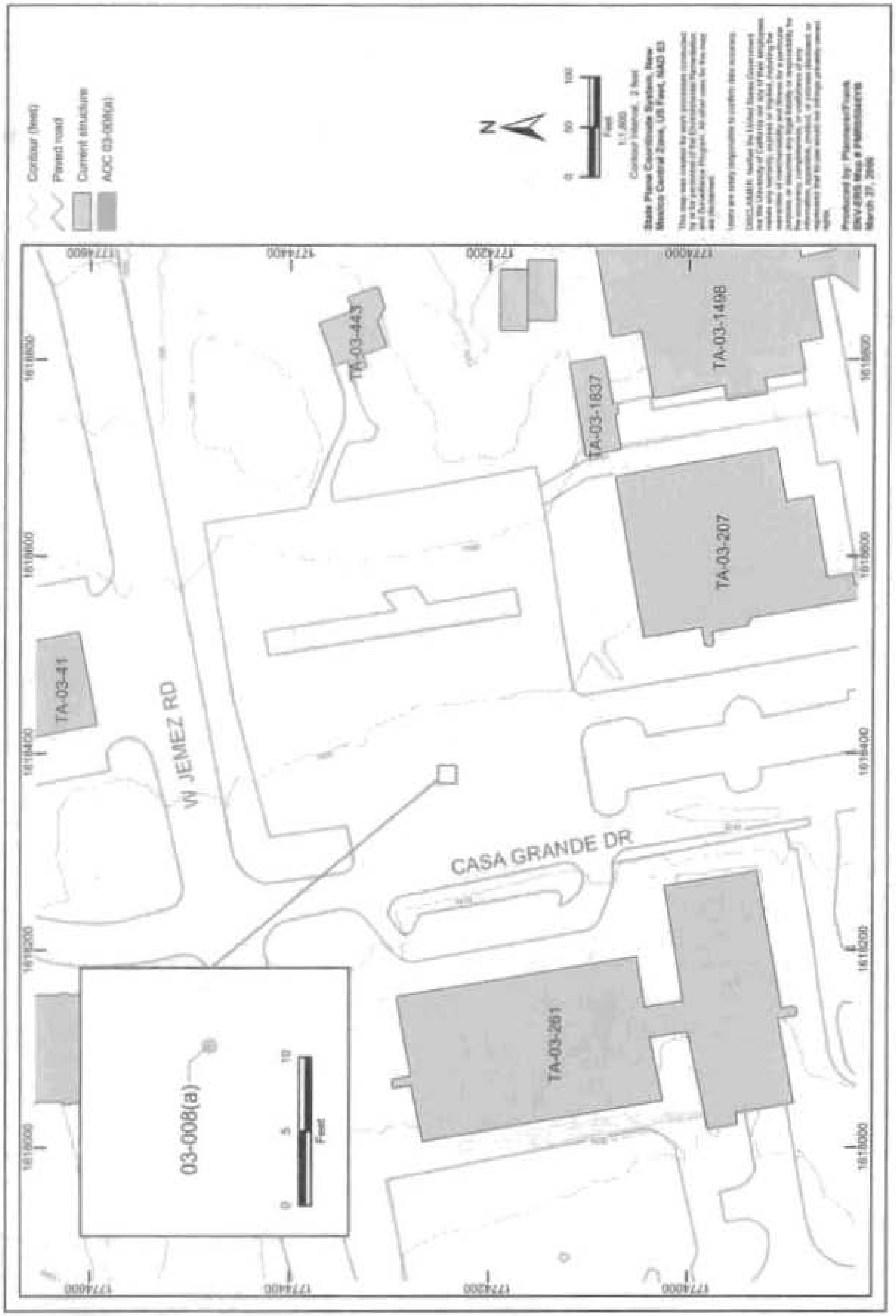

Figure 5.2-1. AOC 03-008(a) site map

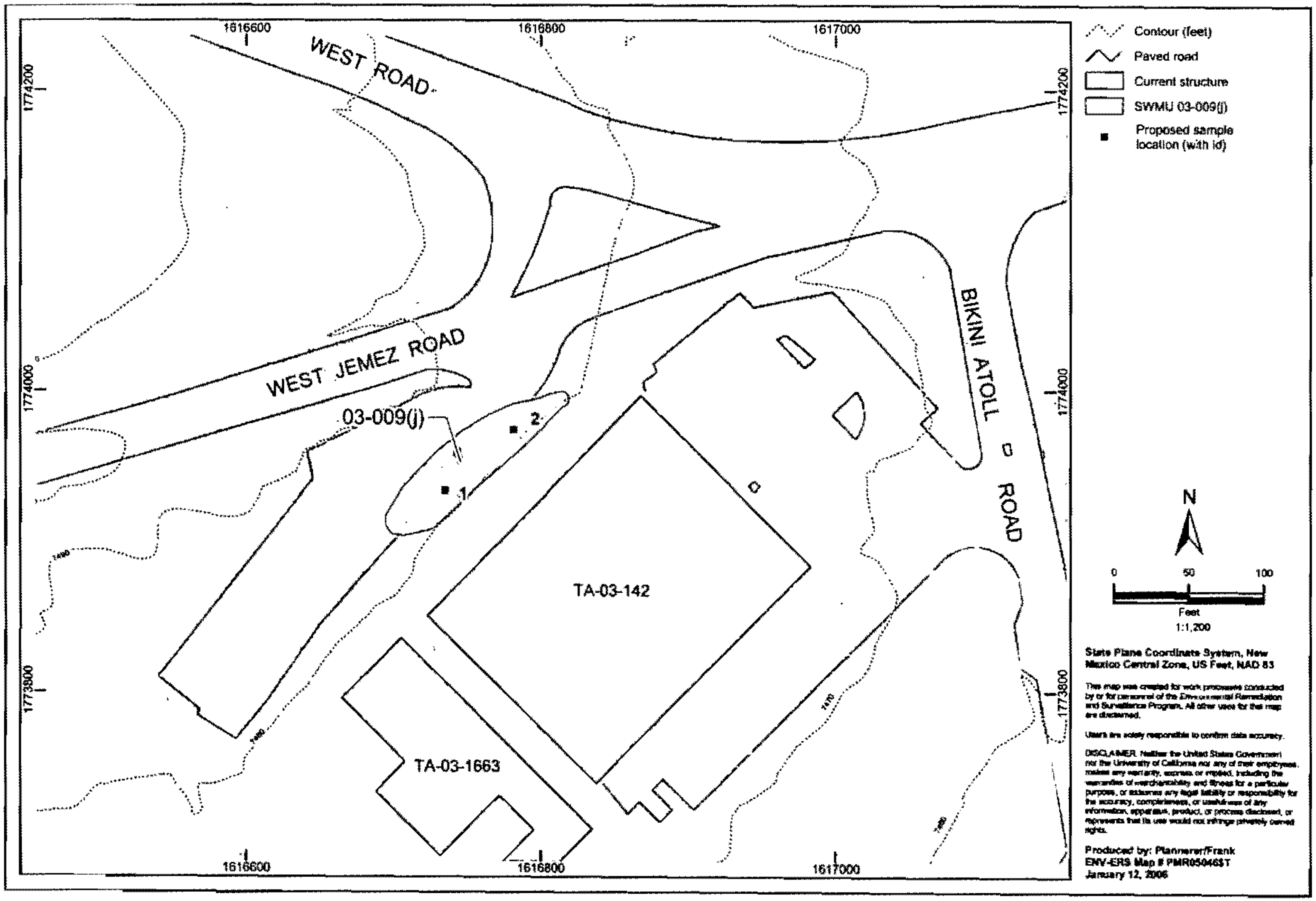

Figure 5.3-1. SWMU 03-009(j) site map and proposed sample locations

Figure 5.4-1. SWMUs 03-038(a,b) site map and proposed sample locations

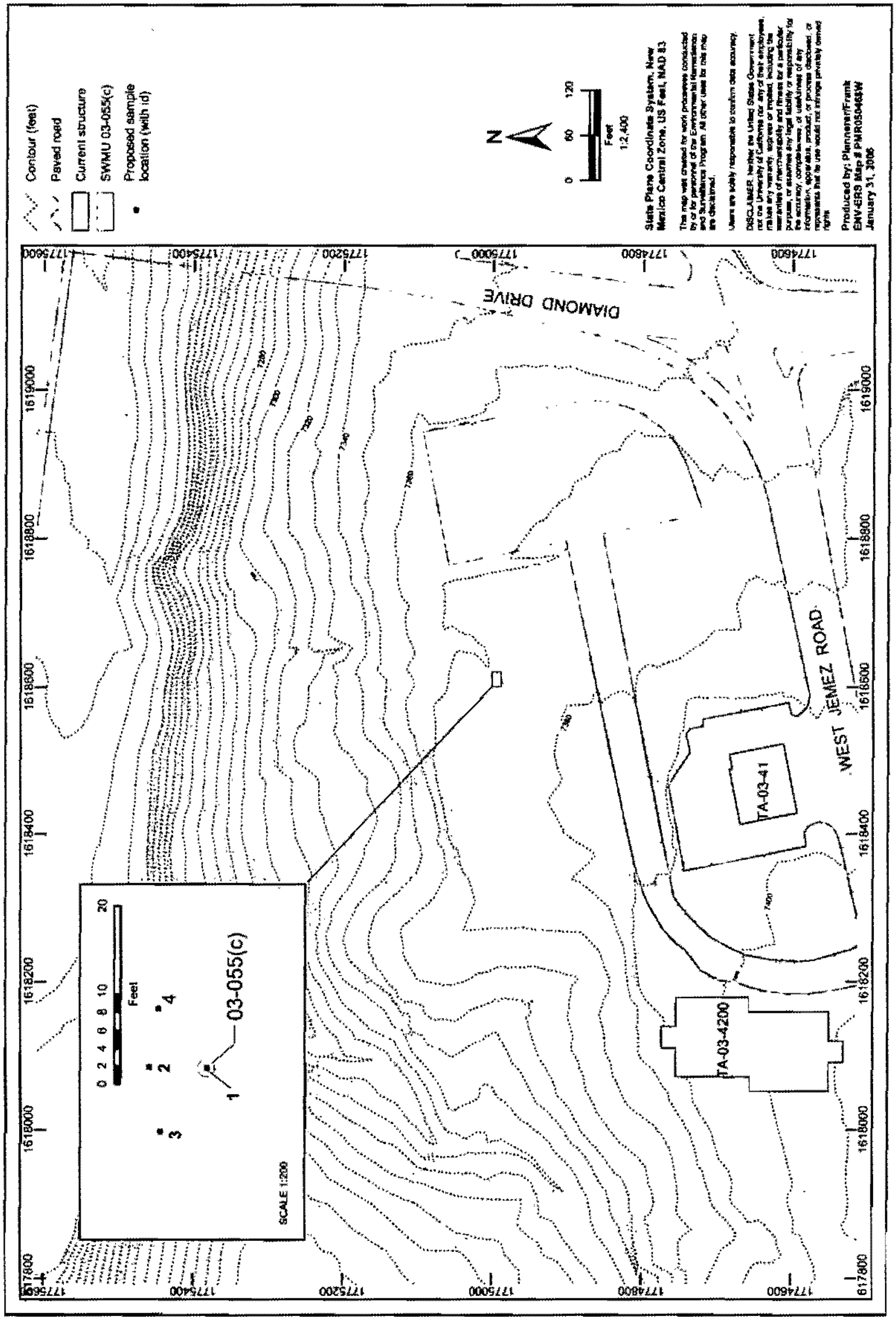

Figure 5.5-1. SWMU 03-055(c) site map and proposed sample locations

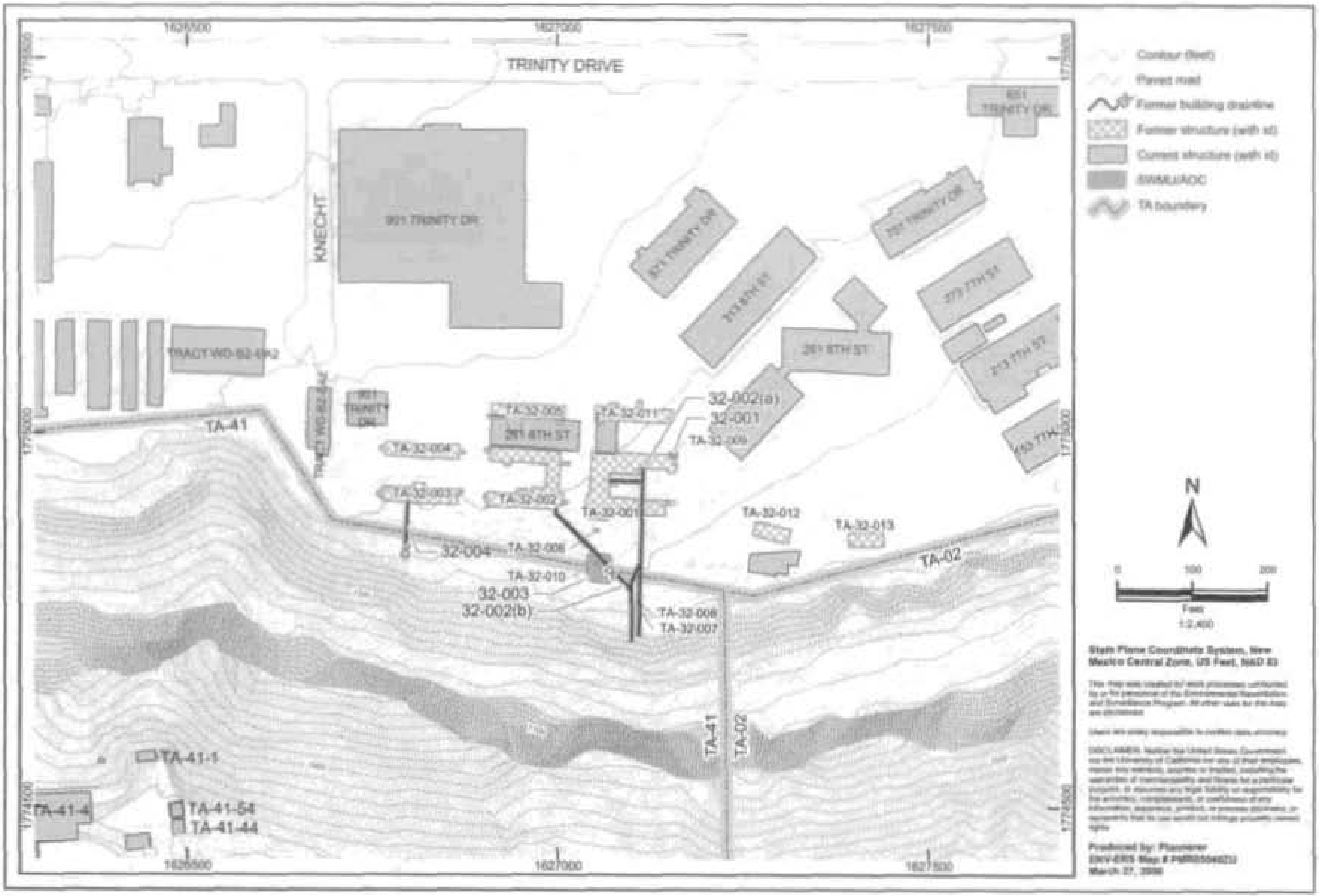

Figure 6.1-1. TA-32 site map

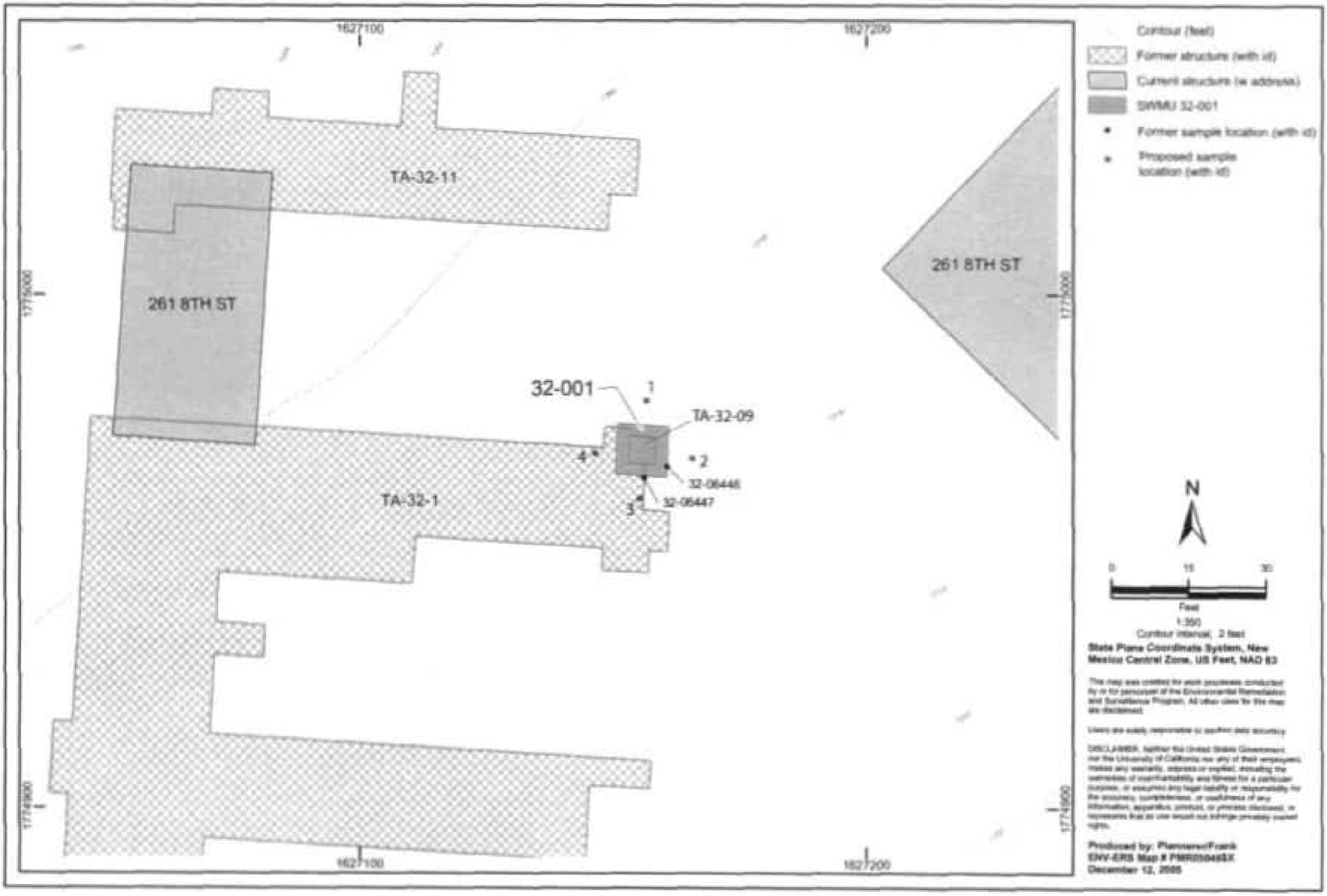

Figure 6.2-1. SWMU 32-001 site map and proposed sample locations

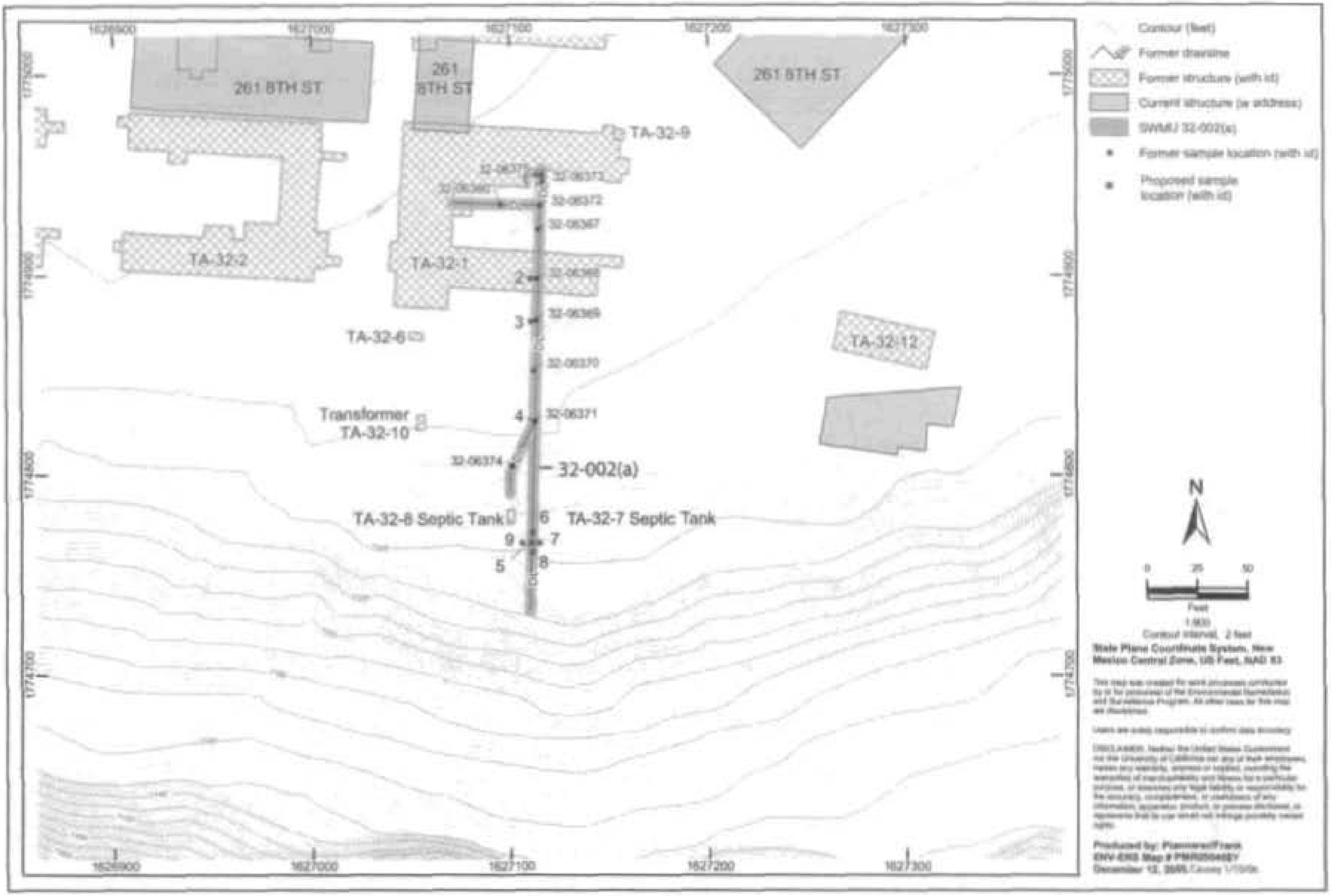

Figure 6.3-1. SWMU 32-002(a) site map and proposed sample locations

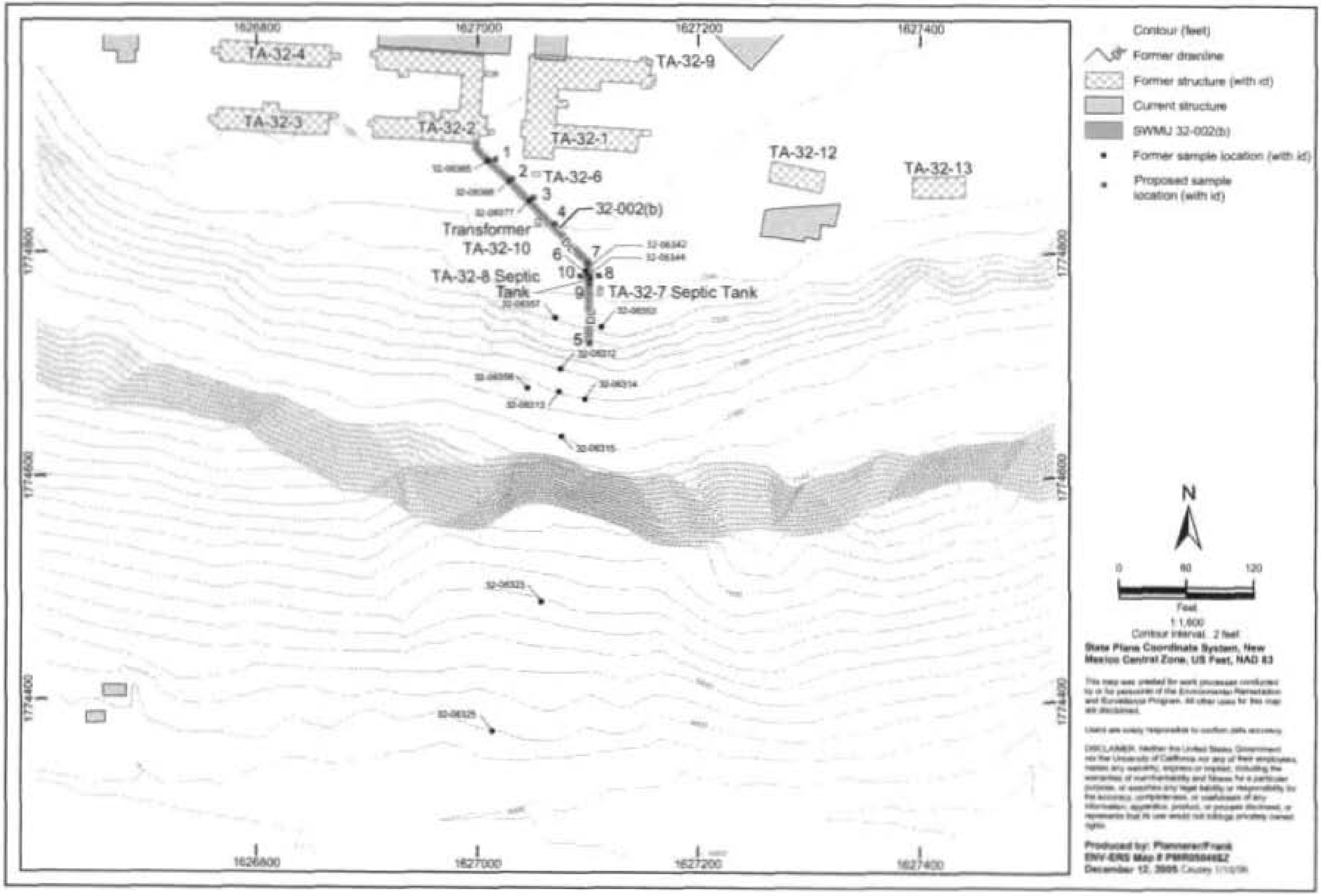

Figure 6.4-1. SWMU 32-002(b) site map and proposed sample locations

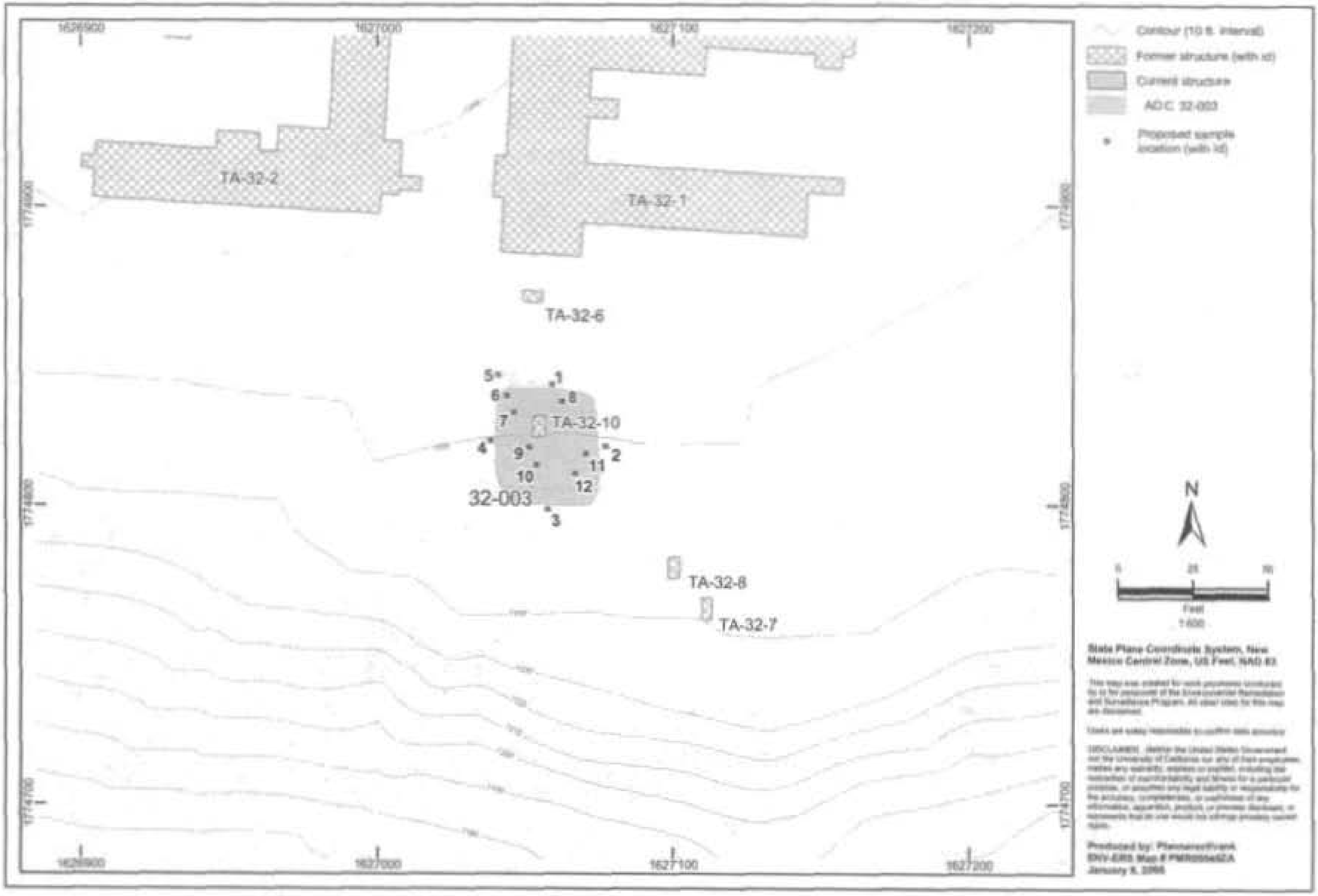

Figure 6.5-1. AOC 32-003 site map and proposed sample locations

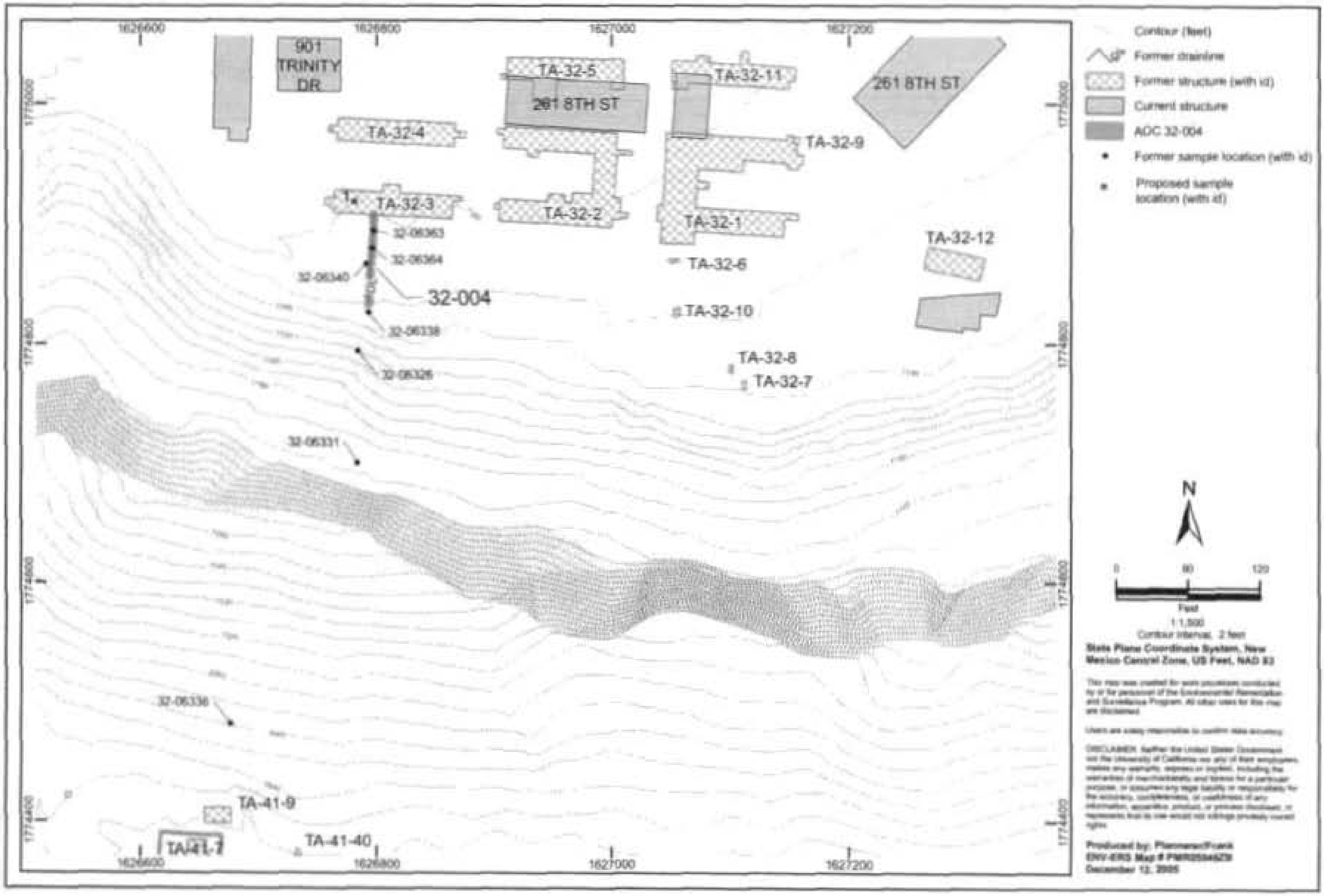

Figure 6.6-1. AOC 32-004 site map and proposed sample locations

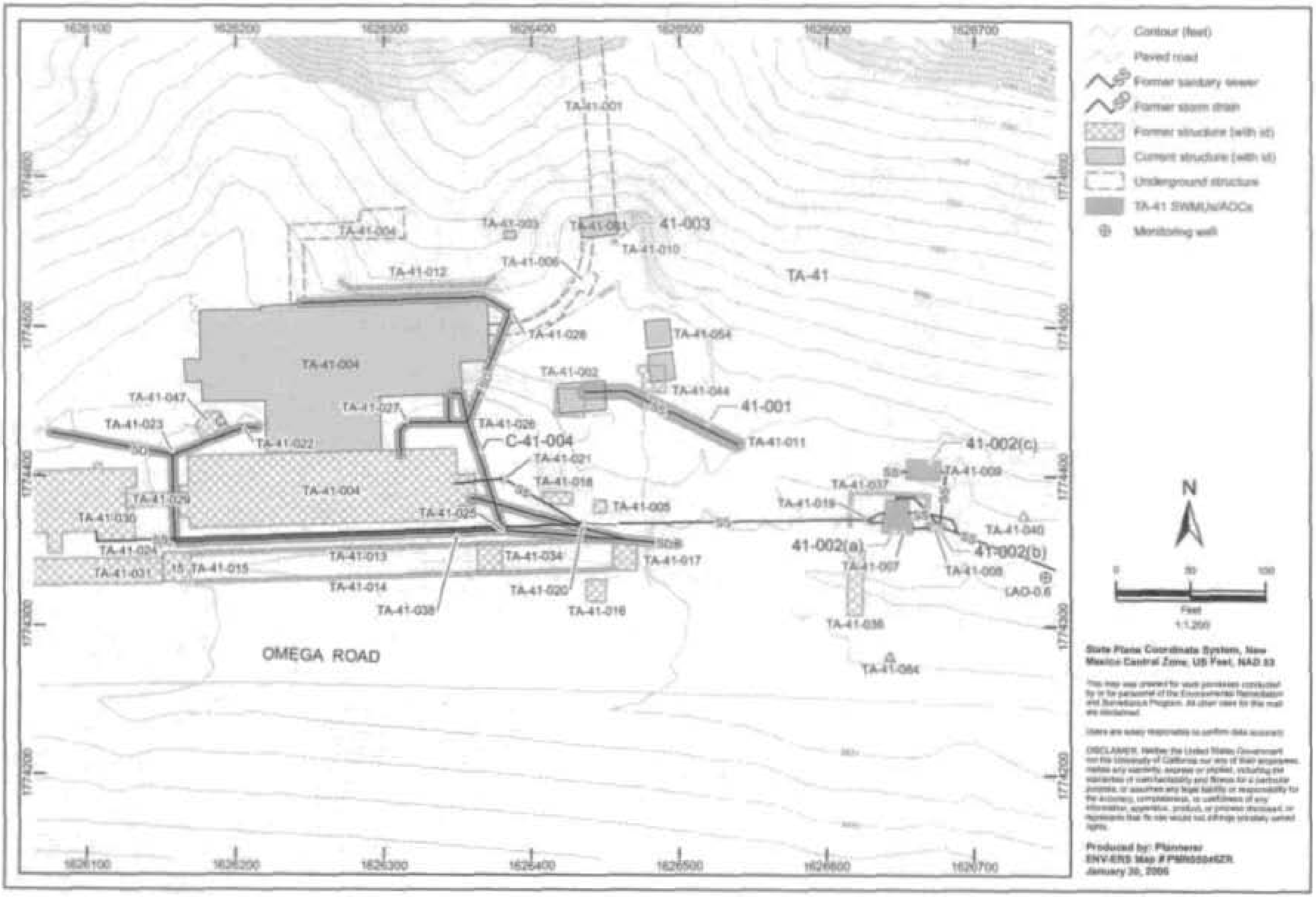

Figure 7.1-1. TA-41 site map

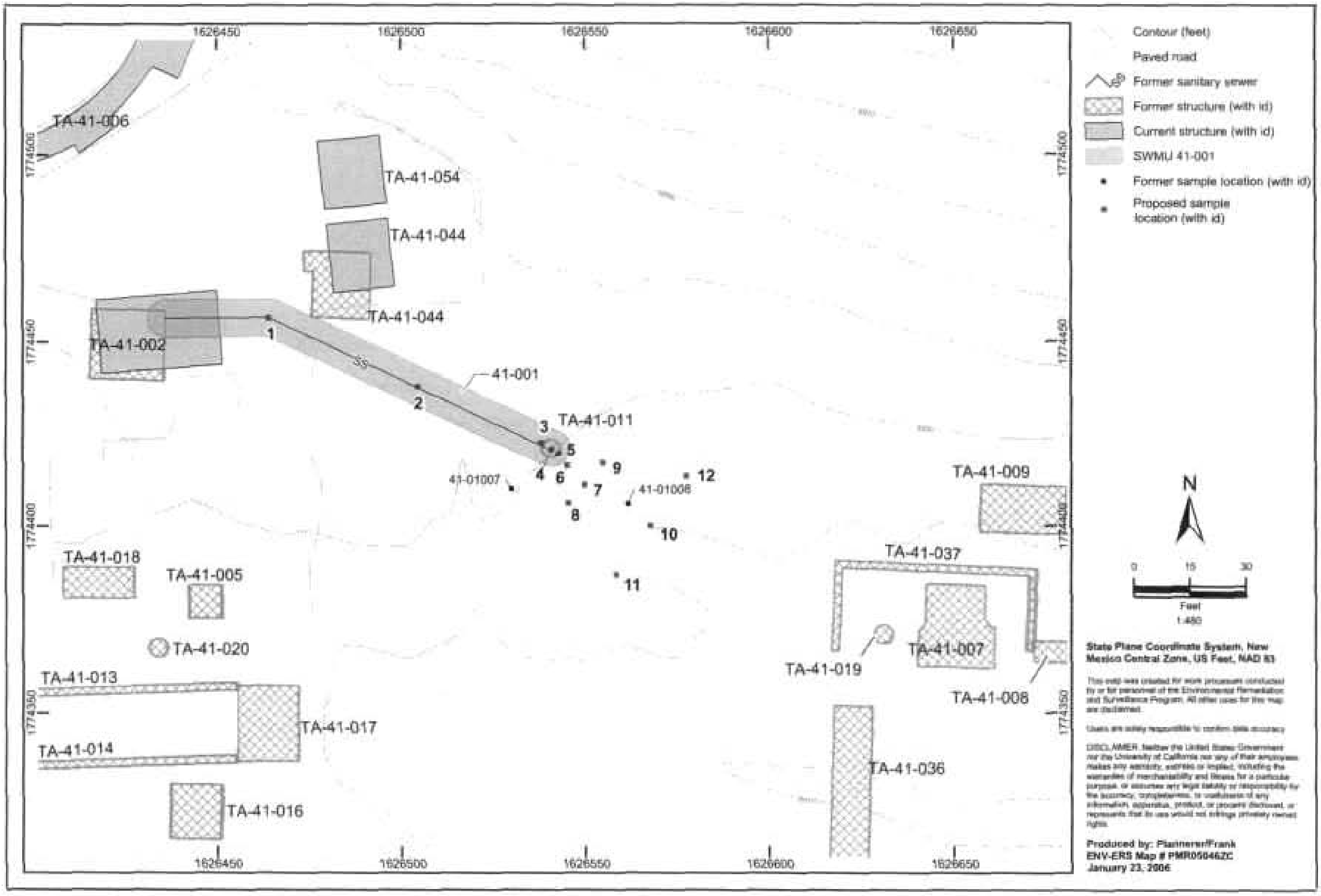

Figure 7.2-1. SWMU 41-001 site map and proposed sample locations

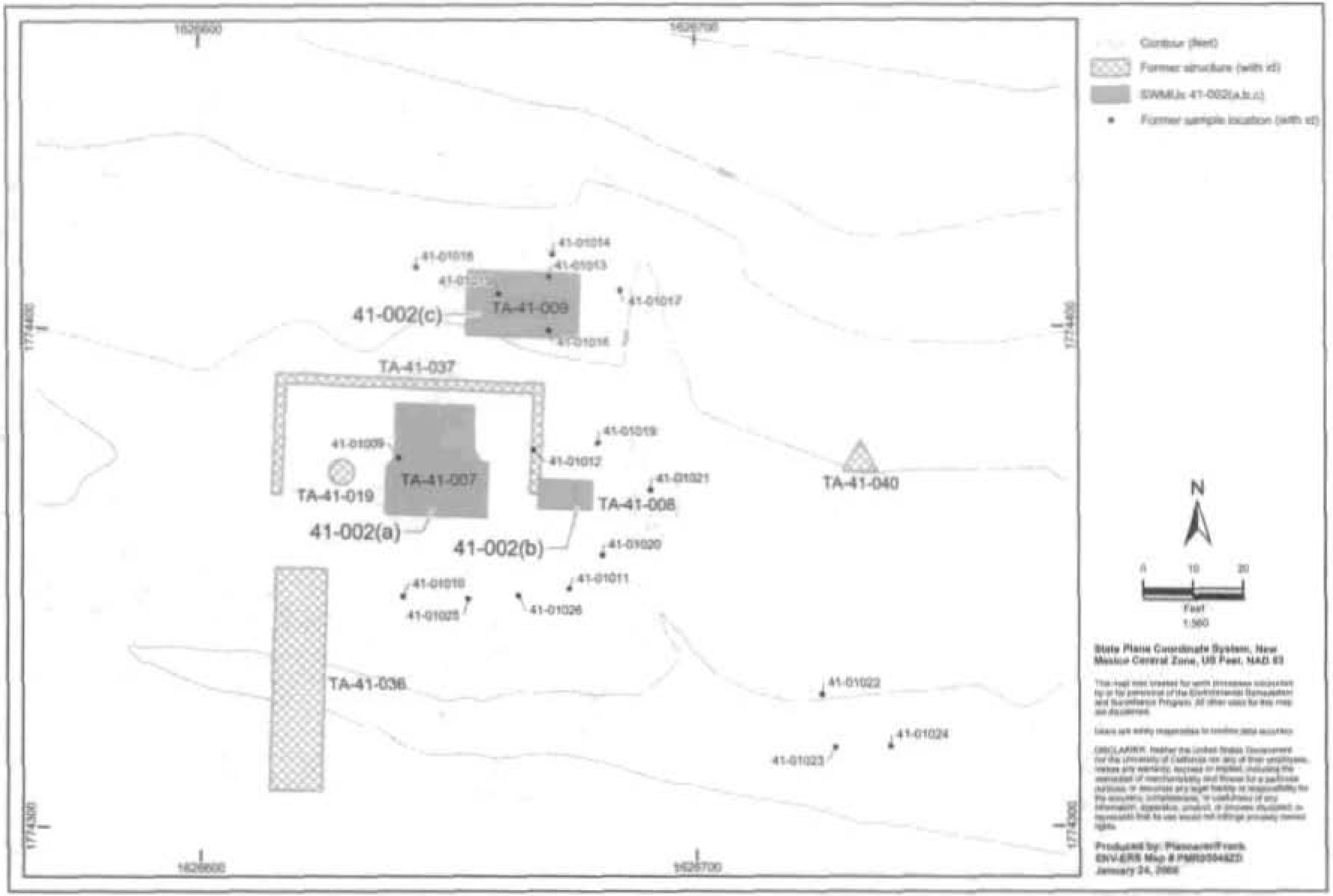

Figure 7.3-1. SWMUs 41-002(a,b,c) site map

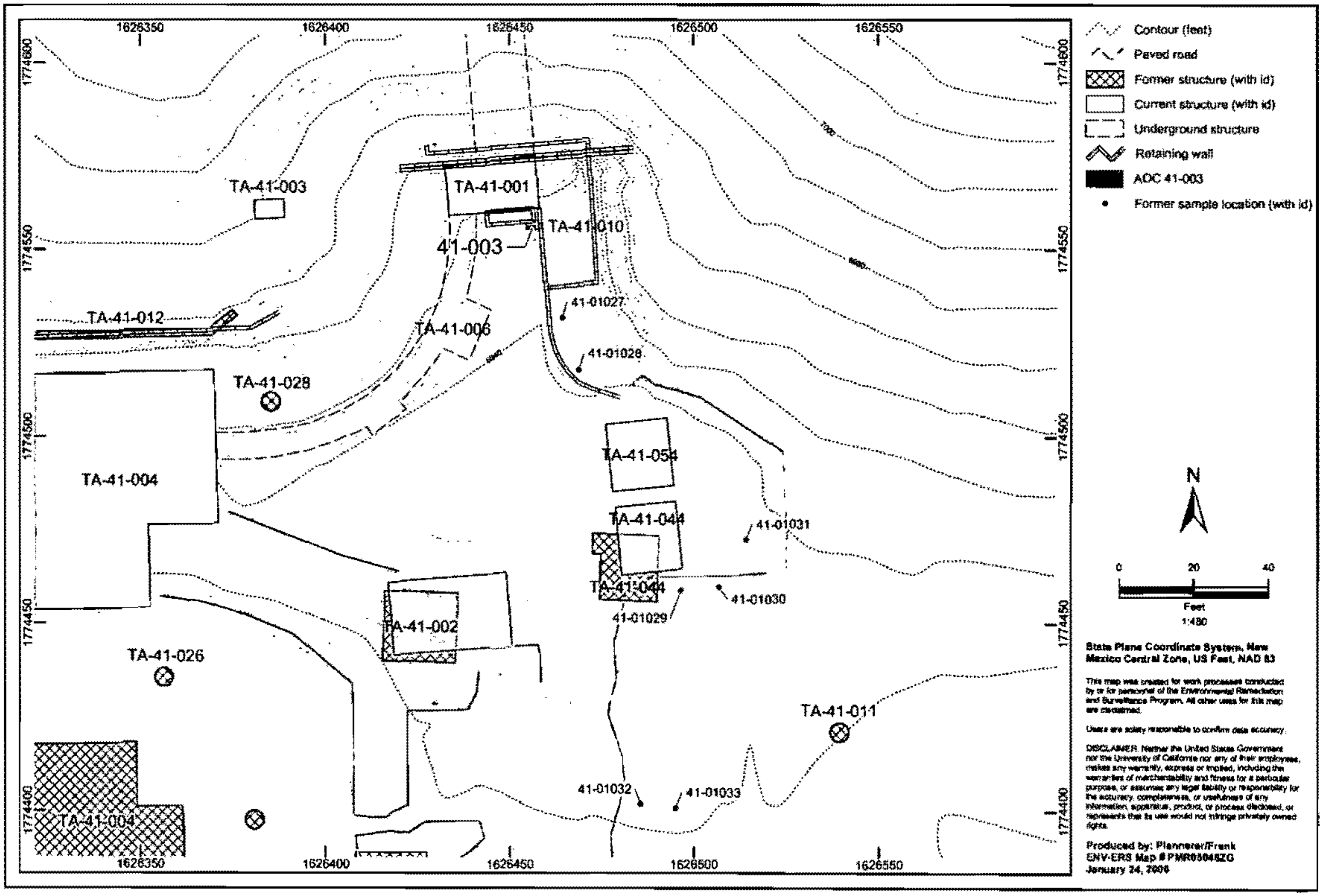

Figure 7.4-1.   AOC 41-003 site map

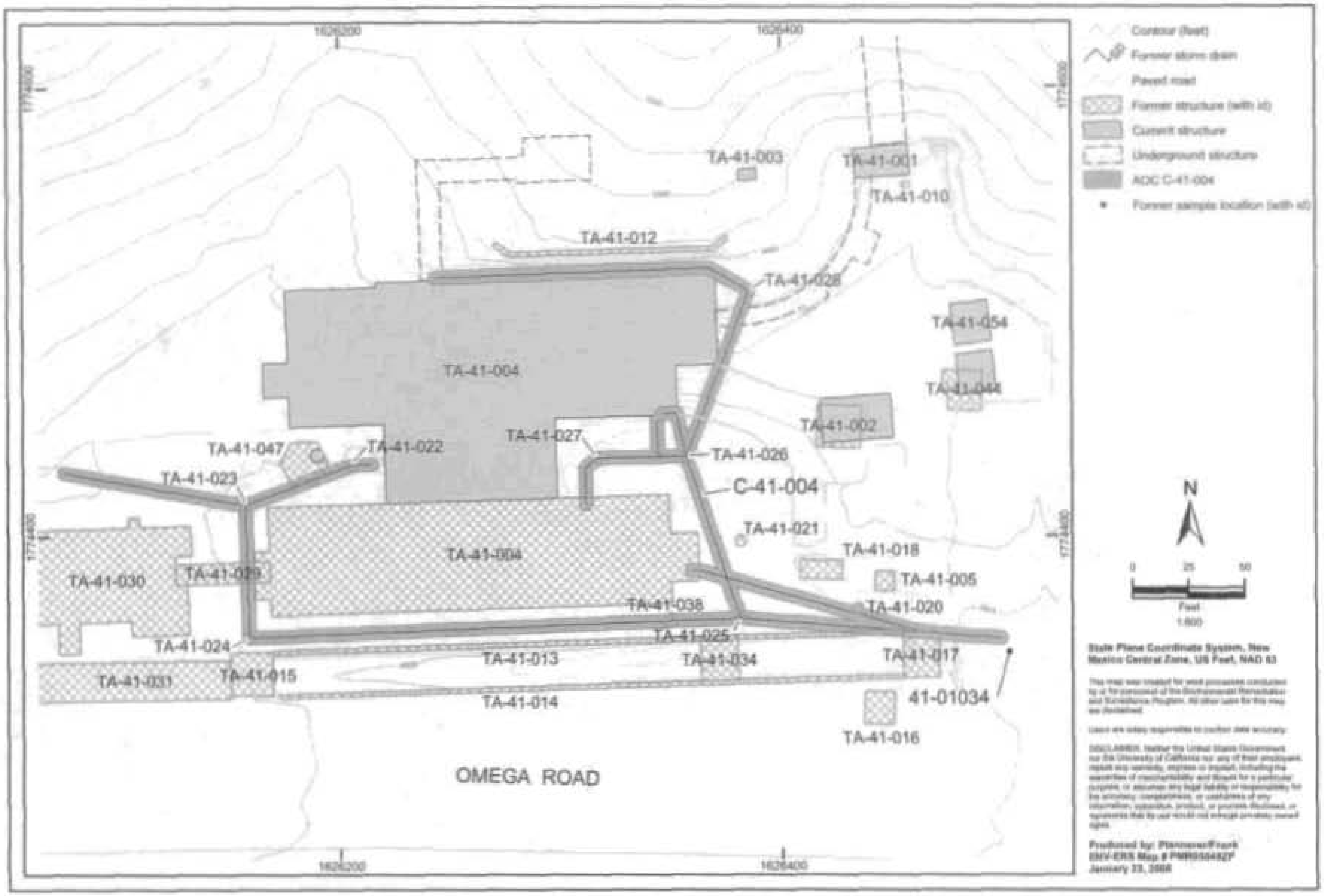

Figure 7.5-1. AOC C-41-004 site map

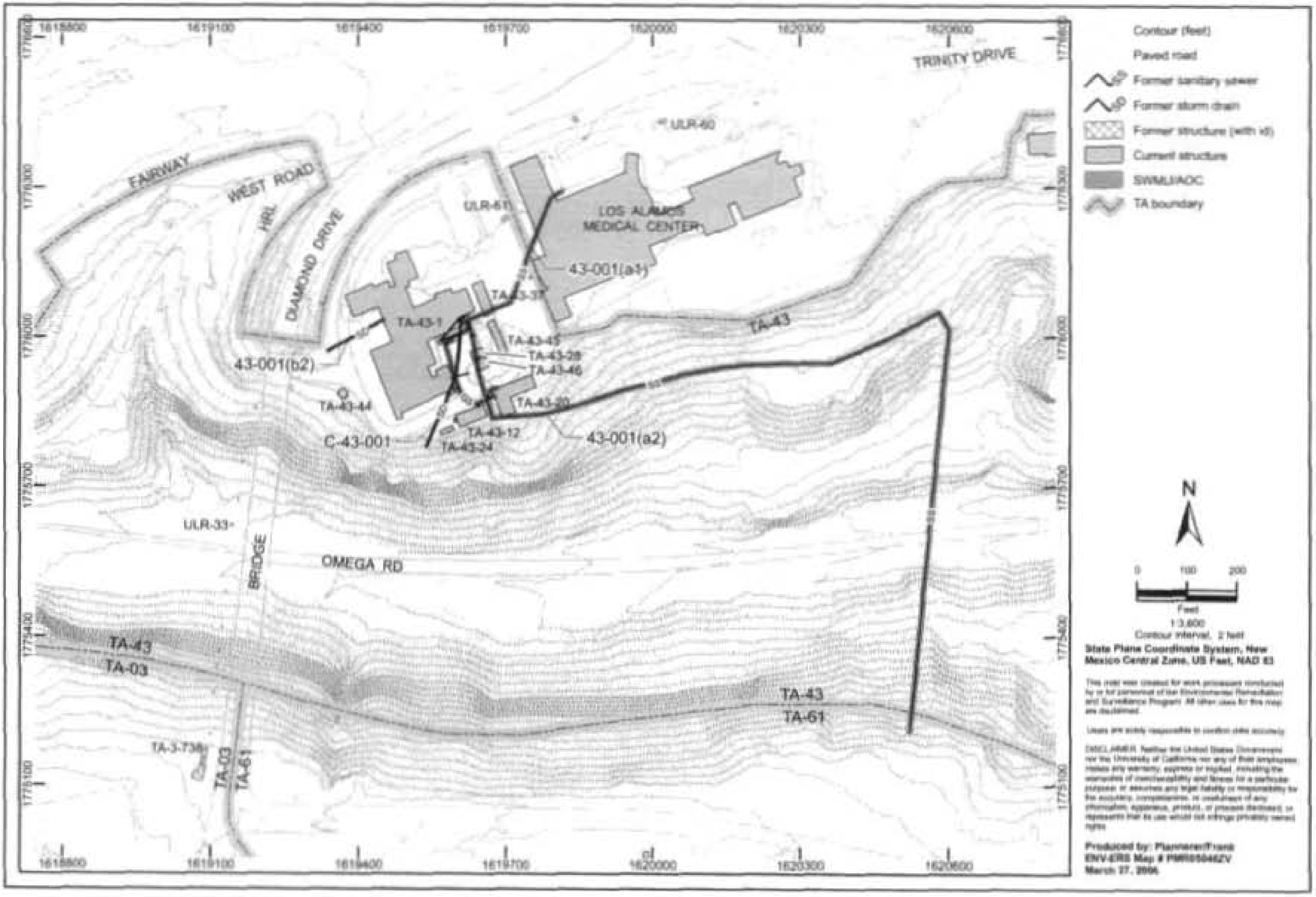

Figure 8.1-1. TA-43 site map

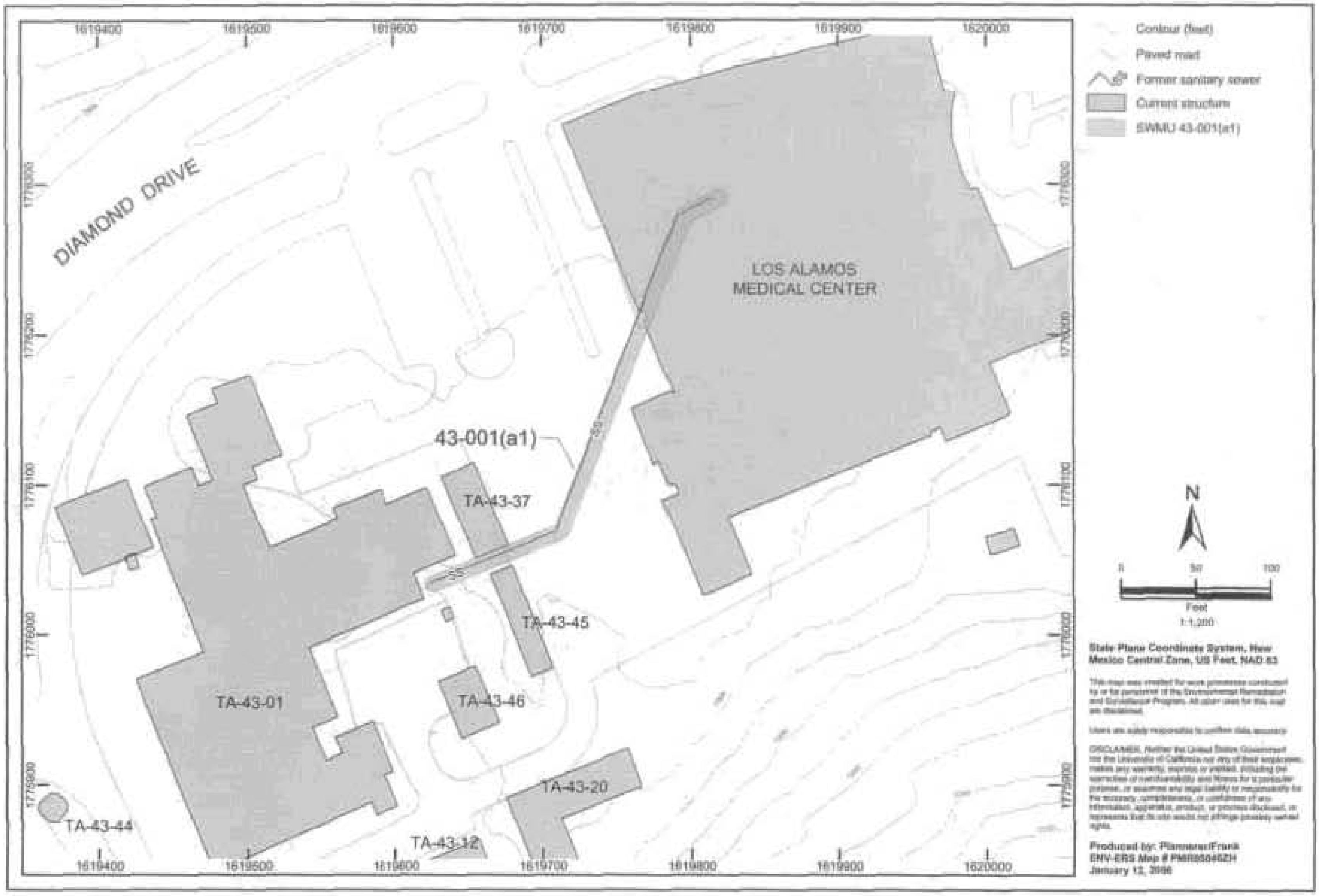

Figure 8.2-1. **SWMU 43-001(a1) site map**

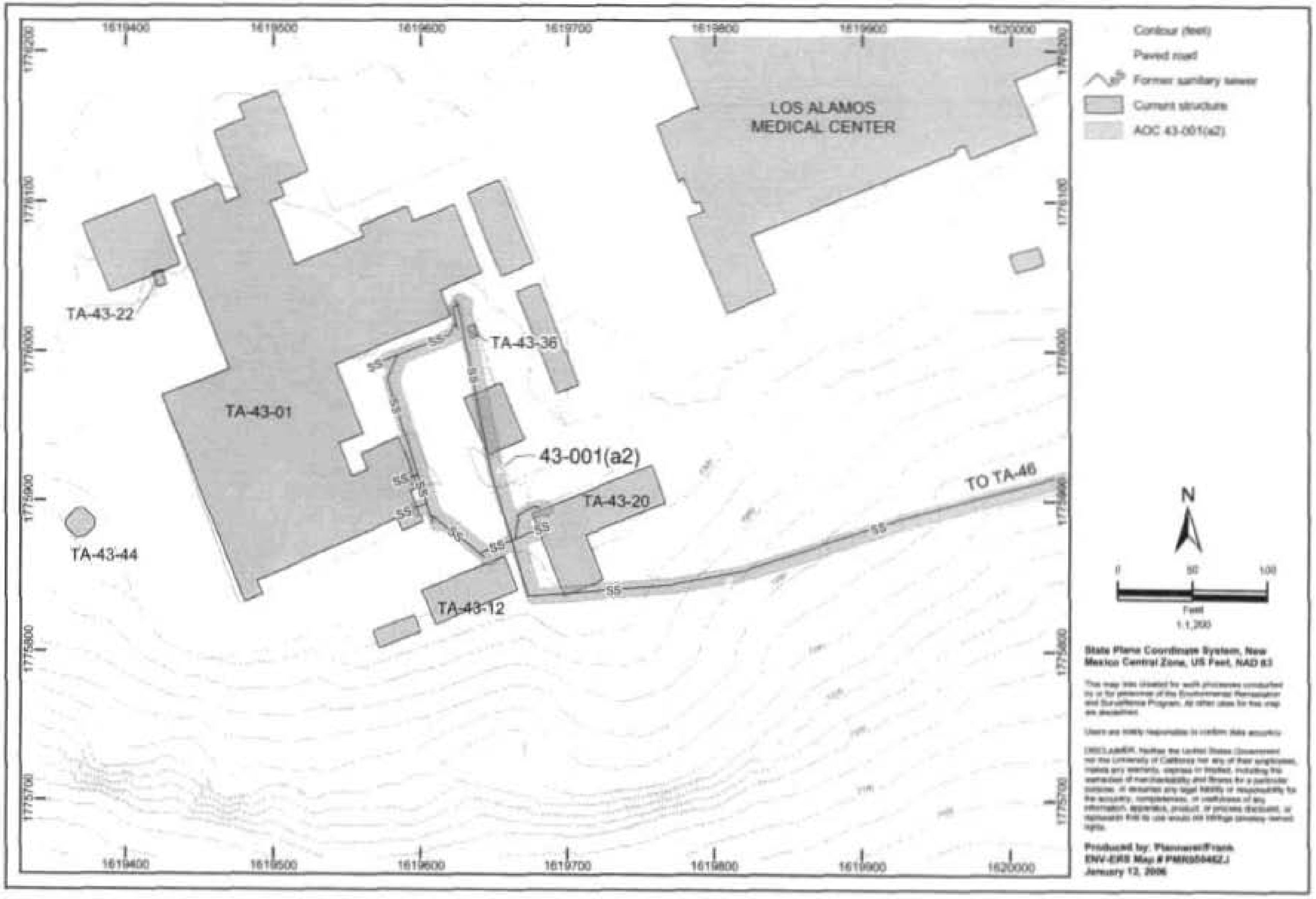

Figure 8.3-1. AOC 43-001(a2) site map

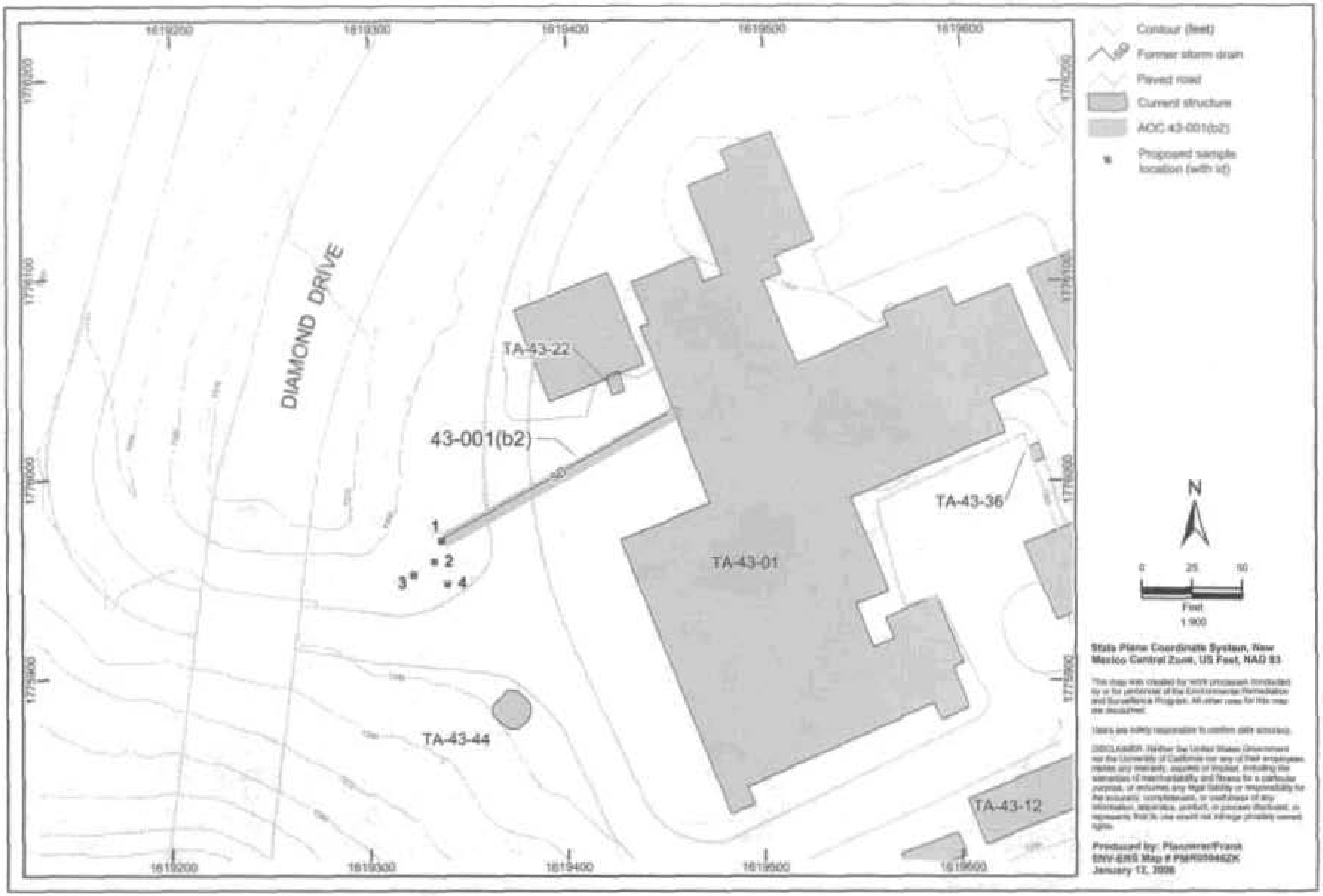

Figure 8.4-1. AOC 43-001(b2) site map and proposed sample locations

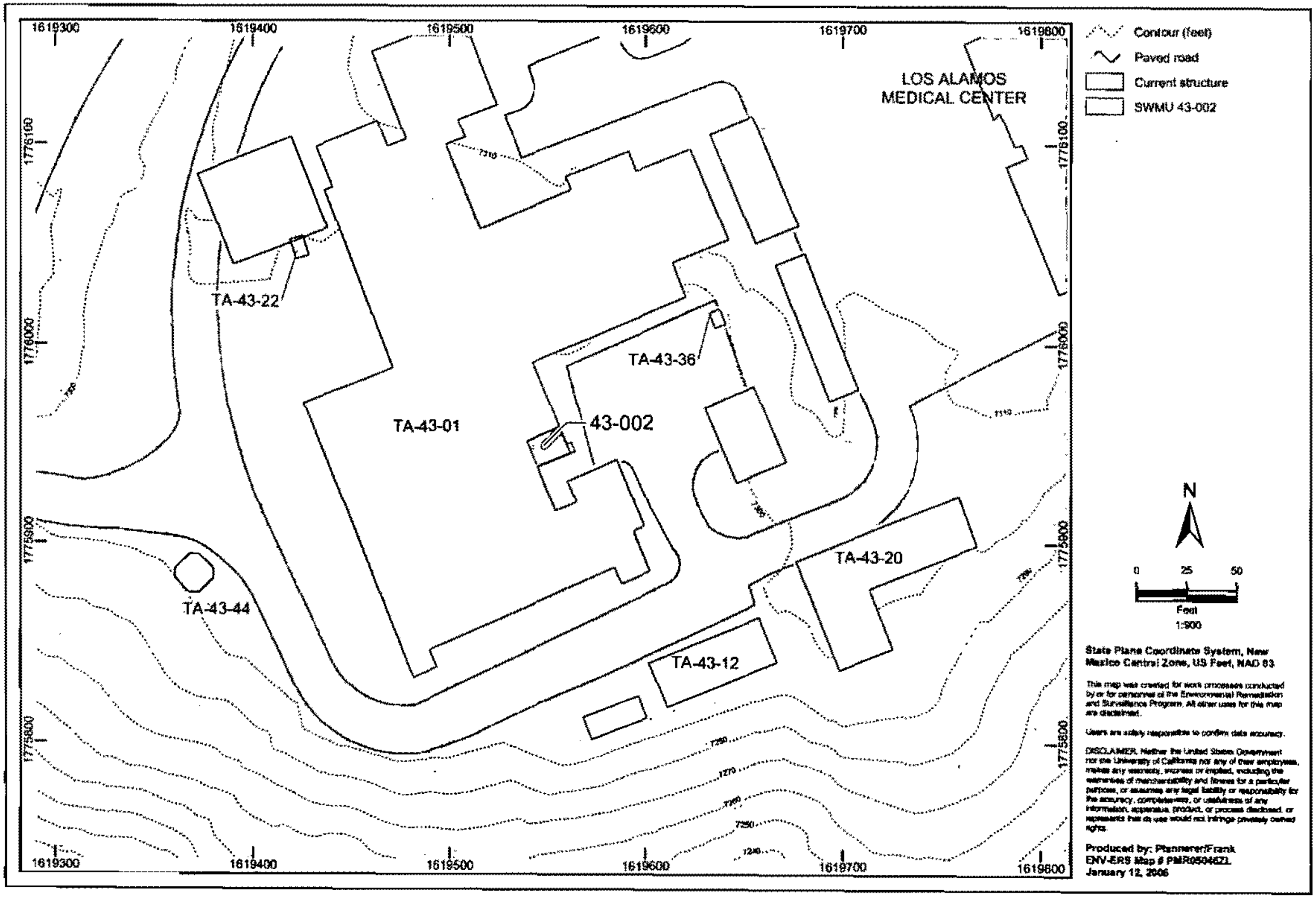

Figure 8.5-1. SWMU 43-002 site map

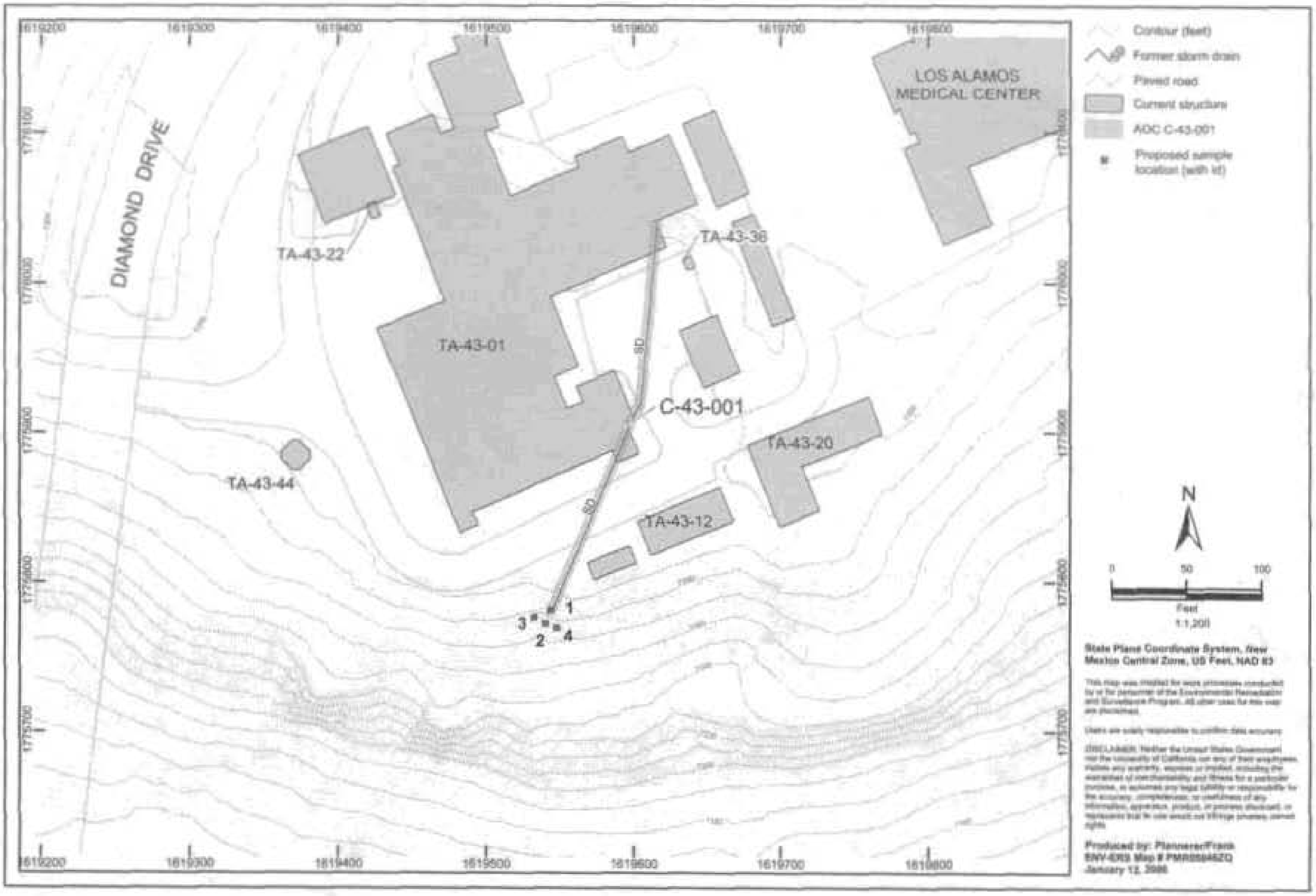

Figure 8.6-1. AOC C-43-001 site map and proposed sample locations

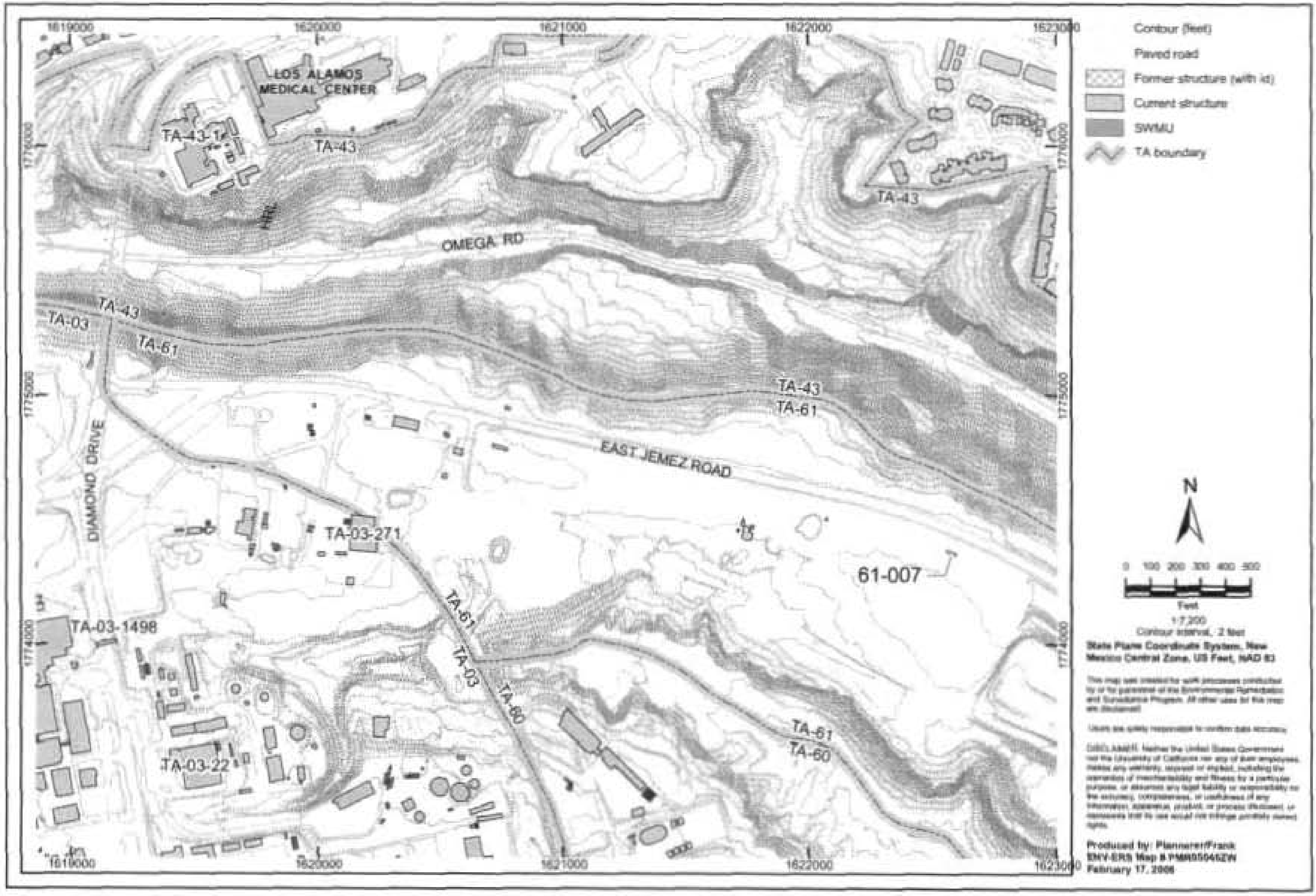

Figure 9.1-1. TA-61 site map

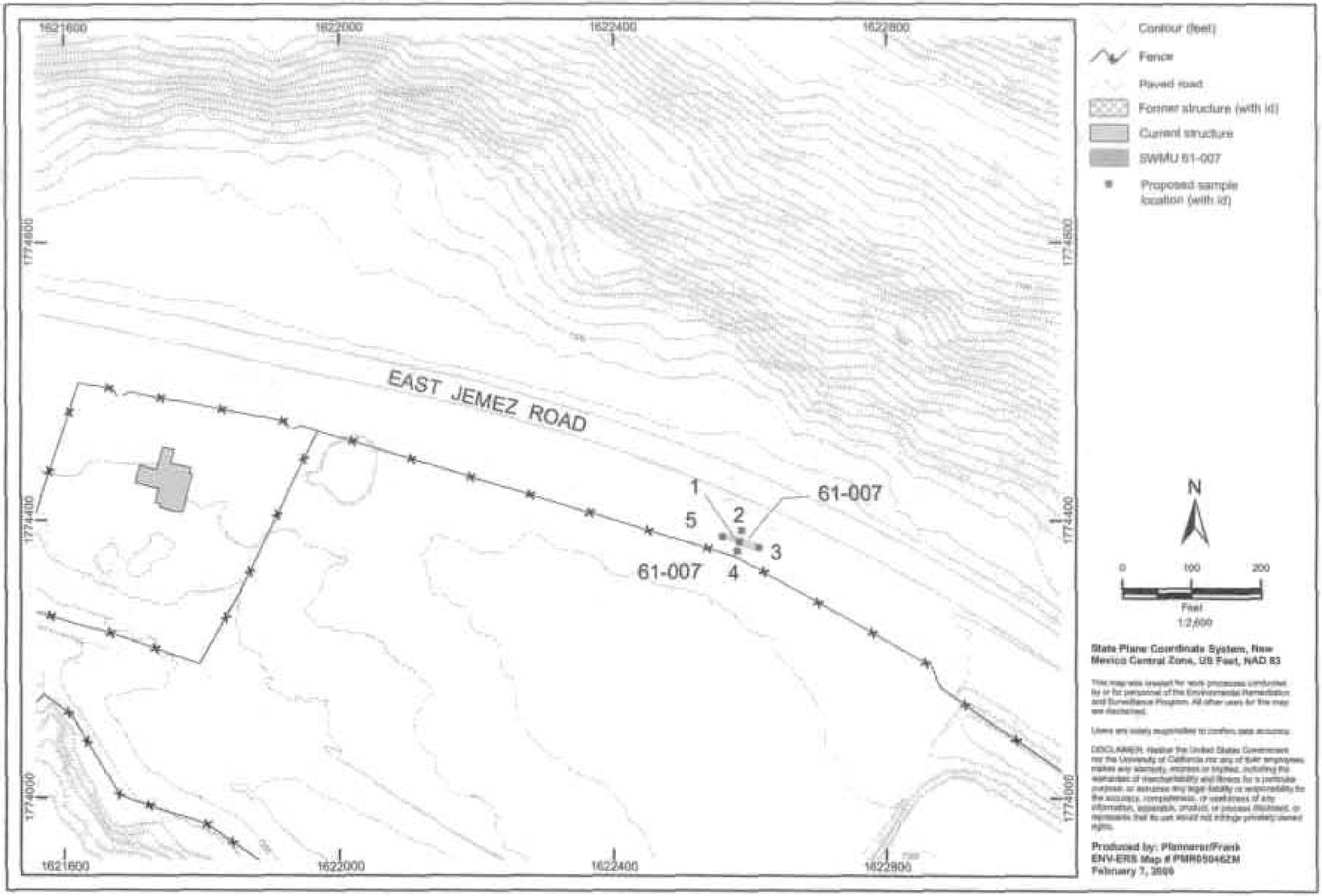

Figure 9.2-1. SWMU 61-007 site map and proposed sample locations

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Table 1.1-1
Upper Los Alamos Canyon Aggregate Area Sites and Their Regulatory Status

Consolidated Unit	SWMU/AOC Number	Site Description	Site in HIR?	Site in Work Plan?	Site Status
TA-00					
00-003-99 Western Steam Plant	SWMU 00-003	Container storage area	Yes	No	NFA granted (NMED 2002, 73096)
	SWMU 00-012	Former underground blow-off tank	Yes	No	NFA granted (NMED 2002, 73096)
	SWMU 00-017	Waste lines	Yes	Yes	Investigation for former line 167; No sampling proposed for line 170 and line 171
	AOC 00-030(i)	Septic system	Yes	No	NFA granted (NMED 2002, 73096)
	AOC 00-031(a)	Soil contamination beneath former service station	Yes	Yes	No sampling proposed
	AOC 00-031(b)	Soil contamination beneath former motor pool (two USTs)	Yes	Yes	No sampling proposed
	AOC 00-032	Soil contamination beneath former motor pool (UST for used motor oil)	Yes	No	NFA granted (EPA 2005, 88464)
	AOC 00-034(b)	Landfill, western area	Yes	Yes	No sampling proposed
	AOC 00-035(a)	Surface disposal	Yes	No	NFA granted (EPA 2005, 88464)
	AOC C-00-042	Tank (formerly part of SWMU 00-032)	Yes	Yes	No sampling proposed
TA-01					
01-001(a)-99 Miscellaneous TA-01	SWMU 01-001(a)	Septic tank 134	Yes	Yes	Investigation
	SWMU 01-001(b)	Septic tank 135	Yes	Yes	Investigation
	SWMU 01-001(c)	Septic tank 137	Yes	Yes	Investigation
	SWMU 01-001(d)	Septic tank 138	Yes	Yes	Investigation
	SWMU 01-001(e)	Septic tank 139	Yes	Yes	Investigation
	SWMU 01-001(f)	Septic tank 140	Yes	Yes	Investigation
	SWMU 01-001(g)	Septic tank 141	Yes	Yes	Investigation
	SWMU 01-001(o)	Sanitary waste line	Yes	Yes	Investigation
	SWMU 01-001(s)	Western sanitary waste line, main line	Yes	Yes	Investigation
	SWMU 01-001(t)	Eastern sanitary waste line	Yes	Yes	Investigation
	SWMU 01-001(u)	Western sanitary waste line, branch line	Yes	Yes	Investigation
	SWMU 01-002	Industrial waste line	Yes	Yes	Investigation
	SWMU 01-003(a)	Bailey Bridge landfill	Yes	Yes	Investigation
	SWMU 01-003(b)	Surface disposal area	Yes	Yes	Investigation

Table 1.1-1 (continued)

Consolidated Unit	SWMU/AOC Number	Site Description	Site in HIR?	Site in Work Plan?	Site Status
	SWMU 01-003(e)	Surface disposal site southeast of Los Alamos Inn	Yes	Yes	Investigation
	AOC 01-004(a)	Gas-fired incinerator	Yes	No	NFA granted (EPA 2005, 88464)
	AOC 01-004(b)	Gas-fired incinerator	Yes	No	NFA granted (EPA 2005, 88464)
	AOC 01-005	Bench-scale incinerator	Yes	No	NFA granted (EPA 2005, 88464)
	SWMU 01-006(a)	Cooling tower drain line and outfall	Yes	Yes	Investigation
	SWMU 01-006(b)	Drain line and outfall	Yes	Yes	Investigation
	SWMU 01-006(c)	Drain lines and outfalls	Yes	Yes	Investigation
	SWMU 01-006(d)	Drain line and outfall	Yes	Yes	Investigation
	AOC 01-006(e)	Drain lines and outfalls to Ashley Pond	Yes	Yes	Investigation
	AOC 01-006(g)	Stormwater drainage system	Yes	Yes	Investigation
	SWMU 01-006(h)	Stormwater drainage system	Yes	Yes	Investigation
	SWMU 01-006(n)	Stormwater drainage system	Yes	Yes	Investigation
	SWMU 01-006(o)	Stormwater drainage system	Yes	Yes	Investigation
	AOC 01-006(p)	Storm drain and outfall	Yes	No	NFA granted (EPA 1994, 38816)
	SWMU 01-007(a)	Suspected subsurface soil radiological contamination	Yes	Yes	Investigation
	SWMU 01-007(b)	Suspected subsurface soil radiological contamination	Yes	Yes	Investigation
	SWMU 01-007(c)	Suspected subsurface soil radiological contamination	Yes	Yes	Investigation
	SWMU 01-007(d)	Suspected subsurface soil radiological contamination	Yes	Yes	Investigation
	SWMU 01-007(e)	Suspected subsurface soil radiological contamination	Yes	Yes	Investigation
	AOC 01-007(f)	Suspected soil contamination	Yes	No	NFA granted (EPA 1994, 38816)
	AOC 01-007(h)	Suspected soil contamination	Yes	No	NFA granted (EPA 1994, 38816)
	AOC 01-007(i)	Suspected soil contamination	Yes	No	NFA granted (EPA 1994, 38816)
	SWMU 01-007(j)	12 areas of suspected subsurface soil radiological contamination	Yes	Yes	Investigation
	SWMU 01-007(l)	Suspected subsurface soil contamination	Yes	Yes	No sampling proposed

Table 1.1-1 (continued)

Consolidated Unit	SWMU/AOC Number	Site Description	Site in HIR?	Site in Work Plan?	Site Status
	AOC 01-007(m)	Suspected soil contamination	Yes	No	NFA granted (EPA 1994, 38816)
	AOC 01-007(o)	Suspected soil contamination	Yes	No	NFA granted (EPA 1994, 38816)
	SWMU 01-001(h)	Septic tank 142	Yes	No	NFA granted (EPA 1994, 38816)
	SWMU 01-001(i)	Septic tank 143	Yes	No	NFA granted (EPA 1994, 38816)
	SWMU 01-001(j)	Septic tank 149	Yes	No	NFA granted (EPA 1994, 38816)
	SWMU 01-001(k)	Septic tank 268	Yes	No	NFA granted (EPA 1994, 38816)
	SWMU 01-001(l)	Septic tank 269	Yes	No	NFA granted (EPA 1994, 38816)
	SWMU 01-001(m)	Septic tank 275	Yes	No	NFA granted (NMED 2000, 68552)
	SWMU 01-001(n)	Septic tank 276	Yes	No	NFA granted (EPA 1994, 38816)
	AOC 01-001(p)	Septic system	Yes	No	NFA granted (EPA 2005, 88464)
	AOC 01-001(q)	Septic system	Yes	No	NFA granted (EPA 1994, 38816)
	AOC 01-001(r)	Septic system	Yes	No	NFA granted (EPA 2005, 88464)
	AOC 01-001(v)	Septic system	Yes	No	NFA granted (EPA 1994, 38816)
	AOC 01-001(w)	Septic system	Yes	No	NFA granted (EPA 1994, 38816)
	AOC 01-003(c)	Surface disposal site	Yes	Yes	No sampling proposed
	SWMU 01-003(d)	Surface disposal site – Can Dump Site	Yes	Yes	Investigation
	AOC 01-006(f)	Drain lines and outfall	Yes	No	NFA granted (EPA 2005, 88464)
	AOC 01-006(i)	Drain lines and outfall	Yes	No	NFA granted (EPA 1994, 38816)
	AOC 01-006(j)	Drain lines and outfall	Yes	No	NFA granted (EPA 2005, 88464)
	AOC 01-006(k)	Drain lines and outfall	Yes	No	NFA granted (EPA 1994, 38816)
	AOC 01-006(l)	Drain lines and outfall	Yes	No	NFA granted (EPA 1994, 38816)
	AOC 01-006(m)	Drain lines and outfall	Yes	No	NFA granted (EPA 1994, 38816)

Table 1.1-1 (continued)

Consolidated Unit	SWMU/AOC Number	Site Description	Site in HIR?	Site in Work Plan?	Site Status
	AOC 01-006(q)	Drain lines and outfall	Yes	No	NFA granted (EPA 2005, 88464)
	AOC 01-006(r)	Drain lines and outfall	Yes	No	NFA granted (EPA 2005, 88464)
	AOC 01-006(s)	Drain lines and outfall	Yes	No	NFA granted (EPA 2005, 88464)
	AOC 01-006(t)	Drain lines and outfall	Yes	No	NFA granted (EPA 1994, 38816)
	AOC 01-007(g)	Soil-contamination area	Yes	No	NFA granted (EPA 1994, 38816)
	AOC 01-007(k)	Soil-contamination area	Yes	Yes	Investigation
	AOC 01-007(n)	Soil-contamination area	Yes	No	NFA granted (EPA 1994, 38816)
	AOC 01-007(p)	Soil-contamination area	Yes	No	NFA granted (EPA 1994, 38816)
TA-03					
	AOC 03-001(m)	Satellite accumulation area	Yes	No	NFA granted (EPA 2005, 88464)
	AOC 03-008(a)	Firing site	Yes	Yes	No sampling proposed
	SWMU 03-009(b)	Surface disposal area	Yes	No	NFA granted (NMED 1998, 63042)
	SWMU 03-009(j)	Surface disposal site	Yes	Yes	Investigation
03-038(a)-00 Tanks and/or Associated Equipment	SWMU 03-038(a)	Acid tank	Yes	Yes	Investigation
	SWMU 03-038(b)	Acid tank	Yes	Yes	Investigation
	SWMU 03-055(c)	Outfall	Yes	Yes	Investigation
	SWMU 03-055(d)	Storm drain (active)	Yes	No	NFA granted (NMED 2001, 70010)
TA-30					
	AOC 30-001	Surface disposal and landfill	Yes	No	NFA granted (DOE 1995, 50023)
TA-32					
	SWMU 32-001	Incinerator (former location)	Yes	Yes	Investigation
	SWMU 32-002(a)	Septic tank (former location); drain lines	Yes	Yes	Investigation
	SWMU 32-002(b)	Septic system	Yes	Yes	Investigation
	AOC 32-003	Transformer site (former location)	Yes	Yes	Investigation
	AOC 32-004	Drain line and outfall	Yes	Yes	Investigation
	AOC C-32-001	Buildings	Yes	No	NFA granted (EPA 2005, 88464)

Table 1.1-1 (continued)

Consolidated Unit	SWMU/AOC Number	Site Description	Site in HIR?	Site in Work Plan?	Site Status
TA-41					
	SWMU 41-001	Septic system	Yes	Yes	Investigation
41-002(a)-99 TA-41 Sewage Treatment Plant	SWMU 41-002(a)	Imhoff tank	Yes	Yes	Deferred action proposed
	SWMU 41-002(b)	Chlorine contact tank	Yes	Yes	Deferred action proposed
	SWMU 41-002(c)	Sludge-drying bed	Yes	Yes	Deferred action proposed
	AOC 41-003	Sump	Yes	Yes	Deferred action proposed
	SWMU 41-004	Container storage	Yes	No	NFA granted (EPA 2005, 88464)
	AOC C-41-001	Duplicate of AOC 41-003	Yes	No	NFA granted (EPA 2005, 88464)
	AOC C-41-002	Underground tank	Yes	No	NFA granted (EPA 2005, 88464)
	AOCC-41-003	Underground tank	Yes	No	NFA granted (EPA 2005, 88464)
	AOC C-41-004	Storm drains	Yes	Yes	Deferred action proposed
	AOC C-41-005	Duplicate of C-41-003	Yes	No	NFA granted (EPA 2005, 88464)
TA-43					
	SWMU 43-001(a1)	Waste lines (pre-1981)	Yes	Yes	Deferred action proposed
	AOC 43-001(a2)	Waste lines (post-1981)	Yes	Yes	Deferred action proposed
	AOC 43-001(b1)	Outfall	Yes	No	NFA granted (EPA 2005, 88464)
	AOC 43-001(b2)	Outfall	Yes	Yes	Investigation
	SWMU 43-002	Incinerator	Yes	Yes	Deferred action proposed
	AOC 43-003	Carcass storage	Yes	No	NFA granted (EPA 2005, 88464)
	AOC 43-004	Waste storage	Yes	No	NFA granted (EPA 2005, 88464)
	AOC 43-005	Radioactive liquid storage	Yes	No	NFA granted (EPA 2005, 88464)
	AOC C-43-001	Storm drain outfall	Yes	Yes	Investigation
TA-61					
	AOC 61-004(b)	Septic tank	Yes	No	NFA granted (EPA 2005, 88464)
	SWMU 61-007	Transformer site – systematic leak – PCB-only site	Yes	Yes	Investigation

Note: Shading denotes consolidated units.

Table 3.1-1
Summary of Analytical Suites for Samples Previously Collected in TA-00

AOC/ SWMU	Sample ID	Location ID	Depth (ft)	Media	Collection Date	Cyanide (Total)	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	SVOCs	VOCs
00-017	RE00-98-0054	00-10126	22.5–25	Tuff	9/24/1998	✓[a]	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0056	00-10127	19–21.5	Tuff	9/23/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0057	00-10127	22.5–25	Tuff	9/23/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0059	00-10128	19–21.5	Fill	9/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0060	00-10128	22.5–25	Tuff	9/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0062	00-10129	19.5–22	Fill	9/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0063	00-10129	22.5–25	Tuff	9/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0065	00-10130	19.5–22	Fill	9/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0066	00-10130	24–26.5	Tuff	9/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0068	00-10131	20.5–23	Fill	9/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0069	00-10131	25–27.5	Tuff	9/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0072	00-10132	16–18.5	Fill	10/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0073	00-10132	20–22.5	Tuff	10/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0074	00-10133	15–17.5	Soil	10/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0076	00-10133	18.5–21	Tuff	10/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0078	00-10134	15–17.5	Soil	10/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0079	00-10134	20–22.5	Tuff	10/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0083	00-10135	14–15.5	Soil	10/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0084	00-10135	20–22.5	Tuff	10/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0085	00-10136	12.5–14.5	Tuff	10/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0086	00-10136	14.5–16	Tuff	10/24/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0087	00-10137	12.5–15	Soil	10/25/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 3.1-1 (continued)

AOC/ SWMU	Sample ID	Location ID	Depth (ft)	Media	Collection Date	Cyanide (Total)	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	SVOCs	VOCs
00-017	RE00-98-0088	00-10137	16–18.5	Tuff	10/25/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0089	00-10138	12.5–15	Soil	10/25/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0090	00-10138	15–17.5	Tuff	10/25/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0091	00-10139	13–15	Soil	10/25/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0092	00-10139	15–17.5	Tuff	10/25/1998	✓	✓	◊[b]	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0093	00-10140	12.5–15	Soil	10/25/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0094	00-10140	16–18.5	Tuff	10/25/1998	✓	◊	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0095	00-10141	7.5–9	Soil	11/3/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-98-0099	00-10143	0.1–0.7	Sed	11/11/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	◊
00-017	RE00-98-0101	00-10144	1–2	Sed	11/11/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	◊
00-017	RE00-98-0103	00-10145	0.3–1	Sed	11/11/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	◊
00-017	RE00-98-0105	00-10146	0.2–1	Sed	11/11/1998	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
00-017	RE00-99-0003	00-10179	0.1–0.5	Soil	1/20/1999	◊	◊	◊	◊	◊	L[c]	◊	◊	◊	◊
00-017	RE00-99-0004	00-10180	0.1–0.4	Soil	1/20/1999	◊	◊	◊	◊	◊	L	◊	◊	◊	◊
00-017	RE00-99-0005	00-10181	0.1–0.8	Soil	1/22/1999	◊	◊	◊	◊	◊	L	◊	◊	◊	◊
00-017	RE00-99-0006	00-10182	0.2–0.8	Soil	1/22/1999	◊	◊	◊	◊	◊	L	◊	◊	◊	◊
00-017	RE00-99-0007	00-10183	0.1–0.3	Soil	1/22/1999	◊	◊	◊	◊	◊	L	◊	◊	◊	◊
00-017	RE00-99-0008	00-10184	0.1–0.6	Soil	1/22/1999	◊	◊	◊	◊	◊	L	◊	◊	◊	◊
00-031(b)	AAB0242	00-01588	10–15	Tuff	5/16/1994	◊	◊	◊	◊	◊	L	◊	◊	◊	◊
00-031(b)	AAB0243	00-01588	40–45	Tuff	5/16/1994	◊	◊	◊	◊	◊	L	◊	◊	◊	◊
00-031(b)	AAB0244	00-01588	65–70	Tuff	5/16/1994	◊	◊	◊	◊	◊	L	◊	◊	◊	◊
00-031(b)	AAB0246	00-01589	5–10	Tuff	5/17/1994	◊	◊	◊	◊	◊	L	◊	◊	◊	◊
00-031(b)	AAB0247	00-01589	10–15	Tuff	5/17/1994	◊	◊	◊	◊	◊	L	◊	◊	◊	◊

Table 3.1-1 (continued)

AOC/ SWMU	Sample ID	Location ID	Depth (ft)	Media	Collection Date	Cyanide (Total)	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	SVOCs	VOCs
00-031(b)	AAB0248	00-01589	55–60	Tuff	5/17/1994	◊	◊	◊	◊	◊	L	◊	◊	◊	◊
00-031(b)	AAB0249	00-01589	75–80	Tuff	5/18/1994	◊	◊	◊	◊	◊	L	◊	◊	◊	◊
00-031(b)	AAB0171	00-01602	0.33–1	Soil	5/7/1994	◊	◊	◊	◊	◊	L	◊	◊	◊	◊
00-031(b)	AAB6639	00-01613	2.2–2.2	Soil	6/30/1994	◊	◊	◊	◊	◊	✓	◊	◊	✓	◊
00-031(b)	AAB6638	00-01614	1.8–1.8	Soil	6/30/1994	◊	◊	◊	◊	◊	✓	◊	◊	✓	◊

[a] ✓= Analysis was requested for the sample.

[b] ◊ = Analysis was not requested for the sample.

[c] L = Only lead was analyzed.

Table 3.2-1
Summary of Proposed Sampling at SWMU 00-017

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Canyon Portion of SWMU 00-017															
Determine nature and vertical extent of potential contamination beneath excavated pipeline	1	Beneath the excavated pipeline, on south wall of Los Alamos Canyon, between previous sampling locations 00-10146 and 00-10145	0–1* 2–3 4–5	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine nature and vertical extent of potential contamination beneath excavated pipeline	2	Beneath the excavated pipeline, on south wall of Los Alamos Canyon, between location 1 and ULR-33	0–1* 2–3 4–5	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine nature and vertical extent of potential contamination beneath excavated manhole	3	At the bottom of the excavated manhole ULR-33	0–1* 2–3 4–5	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine nature and vertical extent of potential contamination beneath excavated pipeline	4	Beneath the excavated pipeline, on north wall of Los Alamos Canyon, between location 5 and ULR-33	0–1* 2–3 4–5	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine nature and vertical extent of potential contamination beneath excavated pipeline	5	Beneath the excavated pipeline, on north wall of Los Alamos Canyon, between previous sampling locations 00-10144 and 00-10143	0–1* 2–3 4–5	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X

*Zero depth is defined as immediately beneath the excavated pipe or structure.

Table 4.1-1
Summary of Analytical Suites for Samples Previously Collected in TA-01

AOC/SWMU	Sample ID	Location ID	Depth (ft)	Media	Collection Date	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	SVOCs	VOCs
01-001(b)	AAA0716	01-01162	0–0.5	Soil	7/20/1992	◊a	◊	✓b	◊	✓	◊	◊	✓	◊
01-001(b)	AAA0717	01-01168	0–0.5	Soil	7/20/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊
01-001(b)	AAA0719	01-01174	0–0.5	Soil	7/20/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊
01-001(c)	AAA1521	01-03003	0–0.5	Fill	8/19/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-001(c)	AAA1550	01-03015	0–0.5	Soil	8/19/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-001(c)	AAA1551	01-03023	0–0.5	Soil	8/19/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-001(d)	AAA1514	01-05028	0–0.5	Soil	8/17/1992	◊	◊	◊	◊	□c	◊	◊	◊	◊
01-001(d)	AAB7445	01-05219	0–0.5	Soil	9/26/1994	◊	◊	✓	◊	◊	◊	◊	◊	◊
01-001(d)	AAB7447	01-05219	0.5–1.83	Soil	9/26/1994	◊	◊	✓	◊	◊	◊	◊	◊	◊
01-001(f)	AAA0723	01-01083	0–0.5	Soil	7/23/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊
01-001(f)	AAA0724	01-01090	0–0.5	Soil	7/23/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊
01-001(f)	AAA0726	01-01095	0–0.5	Soil	7/23/1992	◊	◊	◊	◊	✓	◊	◊	✓	◊
01-001(f)	AAA0727	01-01096	0–0.5	Soil	7/23/1992	◊	◊	◊	◊	✓	◊	◊	✓	◊
01-001(f)	AAA0733	01-01110	0–0.5	Soil	7/23/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊
01-001(f)	AAA0736	01-01112	0–0.5	Soil	7/23/1992	◊	◊	◊	◊	✓	◊	◊	✓	◊
01-001(g)	AAA1631	01-06069	0–0.5	Fill	9/9/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-001(o)	AAA1495	01-02064	0–0.5	Fill	8/3/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊
01-001(o)	AAA1528	01-02073	0–0.5	Soil	8/3/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊
01-001(o)	AAA1530	01-02075	0–0.5	Sed	8/3/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊
01-001(o)	AAA1531	01-02080	0–0.5	Soil	8/3/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊
01-001(o)	AAA1532	01-02095	0–0.5	Sed	8/3/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊
01-001(o)	AAA1533	01-02096	0–0.5	Soil	8/3/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊

Table 4.1-1 (continued)

AOC/SWMU	Sample ID	Location ID	Depth (ft)	Media	Collection Date	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	SVOCs	VOCs
01-001(s)	AAA8267	01-04105	4.75–5.75	Soil	2/15/1994	◊	◊	✓	✓	◊	✓	✓	◊	◊
01-001(s)	AAA8272	01-04109	5–6.5	Soil	2/17/1994	◊	◊	✓	✓	✓	◊	◊	◊	◊
01-001(s)	AAA8308	01-04120	6–7.5	Soil	2/21/1994	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-001(s)	AAC0514	01-04260	0–4	Soil	11/23/1994	✓	✓	✓	✓	✓	✓	✓	✓	◊
01-001(u)	AAA8274	01-04129	1–3	Soil	2/25/1994	◊	◊	✓	✓	✓	✓	✓	✓	✓
01-002	AAA1836	01-04021	2–8	Soil	3/16/1993	◊	◊	✓	✓	◊	◊	◊	◊	◊
01-002	AAA1837	01-04022	3–12	Soil	3/16/1993	◊	◊	✓	✓	◊	◊	◊	◊	◊
01-002	AAA1841	01-04026	4–8	Soil	3/18/1993	◊	◊	✓	✓	◊	◊	◊	◊	◊
01-002	AAB8598	01-04219	8.75–9.25	Fill	8/29/1994	◊	◊	◊	◊	✓	◊	◊	✓	◊
01-002	AAB8599	01-04220	3.33–3.83	Fill	8/29/1994	◊	◊	◊	◊	✓	◊	◊	✓	◊
01-002	AAB8601	01-04220	6.5–7	Fill	8/29/1994	◊	◊	◊	◊	✓	◊	◊	✓	◊
01-002	AAB8597	01-04220	9–9.5	Fill	8/29/1994	◊	◊	◊	◊	✓	◊	◊	✓	◊
01-002	AAB8607	01-04222	14.25–14.75	Soil	8/30/1994	◊	◊	◊	◊	✓	◊	◊	✓	◊
01-002	AAB8605	01-04222	16.42–16.92	Tuff	8/30/1994	✓	◊	◊	◊	✓	◊	◊	✓	◊
01-002	AAB8594	01-04223	7.25–8.25	Fill	8/31/1994	◊	◊	◊	◊	✓	◊	◊	✓	◊
01-002	AAB8595	01-04223	9.5–10	Tuff	8/31/1994	◊	◊	◊	◊	✓	◊	◊	✓	◊
01-002	AAB8592	01-04224	8.75–9.25	Fill	8/31/1994	◊	◊	◊	◊	✓	◊	◊	✓	◊
01-002	AAB8593	01-04224	12–12.5	Tuff	8/31/1994	◊	◊	◊	◊	✓	◊	◊	✓	◊
01-002	AAB8596	01-04225	12.33–12.83	Fill	8/31/1994	◊	◊	◊	◊	✓	◊	◊	✓	◊
01-002	AAB8590	01-04225	20–20.5	Tuff	9/1/1994	◊	◊	◊	◊	✓	◊	◊	✓	◊
01-002	AAB8614	01-04226	1.42–1.92	Fill	9/1/1994	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-002	AAB8611	01-04227	6.25–6.75	Fill	9/1/1994	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-003(a)	AAA1494	01-02058	0–0.5	Fill	8/3/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊

Table 4.1-1 (continued)

AOC/SWMU	Sample ID	Location ID	Depth (ft)	Media	Collection Date	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	SVOCs	VOCs
01-003(a)	AAA1540	01-02114	0–0.5	Soil	8/10/1992	◊	◊	✓	✓	✓	◊	◊	◊	◊
01-003(a)	AAA1541	01-02122	0–0.5	Sed	8/10/1992	◊	◊	✓	✓	✓	◊	◊	◊	◊
01-003(a)	AAA1545	01-02133	0–0.5	Soil	8/10/1992	◊	◊	✓	✓	✓	◊	◊	◊	◊
01-003(a)	AAA1630	01-06064	0–0.5	Fill	9/9/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-003(d)	AAA0709	01-06005	0–0.5	Soil	7/20/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊
01-003(d)	AAA0711	01-06014	0–0.5	Soil	7/20/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊
01-003(d)	AAA0712	01-06023	0–0.5	Soil	7/20/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊
01-003(e)	AAA0752	01-05041	0–0.5	Soil	8/10/1992	◊	◊	✓	✓	✓	◊	◊	◊	◊
01-003(e)	AAA1509	01-05046	0–0.5	Sed	8/10/1992	◊	◊	✓	✓	✓	◊	◊	◊	◊
01-006(a)	AAA1569	01-03083	0–0.5	Soil	8/19/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-006(a)	AAA1557	01-03088	0–0.5	Soil	8/19/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-006(a)	AAA1558	01-03093	0–0.5	Soil	8/19/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(a)	AAA1555	01-03053	0–0.5	Fill	8/19/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(a)	AAA1565	01-03065	0–0.5	Soil	8/19/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(a)	AAA1566	01-03069	0–0.5	Soil	8/19/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(a)	AAA1567	01-03074	0–0.5	Soil	8/19/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(a)	AAA1568	01-03081	0–0.5	Soil	8/19/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(a)	AAA1599	01-03103	0–0.5	Soil	9/2/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(a)	AAA1601	01-03106	0–0.5	Soil	9/2/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(a)	AAA1603	01-03113	0–0.5	Soil	9/2/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(a)	AAA1604	01-03114	0–0.5	Soil	9/2/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(a)	AAA1605	01-03117	0–0.5	Sed	9/2/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(a)	AAA1838	01-04024	8–12	Soil	3/16/1993	◊	◊	✓	✓	◊	◊	◊	◊	◊

Table 4.1-1 (continued)

AOC/SWMU	Sample ID	Location ID	Depth (ft)	Media	Collection Date	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	SVOCs	VOCs
01-007(a)	AAA1839	01-04025	4–8	Soil	3/16/1993	◊	◊	✓	✓	◊	◊	◊	◊	◊
01-007(a)	AAA1842	01-04027	2–12	Fill	3/18/1993	◊	◊	✓	✓	◊	◊	◊	◊	◊
01-007(a)	AAA1843	01-04029	2–6	Soil	3/18/1993	◊	◊	✓	✓	◊	◊	◊	◊	◊
01-007(a)	AAA1844	01-04030	8–12	Fill	3/18/1993	◊	◊	✓	✓	◊	◊	◊	◊	◊
01-007(a)	AAA1845	01-04035	8–12	Soil	3/16/1993	◊	◊	✓	✓	◊	◊	◊	◊	◊
01-007(b)	AAA1522	01-03007	0–0.5	Soil	8/19/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(b)	AAA1552	01-03033	0–0.5	Fill	8/19/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(b)	AAA1553	01-03045	0–0.5	Soil	8/19/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(b)	AAA1554	01-03051	0–0.5	Soil	8/19/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(b)	AAA1602	01-03110	0–0.5	Fill	9/2/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(b)	AAA1607	01-03124	0–0.5	Sed	9/2/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(b)	AAA1608	01-03125	0–0.5	Sed	9/2/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(b)	AAA1609	01-03126	0–0.5	Sed	9/2/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(b)	AAA1610	01-03127	0–0.5	Tuff	9/2/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(b)	AAA1611	01-03128	0–0.5	Fill	9/2/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(b)	AAA1632	01-06073	0–0.5	Soil	9/9/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(b)	AAA1633	01-06074	0–0.5	Soil	9/9/1992	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(d)	AAB8620	01-04211	5.42–5.92	Soil	8/25/1994	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(d)	AAB8619	01-04212	8.75–9.25	Soil	8/25/1994	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(d)	AAB8638	01-04212	13.67–14.17	Tuff	8/25/1994	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(d)	AAB8625	01-04213	2.75–3.25	Fill	8/26/1994	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(d)	AAB8623	01-04214	2.67–3.17	Fill	8/26/1994	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(d)	AAB8627	01-04215	3.5–4	Fill	8/26/1994	◊	◊	◊	◊	✓	◊	◊	◊	◊

Table 4.1-1 (continued)

AOC/SWMU	Sample ID	Location ID	Depth (ft)	Media	Collection Date	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Pesticides	SVOCs	VOCs
01-007(d)	AAB8629	01-04216	4–4.5	Fill	8/26/1994	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(d)	AAB8632	01-04217	6.75–7.25	Fill	8/29/1994	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(d)	AAB8634	01-04217	7.83–8.33	Fill	8/29/1994	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(d)	AAB8636	01-04218	6–6.5	Fill	8/29/1994	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(d)	AAB8633	01-04218	6.67–7.17	Fill	8/29/1994	◊	◊	◊	◊	✓	◊	◊	◊	◊
01-007(d)	AAB8604	01-04221	3.33–3.83	Fill	8/30/1994	◊	◊	◊	◊	✓	◊	◊	✓	◊
01-007(d)	AAB8603	01-04221	19.5–20	Fill	8/30/1994	◊	◊	◊	◊	✓	◊	◊	✓	◊
01-007(j)	AAA1486	01-02034	0–0.5	Fill	8/3/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊
01-007(j)	AAA1487	01-02035	0–0.5	Fill	8/3/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊
01-007(j)	AAA1489	01-02036	0–0.5	Fill	8/3/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊
01-007(j)	AAA1490	01-02038	0–0.5	Fill	8/3/1992	◊	◊	✓	◊	✓	◊	◊	✓	◊
01-007(l)	0101-95-0051	01-10131	0.5–3	Soil	6/30/1996	✓	◊	✓	✓	✓	◊	◊	◊	◊
01-007(l)	0101-95-0052	01-10132	0.5–4	Soil	6/30/1996	✓	◊	✓	✓	✓	◊	◊	◊	◊
01-007(l)	0101-95-0053	01-10133	0.5–1.25	Soil	6/30/1996	✓	◊	✓	✓	✓	◊	◊	◊	◊

[a] ◊ = Analysis was not requested for the sample.

[b] ✓ = Analysis was requested for the sample.

[c] M = Only mercury was analyzed.

Table 4.2-1
Summary of Proposed Sampling at SWMU 01-001(a)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Septic System Pipelines																		
Determine nature and vertical extent of potential contamination beneath the turn in the septic system pipeline	1	Beneath the excavated pipeline, west arm of system, at bend in pipe	0–1[a] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the turn in the septic system pipeline	2	Beneath the excavated pipeline, east arm of system, at bend in pipe	0–1[a] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the joint in the septic system pipeline	3	Beneath the excavated pipeline, at the junction of east and west arms	0–1[a] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Septic Tank (Tank 134)																		
Determine nature and vertical extent of potential contamination beneath excavated septic tank	4	Center of the floor of the excavated septic tank	0–1[a] 4–5	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Outfall																		
Determine nature and vertical extent of potential contamination at the mouth of the outfall	5	At the outfall	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	—[b] X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine extent of potential contamination	6	7 ft downslope from location 5	Two depths[c]	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	7	7 ft west of location 6	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	8	7 ft east of location 6	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Note: Unless specified, zero depth is defined as below ground surface.

[a] Zero depth is defined as immediately beneath the excavated tank or pipe.

[b] — = This sample analysis will not be requested.

[c] One depth interval is in the sediment unit(s) and the other is below the sediment/tuff interface.

Table 4.3-1
Summary of Proposed Sampling at SWMU 01-001(b)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Septic System Pipelines																		
Determine nature and vertical extent of potential contamination beneath the septic system pipeline	1	Beneath the north end of the excavated pipe	0–1[a] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the septic system pipeline	2	Beneath the east end of the excavated pipe	0–1[a] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Septic Tank (Tank 135)																		
Determine nature and vertical extent of potential contamination beneath excavated septic tank	3	Center of the floor of the excavated septic tank	0–1[a] 4–5	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Outfall																		
Determine nature and vertical extent of potential contamination at the mouth of the outfall	4	At the outfall	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	—[b] X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine extent of potential contamination	5	7 ft downslope from location 4	Two depths[c]	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	6	7 ft west of location 5	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	7	7 ft east of location 5	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Note: Unless specified, zero depth is defined as below ground surface.

[a] Zero depth is defined as immediately beneath the excavated tank or pipe.

[b] — = This sample analysis will not be requested.

[c] One depth interval is in the sediment unit(s) and the other is below the sediment/tuff interface.

Table 4.4-1
Summary of Proposed Sampling at SWMUs 01-001(c), 01-006(c), 01-006(d), and 01-007(b)

Objective Addressed	Location Number	Location	Sample Depths (ft)	AL Metals	yanide	itrates	erchlorate	VOCs	VOCs	CBs	amma Spectroscopy	mericium-241	sotopic Plutonium	sotopic Uranium	trontium-90	ritium	loisture	H
Septic System Pipeline, Septic Tank, and Outfall of SWMU 01-001(c)																		
Determine nature and vertical extent of potential contamination beneath the septic system pipeline	1	Beneath the origin of the excavated pipe	0–1[a] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath excavated septic tank	2	Center of the floor of the excavated septic tank	0–1[a] 4–5	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination at the mouth of the outfall	3	At the outfall	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	—[b] X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine extent of potential contamination	4	7 ft downslope from location 3	Two depths[c]	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	5	7 ft west of location 4	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	6	7 ft east of location 4	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Areas of SWMUs 01-006(c, d) and 01-007(b)																		
Determine extent of potential contamination	7	50 ft west of location 1	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	8	1 ft downslope from previous sampling location 01-04044	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	9	Near the pipe ends of the drain lines of SWMU 01-006(c)	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Table 4.4-1 (continued)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Determine extent of potential contamination	10	Near the pipe end of the drain line of SWMU 01-006(d)	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	11	1 ft downslope from previous sampling location 01-03125	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	12	60 ft south of location 10	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Hillside 137																		
Determine extent of potential contamination	13	50 ft downslope from location 11	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	14	1 ft downslope from previous sampling location 01-03023	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	15	60 ft east of location 14	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	16	50 ft downslope from location 13	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	17	40 ft downslope from location 14	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	18	40 ft downslope from location 15	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	19	40 ft downslope of location 16	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	20	1 ft downslope from previous sampling location 01-03045	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Table 4.4-1 (continued)

Objective Addressed	Location Number	Location	Sample Depths (ft)	'AL Metals	yanide	litrates	erchlorate	VOCs	VOCs	CBs	amma Spectroscopy	mericium-241	sotopic Plutonium	sotopic Uranium	trontium-90	ritium	loisture	H
Determine extent of potential contamination	21	1 ft downslope from previous sampling location 01-03051	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	22	40 ft downslope of location 19	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	23	40 ft downslope of location 20	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	24	40 ft downslope of location 21	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Note: Unless specified, zero depth is defined as below ground surface.

[a] Zero depth is defined as immediately beneath the excavated tank or pipe.

[b] — = This sample analysis will not be requested.

[c] One depth interval is in the sediment unit(s) and the other is below the sediment/tuff interface.

Table 4.5-1
Summary of Proposed Sampling at SWMUs 01-001(d) and 01-006(h)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Septic System Pipeline																		
Determine nature and vertical extent of potential contamination beneath the turn in the septic system pipeline	1	Beneath the excavated pipeline at the bend in pipe	0–1[a] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Outfall																		
Determine nature and vertical extent of potential contamination at the mouth of the outfall	2	At the outfall	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	—[b] X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine extent of potential contamination	3	7 ft downslope from location 2	Two depths[c]	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	4	7 ft west of location 3	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	5	7 ft west of location 3	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Hillside 138																		
Determine extent of potential contamination	6	60 ft downslope from canyon rim and 80 ft west of location 7	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	7	1 ft downslope from previous sampling location 01-05028	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	8	60 ft east of location 7	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	9	70 ft downslope from location 6	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Table 4.5-1 (continued)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Determine extent of potential contamination	10	1 ft downslope from previous sampling location 01-05219	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine extent of potential contamination	11	70 ft downslope from location 8	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	12	70 ft downslope from location 9	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	13	70 ft downslope from location 10	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	14	70 ft downslope from location 11	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	15	Downslope from location 12 and after the steep cliff	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	16	Downslope from location 13 and after the steep cliff	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	17	Downslope from location 14 and after the steep cliff	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	18	80 ft downslope from location 15	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	19	80 ft downslope from location 16	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	20	80 ft downslope from location 17	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	21	80 ft downslope from location 18	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Table 4.5-1 (continued)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Determine extent of potential contamination	22	80 ft downslope from location 19	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	23	80 ft downslope from location 20	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Note: Unless specified, zero depth is defined as below ground surface.

[a] Zero depth is defined as immediately benaath the excavated pipe.

[b] — = This sample analysis will not be requested.

[c] One depth interval is in the sediment unit(s) and the other is below the sediment/tuff interface.

Table 4.6-1
Summary of Proposed Sampling at SWMU 01-001(e)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Septic System Pipelines																		
Determine nature and vertical extent of potential contamination beneath the turn in the septic system pipeline	1	Beneath the excavated pipeline, west of Oppenheimer Dr.	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the joint in the septic system pipeline	2	Beneath the excavated pipeline, at the pipe joint, south of the intersection of Oppenheimer Dr. and Loma Vista Dr.	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

*Zero depth is defined as immediately beneath the excavated pipe.

Table 4.7-1
Summary of Proposed Sampling at SWMU 01-001(f)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Septic System Pipelines																		
Determine nature and vertical extent of potential contamination beneath the septic system pipeline	1	Beneath the south end of the excavated pipeline	0–1[a] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the septic system pipeline	2	Beneath the excavated pipeline, beneath the asphalt road	0–1[a] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Outfall																		
Determine nature and extent of potential contamination at the mouth of the outfall	3	At the outfall	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	—[b] X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine extent of potential contamination	4	7 ft downslope of location 3	Two depths[c]	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	5	7 ft north of location 4	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	6	7 ft south of location 4	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine existence of thallium and uranium contamination and extent of potential contamination	7	1 ft downslope from previous sampling location 01-01095	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	8	15 ft north of location 7	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	9	1 ft downslope from previous sampling location 01-01096	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Table 4.7-1 (continued)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Drainage of Hillside 140																		
Determine existence of thallium and uranium contamination and extent of potential contamination	10	1 ft downslope from previous sampling location 01-01112	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	11	20 ft north of location 10	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine existence of thallium and uranium contamination and extent of potential contamination	12	1 ft downslope from previous sampling location 01-01110	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	13	25 ft west of location 11, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	14	40 ft downslope of location 13, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	15	55 ft downslope of location 14, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	16	40 ft downslope of location 15, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	17	65 ft downslope of location 16, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	18	60 ft downslope of location 17, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	19	55 ft downslope of location 18, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	20	55 ft downslope of location 19, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Table 4.7-1 (continued)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Determine extent of potential contamination	21	40 ft downslope of location 20, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Note: Unless specified, zero depth is defined as below ground surface.

[a] Zero depth is defined as immediately beneath the excavated pipe.

[b] — = This sample analysis will not be requested.

[c] One depth interval is in the sediment unit(s) and the other is below the sediment/tuff interface.

Table 4.8-1
Summary of Proposed Sampling at SWMU 01-001(g)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Septic Tank (Tank 141)																		
Determine nature and vertical extent of potential contamination beneath the excavated septic tank	1	Center of the floor of the excavated septic tank	0–1[a] 4–5	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Outfall																		
Determine nature and vertical extent of potential contamination at the mouth of the outfall	2	At the outfall	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	—[b] X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine extent of potential contamination	3	7 ft downslope from location 2	Two depths[c]	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	4	7 ft west of location 3	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	5	7 ft east of location 3	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Note: Unless specified, zero depth is defined as below ground surface.

[a] Zero depth is defined as immediately beneath the excavated tank.

[b] — = This sample analysis will not be requested.

[c] One depth interval is in the sediment unit(s) and the other is below the sediment/tuff interface.

Table 4.9-1
Summary of Proposed Sampling at SWMU 01-001(o)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Septic System Pipelines																		
Determine nature and vertical extent of potential contamination beneath the turn of the pipeline	1	Beneath the excavated pipeline, at the bend in pipe	0–1[a] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Outfall																		
Determine nature and vertical extent of potential contamination at the mouth of the outfall	2	At the outfall	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	—[b] X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine extent of potential contamination	3	7 ft downslope from location 2	Two depths[c]	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	4	7 ft north of location 3	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	5	7 ft south of location 3	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Confirming Previous Sampling Results																		
Confirm existence and vertical extent of plutonium contamination	6	1 ft downslope of previous sampling location 01-02080	0–0.5 2–3	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	7	10 ft downslope from location 6	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	8	10 ft north of location 7	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	9	10 ft south of location 7	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Note: Unless specified, zero depth is defined as below ground surface.

[a] Zero depth is defined as immediately beneath the excavated pipe.

[b] — = This sample analysis will not be requested.

[c] One depth interval is in the sediment unit(s) and the other is below the sediment/tuff interface.

Table 4.10-1
Summary of Proposed Sampling at SWMU 01-001(s)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Waste Line																		
Determine nature and vertical extent of potential contamination beneath the pipeline	1	Beneath the excavated pipe, near the southwest corner of the western building of Trinity Village condominiums	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	2	Beneath the excavated pipe, between the western and central building of Trinity Village condominiums	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	3	Beneath the excavated pipe, at the east entrance of Trinity Village condominiums	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	4	Beneath the excavated pipe, at the parking area behind the Duratek building	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	5	Beneath the excavated pipe, at the parking area on the north side of Oppenheimer Center	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	6	Beneath the excavated pipe, southeast of the intersection of Oppenheimer Dr. and Short Dr.	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	7	Beneath the excavated pipe, northeast of the intersection of Trinity Dr. and Oppenheimer Dr.	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	8	Beneath the excavated pipe, east of Oppenheimer Dr.	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Table 4.10-1 (continued)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Determine nature and vertical extent of potential contamination beneath the pipeline	9	Beneath the excavated pipe, between Shell gas station and Holiday Inn	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	10	Beneath the excavated pipe, southwest comer of the parking lot of Chevron gas station	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	11	Beneath the excavated pipe, east parking lot of Chevron gas station	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	12	Beneath the excavated pipe, paved road	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	13	Beneath the excavated pipe, south parking lot of Los Alamos Inn Office	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

*Zero depth is defined as immediately beneath the excavated pipe.

Table 4.11-1
Summary of Proposed Sampling at SWMU 01-001(t), AOC 01-006(e), and AOC 01-007(k)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Waste Line of 01-001(t) and Drain Lines of 01-006(e)																		
Determine nature and vertical extent of potential contamination beneath the pipeline	1	Beneath the pipe, southwest of Ashley Pond, where the waste line and the drain line intersect	0–1[a] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	2	Beneath the pipe, south of Ashley Pond	0–1[b] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	3	Beneath the pipe, southeast of Ashley Pond, where the waste line and the drain line intersect	0–1[a] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	4	Beneath the pipe, southeast of Ashley Pond, at pipe bend	0–1[b] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	5	Beneath the pipe, south of location 3, where the waste line and the drain line intersect	0–1[a] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	6	Beneath the pipe, at the parking lot of Quality Inn	0–1[b] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	7	Beneath the pipe, at the parking lot of Quality Inn	0–1[b] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	8	Beneath the pipe, at the driveway between Quality Inn and Los Alamos Inn	0–1[b] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Table 4.11-1 (continued)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Determine nature and vertical extent of potential contamination beneath the pipeline	9	Beneath the pipe, at the parking lot between Quality Inn and LANL building 00-1315	0–1[b] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	10	Beneath the pipe, at the parking lot between Quality Inn and LANL building 00-1315	0–1[b] 2-3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

[a] Zero depth is defined as immediately beneath the lower pipe where the waste line and the drain line intersect.

[b] Zero depth is defined as immediately beneath the pipe or excavated pipe.

Table 4.12-1
Summary of Proposed Sampling at SWMU 01-001(u)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Waste Line																		
Determine nature and vertical extent of potential contamination beneath the pipeline	1	Beneath the excavated pipeline, at the parking lot of the Timber Ridge condominiums	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	2	Beneath the excavated pipeline, behind the condominium building in the wooded area	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

*Zero depth is defined as immediately beneath the excavated pipe.

Table 4.13-1
Summary of Proposed Sampling at SWMUs 01-002 and 01-007(c)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Industrial Waste Line																		
Determine nature and vertical extent of potential contamination beneath the pipeline	1	Beneath the excavated pipeline, near the east side of the condominium building	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	2	Beneath the excavated pipeline, at the parking area west of the Duratek building	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	3	Beneath the excavated pipeline, at the parking area north of the Duratek building	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	4	Beneath the excavated pipeline, west of Oppenheimer Dr., across from Shell gas station	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	5	Beneath the excavated pipeline, between condominiums and Shell, east of Oppenheimer Dr.	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	6	Beneath the excavated pipeline, at the entrance road to Ridge Park condominiums	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	7	Beneath the excavated pipeline, west of Oppenheimer Dr., east of a condominium	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	8	Beneath the excavated pipeline, east of Oppenheimer Dr., west of a Los Ventanas townhouse	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Table 4.13-1 (continued)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Determine nature and vertical extent of potential contamination beneath the pipeline	9	Beneath the excavated pipeline, at southwest corner of the parking lot of Shell gas station	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	10	Beneath the excavated pipeline, between Holiday Inn and a condominium	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	11	Beneath the excavated pipeline, behind the condominium building	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	12	Beneath the excavated pipeline, in front of the condominium building	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	13	Beneath the excavated pipeline, in Loma Vista Dr. near the entrance of Los Arboles Dr.	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	14	Beneath the excavated pipeline, in Loma Vista Dr.	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	15	Beneath the excavated pipeline, in asphalt road between the condominium building and Los Alamos Medical Center business office building	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	16	Beneath the excavated pipeline, in parking area of Los Alamos Inn	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Table 4.13-1 (continued)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Determine nature and vertical extent of potential contamination beneath the pipeline	17	Beneath the excavated pipeline, in asphalt road between the condominium building and Los Alamos Medical Center business office building	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the pipeline	18	Beneath the excavated pipeline, on hillside south of the Los Alamos Medical Center business office building	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

*Zero depth is defined as immediately beneath the excavated pipe.

Table 4.14-1
Summary of Proposed Sampling at SWMU 01-003(a)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Area of Landfill																		
Determine nature and extent of potential contamination of the landfill	1	30 ft southwest from the southwest corner of the current building	0–0.5 2–3	X X	X X	X X	X X	—[a] X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination of the landfill	2	50 ft southeast of location 1, 30 ft downslope from the current building	0–0.5 2–3	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination of the landfill	3	50 ft downslope of location 1	0–0.5 2–3	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination of the landfill	4	50 ft downslope of location 2	0–0.5 2–3	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Drainage																		
Determine nature and extent of potential contamination of the landfill	5	50 ft southeast downslope of location 3, start of the drainage	Two depths[b]	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	6	50 ft downslope of location 5, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Confirm existence and vertical extent of radionuclides contamination	7	1 ft downslope from previous sampling location 01-02114	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	8	50 ft downslope of location 6, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Confirm existence and vertical extent of plutonium contamination	9	1 ft downslope from previous sampling location 01-02133	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	10	50 ft downslope of location 8, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	11	50 ft downslope of location 10, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Table 4.14-1 (continued)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Determine extent of potential contamination	12	50 ft downslope of location 11, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	13	50 ft downslope of location 12, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	14	50 ft downslope of location 13, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	15	1 ft downslope from previous sampling location 01-02171 (1623465.7, 1775068.2)	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	16	1 ft downslope from previous sampling location 01-02172 (1623457.7, 1775032.1)	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	17	50 ft downslope of location 16, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	18	50 ft downslope of location 17, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Note: Zero depth is defined as below ground surface.

[a] — = This sample analysis will not be requested.

[b] One depth interval is in the sediment unit(s) and the other is below the sediment/tuff interface.

Table 4.17-1
Summary of Proposed Sampling at SWMU 01-003(d)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Area of Landfill																		
Determine nature and extent of potential contamination of the landfill	1	West portion of the landfill	0–0.5 2–3	X X	X X	X X	X X	—* X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination of the landfill	2	1 ft downslope from previous sampling location 01-06014	0–0.5 2–3	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination of the landfill	3	East portion of the landfill	0–0.5 2–3	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Nature and Extent of Contamination Determination																		
Determine extent of potential contamination	4	Downslope from location 1, 25 ft downslope from the landfill boundary	0–0.5 2–3	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	5	Downslope from location 2, 25 ft downslope from the landfill boundary	0–0.5 2–3	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	6	Downslope from location 3, 25 ft downslope from the landfill boundary	0–0.5 2–3	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Note: Zero depth is defined as below ground surface.

*— = This sample analysis will not be requested.

Table 4.18-1
Summary of Proposed Sampling at SWMU 01-003(e)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Area of Landfill																		
Determine nature and extent of potential contamination of the landfill	1	35 ft downslope of canyon rim,	0–0.5 2–3	X X	X X	X X	X X	—* X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination of the landfill	2	40 ft downslope of canyon rim, 70 ft east of location 1	0–0.5 2–3	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination of the landfill	3	20 ft downslope of canyon rim, 70 ft east of location 2	0–0.5 2–3	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Nature and Extent of Contamination Determination																		
Determine extent of potential contamination	4	50 ft downslope of location 1	0–0.5 2–3	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	5	50 ft downslope of location 2	0–0.5 2–3	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	6	60 ft downslope of location 3	0–0.5 2–3	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Note: Zero depth is defined as below ground surface.

*— = This sample analysis will not be requested.

Table 4.19-1
Summary of Proposed Sampling at SWMU 01-006(a)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Outfall																		
Determine nature and vertical extent of potential contamination at the mouth of the outfall	1	At the outfall	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	—[a] X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine extent of potential contamination	2	7 ft downslope from location 1	Two depths[b]	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	3	7 ft west of location 2	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	4	7 ft east of location 2	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Drainage																		
Determine extent of potential contamination	5	1 ft downslope from previous sampling location 01-03088	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	6	1 ft downslope from previous sampling location 01-03093	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	7	60 ft downslope from location 6, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	8	1 ft downslope from previous sampling location 01-03083	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	9	30 ft downslope from location 8, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Note: Zero depth is defined as below ground surface.

[a] — = This sample analysis will not be requested.

[b] One depth interval is in the sediment unit(s) and the other is below the sediment/tuff interface.

Table 4.24-1
Summary of Proposed Sampling at AOC 01-006(g)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Outfall																		
Determine nature and vertical extent of potential contamination at the mouth of the outfall	1	At the outfall	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	—[a] X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine extent of potential contamination	2	7 ft downslope from location 1	Two depths[b]	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	3	7 ft west of location 2	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	4	7 ft east of location 2	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Note: Zero depth is defined as below ground surface.

[a] — = This sample analysis will not be requested.

[b] One depth interval is in the sediment unit(s) and the other is below the sediment/tuff interface.

Table 4.27-1
Summary of Proposed Sampling at SWMU 01-006(o)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Outfall																		
Determine nature and vertical extent of potential contamination at the mouth of the outfall	1	At the outfall	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	—[a] X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine extent of potential contamination	2	7 ft downslope from location 1	Two depths[b]	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	3	7 ft west of location 2	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	4	7 ft east of location 2	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Note: Zero depth is defined as below ground surface.

[a] — = This sample analysis will not be requested.

[b] One depth interval is in the sediment unit(s) and the other is below the sediment/tuff interface.

Table 4.28-1
Summary of Proposed Sampling at SWMUs 01-007(a), 01-006(b), and 01-006(n)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Area of SWMU 01-007(a)																		
Determine existence and vertical extent of plutonium contamination	1	Proximity of 01-04024	5–6 8–9 11–12 14–15	X X X X	—[a] — — —	— — — —	— — — —	— — — —	— — — —	— — — —	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X
Determine existence and vertical extent of plutonium contamination	2	Proximity of 01-04025	5–6 8–9 11–12 14–15	X X X X	— — — —	— — — —	— — — —	— — — —	— — — —	— — — —	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X
Drain Line and Outfall of SWMU 01-006(b)																		
Determine nature and vertical extent of potential contamination beneath the excavated pipeline	3	Beneath the excavated pipeline, at the origin of the pipeline	0–1[b] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination at the mouth of the outfall	4	At the outfall	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine extent of potential contamination	5	7 ft downslope from location 4	Two depths[c]	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	6	7 ft west of location 5	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	7	7 ft east of location 5	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Outfall of SWMU 01-006(n)																		
Determine nature and vertical extent of potential contamination at the mouth of the outfall	8	At the outfall	0-0.5 1.5-2 4-5	X X X	X X X	X X X	X X X	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X

Table 4.28-1 (continued)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Determine extent of potential contamination	9	7 ft downslope from location 8	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	10	7 ft west of location 9	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	11	7 ft east of location 9	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Drainage																		
Determine extent of potential contamination	12	1 ft downslope from previous sampling location 01-03106	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination and inorganic contaminants	13	1 ft downslope from previous sampling location 01-03069	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	14	70 ft downslope from location 13, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	15	70 ft downslope from location 14, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	16	70 ft downslope from location 15, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	17	70 ft downslope from location 16, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	18	70 ft downslope from location 17, in the main drainage	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Note: Unless specified, zero depth is defined as below ground surface.

[a] — = This sample analysis will not be requested.

[b] Zero depth is defined as immediately beneath the excavated pipe.

[c] One depth interval is in the sediment unit(s) and the other is below the sediment/tuff interface.

Table 4.31-1
Summary of Proposed Sampling at SWMU 01-007(d)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Borehole Samples												
Determine nature and vertical extent of potential contamination	1	At the community area southeast of the condominiums	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination	2	In Short Dr., in front of the condominium	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination	3	In Short Dr., in front of the condominium	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X

*Zero depth is defined as undisturbed tuff.

Table 4.32-1
Summary of Proposed Sampling at SWMU 01-007(e)

Objective Addressed	Location Number	Location	Sample Depths (ft)	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Borehole Samples											
Determine nature and vertical extent of potential contamination	1	In landscaped area west of the intersection of Oppenheimer Dr. and Loma Vista Dr.	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination	2	In paved area west of the north end of the building that is west of the intersection of Oppenheimer Dr. and Loma Vista Dr.	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X

*Zero depth is defined as undisturbed tuff.

Table 4.33-1
Summary of Proposed Sampling at SWMU 01-007(j)

Objective Addressed	Location Number	Location	Sample Depths (ft)	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Borehole Samples											
Determine nature and vertical extent of potential contamination	1	In parking lot area west of the intersection of Oppenheimer Dr. and Short Dr.	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X

*Zero depth is defined at the soil/tuff interface.

Table 5.3-1
Summary of Proposed Sampling at SWMU 03-009(j)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Nature and Extent of Contamination Determination																		
Determine lateral and vertical extent of potential contamination of the fill material	1	South region of the fill area	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine lateral and vertical extent of potential contamination of the fill material	2	North region of the fill area	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

*Zero depth is defined as the interface of fill material and original tuff.

Table 5.4-1
Summary of Proposed Sampling at SWMUs 03-038(a,b)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Borehole Samples																		
Determine nature and extent of potential contamination surrounding former structure 03-700	1	15 ft west of former structure 03-700	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	—* X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine nature and extent of potential contamination surrounding former structure 03-700	2	15 ft south of former structure 03-700	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine nature and extent of potential contamination surrounding former structure 03-700	3	15 ft east of former structure 03-700	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine nature and vertical extent of potential contamination beneath excavation of former structure 03-700	4	Center of the excavation of former structure 03-700	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine nature and extent of potential contamination at the connection of former structures 03-700 and 03-738	5	Between former structures 03-700 and 03-738	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine nature and extent of potential contamination at the connection of former structure 03-738 to industrial waste line	6	North end of the excavation of former structure 03-738	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X

Note: Zero depth is defined as below ground surface.

*— = This sample analysis will not be requested.

Table 5.5-1
Summary of Proposed Sampling at SWMU 03-055(c)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Explosive Compounds	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Outfall																			
Determine nature and vertical extent of potential contamination at the mouth of the outfall	1	At the mouth of the outfall pipe	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	—[a] X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine extent of potential contamination	2	7 ft downslope from location 1	Two depths[b]	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	3	7 ft west of location 2	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine extent of potential contamination	4	7 ft east of location 2	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Note: Zero depth is defined as below ground surface.

[a] — = This sample analysis will not be requested.

[b] One depth interval is in the sediment unit(s) and the other below is the sediment/tuff interface.

Table 6.1-1
Summary of Analytical Suites for Samples Previously Collected in TA-32

AOC/ SWMU	Sample ID	Location ID	Depth (ft)	Media	Collection Date	Americium-241	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Uranium	Metals	SVOCs	VOCs
32-001	0132-96-0209	32-06446	0.17–0.83	Fill	3/21/1996	◊[a]	◊	◊	◊	◊	✓[b]	✓	✓
	0132-96-0210	32-06447	0.17–0.92	Soil	3/22/1996	◊	◊	◊	◊	◊	✓	✓	✓
32-002(a)	0132-96-0610	32-06367	4–4.17	Tuff	4/24/1996	◊	✓	✓	✓	✓	✓	✓	✓
	0132-96-0601	32-06368	4.5–4.67	Tuff	4/24/1996	◊	✓	✓	✓	✓	✓	✓	✓
	0132-96-0602	32-06369	4.5–4.67	Tuff	4/24/1996	◊	✓	✓	✓	✓	✓	✓	✓
	0132-96-0604	32-06370	0–0.25	Tuff	4/25/1996	◊	✓	✓	✓	✓	✓	✓	✓
	0132-96-0606	32-06371	0–0.25	Tuff	4/25/1996	◊	✓	✓	✓	✓	✓	✓	✓
	0132-96-0607	32-06372	3–3.25	Tuff	4/26/1996	◊	✓	✓	✓	✓	✓	✓	✓
	0132-96-0631	32-06373	0–0.5	Soil	4/26/1996	◊	◊	◊	◊	◊	✓	◊	◊
	0132-96-0608	32-06374	0–0.25	Soil	4/26/1996	◊	✓	✓	✓	✓	✓	✓	✓
	0132-96-0609	32-06375	0–0.5	Soil	4/30/1996	◊	◊	✓	✓	◊	✓	✓	✓
	0132-96-0616	32-06380	0–0.5	Soil	5/2/1996	◊	◊	✓	✓	◊	✓	✓	✓
32-002(b)	0132-96-0325	32-06312	0–0.5	Soil	3/28/1996	✓	◊	✓	✓	✓	✓	✓	◊
	0132-96-0326	32-06312	0.5–1	Tuff	3/28/1996	✓	◊	✓	✓	✓	✓	✓	◊
	0132-96-0323	32-06313	0–0.5	Soil	3/28/1996	✓	◊	✓	✓	✓	✓	✓	◊
	0132-96-0324	32-06313	1.25–1.83	Tuff	3/28/1996	✓	◊	✓	✓	✓	✓	✓	◊
	0132-96-0755	32-06314	0–0.5	Tuff	5/6/1996	◊	✓	◊	✓	◊	✓	◊	◊
	0132-96-0327	32-06315	0–0.5	Soil	3/28/1996	✓	◊	✓	✓	✓	✓	✓	◊
	0132-96-0322	32-06323	0–0.5	Soil	3/28/1996	✓	◊	✓	✓	✓	✓	✓	◊
	0132-96-0321	32-06325	0–0.5	Soil	3/28/1996	✓	◊	✓	✓	✓	✓	✓	◊
	0132-96-0802	32-06342	1.5–2	Soil	5/6/1996	◊	◊	◊	✓	◊	✓	✓	◊

Table 6.1-1 (continued)

AOC/ SWMU	Sample ID	Location ID	Depth (ft)	Media	Collection Date	Americium-241	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Uranium	Metals	SVOCs	VOCs
32-002(b) (continued)	0132-96-0801	32-06344	1.5–2	Soil	5/6/1996	◊	◊	◊	✓	◊	✓	✓	◊
	0132-96-0751	32-06353	0–0.5	Tuff	5/6/1996	◊	✓	◊	✓	◊	✓	◊	◊
	0132-96-0752	32-06357	0–0.5	Soil	5/6/1996	◊	✓	◊	✓	◊	✓	◊	◊
	0132-96-0753	32-06358	0–0.5	Tuff	5/6/1996	◊	✓	◊	✓	◊	✓	◊	◊
	0132-96-0611	32-06365	5–5.25	Tuff	4/22/1996	◊	✓	✓	✓	✓	✓	✓	✓
	0132-96-0612	32-06366	4–4.25	Tuff	4/23/1996	◊	✓	✓	✓	✓	✓	✓	✓
	0132-96-0614	32-06377	0–0.5	Tuff	5/1/1996	◊	✓	✓	✓	✓	✓	✓	✓
32-004	0132-96-0354	32-06326	0–0.5	Soil	4/1/1996	✓	◊	✓	✓	✓	✓	✓	◊
	0132-96-0355	32-06326	0.5–1	Tuff	4/1/1996	✓	◊	✓	✓	✓	✓	✓	◊
	0132-96-0356	32-06331	0–0.42	Soil	4/1/1996	✓	◊	✓	✓	✓	✓	✓	◊
	0132-96-0357	32-06336	0–0.5	Soil	4/1/1996	✓	◊	✓	✓	✓	✓	✓	◊
	0132-96-0352	32-06338	0–0.5	Soil	4/1/1996	✓	◊	✓	✓	✓	✓	✓	◊
	0132-96-0353	32-06338	0.5–1	Soil	4/1/1996	✓	◊	✓	✓	✓	✓	✓	◊
	0132-96-0351	32-06340	0–0.5	Soil	4/1/1996	◊	◊	◊	◊	◊	✓	✓	◊
	0132-96-0621	32-06363	0–0.5	Soil	4/19/1996	◊	✓	✓	✓	✓	✓	✓	✓
	0132-96-0622	32-06364	0–0.5	Soil	4/19/1996	◊	✓	✓	✓	✓	✓	✓	✓

[a] ◊ = Analysis was not requested for the sample.

[b] ✓= Analysis was requested for the sample.

Table 6.2-1
Summary of Proposed Sampling at SWMU 32-001

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Dioxins	Furans	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Incinerator																				
Determine nature and extent of potential contamination	1	6 ft north of incinerator location	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination	2	6 ft east of incinerator location	0–1 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination	3	6 ft south of incinerator location	0–1 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination	4	6 ft west of incinerator location	0–1 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

*Zero depth is 0.5 ft beneath the pavement.

Table 6.3-1
Summary of Proposed Sampling at SWMU 32-002(a)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Dioxins	Furans	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Drain Line																				
Determine nature and extent of potential contamination	1	Immediately adjacent to location 32-06375	0–1[a]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			2–3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	2	Immediately adjacent to location 32-06368	0–1[a]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			2–3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3	Immediately adjacent to location 32-06369	0–1[a]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			2–3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4	Immediately adjacent to location 32-06371	0–1[a]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			2–3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Septic Tank																				
Determine nature and extent of potential contamination	5	Center of the septic tank excavation	1.5–2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			3.5–4.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	6	Immediately north of the excavation perimeter	0–0.5	X	X	X	X	—[b]	X	X	X	X	X	X	X	X	X	X	X	X
			2–3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	7	Immediately east of the excavation perimeter	0–0.5	X	X	X	X	—	X	X	X	X	X	X	X	X	X	X	X	X
			2–3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	8	Immediately south of the excavation perimeter	0–0.5	X	X	X	X	—	X	X	X	X	X	X	X	X	X	X	X	X
			2–3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	9	Immediately west of the excavation perimeter	0–0.5	X	X	X	X	—	X	X	X	X	X	X	X	X	X	X	X	X
			2–3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Note: Zero depth is defined as below ground surface.

[a] Zero depth is defined as immediately beneath the excavated pipe.

[b] — = This sample analysis will not be requested.

Table 6.4-1
Summary of Proposed Sampling at SWMU 32-002(b)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Dioxins	Furans	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Drain Line																				
Determine nature and extent of potential contamination	1	Immediately adjacent to location 32-06365	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination	2	Immediately adjacent to location 32-06366	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination	3	Immediately adjacent to location 32-06377	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination	4	50 ft downgradient of location 3 in the drain line path	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination	5	Outfall end of the drain line	0–1* 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Septic Tank																				
Determine nature and extent of potential contamination	6	Center of the septic tank excavation	Soil/fill interface 2 ft deeper	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination	7	Immediately north of the excavation perimeter	Soil/tuff interface 1 ft deeper	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination	8	Immediately east of the excavation perimeter	Soil/tuff interface 1 ft deeper	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination	9	Immediately south of the excavation perimeter	Soil/tuff interface 1 ft deeper	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination	10	Immediately west of the excavation perimeter	Soil/tuff interface 1 ft deeper	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

*Zero depth is defined as immediately beneath the excavated pipe.

Table 6.5-1
Summary of Proposed Sampling at AOC 32-003

Objective Addressed	Location Number	Location	Sample Depths (ft)	PCBs	pH	SVOCs
Determine extent of PCB contamination	1	Approximately 5 ft north of the excavation	0–0.5 2–3	X X	X X	X X
Determine extent of PCB contamination	2	Approximately 5 ft east of the excavation	0–0.5 2–3	X X	X X	X X
Determine extent of PCB contamination	3	Approximately 5 ft south of the excavation	0–0.5 2–3	X X	X X	X X
Determine extent of PCB contamination	4	Approximately 5 ft west of the excavation	0–0.5 2–3	X X	X X	X X
Determine extent of PCB contamination	5	5 ft upslope of previous screening location 32-06458	0–0.5 2–3	X X	X X	X X
Determine extent of PCB contamination	6	Adjacent to previous screening location 32-06458	Soil/fill interface 1 ft deeper	X X	X X	X X
Determine extent of PCB contamination	7	Adjacent to previous screening location 32-06461	Soil/fill interface 1 ft deeper	X X	X X	X X
Determine extent of PCB contamination	8	Adjacent to previous screening location 32-06477	Soil/fill interface 1 ft deeper	X X	X X	X X
Determine extent of PCB contamination	9	Adjacent to previous screening location 32-06466	Soil/fill interface 1 ft deeper	X X	X X	X X
Determine extent of PCB contamination	10	Adjacent to previous screening location 32-06469	Soil/fill interface 1 ft deeper	X X	X X	X X
Determine extent of PCB contamination	11	Adjacent to previous screening location 32-06486	Soil/fill interface 1 ft deeper	X X	X X	X X
Determine extent of PCB contamination	12	Equidistant between previous screening locations 32-06488, 32-06490, and 32-06491	Soil/fill interface 1 ft deeper	X X	X X	X X

Note: Zero depth is defined as below ground surface.

Table 6.6-1
Summary of Proposed Sampling at AOC 32-004

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Radiation Source Vault Room																		
Determine nature and extent of potential contamination	1	In the center of previous screening level samples 32-06307, -06308, -06309, -06310	0–0.5	X	X	X	X	—*	X	X	X	X	X	X	X	X	X	X
			1.5–2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			4–5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Note: Zero depth is defined as immediately below excavation.

*— = This sample analysis will not be requested.

Table 7.1-1
Summary of Analytical Suites for Samples Previously Collected in TA-41

AOC/SWMU	Sample ID	Location ID	Depth (ft)	Media	Collection Date	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Uranium	Metals	SVOCs	VOCs
41-001	0441-95-0003	41-01007	0.0–1.0	Tuff	5/3/1995	◊[a]	✓[b]	✓	✓	◊	✓	✓
	0441-95-0004	41-01007	4.0–5.0	Tuff	5/3/1995	◊	✓	✓	✓	◊	✓	✓
	0441-95-0009	41-01008	0.0–1.0	Tuff	5/3/1995	◊	✓	✓	✓	◊	✓	✓
	0441-95-0010	41-01008	4.0–5.0	Tuff	5/3/1995	◊	✓	✓	✓	◊	✓	✓
	0441-95-0011	41-01008	9.0–10.0	Tuff	5/3/1995	◊	✓	✓	✓	◊	✓	✓
41-002(a)	AAC2706	41-01009	0.0–1.0	Soil	3/7/1995	✓	✓	✓	✓	U[c]	✓	◊
	AAC2712	41-01009	4.0–5.0	Soil	3/7/1995	✓	✓	✓	✓	U	✓	◊
	AAC2719	41-01009	9.0–10.0	Soil	3/7/1995	✓	✓	✓	✓	U	✓	◊
	AAC2713	41-01010	0.0–1.0	Soil	3/7/1995	✓	✓	✓	✓	U	✓	◊
	AAC2716	41-01010	4.0–5.0	Soil	3/7/1995	✓	✓	✓	✓	U	◊	◊
	AAC2703	41-01011	0.0–1.0	Soil	3/7/1995	✓	✓	✓	✓	U	✓	◊
	AAC2727	41-01012	0.0–1.0	Soil	3/8/1995	✓	✓	✓	✓	U	◊	◊
	AAC2721	41-01012	4.0–5.0	Soil	3/8/1995	✓	✓	✓	✓	U	◊	◊
	AAC2723	41-01012	6.0–7.0	Soil	3/8/1995	✓	✓	✓	✓	U	◊	◊
	AAC2726	41-01025	0.0–1.0	Soil	2/28/1995	✓	✓	✓	✓	U	✓	◊
	AAC2720	41-01026	0.0–1.0	Soil	2/28/1995	✓	✓	✓	✓	U	✓	◊
41-002(b)	AAC2709	41-01019	0.0–1.0	Soil	2/27/1995	✓	✓	✓	✓	U	✓	◊
	AAC2715	41-01020	0.0–1.0	Soil	2/28/1995	✓	✓	✓	✓	U	✓	◊
	AAC2714	41-01021	0.0–1.0	Soil	2/28/1995	✓	✓	✓	✓	U	✓	◊
	AAC2708	41-01022	0.0–1.0	Soil	2/28/1995	✓	✓	✓	✓	U	✓	◊
	AAC2705	41-01023	0.0–1.0	Soil	2/28/1995	✓	✓	✓	✓	U	✓	◊
	AAC2704	41-01024	0.0–1.0	Soil	2/28/1995	✓	✓	✓	✓	U	✓	◊

Table 7.1-1 (continued)

AOC/SWMU	Sample ID	Location ID	Depth (ft)	Media	Collection Date	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Uranium	Metals	SVOCs	VOCs
41-002(c)	AAC2700	41-01013	0.0–1.0	Soil	2/28/1995	✓	✓	✓	✓	U	✓	◊
	AAC2702	41-01013	2.0.0–3	Soil	2/28/1995	✓	✓	✓	✓	U	✓	◊
	AAC2718	41-01014	0.0–1.0	Soil	2/27/1995	✓	✓	✓	✓	U	✓	◊
	AAC2710	41-01015	0.0–1.0	Soil	2/27/1995	✓	✓	✓	✓	U	✓	◊
	AAC2717	41-01016	0.0–1.0	Soil	2/27/1995	✓	✓	✓	✓	U	✓	◊
	AAC2707	41-01017	0.0–1.0	Soil	2/27/1995	✓	✓	✓	✓	U	✓	◊
	AAC2711	41-01018	0.0–1.0	Soil	2/27/1995	✓	✓	✓	✓	U	✓	◊
41-003	AAC2687	41-01027	7.0–8.0	Soil	2/17/1995	◊	✓	✓	◊	U	◊	◊
	AAC2690	41-01028	8.5–9.5	Soil	2/17/1995	◊	✓	✓	◊	U	◊	◊
	AAC2686	41-01029	0.0–1.0	Soil	2/17/1995	◊	✓	✓	◊	U	◊	◊
	AAC2688	41-01030	0.0–1.0	Soil	2/17/1995	◊	✓	✓	◊	U	◊	◊
	AAC2689	41-01031	0.0–1.0	Soil	2/17/1995	◊	✓	✓	◊	U	◊	◊
	AAC2694	41-01032	0.0–1.0	Soil	2/17/1995	◊	✓	✓	◊	U	◊	◊
	AAC2695	41-01033	0.0–1.0	Soil	2/17/1995	◊	✓	✓	◊	U	◊	◊
C-41-004	AAC2729	41-01034	0.0–1.0	Sediment	2/27/1995	◊	✓	✓	◊	U	◊	◊

[a] ◊ = Analysis was not requested for the sample.

[b] ✓= Analysis was requested for the sample.

[c] U = Only uranium was analyzed.

Table 7.2-1
Summary of Proposed Sampling at SWMU 41-001

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Sewer Line																		
Determine nature and vertical extent of potential contamination beneath excavated pipeline	1	Beneath the excavated pipeline, at the turn of the pipeline	0–1[a] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath excavated pipeline	2	Beneath the excavated pipeline, 40 ft from location 1	0–1[a] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Septic Tank																		
Determine nature and vertical extent of potential contamination beneath the inlet of septic tank	3	Beneath the inlet of septic tank	0–1[a] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath septic tank	4	Center of the floor of the excavated septic tank	0–1[a] 4–5	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and vertical extent of potential contamination beneath the outlet of septic tank	5	Beneath the outlet of septic tank	0–1[a] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Outfall																		
Determine nature and vertical extent of potential contamination at the mouth of the outfall	6	At the mouth of the outfall pipe	0–0.5[a] 1.5–2 4–5	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine nature and extent of potential contamination	7	7 ft downslope from location 6	0–0.5[b] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination	8	7 ft west of location 7	0–0.5[b] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Table 7.2-1 (continued)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Determine nature and extent of potential contamination	9	7 ft east of location 7	0–0.5[b] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination	10	20 ft downslope from location 7	0–0.5[b] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination	11	15 ft west of location 10	0–0.5[b] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination	12	15 ft east of location 10	0–0.5[b] 2–3	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

[a] Zero depth is defined as immediately beneath the excavated tank or pipe.

[b] Zero depth is defined as immediately beneath the fill.

Table 8.4-1
Summary of Proposed Sampling at AOC 43-001(b2)

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Dioxins	Furans	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Outfall																				
Determine nature and vertical extent of potential contamination at the mouth of the outfall	1	Mouth of the outfall pipe	0–0.5	X	X	X	X	—[a]	X	X	X	X	X	X	X	X	X	X	X	X
			1.5–2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			4–5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	2	7 ft downslope of the mouth of the outfall pipe	Two depths[b]	X	X	X	X	—	X	X	X	X	X	X	X	X	X	X	X	X
				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	3	7 ft west of location 2	Two depths	X	X	X	X	—	X	X	X	X	X	X	X	X	X	X	X	X
				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine nature and extent of potential contamination	4	7 ft east of location 2	Two depths	X	X	X	X	—	X	X	X	X	X	X	X	X	X	X	X	X
				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

[a] — = This sample analysis will not be requested.

[b] One depth interval is in the sediment unit(s) and the other below the sediment/tuff interface.

Table 8.6-1
Summary of Proposed Sampling at AOC C-43-001

Objective Addressed	Location Number	Location	Sample Depths (ft)	TAL Metals	Cyanide	Nitrates	Perchlorate	VOCs	SVOCs	PCBs	Dioxins	Furans	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH
Outfall																				
Determine nature and vertical extent of potential contamination at the mouth of the outfall	1	Mouth of the outfall pipe	0–0.5 1.5–2 4–5	X X X	X X X	X X X	X X X	—[a] X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Determine nature and extent of potential contamination	2	7 ft downslope of the mouth of the outfall pipe	Two depths[b]	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination	3	7 ft west of location 2	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Determine nature and extent of potential contamination	4	7 ft east of location 2	Two depths	X X	X X	X X	X X	— X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

[a] — = This sample analysis will not be requested.

[b] One depth interval is in the sediment unit(s) and the other below the sediment/tuff interface.

Table 9.2-1
Summary of Proposed Sampling at SWMU 61-007

Objective Addressed	Location Number	Location	Sample Depths (ft)	VOCs	SVOCs	PCBs	pH
Determine nature and extent of potential subsurface contamination	1	Center of excavation	0–1[a] 4–5 9–10	X X X	X X X	X X X	X X X
Determine nature and extent of potential subsurface contamination	2	5 ft north of the excavation	0–1[b] 4–5 9–10 14–15 19–20 24–25	X X X X X X	X X X X X X	X X X X X X	X X X X X X
Determine nature and extent of potential subsurface contamination	3	5 ft east of the excavation	0–1[b] 4–5 9–10 14–15 19–20 24–25	X X X X X X	X X X X X X	X X X X X X	X X X X X X
Determine nature and extent of potential subsurface contamination	4	5 ft south of the excavation	0–1[b] 4–5 9–10 14–15 19–20 24–25	X X X X X X	X X X X X X	X X X X X X	X X X X X X
Determine nature and extent of potential subsurface contamination	5	5 ft west of the excavation	0–1[b] 4–5 9–10 14–15 19–20 24–25	X X X X X X	X X X X X X	X X X X X X	X X X X X X

[a] Zero depth is defined as immediately below the plastic demarcating the previous excavation.

[b] Zero depth is defined as 0.5 ft bgs.

Table 10.0-1
Summary of Investigation Methods

Method	Summary
Spade and Scoop Collection of Soil Samples	This method is typically used to collect shallow (i.e., 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 [i.d.]), 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.
Split-Spoon Core-Barrel Sampling	In this method, a stainless-steel core barrel (typically 4-in. i.d., 2.5 ft long) is advanced using a powered drilling rig. The core barrel extracts a continuous length of soil and/or rock that can be examined as a unit. The split-spoon core barrel is a cylindrical barrel split lengthwise so that the two halves can be separated to expose the core sample. Once extracted, the section of core is typically screened for radioactivity and organic vapors, photographed, and described in a geologic log. A portion of the core may then be collected as a discrete sample from the desired depth.
Headspace Vapor Screening	Individual soil, rock, or sediment samples may be field-screened for VOCs by placing a portion of the sample in a plastic sample bag or in a glass container with a foil-sealed cover. The container is sealed and gently shaken and allowed to equilibrate for 5 minutes. The sample is then screened by inserting a PID probe into the container and measuring and recording any detected vapors. PIDs must use lamps with voltage of 10.6 eV or higher.
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.
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 sample locations, sediment sample locations) are located by using a global positioning system. Horizontal locations will be measured to the nearest 0.5 ft. The survey results for this field event will be presented as part of the investigation report. Sample coordinates will be uploaded into the Environmental Restoration Database.

Table 10.0-1 (continued)

Method	Summary
Field Quality Control Samples	Field quality control samples are collected as directed in the Order on Consent as follows: *Field Duplicate*: At a frequency 10%; collected at the same time as a regular sample and submitted for the same analyses. *Equipment Rinsate Blank*: At a frequency of 10%; collected by rinsing sampling equipment with deionized water, which is collected in a sample container and submitted for laboratory analysis. *Trip Blanks*: Required for all field events that include the collection of samples for VOC analysis. Trip blanks containers of certified clean sand that are opened and kept with the other sample containers during the sampling process.
Field Decontamination of Drilling and Sampling Equipment	Dry decontamination is the preferred method to minimize generating liquid waste. Dry decontamination may include the use of a wire brush or other tool to remove soil or other material adhering to the sampling equipment, followed by use of a commercial cleaning agent (nonacid, waxless cleaners) and paper wipes. Dry decontamination may be followed by wet decontamination if necessary. Wet decontamination may include washing with a nonphosphate detergent and water, followed by a water rinse and a second rinse with deionized water. Alternatively, steam cleaning may be used.
Containers and Preservation of Samples	Specific requirements/processes for sample containers, preservation techniques, and holding times are based on EPA guidance for environmental sampling, preservation, and quality assurance. Specific requirements for each sample are printed on the sample collection logs provided by the 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.
Management, Characterization, and Storage of Investigation-Derived Waste	Investigation-derived waste (IDW) is managed, characterized, and stored in accordance with an approved waste characterization strategy form (WCSF) 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.

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Appendix A

Acronyms and Abbreviations,
Glossary, and Metric Conversion Table

A-1.0 ACRONYMS AND ABBREVIATIONS

AOC	area of concern
B	Bioscience Division
bgs	below ground surface
BMP	best management practice
BV	background value
CMR	Chemistry and Metallurgical Research
COPC	chemical of potential concern
CST	Chemical Sciences and Technology
D&D	decontamination and decommissioning
DOE	Department of Energy (U.S.)
DP	Delta Prime
EM	Environmental Management Division
ENV-ERS	Environmental Remediation and Surveillance
EPA	Environmental Protection Agency (U.S.)
ER	Environmental Restoration (as in *former ER Project*)
FV	fallout value
gpm	gallon per minute
GPR	ground penetrating radar
HIR	historical investigation report
HRL	Health Research Laboratory
HSE	Health, Safety, and Environment Division
HSWA	Hazardous and Solid Waste Amendments
IA	interim action
ID	identification
LAMC	Los Alamos Medical Center
LANB	Los Alamos National Bank
LANL	Los Alamos National Laboratory
LASL	Los Alamos Scientific Laboratory
LS	Life Sciences
MCAL	mobile chemistry analytical laboratory
MDA	material disposal area
MRAL	mobile radiological analytical laboratory
NFA	no further action
NMED	New Mexico Environment Department

NMHWA	New Mexico Hazardous Waste Act
NPDES	National Pollutant Discharge Elimination System
NOD	notice of deficiency
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PID	photoionization detector
QA/QC	quality assurance/quality control
QP	quality procedure
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
RPF	Records Processing Facility
SOP	standard operating procedure
SVOC	semivolatile organic compound
SMO	Sample Management Office
SWMU	solid waste management unit
TA	technical area
TAL	target analyte
TSCA	Toxic Substance Control Act
UC	University of California
ULR	Unassigned Land Reserve
UST	underground storage tank
VCA	voluntary corrective action
VCP	vitrified clay pipe
VOC	volatile organic compound
WSWL	western sanitary waste line

A-2.0 GLOSSARY

accelerated corrective action—A cleanup process used to implement presumptive remedies at small-scale and relatively simple sites where groundwater contamination is not a component of the accelerated cleanup, where the remedy is considered to be the final remedy for the site, and where the fieldwork will be accomplished within 180 days of the start of field activities. Accelerated corrective actions may be implemented before the approval of the accelerated corrective action work plan by the New Mexico Environment Department.

accelerated corrective measure—A cleanup process meeting the same criteria as an accelerated corrective action, except that an accelerated corrective measure cannot be implemented before New Mexico Environment Department approval of the accelerated corrective measure work plan.

accuracy—A measure of the closeness of measurements to the true value of the parameter being measured.

action level—(1) A numerical value that has been established by statistical analysis or has been set according to regulatory limits and is used as a criterion for action. Contamination found in a particular medium below an appropriate action level is not generally subject to remediation or further study. (2) A health- and environment-based concentration derived using chemical-specific toxicity information and standardized exposure assumptions. An action level can be developed on a facility-specific basis or can be taken from standardized lists.

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

administrative controls—Nonphysical or nonengineered mechanisms for managing risks to human health and the environment.

administrative order on consent—A legal agreement signed by the U.S. Environmental Protection Agency and an individual, business, or other entity through which a violator agrees to pay for the correction of violations, take the required corrective or cleanup actions, or refrain from an activity. It describes the actions to be taken, may be subject to a comment period, applies to civil actions, and can be enforced in court.

administrative record—All documents that the administrative authority considered, or relied on, when selecting the response action at a site, culminating in the record of decision for remedial action or an action memorandum for removal actions.

adverse condition—An all-inclusive term used to reference failures, malfunctions, defective items, and nonconformances.

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

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

alluvial fan—A fan-shaped piedmont accumulation of alluvium.

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

alpha radiation—A form of particle radiation that is highly ionizing and has low penetration. Alpha radiation consists of two protons and two neutrons bound together into a particle that is identical to a helium nucleus and can be written as He^{2+}.

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

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

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

anthropogenic—Of, relating to, or resulting from, the influence of human beings.

Approved Supplier List—A roster of suppliers who are approved and qualified to provide items or services to the Environmental Remediation and Surveillance Program.

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

aquitard—Geological formation that may contain groundwater but is not capable of transmitting significant quantities of it under normal hydraulic gradients.

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

area of contamination—As defined by the U.S. Environmental Protection Agency, certain areas of generally dispersed contamination that could be equated to a Resource Conservation and Recovery Act (RCRA) landfill. The movement of hazardous wastes within those areas would not be considered land disposal and would not trigger RCRA land-disposal restrictions. An area of contamination may be designated by the Environmental Remediation and Surveillance Program as part of a corrective action for waste management purposes, subject to approval by the administrative authority.

ash-flow tuff—A tuff deposited by a hot, dense volcanic current. Ash-flow tuff can be either welded tuff or nonwelded tuff.

as low as reasonably achievable (ALARA)—(1) An approach to radiation protection for controlling or managing exposure (both individual and collective) to the work force and the general public. (2) An approach for controlling or managing releases of radioactive material to the environment at levels as low as social, technical, economic, practical, and public-policy considerations permit. ALARA is not a dose limit.

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

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

background data—Data that represent naturally occurring concentrations of inorganic and radionuclide constituents in a geologic medium. Los Alamos National Laboratory's (the Laboratory's) background data are derived from samples collected at locations that are either within, or adjacent to, the Laboratory. These locations (1) are representative of geological media found within Laboratory boundaries, and (2) have not been affected by Laboratory operations.

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

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

background sample—A sample collected from an area or site that is similar to the one being studied but known, or thought, to be free from constituents of concern.

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

barrier—Any material or structure that prevents, or substantially delays, the movement of solid-, liquid-, or gaseous-phase chemicals in environmental media.

basalt—A fine-grained, dark volcanic rock composed chiefly of plagioclase, augite, olivine, and magnetite.

best management practices—Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from nonpoint sources.

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

bias—The systematic deviation from a true value that remains constant over replicated measurements within the statistical precision of the measurement process.

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

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

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

canopy—The cover formed by the leafy upper branches of surrounding trees and shrubs.

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

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

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

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

chemical of concern—A chemical identified in human-health or ecological risk assessments as posing a risk.

chemical of potential concern (COPC)—A detected chemical compound or element that has the potential to adversely affect human receptors as a result of its concentration, distribution, and toxicity.

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

cleanup levels—Media-specific contaminant concentration levels that must be met by a selected corrective action. Cleanup levels are established by using criteria such as the protection of human health and the environment; compliance with regulatory requirements; reduction of toxicity, mobility, or volume through treatment; long- and short-term effectiveness; implementability; and cost.

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

comment period—The time provided for the public to review and comment on a regulation action or rule-making after it has been published.

communication tracker (CT) number—A unique number assigned by the Environmental Remediation and Surveillance Program office to all incoming correspondence that needs a response (e.g., a notice of disapproval or request for supplemental information).

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

composite sample—A sample collected over a temporal or spatial range that typically consists of a series of discrete equal samples that have been combined.

conceptual hydrogeologic model—An approximation of the occurrence, movement, and quality of groundwater in a given area and the relationship of that groundwater to the surface water, soil water, and geologic framework in that area.

conceptual model—See site conceptual model.

confined—Pertaining to groundwater in an artesian aquifer.

confluence—A place where two or more streams or canyons meet; the point where a tributary meets the main stream.

Consent Order—See Compliance Order on Consent.

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

construction worker scenario—A land-use condition that evaluates exposures to a human receptor throughout a construction project. The activities typically involve substantial short-term on-site exposures.

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

contract analytical laboratory—An analytical laboratory under contract to the University of California to analyze samples from work performed at Los Alamos National Laboratory.

controlled area—An indoor or outdoor Los Alamos National Laboratory area to which access is controlled for security reasons or for the protection of individuals from exposure to radiation and/or hazardous materials.

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

corrective measure—An action taken at a solid waste management unit or area of concern to protect human health or the environment in the event of a release of contaminants into the environment, or to prevent a release of contaminants into the environment.

corrective measure evaluation—An evaluation of potential remedial alternatives undertaken to identify a preferred remedy that will be protective of human health and the environment and that will attain appropriate cleanup goals.

corrective measures implementation plan—A detailed plan and specifications to implement an approved remedy at a facility. The corrective measures implementation plan is the third step in the corrective action process and includes the design, construction, maintenance, and monitoring of the chosen remedy.

corrective measures study—A formal process for identifying and evaluating alternative remedies for releases at a facility.

Curie—A unit of radioactivity defined as the quantity of any radioactive nuclide that has an activity of 3.7×10^{10} disintegrations per second (dps).

data package—The hard copy deliverable for each sample delivery group produced by a contract analytical laboratory in accordance with the statement of work for analytical services.

data-quality assessment—The statistical and/or scientific evaluation of a data set that establishes whether the data set is adequate for its intended use.

data-quality objectives—Qualitative and quantitative statements of the overall level of uncertainty that a decision maker will accept regarding results or decisions based on environmental data. The objectives provide the statistical framework for planning and managing environmental data operations that will meet user needs.

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

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

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

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

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

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

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

deferred action—The postponement of the selection and implementation of a corrective measure.

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

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

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

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

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

document control—The process of ensuring that documents are reviewed for adequacy, approved for release by authorized personnel, and distributed to, and used at, the location where the prescribed activity is to be performed.

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

dose (dosage)—(1) The actual quantity of a chemical that is administered to an organism or to which it is exposed. (2) The amount of a substance that reaches a specific tissue (e.g., the liver). (3) The amount of a substance that is available for interaction with metabolic processes after it has crossed an organism's outer boundary.

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

environmental assessment—An environmental analysis that is prepared, pursuant to the National Environmental Policy Act, to determine whether a particular federal action would significantly affect the environment and thus require a more detailed environmental impact statement.

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

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

environmental surveillance—The collection and analysis of samples from air, water, soil, foodstuffs, biota, and other media to determine the environmental quality of an industry or community. Environmental surveillance is performed commonly at sites that contain nuclear facilities.

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

equipment blank (rinsate blank)—A sample used to rinse sample-collection equipment and expected to have negligible or unmeasurable amounts of analytes. The equipment blank is collected after the equipment decontamination is completed but before the collection of another field sample.

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

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

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

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

exposure pathway—Any path from the sources of contaminants to humans and other species or settings through air, soil, water, or food.

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

fallout radionuclides—Radionuclides that are present at globally elevated levels in the environment as a result of fallout from world-wide atomic weapons tests. The Los Alamos National Laboratory (the

Laboratory) background data sets consist of environmental surveillance samples taken from marginal and regional locations for the following radionuclides associated with fallout: tritium, cesium-137, americium-241, plutonium-238, plutonium-239/240, and strontium-90. Samples were collected from regional and marginal locations in the Laboratory's vicinity that were (1) representative of geological media found within Laboratory boundaries, and (2) were not impacted by Laboratory operations.

fault—A fracture, or zone of fractures, in rock along which vertical or horizontal movement has taken place and adjacent rock layers or bodies have been displaced.

field blank (field reagent blank)—A blank sample prepared in the field or carried to the sampling site, exposed to sampling conditions (e.g., by removing bottle caps), and returned to a laboratory to be analyzed in the same manner in which environmental samples are being analyzed. Field blanks are used to identify the presence of any contamination that may have been added during the sampling and analysis process.

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

field notebook—A record of activities performed in the field or a compilation of field data.

field reagent blank—See field blank.

field sample—See sample.

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

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

geohydrology—The science that applies hydrologic methods to the understanding of geologic phenomena.

grab sample—A specimen collected by a single application of a field sampling procedure to a target population (e.g., the surface soil from a single hole collected after the spade-and-scoop sampling procedure, or a single air filter left in the field for three months).

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

grout—Cement or bentonite mixtures used for sealing boreholes and wells and for zone isolation. Only Portland Type I or II cement is approved for use at investigative sites.

half-life—(1) The time required for a pollutant to lose one-half of its original concentration (for example, the biochemical half-life of DDT [dichlorodiphenyltrichloroethane] in the environment is 15 yr). (2) The time required for one half of the atoms in a radioactive element to undergo self-transmutation or decay (the half-life of radium is 1620 yr). (3) The time required for the elimination of one half of a total dose from the body.

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

hazardous constituent (hazardous waste constituent)—According to the March 1, 2005, Compliance Order of Consent (Consent Order), any constituent identified in Appendix VIII of Part 261, Title 40

Code of Federal Regulations (CFR) (incorporated by 20.4.1.200 New Mexico Administrative Code [NMAC]) or any constituent identified in 40 CFR 264, Appendix IX (incorporated by 20.4.1.500 NMAC).

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

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

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

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

holding time—The maximum elapsed time a sample can be stored without unacceptable changes in analyte concentrations. Holding times apply under prescribed conditions, and deviations from these conditions may affect the holding times. Extraction holding time refers to the time lapsed between sample collection and sample preparation. Analytical holding time refers to the time lapsed between sample preparation and analysis.

HSWA module—See Module VIII.

hydrogen-ion activity (pH)—The effective concentration (activity) of dissociated hydrogen ions (H+); a measure of the acidity or alkalinity of a solution that is numerically equal to 7 for neutral solutions, increases with alkalinity, and decreases as acidity increases.

"Hydrogeologic Workplan"—The document that describes the activities planned by Los Alamos National Laboratory (the Laboratory) to characterize the hydrologic setting beneath the Laboratory and to enhance the Laboratory's groundwater monitoring program.

hydrogeology—The science dealing with the occurrence of surface water and groundwater, their uses, and their functions in modifying the earth, primarily by erosion and deposition.

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

inspection—The critical examination or measurement of an item or activity to determine its conformance to applicable quality standards or specifications.

institutional controls—Controls that prohibit or limit access to contaminated media. Institutional controls may include use restrictions, permitting requirements, standard operating procedures, laboratory implementation requirements, laboratory implementation guidance, and laboratory performance requirements.

interim measure—An action that can be implemented to minimize or prevent the migration of contaminants and to minimize or prevent actual or potential human or ecological exposure to contaminants, while long-term final corrective action remedies are evaluated and, if necessary, implemented.

Intermittent stream—A stream that flows only in certain reaches as a result of the channel bed's losing and gaining characteristics.

Interrupted stream—A stream whose flow is discontinuous as a result of human-made structures.

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

land disposal—Placement in or on the land, except in a corrective-action management unit or staging pile; this includes, but is not limited to, placement in a landfill, surface impoundment, waste pile, injection well, or land treatment facility.

land-disposal restrictions—Requirements in Title 40 Code of Federal Regulations, Section 268 that specify treatment standards that protect human health and the environment when hazardous waste is land disposed. All hazardous waste, except under certain limited circumstances, must meet a specific treatment standard before it can be land disposed.

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

LANL (Los Alamos National Laboratory) data validation reason codes—The Los Alamos National Laboratory designations applied to sample data by data validators who are independent of the contract laboratory that performed a given sample analysis. Reason codes provide an analysis-specific explanation for applying a qualifier, with some description of the qualifier's potential impact on data use. For a complete list of data qualifiers applicable to any particular analytical suite, consult the appropriate Environmental Remediation and Surveillance Program standard operating procedure.

log book—A notebook used to record tabulated data (e.g., the history of calibrations, sample tracking, numerical data, or other technical data).

long-term environmental stewardship—All the activities required to maintain an adequate level of protection for human health and the environment from risks posed by nuclear and/or chemical materials, waste, and contamination that remain after cleanup is complete.

Los Alamos unlimited release (LA-UR) number—A unique identification number required for all documents or presentations prepared for distribution outside Los Alamos National Laboratory (the Laboratory). LA-UR numbers are obtained by filling out a technical information release form (http://enterprise.lanl.gov/alpha.htm) and submitting the form together with 2 copies of the document to the Laboratory's Classification Group (S-7) for review.

lower acceptance limit (LAL)—The lowest limit that is acceptable according to quality control (QC) criteria for a specific QC sample and for a specific method. Any results lower than the LAL are qualified following the routine validation procedure.

material disposal area (MDA)—A subset of the solid waste management units at Los Alamos National Laboratory (the Laboratory) that include disposal units such as trenches, pits, and shafts. Historically, various disposal areas (but not all) were designated by the Laboratory as MDAs.

matrix—Relatively fine material in which coarser fragments or crystals are embedded; also called "ground mass" in the case of igneous rocks.

maximum contaminant level (MCL)—Under the Safe Drinking Water Act, the maximum permissible level of a contaminant in water that is delivered to any user of a public water system serving 15 or more connections and 25 or more people. MCLs are enforceable standards and take into account the feasibility and cost of attaining the standards.

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

medium (geological)—The solid part of the hydrogeological system; may be unsaturated or saturated.

method detection limit (MDL)—The minimum concentration of a substance that can be measured and reported with a known statistical confidence that the analyte concentration is greater than zero. After subjecting samples to the usual preparation, the MDL is determined by analyzing those samples of a given matrix type that contain the analyte. The MDL is used to establish detection status.

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

migration pathway—A route (e.g., a stream or subsurface flow path) for the potential movement of contaminants to environmental receptors (plants, humans, or other animals).

minimum detectable activity (MDA)—For the analysis of radionuclides, the lowest detectable radioactivity for a given analytical technique. The following equation is used to calculate the MDA unless otherwise noted or approved by Los Alamos National Laboratory. (Note: "MDA" here should not to be confused with material disposal area):

$$MDA = \frac{4.65(BKG)^{0.5} + 2.71}{2.22 \times EFF \times V \times T_S \times Y} ,$$

where BKG = the total background counts, EFF = the fraction detector efficiency,
V = the volume or unit weight,
Ts = the sample count duration, and
Y = the fractional chemical recovery obtained from the tracer recovery.

Depending on the type of analysis, other terms may also be required in the denominator (e.g., gamma abundance).

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

model—A schematic description of a physical, biological, or social system, theory, or phenomenon that accounts for its known or inferred properties and may be used for the further study of its characteristics.

Module VIII—Module VIII of the Los Alamos National Laboratory (the Laboratory) Hazardous Waste Facility Permit. This permit allows the Laboratory to operate as a hazardous-waste treatment, storage, and disposal facility. From 1990 to 2005, Module VIII included requirements from the Hazardous and

Solid Waste Amendments. These requirements have been superceded by the March 1, 2005, Compliance Order on Consent (Consent Order).

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

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

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

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

notice of deficiency—A written notification from the administrative authority to a facility owner/operator following the review of a permit application or other permit-related plan or report. A notice of deficiency requests additional information before a decision can be made regarding the original plan or report.

notices of approval, of approval with modification, or of disapproval—Notices issued by the New Mexico Environment Department (NMED). Upon receipt of a work plan, schedule, report, or other deliverable document, NMED reviews the document and approves the document as submitted, modifies the document and approves it as modified, or disapproves the document. A notice of approval means that the document is approved as submitted. A notice of approval with modifications means that the document is approved but with modifications specified by NMED. A notice of disapproval means that the document is disapproved and it states the deficiencies and other reasons for disapproval.

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

outfall—A place where effluent is discharged into receiving waters.

panel review—A type of decision peer review or document peer review that includes a face-to-face meeting between authors and reviewers for a discussion of issues.

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

perched water—A zone of unpressurized water held above the water table by impermeable rock or sediment.

perennial stream—Water in a channel or bed that flows continuously throughout the year.

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

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

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

population—(1) A group of interbreeding organisms occupying a particular space. (2) The number of humans or other living creatures in a designated area.

porosity—The degree to which soil, gravel, sediment, or rock is permeated with pores or cavities through which water or air can move.

potential release site—A term for a potentially contaminated site at Los Alamos National Laboratory that refers to solid waste management units and areas of concern.

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

quality control—See quality assurance/quality control.

quality-control sample—A specimen that, upon analysis, is intended to provide information that is useful for adjusting, controlling, or verifying the continuing acceptability of sampling and/or analysis activities in progress.

quality management—The portion of an organization's overall management system that determines and implements the quality policy. Quality management includes strategic planning, allocation of resources, and other systematic activities (e.g., planning implementation and assessment) pertaining to an organization's quality standards.

quality management plan (QMP)—A document providing a framework for planning, implementing, and assessing work performed by an organization and for carrying out required quality assurance/quality control. A QMP is part of an organization's structured and documented management system that describes the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan for ensuring quality in work processes, products, and services.

quality procedure—A document that describes the process, method, and responsibilities for performing, controlling, and documenting any quality-affecting activity governed by a quality management plan.

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

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

radioactive tracer—A radionuclide added to, or induced in, a sample for the purpose of monitoring chemical or physical losses of target analytes. The tracer is assumed to behave in the same manner as the target analytes.

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

radioactivity (radioactive decay; radioactive disintegration)—The spontaneous change in an atom by the emission of charged particles and/or gamma rays.

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

RCRA facility assessment (RFA)—Usually the first step in the Resource Conservation and Recovery Act (RCRA) corrective action process. The RFA includes the identification of potential and actual releases from solid waste management units and preliminary determinations about releases and the need for corrective action and stabilization measures.

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

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

read review—A review of a written document performed by a reviewer individually (without meeting as a group).

readiness planning—The process of identifying, sequencing, and scheduling the preparatory activities for fieldwork to ensure compliance with the applicable Los Alamos National Laboratory, local, state, and federal procedural requirements, standards, and regulations, including those regarding human health and safety and the environment.

readiness review—A process to ensure compliance to identified requirements, to document consensus that fieldwork may proceed, and to ensure that the associated activities are closed or scheduled appropriately.

readiness review checklist—An itemized guide for readiness planning and readiness review (Quality Procedure 5.3); this checklist is not designed to be comprehensive for all fieldwork.

receptor—A person, other animal, plant, or geographical location that is exposed to a chemical or physical agent released to the environment by human activities.

recharge—The process by which water is added to a zone of saturation, usually by percolation from the soil surface (e.g., the recharge of an aquifer).

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

recreational scenario—A land-use condition under which individuals may be exposed to contaminants for a limited amount of time as a result of outdoor activities such as hiking, camping, hunting, or fishing.

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

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

regulatory standard—Media-specific contaminant concentration levels of potential concern that are mandated by federal or state legislation or regulation (e.g., the Safe Drinking Water Act, New Mexico Water Quality Control Commission regulations).

relative percent difference (RPD)—The measure used to assess the precision between parent results and their associated duplicate results. The RPD is calculated as follows:

$$|RPD| = \frac{S - R}{\left(\frac{S + R}{2}\right)100},$$

where RPD = relative percent difference,
S = parent sample result, and
R = duplicate sample result.

The Environmental Remediation and Surveillance Program criteria for the RPD are less than 20% for aqueous samples and less than 35% for soil samples when the sample concentrations are greater than, or equal to, five times the method detection limit (MDL). For samples with concentrations less than five times the MDL, but greater than the MDL, the control is +/-MDL. No precision criterion applies to samples with concentrations less than the MDL.

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

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

remediation waste—All solid wastes and hazardous wastes, and all media (including groundwater, surface water, soils, and sediments) and debris, that are managed for implementing cleanup.

reporting limit (RL)—The numerical value that an analytical laboratory (in conjunction with its client) selects for determining if a target analyte has been detected. Results below the RL are considered to be undetected, but results above the RL are considered to be detected. The RLs are not necessarily based on instrument sensitivity. RLs can be established at the instrument detection limit, method detection limit, estimated quantitation limit, or contract-required detection limit.

request for supplemental information—A request issued by the administrative authority (AA) that states that some aspect(s) of a plan or report does not meet the AA's requirements and that additional information is needed.

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

residential scenario—The land use condition under which individuals may be exposed to contaminants as a result of living on or near contaminated sites.

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

restricted area—Any area to which access is controlled by a licensee to protect individuals from exposure to radiation and radioactive materials. The "restricted area" shall not include areas used as residential quarters, although a separate room or rooms in a residential building may be set apart as a restricted area.

retardation—An act or process that reduces the rate of movement of a chemical substance in water relative to the average velocity of the water. The movement of chemical substances in water can be retarded by adsorption and precipitation reactions, and by diffusion into pore water in a given sedimentary or rock matrix.

rinsate blank—See equipment blank.

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

risk analysis—In the quality assurance field, a qualitative evaluation of the probability and the potential consequences associated with noncompliant documents or work activities.

risk assessment—See baseline risk assessment.

risk characterization—The last phase in the risk assessment process which estimates the potential for adverse health or ecological effects to occur as a result of exposure to a stressor, and which evaluates the uncertainty involved.

risk management—The process of evaluating and selecting alternative regulatory and nonregulatory responses to risk. The selection process necessarily requires the consideration of legal, economic, and behavioral factors.

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

run-on—Surface water that flows onto an area as a result of runoff occurring higher up on a slope.

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

sample matrix—In chemical analysis, that portion of a sample that is exclusive of the analytes of interest. Together, the matrix and the analytes of interest form the sample.

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

screening risk assessment—A risk assessment that is performed with few data and many assumptions in order to identify exposures that should be evaluated more carefully for potential risk.

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

significant condition—A condition that, if uncorrected, could have a serious effect on quality, project personnel, or public safety, or which could have a major impact on project costs or schedules.

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

site closeout inspection—An on-site inspection conducted after the completion of fieldwork. The closeout inspection verifies that all fieldwork has been completed and that all compliance issues have been resolved.

site closeout packet—Documentation related to fieldwork that includes field logs, waste-management documentation, best management practice (BMP) inspection records, and sample-management records.

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

site-specific health and safety plan (SSHASP)—A health and safety plan that has been tailored to a site or to an Environmental Remediation and Surveillance (ERS) Program field activity and that has been approved by an ERS health and safety representative. A SSHASP contains information specific to the project, including the scope of work, relevant history, descriptions of hazards from activity associated with the project site(s), and techniques for exposure mitigation (e.g., personal protective equipment and hazard mitigation).

slope—A ratio of units of elevation change to units of horizontal change, usually expressed in degrees.

soil—(1) A material that overlies bedrock and has been subject to soil-forming processes. (2) A sample media group that includes naturally occurring and artificial fill materials.

soil gas—Gaseous elements and compounds in the small spaces between particles of the earth and soil. Such gases can be moved or driven out under pressure.

soil hygrometer—An instrument that measures soil moisture.

soil moisture—The water contained in the pore space of the unsaturated zone.

soil screening level (SSL)—The concentration of a chemical (inorganic or organic) below which no potential for unacceptable risk to human health exists. The derivation of an SSL is based on conservative exposure and land-use assumptions, and on target levels of either a hazard quotient of 1.0 for a noncarcinogenic chemical or a cancer risk of 10^{-5} for a carcinogenic chemical.

soil water—Water in the unsaturated zone, regardless of whether it occurs in soil or rock.

solid waste—Any garbage, refuse, or sludge from a waste treatment plant, water-supply treatment plant, or air-pollution control facility, and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations and from community activities. Solid waste does not include solid or dissolved materials in domestic sewage; solid or dissolved materials in irrigation return flows; industrial discharges that are point sources subject to permits under section 402 of the Federal Water Pollution Control Act, as amended; or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended.

solid waste management unit (SWMU)—(1) Any discernible site at which solid wastes have been placed at any time, whether or not the site use was intended to be the management of solid or hazardous waste. SWMUs include any site at a facility at which solid wastes have been routinely and systematically released. This definition includes regulated sites (i.e., landfills, surface impoundments, waste piles, and land treatment sites), but does not include passive leakage or one-time spills from production areas and sites in which wastes have not been managed (e.g., product storage areas). (2) According to the March 1, 2005, Compliance Order on Consent (Consent Order), any discernible site at which solid waste has been placed at any time, and from which the New Mexico Environment Department determines there may be a risk of a release of hazardous waste or hazardous waste constituents (hazardous constituents), whether or not the site use was intended to be the management of solid or hazardous waste. Such sites include any area in Los Alamos National Laboratory at which solid wastes have been routinely and systematically released; they do not include one-time spills.

split sample—A sample that has been divided into two or more portions that are expected to be of the same composition; used to characterize within-sample heterogeneity, sample handling, and measurement variability.

spring—Groundwater seeping out of the earth where the water table intersects the ground surface.

standard operating procedure—A document that details the officially approved method(s) for an operation, analysis, or action, with thoroughly prescribed techniques and steps.

stratification—The process of separating into layers.

stratigraphy—The study of the formation, composition, and sequence of sediments, whether consolidated or not.

Superfund—Another term for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The two terms are used interchangeably.

surface sample—A sample taken at a collection depth that is (or was) representative of the medium's surface during the period of investigative interest. A typical depth interval for a surface sample is 0 to 6 in. for mesa-top locations, but may be up to several feet in sediment-deposition areas within canyons.

target analyte—A chemical or parameter, the concentration, mass, or magnitude of which is designed to be quantified by a particular test method.

technical area (TA)—At Los Alamos National Laboratory, an administrative unit of operational organization (e.g., TA-21).

technical notebook—A record of the methodology, observations, and results of technical activity investigations.

topography—The physical or natural features of an object or entity and their structural relationships.

toxic pollutant—A water contaminant or combination of water contaminants in concentration(s) that, upon exposure, ingestion, or assimilation, either directly from the environment or indirectly by ingestion through food chains, will unreasonably threaten to injure the health of humans, or the health of other animals or plants that are commonly hatched, bred, cultivated, or protected for use by humans for food or economic benefit.

tracer—A substance, usually a radioactive isotope, that is added to, or induced in, a sample for the purpose of monitoring chemical or physical losses of the target analytes. The tracer is assumed to behave in the same manner as the target analytes.

transmissivity—The ability of an aquifer to transmit water.

transport (transportation)—(1) The movement of a hazardous waste by air, rail, highway, or water. (2) The movement of a contaminant from a source through a medium to a receptor.

treatment—Any method, technique, or process, including elementary neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, recover energy or material resources from the waste, or to render such waste nonhazardous or less hazardous; safer to transport, store, or dispose of; or amenable for recovery or storage; or reduced in volume.

treatment, storage, and disposal facility—An interim-status or permitted facility in which hazardous waste is treated, stored, or disposed.

trip blank—A sample of analyte-free medium taken from a sampling site and returned to an analytical laboratory unopened, along with samples taken in the field; used to monitor cross contamination of samples during handling and storage both in the field and in the analytical laboratory.

tuff—Consolidated volcanic ash, composed largely of fragments produced by volcanic eruptions.

unconfined aquifer—An aquifer containing water that is not under pressure; the water level in a well is the same as the water table outside the well.

underground storage tank—A tank located at least partially underground and designed to hold gasoline or other petroleum products or chemicals.

unique identifier—A word or code that aids in the ability to trace the history, application, or location of an activity, item, datum, or sample using recorded documentation. For Environmental Remediation and Surveillance Program records, a unique identifier is an alphanumeric identifier assigned to a primary record.

unrestricted area—Any area, whose access is not controlled by a licensee for purposes of protecting individuals from exposure to radiation and radioactive materials, and any area used for residential quarters.

unsaturated zone—The area above the water table where soil pores are not fully saturated, although some water may be present.

upper acceptance limit (UAL)—The highest limit that is acceptable, based on the quality control (QC) criteria for a specific QC sample for a specific method. Any results greater than the UAL are qualified.

upper confidence limit—The statistic that represents the upper bound of the arithmetic mean (usually 95%) of the measured data and that is used in a risk assessment as the reasonable maximum exposure point concentration.

upper tolerance limit—A statistical measure of the upper end of a distribution. The 95th percentile upper tolerance limit, which is the 95% upper percentile of the 95th percentile of the data distribution, is the background value used to represent the background data distribution for an inorganic chemical or naturally occurring radionuclide.

U.S. Department of Energy—The federal agency that sponsors energy research and regulates nuclear materials for weapons production.

U.S. Environmental Protection Agency (EPA)—The federal agency responsible for enforcing environmental laws. Although state regulatory agencies may be authorized to administer some of this responsibility, EPA retains oversight authority to ensure the protection of human health and the environment.

vadose zone—The zone between the land surface and the water table within which the moisture content is less than saturation (except in the capillary fringe) and pressure is less than atmospheric. Soil pore space also typically contains air or other gases. The capillary fringe is included in the vadose zone.

verification—A test or tests, generally performed before and after logging in lieu of a calibration, to ascertain whether the logging system is operating properly. Verification differs from calibration in that it does not provide updated system-calibration values..

water balance—The relationship between water input (precipitation) and water output (runoff, evapotranspiration, and recharge) in a hydrological system.

water content—The amount of water in an unsaturated medium, expressed as the ratio of the weight of water in a sample to the weight of the oven-dried sample (often expressed as a percentage).

Drill cuttings. The drill-cuttings waste stream will consist of cuttings from all boreholes drilled during field activities. Drill cuttings will be collected and containerized at the point of generation (i.e., at the drill rig). The drill-cutting waste stream will be characterized with analytical results from core samples augmented by direct sampling of the containerized waste. The maximum detected concentrations of radionuclides will be compared with background/fallout values. If maximum concentrations exceed background/fallout values, the waste cuttings will be designated as low-level radioactive waste. Total concentrations of toxicity characteristic leaching procedure (TCLP) constituents will be compared with 20 times the TCLP regulatory level. If total concentrations are less than 20 times the TCLP regulatory level, the waste cuttings will be designated nonhazardous by characteristic. If total concentrations exceed 20 times the TCLP regulatory level, the waste cuttings will be sampled and analyzed using the TCLP to determine if it is hazardous by characteristic. If potential listed hazardous waste constituents are detected, the Laboratory will conduct a review of historical records and data to determine whether the source of each constituent was as a listed hazardous waste at its point of generation. If the source is determined to be a listed hazardous waste, the cuttings will be managed as hazardous or mixed waste (depending on the levels of radioactivity). Otherwise, the cuttings will be managed as nonhazardous solid waste or low-level waste (LLW) (depending on the levels of radioactivity). These wastes will be stored within 20 yd roll-off containers in secure, designated waste staging areas within the aggregate area boundary[KV1]. Based on the results of previous investigations, the Laboratory expects these wastes to be designated as low-level radioactive waste that will be disposed of at Technical Area (TA) 54.

Metal, concrete, gravel, boulder, and clay pipe debris. This waste stream will consist of inactive drain lines and structures that may be removed during the site investigations. These wastes will be collected and containerized at the point of generation (i.e., at the excavation). These wastes will be characterized based on acceptable knowledge of processes associated with the debris, acceptable knowledge from site characterization sampling and, if necessary, direct sampling of the waste. These wastes will be stored in secure, designated waste staging areas within the aggregate area boundary. The Laboratory expects these wastes to be designated as low-level radioactive waste that will be disposed of at TA-54.

Spent PPE. The spent PPE waste stream will consist of PPE that has potentially contacted contaminated environmental media (i.e., core and/or drill cuttings) and that cannot be decontaminated. The bulk of this waste stream will consist of protective clothing such as coveralls, gloves, and shoe covers. Spent PPE will be collected in containers at personnel decontamination stations. Characterization of this waste stream will be performed through acceptable knowledge of the waste materials, the methods of generation, and the analytical results from the sampling of the environmental media with which the materials were in contact. These wastes will be stored in secure, designated waste staging areas within the aggregate area boundary. The Laboratory expects these wastes to be designated as low-level radioactive waste that will be disposed of at TA-54.

Disposable sampling supplies. The disposable sampling supplies waste stream will consist of all equipment and materials necessary for collecting samples that come into direct contact with contaminated environmental media and that cannot be decontaminated. This waste stream also includes wastes associated with dry decontamination activities. This waste stream will consist primarily of paper and plastic items collected in bags at the sampling location and transferred to accumulation drums. Characterization of this waste stream will be performed through acceptable knowledge of the waste materials, the methods of generation, and the analytical results from the sampling of the environmental media with which the materials were in contact. These wastes will be stored in secure, designated waste staging areas within the aggregate area boundary. The Laboratory expects these wastes to be designated as low-level radioactive waste that will be disposed of at TA-54.

B-2.0 REFERENCE

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author, publication date, and ER identification (ID) number. This information is also included in text citations. ER ID numbers are assigned by the Environmental Stewardship–Environmental Remediation and Surveillance (ENV-ERS) Program Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the ENV-ERS Program master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau, the U.S. Department of Energy–Los Alamos Site Office, EPA Region 6, and the ENV-ERS Program. 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.

LANL (Los Alamos National Laboratory), November 2005. "Los Alamos National Laboratory Hazardous Waste Minimization Report," Los Alamos National Laboratory document LA-UR-05-8650, Los Alamos, New Mexico. (LANL 2005, 91291)

Table B-1.0-1
Summary of Anticipated Investigation-Derived Waste Generation and Management

Waste Stream	Expected Waste Type	Estimated Volumes	Characterization Method	On-Site Management	Expected Disposition
Drill cuttings	LLW	20 yd^3	AK and direct waste sampling results	20 yd^3 roll-off containers	Disposal at TA-54
Metal, concrete, gravel, boulders, and clay pipe debris	LLW	20 yd^3	AK and direct waste sampling results	20 yd^3 roll-off containers	Disposal at TA-54
Spent PPE	LLW	Less than 55 gal.	AK obtained from investigation samples.	Accumulation in 55-gal. drum	Disposal at TA-54
Disposable sampling supplies	LLW	Less than 55 gal.	AK obtained from investigation samples.	Accumulation in 55-gal. drum	Disposal at TA-54

Appendix C

Data Sources for Figures

Feature Data Source Statements for Map Products
Environmental Stewardship–Environmental Remediation & Surveillance Program
GIS Project PMR05046

Map Numbers of the Series with Prefix "PMR05046"

Aggregate Areas; Los Alamos National Laboratory, ENV–Environmental Remediation & Surveillance Program, ER2005-0496; 1:2,500 Scale Data; 22 Sept 2005.

Canyon Rim, Former Location of the, Townsite South Rim; in "Line Features, Not Controlled"; Los Alamos National Laboratory, Environmental Remediation and Surveillance Program, Edition 2006-0B; 1:2,500 Scale Data; 10 March 2006.

Canyon Rim, Location of the, Townsite South Rim in 1991; in "Line Features, Not Controlled"; Los Alamos National Laboratory, Environmental Remediation and Surveillance Program, Edition 2006-0B; 1:2,500 Scale Data; 10 March 2006.

Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; Development Edition of 06 January 2005.

Former Acid Sewer (Industrial Waste) Features of Technical Area (TA) 01; ENV–Environmental Restoration & Surveillance Program, Proposed feature class FRMRTA01_acidsewer_arc, GIS Project PMR05046; 1:2,500 Scale Data; 28 September 2005.

Former Acid Sewer (Industrial Waste) Features of Technical Area (TA) 03; ENV–Environmental Restoration & Surveillance Program, Proposed feature class FRMRTA03_acidsewer_arc, GIS Project PMR05046; 1:2,500 Scale Data; 19 January 2006.

Former Acid Sewer (Industrial Waste) Features of Technical Area (TA) 43; ENV–Environmental Restoration & Surveillance Program, Proposed feature class FRMRTA43_acidsewer_arc, GIS Project PMR05046; 1:2,500 Scale Data; 16 December 2005.

Former Building Drain Lines of Technical Area (TA) 01; ENV–Environmental Restoration & Surveillance Program, Proposed feature class FRMRTA01_bldgdrainlines_arc, GIS Project PMR05046; 1:2,500 Scale Data; 14 September 2005.

Former Building Drain Lines of Technical Area (TA) 32; ENV–Environmental Restoration & Surveillance Program, Proposed feature class FRMRTA32_bldgdrainlines_arc, GIS Project PMR05046; 1:2,500 Scale Data; 09 December 2005.

Former Edge of Road Features of Technical Area (TA) 00; ENV–Environmental Restoration & Surveillance Program, Proposed data for feature class "Line Features, Not Controlled"; 1:2,500 Scale Data; 22 December 2005.

Former Excavations of Technical Area (TA) 00; ENV–Environmental Restoration & Surveillance Program, Proposed data for feature class "Line Features, Not Controlled"; 1:2,500 Scale Data; 22 December 2005.

Former Other Underground Conduit Features of Technical Area (TA) 00; ENV–Environmental Restoration & Surveillance Program, Proposed data for feature class "Line Features, Not Controlled"; 1:2,500 Scale Data; 21 December 2005.

Former Patrol Road, South Canyon Rim, Technical Area (TA) 01; in "Line Features, Not Controlled"; Los Alamos National Laboratory, Environmental Remediation and Surveillance Program, Edition 2006-0B; 1:2,500 Scale Data; 10 March 2006.

Former Sanitary Sewer Features of Technical Area (TA) 01; ENV–Environmental Restoration & Surveillance Program, Proposed feature class FRMRTA01_sanitarysewer_arc, GIS Project PMR05046; 1:2,500 Scale Data; 20 September 2005.

Former Sanitary Sewer Features of Technical Area (TA) 41; ENV–Environmental Restoration & Surveillance Program, Proposed feature class FRMRTA41_sanitarysewer_arc, GIS Project PMR05046; 1:2,500 Scale Data; 23 November 2005.

Former Sanitary Sewer Features of Technical Area (TA) 43; ENV–Environmental Restoration & Surveillance Program, Proposed feature class FRMRTA43_sanitarysewer_arc, GIS Project PMR05046; 1:2,500 Scale Data; 01 December 2005.

Former Storm Drain Features of Technical Area (TA) 01; ENV–Environmental Restoration & Surveillance Program, Proposed feature class FRMRTA01_stormdrain_arc, GIS Project PMR05046; 1:2,500 Scale Data; 08 December 2005.

Former Storm Drain Features of Technical Area (TA) 41; ENV–Environmental Restoration & Surveillance Program, Proposed feature class FRMRTA41_stormdrain_arc, GIS Project PMR05046; 1:2,500 Scale Data; 23 November 2005.

Former Storm Drain Features of Technical Area (TA) 43; ENV–Environmental Restoration & Surveillance Program, Proposed feature class FRMRTA43_stormdrain_arc, GIS Project PMR05046; 1:2,500 Scale Data; 01 December 2005.

Former Structures of Technical Area (TA) 00; ENV–Environmental Restoration & Surveillance Program, Proposed feature class FRMRTA01_structures_ply, GIS Project PMR05046; 1:2,500 Scale Data; 22 December 2005.

Former Structures of Technical Area (TA) 01; ENV–Environmental Restoration & Surveillance Program, Proposed feature class FRMRTA01_structures_ply, GIS Project PMR05046; 1:2,500 Scale Data; 21 December 2005.

Former Structures of Technical Area (TA) 03; ENV–Environmental Restoration & Surveillance Program, Proposed feature class FRMRTA03_structures_ply, GIS Project PMR05046; 1:2,500 Scale Data; 20 January 2006.

Former Structures of TA-32, Medical Research Lab; Los Alamos National Laboratory, ENV–Environmental Remediation and Surveillance Program, ER2006-0054; 1:2,500 Scale Data; 23 February 2006.

Former Structures of Technical Area (TA) 41; ENV–Environmental Restoration & Surveillance Program, Proposed feature class FRMRTA41_structures_ply, GIS Project PMR05046; 1:2,500 Scale Data; 23 January 2006.

Former Structures of Technical Area (TA) 43; ENV–Environmental Restoration & Surveillance Program, Proposed feature class FRMRTA43_structures_ply, GIS Project PMR05046; 1:2,500 Scale Data; 23 December 2005.

Hypsography, 2, 10, 20 and 100 Foot Contour Intervals; Los Alamos National Laboratory, ENV–Environmental Remediation and Surveillance Program; 1991.

LANL Technical Areas; Los Alamos National Laboratory, Site and Project Planning Group; 01 February 2003 as captured 07 September 2004.

Paved Parking; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; Development Edition of 06 January 2005.

Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; Development Edition of 06 January 2005.

Point Feature Locations of the Environmental Restoration Project Database; Los Alamos National Laboratory, ENV– Environmental Remediation and Surveillance Program, ER2005-0401; 16 June 2005.

Ponds; County of Los Alamos, Information Services; 07 September 2004.

Potential Release Sites, ed. 2005-0323; Los Alamos National Laboratory, ENV–Division, Environmental Remediation & Surveillance Program; 1:2,500 Scale Data; 12 August 2005.

Potential Release Sites of TA-32, GIS Spatial Features Representing; Spatial Theme Change Form SUID CC06014; ER Document ER2006-0210; 07 March 2006.

Potential Release Sites, Technical Area (TA) 00 Proposed Changes; Los Alamos National Laboratory, ENV– Environmental Remediation and Surveillance Program, GIS Project PMR05046; 1:2,500 Scale Data; 26 January 2006.

Potential Release Sites, Technical Area (TA) 01 Proposed Changes; Los Alamos National Laboratory, ENV– Environmental Remediation and Surveillance Program, GIS Project PMR05046; 1:2,500 Scale Data; 08 December 2005.

Potential Release Sites, Technical Area (TA) 03 Proposed Changes; Los Alamos National Laboratory, ENV– Environmental Remediation and Surveillance Program, GIS Project PMR05046; 1:2,500 Scale Data; 26 January 2006.

Potential Release Sites, Technical Area (TA) 41 Proposed Changes; Los Alamos National Laboratory, ENV– Environmental Remediation and Surveillance Program, GIS Project PMR05046; 1:2,500 Scale Data; 24 February 2006.

Potential Release Sites, Technical Area (TA) 43 Proposed Changes; Los Alamos National Laboratory, ENV– Environmental Remediation and Surveillance Program, GIS Project PMR05046; 1:2,500 Scale Data; 02 December 2005.

Potential Release Sites, Technical Area (TA) 61 Proposed Change; Los Alamos National Laboratory, ENV– Environmental Remediation and Surveillance Program, GIS Project PMR05046; 1:2,500 Scale Data; 17 February 2006.

Primary Landscape Features; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; Development Edition of 05 January 2005.

Road Centerlines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; Development Edition of 06 January 2005.

Road Centerlines for the County of Los Alamos; County of Los Alamos, Information Services; 07 September 2004.

Streets; County of Los Alamos, Information Services; 08 September 2004.

Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; Development Edition of 22 June 2005.

Structures; County of Los Alamos, Information Services; 08 September 2004.

Well Locations (feature class); ENV–Water Quality & Hydrology; 04 November 2004.

TARGET PAGE

This target page represents **media that was not** scanned. The original media **can be obtained through** the Records Processing **Facility.**

ER ID # 091916

RECORD TYPE: MAP / Plate 1

DATE: April 2006

SYMBOL: LA-UR-06-2464 / ER2006-0224

SUBJECT:

Upper Los Alamos Canyon Aggregate Area SWMU's and AOC's

TARGET PAGE

This target page represents media that was **not** scanned. The original media can be obtained **through** the Records Processing **Facility.**

ER ID # 091916

RECORD TYPE: Map / Plate 2

DATE: April 2006

SYMBOL: LA-UR-06-2464 / ER2006-0224

SUBJECT:
TA-01 Site map

TARGET PAGE

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ER ID # 091916

RECORD TYPE: CD

DATE: April 2006

SYMBOL: LA-UR-06-2464 / ER2006-0226

SUBJECT: Investigation Work Plan for Upper Los Alamos Canyon Aggregate Area.

Attachment B: Peer Review Comment Form

Part 1 (Author or Peer Review (PR) Coordinator Complete) Date: 3/1/06

Title Upper LA Canyon Aggregate IWP Rev. #: ___ Doc. Catalog No: **ER200** - ____

Reviewer's Name (Print): Kelly VanDerpoel Organization: ENV-SWRC Comments due by: 3/15/06 (Date)

Author: Becky Coel-Roback Phone: ________ E-Mail: ________

Return forms to PR Coordinator: Cheri Vidlak Phone: 7-2728 E-Mail: cvidlak@lanl.gov

Part 2 (Reviewer Completes)

Date Received: 3/1/06 Date Review Completed: 3/20/06

Signature & Date (to be signed ONLY upon agreement of comment resolution): Kelly VanDerpoel Date: 4/25/06

Part 3 (If under time constraints, the Author and Reviewer each sign.) ☐ Not all comments resolved; attach PR Comment Form to Document Signature Form.

Author Signature & Date: ________

Reviewer Signature & Date: ________

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
1	general	A Notice of Disapproval (NOD) was issued recently on the Middle LA Canyon investigation work plan. Suggest reviewing the NOD comments to see what the issues were and determine if any adjustments should be made to this work plan to avoid similar comments.	A	We adjusted our work plan to avoid getting similar NOD comments to the Middle LA work plan. For example, we added analyses of PCBs, VOCs, and SVOCs to analytical suites for all sites except the rad-only ones, and deleted text on VOC field screening.	

[1]page, section #, paragraph/line [2]A = accept / R = reject

Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
2	general	General comment concerning format of the plan: Chapter 11 of the Order requires a section on Background and a section on Scope of Activities. In this document, background and scope information is broken up by TA and SWMU/AOC. I don't necessarily think this is a problem, but it may be appropriate to note this in Section 1.1 so that it is very clear how the background and scope information requirements are being met.	A	The plan outline was approved by Darlene Goering in an email dated 2/20/2006. In addition, we added one paragraph at the end of Section 1.1 to talk about how the work plan is structured.	
3	p. 1, ¶3, line 1 and globally in document	Suggest changing "hazardous and radioactive constituents" to "hazardous constituents and radionuclides".	A	Text modified accordingly	
4	p. 1, ¶4, line 3	Delete "Act" after "(HSWA)".	A	Text modified accordingly	
5	p. 1, ¶4, lines 4, 6, and globally in document	The "HSWA Module VIII" should be referred to as **"Module VIII of the Hazardous Waste Facility Permit"** throughout the document. Other variations (e.g., "HSWA Module") should also be changed throughout.	A	Text modified accordingly	

[1]page, paragraph, line [2]A = accept / R = reject

Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
6	p. 1, ¶4, line 8	Replace the sentence: "Pursuant to the Consent Order, ..." with "In accordance with Consent Order requirements, a permit modification is in progress that replaces the corrective action requirements of Module VIII of the Hazardous Waste Facility Permit with those of the Consent Order". Delete the sentence: "The Consent Order is the controlling document...".	A	Text modified accordingly	
7	p. 1, ¶4, last sentence	Suggest using "Module VIII SWMU" rather than "HSWA SWMU".	A	Text modified accordingly	
8	p. 10, Sect. 3.1.1	Not all of the TA-00 SWMUs/AOCs appear to be addressed. Emphasis is on the underground waste lines and the Zia Motorpool. Isn't there any operational history on the others?	A	One paragraph is added in Section 3.1.1 to explain how all the sites in TA-00 are addressed	
9	p. 11, Sect. 3.1.2	Same issue as in Comment 5. Only the underground industrial waste lines and the Zia Motorpool are addressed. Isn't there information on transport mechanisms and receptors for the other TA-00 SWMUs and AOCs?	A	One paragraph is added in Section 3.1.2 to explain how all the sites in TA-00 are addressed	

[1]page, paragraph, line [2]A = accept / R = reject

Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
10	p. 17, Sect. 3.5.3	At the end of the second sentence, add: "..., not for waste disposal."	A	Text modified accordingly	
11	p. 23, Sect. 4.3.3 and globally in document	The mesa top portion of SWMU 01-001(b) is a developed area with an asphalt parking lot, at which we are proposing to collect samples. In looking back at other SWMUs/AOCs up to this point in the document, it seems that we've generally proposed no sample collection in these types of areas [e.g., AOC C-00-042, AOC 00-031(b)]. Please ensure that the rationale for sampling or not sampling in developed/paved areas is clear and consistent throughout.	A	For AOCs 00-031(b) and C-00-042, the USTs (i.e., the contamination sources) have been excavated, and the pavement of the area prevents any transport. We can not use the same argument for the sites in TA-01 because there is no specific record on removal of the pipelines (except a couple sites specified in the document). These sites were discussed, and the approach agreed upon, during the decision peer review.	
12	p. 24, Sect. 4.4.3 and globally in document	In addition to SWMU 01-001(c), proposed sampling for adjacent SWMUs that have not yet been discussed is included. A reference to the section(s) that provide background information on these SWMUs should be included here, and/or the rationale for combining the sampling. This comment also applies to subsequent sections where sampling of SWMUs and AOCs is being combined, and not all background information has been presented sequentially.	A	We have added wording to refer to the sections that provide background information on adjacent sites. Some sites are combined because these sites are physically inseparable so that it is only reasonable to propose field activities for the group of the sites. However, these sites typically have different background information and it would affect the whole structure of the document if we bring up certain sites out of order.	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
13	p. 97, Sect. 10.4	This section briefly mentions segregation of wastes prior to disposal, but provides no detail on how this will be accomplished. There are numerous issues associated with waste staging at investigation sites off Laboratory property. This issue needs to be addressed thoroughly in Appendix B (incorrectly referenced in this Section as Appendix C).	A	Corrected reference to Appendix B; expanded text in Appendix B.	
14	p. 97, Sect. 12.0	This section is incomplete. The anticipated schedule for completion of field investigation and receipt of data needs to be added, prior to submittal of investigation report.	A	Added text discussing schedule, duration of field investigation.	
15	Appendix B, general	As noted in the comment above, on-site staging of IDW at the investigation sites needs to be considered and addressed, or arrangements need to be in place for transport of IDW to a central staging location. If waste is to be transported to a staging location or to TA-54, enough characterization info must be available to prepare a WPF.	A	Appendix B revised as requested.	

[1]page, paragraph, line [2]A = accept / R = reject

Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
16	Table B-1	Some information on estimated volume of each waste type should be added. Expand table to include anticipated method of characterization. Change "Laboratory-approved" to "permitted", globally. Remove footnote – there can be no return of borehole cuttings to point of origin. Is it realistic to assume that the only waste to be generated is LLW, considering the variety of locations where investigation and removal may occur?	A A A A	Estimated volumes column added to table. Methods added to table. Changed "Laboratory-approved" to "permitted". Removed footnote and callout. Most sites are radionuclide-related; best current information indicates that most if not all waste will be LLW.	
17	Figures, general comment beginning with Fig. 3.4-1	For "Sample location", please add "previous" or "former", as with "Proposed sample location".	A	The legend of previous sample locations on all figures has been modified to "former sample location"	
18	Figure 4.1-1	Figure label "Figure 4.1-1" is missing.	A	Figure label added	

[1]page, paragraph, line [2]A = accept / R = reject

Attachment B: Peer Review Comment Form

Part 1 (Author or Peer Review (PR) Coordinator Complete) Date: 2/28/06

Title Upper Los Alamos Canyon Aggregate Investigation Work Plan Rev. #: ___ Doc. Catalog No: **ER200** - ____

Reviewer's Name (Print): Roy Bohn Organization: ENV-ECR Comments due by: 3/15/06 (Date)

Author: Becky Coel-Roback Phone: ________ E-Mail: ________

Return forms to PR Coordinator: Cheri Vidlak Phone: 7-2728 E-Mail: cvidlak@lanl.gov

Part 2 (Reviewer Completes)

Date Received: ____________ Date Review Completed: 3/9/06

Signature & Date (to be signed ONLY upon agreement of comment resolution): Roy Bohn Date: 4/20/06

Part 3 (If under time constraints, the Author and Reviewer each sign.) ☐ Not all comments resolved; attach PR Comment Form to Document Signature Form.

Author Signature & Date: ____________

Reviewer Signature & Date: ____________

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
1	66, Sec 5.2	AOC 03-008(a) is listed as administratively complete in the PRS data base. You may want Joe English or Kelly VanDerpoel to review this section for their regulatory comments.		This site was granted NFA by DOE (1998, 59694). No concurrence from EPA or NMED. NMED will not accept the NFA status for the site. The PRS database will be modified accordingly.	

[1]page, section #, paragraph/line [2]A = accept / R = reject

Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
2	74, Sec 6.4	SWMU 32-002(b) should be described as "a former reinforced concrete tank…."	A	Text modified accordingly	
3	82, 3, 2	Is the surface contamination downstream in LA canyon really attributable to TA-41?	A	Per reference "Environmental Surveillance at Los Alamos during 2004", LA Canyon received releases, over the years, from TA-01, -02, -21, and -53 (pp. 132-133). Because TA-41 is not listed, this paragraph is removed.	
4	90, Sec 8.1.3	LS Division is now B Division	A	Added "(Now B Division)"	
5	92,1,2	Typo at the end of second sentence. Should read (Santa Fe Eng)	A	Text corrected	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
6	95,3 Sec 9.1.2	There is asphalt covering the site, only soil	A	Changed to "soil"	
7	95, Section 92.3	The excavation in 1989 was lined with plastic and backfilled with clean soil after the sewer lines were installed in the excavation. Sampling should take place below the 1989 excavation. Otherwise we will be collecting fill samples. The sampling planned adjacent to the excavation is fine.	A	Very good information! Text modified to "Samples will be collected from the center of the previous excavation starting immediately beneath a plastic liner that marked the depth of the previous excavation."	

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Attachment B: Peer Review Comment Form

Part 1 (Author or Peer Review (PR) Coordinator Complete) Date: 3/1/06

Title Upper LA Canyon Aggregate IWP Rev. #: ___ Doc. Catalog No: **ER200** - ____

Reviewer's Name (Print): Richard Mirenda Organization: ECR Comments due by: 3/15/06 (Date)

Author: Becky Coel-Roback Phone: ________ E-Mail: ________

Return forms to PR Coordinator: Cheri Vidlak Phone: 7-2728 E-Mail: cvidlak@lanl.gov

Part 2 (Reviewer Completes)

Date Received: 2/28/06 Date Review Completed: 3/6/06

Signature & Date (to be signed ONLY upon agreement of comment resolution): Richard Mirenda Date: 4/26/06

Part 3 (If under time constraints, the Author and Reviewer each sign.) ☐ Not all comments resolved; attach PR Comment Form to Document Signature Form.

Author Signature & Date: ________

Reviewer Signature & Date: ________

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	General	See hard copy for markups. Using the hard coy may be easier given the types of comments, i.e., mainly text corrections, changes, etc.	A	All markups in hard copy were followed closely	

[1]page, section #, paragraph/line [2]A = accept / R = reject

Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	General	Need to specify if previous data is OK to use for N&E and site characterization. Will this data be used in the IR for this and risk? Does this data result in additional data needs because will not be used? If old data not used then new data replaces it, if old data used then can eliminate suites? e.g., SVOCs?	A	Only CST offsite data are used in this plan. These data have been recently shown to be largely validatable and revalidation is not expected to significantly change conclusions about necessary characterization activities. A request has been made to have these data packages ordered from Denver and validated before being used in the IR, and any impacts to overall site conclusions will be evaluated as soon as possible.	
	General	SWMU vs. AOC designation. Please check. Some identified as AOC in subheading but then called SWMU in text. Also vice versa. Delete sentences about EQLs. Comparing to CRDLs from SOW not analytical EQLs from data set. Also not relevant.	A	Some are mistakes and have been fixed. Some were called SWMU in previous documents but now designated as AOC. Modified text to use current designation throughout or removed "SWMU". All writings on EQLs deleted. Only detected organics are presented.	
	Executive Summary	Delete reference to HIR. Delete list of SWMUs/AOCs, not relevant to summary. First objective of work plan is to **define N&E**, not determine if necessary to define.	A	The executive summary has been completely rewritten. First objective changed to define nature and extent	
	TOC	Delete OUTSIDE OF LABORATORY Appendix C – put data sources with references, not separate appendix.	A/R	"OUTSIDE OF LABORATORY" deleted from TOC and text We put data sources in Appendix C following the protocol of Middle LA and NMED did not comment on this	

[1]page, paragraph, line [2]A = accept / R = reject

Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	Section 1.1	Give EPA or NMED reference for NFA'd sites. Top of page 2 - put data sources with references, not separate appendix.	A/R	Text clarified to give reference source "NFA approval documents are listed in Table 1.1-1" We put data sources in Appendix C following the protocol of Middle LA and NMED did not comment on this	
	Section 1.2	**The first objective is to define N&E and to propose additional sampling designed to complete the characterization of the SWMUs/AOCs addressed in this work plan**. Delete <u>main</u>. First bullet - ...and **summarizes** previous investigations **of** the sites	A	Text modified accordingly "main" deleted Added one more bullet for "summarizes previous investigations of the sites"	
	Section 1.3	Should also make clear in first paragraph that many sites or portions of sites are inaccessible because of commercial and residential development, roads, etc. Third paragraph – delete <u>at the discretion of the field team</u>. Top of page 3 – If the **previously described** methods... delete <u>to attempt</u>. Even with obtaining property access and approval of owners still may have accessibility issues. Third paragraph – post-1943 or 1942? Delete <u>and to have retained any potential contaminants</u>. Fourth paragraph - **field** screened, spell out VOCs first use also PID.	A	Text added accordingly "at the discretion of the field team" deleted "described" added "to attempt" deleted Post-1943 is correct "and to have retained any potential contaminants" deleted "field" added VOC, PID spelled out "suggest" changed to "indicate" "Laboratory" deleted	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		Fifth paragraph – **indicate** vs. suggest. Sixth paragraph – delete Laboratory, **project leader** not capitalized.		Project Leader de-capitalized	
	Section 1.4	Delete considered. Delete compared to analytical estimated quanititation limits (EQLs). …and **detection status is evaluated** for organic chemicals. Last sentence bottom of page 3 – **This work plan summarizes this data in order to determine whether the nature and extent of contamination is defined for each site**. Delete the bullets.	A	"considered" deleted All writings on EQLs deleted. Text changed to "Concentrations of detected organics are presented." Sentence added as suggested Bullets deleted	
	Section 2.2.1	Global - Upper Los Alamos Canyon Aggregate **Area**	A	"Area" added globally where it's missing after "Upper Los Alamos Canyon Aggregate"	
	Section 2.1.2	First paragraph – delete Los Alamos. gpm? Define. Top of page 5 – spell TA.	A	Text changed to "Most surface water in Los Alamos area…" "gpm" spelled out TA was spelled out in Section 1.1	
	Section 2.1.3	First paragraph – second sentence… and **includes** a portion of the Los Alamos town site. Also includes property owned by DOE?	A	"includes" replaced "is" Added "The wall and floor … **and owned by DOE**."	
	Section 2.2.1	Global - Upper Los Alamos Canyon Aggregate **Area** Top of page 6 – delete surface of the	A	"Area" added globally where it's missing after "Upper Los Alamos Canyon Aggregate"	

[1]page, paragraph, line [2]A = accept / R = reject

Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		Under Badelier Tuff suggest italicize the different parts i.e., *Otowi Member*		"surface of the" deleted "Otowi Member" and "Tshirege Member" italicized	
	Section 2.2.2.1	Global - Upper Los Alamos Canyon Aggregate **Area** Need ER ID for GFI report. Page 9 – include a figure/map of wells? Intermediate Perched Water – delete nearby. Regional Aquifer – change main to **regional**. Global - Upper Los Alamos Canyon Aggregate **Area**	A	"Area" added globally ERID added Two figures added with well locations. "nearby" deleted "main" changed to "regional"; "Area" added globally	
	Section 3.0	Delete OUTSIDE OF LABORATORY For sites with no sampling proposed what is the path forward? Deferred? Propose complete with controls? Nothing?	A	"OUTSIDE OF LABORATORY" deleted from TOC and text	
	Section 3.1.1.1	Top of page 11 – include citation for HIR.	A	Citation for HIR included	
	Section 3.1.1.2	Include citation for HIR.	A	Citation for HIR included	
	Section 3.1.2	What about releases etc. for 034(b) and 031(a)? Not addressed.	A	One paragraph added in Section 3.1.2 to address how the releases will be addressed for all TA-00 sites	

[1]page, paragraph, line [2]A = accept / R = reject

Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	Section 3.1.2.1	How is it known that the sumps leaked? Other releases are assumed or potential? Receptors – no worker other than construction? no **complete** pathway exists	A A A	Text modified and a reference added; releases are potential Changed to "construction and laboratory workers" "complete" added	
	Section 3.1.3	Current usage of 034(b) and 031(a)? Is the parking lot adjacent to the LAMC?	A	Added text on current usage of 034(b) and 031(a) Yes	
	Section 3.2	Use former Manhole ULR-33 throughout. The manhole itself is not listed as a bullet, just the lines. First bullet – **were** left in place…Paragraph after bullets second sentence – delete first is.	A A A A	Text changed to "former Manhole…" throughout The first bullet changed to "Former Line 167 and former Manhole ULR-33" "were" replaced "had been" "is" deleted	
	Section 3.2.1	Site Investigation = RFI? Why not use RFI?	A	"Site Investigation" changed to "RFI" globally	
	Section 3.2.2	Third bullet – indicate that americium-241 detected or detected above FV but then do not state as for Pu-239, tritium, and U-235 whether within or above ranges. Is this because the Am-241 was just a detect and ranges not relevant?	A	Yes	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	Section 3.2.3	First bullet- no **complete** pathway for exposure. Second bullet - …situated at **the location of former Manhole ULR-33**… What about lead from bridge paint? Not really related to SWMU but present. Addressed separately? Not at all? Global for dioxin, furans, etc. – will not be analyzed because they **are** not related to…	A A A A	"complete" added Text changed accordingly Sampling proposed and lead will be analyzed "…they **are** not related to…" changed globally	
	Section 3.3	Second paragraph – reference for LANL/DOE letter? Reference for OU work plan. AOC but SWMU in text. …confirming that **it** was more appropriate that the underground storage tanks be address**ed** by… Were they addressed by UST Bureau? What was the result? NFA under Criterion 3, another reg authority? Criter**ion** 1 would appear to be incorrect? Was it ever located? Confused.	A A	Reference added It is called SWMU in OU 1071 Work Plan; "SWMU" removed Editorial changes done accordingly They have not been addressed further Not necessary to specify criterion for NFA	
	Section 3.3.3	Should there be a proposal for NFA or complete base on this? Will this site ever be finished? Close under UST regs at some future date? What is path forward?	A	NFA will be proposed in IR	
	Section 3.4.1	Site Investigation = RFI? Why not use RFI? NMED 1994, 05-023&? ER ID? Second paragraph – *TAL* metals? Not *and/or* SVOCs. Three for lead only and two for metals and SVOCs.	A A	"Site Investigation" changed to "RFI" globally ERID added "metals" per ERDB Offending text replaced with: "The suites analyzed for each sample are provided in Table 3.1-1."	

[1]page, paragraph, line [2]A = accept / R = reject

Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	Section 3.4.2	*TAL* metals? Page 16 – bullet delete last sentence on EQLs. Next paragraph delete last sentence on EQLs. SVOCs only detected at one location so does other location help to define lateral?	A	"metals" per ERDB All writings on EQLs deleted Lateral extent not defined – see Figure 3.4-2 of HIR	
	Section 3.4.3	Few SVOCs are PAHs, no others. Delete only. no **complete** pathway for exposure.	A A A	" a few SVOCs" changed to "a few PAHs" "only" deleted "complete" added	
	Section 3.5.1	AOC in title SWMU in text. Are we recommending NFA again? Will this site ever be finished? What is path forward?	A	"SWMU" removed NFA will be proposed in IR	
	Section 3.6.1	Organic **chemicals ...**below **BVs.** Delete background upper tolerance limits. Extent defined? If area released was there an NFA granted? Completed under another reg authority?	A R	"analytes" changed to "chemicals" This is a direct quote from reference. LANL 1996, 54618, p. 9 specifically stated "below background upper tolerance limits" NFA will be proposed in IR	
	Section 3.6.2	AOC.	A	"SWMU" changed to "AOC"	
	Section 3.6.3	no **complete** pathway for exposure	A	"complete" added	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	Section 4.1	Page 18 – don't capitalize work plan. Third bullet – reported to **be** below… Fifth bullet- sediments? Text indicates soil contamination.	A A A	"Work Plan" de-capitalized "be" added "and sediments" delted	
	Section 4.1.1	Reference for HIR. Page 19 – organized **into** 16 aggregates… Site Investigation = RFI? VCA spelled out here but acronym used earlier.	A A A A	Reference for HIR added "in" changed to "into" "Site Investigation" changed to "RFI" globally Changed to use acronym	
	Section 4.1.2	Third paragraph – are these definite or possibilities; *may have* occurred, *may have* caused? Reference for Pueblo Canyon work plan? Page 20 – **indicates** vs. suggests; **regional** aquifer; delete considered. Receptors – recreational and trail user? Same? Difference? Construction? Commercial/county worker?	A A A A A A A	"may have" added ERID inserted "indicates" replaced "suggests" "regional" replaced "main" "considered" deleted "recreational and trail users" changed to recreational users" Added "commercial, county, or Laboratory workers"	
	Section 4.1.3	TA-01 **L**aboratory structures?	A	Capitalized L	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	Section 4.2	(**Building** TA-01-104) (**Building** TA-01-103) Page 21 – this SWMU is a septic tank where did the pipelines come from? Are these the lines leading from the buildings? Outlet lines? Same site or different SWMU? What happened to the tank? Removed? Later state yes.	A	"Building" added Section 4.2 includes all the information asked. Text rearranged to convey the information better	
	Section 4.2.1	Site Investigation = RFI? Basis for NFA? No samples from tank location? Tables and figures being referenced for summary of previous investigations and summary of data are from the HIR! Not the IWP! Need to state this.	A A	"Site Investigation" changed to "RFI" globally Not necessary to specify criterion for NFA Global change: removed reference to HIR tables and figures in bullets, put the information in the beginning paragraph of "Summary of Data"	
	Section 4.2.3	Field screening looks at elevated *radiation or radioactivity* levels, not radionuclides. Shallowest depth should always be **0-0.5 ft**, not 0-1. Why have geomorphologist involved? Just sample from 0-0.5 ft and 2-3 ft unless otherwise necessary. VOCs only if screening detects???? No way. Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites. Global for dioxin, furans, etc. – will not be analyzed because they **are** not related to… No SVOCs? Need to analyze for at least at outfall and	A R A A	"radionuclides" changed to "radioactivity" 0-0.5 ft depth applies to surface samples for fallout background comparisons. The 0-1 ft depth is relative to the base of pipes or structures…it is not a surface sample. Further, a 1-ft interval ensures adequate sample volume, if sampling must be conducted using a hand auger or similar device. VOC wording changed to: "VOCs (in samples deeper than 0.5 ft bgs)," "…they **are** not related to…" changed globally SVOCs added	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		down slope.			
	Section 4.3	Branch line? Not mentioned in above description Just tank and single waste line.	A	Removed " through a single sanitary waste line" and changed text to "the locations of the pipelines"	
	Section 4.3.1	Site Investigation = RFI? Basis for NFA? Delete <u>that were</u>; delete <u>at surface</u>. Were sampled **from** one depth interval *Tables and figures being referenced for summary of previous investigations and summary of data are from the HIR! Not the IWP! Need to state this.*	A A A	"Site Investigation" changed to "RFI" globally Not necessary to specify criterion for NFA Editorial changes done accordingly Global change: removed reference to HIR tables and figures in bullets, put the information in the beginning paragraph of "Summary of Data"	
	Section 4.3.2	First bullet – were detected at concentrations greater than BVs *and/or*? the range of bkg conc? Or both? Second bullet- delete EQL text. Third bullet- last sentence No **isotopic plutonium was** detected or detected at activities greater than FV. Vertical extent defined for iso PU? Nothing above FV or detected. Lateral extent defined for inorganics and SVOCs? How? Detected. Top of page 23 – delete second sentence, redundant with first.	 A A A A A	Both. Text changed to "greater than BVs and also greater than the range..." All writings on EQLs deleted. Text changed accordingly Text changed to Lateral extent has **not** been defined" Writing on extent has been modified Second sentence deleted	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	Section 4.3.3	Shallowest depth should always be **0-0.5 ft**, not 0-1. Why have geomorphologist involved? Just sample from 0-0.5 ft and 2-3 ft unless otherwise necessary. VOCs only if screening detects???? No way. Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites. Global for dioxin, furans, etc. – will not be analyzed because they **are** not related to… No SVOCs? Detected. Need to analyze for at least at outfall and down slope.	R A A A	0-0.5 ft depth applies to surface samples for fallout background comparisons. The 0-1 ft depth is relative to the base of pipes or structures…it is not a surface sample. Further, a 1-ft interval ensures adequate sample volume, if sampling must be conducted using a hand auger or similar device. suite list wording changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs "…they **are** not related to…" changed globally suite list wording changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs	
	Section 4.4.1	First bullet - Site Investigation = RFI? Break fourth sentence into two sentences; start second with **However**… Basis for NFA? *Tables and figures being referenced for summary of previous investigations and summary of data are from the HIR! Not the IWP! Need to state this.*	A A A	"Site Investigation" changed to "RFI" globally Not necessary to specify criterion for NFA Editorial changes done accordingly (Rich says we don't have to include criterion -Linda) Global change: removed reference to HIR tables and figures in bullets, put the information in the beginning paragraph of "Summary of Data"	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	Section 4.4.2	Consolidate bullet text - Analytical results … at concentrations greater than BVs **and greater than the range of background concentrations**…	A	Text changed accordingly	
	Section 4.4.3	First bullet - Shallowest depth should always be **0-0.5 ft**, not 0-1. Why have geomorphologist involved? Just sample from 0-0.5 ft and 2-3 ft unless otherwise necessary. Second bullet – top of page 25 – what boundaries? If sampling 1 ft down slope then not re-sampling same location just the vicinity of it. Just sample from 0-0.5 ft and 2-3 ft unless otherwise necessary. Third bullet- Just sample from 0-0.5 ft and 2-3 ft unless otherwise necessary. VOCs only if screening detects???? No way. Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites. Global for dioxin, furans, etc. – will not be analyzed because they **are** not related to… No SVOCs? Site related. Need to analyze for at least at outfall and down slope. Cannot eliminate from analyses.	R A A A A A	0-0.5 ft depth applies to surface samples for fallout background comparisons. The 0-1 ft depth is relative to the base of pipes or structures…it is not a surface sample. Further, a 1-ft interval ensures adequate sample volume, if sampling must be conducted using a hand auger or similar device. Text changed to "boundaries of SWMU 01-007(b)" Global change: "Location XX will be 1 ft down slope from previous location XX" suite list wording changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs "…they **are** not related to…" changed globally suite list wording changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs	
	Section 4.5.1	Site Investigation = RFI? Basis for NFA?	A	"Site Investigation" changed to "RFI" globally	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		interim action not capitalized Page 26 Site Investigation = RFI *Tables and figures being referenced for summary of previous investigations and summary of data are from the HIR! Not the IWP! Need to state this.*	A A	Interim Action de-capitalized Not necessary to specify criterion for NFA Global change: removed reference to HIR tables and figures in bullets, put the information in the beginning paragraph of "Summary of Data"	
	Section 4.5.2	Extent defined for iso Pu? Decreased with depth? Mercury trend with depth?	A	Actually, there were field screening samples that we weren't allowed to put on the map that showed Pu extent not defined. Only one depth collected and analyzed for mercury.	
	Section 4.5.3	Field screening looks at elevated *radiation or radioactivity* levels, not radionuclides. Shallowest depth should always be **0-0.5 ft**, not 0-1. …the **down slope area on** Hillside 138… After the cliff? Below the cliff? Just sample from 0-0.5 ft and 2-3 ft unless otherwise necessary. If sampling 1 ft down slope then not re-sampling same location just the vicinity of it. Just sample from 0-0.5 ft and 2-3 ft unless otherwise necessary. VOCs only if screening detects???? No way. Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites. Global for dioxin, furans, etc. – will not be analyzed	A R A A A	"radionuclides" changed to "radioactivity" 0-0.5 ft depth applies to surface samples for fallout background comparisons. The 0-1 ft depth is relative to the base of pipes or structures…it is not a surface sample. Further, a 1-ft interval ensures adequate sample volume, if sampling must be conducted using a hand auger or similar device. Editorial change done accordingly Global change: "Location XX will be 1 ft down slope from previous location XX" suite list wording changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		because they **are** not related to… No SVOCs? Need to analyze for at least at outfall and down slope.	A A	"…they **are** not related to…" changed globally suite list wording changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs	
	Section 4.6.1	Site Investigation = RFI Basis for NFA? *Tables and figures being referenced for summary of previous investigations and summary of data are from the HIR! Not the IWP! Need to state this.*	A A	Site Investigation" changed to "RFI" globally Not necessary to specify criterion for NFA Global change: removed reference to HIR tables and figures in bullets, put the information in the beginning paragraph of "Summary of Data"	
	Section 4.6.3	Shallowest depth should always be **0-0.5 ft**, not 0-1. Refer to section for 003(a) scope; **no additional sampling is proposed here** for… **because it is the same as proposed in section 4.14.3**. VOCs only if screening detects???? No way. Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites. Global for dioxin, furans, etc. – will not be analyzed because they **are** not related to… No SVOCs? Need to analyze for at least at outfall and down slope.	R A A A A	0-0.5 ft depth applies to surface samples for fallout background comparisons. The 0-1 ft depth is relative to the base of pipes or structures…it is not a surface sample. Further, a 1-ft interval ensures adequate sample volume, if sampling must be conducted using a hand auger or similar device. Text changed accordingly suite list wording changed to: "VOCs, SVOCs" "…they **are** not related to…" changed globally suite list wording changed to: "VOCs, SVOCs"	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	Section 4.7	Second paragraph last sentence – The outfall is **on** undeveloped …	A	"on" added	
	Section 4.7.1	Site Investigation = RFI Basis for NFA? Real-time **field** screening Delete to. Site Investigation = RFI	A A	Site Investigation" changed to "RFI" globally Not necessary to specify criterion for NFA "field" added; "to" deleted	
	Section 4.7.2	Mercury only >BV no range. SVOC vertical extent defined? None detected. Lateral for SVOCs? None detected.	A	Global change: mercury and silver detected greater than BV, not range of background concentrations As text states: "screening-quality data indicated the presence of…SVOCs" We don't talk about or show it on maps because was screening level.	
	Section 4.7.3	*Tables and figures being referenced for summary of previous investigations and summary of data are from the HIR! Not the IWP! Need to state this.* Shallowest depth should always be **0-0.5 ft**, not 0-1. Photo showing proximity of tank to building? Top of page 30 – re-sample like others or actual re-sample of exact location? Just sample from 0-0.5 ft and 2-3 ft unless otherwise necessary. Geomorphologist unnecessary. VOCs only if screening detects???? No way. Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to	A R R A R A	Global change: removed reference to HIR tables and figures in bullets, put the information in the beginning paragraph of "Summary of Data" See previous responses to similar comments Figure 4.7-1 should be sufficient Global change: "Location XX will be 1 ft down slope from previous location XX" See previous responses to similar comments Suites text changed to: "VOCs (in samples deeper	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		analyze for regardless. Analytical data only thing that decisions are based on for sites. Global for dioxin, furans, etc. – will not be analyzed because they **are** not related to… No SVOCs because extent defined by previous sampling? Delete text on SVOCs If not define need to analyze for at least at outfall and down slope; do not eliminate.	 A A	than 0.5 ft bgs), SVOCs" "…they **are** not related to…" changed globally Suites text changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs"	
	Section 4.8	SWMU is a septic tank but only mention current location of inlet and outfall. Removed?	A	See Section 4.8-1 that states: " The tank, its inlet and outlet lines were removed…."	
	Section 4.8.1	Site Investigation = RFI Basis for NFA? Tables and figures being referenced for summary of previous investigations and summary of data are from the HIR! Not the IWP! Need to state this.	A A	Site Investigation" changed to "RFI" globally Not necessary to specify criterion for NFA Global change: removed reference to HIR tables and figures in bullets, put the information in the beginning paragraph of "Summary of Data"	
	Section 4.8.2	**BVs** vs. background values.	A	"background values" changed to "BVs"	
	Section 4.8.3	Tables and figures being referenced for summary of previous investigations and summary of data are from the HIR! Not the IWP! Need to state this. Shallowest depth should always be **0-0.5 ft**, not 0-1. Just sample from 0-0.5 ft and 2-3 ft unless otherwise	A R	Global change: removed reference to HIR tables and figures in bullets, put the information in the beginning paragraph of "Summary of Data" See previous responses to similar comments	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		necessary. Geomorphologist unnecessary. VOCs only if screening detects???? No way. Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites. Global for dioxin, furans, etc. – will not be analyzed because they **are** not related to… Delete text on SVOCs, add to list of analyses. Need to analyze for at least at outfall and down slope; do not eliminate.	A A A	Suites text changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs" "…they **are** not related to…" changed globally Suites text changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs"	
	Section 4.9	More than one pipeline? First paragraph implies only one.	A	Text changed to " the location of the pipeline"	
	Section 4.9.1	Site Investigation = RFI Basis for NFA? Tables and figures being referenced for summary of previous investigations and summary of data are from the HIR! Not the IWP! Need to state this.	A A	Site Investigation" changed to "RFI" globally Not necessary to specify criterion for NFA Global change: removed reference to HIR tables and figures in bullets, put the information in the beginning paragraph of "Summary of Data"	
	Section 4.9.2	Mercury and silver only above BVs no ranges. Shallowest depth should always be **0-0.5 ft**, not 0-1. Just sample from 0-0.5 ft and 2-3 ft unless otherwise necessary. Geomorphologist unnecessary. VOCs only if screening detects???? No way. Field	A R	Global change: mercury and silver detected greater than BV, not range of background concentrations See previous responses to similar comments Suites text changed to: "VOCs (in samples deeper	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites. Global for dioxin, furans, etc. – will not be analyzed because they **are** not related to… Delete text on SVOCs, add to list of analyses, previous data has detects. Need to analyze for at least at outfall and down slope; do not eliminate.	A A A	than 0.5 ft bgs), SVOCs" "…they **are** not related to…" changed globally Suites text changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs"	
	Section 4.10	Fourth bullet - …was found **to be** free… Page 34 – 030(g) tank #5 or #6?	A A	"to be" added It is #6. Text changed	
	Section 4.10.1	Site Investigation = RFI Basis for NFA? Delete <u>considered</u>. **interim action** not capitalized *and/or* not accurate for analyses. List how many samples analyzed for each; 2 metals, 1PCB/pest and 1 PCB/pest and SVOC, 2 or 1 for rad.	A A A	Site Investigation" changed to "RFI" globally Not necessary to specify criterion for NFA Editorial changes done accordingly Text changed to HIR reference	
	Section 4.10.2	Mercury only above BV no range. Top of page 35 – organics not defined? No detects.	A A	Global change: mercury and silver detected greater than BV, not range of background concentrations SWMU covers at least 1 mile, only 2 samples analyzed for organics, so extent is not defined.	

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	Section 4.10.3	Reference for 1993 sampling and analysis plan. Section for 001(u). Shallowest depth should always be **0-0.5 ft**, not 0-1. PCBs not detected, need more data? VOCs only if screening detects???? No way. Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites. Global for dioxin, furans, etc. – will not be analyzed because they **are** not related to… Delete text on SVOCs, add to list of analyses, previous data has detects. Need to analyze for at least at outfall and down slope; do not eliminate.	A R A A A	Reference added See previous responses to similar comments Suites text changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs" "…they **are** not related to…" changed globally Suites text changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs"	
	Section 4.11	Top of page 36 – Building S should be a bullet. Move [SWMU 00-030b)] to follow Septic Tank 1.	A A	Editorial changes done accordingly	
	Section 4.11.1	Site Investigation = RFI Basis for NFA?	A R	Site Investigation" changed to "RFI" globally Not necessary to specify criterion for NFA	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	Section 4.11.3	01-007(k) in title but not listed/mentioned in first paragraph with other sites. Where are proposed locations presented for this site? Pipe branch also not sampled because not accessible? No meaningful data can be obtained? Not really true if go deep enough? Shallowest depth should always be **0-0.5 ft**, not 0-1. Locations are **<u>under</u>** either parking lots or driveway**s**? If not plural than a parking lot and a driveway. VOCs only if screening detects???? No way. Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites. Global for dioxin, furans, etc. – will not be analyzed because they **are** not related to… Delete text on SVOCs, add to list of analyses, previous data has detects. Need to analyze for at least at outfall and down slope; do not eliminate.	A R R A A A A	Text revised to include 01-007(k) and proposed sampling for this site We stand by our argument that "no meaningful data can be obtained from under the road" because of the disturbance explained earlier. See previous responses to similar comments "Locations are under either parking lots or driveways" added to Suites: VOCs; SVOCs "…they **are** not related to…" changed globally appropriate change made	
	Section 4.12.1	Location 2 on a map? Which? Site Investigation = RFI Basis for NFA?	A A	Added "Location 2 on Figure 4.12-1" Site Investigation" changed to "RFI" globally Not necessary to specify criterion for NFA	

[1]page, paragraph, line [2]A = accept / R = reject

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	Section 4.12.2	Page 38 – first bullet combine last two sentences. …was detected at a concentration greater than BV **but within the range of background concentrations**…; delete last sentence. Delete EQL sentence.	A A	Text changed accordingly All writings on EQLs deleted	
	Section 4.12.3	Shallowest depth should always be **0-0.5 ft**, not 0-1. Global for dioxin, furans, etc. – will not be analyzed because they **are** not related to… PCBs and SVOCs only analyzed for in one sample. Cannot eliminate based on this. SVOCs? Not sure can eliminate.	R A A	See previous responses to similar comments "…they **are** not related to…" changed globally Suites: VOCs; SVOCs, PCBs	
	Section 4.13.1	Site Investigation = RFI Basis for NFA? Second paragraph – and/or not accurate. Metals, and/or SVOCs? List samples per analysis; 8 metals, 6 SVOCs, 3 or rad. Tables and figures being referenced for summary of previous investigations and summary of data are from the HIR! Not the IWP! Need to state this.	A R A A	Site Investigation" changed to "RFI" globally Not necessary to specify criterion for NFA Text changed to refer to table Global change: removed reference to HIR tables and figures in bullets, put the information in the beginning paragraph of "Summary of Data"	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	Section 4.13.2	Mercury only > BV no range. Top of page 40 – delete EQL text. Next bullet – delete last sentence and move location number to previous sentence.	A A A	Global change: mercury and silver detected greater than BV, not range of background concentrations All writings on EQLs deleted Text changed accordingly	
	Section 4.13.3	007(c) sampling depicted where? Shallowest depth should always be **0-0.5 ft**, not 0-1. Details for 007(c)? How many samples, depths? VOCs only if screening detects???? No way. Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites. Global for dioxin, furans, etc. – will not be analyzed because they **are** not related to… Delete text on SVOCs, add to list of analyses, previous data has detects.	A A A A	Text modified to reflect proposed sampling at 01-007(c) 0-0.5 ft depth applies to surface samples; 0-1 ft depth for below pipes or structures Suites text changed to: "VOCs, SVOCs" "…they **are** not related to…" changed globally Suites text changed to: "VOCs, SVOCs"	
	Section 4.14	Is the head of Bailey Bridge canyon the landfill? Where is it?		Yes. See Figure 4.14-1	
	Section 4.14.1	Site Investigation = RFI Basis for NFA? Delete that were. And/or inaccurate. List the number of analyses per suite; 5 for metals, 1 for SVOCs, 1 or 3 rad.	A A	Site Investigation" changed to "RFI" globally Not necessary to specify criterion for NFA Text changed to refer to table	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		Tables and figures being referenced for summary of previous investigations and summary of data are from the HIR! Not the IWP! Need to state this.	A	Global change: removed reference to HIR tables and figures in bullets, put the information in the beginning paragraph of "Summary of Data"	
	Section 4.14.2	Mercury only > BV no range. **No SVOCs were detected**. Top of page 42 – **has** not been defined.	A A	Global change: mercury and silver detected greater than BV, not range of background concentrations Text changed accordingly	
	Section 4.14.3	Just sample from 0-0.5 ft and 2-3 ft unless otherwise necessary. Geomorphologist unnecessary. VOCs only if screening detects???? No way. Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites. Why PCBs? Related to historical operations? Doesn't appear to be. Global for dioxin, furans, etc. – will not be analyzed because they **are** not related to… Delete text on SVOCs, add to list of analyses, previous data has detects. Need to analyze for at least at outfall and down slope; do not eliminate.	R A A A	See previous responses to similar comments Suites text changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs" "…they **are** not related to…" changed globally Suites text changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs"	
	Section 4.15	Photo of site?		It does not provide additional information	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	Section 4.15.1	Do not capitalize **work plan** Basis for NFA?	A R	"Work Plan" de-capitalized Not necessary to specify criterion for NFA	
	Section 4.15.3	Figure showing sampling locations? Delete because it will not be analyzed.	A	The location of the site is unknown. Field recon is necessary before sampling. "because it will not be analyzed" deleted	
	Section 4.16	Listed as **a** surface disposal area **Bailey Bridge Canyon**	A	Editorial changes done accordingly	
	Section 4.16.1	Reference for OU 1078 work plan? Title 003(c) an AOC, text SWMU. Site Investigation = RFI Delete however.	A	Reference added; "SWMU" deleted; Site Investigation" changed to "RFI" globally; "however" deleted	
	Section 4.16.3	A site visit revel**ed** that…	A	"revels" changed to "reveled'	
	Section 4.17.1	Site Investigation = RFI Basis for NFA? Tables and figures being referenced for summary of previous investigations and summary of data are from the HIR! Not the IWP! Need to state this.	A A	Site Investigation" changed to "RFI" globally Not necessary to specify criterion for NFA Global change: removed reference to HIR tables and figures in bullets, put the information in the beginning paragraph of "Summary of Data"	
	Section 4.17.2	Mercury only > BV no range.	A	Global change: mercury and silver detected greater than BV, not range of background concentrations	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	Section 4.17.3	VOCs only if screening detects???? No way. Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites. Global for dioxin, furans, etc. – will not be analyzed because they **are** not related to…	A A	Suites text changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs" "…they **are** not related to…" changed globally	
	Section 4.18.1	Site Investigation = RFI Basis for NFA? Tables and figures being referenced for summary of previous investigations and summary of data are from the HIR! Not the IWP! Need to state this.	A A	Site Investigation" changed to "RFI" globally Not necessary to specify criterion for NFA Global change: removed reference to HIR tables and figures in bullets, put the information in the beginning paragraph of "Summary of Data"	
	Section 4.18.2	First bullet - combine last two sentences. …was detected at a concentration greater than BV **but within the range of background concentrations**…; delete last sentence.	A	Text modified accordingly	
	Section 4.18.3	Why is no sampling proposed for the mesa top? VOCs only if screening detects???? No way. Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites. Why PCBs? Related to operations? Global for dioxin, furans, etc. – will not be analyzed	A A	Reason added Suites text changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs"	

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		because they **are** not related to… Delete text on SVOCs, add to list of analyses, previous data has detects. Need to analyze for at least at outfall and down slope; do not eliminate.	A A	"…they **are** not related to…" changed globally Suites text changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs"	
	Section 4.19.1	Site Investigation = RFI Basis for NFA? Second paragraph make first sentence into two. Start second with **However,**…	A R A	Site Investigation" changed to "RFI" globally Not necessary to specify criterion for NFA Text modified accordingly	
	Section 4.19.2	Bullet – LANL 2006, XXXXX Combine last two sentences. …was detected at a concentration greater than BV **but within the range of background concentrations**…; delete last sentence.	A A	Global change: removed reference to HIR tables and figures in bullets, put the information in the beginning paragraph of "Summary of Data" Text modified accordingly	
	Section 4.19.3	Location 03083 needs sampling at least for selenium down slope. Just sample from 0-0.5 ft and 2-3 ft unless otherwise necessary. Geomorphologist unnecessary. VOCs only if screening detects???? No way. Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites. Why PCBs? Related to operations? Global for dioxin, furans, etc. – will not be analyzed	A R A A	Another sampling point has been added down slope. See previous responses to similar comments Suites text changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs" PCBs added at request of UTR /ENV water people "…they **are** not related to…" changed globally	

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		because they **are** not related to… Delete text on SVOCs, add to list of analyses, previous data has detects. Need to analyze for at least at outfall and down slope; do not eliminate.	A	SVOCs added	
	Section 4.20	Delete hot spots; use **areas of elevated radioactivity**	A	Replaced "hot spots" globally	
	Section 4.20.1	Site Investigation = RFI Basis for NFA?	A R	Site Investigation" changed to "RFI" globally Not necessary to specify criterion for NFA	
	Section 4.21	**Building** D-2 area	A	"Building" added	
	Section 4.21.1	Site Investigation = RFI Basis for NFA?	A R	Site Investigation" changed to "RFI" globally Not necessary to specify criterion for NFA	
	Section 4.21.3	…**is presented** along with…	A	"has been explained" changed to "is presented globally	
	Section 4.22	**Building** D-2 drain lines Delete hot spots; use **areas of elevated radioactivity**. **Building** D-2 area	A A A	"Building" added Replaced "hot spots" globally "Building" added	
	Section 4.22.1	Site Investigation = RFI Basis for NFA? …no contaminant**s** of concern **were** identified…	A/R A	Site Investigation" changed to "RFI" globally. Not necessary to specify criterion for NFA. Editorial corrections done accordingly	

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	Section 4.22.3	…**is presented** along with…	A	"has been explained" changed to "is presented globally	
	Section 4.23	Cleaning plant building #? Spell out diameter. Delete early. Los Alamos **County**	A	Has no building # in database Editorial corrections done accordingly	
	Section 4.23.1	IT **Corporation**? Delete or absence. No **contamination** was found… Basis for NFA?	A R	"Corporation" added; "or absence" deleted; "contaminant" changed to "contamination" Not necessary to specify criterion for NFA	
	Section 4.23.2	Delete their.	A	"their" deleted	
	Section 4.23.3	…**is presented** along with… No sure last statement is true regarding evidence of historical operations not being present in current water and sediment. If the system is continually being flushed may still have some contamination. Possible? If no sampling and this is true should we propose this portion complete?	A	"has been explained" changed to "is presented globally Although previous investigations have focused on Ashley Pond, it is not part of the SWMU, and is unlikely to give us information about the SMWU now. This investigation will focus on the drainlines to determine potential contaminants, locations, depths, and perhaps whether they have been capped off. We hope to proposed NFA.	
	Section 4.24	Bullet for Building ML Outfall? Is there one?	A A	Bullet added Outfall information added	
	Section	Site Investigation = RFI Basis for NFA?	A	Site Investigation" changed to "RFI" globally	

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	4.24.1	No contaminant**s** of concern **were** identified.	 A	Not necessary to specify criterion for NFA Text modified accordingly	
	Section 4.24.2	AOC in title, SWMU in text.	A	"SWMU" changed to "AOC"	
	Section 4.24.3	Residual contamina**tion**…, however **it** would have been… Which building? Just sample from 0-0.5 ft and 2-3 ft unless otherwise necessary. Geomorphologist unnecessary. Sample further down drainage? VOCs only if screening detects???? No way. Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites. Why PCBs? Related to operations? Global for dioxin, furans, etc. – will not be analyzed because they **are** not related to… Delete text on SVOCs, add to list of analyses, previous data has detects. Need to analyze for at least at outfall and down slope; do not eliminate.	A A R A A A	Text modified accordingly Building information added See previous responses to similar comments Suites text changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs" PCBs added per request of UTR/ENV water people "…they **are** not related to…" changed globally Suites text changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs"	
	Global	*Majority of comments for the rest of section 4 are similar to those already presented, i.e., Site Investigation = RFI, Basis for NFA, delete hot spots; use **areas of elevated radioactivity**, just sample from 0-0.5 ft and 2-3 ft unless*		All items addressed; see specific comment items	

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		*otherwise necessary; geomorphologist unnecessary, VOCs only if screening detects???? Field screening is for drilling/sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites, global for dioxin, furans, etc. – will not be analyzed because they **are** not related to..., delete text on SVOCs, add to list of analyses, previous data has detects. Need to analyze for at least at outfall and down slope; do not eliminate,...**is presented** along with..., etc.* *Tables and figures being referenced for summary of previous investigations and summary of data are from the HIR! Not the IWP! Need to state this.* ***For the remainder of section 4 only comments different from these are presented. See hard copy mark up for other comments. Also check hard copy of other text edits/changes.***			
	Section 4.26	Mention that drain lines were removed so what pipelines are under the paved parking lot/ Is there actually lines there or is this where they were?	A	The paragraph under Section 4.26 does give relevant information	
	Section 4.27.3	Why PCBs analyzed for? Wouldn't seem like these are related to storm drain. Add SVOCs.	A	PCBs requested by UTR/ENV water people. SVOCs added.	
	Section 4.28.1	Delete and/or, inaccurate; just list number of samples per analysis; 10 for metals, six for iso Pu and U.	A	Text changed to refer to table	

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	Section 4.28.3	First bullet – which inorganics are just above BV and not range? If only 0-0.5 and soil then all have ranges.	A	Text modified to explain why sampling starts at 5.0 ft	
	Section 4.28.3	Not clear why so deep. All four locations these depths? Second bullet – shallowest depth should be 0-0.5 ft. Why 007(a) not analyzed for metals? Extent not defined. Previous data shows metals above background, need to define extent. Think stuck looking at metals despite being a radiological contamination area because of previous data. Why PCBs analyzed for? Wouldn't seem like these are related to either site. Add SVOCs at least for 006(b) at outfall and down channel.	A R A A	Text modified to explain why sampling starts at 5.0 ft and goes to 14.0 ft See previous responses to similar comments metals added PCBs added per UTR/ ENV water people. SVOCs added per your request	
	Section 4.29.2	Mercury only > BV no range.	A	Global change: mercury and silver detected greater than BV, not range of background concentrations	
	Section 4.31.1	Delete and/or, inaccurate; just list number of samples per analysis; 9 for metals, 1 for SVOCs.	A	Text changed to refer to table	
	Section 4.31.2	Mercury only > BV no range.	A	Global change: mercury and silver detected greater than BV, not range of background concentrations	
	Section 4.31.3	Shallowest depth should be 0-0.5 ft. Need to analyze for metals. Extent not defined. Previous data shows metals above background, need to define extent. Think stuck looking at metals despite being a	R A	See previous responses to similar comments metals added	

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		radiological contamination area because of previous data.			
	Section 4.32.3	Shallowest depth should be 0-0.5 ft. Question here of whether metals need to be analyzed for since similar to other sites where metals above background detected. Probably should try to not analyze for metals here given no data and see what happens.	R A	See previous responses to similar comments agreed	
	Section 4.33	Delete all reference to "Spots", use area or areas. **Nos.** when more than one. Title states 12 areas, text states 17 spots. Which is correct? Title has **007(j)**, second paragraph has **007(i)**. Correct? If all areas related to 007(j) then how can a SWMU be NFA'd? Re-designated? Why? Need clarification on this. NMED granted? Status of Nos. 16 and 17 if false positives? NFA'd? Done? Page 60 – fourth bullet under No. 9. BMP already spelled out. Has 001(f) been NFA'd? Not clear how VCA related to area No. 9, seems separate corrective action. Affects sampling? Second bullet under Nos. 13, 14 and 15 delete <u>Samples were analyzed at off-site laboratories for inorganic chemicals</u>, ...repeated top of page 61. Top of page 61 delete <u>Results of these data are presented in the next section</u>.	R A A A	Spots were used traditionally and it implies small areas Only 12 spots for this SWMU. The text is describing how these 12 spots become this SWMU. Could remove (or only briefly mention the other spots) Nos. 16 and 17 are not part of the SWMU. Used "BMP" 01-001(f) is down gradient from Spot No. 9. This bullet removed because it does not relate to this spot. Text modified accordingly	

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		Next bullet page 61 – this is not Criterion 4 language.	R	Not necessary to specify criterion for NFA	
	Section 4.33.2	Second bullet – delete EQL text. Third bullet- spell out **isotopic**.	A A	All writing on EQLs deleted "iso-" changed to "isotopic"	
	Section 4.33.2	Shallowest depth should be 0-0.5 ft. Resample old location(s)? Down slope of old locations? Need to analyze for metals. Extent not defined. Previous data shows metals above background, need to define extent. Think stuck looking at metals despite being a radiological contamination area because of previous data. What about SVOCs?	R A R	See previous responses to similar comments Global change: "Location XX will be 1 ft down slope from previous location XX" We are going try to minimalist approach here, only propose rad analysis, and see what happens	
	Section 4.35.1	Page 63 – Criterion 4 language is not accurate. Need to state actual criterion.	R	Not necessary to specify criterion for NFA	
	Section 4.35.2	Mercury and silver > BV only, unless silver in Qbt 2,3,4.	A	Global change: mercury and silver detected greater than BV, not range of background concentrations (unless silver in tuff)	
	Section 4.35.3	Samples collected when opportunity arises? What does this mean? Ever happen? Angle boreholes under pavement? Shallowest depth should be 0-0.5 ft. Extent not defined. Previous data shows metals above background, need to define extent. Think stuck looking at metals despite being a radiological contamination	A R R	Changed text to say no sampling. Extent is defined by fill. See previous responses to similar comments Extent of contamination is extent of fill material. Additional data will just show that the fill is variable	

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		area because of previous data.		with no real trends.	
	Section 5.1	Fourth bullet - …are **Consolidated Unit** 03-038(a)-00.	A	Text modified accordingly	
	Section 5.1.2	Page 65 – Transport Mechanisms - …access subsurface **contamination** exposed…Second paragraph – **indicates** vs. suggests; migration of **contamination**; **regional** vs. main; delete considered. First bullet – is there any airborne transport given TA-03 development? Disturbance and uptake of animals and plants likely? One or both of these are probably not even potential mechanisms. Receptors – recreational user and trail user? Difference? Both recreational. Construction worker given building going on?	A A	Text modified accordingly Airborne transport and disturbance/uptake by animals with 03-038(a and b) in mind since they are on hillside "recreational user and trail user" changed to "recreational user", added "county or Laboratory workers"	
	Section 5.1.3	Administrative or Administration Building?	A	It is Administration Building.	
	Section 5.2	Any photos of site?	N/A	Photos do not provide meaningful information about the site.	
	Section 5.2.3	Proposing NFA? Deferred until later? How are we proceeding with this site?	A	Will propose NFA in the report	
	Section 5.3	Any photos of site? Reason for NMED rejection of NFA?	N/A A	Photo does not provide additional information Reason added	

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	Section 5.3.3	Shallowest depth should be 0-0.5 ft. Bullet text states landfill area, but site is a surface disposal area. Correct? Last paragraph page 66 – delete VOCs text, later sate not analyzed for.	R A A	See previous responses to similar comments Text changed to "soil fill area" VOCs text deleted	
	Section 5.4	First paragraph – (**former** Line 167 of SWMU 00-017) No outlet for SWMUs? Tanks removed so description should be **was**.	A A A	"former" added Building severed industrial waste line Changed to "was"	
	Section 5.4.3	Add one more set of samples for 038(b) down slope.	R	Down slope is SWMU 00-017 and there are samples proposed there. We are going for the minimalist approach	
	Section 5.5	Reference for OU 1114 work plan addendum.	A	Reference added	
	Section 5.5.3	Just sample from 0-0.5 ft and 2-3 ft unless otherwise necessary; geomorphologist unnecessary. VOCs only if screening detects???? Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites. Global for dioxin, furans, etc. – will not be analyzed because they **are** not related to… Delete text on SVOCs, add to list of analyses. Need to	R A A A	See previous responses to similar comments text changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs," "…they **are** not related to…" changed globally text changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs,"	

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		analyze for at least at outfall and down slope; do not eliminate.			
	Section 6.1.2	Page 70 – Transport Mechanisms - …access subsurface **contamination** exposed…Second paragraph – **indicates** vs. suggests; migration of **contamination**; **regional** vs. main; delete <u>considered</u>. First bullet – is there any airborne transport given nature of sites? Disturbance and uptake of animals and plants likely? One or both of these are probably not even potential mechanisms. Section 6.1.3 state that TA-32 mostly covered with asphalt. Receptors – recreational user and trail user? Difference? Both recreational. Construction worker given building going on?	A A A	Text modified accordingly Text airborne transport and uptake by animals and plants deleted. "recreational user and trail user" changed to "recreational user", added "construction workers"	
	Section 6.2.1	Site Investigation = RFI Top of page 71 – which of the additional samples down gradient from incinerator were analyzed on-site? MCAL? PCBs again? Basis for NFA? No **COPCs were** identified. Site Investigation = RFI	A A R A	Site Investigation" changed to "RFI" globally Text changed to: "Two additional samples were collected at locations down gradient from the incinerator ((32-06447 and 32-06447) and analyzed for metals, organic chemicals at an off-site laboratory, and radionuclides at the Mobile Radiological Analytical Laboratory (MRAL)" Not necessary to specify criterion for NFA Text modified accordingly	
	Section	Mercury only > BV, no range.	A	Global change: mercury and silver detected greater	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	6.2.2	[cis-1,2]dichloro**e**thene Delete EQL text. Mercury only > BV not range.	A	than BV, not range of background concentrations All writing on EQLs deleted	
	Section 6.2.3	Top of page 72 - Delete text on SVOCs, add to list of analyses. Need to analyze for; do not eliminate. Extent defined?	A	SVOCs added. Section 6.2.2 states: "Vertical extent was not defined…" and "Lateral extent was not defined…"	
	Section 6.3	Septic tank area or outfall on hillside?	A	The outfall area	
	Section 6.3.1	Site Investigation = RFI; **substantially** southeast Site Investigation = RFI **Criterion** 4, which states that…; use correct language for this criterion. Site Investigation = RFI and/or inaccurate, just list number of analysis per suite; 10 for metals, 9 for SVOCs and VOCs, 7 for gamma and iso U, 9 for iso Pu and tritium. Include eco assessment? Old approach, not relevant anymore. Unlikely any eco risk.	A R A A	Site Investigation" changed to "RFI" globally; text changed accordingly Not necessary to specify criterion for NFA Table referenced regarding suites & number of analyses Eco deleted.	
	Section 6.3.2	Second bullet – benzo(b)flu**o**ranthene, fl**uor**anthene Delete sentence listing organic chemicals above EQLs. Last sentence An analysis **indicated no potential** unacceptable risk…	A	Text corrected accordingly	

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		Third bullet - ...**detected** at depths where FVs do not apply...	A	"detected" added	
	Section 6.3.3	Page 74 - Shallowest depth should be 0-0.5 ft. What are actual depths of samples in center of excavation? Seems samples on perimeter should be deeper if excavation is 18 in deep. The outfall **is discussed under**... Delete text on SVOCs, add to list of analyses. Need to analyze for at least at outfall and down slope; do not eliminate.	R A A A	See previous responses to similar comments The depths confirmation samples were 1.5-2 ft (which is actually 0-0.5 ft because the top 1.5 ft was excavated away previously). We propose perimeter samples down to 3 ft. Text changed to "is discussed under" Text changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs,"	
	Section 6.4	**Criterion** 4, which states that...; use correct language for this criterion.	R	Not necessary to specify criterion for NFA	
	Section 6.4.1	Site Investigation = RFI Top of page 75 - Site Investigation = RFI Confirmation samples analyzed on-site for PCBs done by MCAL? **Criterion** 4, which states that...; use correct language for this criterion. A total of 116 ft of drain line **was** removed... Confirmation samples were collected **from** the base... Site Investigation = RFI ...either **from** the base of... **Some or all of the** samples were analyzed for... delete and/or. Include eco assessment? Old approach, not relevant	A A R A A A	Site Investigation" changed to "RFI" globally Yes PCB analysis was done by MCAL and wording added to text to indicate that Not necessary to specify criterion for NFA Editorial changes done accordingly Reader referred to table for suites Eco info deleted.	

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		anymore. Unlikely any eco risk.			
	Section 6.4.2	Second bullet – benzo(b)fluoranthene, **fluor**anthene Delete sentence listing organic chemicals above EQLs. Page 76 – lateral extent defined for SVOCs and rad but not for inorganics? Later state under *Outfall area* extent defined for all analytes, including metals?	A A	Text corrected accordingly All writing on EQLs deleted "Lateral extent has been defined in the outfall with analytes concentrations demonstrating a decreasing trend with distance from the outfall." Added for clarification.	
	Section 6.4.3	First bullet – samples collected under lines? Why 1.0-1.5 ft under and not 0-0.5 under? Second bullet - What are actual depths of samples in center of excavation? Seems samples on perimeter should be deeper if excavation is 18 in deep. Which is the sample depth? 0-0.5 and 2-3 ft or soil/tuff interface and 1 ft deeper? Confusing. Last bullet states no sampling of outfall area but state inorganic extent not defined above. Top of page 77 - Delete text on SVOCs, add to list of analyses. Need to analyze for at least at outfall and down slope; do not eliminate.	A A A	Typographical error. This has been corrected. Text changed to "soil/fill interface and 2 ft deeper at the center of tank excavation" and "soil/fill interface and 1 ft deeper" on perimeter "Lateral extent has been defined in the outfall with analytes concentrations demonstrating a decreasing trend with distance from the outfall." Added for clarification. Suites: text on SVOCs deleted and SVOCs added to list	
	Section 6.5	Delete <u>investigation</u>. **AOC** 32-003.	A	Editorial changes done accordingly	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	Section 6.5.1	Site Investigation = RFI Aroclor-1260 was retained as a **COPC**… on-site lab for PCBs was MCAL? **Criterion** 4, which states that…; use correct language for this criterion. Include eco assessment? Old approach, not relevant anymore. Unlikely any eco risk.	A A R A	Site Investigation" changed to "RFI" globally Yes PCBs were analyzed by MCAL Not necessary to specify criterion for NFA Eco discussion deleted	
	Section 6.5.3	**AOC** 32-003 Top of page 78 – down slope from screened locations? Why not the screened locations plus down slope? Delete text on SVOCs, add to list of analyses. Need to analyze for at least at outfall and down slope; do not eliminate.	A A A	"SWMU" changed to "AOC" "immediately down slope" from the previous location means just inches from the previous location. We do not want to sample on top of the previous location because the dirt has already been collected from that location. Suites: text on SVOCs deleted and SVOCs added to list	
	Section 6.6	The drain line **led** directly to… and **did** not pass… Delete investigation. **AOC** 32-004.	A	Editorial changes done accordingly	
	Section 6.6.1	Site Investigation = RFI …collected **from** inside the pipe… Is the contamination upgradient likely to be detected within the AOC? Not clear. Can distinguish contributions from this vs. site related? Phase II **RFI**, delete investigation. Site Investigation = RFI …include**d** nine soil… delete and/or, **Some or all of the samples** were analyzed	A A A A	Site Investigation" changed to "RFI" globally Sample results clearly showed that contamination came from offsite wording changed to more clearly relate that. Editorial changes done accordingly Eco discussion deleted	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		for… Top of page 79 - Include eco assessment? Old approach, not relevant anymore. **AOC** 32-004.	A		
	Section 6.6.2	Mercury > BV no ranges. Can you actually distinguish between site and off-site contamination? Delete EQL text from bullets. benzo(b)fluoranthene Page 80 – analyzed **by** gamma spectroscopy. > FV at 0-1 ft? 0-0.5 ft relevant? Vertical extent defined for what?	A A	Global change: mercury and silver detected greater than BV, not range of background concentrations Sample results clearly showed that contamination came from offsite wording changed to more clearly relate that. All writing on EQLs deleted Text corrected Discussion of rad, inorgs and orgs added	
	Section 6.6.3	Only one proposed sample location? Why 1-2 ft interval not 0-0.5 ft? Deeper samples? Top of page 81- not associated with vault based on upgradient data?	A A A	Yes. Nothing was found there before. 1-2 ft because it's under asphalt. And we did propose 2 depths; the deeper one at 4-4.5 ft Upgradient is up from the outfall, not up from the rad vault.	
	Section 7.1	Almost constant source of surface water? Sometimes dries up if drought? Second bullet - …are **Consolidated Unit**…	A A	Deleted "constant" Changed to "Consolidated Unit"	
	Section 7.1.2	Bottom page 81 – generated **by** the work done at TA-41. Page 82 second paragraph – …the primary **COPCs** at	A	Text modified accordingly	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		TA-41 are… Next paragraph – **indicated** vs. suggested Reference for surface sediment contamination found in creek channel? Transport Mechanisms - …could carry the **contamination** discharged…, delete that were. **regional** vs. main Potential Receptors – The site **is continually used** by … Down gradient receptors? Who? How? Trail users? Clarify or delete.	A A A	Deleted paragraph on environmental monitoring Editorial changes made Deleted "down gradient receptors" and clarified.	
	Section 7.2	(**S**tructure 41-11) (**S**tructure 41-2) **S**tructure 41-11	A	Text modified accordingly	
	Section 7.2.1	Site Investigation = RFI **Sample results indicated no COPCs were present.**	A A	Site Investigation" changed to "RFI" globally Text modified accordingly	
	Section 7.2.2	First bullet – delete last sentence on EQLs. Extent defined for organics? Rad? Based on two locations? No clear from summary of data that defined. Then state vertical extent for site not defined. Confusing.	A A	All writing on EQLs deleted Extent portion re-written	
	Section 7.2.3	Shallowest depth should be 0-0.5 ft. Sample further down slope from outfall? Dioxin, furans, etc. – will not be analyzed because they **are** not related to…	R A	See previous responses to similar comments More samples is an excellent idea. We are proposing the minimalist approach and when the State says they want more samples, we will add them here.	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
				"…they **are** not related to…" changed globally	
	Section 7.3	(**S**tructure 41-7) (**S**tructure 41-8) (**S**tructure 41-9) **Consolidated Unit** 03-014(a)-99	A	Text modified accordingly	
	Section 7.3.1	Site Investigation = RFI Samples only analyzed for **uranium** not metals. Delete and/or, **Some or all samples were analyzed** for…	A A	Site Investigation" changed to "RFI" globally "measured for total uranium" Text now refers Reader to a table for info on suites	
	Section 7.3.2	SWMU 41-00**2**(a)? Samples only analyzed for **uranium** not metals. Delete EQL text. Top of page 86 – vertical extent of inorganics defined? Only uranium analyzed for. Not evident from data summary. SVOCs not defined? Lateral defined? Uranium only? Not evident from data summary. …continue to increase as **seen** in the next down gradient sample… What is the next down gradient sample? Refer to figure? Table? SWMU 41-00**2**(b) Samples only analyzed for **uranium** not metals. Delete EQL text. Third bullet – last sentence **Plutonium-239 and tritium** were detected…	A A A A A A A A A A A	Yes. Text corrected Changed to "analyzed for total uranium" All writing on EQLs deleted Extent section re-written "analyzed for total uranium" extent re-written, figure referred to Text corrected "analyzed for total uranium" All writing on EQLs deleted Text modified Changed to: "Lateral extent down gradient has been	

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		Lateral extent defined? By one sample?	A	defined for all suites analyzed by decreasing trends in concentrations or non-detects in the most down gradient sample location (41-01024)."	
		SWMU 41-00**2**(c)	A	Text corrected	
		Samples only analyzed for **uranium** not metals.	A	"analyzed for total uranium"	
		No SVOCs were detected.		Text modified	
		Lateral defined? Low concentrations outside of drying bed? For everything? Down slope?		Extent re-written and down slope is another SWMU	
	Section 7.4	(**S**tructure 41-10) ...**situated** on concrete?	A	Text modified accordingly	
	Section 7.4.1	Site Investigation = RFI **AOC** area	A A	Site Investigation" changed to "RFI" globally "SWMU" changed to "AOC"	
	Section 7.4.2	Samples only analyzed for **uranium** not metals.	A	"analyzed for total uranium"	
	Section 7.4.3	(**Structure 41-001**)	A	Text modified	
	Section 7.5	(**S**tructures 41-22 through 41-28)	A	Text modified	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	Section 7.5.1	Site Investigation = RFI	A	Site Investigation" changed to "RFI" globally	
	Section 7.5.2	Samples only analyzed for **uranium** not metals.	A	"analyzed for total uranium"	
	Section 7.5.3	Building 41-004 or 41-4? Be consistent. Delete TA.	A	Text modified	
	Section 8.1.2	**Contamination** may have been released… Page 90 - **indicates** vs. suggests; migration of **contamination**; **regional** vs. main; delete considered Is disturbance and uptake from plants and animals likely given nature of sites? Recreational and trail user? Difference? Construction worker?	A A A A	Text modified accordingly Text modified accordingly "on the hillside" added "recreational user and trail user" changed to "recreational user", changed to "construction workers"	
	Section 8.2	(Structure 41-10) **AOC** 43-002(a2)	A	Text modified	
	Section 8.2.3	Is it likely that utilities will be deactivated and buildings removed? Planned?	A	Yes it is likely, but it has yet to be planned.	
	Section 8.3.3	**AOC** not SWMU. Is it likely that utilities will be deactivated and buildings removed? Planned?	A A	"SWMU" changed to "AOC" Yes it is likely, but it has yet to be planned.	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	Section 8.4.3	Just sample from 0-0.5 ft and 2-3 ft unless otherwise necessary; geomorphologist unnecessary. Sample further down slope? VOCs only if screening detects???? Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for sites. Delete text on SVOCs, add to list of analyses. Need to analyze for at least at outfall and down slope; do not eliminate.	R A A	0-0.5 ft depth applies to surface samples; 0-1 ft depth for below pipes or structures; sediment samples with two depths determined by geomorphologist agreed previously with field personnel Suites changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs" Suites changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs"	
	Section 8.5	Page 93 – reference for OU 1136 work plan.	A	Reference added	
	Section 8.5.3	Is it likely that utilities will be deactivated and buildings removed? Planned?	A/R	Yes it is likely, but it has yet to be planned.	
	Section 8.6	**Structure** **SWMU** 43-001(a1) and **AOC** 43-001(a2)	A	Text modified accordingly	
	Section 8.6.3	Just sample from 0-0.5 ft and 2-3 ft unless otherwise necessary; geomorphologist unnecessary. VOCs only if screening detects???? Field screening is for drilling sampling purposes, need to analyze for VOCs to characterize the site. Need to analyze for regardless. Analytical data only thing that decisions are based on for	R A	0-0.5 ft depth applies to surface samples; 0-1 ft depth for below pipes or structures; sediment samples with two depths determined by geomorphologist agreed previously with field personnel Suites changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs"	

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		sites. Delete text on SVOCs, add to list of analyses. Need to analyze for at least at outfall and down slope; do not eliminate.	A	Suites changed to: "VOCs (in samples deeper than 0.5 ft bgs), SVOCs"	
	Section 9.1	Delete 300 ft deep. Los Alamos **County** municipal...	A	Text modified accordingly	
	Section 9.1.2	Only construction worker? No site/Lab worker?	R	It is a subsurface site and only construction workers would be exposed.	
	Section 9.2.1	Spell out TSCA first use. If not off-site lab data how cleaned up under TSCA?	A	"TSCA" spelled out. In 1989, EPA accepted on-site data	
	Section 9.2.3	Shallowest depth should be 0-0.5 ft. Why analyze for anything besides PCBs? Transformer site only PCBs likely. See rationale last sentence. eliminate VOCs and SVOCs also.	R A	0-0.5 ft depth applies to surface samples; 0-1 ft depth for below the asphalt "workers detected an organic odor" added to site description to justify analysis of VOCs and SVOCs	
	Section 10.0	Section on methods seems a bit short. Need more detail? SOPs are ECR now, not ER. Delete all, just applicable SOPs, QPs, etc.	R A	Some of the methods section was moved into the phased approach discussion. "ER" changed to "ECR"; "all" deleted	
	Section 10.2	What are SOPs for spade and scoop and hand auger?	A	These SOPs are in the bullet list; added text ref. "sample" added	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		Top of page 97 – **sample** collection logs Samples will be field screened… SOPs for field screening VICs and Rad? Recorded on SCLs using which SOP? Delete LANL-ER- Sent to an **off-site** lab Delete LANL-ER- Delete LANL-ER- What section of Consent Order presents blanks?	A A A A A A	Text modified accordingly Added SOP for headspace screening, field documentation SOP ref. Added reference to Order section (specifies percentage for field dups, but not for blanks).	
	Section 10.3	Delete LANL-ER-	A	Text modified	
	Section 12.0	No date just March 2009?	A	Added specific date, text summarizing anticipated schedule.	
	Appendix B	Upper Los Alamos Canyon **A**ggregate **A**rea, delete sites Is there now a 2005 roadmap? Bottom of page B-2 – **Table B-1 presents a summary** of how wastes… Is this a proposed approach? What about the purge water? Not mentioned as waste and how managed. All LLW? Is this appropriate?	A A A	Text modified accordingly Not really "proposed"; standard methods. Reference to purge water removed, not an expected waste stream for this investigation. Most sites are radionuclide-related; best current information indicates that most if not all waste will be	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
				LLW.	
	Figures	1.0-1 – can't see coloring in legend Upper LA Aggregate, Laboratory boundary. 1.0-2 – SWMU/AOC not PRS in legend; colors, lines not visible in legend. 3.1-1 – can't see some of the SWMU/AOC locations in green. 3.2-1 – line 171 not shaded with rest of SWMU parts. 4.1-1 – no figure number on TA-01 site map. SWMU/AOC not PRS in legend; colors, lines not visible in legend. 4.2-1 – sample further down slope then one line of samples? 4.3-1 - sample further down slope then one line of samples? 4.8-1 - sample further down slope then one line of samples? 4.10-1 – is end of line in upper left hand corner an outfall? No samples? 4.12-1 – end of line an outfall? No samples? Photo for 01-003(b)? 4.18-1 - sample further down slope then one line of samples?	A	**Figures 1.0-1, 1.0-2, 3.1-1, 3.2-1, 4.1-1** modified. **Figures 4.2-1, 4.3-1, 4.8-1, 4.18-1, 4.24-1, 4.27-1, 4.33-1, 8.6-1**: Sampling scheme was approved during peer review presentation and by field personnel. **Fig 4.10-1**: this section has been NFA-ed. See Section 4.10.3. **Fig 4.12-1**: north end connects to 01-001(s). The connection point can't be sampled because limited space and too close to a utility box. **Photos for 01-003(b), 01-007(l), 03-008(a)**: we provide photos to show why limited sampling is proposed. Photos at these sites do not provide	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		4.19-1 – resample 03083 because of high selenium and further down slope? 4.24-1 - sample further down slope then one line of samples? 4.27-1 - sample further down slope then one line of samples? 4.33-1 – resample on slope near #13? Down slope? 4.35-1 – proposed locations? Photo? 5.1-1 – no green area for 055(c) and 008(a) 5.2-1 – Photo? Area for 008(a)? 5.4-1 – only one location for 038(b)? 6.3-1 – samples down slope? 6.4-1 – no new samples down slope? 6.6-1 - no new samples down slope? 7.2-1 – resample 01008? Further down gradient from this location? Organics and rad? 8.3-1 – **AOC** not SWMU. 8.6-1 - sample further down slope then one line of samples?		additional supportive information. **Fig 4.19-1**: sample added **Fig 4.35-1**: we decided to propose no sampling for 01-007(l). See Section 4.35.3. **Fig 5.1.1** revised. **Fig 5.4-1**: 03-038(b) was an intact tank and there was no contamination at the excavation. Both inlet and outlet will be sampled. **Fig 6.3-1**: Outfall is discussed under Section 6.4-3. **Fig 6.4-1**: No sampling proposed at outfall because extent has been defined. **Fig 6.6-1**: No sampling proposed at outfall because extent has been defined. **Fig 7.2-1**: sample added. Fig 8.3-1: changed AOC.	
	Tables	1.1-1 – Site Status column – **No proposed sampling**. Recommend NFA? Deferred? For 01-001(a)-99 no	A	"Proposed no sampling" changed to "No proposed sampling". NFA recommendation will be done in IR.	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		removals? TA-32 no removals? Which are deferred? TA-41 and TA-43? 3.1-1 – title …**Samples Previously Collected.** 3.2-1 – title delete Soil. Shallowest depth should be 0-0.5 ft, not 0-1 ft. Add SVOCs. VOCs??? 4.1-1 - title …**Samples Previously Collected.** 4.2-1 - title delete Soil. Shallowest depth should be 0-0.5 ft, not 0-1 ft. Add SVOCs at outfall. Sample 0-0.5 and 2-3 ft, delete Two depths and footnote. VOC footnote incorrect, delete. Will be analyzed for. 4.3-1 - title delete Soil. Shallowest depth should be 0-0.5 ft, not 0-1 ft. Add SVOCs at outfall. Sample 0-0.5 and 2-3 ft, delete Two depths and footnote. VOC footnote incorrect, delete. Will be analyzed for. 4.4-1 - title delete Soil. Shallowest depth should be 0-0.5 ft, not 0-1 ft. Add SVOCs at outfall/hillside. Sample 0-0.5 and 2-3 ft, delete Two depths and footnote. VOC footnote incorrect, delete. Will be analyzed for. 4.5-1 – same as above. 4.6-1 - title delete Soil. Shallowest depth should be 0-0.5 ft, not 0-1 ft. Add SVOCs. VOC footnote incorrect, delete. Will be analyzed for. 4.7-1 - title delete Soil. Shallowest depth should be 0-0.5 ft, not 0-1 ft. Add SVOCs at outfall. Sample 0-0.5 and 2-3 ft, delete Two depths and footnote. VOC footnote		Removals are a sub-action within the "investigation" status but not called out specifically. Deferred actions updated. **Globally.** " Previously" added and "Soil" deleted in titles. 0-1 ft depths stay because they are NOT surface samples. They are beneath a pipe or tank and we will be needing that much volume of dirt for the analysis. All deeper sample intervals are 1 ft increments. 2 depth sampling in outfalls was a requirement by geomorphologist & arbitrary depths were specifically not allowed. VOC footnotes were changed to be the same as Middle LA. "Will be analyzed" changed to "Will be requested". RE: adding SVOCs, as mentioned in text any SVOCs detected would not be indicative of lab processes 50 yrs ago but more reflective of residential roads and cars. In the outfalls and hillsides SVOCs would reflect runoff from today's roads. **3.2-1.** No SVOCs or VOCs will be analyzed as mentioned in text because they were not previously detected. **4.10-1**. PCBs were added because they are required by the Order and we only had 4 PCB samples for a huge footage of pipeline and we did not feel that was adequate sampling to rule out sampling for PCBs. **4.11.1**. PCBs were added because they are required by the Order and we only had 1 previous sample analyzed for PCBs and we did not feel that was	

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		incorrect, delete. Will be analyzed for. 4.8-1 – same as above. 4.9-1 – same as above. 4.10-1 - title delete <u>Soil</u>. Shallowest depth should be 0-0.5 ft, not 0-1 ft. Add SVOCs? Not detected? VOC footnote incorrect, delete. Will be analyzed for if related to site. Why PCBs? 4.11-1 - title delete <u>Soil</u>. Shallowest depth should be 0-0.5 ft, not 0-1 ft. Add SVOCs? Not detected? VOC footnote incorrect, delete. Will be analyzed for if related to site. Why PCBs? 4.12-1 - title delete <u>Soil</u>. Shallowest depth should be 0-0.5 ft, not 0-1 ft. Add SVOCs? 4.13-1 - title delete <u>Soil</u>. Shallowest depth should be 0-0.5 ft, not 0-1 ft. Add SVOCs? Not detected? VOC footnote incorrect, delete. Will be analyzed for if related to site. Why PCBs? 4.14-1 - title delete <u>Soil</u>. Why PCBs? Add SVOCs. VOC footnote incorrect, delete. Will be analyzed for if related to site. Location 18 has two depths in text. 4.17-1 - title delete <u>Soil</u>. VOC footnote incorrect, delete. Will be analyzed for if related to site. 4.18-1 - title delete <u>Soil</u>. Why PCBs? Add SVOCs. VOC footnote incorrect, delete. Will be analyzed for if related to site.		adequate sampling to rule out sampling for PCBs. **4.13-1.** PCBs were added because they are required by the Order and we had no previous samples analyzed for PCBs and we did not feel there was rationale to rule out sampling for PCBs. **4.14-1.** PCBs were added because they are required by the Order and we only had 5 CST onsite samples previously analyzed for PCBs and we did not feel that was adequate to rule out sampling for PCBs. "Two Depths" has been added to the table. **4.18-1.** PCBs were added because they are required by the Order and since PCBs have not been analyzed previously at this site, we have no adequate rationale by which to rule out sampling for PCBs.	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		4.19-1 - title delete <u>Soil</u>. Shallowest depth should be 0-0.5 ft, not 0-1 ft. Add SVOCs at outfall. Sample 0-0.5 and 2-3 ft, delete <u>Two depths</u> and footnote. VOC footnote incorrect, delete. Will be analyzed for. Add down slope location past 03083. 4.24-1 - title delete <u>Soil</u>. Add SVOCs. Sample 0-0.5 and 2-3 ft, delete <u>Two depths</u> and footnote. VOC footnote incorrect, delete. Will be analyzed for. Why PCBs? 4.27-1 - title delete <u>Soil</u>. Add SVOCs. Sample 0-0.5 and 2-3 ft, delete <u>Two depths</u> and footnote. VOC footnote incorrect, delete. Will be analyzed for. Why PCBs? 4.28-1 – metals not analyzed for here previously. Title delete <u>Soil</u>. Shallowest depth should be 0-0.5 ft, not 0-1 ft. Add SVOCs. Sample 0-0.5 and 2-3 ft, delete <u>Two depths</u> and footnote. VOC footnote incorrect, delete. Will be analyzed for. Why PCBs? 4.31-1 – metals? Title delete <u>Soil</u>. Shallowest depth should be 0-0.5 ft, not 0-1 ft. 4.32-1 - metals? Title delete <u>Soil</u>. Shallowest depth should be 0-0.5 ft, not 0-1 ft. 4.33-1 - metals? Title delete <u>Soil</u>. Shallowest depth should be 0-0.5 ft, not 0-1 ft. 5.3-1 - title delete <u>Soil</u>. Shallowest depth should be 0-0.5 ft, not 0-1 ft. 5.4-1 - title delete <u>Soil</u>. VOC footnote incorrect, delete.		**4.19-1** "Two Depths" has been added to the table. A sample location will not be added down slope of location 03083 because a clear decreasing trend has been established by previous sample results. **4.24-1, 4.27-1** "Two Depths" has been added to the table. PCBs were added because they are required by the Order and since PCBs have not been analyzed previously at this site, we have no adequate rationale by which to rule out sampling for PCBs. **4.28-1** True, metals not previously analyzed and as the text reads: "They will not be analyzed for inorganic and organic chemicals because this area was designated a SWMU solely due to the past presence of radionuclides." We are not requesting PCB analysis at this site. **4.31-1, 4.32-1, 4.33-1** True, metals not previously analyzed and as the text reads: "They will not be analyzed for inorganic and organic chemicals because this area was designated a SWMU solely due to the past presence of radionuclides."	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		Will be analyzed for. Add Location #7 for 038(b) 5.6-1 - title delete <u>Soil</u>. Add SVOCs? Sample 0-0.5 and 2-3 ft, delete <u>Two depths</u> and footnote. VOC footnote incorrect, delete. Will be analyzed for. 6.1-1 - title …**Samples Previously Collected**. 6.2-1 - Add SVOCs. 6.3-1 - Add SVOCs. 6.4-1 – need down slope samples? Shallowest depth should be 0-0.5 ft. Sample 0-0.5 beneath tank and 2-3 ft. Add SVOCs. 6.5-1 – if objective is determine extent of PCB contamination so why analyze for all the other stuff? Shallowest depth should be 0-0.5 ft. Add SVOCs. VOC footnote incorrect, delete. Will be analyzed for. 6.6-1 – 1-1.5 ft? 0-0.5? Not 1-2. 7.1-1 - title …**Samples Previously Collected**. 7.2-1 - Shallowest depth should be 0-0.5 ft. 01008 had organics and rad detected, need to go further down slope. 8.4-1 - Add SVOCs. Sample 0-0.5 and 2-3 ft, delete <u>Two depths</u> and footnote. VOC footnote incorrect, delete. Will be analyzed for. 8.6-1 - Add SVOCs. Sample 0-0.5 and 2-3 ft, delete <u>Two depths</u> and footnote. VOC footnote incorrect, delete. Will		**5.4-1** Where you propose additional location #7 is great. This is work plan is a minimalist approach and we will add in location #7 when the State says they want more samples collected. **6.2-1, 6.3-1, 6.4-1, 6.5-1** RE: adding SVOCs, as mentioned in text: "SVOCs that could be detected would reflect current site usage" and that is clearly shown in SVOC sample results from AOC 32-004. TA-32 sites are either beneath asphalt or down gradient from where the County maintenance yards have been operating (i.e., parking trucks on asphalt) for 50 years. **6.4-1** RE: need for down slope samples. The most down slope sample locations (32-06323 and -06325) were analyzed for AM-241, H3, Iso-Pu, Iso-U, metals, and SVOCs. There were no detects for SVOCs, or metals >BV, or Iso-U. For metals and Pu there is a decreasing trend. So there doesn't appear to be a need for more down slope samples. **6.5-1.** Great catch! Thank you. All suites but PCBs eliminated.	

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		be analyzed for. 9.2-1 – why VOCs and SVOCs? PCBs only contaminant. Shallowest depth should be 0-0.5 ft. VOC footnote incorrect, delete.		**9.2-1** text added to IWP and HIR to explain the analysis of VOCs (a VOC was previously detected)	

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Attachment B: Peer Review Comment Form

Part 1 (Author or Peer Review (PR) Coordinator Complete) Date: 3/1/06

Title Upper LA Canyon Aggregate IWP Rev. #: __ Doc. Catalog No: **ER200** - ____

Reviewer's Name (Print): Melanee Shurter Organization: ENV-ECR Comments due by: 3/15/06 (Date)

Author: Becky Coel-Roback Phone: 7-7369 E-Mail: mshurter@lanl.gov

Return forms to PR Coordinator: Cheri Vidlak Phone: 7-2728 E-Mail: cvidlak@lanl.gov

Part 2 (Reviewer Completes)

Date Received: 2/28/06 Date Review Completed: 3/15/06

Signature & Date (to be signed ONLY upon agreement of comment resolution): Melanee M Shurter Date: 4/20/06

Part 3 (If under time constraints, the Author and Reviewer each sign.) ☐ Not all comments resolved; attach PR Comment Form to Document Signature Form.

Author Signature & Date: ____

Reviewer Signature & Date: Melanee M Shurter

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
1	Executive Summary	The executive summary sounds more like an introduction. Also, do we need to list all 61 SWMUs and AOCs here? Change the executive summary so that it summarizes for the manager what you are trying to recommend that is explained in excruciating detail within the next 100+ pages. For example, what are the primary recommended actions, associated time tables, coordination necessary, issues, etc.	A	The executive summary has been completely rewritten to summarize the plan. The list of the 61 SWMUs and AOCs has been moved to Section 1.1. A paragraph has been added in ES that summarizes the phased approach to achieve the main objective of the WP. We do not typically include schedule information in the executive summary, which is presented in Chapter 12.	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
2	1.0	The introduction is very boiler-plate-sounding. Need to introduce the specific project with most important points made out of section 1. Somewhere it should explain **why** you need to determine "if it is necessary to characterize the nature and extent"....Somehow the document doesn't seem to get across the points that were discussed at an overview level when this document was developed, such as the fact that many of the sites were remediated previously and we are re-assessing with new-fangled technology now, or that some areas have condos on top of them and how we plan to work with the public, etc. This type of information should also be summarized in the Executive Summary.	A	Our introductions *are* mostly boiler plate, and cover some of the "legalese" that we are told we must include. The statement that "if it is necessary to characterize the nature and extent…" has been removed. It is always necessary to determine nature and extent…it is central to ER work (everywhere, not just at LANL). Section 1.3 "Phased Approach of Field Activities" points out the highly developed conditions such as in TA-01 and how field activities will proceed. A paragraph has been added in the Executive Summary that summarizes the phased approach to achieve the main objective of the WP, as well as the significant changes that have occurred at these sites since they were operational.	

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Attachment B: Peer Review Comment Form

Part 1 (Author or Peer Review (PR) Coordinator Complete) Date: 3/1/06

Title Upper LA Canyon Aggregate HIR Rev. #: ___ Doc. Catalog No: **ER200** - ____

Reviewer's Name (Print): Melanee Shurter Organization: ENV-ECR Comments due by: 3/15/06 (Date)

Author: Becky Coel-Roback Phone: ________ E-Mail: ________

Return forms to PR Coordinator: Cheri Vidlak Phone: 7-2728 E-Mail: cvidlak@lanl.gov

Part 2 (Reviewer Completes)

Date Received: 2/28/06 Date Review Completed: 3/15/06

Signature & Date (to be signed ONLY upon agreement of comment resolution): Melanee M Shurter Date: 4/20/06

Part 3 (If under time constraints, the Author and Reviewer each sign.) ☐ Not all comments resolved; attach PR Comment Form to Document Signature Form.

Author Signature & Date: ________

Reviewer Signature & Date: ________

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
1	Introduction	Through a summary statement, identify the sources of information on past investigations and possibly the level of confidence in the information, if known or applicable.	A/R	Because a wide range of sites are addressed, the sources of information on past investigation (references with page numbers indicating sources) are given within each site write-up. There is no simple summary statement that can capture the diverse sources and quality of information available for the aggregate as a whole.	

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2	Major sections and Appendices	Provide more tabs to be able to locate major sections and appendices more easily.	A/R	Tabs were included in the peer review document to aid the peer reviewers. Following the editing and compositing guidelines for ER documents, tabs are generally not included because major sections (i.e. 1.0, 2.0, etc.) do not start over at the top of a page. If time allows, we will produce tabs to separate the main body of the text from the Appendices.	

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Attachment B: Peer Review Comment Form

Part 1 (Author or Peer Review (PR) Coordinator Complete) Date: 3/1/06

Title Upper LA Canyon Aggregate IWP Rev. #: ___ Doc. Catalog No: **ER200** - ___

Reviewer's Name (Print): Steven Koch Organization: ENV-ECR Comments due by: 3/15/06 (Date)

Author: Becky Coel-Roback Phone: ___ E-Mail: ___

Return forms to PR Coordinator: Cheri Vidlak Phone: 7-2728 E-Mail: cvidlak@lanl.gov

Part 2 (Reviewer Completes)

Date Received: 3/21/2006 Date Review Completed: 3/23/06

Signature & Date (to be signed ONLY upon agreement of comment resolution): Steven Koch Date: 3/23

Part 3 (If under time constraints, the Author and Reviewer each sign.) ☐ Not all comments resolved; attach PR Comment Form to Document Signature Form.

Author Signature & Date: ___

Reviewer Signature & Date: ___

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
1	Appendix C	Many of the spatial data features used in this report are in the change control process but not yet stored as official datasets. The project leader is encouraged to check on the status of this proposed data at the project close-out and confirm that it is on-track to be stored properly.			

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
2	Fig. 3.2-1, Fig. 4.2-1, Fig. 4.3-1, Fig. 4.4-2, Fig. 4.5-2, Fig. 4.6-1, Fig. 4.7-1, Fig. 4.8-1, Fig. 4.9-1, Fig. 4.10-1, Fig. 4.11-2, Fig. 4.12-1, Fig. 4.13-2, Fig. 4.14-1, Fig. 4.17-1, Fig. 4.18-1, Fig. 4.19-1, Fig. 4.24-1, Fig. 4.27-1, Fig. 4.28-2, Fig. 4.31-1, Fig. 4.31-1, Fig. 4.33-1, Fig. 5.3-1, Fig. 5.4-1, Fig. 5.5-1, Fig. 6.2-1, Fig. 6.3-1, Fig. 6.4-1, Fig. 6.5-1, Fig. 6.6-1, Fig. 7.2-1, Fig. 8.4-1, Fig. 8.6-1, Fig. 9.2-1	Proposed sample locations are not under change control or available to the project staff. This is not required. Project leader should be aware that project staff cannot duplicate these figures.			

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Part 1 (Author or Peer Review (PR) Coordinator Complete) Date: 3/1/06

Title Upper LA Canyon Aggregate HIR Rev. #: __ Doc. Catalog No: **ER200** - ____

Reviewer's Name (Print): Richard Mirenda Organization: ECR Comments due by: 3/15/06 (Date)

Author: Becky Coel-Roback Phone: ____ E-Mail: ____

Return forms to PR Coordinator: Cheri Vidlak Phone: 7-2728 E-Mail: cvidlak@lanl.gov

Part 2 (Reviewer Completes)

Date Received: 2/28/06 Date Review Completed: 3/6/06

Signature & Date (to be signed ONLY upon agreement of comment resolution): Richard Mirenda Date: 4/24/06

Part 3 (If under time constraints, the Author and Reviewer each sign.) ☐ Not all comments resolved; attach PR Comment Form to Document Signature Form.

Author Signature & Date: ____

Reviewer Signature & Date: ____

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
1	General	See hard copy for markups. Using the hard coy may be easier given the types of comments, i.e., mainly text corrections, changes, etc.	A	Accepted	Accepted
2	General	Text is inconsistent about whether the concentrations increase, decrease or remain unchanged, i.e., if extent is defined. Should have something that concludes whether this is true or not.	A	Extent is not defined for any site. That's why we are going back to take more samples. However, we will review the extent write-ups and beef them up and check for consistency.	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
3	General	Also need a statement somewhere either per site, per group or overall whether the RFI, VCA, etc. data (i.e., older data) will be used to characterize the sites in the IR, i.e., Denver (CST of-site), SMO vintage, etc. will be used, and the new data will supplement or CST off-site data will not be used. Maybe this goes better in the work plan but needs to be clear somewhere.	A	Agreed that is would be better not to include it here	
4	General, Section 2	Many of the comments are redundant throughout this section. Specific comments are made separately. Criteria for NFA need to be consistently presented. Some sites have it some don't. Also the criterion itself is not consistently written out or not written at all. Criterion 4 is presented with different text. Need to state basis (criterion) for NFA for all sites. Need to reference when EPA approved the NFA versus when they confirmed it. Many sites do not have the approval noted and some state approved with no reference. SWMU vs. AOC designation. Please check. Some identified as AOC in subheading but then called SWMU in text; this is primary inconsistency. Also vice versa. Reference to DOE/LANL permit is inconsistent. Some give permit number, some mention HSWA, Module VIII with reference. Need to present the same each time. See page 6 for examples of inconsistent presentation.	A	Agreed that comments are redundant NFA criteria have been deleted throughout the text after discussions with L. Nonno and R. Mirenda Per J. English, the EPA sometimes only wrote when they disapproved. If they approved, they sometimes didn't bother with the site any further in writing. These non-written approvals have been deleted to avoid confusion. SWMU vs AOC has been fixed. Reference to permit has been made consistent.	

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5	Executive Summary	Delete all reference citations in Executive Summary. Delete in this HIR second paragraph. Delete last paragraph about Consent Order, not relevant for Executive Summary.	A	All reference citations deleted "in this HIR" deleted Last paragraph deleted.	
6	TOC	Put data sources for maps in reference section, no need for separate appendix. Work with the editor.	A	Will let the editor make the final call about moving map data sources from the App to references.	
7	Section 1.0	Table 1.1-1 not referenced in this section. What is the basis for grouping sites? TA? Related processes? Put data sources for maps in reference section.	A	Table 1.1-1 changed to Table 1.0-1 and referenced. Discussion of site grouping added indicating grouping by regulatory status and then numerically. Will let the editor make the final call about moving map data sources from the App to references.	
8	Section 2.1	Delete <u>outside of Laboratory</u>; just TA-00. Refer to Table 1.1-1 for summary of admin complete sites? Section 2.0?	A	"outside of Laboratory" deleted Introductory discussion added in Section 2.0 and the table referenced	
9	Section 2.1.1	Last bullet – no NMED letter to reference only a web site? Should be a letter. See section 2.2.1.	A	Website deleted, reference to letter made instead.	
10	Section 2.1.2	First bullet – instead of <u>before they were placed</u>, **before being placed on standby**…	A	Wording changed.	
11	Section 2.2	Title TA-01, former **Main Technical Area**	A	Capitalization change made	

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12	Section 2.2.2	Second bullet – **Septic T**ank 143.	A	Requested change made	
13	Section 2.2.8	01-001(p) heading is Septic System but text describes as a **steam tunnel**. If re named should out in section heading with correct name.	A	It hasn't been re-named.	
14	Section 2.2.10	Second bullet should be **1992 -**	A	1992- has been added	
15	Section 2.2.13 and .14	Why include phrase of <u>and requires no further investigation</u> if NFA?	A	"and requires no further investigation" deleted	
16	Sections 2.2.19 and 2.2.20	Storm drain/drain line vs. pipe?	A	"pipe" replaced with "storm drain"	
17	Section 2.2.30	First paragraph – GR? Spelled out previously? storag**e** Delete) after storage**.**	R A	"GR" is the designation of the warehouse just like "TU" is the name of a building. It's not an abbreviation. ")" deleted, "e" added	
18	Section 2.2.31	… consist**ed** of potential…	A	Requested change made.	

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19	Section 2.2.33	… consist**ed** of an area of potential… Delete lasting. Second bullet - indic**ated**	A	Requested changes made.	
20	Section 2.3	Title TA-03, **South Mesa Site**	A	Requested change made	
21	Section 2.3.1	Delete at the Laboratory. Third bullet - …NFA Criterion 4**, which states**… delete as parenthetical.	A	Requested changes made. Info Re: Criteria removed per Mirenda & Nonno	
22	Section 2.3.2	Don't capitalize interim action. Second bullet - **Criterion** 4 Reference for criterion?	A	interim action de-capitalized Info Re: Criteria removed per Mirenda & Nonno	
23	Section 2.3.3	Initially identified? What is it now?	A	The current description in the 1995 bullet has been moved up into the SWMU description.	
24	Section 2.4	Title TA-30, **Electronics Testing Area** Rearrange text to read **TA-30 was developed as an electronics testing area during World War II. It was a small site with a single wooden hutment equipped with an oil-burning stove, built in 1945 (Betts 1947, 05581). Engineering records indicate that the hutment was removed in 1946. The site was decommissioned in 1948 (LANL**	A	Requested changes made.	

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		1993, 20947, p. 2-6). **TA-30 was located in the northwest angle of the intersection of the old Anchor Ranch Road and West Road. The area is gently sloping pine forest that has been thinned for firebreak purposes. A short length of culvert and scattered gravel are all that remain of the site ((LANL 1993, 20947, p. 2-3). The quarter-acre site lies within the current boundaries of TA-03.**			
25	Section 2.4.1	**Decommissioned and** abandoned? Old **A**nchor Ranch Road Earlier referenced as **original** SWMU Report.	A	Changes made. "decommissioned and no longer used" added. Requested capitalization added. "original" deleted.	
26	Section 2.5	Title TA-32, **Medical Research Laboratory** Delete <u>considered.</u> Why no text on other TA-32 SWMUs?	A	Requested changes made. There is only 1 TA-32 site that was NFA'd. All the rest of the TA-32 sites are in Section 6.0 Reference to the other SWMUs has now been deleted to reduce confusion	
27	Section 2.6	Title TA-41, W **Site**	A	Requested changes made.	
28	Section 2.6.1	**B**uilding TA-41-30. Delete <u>in the past</u>. ...epoxy hard**e**ner...an**d** wire hard**e**ner...	A	Requested changes made.	
29	Section 2.6.2	**C**-41-003? Named an inactive sump here but later an Underground Tank. Which is correct? **S**tructure 41-10.	A	This can be confusing. Please see the table that lists the sites and their status. There is a both AOC 41-003 AND AOC C-41-003. One is a sump (Structure	

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				41-10) and the other is an underground tank (41-W45). We added text to clarify: "AOC C-41-001 is a duplicate of AOC 41-003, an inactive sump pit (structure 41-10), which is addressed in Section 7.4, not to be confused with AOC C-41-003, an underground tank (TA-41-W45) discussed in Section 2.6.4."	
30	Section 2.6.4	Title **AOC** C-41-003… Underground Tank? If C-41-001 a duplicate should be the same thing?	A	See explanation immediately above.	
31	Section 2.6.5	If duplicates should these be NFA'd based on Criterion 1, does not exist or duplicate?	A	Info Re: Criteria removed per Mirenda & Nonno	
32	Section 2.7	Title TA-43, **Health Research Laboratory**	A	Requested change made.	
33	Section 2.7.3	First bullet make into two sentences. Start second sentenced with **The DOE agreed**…	A	Requested change made.	
34	Section 2.8	Title TA-61, **East Jemez Site**	A	Requested change made.	
35	Section 3.0	Title delete <u>OUTSIDE OF LABORATORY</u>	A	Requested change made.	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
36	Section 3.1.1	Page 19 – top of page, **c**anyon Figure 3.1-1 does not show the lines. 3.2-1? Next paragraph – delete As described by Elder et al. Move reference citation to end of sentence and start sentence with **Initially, the industrial**... newly constructed radiochemistry *laboratory? facility?* What line did this discharge to? Delete an alpha emitter. Industrial waste lines plural? Only one? Insert **Manhole** before ULR number. Page 20 – reference for established industrial waste line guideline of 25 pCi/g? Zia Company paragraph – Figure 3.1-1 cannot see anything except overall view.	A	Canyon decapitalized. Text modified to refer to Figure 3.2-1 Requested change made. Changed text to "...TA-48, the radiochemistry site, ..." "an alpha emitter" deleted "s" added to waste line Manhole inserted Reference added Added reference to Figure 3.4-1	
37	Section 3.1.2	First paragraph delete considered as. Second paragraph delete last sentence on data Simply refer to Appendix/CD and state whether the data are good quality, sufficient, and will be used to define N&E.	A	"considered as" deleted Sentence deleted.	

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38	Section 3.2	First bullet bottom page 20 – delete had been left in place in 1984 and 1985. Top of page 21 – VCP spelled out before? HRL was spelled out. LAMC? Next paragraph – delete is. Medians of what? Roads? Which? Is the parking lot for LAMC?	A A A R	Changed to "were left in place" VCP spelled out, HRL contracted, LAMC spelled out "is" deleted. Medians of parking lots added. No need to try to distinguish between the parking lots of HRL and LAMC – it all runs together.	
39	Section 3.2.1	First bullet - Site Investigation = RFI? Why not use RFI? This is global. Delete if present. Change viable pathway to **complete** pathway**s**. Second bullet - shouldn't this be a referencing a NMED letter not LANL?	A A A	Global change made "if present" deleted. Viable pathway changed to complete pathways NMED referenced as requested	
40	Section 3.2.2	TAL metals? Have and/or tritium and by gamma spec but page 23 does not indicate and/or only all analyzed for these. Inorganic bullets – some have text describing trends and some don't. Should be consistent. Need a conclusion at the end stating whether extent defined or not. Mercury has not range, just a BV. Same for silver. Page 23 – **No organic chemicals were detected**. …analyzed **by** gamma spectroscopy **and for** isotopic… Fourth bullet – state tritium greater than range of fallout values but paragraph above state not soil FV available.	A/R A/R A A A	"metals" according to ERDB; Deleted all listings of suites; refer to tables for suites According to the protocol of Middle LA WP, trend (if available) is discussed only for metals detected above the range of the background, not for the ones detected within the range. Nature and extent writing is in IWP as how Middle LA WP has, which NMED did not comment. Silver and mercury text fixed Requested wording changed Requested wording changed	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
			A	Tritium write up appropriately changed	
41	Section 3.3	AOC in title but SWMU in text then back to AOC. Page 24 first full paragraph seventh line something is missing. ...confirming ***that is was more*** appropriate that the...????? **Criterion** 1, **which states** that...	A	SWMU changed to AOC "is" changed to "it" Info Re: Criteria removed per Mirenda & Nonno	
42	Section 3.4.1	Site Investigation = RFI? Delete detectable levels of. Top of page 25 – minimum of three samples collected were of pore gas? Not clear samples of what.	A A A	Global change made from site invest to RFI Deleted "detectable levels of" "soil samples"	
43	Section 3.4.2	...after excavation **in** the vicinities... TAL Metals? Not and/or SVOCs, 3 for metals, 2 for SVOCs; just state that. Third bullet - mercury above BV not range. Delete last sentence about EQLs. Comparing to CRDLs from SOW not analytical EQLs from data set. *Also a global deletion.*	A A/R A A	"of" changed to "in" "metals" according to ERDB; Deleted all listings of suites; refer to tables for suites Global chg made showing mercury only >BV not range EQL info deleted	
44	Section 3.5	AOC in title but SWMU in text. ...of the pit **was** found...	A	SWMU changed to AOC, "had been" changed to "was"	
45	Section 3.6	LANB acronym spell out, used earlier.	A	Acronym used earlier deleted.	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
46	Section 3.6.1	VCA spelled out? SSLs not used in 1995, just SALs. Need to spell out first use.	A	VCA spelled out in Section 2.1.1. SSLs replaced with SALs and spelled out.	
47	General, Section 4.0	Some of the comments are redundant throughout this section. Specific comments are made separately. Site Investigation = RFI? Why not use RFI? SSLs not used before 2000, just SALs. Delete sentences about EQLs. Comparing to CRDLs from SOW not analytical EQLs from data set. BV for mercury and silver not range of background concentrations, except if silver in Qbt 2,3,4. Criteria for NFA need to be consistently presented. Some sites have it some don't. Also the criterion itself is not consistently written out or not written at all. Criterion 4 is presented with different text. Need to state basis (criterion) for NFA proposed for all sites. SWMU vs. AOC designation. Please check. Some identified as AOC in subheading but then called SWMU in text; this is primary inconsistency.	A A A A A A A	Agreed Global chg from site invest to RFI made Global ck for SSLs made and deletions made Deleted info on EQLs globally Global chg on mercury and silver made Info Re: Criteria removed per Mirenda & Nonno SWMU vs AOC fixed	
48	Section 4.1	Second paragraph – don't cite the document you are in; give sections numbers if necessary. Also refer to Table 1.1-1. Second bullet – when state the industrial waste line do we mean for TA-01? Laboratory as a whole? The *the* designation implies a large context.	A R A	Ref deleted. Ref to Table 1.1-1 not necessary Changed to "the TA-01 industrial waste line"	

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		Third bullet – delete to. Fourth bullet – outfalls associated with which SWMU or AOC? Not designated separately. Fifth bullet – sediment? All data compared to soil BVs?	A R A	"to" deleted This is an overview section – the specifics are given with each site. "soil" deleted to avoid confusion	
49	Section 4.1.1	Page 28 - DP spell out first time? Fourth paragraph - …generated what **are now** classified as mixed wastes. Bottom of page put space between No. and 2. Page 29 – no references for all of this info last two paragraphs? Page 30 – third paragraph – **Ahlquist** Radiological Survey? Fourth paragraph **remaining** vs. remained. Fifth paragraph – delete NFA or Phase I. …based on **Phase** I data… don't capitalize **work plan**. Next paragraph - …were organized **into** 16 aggregates… Phase I **RFIs** **Work in 1990s also included** should not be a bullet.	A A A A A A A	DP spelled out, "are now" inserted, and space inserted between No. and 2. Reference added "Ahlquist" inserted. "remaining" inserted deleted NFA or Phase I. "Phase" inserted. "work plan" de-capitalized "into" inserted. "RFIs" inserted "Work…" unbulleted	

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50	Section 4.1.2	First paragraph – believe and/or is incorrect; no sites where rad was analyzed instead of metals. Delete considered as. Delete in their entirety. Second paragraph – **sample** location, not sample's. Delete last sentence on data Simply refer to Appendix/CD and state whether the data are good quality, sufficient, and will be used to define N&E.	A A A	? Table 4.1-1 shows that either one category of suites, or two, or three were analyzed for samples. considered as. and in their entirety deleted global replacement of "sample's" with "sample" Sentence deleted.	
51	Section 4.2	End of first paragraph – makes into two sentences. Second sentence starts with **The rest of the**... delete and then.	A	Made into 2 sentences.	
52	Section 4.3	SWMU is a septic tank but text talks about branch and main lines, not clear if part of SWMU and relevance.	A	The SWMU is called a septic tank but there are 2 lines that go with it	
53	Section 4.3.2	Bottom page 32 - ...former septic tank and were sampled **from** only one depth interval; delete at surface. Page 33 fourth bullet – mercury only BV not range. Second set of bullets see general comments. Last paragraph – **Isotopic plutonium was not** detected or detected...	A A A	"from" inserted, "at surface" deleted range changed to BV Sentence changed as requested	
54	Section 4.4.1	Bullet bottom of page 33 – delete it and – between gross and alpha. Top of page 34 see general comments.	A	"it" and "-" deleted General comments were addressed here.	
55	Section	include**d**	A	"d" added	

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	4.4.2				
56	Section 4.5.1	Was the outlet line also left in place? Other parts also? Page 35 first bullet – see general comments. Already defined COPCs. COPCs in stormwater cannot be above SALs. Trail user scenario in 1994? Seems unlikely. Thought more recent invention. Eco screening assessment? Not relevant used old methodology. Should we just delete?	? A	See pg 79 of Alquist Report. They don't specify if they removed the outlet pipe. COPC definition deleted. Info re: SALs and trail user deleted although pg 94 of ERID 49703 states trail user scenario was used. Info on Eco Assmt deleted	
57	Section 4.5.2	See general comments.	A	General comments addressed here.	
58	Section 4.6.1	See general comments. State two soil samples collected then say in 4.6.2 no lab data. Were these samples CST on-site? Mobile lab?	A A	General comments addressed here. "in 1976" added to clarify that the samples were collected a long time ago.	
59	Section 4.7.1	First bullet – maximum **activity** being 48 pCi/g. Second bullet – see general comments. Storm water samples analyzed off-site/ Ten COPCs. Delete sentence starting with Human health risks associated with… Last sentence delete radiation health risk, just **do not pose an unacceptable dose**.	A	"activity" added. General comments addressed here. Info re: SALs deleted. Human health risks associated with and radiation health risk deleted. Added **do not pose an unacceptable dose**. "chemicals" changed to "COPCs". Requested sentence and wording deleted. **do not pose an unacceptable dose** added	

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60	Section 4.7.2	See general comments. And/or not correct. Metals and SVOCs all samples, iso PU just 3. Fourth bullet – thallium text should go with next bullet. **No SVOCs were detected**.	A	General comments addressed here. Deleted all listings of suites; refer to tables for suites Thallium given its own bullet Wording changed to **No SVOCs were detected**	
61	Section 4.8.1	See general comments.	A	General comments addressed here	
62	Section 4.9.1	First bullet - …until the **building was demolished**… Actually disposed of in the canyon? Landfill? See general comments.	A	Text changed to "building was demolished" In the canyon, see Buckland 1973, 58138	
63	Section 4.9.2	First paragraph – delete <u>that were</u>. First bullet - antimony and thallium above range or BV? Not just range? Third bullet – at **a** concentration. Mercury should be separate bullet and only above BV, not range. Silver at **a** concentration **above BV**… second sentence also. No range for soil. Page 41 – see general comments on EQLs.	A A A A A A	"that were" deleted Text changed to reflect that range of background concentrations not available for sediment "a" added Text changed accordingly Text changed accordingly Info on EQLs deleted globally	

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64	Section 4.10	Top of page 42 – earlier on page 28 030(g) was Septic tank 6, now 5. Septic tank 5 was 030(f). Second bullet – delete considered. No location 10 in second list? No locations 2 and 8 in third list? No **COPCs** were detected **at** concentrations… Third bullet – VCP spelled out here but used earlier. Interim Action Report cited at end of bullet is the LANL 1996, 62538 reference? Add to end of sentence. …at this site **had** also been eliminated. Fourth bullet – last sentence **Also, there is not complete pathway for the exposure to potential contaminants**. Unless excavated? Top of page 43 – other locations not NFA'd? Any reason given?	A	Correction to "6" made "considered" deleted. Location 10 is in second bullet; the first sentence of 3rd bullet states the IA did not include locations 2 and 8. "COPCs" and "at" added "vitrified clay pipe" deleted. Ref added after the Report. "had" added **Also, there is not** currently **complete pathway for the exposure to potential contaminants** added Right- other locations not NFA'd No. The last correspondence was LANL providing response to NMED's RSI.	
65	Section 4.10.2	First paragraph states four locations sampled and text implies all four were analyzed for metals, PCBs, pesticides, SVOCs, iso Pu, and iso U. Next paragraph says only 3 analyzed for metals, then 1 for organics, 2 or 1 for rad. Is four correct? Second bullet - cadmium within range all locations? Third bullet – at **a** concentration. Fifth bullet – Mercury at **a** concentration greater than **BV**… no range.	A A A A A	Deleted all listings of suites; refer to tables for suites The rest of information on which sample analyzed for what is correct Cadmium reworked in the text "a" added 3rd and 5th bullets, range info deleted. Silver and thallium fixed	

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		Sixth bullet – silver is BV, thallium is range. Switch order and respectively. **No organic chemicals were detected**. …**by** gamma spectroscopy **and for** isotopic plutonium,…	A A	**No organic chemicals were detected**. Added "by" "and for" added	
66	Section 4.11	Page 44 – paragraph after bullets – move SWMU 00-030(b) to follow Septic Tank 1.	A	So moved.	
67	Section 4.11.1	See general comments. **COPCs** vs. contaminants. Basis for NMED rejection?	A	Gen comments addressed COPCs used.	
68	Section 4.12	Delete it. Top of page 45 – first Trinity Drive Condominiums then Trinity Drive Apartments. Are there two different complexes or should these be the same? …and the **middle** section is…	A	"it" deleted. Two different complexes "middle" added	
69	Section 4.12.1	Second bullet - **COPCs** vs. chemical constituents. …were detected **at** concentrations **to indicate**… delete sufficient.	A	"COPCs" used. "at" and "to indicate" added, "sufficient" deleted	
70	Section 4.12.2	Delete at the depth interval. First bullet – mercury > BV, no range. See general comments on EQLs. **No radionuclides were** detected or detected greater	A	at the depth interval deleted mercury fixed EQL info eliminated	

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		than BV/**FV**.		Rad sentence changed.	
71	Section 4.13	Page 46 – bullet for Sigma Building at end of bullets. **B**uilding J-2.	A	Bullet added Building capitalized	
72	Section 4.13.1	First bullet - soil **sample** data Third bullet - …route of **the** former… Los Alamos **County** schools top of page 47 – mean that VOCs, SVOCs and PCBs were not detected? Just say so. See general comments.	A	"sample" added "former" and "County" added. Sentence changed to "VOCs, SVOCs, and PCBs were not detected." General comments applied	
73	Section 4.13.2	Only count 9 locations total not 11. First bullet – great**er** than Bulleted text is different than previous …was detected **at a concentration or concentrations**… make consistent. Sixth bullet - Mercury only greater than BV, no range. Zinc detected greater than **the range of** background concentrations? Next paragraph see general comments on EQLs. Delete last sentence. …analyzed **by** gamma spectroscopy. Delete most of last sentence <u>Plutonium-238 was detected at where FV does not apply in the only depth interval sampled</u>.	R A A A A A A	Table 4.1-1 and Fig 4.13-1 show 11 locations. "er" added **"at a concentration"** added Range deleted from mercury discussion Yes EQL discussion deleted "by added. Most of last sentence deleted. "<u>Plutonium-238 was detected at where FV does not apply in the only depth interval sampled" added</u>	

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74	Section 4.14	What about info on page 39 about disposal in canyon? Bailey Bridge no longer exists but what about the landfill? Canyon?	A	Changed date to 1959 to include concrete from SWMU 01-001(o) RE: fate of landfill/canyon…"the disposed concrete was covered with four feet of earthen fill (Hill 1964, 04821). Additional fill was deposited when the area was developed for housing."	
75	Section 4.1.4.1	First bullet bottom page 48 – Bailey Bridge Canyon area? Landfill? Not *Bailey's Bridge* area. Top of page 49 – see general comments. Samples collected from landfill or head of canyon? Same? **Indicates** vs. suggests.	A	"Canyon" added General comments applied. Yes, the landfill and the head of the canyon are the same thing. "indicates" inserted	
76	Section 4.14.2	Delete <u>that were</u>. First bullet – antimony just above range not BV surface. Third bullet – where is cadmium detected within range? Four locations? List. Bulleted text is different than previous …was detected **at a concentration or concentrations**… make consistent. Fifth bullet - Mercury only greater than BV, no range. Page 50 – **No SVOCs were detected.** Bulleted text is different than previous …was detected **at a concentration or concentrations**… make consistent.	A	"that were" deleted. Antimony correction made. According to the protocol of Middle LA WP, we do not list locations for samples detected within the range of background. Text made consistent Mercury correction made Requested change made Text made consistent	

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77	Section 4.15.1	Do not capitalize **work plan**. The pipes belong to a SWMU?	A	Work plan de-capitalized Above-ground steam lines were not designated a SWMU	
78	Section 4.16	Bottom page 50 - ...listed as **a** surface disposal area... and west of **Bailey Bridge Canyon**... Now listed as something else? If same why originally included?	A	"a" added. "Bailey Bridge Canyon added. "originally" deleted.	
79	Section 4.16.1	See general comments. Do not capitalize **work plan**. Last sentence should be separate bullet. **AOC** 01-003(c).	R A A	Work Plan remains capitalized because it is the title of the OU 1078 RFI Work Plan. Last 2 sentences put in a separate bullet SWMU changed to AOC where appropriate	
80	Section 4.17	First paragraph third sentence – **The SWMU** is located...	A	Requested change made	
81	Section 4.17.1	First bullet – delete last sentence. Second bullet – **A** VCA was... Top of 0page 52 bullet – indicate**d**. RFI Report or report?	A	Last sentence deleted "A" added "d" added. Report de-capitalized.	
82	Section 4.17.2	Delete <u>that were</u>. Bulleted text is different than previous ...was detected **at a concentration or concentrations**... make consistent. Fourth bullet - Mercury only greater than BV, no range.	A	"that were" deleted Text made consistent Mercury text changed to BV Silver and thallium text changed	

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		Silver > BV, thallium > range, reorder and add respectively. **No SVOCs were detected.**		"No SVOCs were detected" change made	
83	Section 4.18.1	See general comments. Second bullet – use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria. Third bullet - greater than **BV**. Composite sample?	A	General comments addressed Info Re: Criteria removed per Mirenda & Nonno Changed to BV. Not a composite sample	
84	Section 4.18.2	**No radionuclides were detected.**	A	Text change made	
85	Section 4.19.1	Page 54 first bullet – see general comments. Next bullet - use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria.	A	General comments addressed Info Re: Criteria removed per Mirenda & Nonno	
86	Section 4.19.2	See general comments. First bullet -…at concentration**s** greater than…	A	Requested changes made	
87	Section 4.20	Don't use hot spots. State **areas of elevated radioactivity**. Is SWMU on *undeveloped DOE* land?	A	"Hot spots" changed to "areas of elevated radioactivity" SWMU is NOT on DOE land – it is privately owned	

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88	Section 4.20.1	First bullet – delete considered. See general comments. Page 55 Second bullet – use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria.	A	"considered" deleted General comments applied Info Re: Criteria removed per Mirenda & Nonno	
89	Section 4.21	…conducted in **the area of Building D-2**…	A	Requested change made	
90	Section 4.21.1	First bullet – in **the areas of**… Delete considered. See general comments. Third bullet – use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria.	A	Requested change made Gen comments applied Info Re: Criteria removed per Mirenda & Nonno	
91	Section 4.22	…**Building** D-2 drain lines… Don't use hot spots. State **areas of elevated radioactivity**. Top of –page 56 – **Building** D-2 area Excavation meaning D&D? Is SWMU on *undeveloped DOE* land?	A	Requested changes made SWMU is not on DOE land.	
92	Section 4.22.1	See general comments. Second bullet – use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria.	A	General comments applied Info Re: Criteria removed per Mirenda & Nonno	

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93	Section 4.23	Spell out **diameter**. Early **D&D** activities vs decommission? Los Alamos **County**.	A	Diameter spelled out "decommission" replaced with "D&D" County wording changed.	
94	Section 4.23.1	Fifth bullet – delete or absence. TAL already spelled out? Already used. **COPC** vs. chemical constituent. See general comments on SALs. Top of page 57 **COPCs** vs. chemical constituents. Use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria.	A R A A	"or absence" deleted. This is the first use of TAL. COPC used. General comments applied Language changed Info Re: Criteria removed per Mirenda & Nonno	
95	Section 4.24	Bullet for Building ML.	A	Bulleted	
96	Section 4.24.1	See general comments. Third bullet – use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria.	A	General Comments applied Info Re: Criteria removed per Mirenda & Nonno	
97	Section 4.24.2	**AOC** not SWMU.	A	"SWMU" changed to "AOC"	

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98	Section 4.25.1	Do not capitalize **survey** and **report**. ...did not mention... See general comments. Third bullet – indicated **no potential unacceptable risk**; delete above levels of concern. Fourth bullet – NMED issued **a** Notice of Deficiency...	A	"survey" and "report" de-capitalized General comments applied Risk wording changed "a" added	
99	Section 4.26	Excavation meaning D&D? Don't use hot spots. State **areas of elevated radioactivity**.	A	"Excavation" replaced with "D&D Hot spot wording changed	
100	Section 4.26.1	Do not capitalize **survey.** See general comments. Third bullet – use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria.	A	Survey decapitalized General comments applied Info Re: Criteria removed per Mirenda & Nonno	
101	Section 4.27.1	Do not capitalize **survey.** See general comments. Los Arboles **Condominiums** **Criterion 1, which states that the site cannot be located or has been found not to exist, is a duplicate PRS, or is located within and therefore investigated as part of another PRS.** The never managed hazardous waste is Criterion 2. So which is the right Criterion?? Standard language for criteria.	A	Survey decapitalized General comments applied, Condo capitalized Info Re: Criteria removed per Mirenda & Nonno	

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102	Section 4.28.1	Third bullet – use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria.	A	Info Re: Criteria removed per Mirenda & Nonno	
103	Section 4.28.2	Locations for metals different from locations for rad. So should read **metals or iso PU and iso U**. All metals are surface so should be range of background concentrations for antimony, delete or BV. Cadmium was detected at **a** concentration… Page 61 depth for rad is 0-12 or 2-12 ft? No surface samples?	A A A R	And/or language changed. "or BV" deleted "a" added Stated rad depth is correct –there were no surface samples analyzed for rad	
104	Section 4.29.1	Delete considered. See general comments. Third bullet – use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria.	A	"considered" deleted. General comments applied Info Re: Criteria removed per Mirenda & Nonno	
105	Section 4.19.2	Page 62 – first bullet delete or BV. Mercury only greater than BV, no range. Thallium delete or BV.	A	"or BV" deleted Mercury range deleted "or BV" deleted	
106	Section 4.30.1	Is **an** area of spotty, shallow … clay **tile** pipe See general comments. Top of page 63 – use same language for Criterion 4 as	A	"an" inserted "tile" inserted General comments applied Info Re: Criteria removed per Mirenda & Nonno	

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		on page 49. Delete last part. Standard language for criteria.			
107	Section 4.31	**Buildings** H and Theta; **Building** Theta.	A	Wording changed made	
108	Section 4.31.1	See general comments. Third bullet – use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria.	A	General comments applied Info Re: Criteria removed per Mirenda & Nonno	
109	Section 4.31.2	**All samples analyzed for metals and one sample analyzed for SVOCs.** Mercury only greater than BV, no range. **No SVOCs were detected.**	A	Wording change made Change to BV made SVOCs wording changed	
110	Section 4.32.1	See general comments. Second bullet – (The Phase I **RFI**...) Third bullet – use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria. Top of page 65 – sentence regarding highest radioactivity should be deleted.	A	General comments applied RFI added Info Re: Criteria removed per Mirenda & Nonno Sentence deleted re: highest rad	

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111	Section 4.33	Instead of "Spots" use **areas** (locations?) throughout. Don't cite the document you are in, i.e., the HIR, give sections numbers. Last paragraph - ...as they are relevant **to** SWMU descriptions; delete in.	R A A	We left "spots" in because that's what they've been called for 30+ yrs and in all the references Document citation deleted. "to" inserted, "in" deleted	
112	Section 4.33.1	Title **of** vs. for. Delete Spots, just **Nos.** 1 and 8... Top of page 66 - use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria. Next bullet – specify which area is which in current. Delete Spots, just **Nos.** 2 through 7... Use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria. Delete Spot, just No. 9... why is phoswich capitalized? Second bullet - Delete spot. Indicate**d** Use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria.	A R A R R R A R R A	Title changed to "of" We left "spots" in because that's what they've been called for 30+ yrs and in all the references Info Re: Criteria removed per Mirenda & Nonno Spots 1 & 8 specified. We left "spots" in because that's what they've been called for 30+ yrs and in all the references All criteria language deleted We left "spots" in because that's what they've been called for 30+ yrs and in all the references Phoswich decapitalized We left "spots" in because that's what they've been called for 30+ yrs and in all the references and Second bullet wording changed Criteria language deleted 4th bullet re-written	

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		Fourth bullet - delete to. Last bullet change spot to **area**. Delete Spots, just **Nos.** 13, 14, and 15… delete Spot throughout.	R A	We left "spots" in because that's what they've been called for 30+ yrs and in all the references Last bullet changed to area	
		Top of page 67 – first bullet - …and **soil** disposed of… second bullet – see general comments. Delete Spot. Delete last sentence. Delete prior two sentences and put in next section. Third bullet – use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria. Last bullet change spot to **area**.	A A R A A A A	"soil" added General comments applied We left "spots" in because that's what they've been called for 30+ yrs and in all the references Last sentence deleted and other 2 sentences moved. Criteria language deleted Info Re: Criteria removed per Mirenda & Nonno Spot changed to area	
113	Section 4.33.2	Add two sentences from above to the first paragraph. Re: samples analyzed and suites. Next to last paragraph page 67 see general comments on EQLs. **No radionuclides were detected.**	A	2 sentences from above added General comments applied "No radionuclides were detected" inserted.	
114	Section 4.34.1	**Criterion 1, which states that the site cannot be located or has been found not to exist, is a duplicate PRS, or is located within and therefore investigated as part of another PRS.** The never managed	A	Info Re: Criteria removed per Mirenda & Nonno	

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		hazardous waste, etc. is **Criterion 2**. So which is the right Criterion?? Standard language for criteria.			
115	Section 4.34.2	**AOC** not SWMU.	A	Change made	
116	Section 4.35	Timber Ridge **Condominiums**? **Building** D area **yd^3** **Building** D; delete the.	A	Requested changes made	
117	Section 4.35.1	See general comments. Top of page 69 **COPCs** vs. chemical constituents. Use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria. See general comments on SALs.	A	General comments applied "chemical constituents" replaced with COPCs Info Re: Criteria removed per Mirenda & Nonno General comment on SALs applied	
118	Section 4.35.2	See general comments. Three **soil** samples… Mercury and silver BVs only no ranges. Reorder and add respectively. …analyzed **by** gamma spectroscopy **and for** isotopic…	A	General comments applied. "soil" made singular Hg, silver and thallium re-written "by" and "and for" added	
119	Section 5.1	Page 70 fourth bullet – SWMUs 03-038(a and b) **are Consolidated Unit** 03-038(a)-00.	A	Requested change made	
120	Section 5.1.1	**Construction** is singular.	A	"s" deleted	

[1]page, paragraph, line [2]A = accept / R = reject

Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
121	Section 5.2	Second paragraph delete second <u>currently</u>, just the area is **a** developed…	A	Requested changes made	
122	Section 5.2.1	**Criterion 1, which states that the site cannot be located or has been found not to exist, is a duplicate PRS, or is located within and therefore investigated as part of another PRS.**	A	Info Re: Criteria removed per Mirenda & Nonno	
123	Section 5.3	SWMU 03-009(j) **was** a soil fill area…? Proposed for NFA under *Criterion 2* site never used to manage hazardous waste, etc.? Basis for NMED rejection?	A A A	"was" added Info Re: Criteria removed per Mirenda & Nonno Text revised to "NMED requested a sampling and analysis plan…"	
124	Section 5.4	(**S**tructure TA-03-738)	A	Word capitalized	
125	Section 5.4.1	Page 72 second bullet – *CVP*? Not spelled out. Supposed to be VCP?	A	Typo fixed	
126	Section 5.5	(**Building** TA-03-41)	A	"Building added"	
127	Section 5.5.1	EM-8? Who is this? Screened for organics and metals or just the gross rad?	A A	EM-8 deleted Just rad – text rewritten	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		Add period to end of last sentence bottom page 72. Top of page 73 – what criterion for NFA?	A A	Period added. Info Re: Criteria removed per Mirenda & Nonno	
128	Section 6.1.1	Carcasses and excrement incinerated in SWMU 32-001? (**S**tructure TA-32-9) (**S**tructure TA-32-7) Page 74 – CERAP? Spell out. EP Toxicity? Spell out.	A	"(SWMU 32-001)" added Capitalization added CERAP spelled out. EP was typo for EPA and has been removed	
129	Section 6.1.2	Delete considered as. Delete analytical. Delete last sentence first paragraph. Delete last sentence second paragraph. Simply refer to Appendix/CD and state whether the data are good quality, sufficient, and will be used to define N&E.	A A	Deletions made Sentence deleted	
130	Section 6.2.1	First bullet bottom page 74 - Phase I RFI vs. Site Investigation. Second sentence – corresponding **to** fractures. Close parentheses after p. 6. Page 75 first bullet - Phase I **RFI** vs. Site Investigation. QC spelled out? Phase II **RFI** and VCA report or reports? Use same language for Criterion 4 as on page 49. Delete last part. Standard language for criteria. LANL 1996, 59178 is VCA report?	A	General comments applied. "to" added.) added. RFI added. QC has been spelled out. RFI added. There was 1 report called a Phase II and VCA Info Re: Criteria removed per Mirenda & Nonno LANL 1996, 59178 is Phase II and VCA report	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
131	Section 6.2.2	Phase II **RFI** vs. Site Investigation. Cobalt was detected at **a** concentration… Copper and zinc were detected at concentration**s**… Mercury only greater than BV, no range; delete <u>range of the background concentrations</u>. Page 76 – [cis-1,2-]dichloro**e**thene both places. Bullets delete text about EQLs. Compared to CRDLs not analytical EQLs.	A	RFI added "a" added "s" added Mercury change made "e" added EQL and CRDL language deleted	
132	Section 6.3.1	First bullet – AOC 32-003 discussion? Second bullet – the Phase II **RFI**? And VCA conducted at correct location? Page 77 last bullet – what data was used for eco? Down the drainage? Is this necessary or relevant since methods are different?	A	SWMU changed to AOC "RFI" added. At corrected location added Eco discussion deleted	
133	Section 6.3.2	Phase II **RFI** vs. Site Investigation. List of suites on page 76 did not include any and/ors. Should list how many samples per analyses, i.e., 10 for metals, 9 for organics, and 7 for rad. Arsenic was detected at **a** concentration… Page 78 – Calcium was detected at **a** concentration… Chromium, iron, silver, and zinc were detected at concentration**s**… only silver greater than BV, other >	A	General comments applied Deleted all listings of suites; refer to tables for suites "a" added "a" added "s" added "> range" added, silver moved to its own bullet	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		range. Reorder and add respectively. Mercury only greater than BV, no range; delete range of the background concentrations. Silver only greater than BV, no range unless Qbt 2,3,4; delete range of the background concentrations. Benzo(b)fluo**r**anthene, fl**uor**anthene Delete all text regarding EQLs. Incorrect. Used CRDL not analytical EQLs. Page 79 – add bullet to *Dichlorodifluoromethane* text Fl**uora**nthene …analyzed **by** gamma spectroscopy **and for** isotopic uranium… …were detected greater than FVs, **detected** at depths …		Mercury rewritten Silver rewritten Typos corrected EQL and CRDL discussion deleted Dichloro bulleted Typo corrected Requested words added	
134	Section 6.4	Put parentheses around Building TA-32-1. Move sentence The sludge was disposed of at MDA L to follow sentence on MDA G. **Criterion** 4, **which states that** … Use standard language. p. 49? Next paragraph – last sentence …are on **an** undeveloped hillside.	A	( ) added. Sentence moved. Info Re: Criteria removed per Mirenda & Nonno "an" added	
135	Section 6.4.1	Second bullet - Phase I **RFI** vs. Site Investigation. Page 81 Outfall Area – Phase II **RFI** data; human health **risk** not concerns; Phase I **RFI**	A	RFI substituted where indicated Concern changed to risk Building capitalized	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		Building TA-32-2 Next bullet – is this eco assessment relevant given change in methods?		Eco info deleted per e-mail from Mirenda.	
136	Section 6.4.2	List of analytical suites did not have and/or in previous sections just list as 14 locations for metals, 10 for organics, and 5 for rad; and/or is not accurate. How do the wrong samples figure into this analysis of data? Included? Discussed? Bullets – no need to list all the locations if apply to > BV or range. Delete from first bullet bottom page 81. Some bullets mention trends most do not, need to be consistent. Manganese was detected at **a** concentration… Mercury just > BV no ranges. Delete <u>range of the background concentrations</u>. Silver just > BV, no range unless in Qbt 2,3,4. . Delete <u>range of the background concentrations</u>. Thallium was detected at **a** concentration… Benzo(b)fluoranthene, fl**uor**anthene throughout. Delete text on EQLs. Incorrect. Used CRDL not analytical EQLs. …analyzed **by** gamma spectroscopy… …detected greater than soils FVs, or **detected** at depths where soil	A/R A A/R A A R A A A A	Deleted all listings of suites; refer to tables for suites Wrong samples went to AOC 32-003 and are discussed in section 6.5 and screening level data. Deleted list that encompassed all the locations in 1st bullet According to the protocol of Middle LA WP, trend (if available) is discussed only for metals detected above the range of the background, not for the ones detected within the range. "a" added for mercury, range was deleted for silver, it was in tuff, so there was a range. "a" added global spell ck done text on EQLs and CRDLs deleted. Global change to "by" made	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		FV...	A	"detected" added	
137	Section 6.5	Need ER ID for drawing. Delete investigation after RFI.	A	ERID added "investigation" deleted	
138	Section 6.5.1	First bullet - Delete investigation after RFI. ...and **were analyzed for** TAL metals,... delete period after PCBs (all **were** screening level data). Second bullet – Phase II **RFI**, delete investigation. Late mention VCA. Is this a separate study? Same reference for both? Top of page 85 - is this eco assessment relevant given change in methods?	A	1st bullet. Requested changes made. 2nd bullet. "RFI" added, "investigation" added. Phase II and VCA are the same document. Eco assessment discussion deleted.	
139	Section 6.6	The drain line **led** directly to...and **did** not pass... Delete investigation after RFI. **AOC** not SWMU.	A	Requested changes made.	
140	Section 6.6.1	First bullet - Delete investigation after RFI. Second bullet - Phase II **RFI**, delete investigation. What about VCA? Outfall – delete if any. Organic chemicals? Which ones? Top of page 86 – **AOC** not SWMU.	A	"investigation" deleted "RFI" added, "investigation" deleted VCA is discussed in drain line paragraph "if any" deleted. "SVOCs" added. SWMU changed to AOC	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
141	Section 6.6.2	Phase II **RFI** vs. Site Investigation. include**d** Delete that were. List of analytical suites did not have and/or in previous sections just list as 7 locations for metals, 7 for organics, and 4 for rad; and/or is not accurate.	A A/R	"RFI" added. "d" added. "that were" deleted. Deleted all listings of suites; refer to tables for suites	
		No need to list all the locations if apply to > BV or range. Delete from first bullet.	A	Sample locations deleted from 1st bullet	
		Copper was detected at **a** concentration…	A	Copper deleted – it was from non-AOC sample	
		Mercury just > BV no ranges. Delete range of the background concentrations.	A	mercury range info deleted	
		Silver was detected at **a** concentration… Silver just > BV, no range unless in Qbt 2,3,4. Delete range of the background concentrations. Separate thallium into another bullet.	A A	silver corrections made thallium put into its own bullet	
		Benzo(b)flu**or**anthene, fl**uor**anthene throughout.	A	global correction made	
		Delete text on EQLs. Incorrect. Used CRDL not analytical EQLs.	A	EQL, CRDL text deleted	
		…analyzed **by** gamma spectroscopy…	A	"by" added	
142	Section 7.1	Second bullet - …are **Consolidated Unit**…	A	Requested change made	
143	Section 7.1.1	…with an inert metal **so** that no… include**d**	A	"so" added	
144	Section	Already spelled out CST? Delete considered as.	A	Deleted definition, deleted "considered as"	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
	7.1.2	Top of page 89 – compared to CRDLs not analytical EQLs. Delete this. Delete last sentence of paragraph. Just state whether data are of good quality and sufficient. ON CD and whether useful for N&E.	A A	EQL, CRDL discussion deleted Last sentence deleted.	
145	Section 7.2	(**S**tructure 41-11) (**S**tructure 41-2) **S**tructure 41-11 Before had TA-..., which is correct? ...contamination **was** affiliated with...	A	Structure capitalized 41-2 changed to TA-41-2 "would be" changed to "was"	
146	Section 7.2.1	Phase I **RFI** vs. Site Investigation. 1995 SSLs were not used, just SALs. Second bullet – need reference.	A	RFI inserted SSLs deleted Ref found	
147	Section 7.2.2	First bullet bottom page 89 – delete text on EQLs. Top of page 90 – delete text on EQLs.	A	Text on EQLs deleted	
148	Section 7.3	10 ft by 8 ft by 10 **ft** chlorinator...41-002(b) was a chlorine tank? Still there? (**S**tructure 41-8) (**S**tructure 41-9) [**C**onsolidated **Unit** 03-014(a)-99] Delete into unit 41-002(a)-99.	A	"ft" inserted 41-002(b) is a chlorinator not a chlorine tank capitalizations made, "unit 41..." deleted	
149	Section 7.3.1	Second bullet – reference is not available? Page 91 - Phase I **RFI** vs. Site Investigation. Inorganics/metals only CST on-site?	A	Ref deleted "RFI" inserted CST on-site was metals only – correction made	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
150	Section 7.3.2	41-002(b) - Phase I **RFI** vs. Site Investigation. Analyzed for only **uranium** not metals at off-site labs. Delete and/or. Inaccurate. State that 6 for uranium, 5 for SVOCs, and six for rad. Delete text on EQLs. Incorrect. Used CRDL not analytical EQLs. ...analyzed **by** gamma spectroscopy **and for**... Both **radionuclides** were detected... 41-002(c) -- Phase I **RFI** vs. Site Investigation. Analyzed for only **uranium** not metals at off-site labs. **No SVOCs were detected**. ...analyzed **by** gamma spectroscopy **and for**... Both **radionuclides** were detected...	A	"RFI added "metals" changed to "total uranium" Deleted all listings of suites; refer to tables for suites EQL text deleted "by" "and for" added "RFI inserted. "total uranium" replaces "metals" "SVOCs" replaces "organic chemicals" "by" "and for" "radionuclides" added	
151	Section 7.4	...beneath the ventilation system, which is **situated** on concrete.	A	"situated" added	
152	Section 7.4.1	Second bullet - Phase I **RFI** vs. Site Investigation. Inorganics/metals only CST on-site?	A	"RFI" added metals onsite only	
153	Section 7.4.2	Analyzed for only **uranium** not metals at off-site labs. Delete only.	A	Metals replaced with total uranium Only deleted	
154	Section 7.5	(**S**tructures 41-22 and 41-28) Delete to the system.	A	Capitalization done, deletion done	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
155	Section 7.5.1	Phase I **RFI** vs. Site Investigation.	A	RFI inserted	
156	Section 7.5.2	Analyzed for only **uranium** not metals at off-site labs. Delete only. Both **radionuclides** were detected…	A	"uranium" inserted for "metals", "only" deleted "radionuclides" added	
157	Section 8.1	Second bullet – should this be 43-001(**a1**)?	A	Yes. Change made -thanks	
158	Section 8.1.1	H Division? What is it? (DOE 1987, 08661, pg. ***TA43-1?***) LS Division? …low **level** contamination…	A	H division is like H Building is like LS Division. H at one time stood for Health and LS for Life Science. "TA43-1" really IS the page # "level" added	
159	Section 8.2	(**S**tructure 41-10) **S**tructure 41-10 Delete then.	A	Capitalizations made. "then" deleted	
160	Section 8.3.2	**AOC** not SWMU.	A	SWMU changed to AOC	
161	Section 8.4	Top of page 97 Santa Fe End 1992, *23-0071*?	A	It's a reference -we have the correct ER ID # now	
162	Section 8.4.2	**AOC** not SWMU.	A	SWMU changed to AOC	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
163	Section 8.5	Delete second (Watanabe 1993, 58452) at end of first paragraph. Reference for OU 1136 work plan?	A	We kept the reference but put it all in one set of ( ). Ref added.	
164	Section 8.6	(**S**tructure 41-10) **SWMU** 43-001(a1) and **AOC** 43-001(a2)	A	Capitalization and SWMU/AOC fixed	
165	Section 9.1.1	…**municipal** sanitary landfill.	A	Municipal added.	
166	Section 9.2.1	TSCA? Spelled out? ESH? NFA was recommended **for** SWMU 61-007… Delete SWMU 61-007 later. NMED letter reference for denial?	A	TSCA spelled out and ESH deleted. "for" added, "SWMU 61-007" deleted later ref for ltr added.	
167	Figures	1.0-2 – legend colors do not show up for Upper LA Canyon Aggregate; Contour; Paved Roads. Global – all figure with data need to add either mg/kg or pCi/g as units for results. Global – check rad data figure to see if always greater than fallout or background values. Some should be detected only due to depths and tuff. Figures for 00-017 – line 171 not shaded as SWMU. Are the inorganic data all detects? No nondetects above BV? 4.10-3 – background only for U-2354, Pu-239 detected	A	Figure 1.0-2 fixed All figures added units All figure names checked and revised to specify radionuclides above BV or FV or detected at depths FVs do not apply Figure 3.1-1, 3.2-1 through 5 fixed Inorganic data are detects or nondetects above BV. Figure and table title modified	

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Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		only. 4.13-3 – rad detected only not FVs apply. 4.28-3 – detected only, FVs do not apply. 4.34-1 – legend add location IDs with dot. No data map for 007(k)? 4.35-3 - detected only, FVs do not apply. 5.1-1 – Need to show green area for SWMUs/AOCs. 6.3-3 – some detected only. 6.4-2 – (J) for methylene chloride and pyrene location 06365. 6.4-3 – detected only for some. 7.2-3, 7.3-3, 7.4-3 - detected only for some. 7.5-3 – tritium should be detected, not FV. 8.3-1 – AOC not SWMU; caption and legend.		Figure and table title modified Figure and table title modified Figure 4.34-1 removed sample locations and added 01-007(k) Figure and table title modified Figure 5.1-1 modified with insert maps Figure and table title modified Figure corrected Figure and table title modified Figure and table titles modified Figure and table titles modified Caption and legend fixed	
168	Tables	Global for analytical Summary tables – add **Samples Collected** to title. Last two samples for 3.1-1 should have a for lead only? Global – delete all footnotes defining qualifiers. Qualifiers defined in Appendix A, Acronyms. Global - ◊ means not measured *or not analyzed* for? Not requested?	A	Done No. We still think tables should be able to stand alone with all symbols explained in footnotes Changed to "analysis of the analyte was not requested for the sample"	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
		Global – if no data (no values) for a sample delete the row from the table. Global – Delete EQL row and associated footnote. Global rad tables – If based on detected status either add to title or change title of table to note that not only above BV or FV but also detected. Delete footnotes if appropriate.		We still think that having these samples in provides important information that the analytes were not detected or detected less than BV/FV. All EQL information deleted. All titles checked and revised to specify radionuclides above BV or FV or detected at depths FVs do not apply.	

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Attachment B: Peer Review Comment Form

Part 1 (Author or Peer Review (PR) Coordinator Complete) Date: 3/10/06

Title Upper LA Canyon Aggregate IWP and HIR Rev. #: ___ Doc. Catalog No: **ER200** - ____

Reviewer's Name (Print): Ed Webb Organization: ECR QII Group Comments due by: 3/10/06 (Date)

Author: Becky Coel-Roback Phone: ________ E-Mail: ________

Return forms to PR Coordinator: Cheri Vidlak Phone: 7-2728 E-Mail: cvidlak@lanl.gov

Part 2 (Reviewer Completes)

Date Received 03/07/06 Date Review Completed: 03/10/06

Signature & Date (to be signed ONLY upon agreement of comment resolution): William E. Webb Jr. Date: 4/21/06

Part 3 (If under time constraints, the Author and Reviewer each sign.) ☐ Not all comments resolved; attach PR Comment Form to Document Signature Form.

Author Signature & Date: ________

Reviewer Signature & Date: ________

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
1	IWP Section 1.1 Last paragraph	There is no Appendix C in this work plan.	A	Appendix C added.	

[1]page, section #, paragraph/line [2]A = accept / R = reject

Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
2	IWP Section 2.2.2.1 Regional Aquifer	Is there a specific number available for LANL 2005, xxxxx?	A	ERID added	
3	IWP Section 3.2.2 First Bullet	There is no Figure 3.2-3.	A	We meant Figure 3.2-3 in the HIR. We have modified the text to make it clear which figures and tables are from HIR and which are for IWP.	
4	IWP Section 3.2.2 Second Bullet	Add "for" after "Analyzed".	A	"for" added	
5	IWP Section 3.2.2 Third Bullet	There are no Tables 3.2-4 and -5.	A	We meant Tables 3.2-4 and -5 in the HIR. We have modified the text to make it clear which figures and tables are from HIR and which are for IWP.	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
6	IWP Sections 3.3/3.4/3.5/3.6	If no work is to be performed at these sites, should they be included in the work plan section of this document? The information here is covered in the HIR and duplication is another chance to introduce an inadvertent error.	A/R	HIR does not present what we propose and what we do not propose to do at the site. Scope of activity should be and is presented in IWP.	
7	IWP Section 4.1 Last sentence	Figure 4.1-1 is not labeled.	A	Label added	
8	IWP Section 4.4.3	Sample point 12, shown in Figure 4.4-2 and described in Table 4.4-1 is not included in the description in 4.4.3.	A	Text added to describe sample point 12	
9	IWP Table 4.8-1	Sample Location 2 – The sample depth of 1.5 to 2.0 feet is not shown.	A	Depth added	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
10	IWP Section 4.11.3	For sample points 1 and 3 where two lines cross, should there be a note to indicate the zero level is below the lowest pipe? Should there be a sample point south of point 3 where the two lines cross again?	A A	Text modified to state that the zero level is below the lower pipe Yes, we moved sample location 5 to where the two lines cross again to the south of location 3	
11	IWP Section 4.13 Last Paragraph	Figure 4.12-1 should be Figure 4.13-1	A	Yes, corrected	
12	IWP Section 4.14.3 Second Bullet	Section 4.14.3 indicates that samples taken at locations 6-18 will be at least 2 depth intervals. Table 4.14-1 indicated depths of 0-0.5 feet and 2-3 feet.	A	Table corrected based on text descriptions	
13	IWP Section 4.15.3	Last paragraph, last sentence – repeated text.	A	Corrected	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
14	IWP Section 4.18.3 Third Bullet	How will the workers know the location of the south boundary of the SWMU?	A	The debris and fill at the site define the SWMU boundary	
15	IWP Section 4.19.3 Third Bullet	Narrative indicates that samples will be taken at 2 depth intervals but Table 4.19-1 shows 0-0.5 feet and 2-3 feet.	A	Table corrected based on text descriptions	
16	IWP Section 4.33 First Sentence	There are only 15 numbered spots on Figure 4.33-1	A	There are 12 green spots shown on Figure 4.33-1, which comprise 01-007(j). Spot Nos. 10, 11, and 12 comprise another SWMU which has been NFA-ed and which is not within the scope of Upper LA. The numbering scheme is from reference Ahlquist (1977, 05710).	
17	IWP Section 4.33.3 Second Paragraph	Table 4.32-1 should be Table 4.33-1	A	Corrected	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
18	IWP Section 4.35.3	There is no corresponding Table 4.35-1 for this sampling plan. How will this sampling be tracked? How will ENV-ECR know when this area will be available for sampling? Who will initiate/do this? How many samples will be needed-distance apart, etc.?	A	We have decided to propose no sampling at this site. See Section 4.35.3 for our rationale. If the state accepts this rationale, we will propose no further action at this site.	
19	IWP Figure 5.1-1	AOC 03-008(a) and SWMU 03-055 (c) are not very well marked with green as indicated in the Figure legend.	A	These two sites are too small to show up due to the scale of the map. We have added inserts on this figure to better show them.	
20	IWP Figure 5.2-1	AOC 03-008(a) is not marked with green as indicated in the Figure legend.	A	We have put insert in this figure to better show this site.	
21	IWP Section 5.2.3	The reasoning that "the site does not exist anymore" does not follow the logic of the previous sections of this work plan. None of the previous sites exist anymore either.	A	Removed "the site does not exist anymore"	

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Attachment B: Peer-Review Comment Form

Comment #	Location[1]	Reviewer's Comment/Suggestion	A/R[2]	Author's Proposed Revision/Resolution	Final Resolution
22	IWP Section 5.5.3	There is no Table 5.5-1 Last paragraph – the storm drain serves more than just the fire station area. Were there any of the other areas served where these things may have been present (i.e. explosives from 03-008(a) or any oil filled transformers in the area)?	A	Table 5.6-1 should be 5.5-1. We added explosive compounds to the analytical suites of this SWMU based on operational history.	
23	IWP Table 6.3-1	The location for samples 7, 8 and 9 are not consistent with Figure 6.3-1 and Section 6.3.3 narrative.	A	Table corrected based on text descriptions	
24	IWP Table 6.4-1	The sample depths in the table for location numbers 7,8,9 and 10 are not consistent with the narrative in 6.4.3.	A	Table corrected based on text descriptions	
25	IWP Section 6.4.3 Outfall Area	Not sampling the outfall area (for SWMU 32-002(a) and (b) does not follow the same sampling pattern used for the other septic tank outfall areas.	A	We did not propose sampling at the outfall area because the extent has been defined.	

[1]page, paragraph, line [2]A = accept / R = reject

Attachment B: Peer-Review Comment Form

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26	IWP Section 6.5.3 and Table 6.5-1	Sample depths for locations 6-12 do not agree with the narrative in 6.5.3. Location description of location 12 does not agree with the narrative of 6.5.3. Former sample locations are not identified on Figure 6.5-1.	A	Table corrected based on text descriptions The description of location 12 is correct. The center of the wood pile is not the center of the SWMU. The former sample locations the text talks about area on site samples which we do not show on maps	
27	IWP Figure 7.1-1	Color code for 41-003 appears to be incorrect according to the legend.	A	The SWMU itself is green. The boundary of former structure (brownish yellow) is obscuring the green because the structure is very small.	
28	IWP Section 7.3.3	How will deferred sampling activities be tracked?	A	These sites will be tracked as long as they stay on the Module VIII of the Hazardous Waste Facility Permit. Sites remain on the permit until they have been characterized and/or remediated and approved by NMED/DOE. Linda Nonno tracks the permit.	
29	IWP Section 10.1	What procedures will be used to perform this work? How will workers know what technique to use?	A	The methods section of the IWP is written in accordance with Order requirements. Through NMED approval of previous documents, we know what is acceptable to them. These documents are written for NMED and cannot be used as a stand-alone document to direct all site work. We need QPs,SOPs, LIRs, etc. to provide the details.	

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30	IWP Section 10.2	Procedures throughout should be referenced similar to the first sentence of the last paragraph. Last paragraph – last sentence – There should be specific guidance on this instead of "as directed by the consent order". Field teams probably will not have access to the Consent Order.	A	A list of procedures is provided, as well as a summary table of procedures, in accordance with other work plans that have been accepted by NMED. The text in the last paragraph has been modified to: "Quality assurance/quality control (QA/QC) samples will include field duplicate, equipment blank, and field trip blank samples collected in accordance with SOP-1.05. Field duplicate samples will be collected at a frequency of at least one for every 10 regular samples as directed by Section IX.C.3.b of the Consent Order."	
31	IWP Sectopms10.3/10.4	How will decontamination waste be handled? Appendix B is not referenced. Should Appendix C be Appendix B?	A	Appendix B is the correct reference. The typographical error has been fixed. Appendix B provides the details of how we handle investigation –derived waste (IDW).	
32	IWP Appendix B	How will workers know if they have generated contaminated waste in the field?	A	All contact waste is assumed contaminated, and is handled conservatively pending analytical results. Appendix B provides handling strategy for all IDW. In addition, a waste characterization strategy form (WCSF) is generated and approved for all waste streams as part of the readiness process.	

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33	HIR Section 2.2.30	Third line – typo - storag should be storage	A	Text corrected	
34	HIR Section 2.1.4	Third Bullet – typo – life should be lift	A	Text corrected	
35	HIR Section 2.4.1	Third line type – anchor – should be Anchor	A	Text corrected	
36	HIR Sections 3.1.2 and 4.1.2	Last paragraph last full line should the "not" be there?	A	Text modified	

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37	HIR Section 3.2.1	First Bullet, third full line from the bottom with - to	A	Text modified	
38	HIR Section 3.2.2	Page 23, First paragraph after the top 4 bullets, first line add "for" after "analyzed".	A	Text modified	
39	IWP Section 3.2.2	General Comment: According to HIR section 3.2.1, second bullet, NMED did not agree that the SWMU included only lines 167,170 and 171 and manhole URL-33. We need to identify and sample the remainder of the underground acid/industrial line system.	A	The entire industrial waste line goes beyond the scope of Upper LA Canyon Aggregate Area and also beyond TA-00. This work plan will address those portions of the waste line that are 1) accessible, and 2) within TA-00. The remainder of the line must be addressed as part of another aggregate area's scope.	
40	IWP	General Comment: Should there be a QP developed to provide guidance on Work Plans?	A	The work plans are developed per the Consent Order requirements. We are given a certain amount of flexibility, because every field campaign is different, through written approval from the state for deviations from the Order. This is working pretty well for the last couple years.	

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41	IWP	General Comments: How do we determine zero depth, i.e. beneath the bed of the excavated pipe? Or the floor of the excavation of the former structure?	A	Zero depth for each location is specifically explained in the text and in tables If the pipe is in place, we sample directly underneath it, but if it is removed we sample the floor of the excavation (tuff) to avoid the possibility of sampling clean backfill.	
42	IWP	General Comment: How do we find and verify the correct locations to take these samples? Some of the sample locations are rather vague.	A	IWP and proposed sampling maps are the best guidance we can provide at current stage. The phased approach written in the work plan gives detailed information about the process for getting better sample location information. The final call must be made in the field based on the observations from the phased approach. Sometimes vague is good.	
43	IWP	General Comment: There were probably a number of large oil filled transformers. However, there are not many of the SWMUs that mention transformers or PCBS. Has this source of contamination been considered?	A	There are two transformer sites in Upper LA Aggregate: 32-003 and 61-007. There is no reason to suspect other sites had transformers. However, PCBs were added to the analytical suites to all the sites except a few radiological contamination sites	
44	IWP section 10	General Comment: Section 10 should be much more specific to provide the field personnel and their supervisors with as much direction in how these tasks are to be performed so that there is a minimum of creativity resulting in opportunities to challenge the integrity of the process.	R	We cannot provide all of the detail necessary to cover every aspect of the field work, and the State has said they don't want to see it. The plan is the "what"...QPs and SOPs provide the "how."	

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45	IWP Section 10	General Comment: The following areas have not been addressed in the IWP: Safety, Training, Permits, Security, Readiness Review, Protective Equipment, Document/Procedure Control	R	The Order outline does not allow for addressing these areas, and the plan would be too much to handle with all of these aspects covered in detail. That is why we must have SSHASPs, IWDs, QPs, SOPs, FTAs, MOUs, LIRs, LIGs, etc.	
46	IWP	General Comment: What will be the process for handling areas where sample results indicate contamination?	A	If the nature and extent of contamination has not been determined, further sampling will be proposed; if risk is indicated, corrective actions will be proposed. The state must approve before additional work is conducted.	

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