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Historical Investigation Report for Lower Water/Indio Canyons Aggregate Area

Prepared by the Associate Directorate for Environmental Management

EP2016-0078

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June 2016

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EXECUTIVE SUMMARY

The Lower Water/Indio Canyons Aggregate Area, located in Technical Area 15 (TA-15) and TA-49 at Los Alamos National Laboratory, includes a total of 3 solid waste management units and 8 areas of concern. Of these 11 sites, 4 sites have been approved for no further action, and 1 site is being addressed under another investigation. For the remaining 6 sites requiring investigation, this historical investigation report provides site descriptions, summarizes previous investigations, and presents analytical results. The background information and previous investigations discussed within this report form the basis for the proposed sampling design necessary to complete site investigations, as discussed in the Lower Water/Indio Canyons Aggregate Area investigation work plan.

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1.0 INTRODUCTION

Los Alamos National Laboratory (LANL or the Laboratory) is a multidisciplinary research facility owned by the U.S. Department of Energy (DOE) and managed by Los Alamos National Security, LLC. The Laboratory is located in north-central New Mexico approximately 60 mi northeast of Albuquerque and 20 mi northwest of Santa Fe. The Laboratory site covers approximately 39 mi^2 of the Pajarito Plateau, which consists of a series of fingerlike mesas separated by deep canyons containing perennial and intermittent streams running from west to east. Mesa tops range in elevation from approximately 6200 to 7800 ft above mean sea level. Figure 1.0-1 shows the location of Lower Water/Indio Canyons Aggregate Area with respect to Laboratory technical areas (TAs) and surrounding land holdings.

The Laboratory is participating in a national effort by DOE to reduce risk to human health and the environment at its facilities. The goal of the Laboratory's effort 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 Laboratory is currently investigating sites potentially contaminated by past Laboratory operations. The sites under investigation are designated as solid waste management units (SWMUs) and areas of concern (AOCs).

This historical investigation report (HIR) describes operational histories, previous investigations, and analytical data for SWMUs and AOCs in Technical Area 15 (TA-15). These sites are potentially contaminated with hazardous chemicals and radionuclides. The New Mexico Environment Department (NMED), pursuant to the New Mexico Hazardous Waste Act, regulates cleanup of hazardous wastes and hazardous constituents. DOE regulates cleanup of radioactive contamination, pursuant to DOE Order 458.1, Administrative Change 3, "Radiation Protection of the Public and the Environment," and DOE Order 435.1, "Radioactive Waste Management." Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to NMED in accordance with DOE policy.

Corrective actions at the Laboratory are subject to a Compliance Order on Consent (the Consent Order). This HIR provides supporting information for activities performed under the investigation work plan (LANL 2016, 601538) that will be executed and completed in accordance with the Consent Order.

1.1 Historical Investigation Report Overview

The Lower Water/Indio Canyons Aggregate Area includes 3 SWMUs and 8 AOCs located in TA-15 and TA-49. Of these 11 sites, 4 sites have been approved for no further action (NFA), and 1 site in TA-49 is being investigated under another aggregate area investigation. The remaining 6 sites require additional characterization and are addressed in this report. Table1.1-1 provides a summary of the 11 sites within the aggregate area and their status. The NFA sites and the single site being investigated under another investigation are referenced in Table 1.1-1, with brief descriptions and references to the corresponding approval documents, but are not discussed further in the HIR.

The purpose of this HIR is to provide supporting information for the activities necessary to complete the investigations as presented in the Lower Water/Indio Canyons Aggregate Area investigation work plan (LANL 2016, 601538).

Section 2 of this HIR provides site descriptions and operational histories, summarizes previous investigations, and presents analytical data for the sites under investigation. For each site, the location, historical operations, and current status are described first, followed by descriptions of historical investigations with dates and activities conducted. The section also summarizes results of analytical data

obtained from previous investigations. Plate 1 shows the locations of the sites under investigation within the Lower Water/Indio Canyons Aggregate Area.

Appendix A includes a list of acronyms and abbreviations, a metric conversion table, and a data qualifier definitions table. Appendix B presents the screening-level data from previous investigations. Appendix C contains site photographs.

1.2 Data Overview

Data evaluated in this report include historical data collected in 1995 as part of Resource Conservation and Recovery Act facility investigations (RFIs). In the Environmental Management Directorate's database, all data records include a vintage code field denoting how and where samples were collected and submitted for analyses.

Samples described in this HIR have undergone analyses at both on-site and off-site laboratories. In general, because analytical practices and documentation of analyses vary in quality and completeness, analytical data presented are designated as either screening-level or decision-level quality. Because the data from these sites are approximately 20 yr old, they are considered screening-level data. Screening-level data are appropriate for applications that require only determination of areas of gross contamination and/or for site characterization. Screening-level data are also often used to specify areas where additional data should be collected.

2.0 SITES UNDER INVESTIGATION

TA-15 is located in the south-central portion of the Laboratory and is bounded by TA-14, TA-16, and TA-37 to the west, TA-49 to the south, TA-36 to the east, and TA-67 to the north (Figure 1.0-1). The portion of TA-15 within the Lower Water/Indio Canyons Aggregate Area drains to the south to Water Canyon.

TA-15 has been used from the mid-1940s to the present for explosives experiments. In that capacity, test explosions ranging from a few kilograms of high explosives (HE) to as much as 650 kg were conducted. These experiments used natural uranium, depleted uranium (DU), lesser quantities of beryllium, and other metals. In most cases, the tests were carried out aboveground, which resulted in the test materials being scattered over areas. Based on estimates from Laboratory records, approximately 75 metric tons of natural uranium and DU have been expended at the TA-15 firing sites since the mid-1940s (LANL 1993, 020946, pp. E2, E9). The only TA-15 operating areas within the Lower Water/Indio Canyons Aggregate Area are the Pulsed High-Energy Radiographic Machine Emitting X-rays (PHERMEX) facility and the Dual-Axis Radiographic Hydrodynamic Test (DARHT) facility. PHERMEX is currently inactive and was used to radiograph explosive tests; DARHT is active but no SWMUs or AOCs are associated with it. One inactive firing site, Firing Site H [SWMU 15-004(h)], is located within this aggregate area.

Most of the sites in this HIR are located near the PHERMEX facility, which became operational in 1961. During the time period 1961 to 1971, a maximum of 4000 kg of DU was expended at the PHERMEX site. During that same time period, about 150 kg of beryllium, 250 kg of lead, 40 kg mercury, and 40 kg of thorium were expended. Since 1971, less than 1000 kg per year of uranium-238 was expended at the PHERMEX firing site. Beryllium usage decreased from about 10 kg per year in 1971 to about 3 kg per year in 1987 (LANL 1993, 020946, p. 6-5).

2.1 AOC 15-001, Storage Area

2.1.1 Description and History

AOC 15-001 consists of a storage area, referred to as "The Boneyard," located within TA-15 adjacent to inactive Firing Site G [SWMU 15-004(g)] (Figure 2.1-1). AOC 15-001 is located just northeast of a former firing bunker (structure 15-9). The area was used to store materials associated with activities at the DARHT and PHERMEX facilities. These materials, which included equipment, steel, experimental vessels, and construction debris, were stored in the open, on the ground surface, and within transportainers and small storage sheds. Materials stored at AOC 15-001 before the mid-1990s have been removed, but small pieces of debris (e.g., metal scrap) may still be present. The area is currently being used to store equipment associated with ongoing activities at TA-15 (Appendix C, Figure C-1).

2.1.2 Previous Investigations

Although previous investigations have not specifically addressed AOC 15-001, they have addressed the general area that could have been impacted by Firing Site G [SWMU 15-004(g)], including the area occupied by AOC 15-001. A 1982 aerial radiological survey identified no radionuclides above background levels at Firing Site G or adjacent areas. However, during surface surveys performed at the site in 1991 and 1996, several areas of radiological surface contamination were identified. This contamination is believed to be associated with uranium debris from tests conducted at Firing Site G. Although investigation of AOC 15-001 was proposed in the Operating Unit (OU) 1086 RFI work plan, investigation of this site was deferred during the 1995–1996 RFI because it was an active site (LANL 1996, 054977, p. 5-1). However, three surface samples were collected at three locations within and adjacent to AOC 15-001 from depth intervals of 0–0.25 ft, 0–0.33 ft, and 0–0.5 ft below ground surface (bgs). The samples were submitted to an off-site contract analytical laboratory for analysis of uranium. Samples collected and analyses requested are presented in Table 2.1-1.

2.1.3 Analytical Results

Inorganic chemicals detected above background values (BVs) during the 1995–1996 RFI include uranium. Uranium was detected above the soil BV (1.82 mg/kg) in three samples with a maximum concentration of 6.37 mg/kg.

Analytical data from the 1995–1996 RFI sampling are presented in Table 2.1-2. Sampling locations and results of uranium detected above BV are shown in Figure 2.1-2.

2.2 AOC 15-004(h), Firing Site H

2.2.1 Description and History

AOC 15-004(h) is inactive Firing Site H located northwest of the PHERMEX facility at TA-15 (Figure 2.2-1). Firing Site H is located approximately 100 ft north of the PHERMEX power control building (structure 15-185). The explosives testing firing site was constructed in 1948 and included a concrete pad, a protective berm, an instrument chamber (former structure 15-17), and a camera chamber (structure 15-92). The exact nature of the materials used during tests is not known but may have included DU, beryllium, lead, and HE. Firing site operations were discontinued in approximately 1953 (LANL 1993, 020946, p. 8-23), and the instrument chamber was demolished in 1967. The camera chamber and the concrete pad remain on-site, but the concrete pad has been partially covered with fill.

2.2.2 Previous Investigations

Although the investigation of AOC 15-004(h) was proposed in the OU 1086 RFI work plan, the investigation of this site was deferred during the 1995–1996 RFI because it was within the active PHERMEX hazard area (LANL 1996, 054977, p. 5-1). However, 11 surface samples (0.0–0.17 ft bgs to 0.0–0.5 ft bgs) and 7 subsurface samples (1.08–1.58 ft bgs or 1.5–2.0 ft bgs) were collected from 11 locations. The samples were submitted to an off-site contract analytical laboratory for analysis of uranium. Samples collected and analyses requested are presented in Table 2.2-1.

2.2.3 Analytical Results

Inorganic chemicals detected above BV during the 1995–1996 RFI include uranium. Uranium was detected above the soil BV (1.82 mg/kg) in 18 samples with a maximum concentration of 510 mg/kg.

Analytical data from the 1995–1996 RFI sampling are presented in Table 2.2-2. Sampling locations and results of uranium detected above BV are shown in Figure 2.2-2.

2.3 SWMU 15-009(g), Septic System

2.3.1 Description and History

SWMU 15-009(g) consists of an inactive septic system at the PHERMEX facility that is located south of the chamber building (structure 15-184) (Figure 2.3-1). The septic system consists of a septic tank (structure 15-205), leach field, and inlet and outlet drainlines. The 4 ft × 8 ft × 5 ft reinforced concrete septic tank was installed in 1960 and has a capacity of 605 gal. The septic tank discharged to a 10 ft × 75 ft leach field (LASL 1959, 601541). The septic system received sanitary wastes from restrooms, sinks, and a water fountain within the power control building (structure 15-185) and from floor drains, a restroom, and a hot water heater within the detection chamber (structure 15-186) (Santa Fe Engineering Ltd. 1992, 020981). Beginning in 1987, the septic system began receiving discharges from restrooms within the PHERMEX Multidiagnostic Operations Building (structure 15-310). Engineering drawing C-49874, sheet 5, indicates that in 1996, the noncontact cooling water discharge from building 15-184 was plumbed into the sanitary line connected to the SWMU 15-009(g) septic system (LANL 1996, 601540). All facilities connected to the septic system are now inactive, and there is currently no discharge to the system.

2.3.2 Previous Investigations

No previous investigations have been conducted at SWMU 15-009(g).

2.3.3 Analytical Results

There are no analytical results for SWMU 15-009(g).

2.4 AOC 15-014(d), Drainline and Outfall

2.4.1 Description and History

AOC 15-014(d) consists of a drainline and outfall located south of the PHERMEX facility in the southeast portion of TA-15 (Figure 2.4-1). The outfall received storm water from roof drains on the power control building (structure 15-185) and discharge from the SWMU 15-014(l) outfall. SWMU 15-014(l) received

wash water from floor drains in building 15-185 and cooling tower blowdown from structure 15-202 (Santa Fe Engineering 1992, 020981). Engineering drawing ENG-C-37323 (LASL 1969, 601543) indicates that the AOC 15-014(d) drainline, which consists of a corrugated metal pipe connected to the SWMU 15-014(l) outfall and the building 15-185 roof drains, was installed in approximately 1969. Before that time, the roof drain and floor drains from building 15-185 discharged to the paved area behind the building and flowed to a drainage channel adjacent to the roadway south of PHERMEX. The AOC 15-014(d) outfall is located at the head of a drainage channel that flows to Water Canyon. The outfall still receives storm water from the roof drains on building 15-18, as well as any storm water entering the SWMU 15-014(l) drop inlet.

2.4.2 Previous Investigations

No previous investigations have been conducted at AOC 15-014(d).

2.4.3 Analytical Results

There are no analytical results for AOC 15-014(d).

2.5 SWMU 15-014(l), Drainline and Outfall from Building 15-185

2.5.1 Description and History

SWMU 15-014(l) is a drainline and formerly permitted outfall (EPA 03A028) for a cooling tower (structure 15-202) located at the PHERMEX facility in TA-15 (Figures 2.2-1 and 2.5-1). This drainline and outfall received blowdown discharge from the cooling tower, which was installed in 1961. Cooling water was piped to building 15-185 and blowdown discharged to a basement floor drain. The basement floor drain discharged to a concrete gutter in the paved area south of building 15-185 (LASL 1961, 601542). Discharges from the gutter flowed to a drainage ditch adjacent to the roadway and into a culvert that drained to the ground surface south of the roadway. This culvert also received discharges from the floor drains in building 15-184. In 1969, a corrugated metal pipe was installed to convey discharges from the SWMU 15-014(l) outfall to a new outfall south of the parking area and roadway (LASL 1969, 601543). The drainline and outfall installed in 1969 comprise AOC 15-014(d). The SWMU 15-014(l) outfall is currently located within a drop inlet in a paved area outside the southeast corner of building 15-185 (Appendix C, Figure C-2). Outfall 03A028 was removed from the Laboratory's National Pollutant Discharge Elimination System permit in 2007. The outfall currently receives only storm water discharges from the paved area around the drop inlet.

2.5.2 Previous Investigations

No previous investigations have been conducted at SWMU 15-014(l).

2.5.3 Analytical Results

There are no analytical results for SWMU 15-014(l).

2.6 AOC C-15-011, Former Underground Tank

2.6.1 Description and History

AOC C-15-011 consists of a former underground fuel storage tank (structure 15-274) that was located at the PHERMEX facility in the southeast portion of TA-15 (Figure 2.6-1). The galvanized steel storage tank was installed in 1973 and was located immediately south of the power control building (structure 15-185). The storage tank had a capacity of 218 gal., and the bottom of the tank was reported to be 6 ft bgs. The tank was removed in 1987 (LANL 1993, 020946, p. 8-26). The surface of the former tank location is now an asphalt parking lot (Appendix C, Figure C-3).

2.6.2 Previous Investigations

During the 1995-1996 RFI conducted at AOC C-15-011, two subsurface samples were collected from one borehole from depth intervals of 6–6.5 ft bgs and 10–10.5 ft bgs next to the former tank location. The samples were field-screened for radioactivity and submitted to an off-site contract analytical laboratory for analysis of volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). Samples collected and analyses requested are presented in Table 2.6-1.

2.6.3 Analytical Results

No organic chemicals were detected in the RFI samples.

3.0 REFERENCES AND MAP DATA SOURCES

3.1 References

The following list includes all documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ER ID or ESH ID. This information is also included in text citations. ER IDs were assigned by the Environmental Programs Directorate's Records Processing Facility (IDs through 599999), and ESH IDs are assigned by the Environment, Safety, and Health (ESH) Directorate (IDs 600000 and above). IDs are used to locate documents in the Laboratory's Electronic Document Management System and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the ESH Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

EPA (U.S. Environmental Protection Agency), January 21, 2005. "EPA's Prior Decisions on SWMU/AOC Sites at Los Alamos National Laboratory (LANL)," U.S. Environmental Protection Agency letter to J. Bearzi (NMED-HRMB) from L.F. King (EPA Federal Facilities Section Chief), Dallas, Texas. (EPA 2005, 088464)

LANL (Los Alamos National Laboratory), July 1993. "RFI Work Plan for Operable Unit 1086," Los Alamos National Laboratory document LA-UR-92-3968, Los Alamos, New Mexico. (LANL 1993, 020946)

LANL (Los Alamos National Laboratory), May 1996. "RFI Report for Potential Release Sites at TA-15, 15-001, 15-002, 15-004(g,h), 15-005(b,c), 15-006(c,d), 15-007(a), 15-008(c,g), 15-009(a,f,i,k), 15-010(a-c), 15-011(a-c), 15-012(a), 15-014(a,b,d,e,g-l), C-15-001, C-15-005, C-15-007, C-15-010, and C-15-011 (located in former Operable Unit 1086)," Los Alamos National Laboratory document LA-UR-95-1685, Los Alamos, New Mexico. (LANL 1996, 054977)

LANL (Los Alamos National Laboratory), November 25, 1996. "Waste Stream Corrections FMU #67, Site Plan, Package 4X, Bldg. 184, 185, TA-15," Engineering Drawing C49874, sheet number C1, 5 of 14, Los Alamos, New Mexico. (LANL 1996, 601540)

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, 059730)

LANL (Los Alamos National Laboratory), September 2010. "Response to the Notice of Disapproval for the Investigation Report for Sites at Technical Area 49 Outside the Nuclear Environmental Site Boundary," Los Alamos National Laboratory document LA-UR-10-6035, Los Alamos, New Mexico. (LANL 2010, 110654.4)

LANL (Los Alamos National Laboratory), June 2016. "Investigation Work Plan for Lower Water/ Indio Canyons Aggregate Area," Los Alamos National Laboratory document LA-UR-16-24247, Los Alamos, New Mexico. (LANL 2016, 601538)

LASL (Los Alamos Scientific Laboratory), August 4, 1959. "Phermex Facility, TA-15, Civil, Sanitary Sewerage Facilities, Septic Tank System, Firing Point Area," Engineering Drawing ENG-C-30535, sheet number 21 of 186, Los Alamos, New Mexico. (LASL 1959, 601541)

LASL (Los Alamos Scientific Laboratory), June 1961. "Phermex Facility, TA-15, Civil, Firing Point, Location and Grading Plan, Revision 1," Engineering Drawing ENG-C-30518, sheet number 4 of 186, Los Alamos, New Mexico. (LASL 1961, 601542)

LASL (Los Alamos Scientific Laboratory), October 1, 1969. "Drainage Modifications Vicinity Bldg R-185, Plans, Details, TA-15, Revision 1," Engineering Drawing ENG-C-37323, sheet number C-1, 1 of 2, Los Alamos, New Mexico. (LASL 1969, 601543)

NMED (New Mexico Environment Department), March 23, 2007. "Approval of Class 3 Permit Modification for No Further Action of 20 Solid Waste Management Units," New Mexico Environment Department letter to D. Glenn (DOE LASO) and R. Watkins (LANL) from C. Padilla (NMED), Santa Fe, New Mexico. (NMED 2007, 095495)

NMED (New Mexico Environment Department), July 2015. "Risk Assessment Guidance for Site Investigations and Remediation," Hazardous Waste Bureau and Ground Water Quality Bureau, Santa Fe, New Mexico. (NMED 2015, 600915)

Santa Fe Engineering Ltd., June 1992. "Wastewater Stream Characterization for TA-15, Environmental Study, Characterization Report #24," report prepared for Los Alamos National Laboratory, Santa Fe, New Mexico. (Santa Fe Engineering, Ltd. 1992, 020981)

3.2 Map Data Sources

Sampling location: er_location_ids_pnt; ER Project Locations; Los Alamos National Laboratory, ESH&Q Waste and Environmental Services Division, 2010-2E; 1:2,500 Scale Data; 04 October 2010.

SWMU or AOC: er_res_all_reg; Potential Release Sites; Los Alamos National Laboratory, ESH&Q Waste & Environmental Services Division, Environmental Data and Analysis Group, EP2010-1C; 1:2,500 Scale Data; 02 December 2010.

Structure or building: ksl_structures_ply; Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Fence: ksl_fences_arc: Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Paved road: ksl_paved_rds_arc; Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Unpaved road: ksl_dir_rds_arc; Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Contours: generated from 2014 LIDAR DATA

Communication line: ksl_comm_arc; Communication Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 08 August 2002; as published 29 November 2010.

Surface Water Sampling Station: er_location_ids_pnt; ER Project Locations; Los Alamos National Laboratory, ESH&Q Waste and Environmental Services Division, 2010-2E; 1:2,500 Scale Data; 04 October 2010.

Lower Water/Indio Canyons Aggregate Area: er_agg_areas_ply; Aggregate Areas; Los Alamos National Laboratory, ENV Environmental Remediation & Surveillance Program, ER2005-0496; 1:2,500 Scale Data; 22 September 2005.

Technical area boundary: plan_tecareas_arc; Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 13 August 2010.

LANL boundary: plan_tecareas_ply; Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 13 August 2010.

River: wqh_drainage_arc: WQH Drainage_arc; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003.

Spring: er_springs_pt: Locations of Springs; Los Alamos National Laboratory, Waste and Environmental Services Division in cooperation with the New Mexico Environment Department, Department of Energy Oversight Bureau, EP2008-0138; 1:2,500 Scale Data; 17 March 2008.

Primary paved road: ksl_centerline_arc; Road Centerlines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 15 December 2005; Unknown publication date.

Secondary paved road: ksl_centerline_arc; Road Centerlines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 15 December 2005; Unknown publication date.

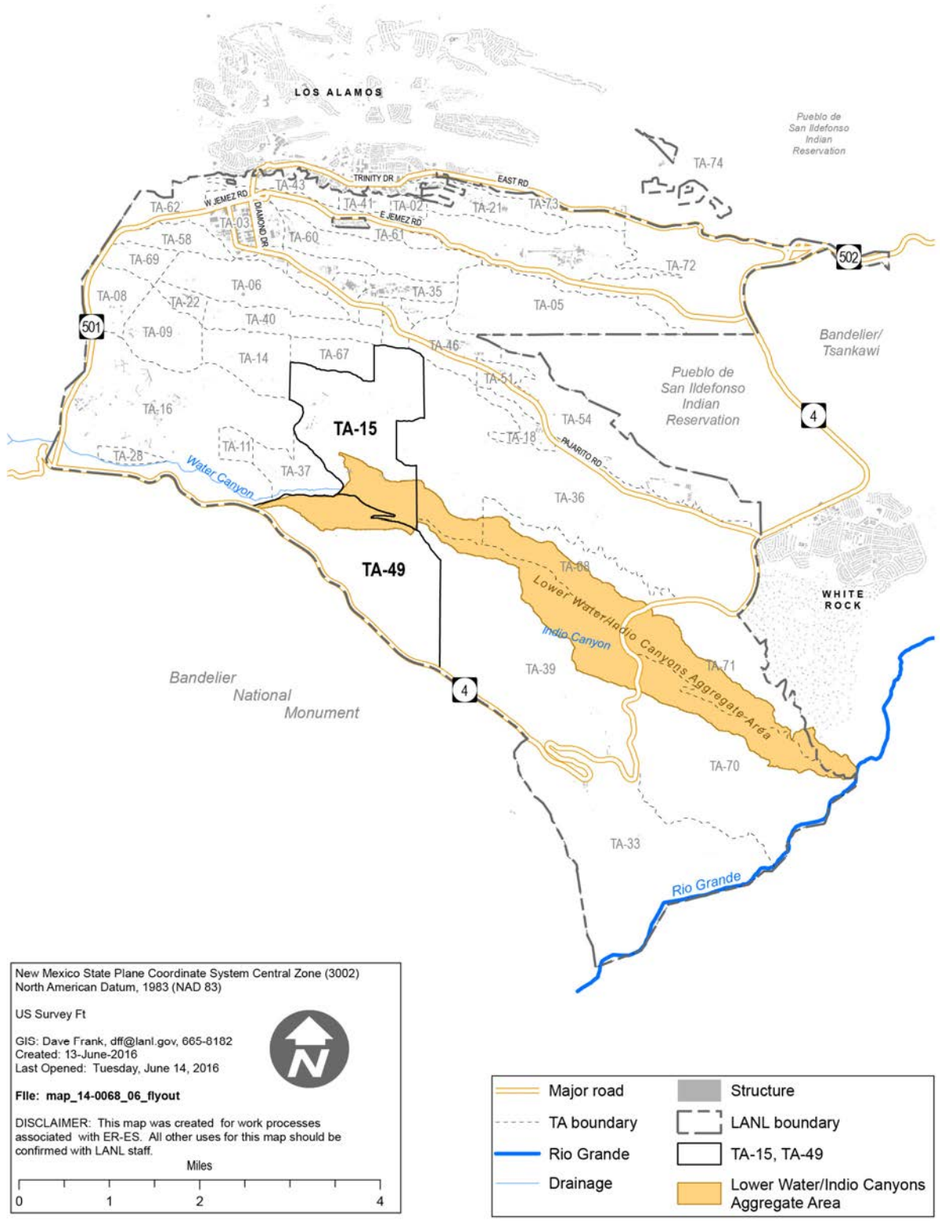

Figure 1.0-1 Location of Lower Water/Indio Canyons Aggregate Area with respect to Laboratory technical areas and surrounding land holdings

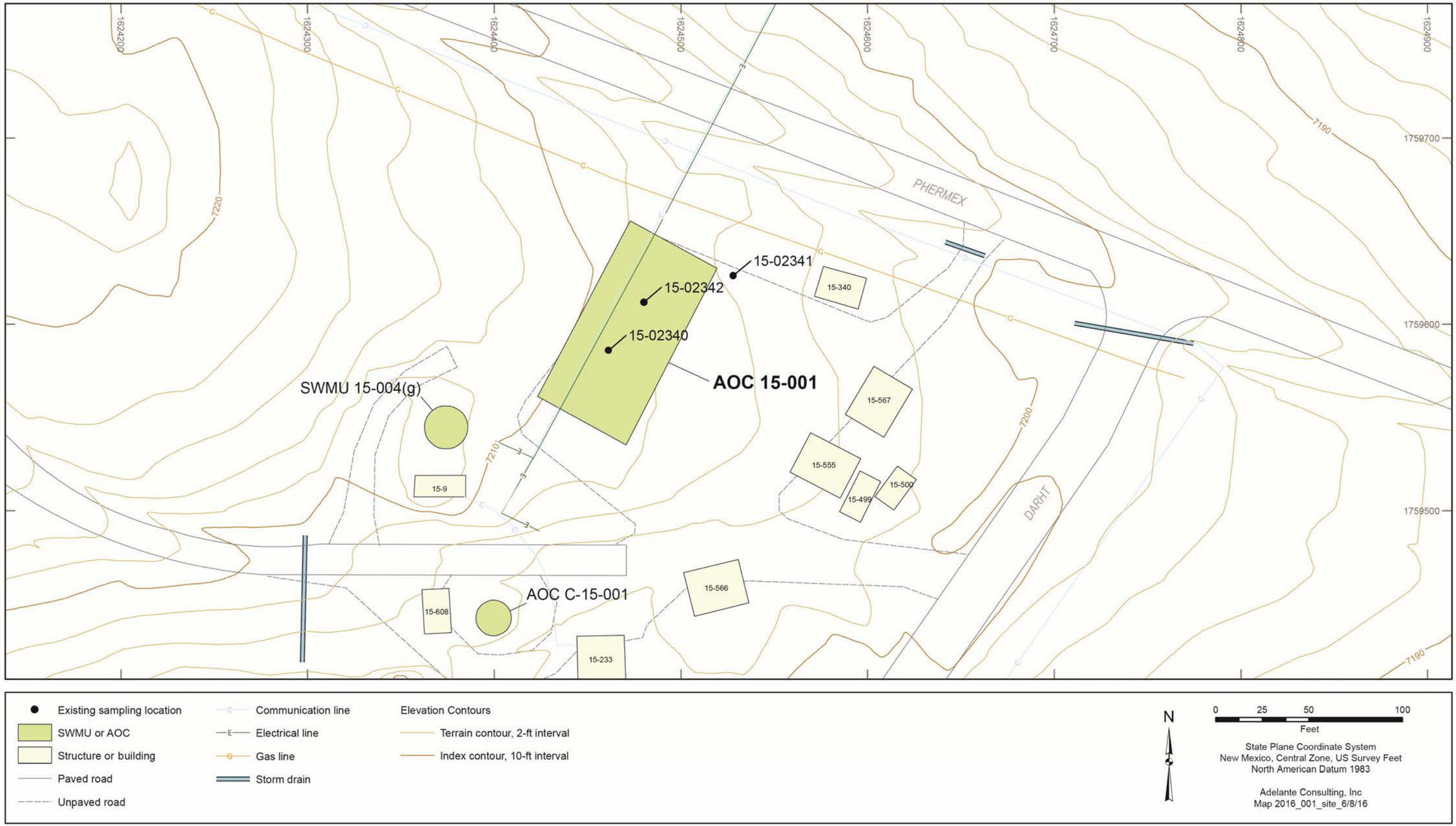

Figure 2.1-1 Site features and historical sampling locations for AOC 15-001

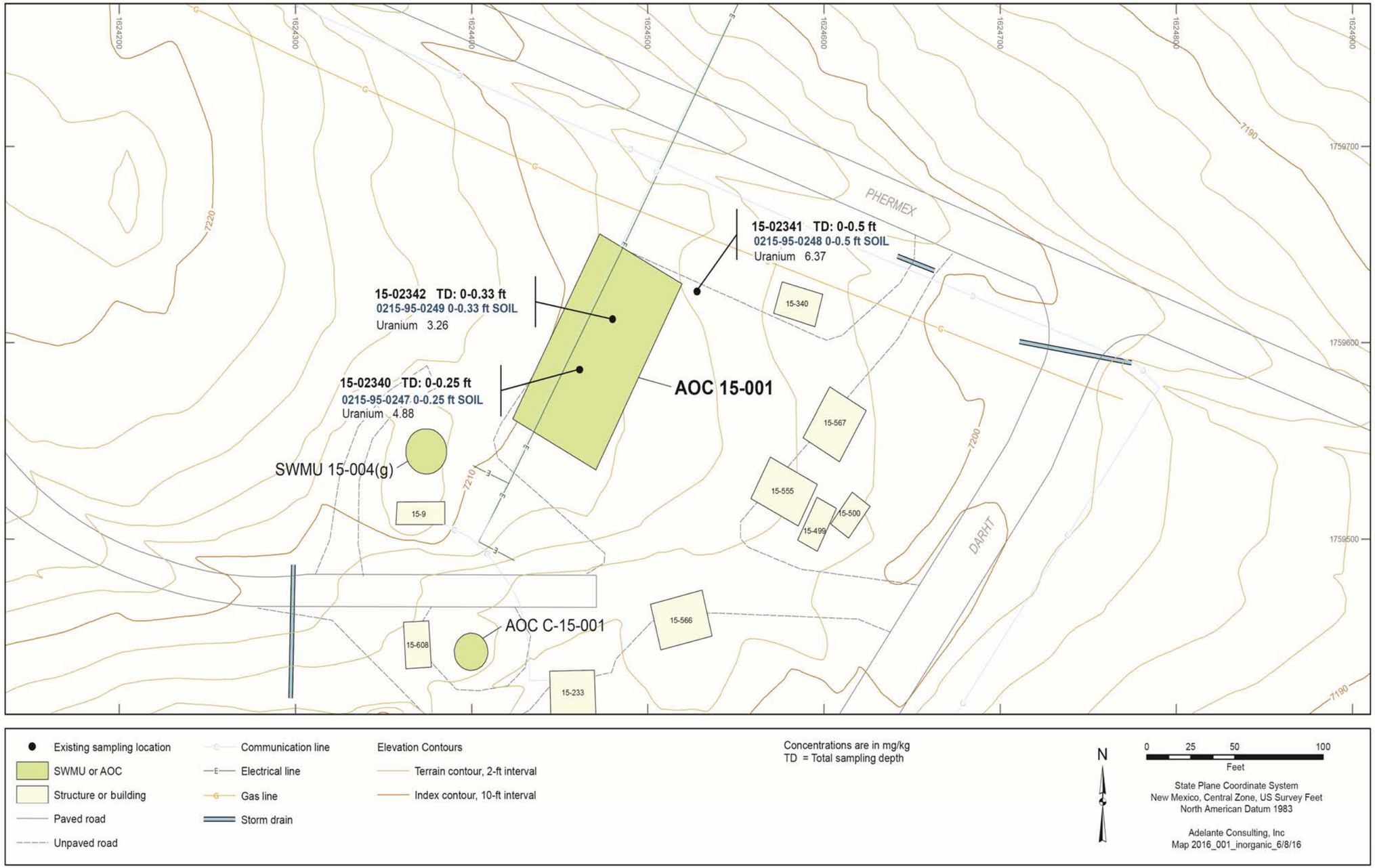

Figure 2.1-2 Inorganic chemicals detected above BVs at AOC 15-001

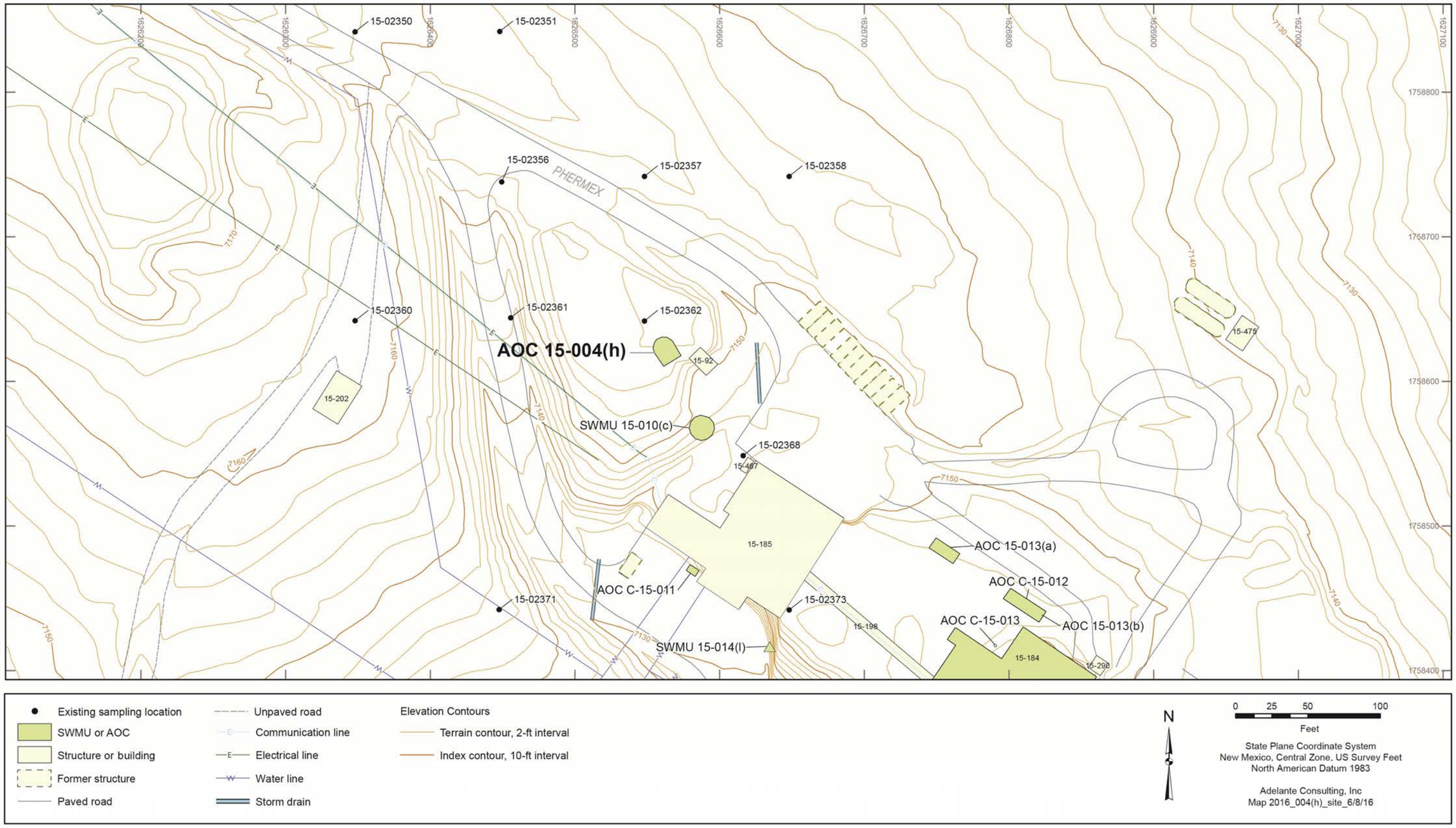

Figure 2.2-1 Site features and historical sampling locations for AOC 15-004(h)

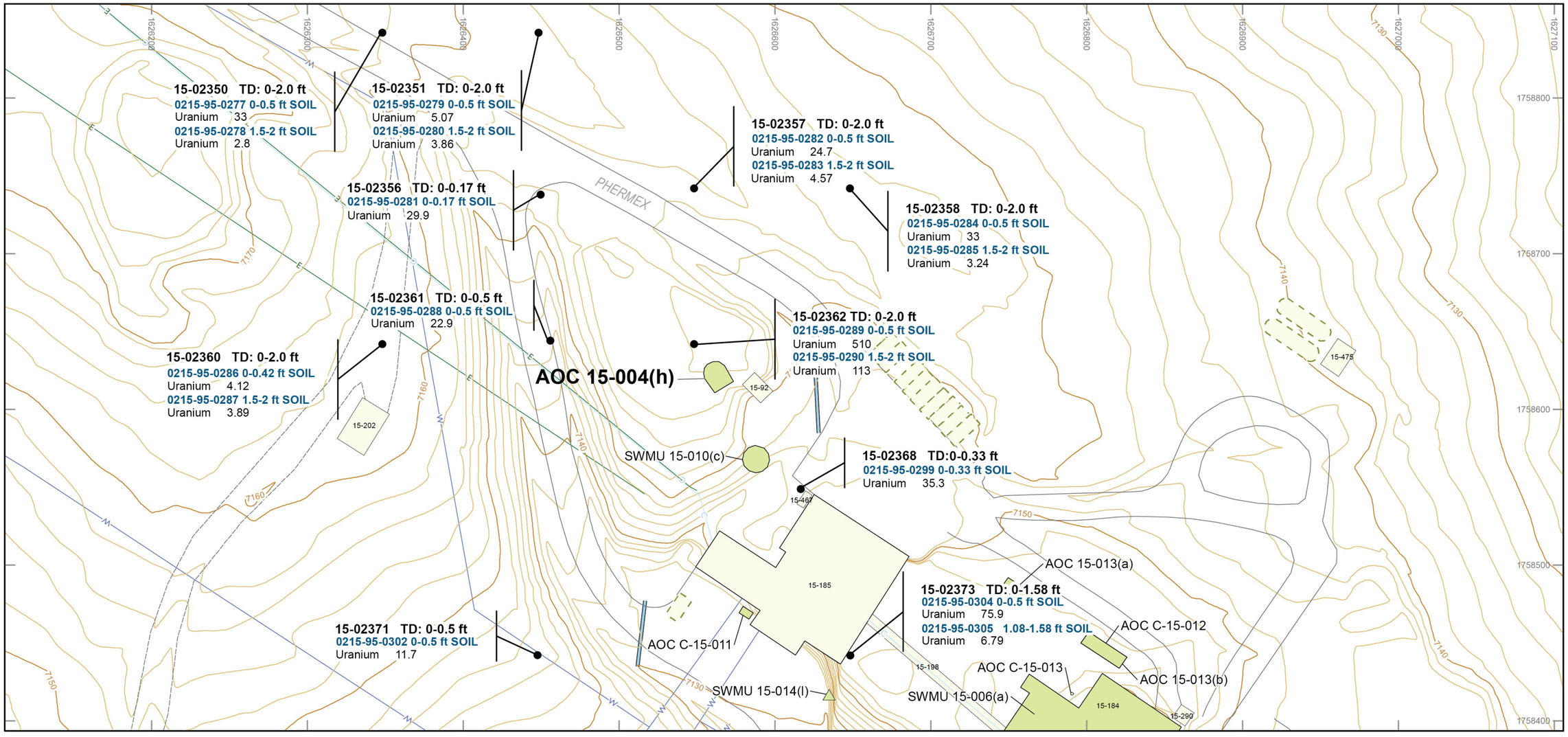

Figure 2.2-2 Inorganic chemicals detected above BVs at AOC 15-004(h)

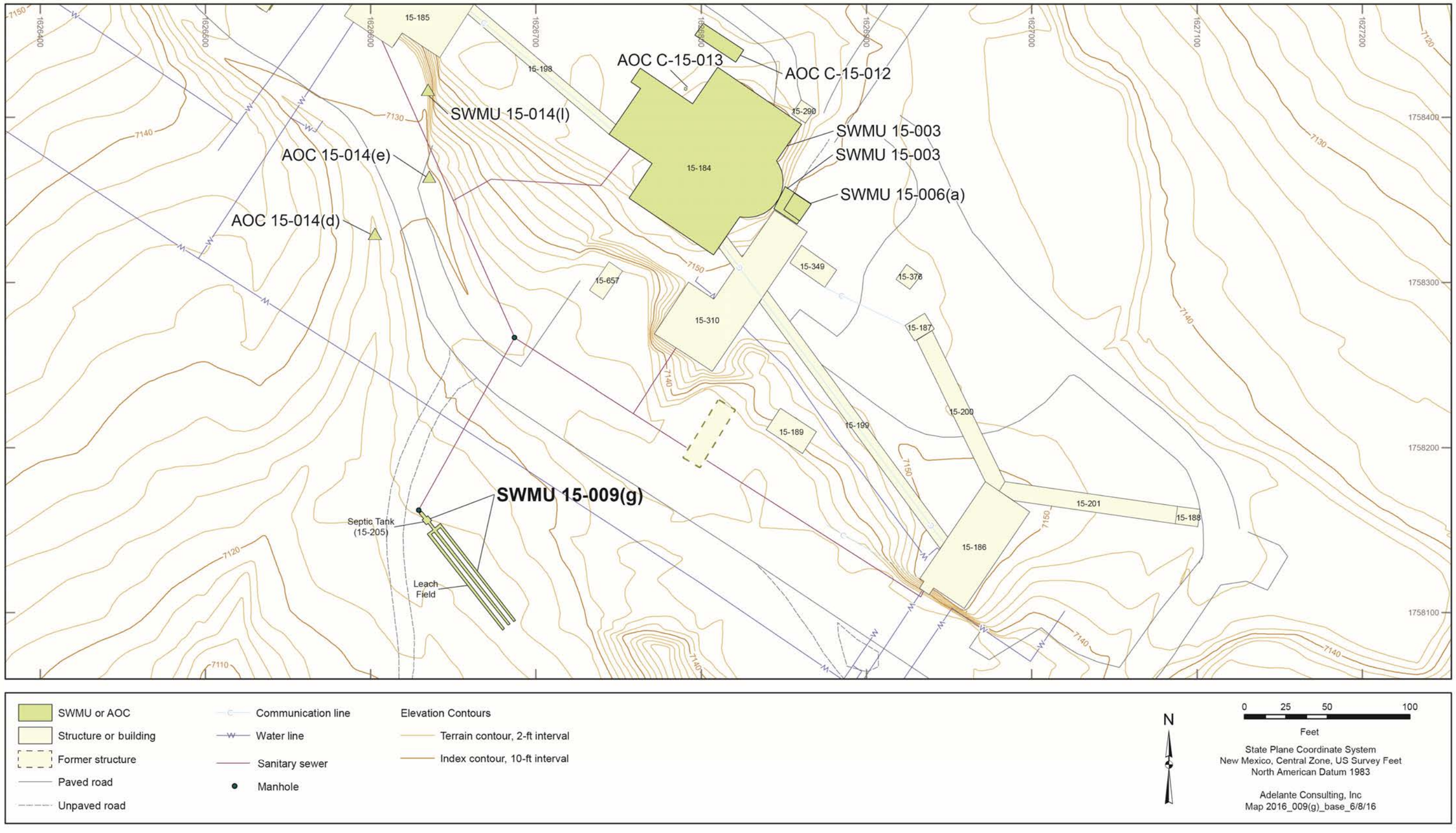

Figure 2.3-1 Site features for SWMU 15-009(g)

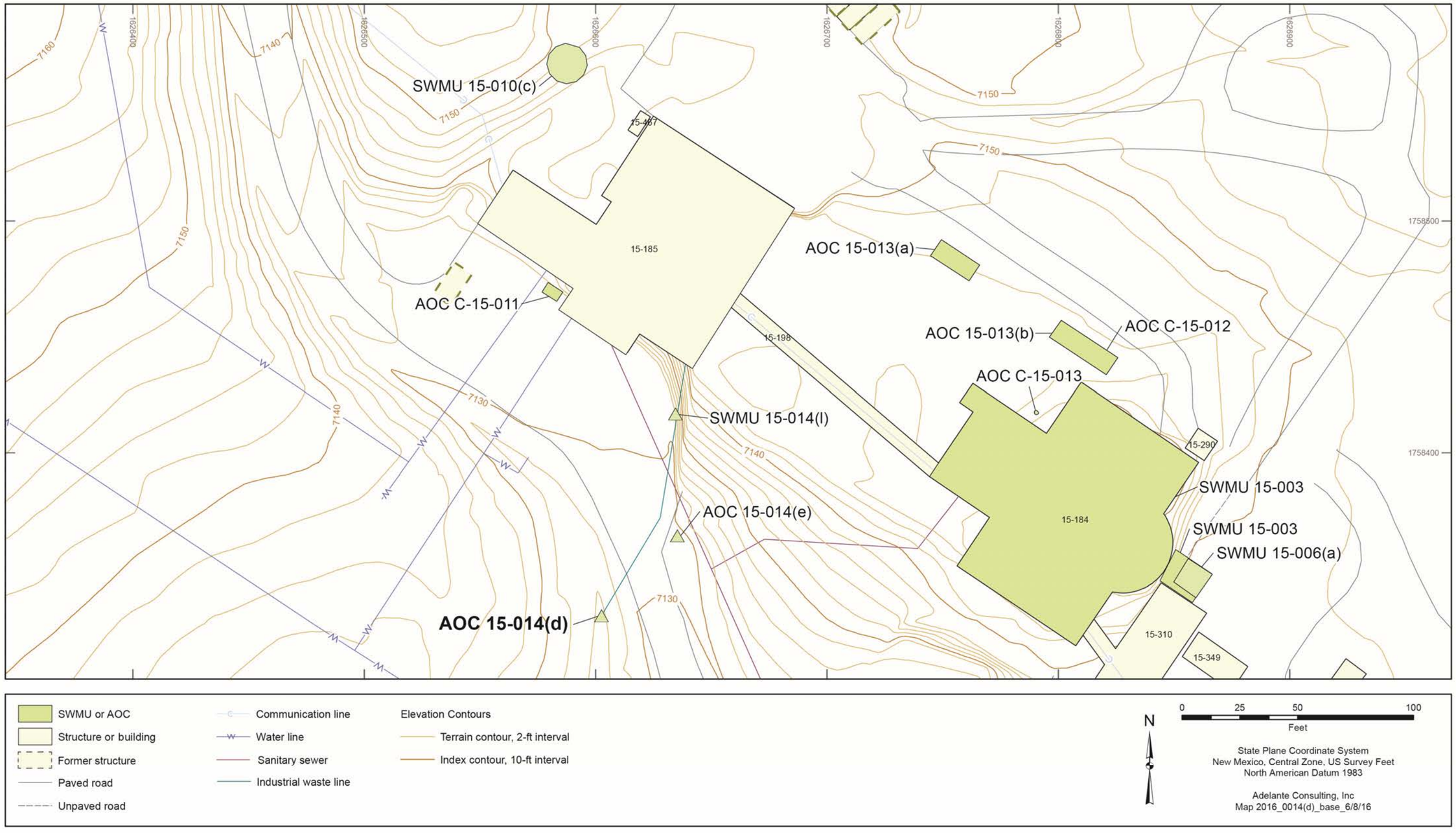

Figure 2.4-1 Site features for AOC 15-014(d)

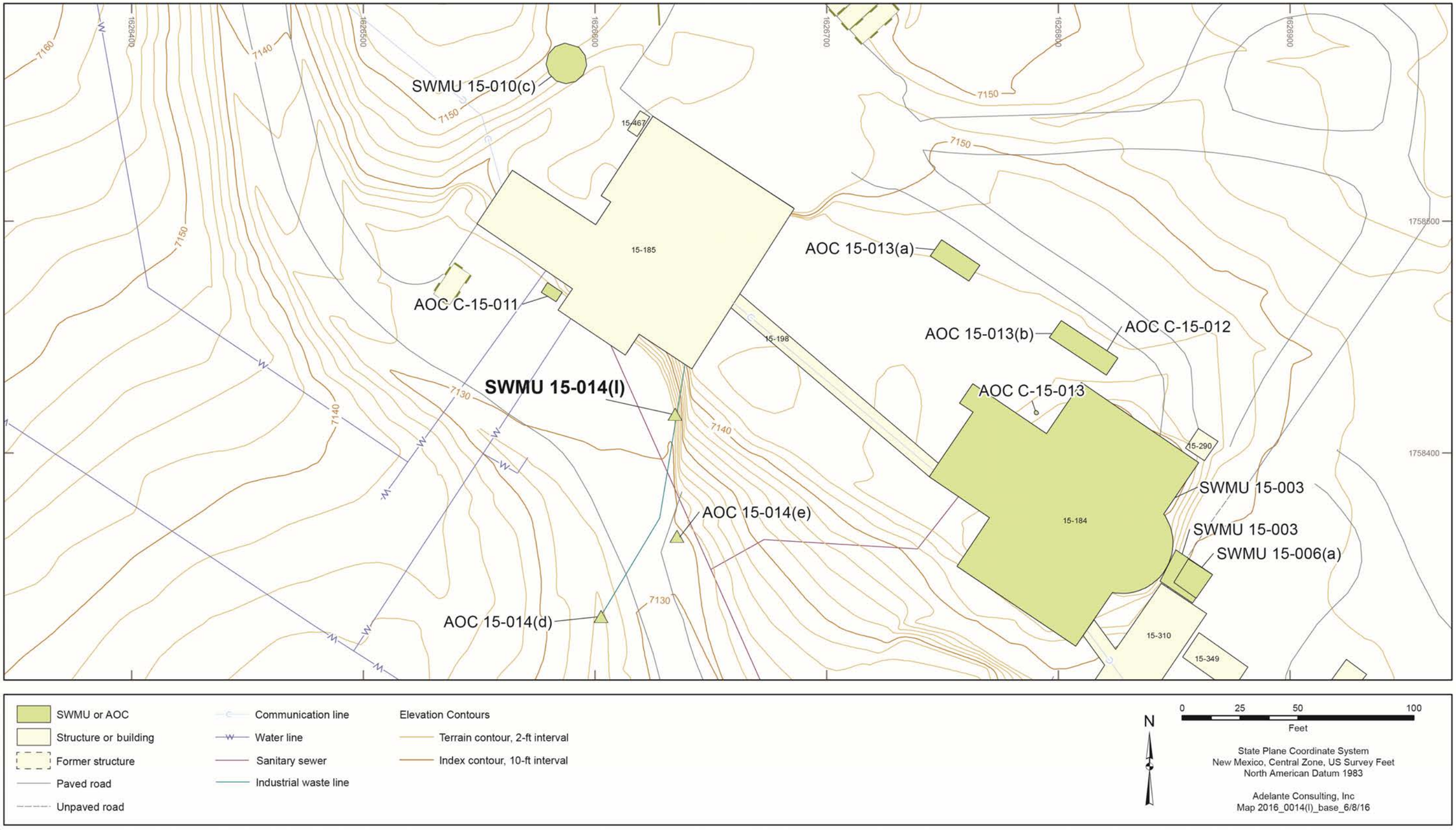

Figure 2.5-1 Site features for SWMU 15-014(l)

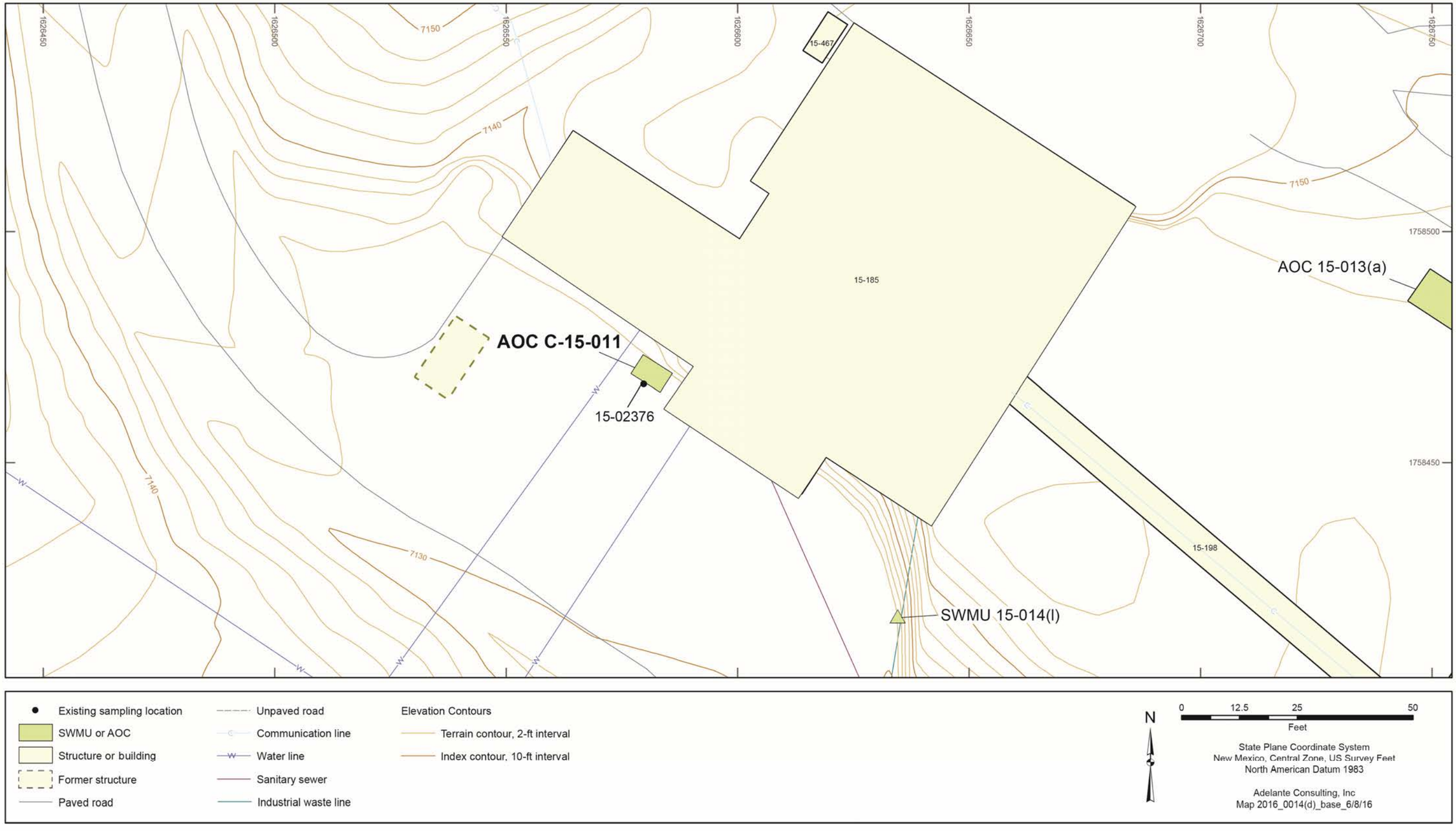

Figure 2.6-1 Site features and historical sampling locations for AOC C-15-011

Table 1.1-1
Status of SWMUs and AOCs in Lower Water/Indio Canyons Aggregate Area

Site ID	Brief Description	Site Status	Reference
TA-15			
AOC 15-001	Storage Area	Under investigation	Work plan section 4.1
AOC 15-004(h)	Firing Site H	Under investigation	Work plan section 4.2
SWMU 15-009(g)	Septic System	Under investigation	Work plan section 4.3
AOC 15-010(c)	Drainline	NFA approved, 03/23/2007	NMED 2007, 095495
AOC 15-013(a)	Underground Tank	NFA approved, 01/21/2005	EPA 2005, 088464
AOC 15-014(d)	Drainline and Outfall	Under investigation	Work plan section 4.4
AOC 15-014(e)	Outfall	NFA approved, 01/21/2005	EPA 2005, 088464
SWMU 15-014(l)	Drainline and Outfall from Building 15-185	Under investigation	Work plan section 4.5
AOC C-15-011	Former Underground Tank	Under investigation	Work plan section 4.6
TA-49			
SWMU 49-004	Burn Site and Landfill (Area 6)	Under investigation	LANL 2010, 110654
AOC 49-007(a)	Septic System (Area 6)	NFA approved, 01/21/2005	EPA 2005, 088464

Table 2.1-1
Samples Collected and Analyses Requested at AOC 15-001

Sample ID	Location ID	Depth (ft)	Media	Uranium
0215-95-0247	15-02340	0–0.25	Soil	69304*
0215-95-0248	15-02341	0–0.5	Soil	69304
0215-95-0249	15-02342	0–0.33	Soil	69304

* Analytical request number

Table 2.1-2
Inorganic Chemicals above BVs at AOC 15-001

Sample ID	Location ID	Depth (ft)	Media	Uranium
Soil BV[a]				**1.82**
Construction Worker SSL[b]				**277**
Industrial SSL[b]				**3880**
Residential SSL[b]				**234**
0215-95-0247	15-02340	0–0.25	Soil	4.88
0215-95-0248	15-02341	0–0.5	Soil	6.37
0215-95-0249	15-02342	0–0.33	Soil	3.26

Notes: Units are mg/kg.

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

[b] Soil screening levels from NMED (2015, 600915).

Table 2.2-1
Samples Collected and Analyses Requested at AOC 15-004(h)

Sample ID	Location ID	Depth (ft)	Media	Uranium
0215-95-0277	15-02350	0–0.5 ft	Soil	68394*
0215-95-0278	15-02350	1.5–2 ft	Soil	68394
0215-95-0279	15-02351	0–0.5 ft	Soil	68394
0215-95-0280	15-02351	1.5–2 ft	Soil	68394
0215-95-0281	15-02356	0–0.17 ft	Soil	68394
0215-95-0282	15-02357	0–0.5 ft	Soil	68394
0215-95-0283	15-02357	1.5–2 ft	Soil	68394
0215-95-0284	15-02358	0–0.5 ft	Soil	68394
0215-95-0285	15-02358	1.5–2 ft	Soil	68394
0215-95-0286	15-02360	0–0.42 ft	Soil	68394
0215-95-0287	15-02360	1.5–2 ft	Soil	68394
0215-95-0288	15-02361	0–0.5 ft	Soil	68394
0215-95-0289	15-02362	0–0.5 ft	Soil	68394
0215-95-0290	15-02362	1.5–2 ft	Soil	68394
0215-95-0299	15-02368	0–0.33 ft	Soil	68394
0215-95-0302	15-02371	0–0.5 ft	Soil	68394
0215-95-0304	15-02373	0–0.5 ft	Soil	68394
0215-95-0305	15-02373	1.08–1.58 ft	Soil	68394

* Analytical request number

Table 2.2-2
Inorganic Chemicals above BVs at AOC 15-004(h)

Sample ID	Location ID	Depth (ft)	Media	Uranium
Soil BV[a]				**1.82**
Construction Worker SSL[b]				**277**
Industrial SSL[b]				**3880**
Residential SSL[b]				**234**
0215-95-0277	15-02350	0–0.5	Soil	33
0215-95-0278	15-02350	1.5–2	Soil	2.8
0215-95-0279	15-02351	0–0.5	Soil	5.07
0215-95-0280	15-02351	1.5–2	Soil	3.86
0215-95-0281	15-02356	0–0.17	Soil	29.9
0215-95-0282	15-02357	0–0.5	Soil	24.7
0215-95-0283	15-02357	1.5–2	Soil	4.57
0215-95-0284	15-02358	0–0.5	Soil	33
0215-95-0285	15-02358	1.5–2	Soil	3.24
0215-95-0286	15-02360	0–0.42	Soil	4.12
0215-95-0287	15-02360	1.5–2	Soil	3.89
0215-95-0288	15-02361	0–0.5	Soil	22.9
0215-95-0289	15-02362	0–0.5	Soil	510
0215-95-0290	15-02362	1.5–2	Soil	113
0215-95-0299	15-02368	0–0.33	Soil	35.3
0215-95-0302	15-02371	0–0.5	Soil	11.7
0215-95-0304	15-02373	0–0.5	Soil	75.9
0215-95-0305	15-02373	1.08–1.58	Soil	6.79

Notes: Units are mg/kg.

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

[b] Soil screening levels from NMED (2015, 600915).

Table 2.6-1
Samples Collected and Analyses Requested at AOC C-15-011

Sample ID	Location ID	Depth (ft)	Media	VOC	SVOC
0215-95-0245	15-02376	6–6.5 ft	Soil	68411*	68345
0215-95-0246	15-02376	10–10.5 ft	Soil	68411	68345

* Analytical request number.

Appendix A

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

A-1.0 ACRONYMS AND ABBREVIATIONS

AOC	area of concern
bgs	below ground surface
BV	background value
Consent Order	Compliance Order on Consent
DARHT	Dual-Axis Radiographic Hydrodynamic Test
DOE	Department of Energy (U.S.)
DU	depleted uranium
ESH	Environment, Safety, and Health
HE	high explosives
HIR	historical investigation report
LANL	Los Alamos National Laboratory
NFA	no further action
NMED	New Mexico Environment Department
OU	operable unit
PHERMEX	Pulsed High-Energy Radiographic Machine Emitting X-rays
RFI	Resource Conservation and Recovery Act facility investigation
SSL	soil screening level
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TA	technical area
VOC	volatile organic compound

A-2.0 METRIC CONVERSION TABLE

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

A-3.0 DATA QUALIFIER DEFINITIONS

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

Appendix B

Analytical Suites and Results
(on CD included with this document)

Appendix C

Site Photographs

Figure C-1 Area of Concern (AOC) 15-001 storage area, looking northeast

Figure C-2 Drop inlet at Solid Waste Management Unit (SWMU) 15-014(l) south of building 15-185, looking east

Figure C-3 Location of former underground tank AOC C-15-011, south of building 15-185, looking north