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SOIL GAS INVESTIGATION WORKPLAN

BUCKLEY ROAD VICINITY
San Luis Obispo, California

Submitted to:
Central Coast Regional Water Quality Control Board
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1.0 INTRODUCTION

Roux Associates, Inc. (Roux Associates) has been retained on behalf of the County of San Luis Obispo (County), to evaluate claims made against the County by the Central Coast Regional Quality Control Board (RWQCB) and various claimants regarding alleged groundwater contamination near Buckley Road. Roux Associates is submitting this Soil Gas Investigation Workplan (Workplan) to the RWQCB, to conduct a phased soil gas investigation in the vicinity of the San Luis Obispo County Regional Airport (Airport), located at 901 Airport Drive in San Luis Obispo, California. For the purposes of this workplan, the Site consists of the secure operational areas of the Airport (runways, taxiways and associated security zones) and County-owned land, outside of the airport operational zones (Figures 1 and 2). The scope of work described below was developed based upon a letter from the RWQCB dated February 26, 2016 (RWQCB, 2016A), and a meeting with the RWQCB held on March 8, 2016. The original version of this workplan was submitted to the RWQCB on April 15, 2016, and has been subsequently revised to address the conditional approval issued by the RWQCB in a letter dated May 13th (RWQCB, 2016B).

As described by the RWQCB (RWQCB, 2015 and 2016A), concentrations of the chlorinated solvent trichloroethene (TCE) have been detected in one or more water supply wells located in close proximity to 795 Buckley Road since the 1990s. When the supply wells were initially tested in the early 2000s, monitoring data indicated a maximum TCE concentration of 320 micrograms per liter ($\mu\text{g/L}$) in groundwater (RWQCB, 2015). Since that time, TCE concentrations have reportedly fluctuated, but there is an overall decreasing trend. The most recent groundwater monitoring data indicate a maximum TCE concentration of 61 $\mu\text{g/L}$ in groundwater, which exceeds the California Department of Public Health's maximum contaminant level for TCE of 5 $\mu\text{g/L}$ (RWQCB, 2015).

There are at least two known groundwater wells on the Site (Figure 2). Groundwater samples collected recently by the County detected low levels of TCE. The County conducted reviews of current and past operations, and reviewed records and historical documentation. The County has not found any indications of storage, use, misuse, transfer, spills, or disposal of TCE or products containing TCE (County, 2016A, 2016B and 2016C; SAIC, 1997A and 1997B; USACE, 1999). Because this extensive research regarding historical activities conducted on County property has revealed no indication that TCE was used or stored on the Site, the source of TCE in groundwater

in the Buckley Road vicinity is unknown. Beyond the information already provided and that was transmitted by the County with the original version of this workplan (County, 2016C), research into potential additional aerial photographs, and aerial photograph advanced analysis have not been completed. Any significant findings will be communicated to the RWQCB promptly, if any meaningful new information is identified.

Despite historical records that show no evidence of TCE use on County property, the February 26, 2016 RWQCB directive (RWQCB, 2016A) required the County to submit a detailed workplan to investigate the potential presence of TCE in soil gas and groundwater along Buckley Road and at other locations in the vicinity of the Site. In summary, the investigation portion of the directive states that the workplan must include:

1. A proposal for collecting groundwater samples along Buckley Road;
2. A proposal for soil gas sampling along Buckley Road, specifically at stormwater drainage pathways;
3. A proposal for soil gas sampling at the former leach field area located east of Runway 25, including a provision for collecting groundwater samples where TCE is detected in soil gas; and,
4. A proposal for soil gas sampling at other areas at the Airport, based on a review of aerial photographs, disposal records, and operational records.

Roux Associates is proposing a phased approach to address the RWQCB directive. This workplan will primarily address Items 2, 3, and 4; Item 1 is addressed in a Groundwater Investigation Workplan, which is being submitted concurrently under separate cover. Item 3 as it relates to groundwater is also partially discussed in the Groundwater Investigation Workplan.

2.0 PRELIMINARY CONCEPTUAL SITE MODEL

The following presents a preliminary conceptual site model, as very little to no information is known regarding the potential sources or pathways for TCE impacts detected in industrial/commercial and residential groundwater wells in the Buckley Road and Site vicinity. Sparse information is currently available related to the lateral and vertical lithologic and hydrogeologic setting, let alone sub-regional groundwater horizontal and vertical flow characteristics and the localized influences of groundwater extraction on regional groundwater flow.

2.1 Site Description

The Site is located approximately 3 miles south-southeast of the City of San Luis Obispo, California (Figure 2). The Site is situated west of Highway 227, south of Tank Farm Road, and north of Buckley Road. It consists of approximately 340 acres (Coffman, 2005). In addition, there is a fire station located at 4671 Broad Street, and other locations in this area include a restaurant and car rental businesses. The Airport and these locations are collectively referred to herein as the “Site” (County, 2016D).

2.2 Topography

The Site elevation ranges from approximately 135 feet along the western Site boundary, to approximately 215 feet at the southeastern Site boundary at the intersection of Buckley Road and Highway 227 (United States Geological Survey [USGS] topographic map, Pismo Beach, California Quadrangle; Appendix A). The Site and vicinity slope generally towards the northwest and west.

2.3 Drainage

General plans for the Site describe the topography as nearly level, with surface drainage generally running from east to west (County, 2016). An engineered system of surface collection ponds and drainage conveyances help move water off the Site and discharge it in one of several locations, including an outfall near Buckley Road (Mead and Hunt, 2006). Historically, much of the southeastern portion of the Site and drainage onto the Site from the north or east drained first to a detention area or basin onsite, which was then conveyed via a pipeline under Runway 29, toward

Buckley Road and thereafter into a swale/depression and under a culvert to south of Buckley Road.

Main Site operations and maintenance, however, are currently drained toward a basin located north of the Site (Mead and Hunt, 2006). The Fire Station appears to be drained toward off-site detentions basins located north of Highway 227 or south of Buckley Road. A figure showing current drainage pathways, as well as previous drainage pathways utilized as late as 2006 are provided as Appendix B (Mead and Hunt, 2006).

2.4 Geology

The Site is located within the Coast Range Geomorphic Province of California. The province is characterized by northwest-trending mountains and valleys located between the Great Valley of California and the Pacific Ocean. The Site is situated in the San Luis Valley, which is a basin filled with Holocene-aged alluvium with fan deposits, and a maximum thickness of approximately 160 feet (Dibblee, 2006; shown in Figure 3). The alluvium rests unconformably on bedrock of the Franciscan Formation. The valley is bounded on the northeast by the Santa Lucia Range, on the southwest by the San Luis Range, and on all other sides by contact with impermeable Miocene and Franciscan Group rocks and the Los Osos and Edna Faults (County, 2015).

The Site and vicinity are located in the northeastern portion of the Pismo Beach Quadrangle. The Site and businesses on Buckley Road are situated on older alluvium consisting of clay, dissected gravel, and sand (Dibblee, 2006). The alluvium is thickest (more than 160 feet thick) in the western portion (Cleath, 1987). Immediately to the east of the Site is described as consisting of Franciscan Rocks, pervasively sheared melange, primarily dark claystone and sandstone, marine sedimentary and volcanic rocks from the Jurassic and Cretaceous periods. To the south is described as the Paso Robles Formation from the Pliocene to Pleistocene, consisting of older alluvial gravel, sand, and clay.

According to an environmental assessment performed in 2005, the soils beneath the Site are classified as sandy loam, silt-clay materials, and Cropley clay. This soil is described as “somewhat to very deep and well drained ... (with) very slow permeability, medium surface runoff, and moderate erosion hazard” (County, 2016A). Soil from a boring advanced south of

Buckley Road was described as sandy silty clay in the shallow vadose zone. At approximately 25 feet below ground surface (bgs), soil was described as clayey sand with gravel (Beacon, 2009 and Appendix C). A search was performed for boring logs for groundwater wells installed at the Site, but none were located and a request to the California Department of Water Resources for the boring logs for the two known wells on the Site is still outstanding. The County has provided all available well logs in their possession to the RWQCB in a transmission after the April 15, 2016 response.

2.5 Hydrogeology

The Site and vicinity lie within the northern/western portion of the San Luis Obispo Valley Groundwater Basin, which consists of Pleistocene to Holocene-age terrestrial deposits of gravel, sand, silt, and clay of fluvial origin (DWR, 2003). Primary groundwater producing formations include the Franciscan Formation, the Squire member of the Pismo Formation, and alluvium, with the alluvium being the primary groundwater-bearing material (Cleath, 1987). Saturated aquifers within the alluvium are typically less than 40 feet thick and are interspersed with clay layers (Cleath, 1987). The Edna Fault is reportedly located east of the Site, but the fault does not appear to affect the movement or quality of groundwater (DWR, 2003). Groundwater in the basin is recharged through infiltration of precipitation (between approximately 19 to 23 inches per year), applied irrigation water, and streamflow (Cleath, 1987).

Water supply in the region is obtained primarily from groundwater (Cleath, 1987). Consequently, the region surrounding the Site has many groundwater wells, especially in the more developed areas and along Highway 227 (Cleath, 1987), including those sampled recently for TCE (RWQCB, 2015). Agricultural, municipal, and industrial extractions total approximately 5,800 acre feet per year (DWR, 2003). Trend analysis of groundwater levels suggest that groundwater levels are quickly responsive to increased pumping during droughts (Cleath, 1987).

The groundwater gradient in the San Luis Valley generally flows toward San Luis Obispo Creek from the east and north; in the southeast portion of the Site, however, information on groundwater flow is insufficient to draw definitive conclusions, but may be expected to flow toward the west northwest, generally paralleling the topography as it flows into the San Luis Valley Groundwater basin between the Santa Lucia and the San Luis Ranges (Cleath, 1987). Cleath noted a possible

depression in groundwater levels south of Buckley Road, possibly due to groundwater pumping practices (Cleath, 1987). The local groundwater flow direction may vary vertically and is also influenced by localized groundwater production for both residential and industrial use along Buckley Road. Well logs and screened intervals for any wells in the region are unknown at this time.

At least six groundwater extraction wells do currently, or have existed in the Buckley Road industrial/commercial area as part of permitted Non-Transient/Non-Community Water Systems associated with industrial/commercial uses, including Strasbaugh, Noll, and Buttonwood Industrial Park (SDWIS, 2016). Where a Non-Transient/Non-Community Water system is defined as, “A public water system that regularly supplies water to at least 25 of the same people at least six months per year. Some examples are schools, factories, office buildings, and hospitals which have their own water systems.” (USEPA, 2016). The magnitude and frequency of groundwater extraction associated with these non-residential uses and the subsequent local influence of groundwater extractions on the general regional groundwater gradient and flow direction both laterally and vertically is not known.

In 2015, at the Former San Luis Obispo Tank Farm located immediately to the west of the Airport, depth to groundwater ranged between approximately 10 feet to 25 feet bgs. The direction of groundwater flow was calculated to generally flow toward the southwest under a hydraulic gradient of approximately 0.006 ft/ft. (Padre, 2015).

2.6 Hypothetical Sources, Pathways, and Receptors

As stated above, concentrations of TCE in groundwater have been detected in several water supply wells located in close proximity to Buckley Road south of the Site. The source of these impacts is unknown. A Groundwater Investigation Workplan is being submitted to the RWQCB under separate cover to collect groundwater data. Although the RWQCB has issued informational/investigation directives to at least three entities in the Buckley Road vicinity, a comprehensive knowledge of past solvent storage, use and disposal is not known for all of the industrial/commercial entities in the Buckley Road vicinity.

The RWQCB has noted that drainage pathways on the Site, including in particular a storm drain pipe travelling under Runway 29 and flowing toward and south of Buckley Road, may have hypothetically transported discharges from the Site to the subsurface offsite. A search of numerous historical records by the County has not found any indication that TCE was used, disposed of, or spilled on the Site (County, 2016A, 2016B and 2016C). As discussed in Section 2.5, the groundwater flow direction, although primarily east to west, is also uncertain both: a) laterally and vertically; and, b) due to historical and current pumping activities (Cleath, 1987).

Known and potential receptors of impacted groundwater are water supply wells located south of Buckley Road.

3.0 SITE HISTORY

The historical uses of the Site were researched by reviewing:

- information already submitted and new information that was sent concurrently by the County with the original version of this workplan to the RWQCB (County, 2016A, 2016B and 2016C);
- historical aerial photographs (Figures 4A through 4L and Appendix D) and historical topographic maps (Appendix A); and
- additional information relating to evaluations of the former military use of County property from the United States Army Corps of Engineers (USACE) are included in Appendix E.

For a discussion of the historical information for the surrounding properties, see Roux Associates' Groundwater Investigation Workplan, dated April 15, 2016.

3.1 County Property Research and Submissions to the RWQCB

A review of the Airport's Material Safety Data Sheet (MSDS) records going back 30 years (provided in a letter from San Luis Obispo County, dated January 20, 2016 [County, 2016A]), shows the only 'solvents' used were two paint thinner products (Ace Paint Thinner and Klean Strip Paint Thinner) which use aliphatic hydrocarbons Stoddard Solvent as active ingredients, and two concrete degreaser products (SSS HD Concrete Degreaser, Oil-Eater Cleaner Degreaser), which use sodium hydroxide or terpene hydrocarbons (citrus derivatives) as primary active ingredients. The quantities of these chemicals on the Site were less than 5 gallons at any one time (San Luis Obispo County, 2016A).

The County identified only two spills (both were fuel spills): one in 1990, and another in 1988 (County, 2016A). These spills occurred in an area of the airport that drains to the north. While subsurface petroleum hydrocarbon (jet fuel) impacts were found resulting from drainage off this portion of the Site, the reports do not indicate that TCE was found in the soils or groundwater (County, 2016A). The same location where military operations, if any, would have taken place is believed to have drained into this area of the Site. In 1995, a Phase II environmental assessment

of the Filbin site, located immediately west of the Site, found no chlorinated solvents (or other impacts) in the groundwater (County, 2016A).

3.2 Department of Defense, Formerly Used Defense Site Evaluation

On behalf of the USACE and the Department of Defense, SAIC performed a thorough evaluation of the past operations of the Site as a former defense site and general activities since then (key documents provided in Appendix E). The general findings of that process (corroborated by historical aerial photographs and topographic maps) which culminated in a formal Findings of Fact document include, but are not limited to:

- The Airport existed prior to military involvement. Reportedly, the County leased 116 acres of land in 1938 (SAIC, 1997A). The airport reportedly opened in March, 1939 (County, 2014). While starting in November 1938, the Airport was also used by the U.S. Army Air Corps and the California National Guard (USACE, 1999). Starting in 1938, the first use of the Airport by the Military was reportedly related to, “the 40th Division Aviation of the California National Guard approved use of the airport for training purposes,” and indicated that, “the airport was to consist of 4,000 foot main runway, an administration building, hangars, photographic unit, barracks, mess halls, mechanic shops, two 47s reconnaissance/photograph planes, and five Douglas 32s” (SAIC, 1997A). What appear to be dirt strips are visible on the earliest available aerial photograph dated 1939 (Appendix D);
- During and immediately after the War (starting in 1943 [USACE, 1999]), reportedly ending in 1946, the U.S. Navy leased the airport as an auxiliary backup field to the Alameda Naval Air Station for emergency landings and to support land and sea operations. However, the airport was reportedly not frequently used, and only five people were stationed at the Airport (SAIC, 1997A). The Navy’s use of the airport reportedly did not even include fuel storage, and no military planes were reportedly stored at the airport during the Navy’s occupancy (SAIC, 1997A);
- In 1946, reportedly the first commercial airline operations (Southwest Airways) began at the Airport (SAIC, 1997A and County, 2014). The Southwest Airways operations reportedly stopped in 1955 (County, 2014). Development of more landing strips and an

airplane hangar is visible in the 1949 aerial photograph and airport development is evident in the 1952 topographic map;

- In the 1960s, Coastal Air reportedly operated one Underground Storage Tank selling fuel to private planes, while reportedly no commercial airline operations were based at the airport in the early 1960s (SAIC, 1997A);
- Reportedly, in the late 1960s, commercial airline operations resumed at the Airport (County, 2014). Swift Aire was based at the Airport between 1969 and 1981. Significant building development is visible on the 1965 topographic map (Appendix A) and the 1972 aerial photograph (Appendix D); and
- There is only one mention of any non-petroleum related hazardous materials storage in the SAIC documentation relating to the American Eagle/Wings West hangar (SAIC, 1997B).

In all of the information reviewed by SAIC on behalf of the Department of Defense, it appears that the only documented, or even suspected, underground storage of fluids at the Airport included petroleum hydrocarbons, with the exception of one or two waste oil, or underground slop storage tanks (SAIC, 1997A). No indications of chlorinated solvent (or TCE) use, handling or disposal or explicit mention of any hazardous materials disposal areas during, or after military use at the Airport were noted by SAIC.

The military use of the Airport at maximum intensity between 1938 and 1946 appears to have involved basing of approximately seven military airplanes for aerial observation and civilian training. Although mechanic shops were noted as being present, it is relatively unlikely based upon historical evaluations of military chlorinated solvent use; that such a small military operation would rise to the level of obtaining highly controlled and prioritized chlorinated solvents (Doherty, 2012).

The only two significant commercial operators at the Airport until the 1980s were Southwest Airways between approximately 1946 and 1955 and Swift Aire between approximately 1969 and 1981 (County, 2014).

3.3 Historical Aerial Photographs

Scaled and aligned selected aerial photographs are presented in Figures 4A through 4L and are electronically provided in Appendix D. The aerial photograph acquisition, review and analysis task is not complete; however, the aerial photographs as currently presented are informative for evaluating general geographical/land-use changes in the Buckley Road vicinity.

Historical aerial photographs were obtained from EDR for the years 1939, 1949, 1956, 1959, 1963, 1965, 1972, 1978, 1987, 1994, 2002, 2005, 2009, 2010, and 2012. Historical aerial photographs for the years 1939, 1949, 1956, 1999, 2003, 2007, 2011, and 2014 were obtained from San Luis Obispo County. The historical aerial photographs for the years 1960, 1963, 1981, 1994, and 2011 were obtained from the United States Geologic Survey (USGS). Copies of these photographs are included as Appendix D.

3.4 Historical Topographic Maps

Historical topographic maps of the Site were obtained from the USGS for the years 1942, 1952, 1965, 1978, and 1998 and are presented in Appendix A. The topographic maps corroborate the reported general development of the Site and surrounding area, as shown in the historical aerial photographs.

4.0 PROPOSED SCOPE OF WORK

All work will be performed under the direction of a California-registered Professional Geologist. The soil gas investigation will be implemented by means of a phased approach and will include the following:

- Soil Gas Sampling Adjacent to Buckley Road; and,
- Soil Gas Sampling at the Former Leach Field East of Runway 25; near the southeast end of former Runway 28 (currently Runway 29) and in Historical and Current Operations Areas.

The soil gas investigation will utilize passive sampling techniques as a means of screening for vadose zone impacts. Because Site records do not mention historical use of TCE, the targeted areas of investigation are large. Passive sampling techniques present a cost-effective way to develop a screening-level picture of a large site and evaluate whether the subsurface has been impacted (Cal-EPA, 2015).

If the results of the passive soil gas sampling activities show positive, or significant detections of TCE in soil gas, Roux Associates may recommend active soil gas sampling in order to report TCE concentrations present in the subsurface with greater specificity, in accordance with RWQCB protocols (Cal-EPA, 2015).

4.1 Proposed Passive Soil Gas Sampling Locations

As shown in Figures 5, 6A and 7A, the proposed scope of work involves the collection of passive soil gas samples on the Site. The scope of work requested by the RWQCB has been divided into three phases. Phase I is centered south of the runways near Buckley Road and a known current and historical stormwater drainage channel (Figure 5). This phase is designed to satisfy Item Number 2 of the RWQCB directive. Phase II will be a screening of the historical leach field as depicted by Cleath (1987) and current and historical operational areas, which as discussed in Section 3.0, have primarily been concentrated north of the runways (Figures 6A and 6B). This phase is designed to satisfy Item Numbers 3 and 4. Phase III will be a screening near the southeastern end of former Runway 28 (Figures 7A and 7B), as requested by the RWQCB in the conditional approval letter (RWQCB, 2016B).

4.1.1 Phase I – Soil Gas Sampling South of Runways

As shown in Figure 5, the proposed scope of work for Phase I, involves the collection of passive soil gas samples from an area spanning approximately 2,000 feet south of the runways and parallel to Buckley Road. Passive sampling modules will be spaced in a transect with approximately 100-foot spacing in most areas, per manufacturer recommendations. In the area immediately surrounding the drainage channel, passive sampling modules will be spaced approximately 50 feet apart. A secondary transect line will be stepped back approximately 50 feet to the north and will be spaced approximately 200 feet apart. See Figure 5 for proposed sample locations. As requested by RWQCB in the February 26, 2016 letter (RWQCB 2016A), this initial scope of work (Phase I) will be scheduled immediately after approval of this workplan. Phase I will be prioritized over Phases II and III in scheduling.

4.1.2 Phase II – Soil Gas Sampling at the Former Leach Field and Operational Areas

As requested in Item Number 3 of the workplan requirements, soil gas samples will be collected within and around the boundaries of the former leach field, as drawn in Cleath's 1987 Groundwater Study (see Figure 6A).

As requested in Item Number 4 of the workplan requirements, soil gas samples will also be collected in the primary current and historical operational areas of the Site (Figures 6A and 6B, respectively). As described in Section 3.0 and noted in historical aerial photos and current Site layout maps, operations and maintenance activities have almost exclusively been located north of the runways. In addition to these operational areas, the former Aircraft Rescue and Fire Fighting (ARFF) facility, also known as Fire Station 21, will also be targeted in this phase of investigations. This facility was approximately located within the former leach field along Highway 227 (Figure 6B).

4.1.3 Phase III – Soil Gas Sampling at the End of Former Runway 28

As directed by the RWQCB in the May 13, 2016 conditional approval letter (RWQCB, 2016B), six soil gas samples will be collected near the southeastern end of Former Runway 28 (now Runway 29). The proposed sample locations relative to current Site features are shown on Figure 7A. The 1956 aerial photograph appears to show disturbed soil in the southeastern portion of the Site (Figure 7B). The current extent of the runway (now designated as Runway 29) has been

lengthened; however, as shown in Figure 7B, the sample locations have been placed within and near the general vicinity of the disturbed area evident in the 1956 aerial.

Because of the need to preserve the integrity of the Airport concrete pads and aprons, passive soil gas samplers will be deployed in unpaved accessible areas of vegetation or bare soils in transects with either approximately 50 to 100-foot spacing.

Following the completion of all phases of the proposed soil gas investigation, a soil gas investigation report will be submitted to the RWQCB with recommendations for additional characterization, if necessary. An addendum to this workplan with additional sample locations will then be drafted and submitted to the RWQCB for approval.

4.2 Pre-Field Activities

Prior to intrusive work at the Site, the field work contractor will arrange for appropriate training and security clearances, make appropriate notifications of intended subsurface sampling activities, clear boring locations, and prepare a Site-specific health and safety plan. These activities are detailed below. Because the soil gas samples are shallow, less than 25 feet bgs, and groundwater is not expected to be encountered, no permitting is required for this investigation.

4.2.1 Airport Security Clearance/Soil Gas Sample Locations

Proposed locations will first be cleared with Airport staff. Required clearances and escorts for personnel will be arranged, as well as any training, as necessary. Work on the Site will be consistent with all applicable FAA guidance (FAA, 2011). Sample locations may be modified slightly as part of this process. The Phase III sampling locations are very near and within the safety area for one of the two active runways at the Airport (County, 2016D). As such, these Phase III locations may be accessed during off-hours and/or will require additional safety precautions.

4.2.2 Dig-Alert

The proposed sample areas will be pre-marked with white paint, and Underground Service Alert (USA) of Southern California will be notified at least 48 hours in advance of drilling to demarcate

utilities coming to and through the Site. Intended drilling locations will be modified or relocated, as necessary, based on the proximity to subsurface utilities.

4.2.3 Geophysical Investigation

A private geophysical services and utility locating firm may be contracted to evaluate the proposed sample locations and mitigate the risk of disrupting potentially buried utility lines. As part of the investigation, the geophysical services company may use a variety of tools, including ground penetrating radar (GPR), radio detection (RD-4000), Dynatel diagnostic testing equipment, and M-Scope metal detection equipment. Intended sample locations will be modified or relocated, as necessary, based on the results of the geophysical investigation.

4.2.4 Health and Safety Plan

A Site-specific Health and Safety Plan will be prepared to identify significant risks and hazards to be potentially encountered during implementation of field work. During the implementation of field work, exclusion and work zones will be clearly demarcated with orange cones to indicate limited access areas for drilling and sampling activities. Field workers will acknowledge their familiarity with all safety procedures and indicate their intent to follow the HASP by signing the HASP after tailgate safety meetings, which will take place at the beginning of each field day. All personnel working in the exclusion zone will be OSHA trained, consistent with federal regulation 29 CFR 191.120. The HASP will be submitted to the RWQCB at least two weeks prior to the initiation of fieldwork.

4.3 Passive Soil Gas Sampling

Because of the extensive area to be characterized, Roux Associates is proposing a passive soil gas sampling methodology. Each passive sampling module contains an equal amount of engineered sorbent material, specifically selected for affinity to a broad range of volatile organic compounds (VOCs), while minimizing uptake of water vapor (the principal soil gas constituent in most areas). The modules are sheathed in a vapor permeable retrieval cord looped at the top. The loop is used as a means of tying the module to a string for installation and retrieval. The retrieval cord and the sorbent containers are constructed of an inert, hydrophobic, microporous expanded polytetrafluoroethylene (ePTFE) membrane. The microporous structure of the membrane allows vapors to move freely across the membrane and onto the sorbent material (AGI, 2016).

Each passive sampling module will be installed in general accordance with the manufacturer instructions. In vegetation, soil, and/or gravel covered areas; the subsurface soil will be accessed by making a pilot hole utilizing an appropriate hand tool to a depth of approximately 3 feet. The passive sampling module will then be inserted into the pilot hole using a stainless steel insertion rod. The module will be inserted to a depth of approximately 3 feet bgs utilizing string and a cork with a screw eye hook attached, which will facilitate retrieval. The string will be fastened to the cork screw eye and the cork tamped about 2-inches below ground surface and sealed with hydrated granular bentonite to ground surface. Large steel washers will be placed on the top of the cork before covering with bentonite to assist in retrieval of the modules. The location of each module will be surveyed using a hand-held global positional system (GPS) unit.

The passive sampling modules will remain in the pilot hole approximately 10 days and subsequently will be removed using the cork and attached string. After retrieval of the passive sampling module, each pilot hole will be filled with hydrated bentonite to about 0.5 feet bgs and the remaining hole will be patched with similar material surrounding the hole.

All samples will be properly labeled and handled in accordance with approved protocols. The samples will carefully be packaged and mailed to an appropriate certified laboratory under standard chain-of-custody procedures. Additional details regarding field quality assurance/quality control (QA/QC) procedures are discussed in Section 5.0. Samples will be analyzed for VOCs using USEPA Method 8260; results will be reported in micrograms (μg).

4.4 Active Soil Gas Sampling

If the results of the passive soil gas sampling activities show positive, or significant detections of TCE in soil gas, Roux Associates may recommend active soil gas sampling in order to report TCE concentrations present in the subsurface with greater specificity. If such is the case, an addendum to this workplan will be submitted to the RWQCB with specific recommended sampling locations and procedures. All protocols and procedures utilized by Roux Associates will be conducted in strict accordance with the July, 2015, California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC), Los Angeles Regional Water Quality Control Board (LA-RWQCB), and San Francisco Regional Water Quality Control Board (SF-RWQCB), *Advisory, Active Soil Gas Investigations* (Soil Gas Advisory).

4.5 Reporting

The investigative activities for each phase will be documented in a single report, which will be submitted to the RWQCB for review, comment, and approval. The report will include an updated conceptual site model, as applicable, figures, and tables. The report will also include conclusions relative to potential TCE vadose zone impacts at the Site and recommendations for additional actions (if any), including recommendations for groundwater sampling in areas on the Site where TCE is found to be present, as directed by the RWQCB. The report will include the following sections:

1. Introduction
2. General Background
3. Investigation Objectives
4. Scope of Work
5. Sample Collection and Procedures
6. Field Observations and Analytical Results
7. Discussion of Results
8. Summary, Conclusions, and Recommendations
9. Closing
10. References

It is expected that the report documenting each phase of sampling will be submitted to RWQCB in early fall 2016 (see Section 6.0).

5.0 QA/QC PROCEDURES

To document the quality of the data being collected, and to assess whether reported concentrations of chemicals identified through results of analytical testing are of acceptable quality, several control checks for both field and laboratory data will be performed as described in the sections below.

5.1 Field Record Keeping

Bound field logbooks will be maintained by the field supervisor and any other team members to provide a daily record of significant events, observations, and measurements during the field investigation. All entries will be signed and dated. All information pertinent to the field survey and/or sampling will be recorded in the logbooks. The logbooks will be bound, with sequentially numbered pages.

Instruments and equipment used to gather, generate, or measure environmental data will be calibrated according to manufacturer's specifications with sufficient frequency to ensure accuracy and reproducibility of results. At a minimum, monitoring equipment used in the field will be calibrated daily against a known standard. If the results show that the concentration is within 5 percent of the known standard, the equipment will be considered calibrated.

5.2 Sample Handling

All samples will be properly labeled, preserved (where appropriate), and handled in accordance with approved protocols. All laboratory analyses will be conducted by a California-certified laboratory approved for standard quality assurance and quality control procedures (QA/QC).

5.3 Field QC Samples

As a check on field sampling, QA/QC samples will be collected. Definitions for field QA/QC samples are presented below.

5.3.1 Field Duplicates

Field duplicate samples will be collected at 10% of the sample locations. That is, 10% of the passive sampling modules will be deployed in pairs. For these locations, the primary module will be installed according to manufacturer instructions, and then a second module will be installed

according to manufacturer instructions immediately adjacent to the primary location. These secondary modules will be submitted as field duplicate samples to evaluate the precision of the sampler and the analytical laboratory. Duplicate samples will be handled in the same manner as primary samples and will be given the sample designation “D” to indicate that it is a duplicate sample. Field duplicate samples will be analyzed for VOCs and oxygenates via USEPA Method 8260.

5.3.2 Trip Blanks

Trip blanks will be collected daily during deployment and retrieval to document sample integrity associated with the shipment, collection, and storage of environmental samples. Trip blanks will be treated the same as samples, except they will not be removed from the sheath during sample deployment. The trip blanks will be stored with the samples following deployment to measure potential artifacts introduced during storage in the field and shipping for analysis.

5.4 Data Validation and Verification

The initial data interpretation, validation, and reporting will be performed by the laboratory. Data will then be validated outside the laboratory at Level II. All data validation will be in accordance with the USEPA’s Contract Laboratory Program National Functional Guidelines, dated January 2010, for both organic and inorganic data review.

5.5 Data Review

The Project Manager (PM), Project Geologist, Project Scientist, or appropriate Task Leader assigned by the PM, will initially review the laboratory data for consistency with historical Site data and among primary and duplicate samples. A review of data qualifiers assigned by the laboratory will also be performed. If anomalies are found, the laboratory will be instructed to review the reported data and/or re-analyze certain samples. Acceptable data will then be compared to their and other applicable screening levels.

5.6 Corrective Actions

Corrective actions may be initiated if the precision or accuracy goals are not achieved. The first step in corrective action will be to instruct the analytical laboratory to examine its procedures to assess whether analytical or computational errors caused anomalous results. At the same time,

sample collection and handling procedures will be reviewed to assess whether they may (also) have contributed to anomalous results. Based on this evaluation, the PM, Project Geologist, Project Scientist, or appropriate Task Leader assigned by the PM, will evaluate the laboratory Method Detection Limits (MDLs) and MRLs, the sample collection procedures, the analytical parameters, sample custody and sample documentation, and will assess whether re-analysis or re-sampling is required or whether any protocol should be modified for future sampling events.

6.0 PROJECT SCHEDULE

As requested the RWQCB, below is a detailed projected schedule of events following the submittal of this workplan. The schedule is subject to change based on final workplan approval from the RWQCB, County contracting process, subcontractor scheduling, and other unforeseen delays regarding Site access on an actively operating Airport.

Activity	Start	Duration	End
RWQCB Workplan Review	4/18/16	4 weeks	5/13/16
Airport Access, Safety and Logistics	4/18/16	10 weeks	7/1/16
RWQCB Conditional Approval	5/13/16	---	---
Revise Workplan	5/13/16	2 weeks	5/27/16
Workplan Approval	5/27/16	3 work days	6/3/16
Contracting	6/3/16	4 weeks	7/1/16
Contractor Health and Safety, Scoping, Scheduling, Permitting	7/5/16	3 weeks	7/22/16
Start Soil Gas Fieldwork, Install Probes	7/25/16	1 work week	7/29/16
Soil Gas Probe Equilibration	7/25/16	10 days	8/8/16
Retrieve Soil Gas Probes	8/4/16	4 days	8/9/16
Soil Gas Lab Analyses	8/5/16	2 weeks	8/24/16
Transmit Draft Soil Gas Results to RWQCB	8/23/16	As available	8/26/16
Soil Gas Investigation Report	8/26/16	3 Weeks	9/20/16

7.0 CLOSING

Roux Associates is available to answer any questions that the RWQCB may have regarding this Workplan. Please contact Kaleena Johnson at 310-879-4930, or kjohnson@rouxinc.com or Jon Rohrer at 310-879-4921, or jrohrer@rouxinc.com.

Sincerely,

ROUX ASSOCIATES, INC.



Kaleena Johnson
Senior Scientist



Jon Rohrer, P.G., C.Hg.
Principal Hydrogeologist



8.0 REFERENCES

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FIGURES

- 1. Site Vicinity Map**
- 2. Site Map**
- 3. Regional Geology**
- 4. Aerial Imagery (Figures 4A through 4L)**
- 5. Phase I Soil Gas Sample Locations**
- 6A. Phase II Soil Gas Sample Locations (Current)**
- 6B. Phase II Soil Gas Sample Locations (1972)**
- 7A. Phase III Soil Gas Sample Locations (Current)**
- 7B. Phase III Soil Gas Sample Locations (1956)**



Image Source: ESRI World Imagery 2016

Legend

-  Site Boundary
-  Airport Operational Area




Title:			
SITE VICINITY MAP			
SAN LUIS OBISPO, CALIFORNIA			
Prepared For:			
COUNTY OF SAN LUIS OBISPO			
 ROUX ASSOCIATES, INC. Environmental Consulting & Management	Compiled by: PDF	Date: 4/15/2016	FIGURE 1
	Prepared by: PDF	Scale: 1:20,000	
	Project Mgr: KJ	Office: LA	
	File No: F(AL)	Project: 2744.0001L001	



Image Source: ESRI World Imagery 2016

Legend

- Site Boundary
- Present Extent of Runways
- Approximate Location of Former Leach Field (Cleath, 1987)
- Existing Groundwater Monitoring Well
- Buckley Road Drainage Outlet

0.1 0 0.1 0.2
Miles

Title:

SITE MAP

SAN LUIS OBISPO, CALIFORNIA

Prepared For:

COUNTY OF SAN LUIS OBISPO

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FIGURE
2

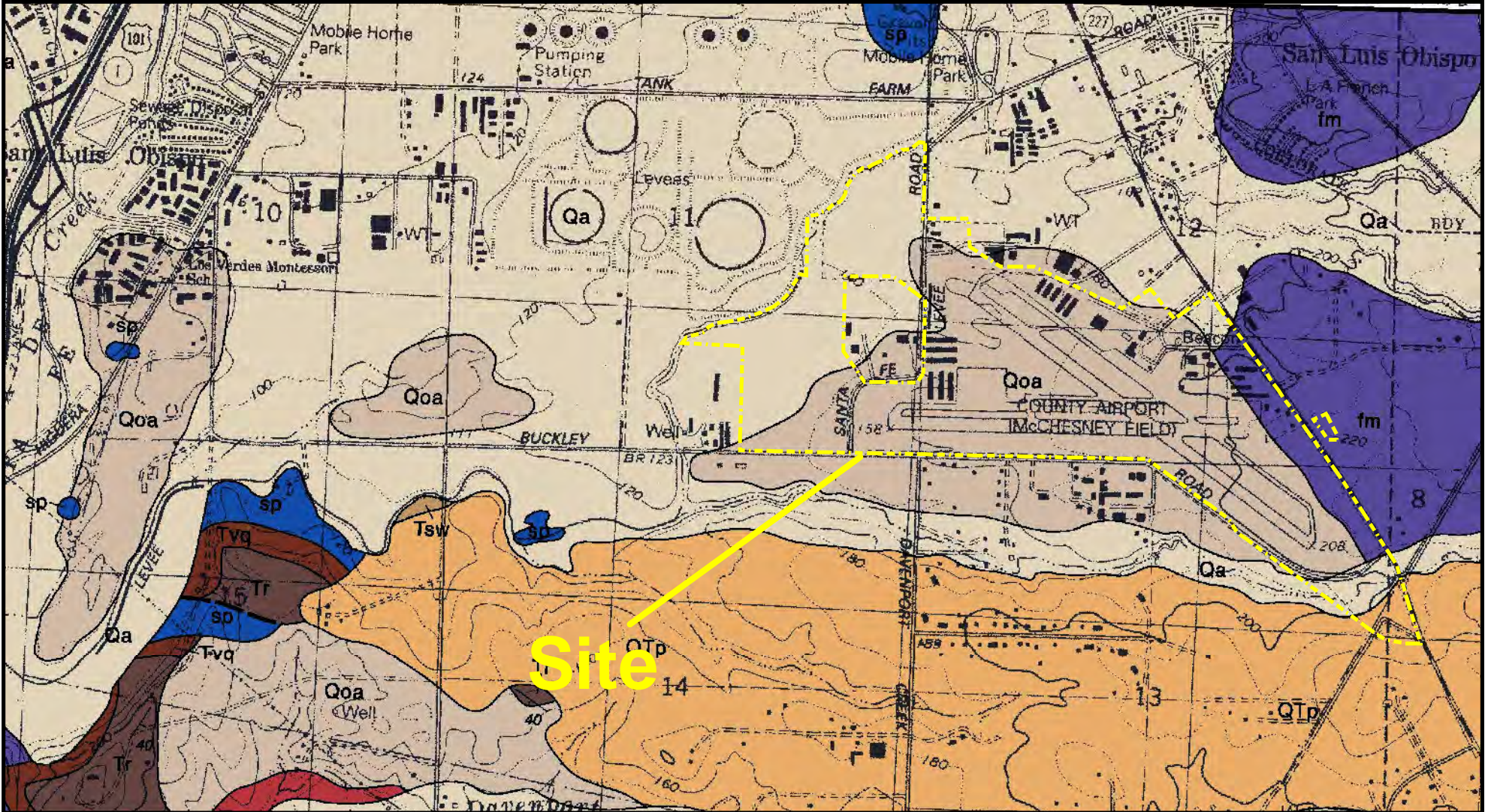
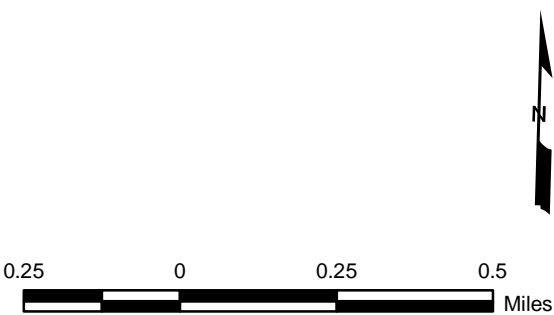



Image Source: Dibblee Pismo Beach Map (DF-212) 2006

Legend

- Site Boundary
- Qa: Surficial sediments
- QTP: Paso Robles Formation
- Qoa: Older Alluvium
- fm: Franciscan Rocks



Title:			
REGIONAL GEOLOGY			
SAN LUIS OBISPO, CALIFORNIA			
Prepared For:			
COUNTY OF SAN LUIS OBISPO			
		Compiled by: PDF	Date: 4/14/2016
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		Project Mgr: KJ	Office: LA
		File No: F(AL)	Project: 2744.0001L001
			FIGURE 3

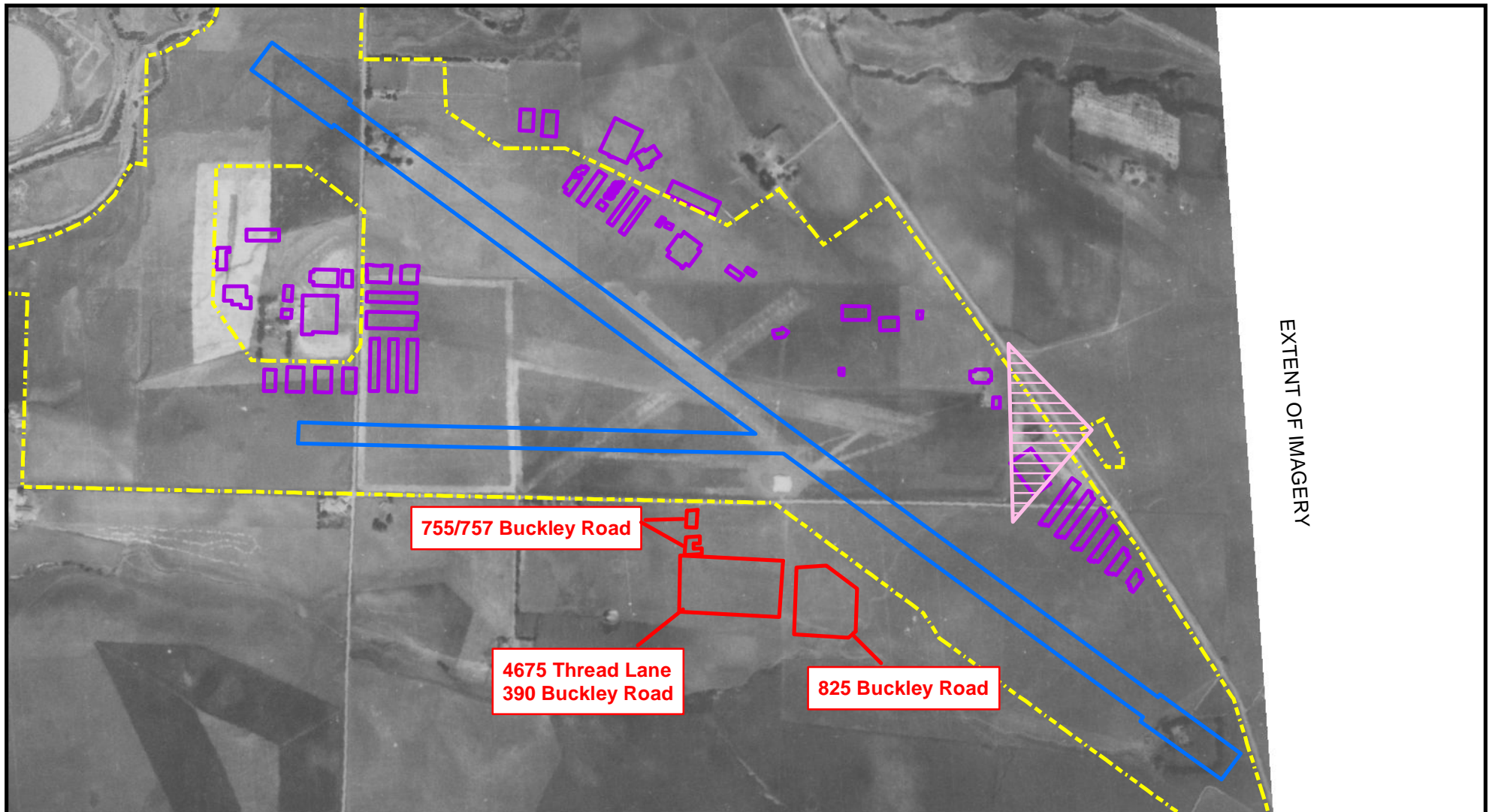




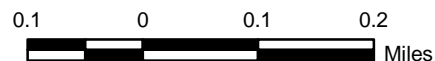


Image Source: <http://gis.slocounty.ca.gov/arcgis/rest/services/Aerials>

Legend

-  Site Boundary
-  Present Extent of Runway
-  Present Building Footprints
-  Approximate Location of Former Leach Field (Cleath, 1987)



Title:

1939 AERIAL IMAGERY

SAN LUIS OBISPO, CALIFORNIA

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Prepared by: PDF	Scale: 1:10,542
Project Mgr: KJ	Office: LA
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Figure	4A
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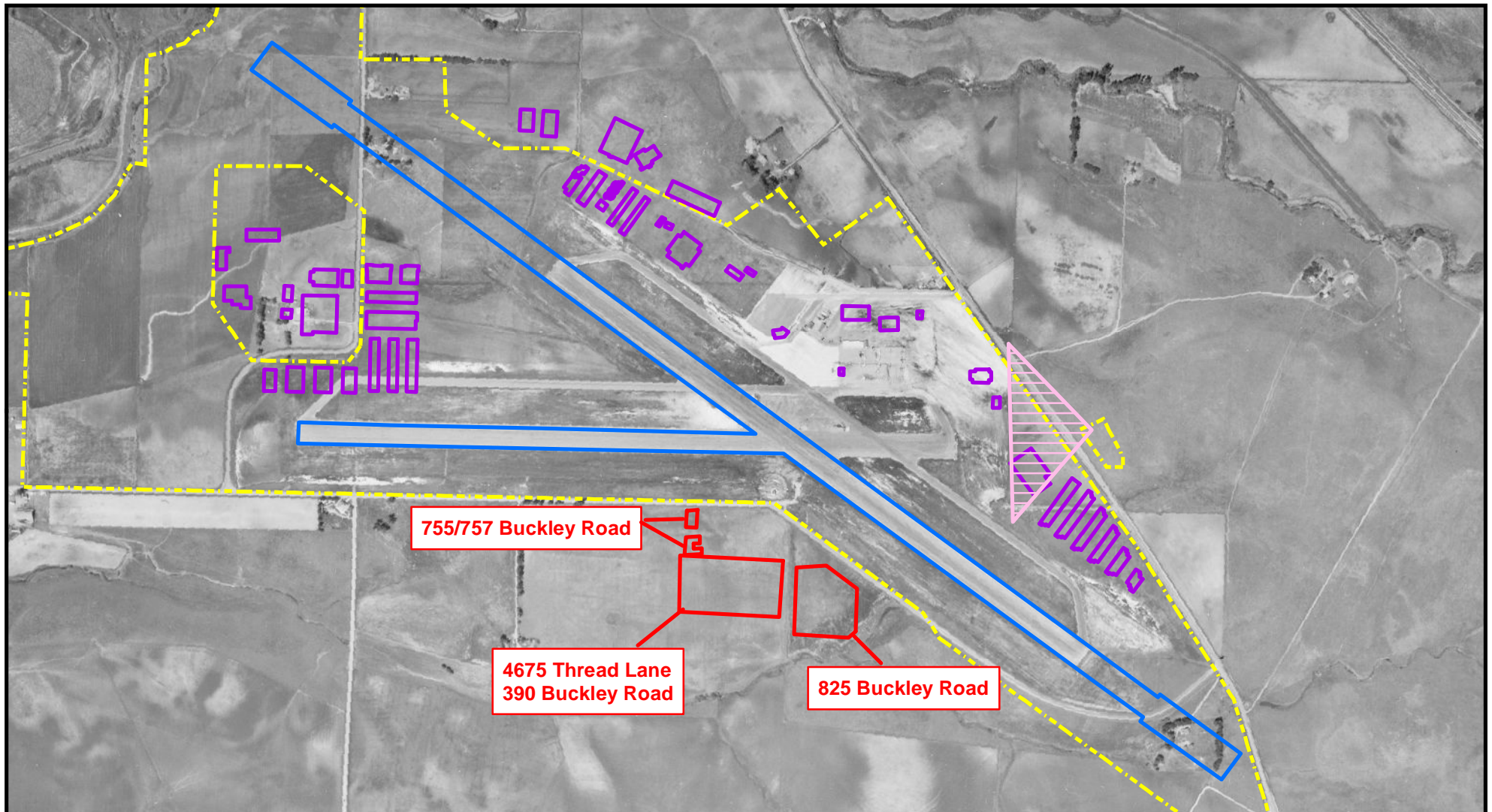




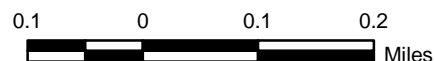


Image Source: <http://gis.slocounty.ca.gov/arcgis/rest/services/Aerials>

Legend

-  Site Boundary
-  Present Extent of Runway
-  Present Building Footprints
-  Approximate Location of Former Leach Field (Cleath, 1987)



Title:

1949 AERIAL IMAGERY

SAN LUIS OBISPO, CALIFORNIA

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FIGURE

4B

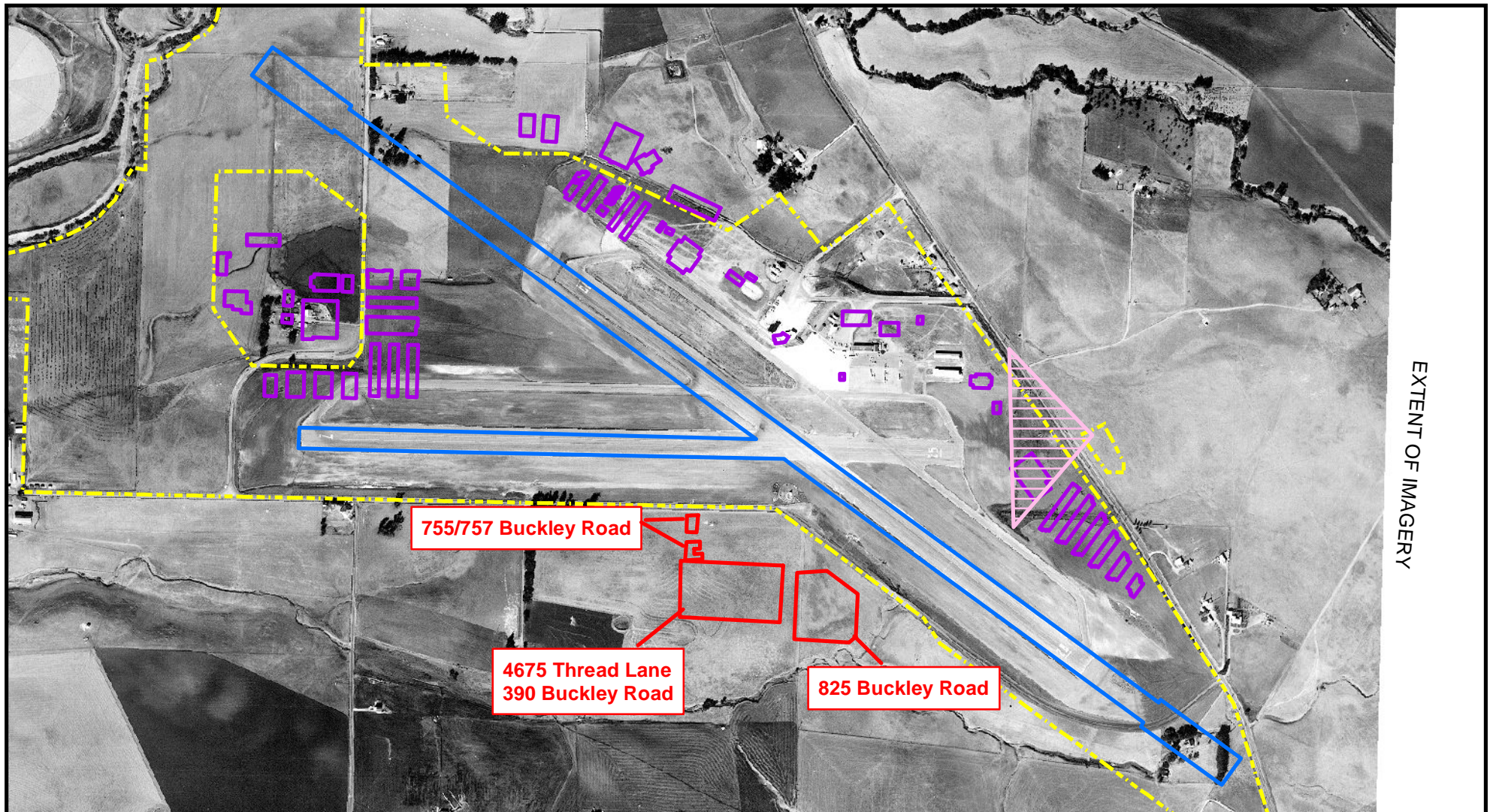
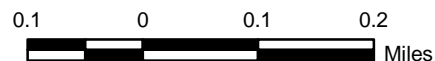


Image Source: Environmental Data Resources-Requested March 21, 2016

Legend

- Site Boundary
- Present Extent of Runway
- Present Building Footprints
- Approximate Location of Former Leach Field (Cleath, 1987)



Title:

1959 AERIAL IMAGERY

SAN LUIS OBISPO, CALIFORNIA

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Scale: 1:10,542
Office: LA
Project: 2744.0001L001

FIGURE

4C

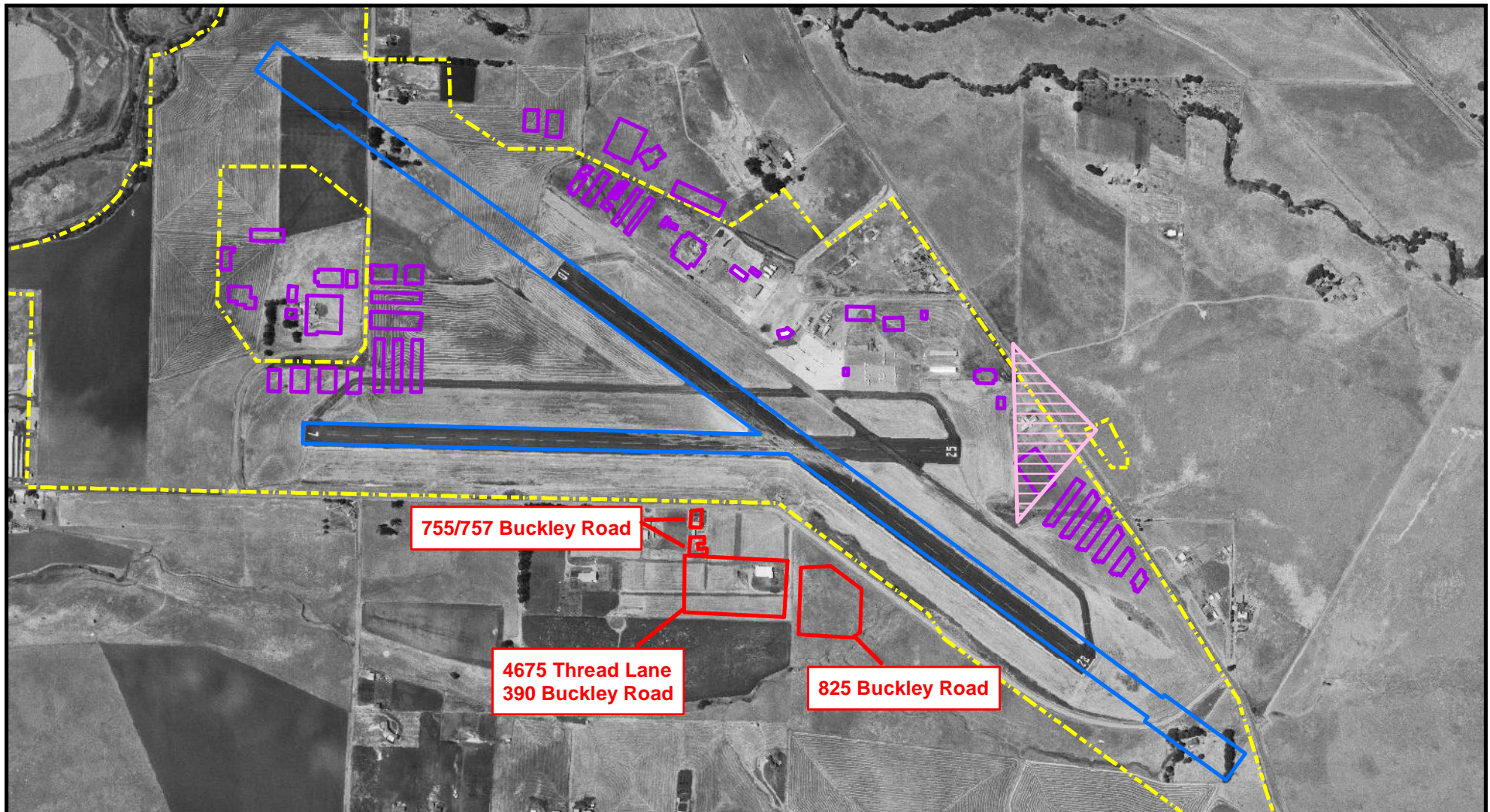


Image Source: United States Geological Survey

Legend

- Site Boundary
- Present Extent of Runway
- Present Building Footprints
- Approximate Location of Former Leach Field (Cleath, 1987)

0.1 0 0.1 0.2
Miles

Title:

1963 AERIAL IMAGERY

SAN LUIS OBISPO, CALIFORNIA

Prepared For:

COUNTY OF SAN LUIS OBISPO

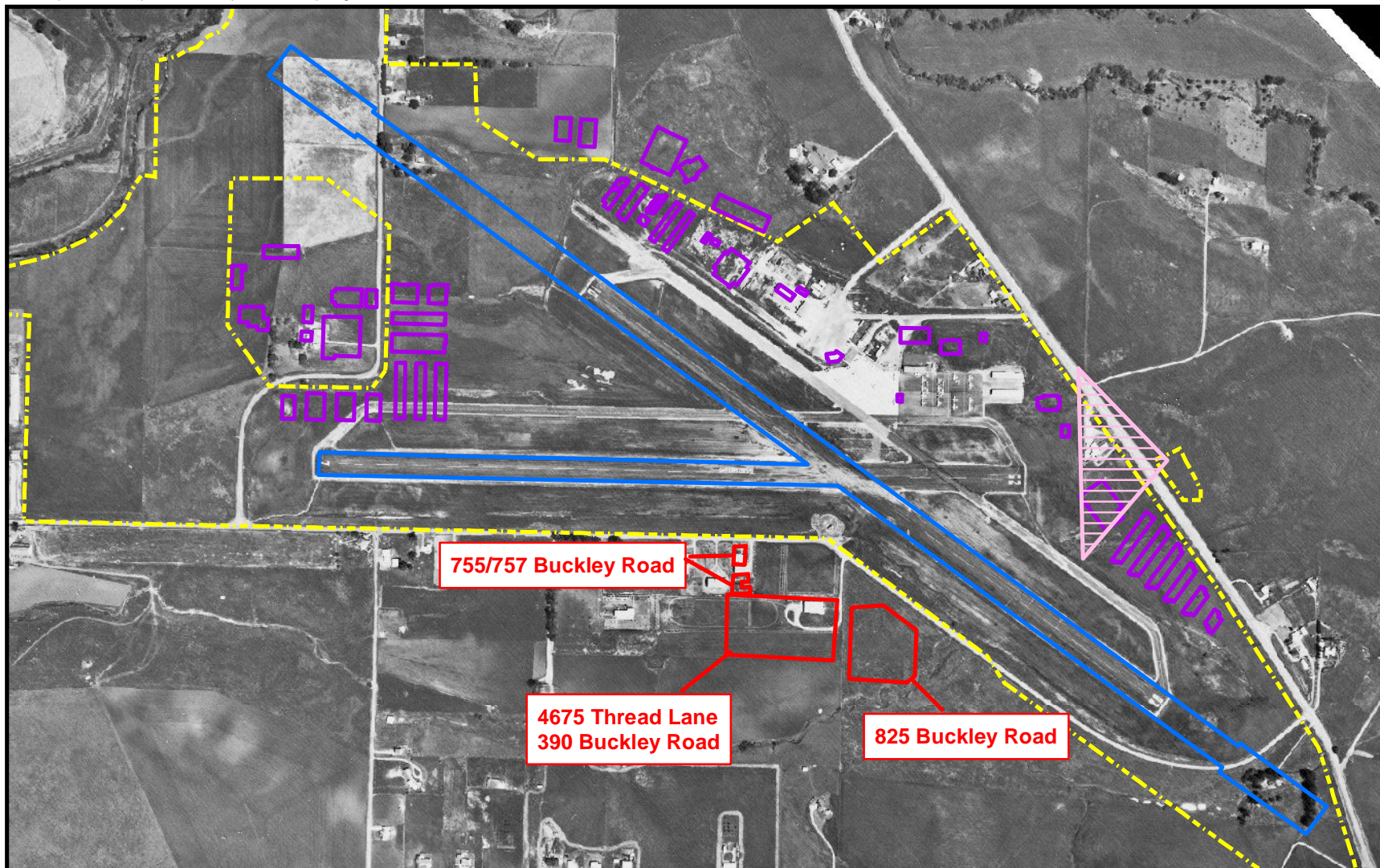
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FIGURE

4D



EXTENT OF IMAGERY

Image Source: Environmental Data Resources-Requested March 21, 2016

Legend

- Site Boundary
- Present Extent of Runway
- Present Building Footprints
- Approximate Location of Former Leach Field (Cleath, 1987)

0.1 0 0.1 0.2
Miles

Title:

1965 AERIAL IMAGERY

SAN LUIS OBISPO, CALIFORNIA

Prepared For:

COUNTY OF SAN LUIS OBISPO

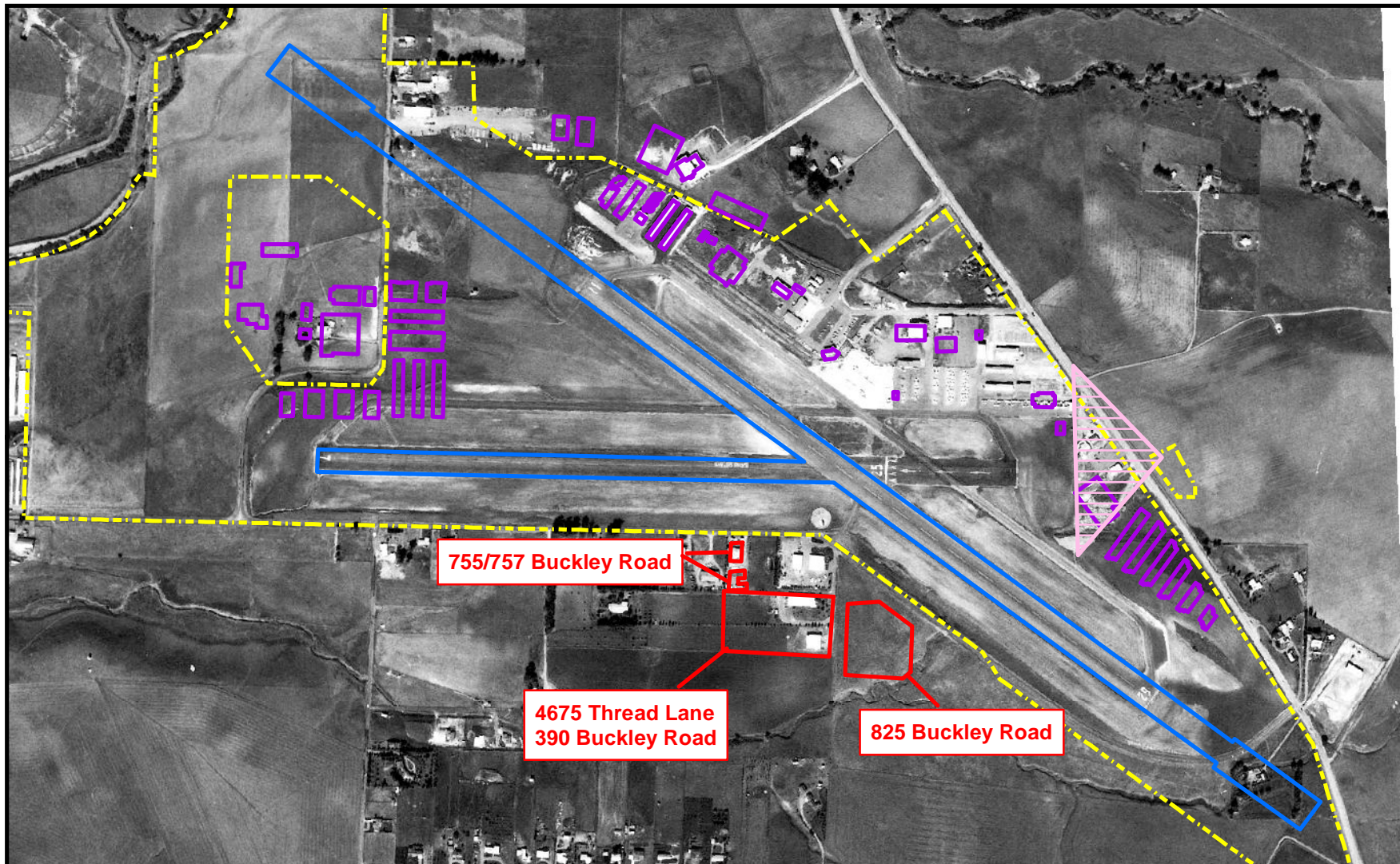
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FIGURE
4E

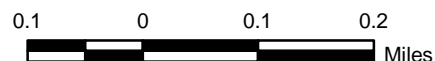


EXTENT OF IMAGERY

Image Source: Environmental Data Resources-Requested March 21, 2016

Legend

- Site Boundary
- Present Extent of Runway
- Present Building Footprints
- Approximate Location of Former Leach Field (Cleath, 1987)



Title:

1972 AERIAL IMAGERY

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FIGURE

4F

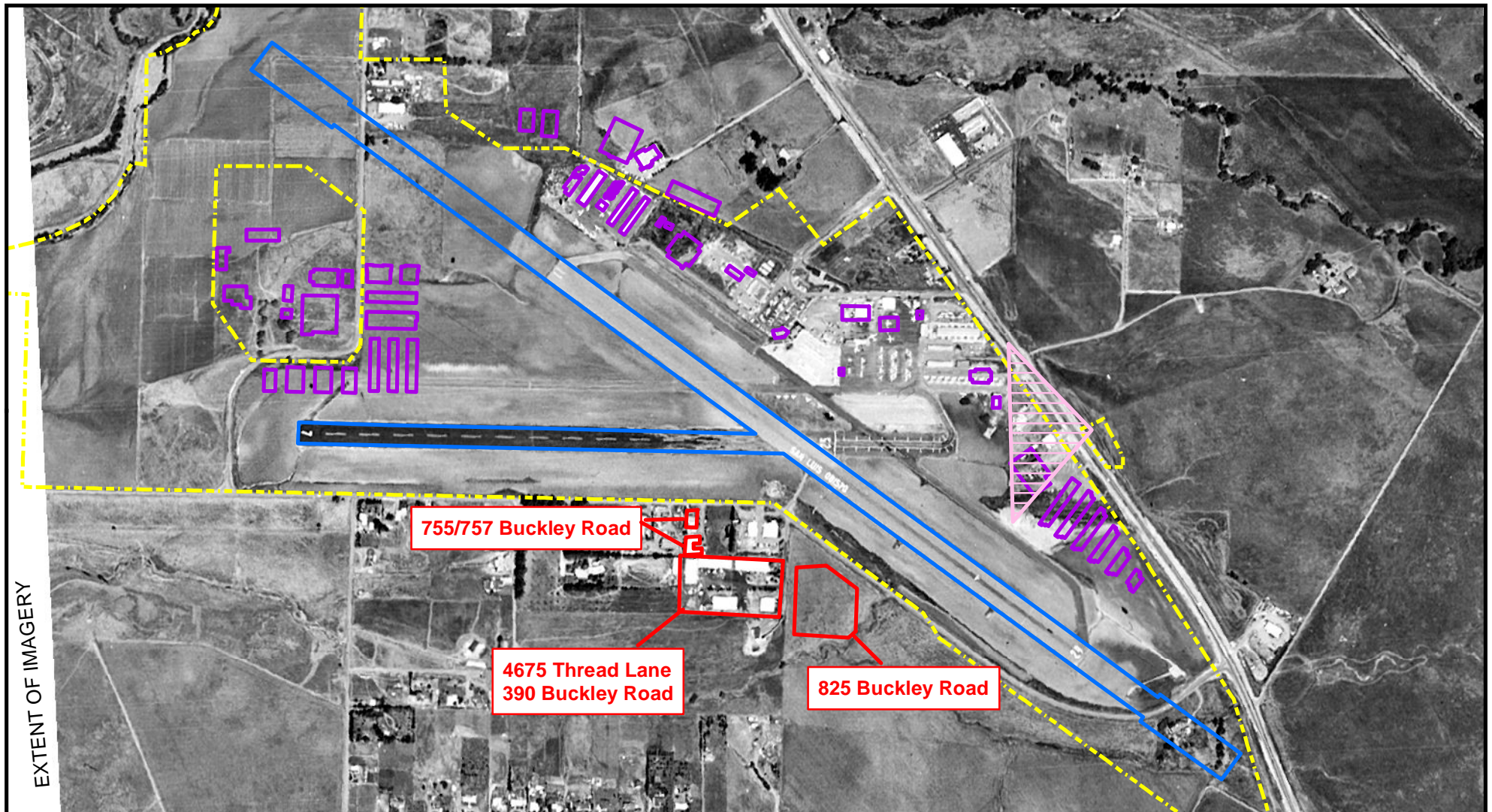


Image Source: Environmental Data Resources-Requested March 21, 2016

Legend

- Site Boundary
- Present Extent of Runway
- Present Building Footprints
- Approximate Location of Former Leach Field (Cleath, 1987)

0.1 0 0.1 0.2
Miles

Title:

1978 AERIAL IMAGERY

SAN LUIS OBISPO, CALIFORNIA

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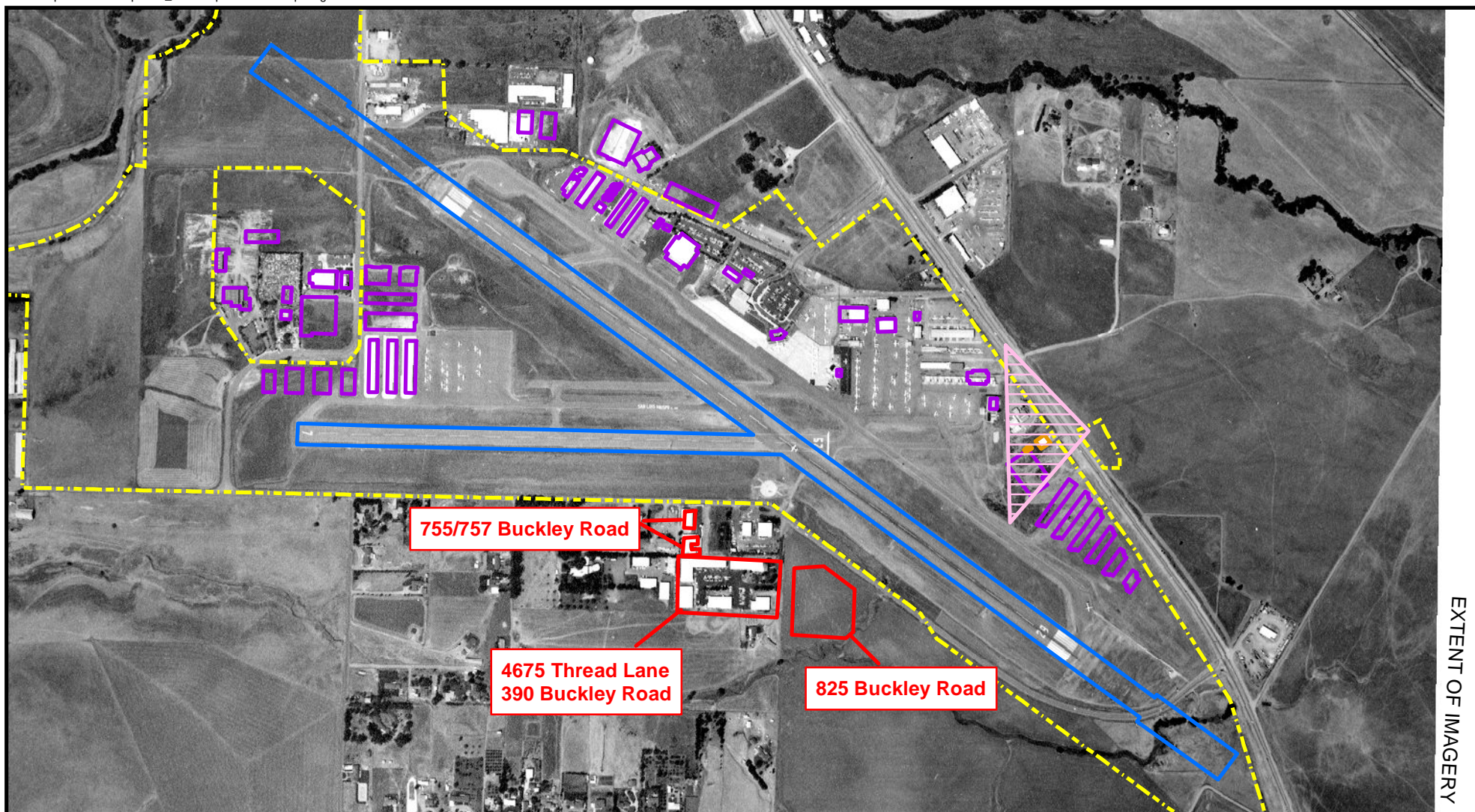
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FIGURE

4G

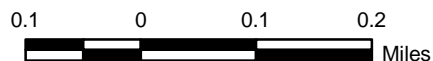


EXTENT OF IMAGERY

Image Source: Environmental Data Resources-Requested March 21, 2016

Legend

- Site Boundary
- Present Extent of Runway
- Present Building Footprints
- Approximate Location of Former Leach Field (Cleath, 1987)



Title:

1987 AERIAL IMAGERY

SAN LUIS OBISPO, CALIFORNIA

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Office: LA
Project: 2744.0001L001

FIGURE

4H

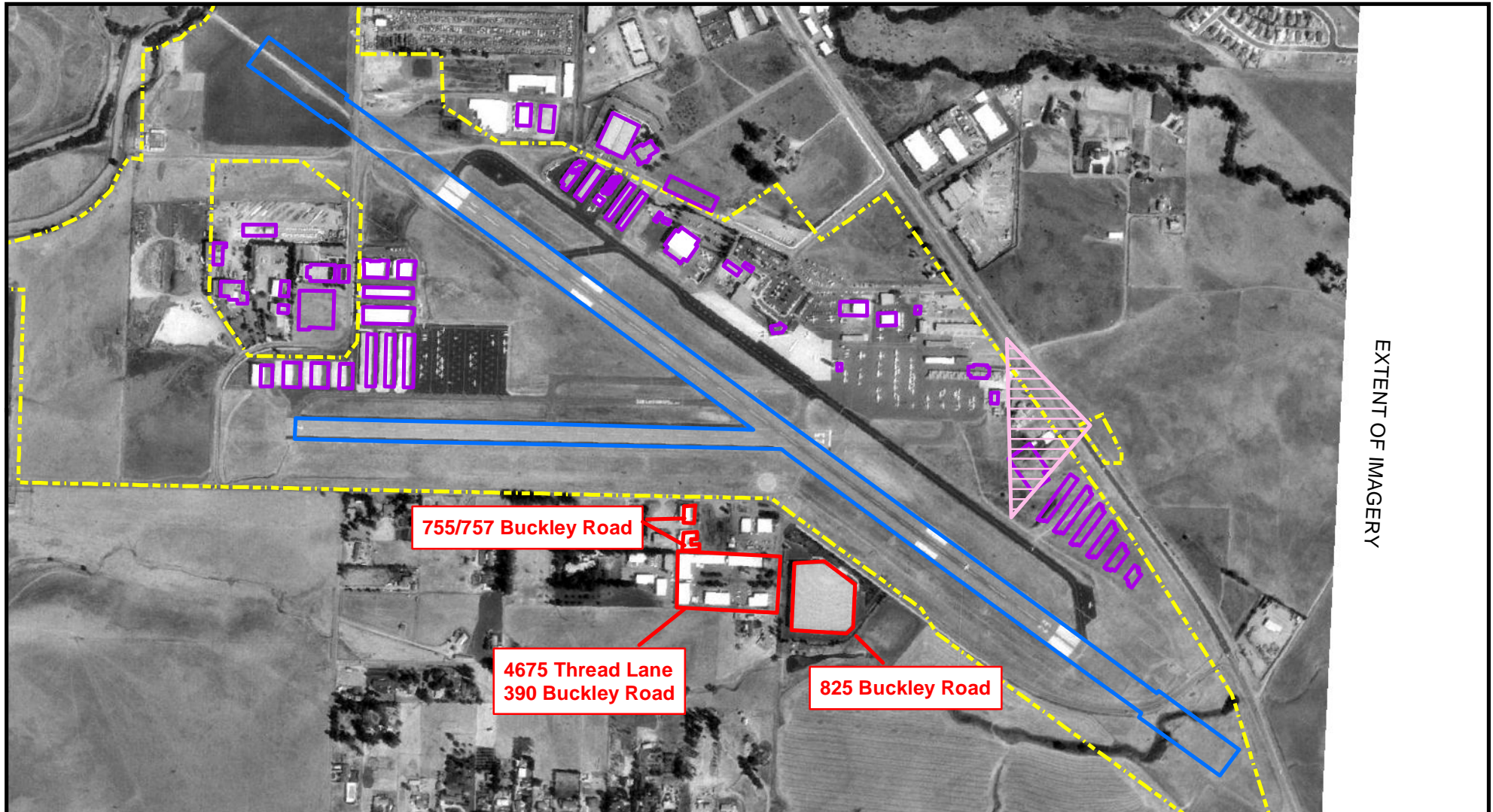


Image Source: Environmental Data Resources-Requested March 21, 2016

Legend

- Site Boundary
- Present Extent of Runway
- Present Building Footprints
- Approximate Location of Former Leach Field (Cleath, 1987)

0.1 0 0.1 0.2
Miles

Title:

1994 AERIAL IMAGERY

SAN LUIS OBISPO, CALIFORNIA

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FIGURE
41

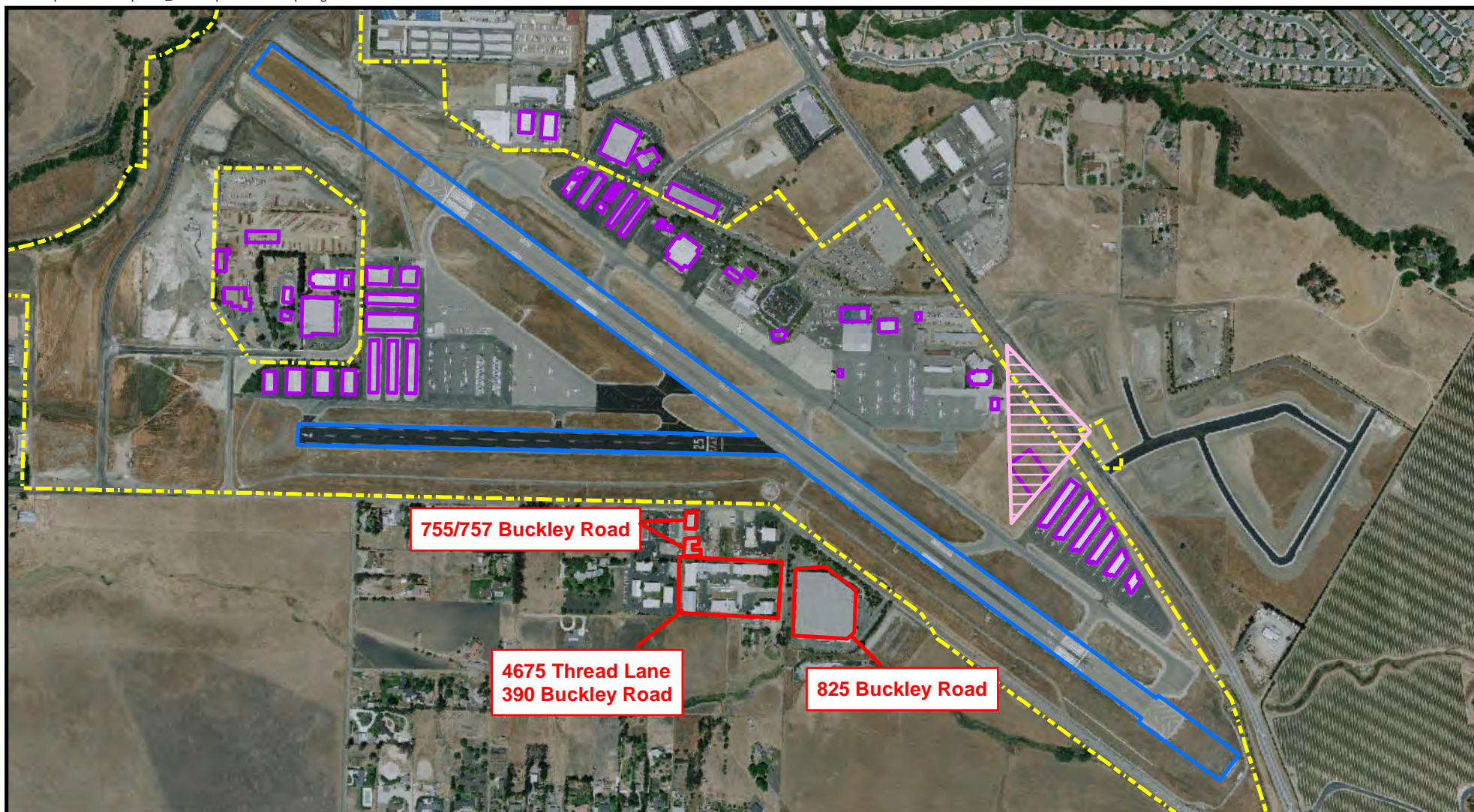


Image Source: <http://gis.slocounty.ca.gov/arcgis/rest/services/Aerials>

Legend

- Site Boundary
- Present Extent of Runway
- Present Building Footprints
- Approximate Location of Former Leach Field (Cleath, 1987)

0.1 0 0.1 0.2
Miles

Title:

2007 AERIAL IMAGERY

SAN LUIS OBISPO, CALIFORNIA

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Project: 2744.0001L001

FIGURE

4J

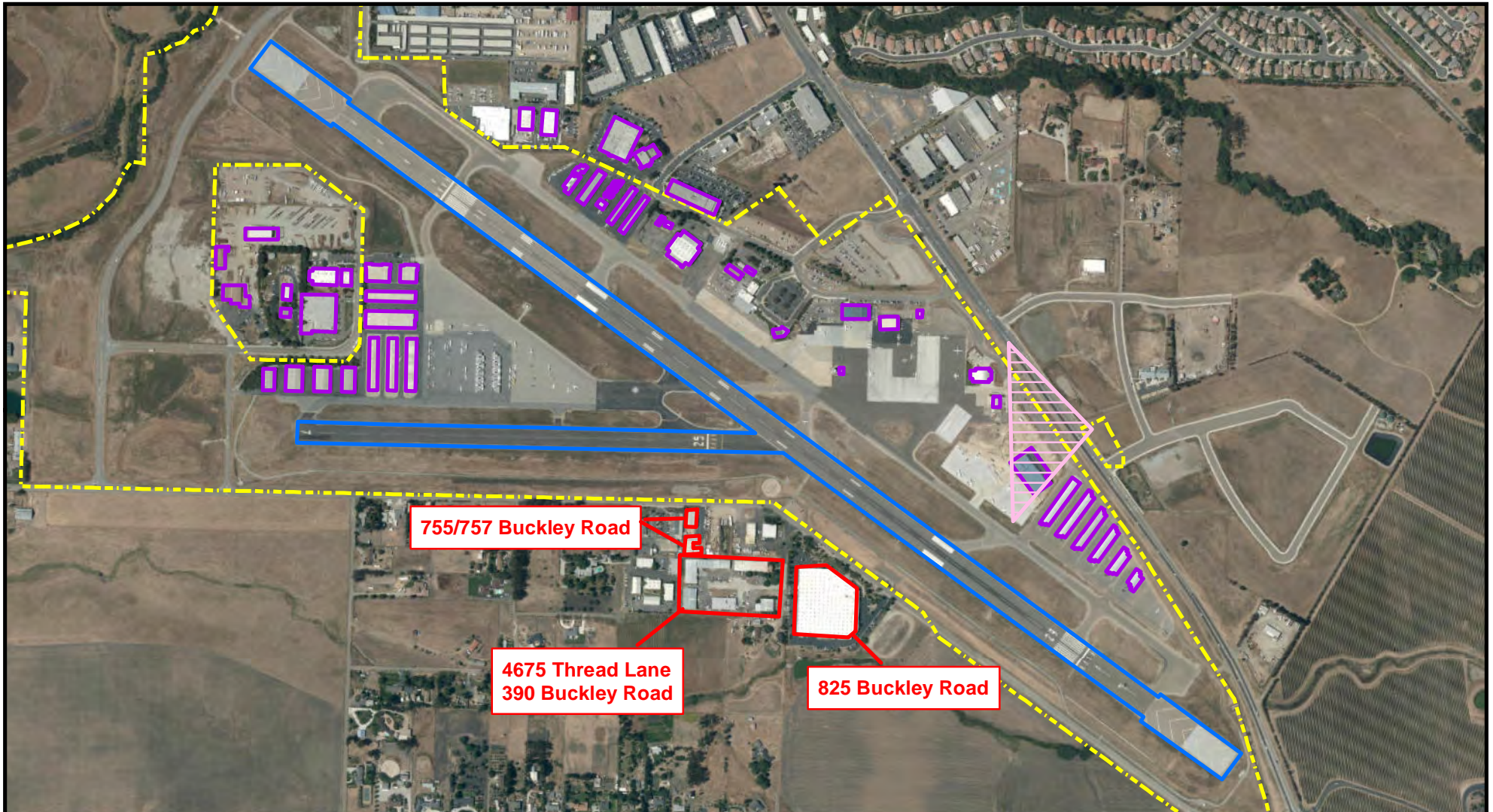






Image Source: <http://gis.slocounty.ca.gov/arcgis/rest/services/Aerials>

Legend

-  Site Boundary
-  Present Extent of Runway
-  Present Building Footprints
-  Approximate Location of Former Leach Field (Cleath, 1987)

0.1 0 0.1 0.2
Miles

Title:

2011 AERIAL IMAGERY

SAN LUIS OBISPO, CALIFORNIA

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FIGURE

4K

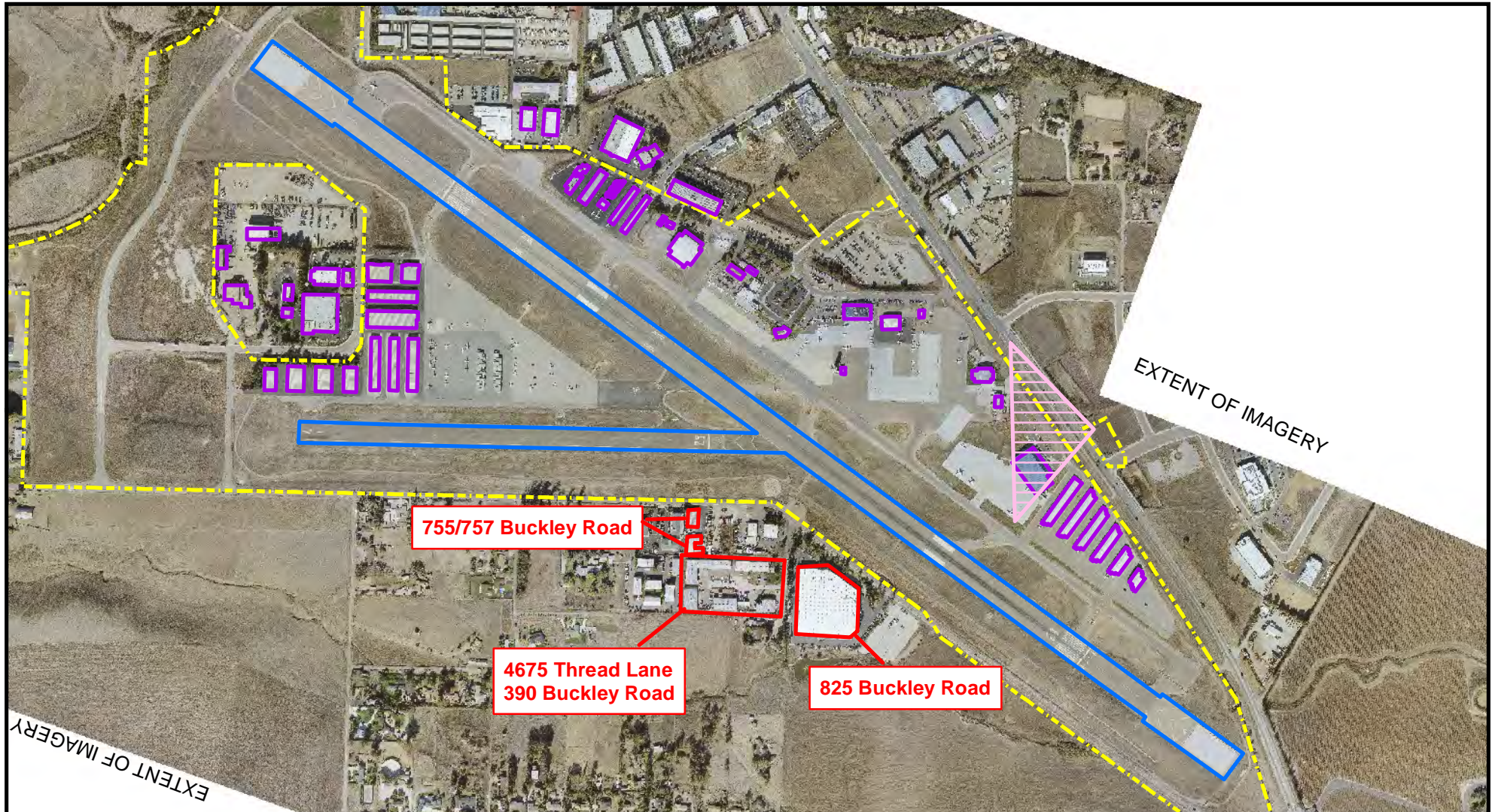
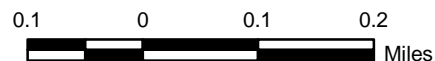


Image Source: <http://gis.slocounty.ca.gov/arcgis/rest/services/Aerials>

Legend

- Site Boundary
- Present Extent of Runway
- Present Building Footprints
- Approximate Location of Former Leach Field (Cleath, 1987)



Title:

2014 AERIAL IMAGERY

SAN LUIS OBISPO, CALIFORNIA

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File No: F(AL)

Project: 2744.0001L001





FIGURE

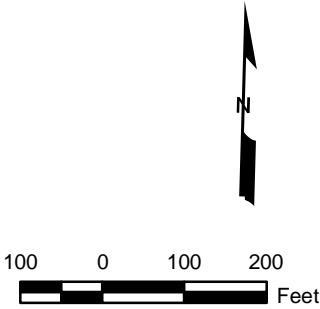
4L



Image Source: ESRI World Imagery 2016

Legend

-  Proposed Soil Gas Sample Locations
-  Buckley Road Drainage Outlet
-  Site Boundary
-  Present Extent of Runway




Title:

**PROPOSED PHASE I SOIL GAS
SAMPLE LOCATIONS**

SAN LUIS OBISPO, CALIFORNIA

Prepared For:

COUNTY OF SAN LUIS OBISPO



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& Management

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Prepared by: PDF	Scale: 1:2,813
Project Mgr: KJ	Office: LA
File No: F(AL)	Project: 2744.0001L001

FIGURE

5

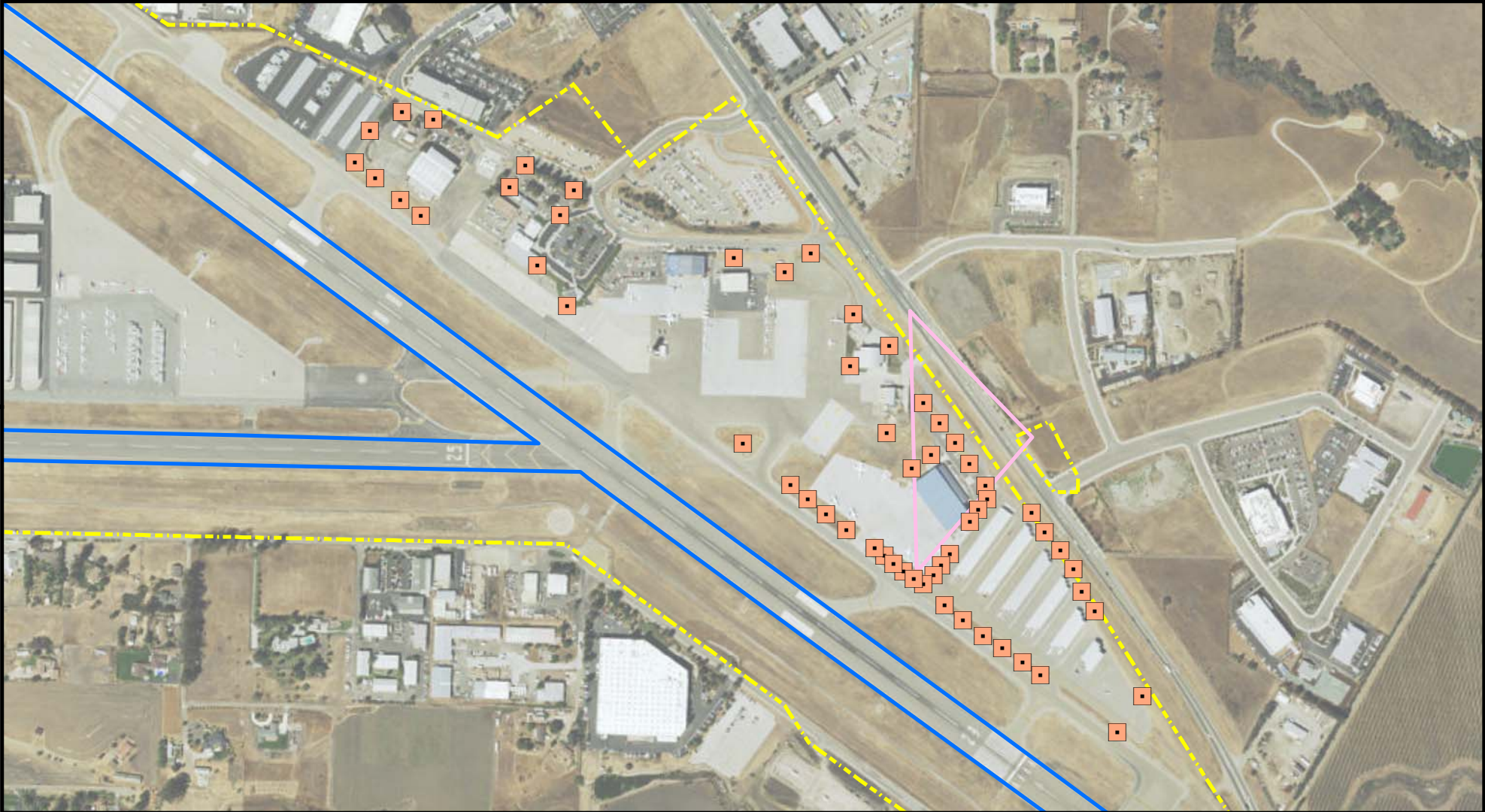
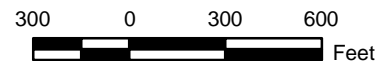


Image Source: ESRI World Imagery 2016

Legend

- Proposed Soil Gas Sample Locations
- Site Boundary
- Present Extent of Runway
- Approximate Location of Former Leach Field (Cleath, 1987)



Title: PROPOSED PHASE II SOIL GAS SAMPLE LOCATIONS SAN LUIS OBISPO, CALIFORNIA			
Prepared For: COUNTY OF SAN LUIS OBISPO			
 ROUX ASSOCIATES, INC. Environmental Consulting & Management	Compiled by: PDF	Date: 5/25/2016	FIGURE 6A
	Prepared by: PDF	Scale: 1:7,200	
	Project Mgr: KJ	Office: LA	
	File No: F(AL)	Project: 2744.0001L001	

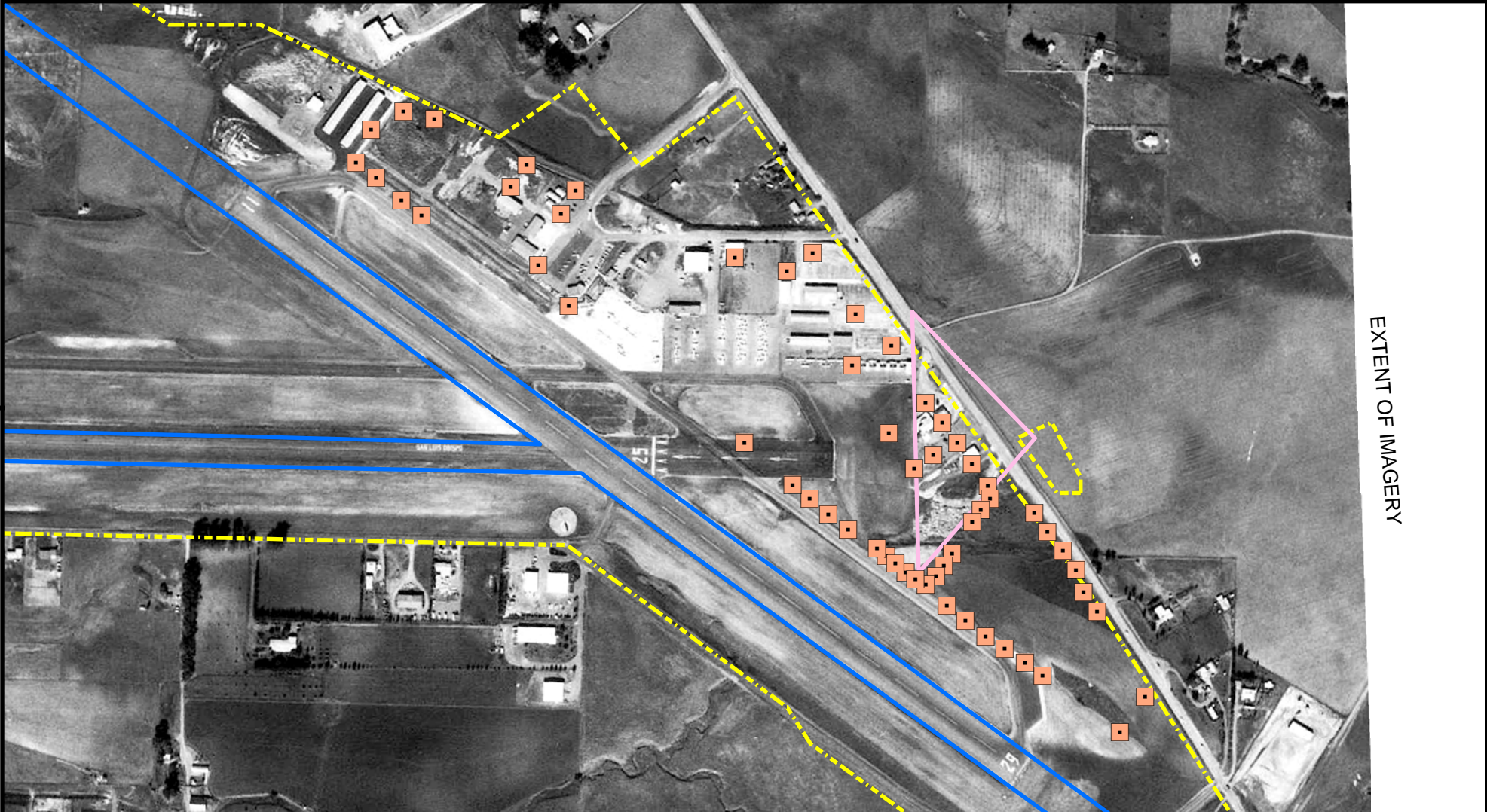






Image Source: Environmental Data Resources-Requested March 21, 2016

Legend

-  Proposed Soil Gas Sample Locations
-  Site Boundary
-  Present Extent of Runway
-  Approximate Location of Former Leach Field (Cleath, 1987)

300 0 300 600
Feet

Title:

**PROPOSED PHASE II SOIL GAS
SAMPLE LOCATIONS (1972)**

SAN LUIS OBISPO, CALIFORNIA

Prepared For:

COUNTY OF SAN LUIS OBISPO

ROUX

ROUX ASSOCIATES, INC.
Environmental Consulting
& Management

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Date: 5/25/2016

Prepared by: PDF

Scale: 1:7,200

Project Mgr: KJ

Office: LA

File No: F(AL)

Project: 2744.0001L001




FIGURE

6B



Image Source: ESRI World Imagery 2016

Legend

-  Proposed Soil Gas Sample Locations
-  Site Boundary
-  Present Extent of Runway



Title:

**PROPOSED PHASE III SOIL GAS
SAMPLE LOCATIONS**

SAN LUIS OBISPO, CALIFORNIA

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COUNTY OF SAN LUIS OBISPO

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Scale: 1:4,800

Project Mgr: KJ

Office: LA

File No: F(AL)

Project: 2744.0001L001

FIGURE

7A

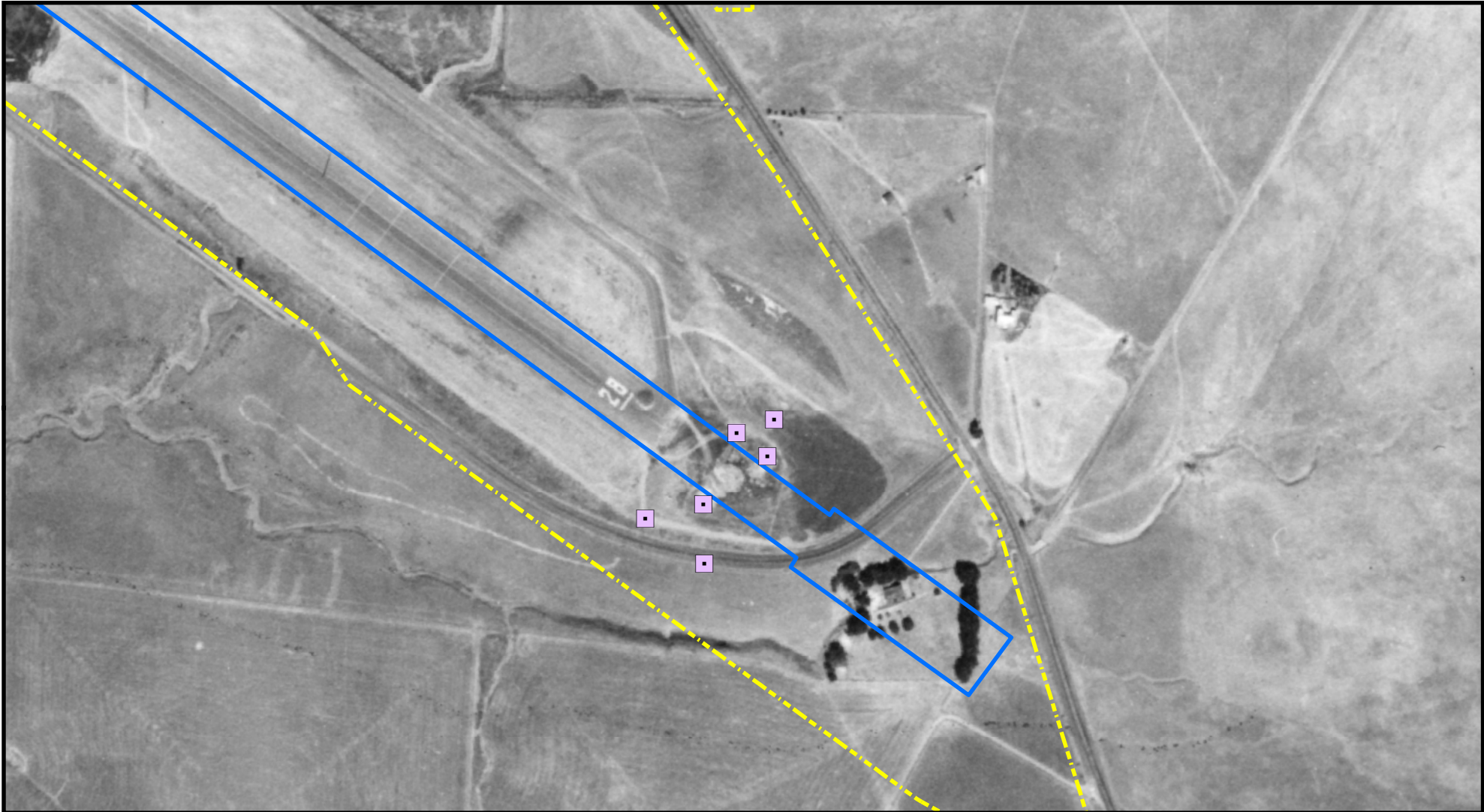


Image Source: SLO County GIS Staff

Legend

- Proposed Soil Gas Sample Locations
- Site Boundary
- Present Extent of Runway

400 0 400 800 Feet

Title:

**PROPOSED PHASE III SOIL GAS
SAMPLE LOCATIONS (1956)**

SAN LUIS OBISPO, CALIFORNIA

Prepared For:

COUNTY OF SAN LUIS OBISPO

ROUX ROUX ASSOCIATES, INC. Environmental Consulting & Management	Compiled by: PDF	Date: 5/25/2016	FIGURE 7B
	Prepared by: PDF	Scale: 1:4,800	
	Project Mgr: KJ	Office: LA	
	File No: F(AL)	Project: 2744.0001L001	

APPENDICES

A. Topographic Maps

B. Surface Drainage Maps

C: Geotechnical Boring Log for 390 Buckley Road

D: Aerial Photographs (PROVIDED ELECTRONICALLY)

E: Airport FUDS Documentation

E.1: 1999 DOD/USACE Findings of Fact

E.2: 1997 SAIC Site Inspection Memorandum

E.3: 1997 SAIC Site Inspection Photographs

E.4: 2012, Doherty Paper, RE: Solvent Use During World War II

**ALL APPENDICES PREVIOUSLY PROVIDED
IN APRIL 15, 2016 SUBMITTAL**