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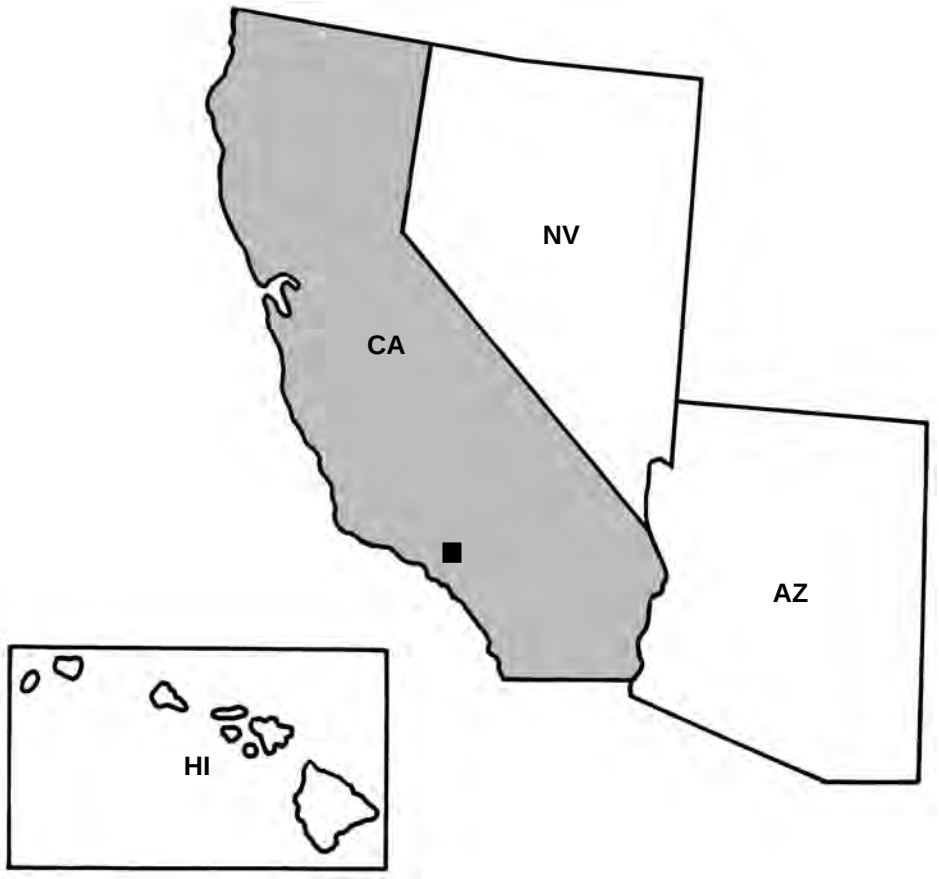
Research and Development

AERIAL PHOTOGRAPHIC ANALYSIS OF SANTA SUSANA FIELD LABORATORY - AREA IV

Ventura County, California

Volume 1 & 2

EPA Region 9



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AERIAL PHOTOGRAPHIC ANALYSIS OF SANTA SUSANA FIELD LABORATORY - AREA IV

Ventura County, California

Volume 1 & 2

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NOTICE

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ABSTRACT

This report presents the results of a historical aerial photographic analysis of the Santa Susana Field Laboratory-Area IV, located in Ventura County, California. The U.S. Environmental Protection Agency (EPA) Region 9 Office requested operational remote sensing support to document observable past patterns of waste disposal activity and other conditions of environmental significance on the Santa Susana Field Laboratory-Area IV. Collateral information supplied by EPA Region 9 states that Santa Susana Field Laboratory-Area IV was the location of nuclear power development activities from the 1950s until the late 1980s.

The purpose of this report is to document historical conditions at Solid Waste Management Units (SWMU), Areas of Concern (AOC), and other environmentally significant features related to waste management at the Santa Susana Field Laboratory-Area IV. Findings from the analysis revealed details related to waste disposal areas, impoundments, processing areas, fill areas, and open storage areas on seventeen SWMUs/AOCs and other locations on Santa Susana Field Laboratory-Area IV.

Thirty-eight dates of historical photographs covering the period from 1939 through 2005 were analyzed to produce this report and thirteen years of photography were reproduced for inclusion in the report. The report is presented in two volumes. Volume 1 presents the text description of the findings from the analysis of the thirty-eight dates of photography. Volume 2 contains photos with interpretive overlays from the analysis.

The EPA Environmental Sciences Division, Landscape Ecology Branch in Las Vegas, Nevada, prepared this report for the EPA Region 9 Superfund Division in San Francisco, California, and the EPA Office of Superfund Remediation Technology Innovation in Washington, D.C.

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INTRODUCTION

This report presents the results of a historical aerial photographic analysis of the Santa Susana Field Laboratory-Area IV (CERCLIS ID# CAN000908498), located in Ventura County, California (Figures 1 and 2). The Santa Susana Field Laboratory covers approximately 1,153 hectares (2,850 acres), and is administratively divided into four areas and a Buffer Zone. This report covers Area IV which is located in the western section of the Santa Susana Field Laboratory and comprises approximately 117 hectares (290 acres). The U.S. Environmental Protection Agency (EPA) Region 9 Office requested operational remote sensing support to document observable past patterns of waste disposal activity and other conditions of environmental significance on the Santa Susana Field Laboratory-Area IV.

Collateral information supplied by EPA Region 9 states that Santa Susana Field Laboratory-Area IV was the location of nuclear power development activities from the 1950s until the late 1980s when most nuclear related activities ceased operations. However, activity related to radioactive materials handling, fuel storage, and instrument calibration continued for several more years. By the early 1990s, decommissioning and decontamination activities commenced.

The primary task of this analysis was to identify and document environmentally significant features within the Santa Susana Field Laboratory-Area IV. The analysis findings presented in the text portion of the report are organized by Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) that are delineated on the Resource Conservation and Recovery Act Facility Investigation (RFI) Location Map, Santa Susana Field Laboratory (California Environmental Protection Agency website). The SWMUs and AOCs reviewed in this current report are:

SWMU 7.1 - Building 56 Landfill
SWMU 7.3 - Former Sodium Disposal Facility
SWMU 7.4 - Old Conservation Yard
SWMU 7.5 - Building 100 Trench

SWMU 7.6 - Radioactive Materials Handling Facility
SWMU 7.7 - Rockwell International Hot Laboratory
SWMU 7.8 - New Conservation Yard
SWMU 7.9 - ESADA Chemical Storage Area
SWMU 7.10 - Former Coal Gasification PDU
AOC - Former Hazardous Materials Storage Area
AOC - Chemistry Laboratory Metals Clarifier
AOC - Pond Dredge Area
AOC - Sodium Reactor Experiment Area
AOC - SE Drum Storage Yard
AOC - SNAP Facility
AOC - Boeing Area IV Leach Fields
AOC - DOE Area IV Leach Fields

NOTE: No significant environmental activity was identified at the AOC-Boeing Area IV Leach Fields or the AOC-DOE Area IV Leach Fields. These two AOCs are no longer discussed nor are they annotated on the photographic overlays.

Five types of environmentally significant features were identified in the analysis: waste disposal areas (WDA), processing areas (PA), open storage areas (OS), fill areas (FA), and impoundments (IM). If one of these features is located on a SWMU/AOC it is discussed in the text with that SWMU/AOC. If a feature is not located on any of the Santa Susana Field Laboratory-Area IV SWMUs or AOCs it will be discussed after the SWMU/AOC section of the report. Additional features and conditions of environmental significance, such as stains, storage tanks, pipelines, disturbed ground, mounded material, smokestacks, ground scars, building foundations, and cleared areas are annotated on the overlays when observed on the photographs, but may not be discussed in the text. Buildings (B) when first observed are annotated on the overlays and may not discussed in the text.

This report is presented in two volumes. Volume 1 contains the text of the report, including the introduction, methodology, historical photographic analysis, glossary, and reference sections. Volume 2 contains the various maps and the photographs; a transparent overlay with interpretative data is affixed to each of the digital prints.

A text description of the findings from the analysis of all thirty-eight dates of historical photographs is provided in Volume 1. Thirteen years of photography (1952, 1957, 1959, 1962/63, 1965, 1967, 1972, 1978, 1980, 1983, 1988, 1995, and 2005) were reproduced for Volume 2. Volume 2 contains these photographs along with interpretive overlays depicting the findings from the analysis. Findings from the analysis of photographs not reproduced in Volume 2 are, however, present in the report. An asterisk (*) is used in both the text and on the photographic overlays to denote dates of photography not reproduced in the report. For example, if the text reads: "A fill area was seen in 1993*.", the fill area was visible on the 1993 photographs which were not reproduced in the report.

All proper names utilized in this report are derived from the Resource Conservation and Recovery Act Facility Investigation (RFI) Location Map, Santa Susana Field Laboratory (California Environmental Protection Agency website, see References section). Boundaries of the Santa Susana Field Laboratory-Area IV used in this report were determined from observations made on aerial photographs in conjunction with collateral data supplied by Region 9, and do not necessarily denote legal property lines or ownership. A list of all aerial photographs that were identified and evaluated for potential application to this study can be obtained by contacting the EPA Work Assignment Manager.

The EPA Environmental Sciences Division, Landscape Ecology Branch in Las Vegas, Nevada, prepared this report for the EPA Region 9 Superfund Division in San Francisco, California, and the EPA Office of Superfund Remediation Technology Innovation in Washington, D.C.

METHODOLOGY

This report was prepared using a standard methodology that includes the following steps:

- **data identification and acquisition,**
- **photographic analysis and interpretation, and**
- **graphics and text preparation.**

These steps are described below. Subsections also address details related to specific kinds of analyses that may be required to identify environmental features such as surface drainage and wetlands. All operational steps and processes used to perform this work (including data identification and acquisition, photographic analysis and interpretation, and graphics and text preparation) adhere to strict QA/QC guidelines and standard operating procedures (SOPs). These guidelines and procedures are documented in the Master Quality Assurance Project Plan (QAPP) prepared for Remote Sensing Support Services Contract No. EP-D-05-088 (LMS, 2006).

Data identification and acquisition included a search of government and commercial sources of historical aerial film for the study area. Photographs with optimal spatial and temporal resolution and image quality were identified for acquisition. In addition, U.S. Geological Survey (USGS) topographic maps were obtained to show the study area location and to provide geographic and topographic context.

To conduct this analysis, the analyst examined diapositives (transparencies) of historical aerial photographs showing the study area. Diapositives are most often used for analysis instead of prints because the diapositives have superior photographic resolution. They show minute details of significant environmental features that may not be discernible on a paper print.

A photographic analyst uses a stereoscope to view adjacent, overlapping pairs of diapositives on a backlit light table. In most cases, the stereoscope is capable of various magnifications up to 60 power.

Stereoscopic viewing involves using the principle of parallax (observing a feature from slightly different positions) to observe a three-dimensional representation of the area of interest. The stereoscope enhances the photo interpretation process by allowing the analyst to observe vertical as well as horizontal spatial relationships of natural and cultural features.

The process of photographic analysis involves the visual examination and comparison of many components of the photographic image. These components include shadow, tone, color, texture, shape, size, pattern, and landscape context of individual elements of a photograph. The photo analyst identifies objects, features, and "signatures" associated with specific environmental conditions or events. The term "signature" refers to a combination of components or characteristics that indicate a specific object, condition, or pattern of environmental significance. The academic and professional training, photo interpretation experience gained through repetitive observations of similar features or activities, and deductive logic of the analyst as well as background information from collateral sources (e.g., site maps, geologic reports, soil surveys) are critical factors employed in the photographic analysis.

The analyst records the results of the analysis by using a standard set of annotations and terminology to identify objects and features observed on the diapositives. Significant findings are annotated on overlays attached to the photographic or computer-reproduced prints in the report and discussed in the accompanying text. Annotations that are self-explanatory may not be discussed in the text. The annotations are defined in the legend that accompanies each print and in the text when first used.

Objects and features are identified in the graphics and text according to the analyst's degree of confidence in the evidence. A distinction is made between certain, probable, and possible identifications. When the analyst believes the identification is unmistakable (certain), no qualifier is used. Probable is used when a limited number of discernible characteristics allow the analyst to be reasonably sure of a particular identification. Possible is used when only a few characteristics are discernible, and the analyst can only infer an identification.

The prints in this report have been reproduced, either by photographic or computer methods, from the original film. Reproductions are made from the original film and may be either contact (the same size) prints or enlargements, depending on the scale of the original film. Any computer-produced prints used in this report are generated from scans of the film at approximately 1,300 dots per inch (dpi) and printed at 720 dpi. Although the reproductions allow effective display of the interpretive annotations, they may have less photographic resolution than the original film. Therefore, some of the objects and features identified in the original image and described in the text may not be as clearly discernible on the prints in this report.

Study area boundaries shown in this report were determined from aerial photographs and from information supplied by EPA Region. Boundaries used in this report do not necessarily denote legal property lines or ownership.

Digital Diapositives

Some film vendors no longer supply analog film products (e.g., diapositive transparencies) to their customers. Digital files, created by scanning the original analog film products, are provided. The digital file, a representation of an original analog film product, can be analyzed either by computer viewing techniques or by creating a secondary diapositive from the digital file and viewing the secondary diapositve on a light table. The result of this process of converting an analog diapositive image to a digital file may be a reduction in the photographic resolution. A potential consequence of this in the realm of aerial photographic analysis is a lower confidence in the identification of features or conditions of environmental significance. For example, what may have been identified with certainty as "a drum" on the analog version of the diapositive may, on the digital diapositive, only be determined to be "a probable drum."

Color Infrared Photographs

Some photographs used for this analysis were made from color infrared film. Normal color film records reflected energy in the blue, green, and red portions of the electromagnetic spectrum. Color infrared film differs

in that it is sensitive not only to reflected blue, green, and red energy, but also to reflected energy in the infrared portions of the electromagnetic spectrum; however, the blue energy is filtered out and only the green, red, and infrared energy is recorded. When color infrared film is processed, it displays "false" colors that do not correspond with the true colors of the features photographed. For example, features that are highly reflective in the infrared portion of the spectrum, such as healthy vegetation, appear red to magenta on color infrared film. The false color displayed by a feature is produced in accordance with the proportions of green, red, and infrared energy it reflects. These portions are referred to as the "spectral reflectance characteristics" of the feature. To interpret the true color of a particular feature accurately from color infrared film, a knowledge of the spectral reflectance characteristics of that feature is required. This information is not readily available for the majority of features identified in this report. Therefore, unless otherwise indicated, no attempt has been made to interpret the true colors of the features identified on the color infrared film analyzed for this report.

Surface Drainage

The surface drainage analysis produced for this report identifies the direction and potential path that a liquid spill or surface runoff would follow based on the topography of the terrain and the presence of discernible obstacles to surface flow. The analyst determines the direction of surface drainage by stereoscopic analysis of the aerial photographs and by examining USGS topographic maps. Site-specific surface drainage patterns are annotated on the map or photo overlay. Where the direction of subtle drainage cannot be determined, an indeterminate drainage line symbol is used. Regional surface flow is ascertained from the USGS topographic maps.

HISTORICAL PHOTOGRAPHIC ANALYSIS

The Santa Susana Field Laboratory-Area IV, located south of Simi Valley in Ventura County, California, covers approximately 117 hectares (290 acres). Surface elevations range from approximately 658 meters (2,160 feet) above sea level in the southwestern part of Area IV to about 525 meters (1,725 feet) above sea level near the northwestern part of Area IV (USGS, 1967). The Santa Susana Field Laboratory-Area IV is bounded by undeveloped land to the north, west, and south; and to the east by Area III of the Santa Susana Field Laboratory-Area III.

The location of the future Santa Susana Field Laboratory-Area IV (i.e., before the laboratory had been built) is depicted on Figure 3 (December 22, 1952). At that time no buildings or other features associated with the Santa Susana Field Laboratory-Area IV had been constructed. A small agricultural area (AG), several roads (not annotated), trees and shrubs, grasses (VEG), and numerous rock outcrops of bedrock (not annotated) were visible. South of the Santa Susana Field Laboratory-Area IV were several residential homes (RES) and impoundments which contained liquid (LQ).

Drainage patterns are shown on the photographic overlay for 1952 (Figure 3). Most of the runoff from the northern part of Area IV trends north into Meire Canyon. Runoff in the southern part of Area IV is directed to the south and southeast into the future location of Santa Susana Field Laboratory-Area III. Offsite impoundments are shown on the photographic overlays.

For the remainder of this report the Santa Susana Field Laboratory-Area IV will be divided into the west section (Figures 4 through 15) and the east section (Figures 16 through 27).

An asterisk (*) is used in the text to denote dates of photography not reproduced in the report. For example, if the text reads: “A fill area was seen in 1993*.”, the fill area was visible on the 1993 photographs which were not reproduced in the report.

WEST SECTION OF THE SANTA SUSANA FIELD LABORATORY-AREA IV

Figures 4 through 15 (1957 through 2005)

Solid Waste Management Units (SWMU) and Areas of Concern (AOC)

SWMU 7.1 - Building 56 Landfill

SWMU 7.1 - Building 56 Landfill is located at the terminus of access roads extending from unnamed roads and F Street in the northern part of the Santa Susana Field Laboratory-Area IV. This area was active in 1957 (Figure 4). Fill areas FA-3, FA-4 and FA-9, and waste disposal area WDA-3 were located on the Building 56 Landfill. In addition, in 1965 an excavation area (EX) was noted, and by 1967 the excavation pit was filled with liquid. Liquid was in this excavation through the remainder of the analysis.

FA-3: FA-3 is located at the head of a drainage ravine. An access road extends north from Arness Fire Road and terminates at this fill area. The deposition of light-toned material (LTM) occurred at this location before 1957 (Figure 4) and ended by 1967. In 1959 partial vegetation was observed on the surface of the fill area. No evidence of fill activity was observed in 1962/63, but by 1965 light-toned material had again been deposited near the head of the drainage ravine. This deposited material may have come from a nearby excavation area. Deposition slowed or ceased by 1967, and ground scars (GS) and scattered vegetation were observed. By 1972 this fill area was partially vegetated (PV) and approximately ten light-toned objects were observed. From 1978 through 2005, this fill area remained vegetated and there were no signs of disturbance.

FA-4: FA-4 is located on the eastern slope of a drainage ravine. An access road extending north from Arness Fire Road leads to this fill area. Deposition of light-toned material was initiated prior to 1957 (Figure 4) and the fill area remained active through at least 1980. In 1962/63 a collection of individual dump-truck-sized mounds of medium-toned material (MTM) were visible atop this fill area. The deposition of material that occurred between 1963/63 and 1965 increased the areal extent of this fill area. The collection of individual dump-truck-sized mounds of medium-toned

material noted in 1962/63 could not be seen atop this fill area. These mounds had been removed or spread across the surface of the fill area. In 1967 no activity was observed and vegetation was noted and in 1972 light-toned material and partial vegetation were observed. In 1978 solid waste disposal activity was identified (see waste disposal area WDA-3 below) and the areal extent of this fill area had increased when compared to 1972. By 1980 the areal extent of this fill area appeared to have been expanded slightly compared to 1978, and uniform light-toned material and a mound of similar material were seen atop this fill area. In 1983 ground scars were observed. From 1986* through 2005 the fill area remained vegetated; however, in 2002* ground scars were identified.

FA-9: FA-9 is located immediately west of a liquid-filled excavation. Deposition of material occurred at FA-9 between 1980 and 1983 (Figure 12). By 1983 medium-toned material had been deposited in the drainage channel adjacent to the excavation. No further deposition activity was noted, and by 1988 this fill area was partially vegetated. In 1994* and 1995, ground scars were present. From 1998* through 2005 this area remained vegetated.

WDA-3: In 1978 solid waste disposal activity was visible at two locations atop FA-9 (Figure 10). Alongside the access road leading onto FA-4 was a small pile of possible solid waste (SW). By February 1980*, dump-truck-sized mounds of uniform light-toned material were identified atop the landfill and may have been used to cover the possible solid waste. No additional solid waste deposition activity was observed at this location through the remainder of this analysis.

<u>SWMU 7.3 - Former Sodium Disposal Facility (FSDF)</u>

SWMU 7.3 - Former Sodium Disposal Facility is located in the far western part of the Santa Susana Field Laboratory-Area IV, north of Arness Fire Road. This area was active by 1957 (Figure 4) and fill area FA-1 was in place. Waste disposal area WDA-1; impoundments IM-2, IM-3, and IM-7; and fill area FA-1 are located on the Former Sodium Disposal Facility. In addition, trenches (TR), stains (ST), and dark-toned material (DTM) were also visible on the Former Sodium Disposal Facility.

By 1993* an excavation that encompassed impoundments IM-2, IM-3, and IM-7 had been initiated. The area of excavation was slightly larger in areal extent than the three impoundments. The ground surface on the excavation was mostly covered with dark-toned material, and heavy equipment (HE) was noted nearby. Excavation activity continued through at least 1998*. During this time, the ground surface was mostly composed of uniform light- and dark-toned material and pools of standing liquid (SL) were also noted. By 2002* this area had been filled. In 2005 dark-toned material was observed at this location.

WDA-1: By 1959 (Figure 4) light-toned solid waste material had been deposited on WDA-1. In 1962/63 only a ground scar and probable disposal activity were visible within a trench at this location. By 1965 the trench had been filled. A possible trench extending to the north, which terminated near a rock outcrop, was seen nearby. By 1967 the possible trench was no longer observed and may have been filled. In 1978 two possible derelict (DER) storage tanks were seen near a rock outcrop. Also in 1978, a possible burn area and disturbed ground (DG) were visible on and along the western containment berm (not annotated) of impoundment IM-3. This area was stained in 1980 and possible stains were noted in 1983.

IM-2: In 1965 (Figure 7) and 1967 this earthen-bermed (not annotated) impoundment contained liquid. In 1967 portions of this impoundment were used as a possible burn pit. In 1972 the level of liquid in the impoundment was less when compared to 1967. Also visible in 1972 was a drainage pathway, which extended northward from a ground scar near this impoundment to a vegetated area, situated between rock outcrops (not annotated). Liquid continued to be observed in the impoundment through 1978. By February 1980* the impoundment was empty. Ground scars could be seen in 1983. In 1988 stains (possibly burned) and ground scars were visible. By 1993* an excavation that encompassed impoundment IM-2 had begun.

IM-3: This earthen-bermed impoundment was first noted in 1972 (Figure 9) and contained liquid. In 1978 no liquid was identified, but a possible burn area and disturbed ground were visible on and along the western containment berm (not annotated). Stained ground was identified in September 1978* and February 1980*. Possible stains and ground scars could

be seen from 1983 to 1988. Immediately to the west were ground scars located along a drainage channel. By 1993* an excavation that encompassed impoundment IM-3 had begun.

IM-7: First seen in 1965 (Figure 7) this possible impoundment was located on a raised rectangular-shaped pad in the southern part of the denuded area. From 1965 to 1988 possible liquid was noted. In 1988 a man-made drainage ditch was visible west of IM-7, alongside Arness Fire Road, near a building (not annotated). The ditch ran along the north side of Arness Fire Road, then north through a vegetated area, before terminating between rock outcrops. By 1993* an excavation that encompassed impoundment IM-7 had begun.

FA-1: By 1957 (Figure 4) light-toned material had been deposited at this fill area, which is located between rock outcrops at the terminus of an access road. By 1959 deposition activity appeared to have ceased. Parts of the surface were graded (GR) and supported possible vegetation (not annotated). In 1962/62 approximately six light-toned objects (LT OBJ), approximately one-fourth the size of an automobile, and a rectangular-shaped graded area were noted. In 1965 light-toned material and vegetation were noted, and by 1972 the fill area was partially vegetated. In 1978 stains were present and immediately northwest of the fill area was a possible pit. The surface of this fill area remained disturbed through at least 1983. Ground scars and vegetation were noted through 1988. By 1995 the fill area was mostly vegetated. In 2002* through 2005 this fill area was covered with a dark-toned material.

<u>SWMU 7.5 - Building 100 Trench</u>

The SWMU 7.5 - Building 100 Trench is located between G Street and the SWMU 7.1 - Building 56 Landfill. Several trenches and rectangular-shaped ground scars were observed near this location from 1959 (Figure 5) through 1967. Probable waste disposal area WDA-2 was located within one of the trenches.

WDA-2: In 1959 (Figure 5) a possible excavation area was noted. By 1962/63 a probable waste disposal was visible within a rectangular-shaped trench just north of G Street. Near this trench was a mound of medium-

toned material (MTMM) likely excavated from the trench. In 1965 evidence of waste disposal activity and the rectangular-shaped trench was no longer visible. The trench appeared to be covered with light-toned material. Two additional open trenches could be seen nearby. One trench was located atop a mound of medium-toned mounded material. The second trench was alongside this mound. Also noted near this light-toned mound was an area of stained ground. By 1967 the trenches appeared to have been filled; the mound of medium-toned material remained. This mound could be seen until 1980.

Just to the west of the Building 100 Trench was a rectangular-shaped ground scar first observed in 1957. This ground scar could be the result of a former excavation and was visible through 1962/63.

SWMU 7.7 - Rockwell International Hot Laboratory (RIHL)

SWMU 7.7 - Rockwell International Hot Laboratory is a building located in the western part of the Santa Susana Field Laboratory-Area IV, alongside 24th Street. This building appeared to be in use when first observed in 1959 (Figure 5). The building was removed before 1998*. During this analysis, a smokestack (SS), four possible horizontal storage tanks (HT), probable stains, and open storage area OS-16 were observed attached to or adjacent to this building.

OS-16: OS-16 contained material from 1962/63 (Figure 6) to 1998*. In 1962/62 possible stains were noted. Through 1972 no environmentally significant conditions or features were identified at this open storage area. In 1978 possible drums (DR) were noted and in 1980 possible stains were observed. From 1983 through 1998*, no environmentally significant features or conditions could be identified at this open storage area.

SWMU 7.9 - ESADA Chemical Storage Area (ESADA)

SWMU 7.9 - ESADA Chemical Storage Area is located in the far western part of the Santa Susana Field Laboratory-Area IV, south of Arness Fire Road. In 1959 (Figure 5), a possible trench alongside Arness Fire Road and two linear (LIN) ground scars were observed. By 1962/63 the trench alongside the road had been widened. A second trench, thinner and located perpendicular to Arness Fire Road, was visible at the same location of the

ground scar seen on the 1959 photographs. In 1965 two buildings had been constructed that were connected by an aboveground pipeline. A trench extending almost parallel to Arness Fire Road ended at a probable ground scar. By 1967 two trenches extending north-south were identified between Arness Fire Road and the buildings. In 1972 dark-toned material was observed and the two trenches seen in 1967 appeared to be closed. On the 1978 photographs, a horizontal storage tank was noted. By 1980 two new buildings had been constructed and numerous containers (CONT) were present. Containers continued to be identified through 1983. By 1986* these containers had been removed. In 1995 a mound of uniform light-toned material was visible, but most structures at the ESADA had been removed.

AOC - Chemistry Laboratory Metals Clarifier (CLMC)

The AOC - Chemistry Laboratory Metals Clarifier is located immediately north of G Street. The Chemistry Laboratory Metals Clarifier is an impoundment (IM-6) and appears to be part of processing area PA-4 (see Processing Areas section of this report).

IM-6: Impoundment IM-6 was first observed on the 1978 photographs (Figure 10) but no liquid was visible within the impoundment. By September 1978* probable liquid was noted. From February 1980* through 1986* the impoundment appeared to be dry. In 1987* liquid was observed, and in 1988 possible liquid was noted. In 1990* through 1995, liquid could be identified within this impoundment. Possible liquid was noted in 1998*. Through the remainder of the analysis period medium-toned material was observed.

AOC - Pond Dredge Area (PDA)

The AOC - Pond Dredge Area is located near the western terminus of J Street. This area contains fill areas FA-13 and FA-14.

The eastern part of the Pond Dredge Area was active in 1990*; light-toned mounded material (LTMM) was noted within an excavation area. The volume of light-toned material increased through 1993*. Dark-toned mounded material (DTMM) was also seen in 1993*. In 1994* and 1995 (Figure 14), light-toned mounded material and mounded material covered with scattered

vegetation were observed. By 1998* the excavation had been filled with material, forming fill area FA-13. This area remained undisturbed through 2005.

The western part of the Pond Dredge Area also was active in 1990*; piles of light-toned material were noted. By 1992* the surface was covered with light-toned material and appeared disturbed; no mounded material could be discerned. By 1993* mounds of both light- and dark-toned material covered the western part of the Pond Dredge Area forming fill area FA-14. This area remained undisturbed through 2005.

AOC - Systems for Nuclear Auxiliary Power (SNAP) Facility

The AOC - Systems for Nuclear Auxiliary Power Facility is a building located at the northern terminus of 20th Street. This building was first observed in 1965 (Figure 7). The building remained active through 1998*. Open storage areas (OS-9 and OS-10) are located on the AOC - Systems for Nuclear Auxiliary Power (SNAP) Facility. By 2002* the building appeared abandoned and the open storage areas near the building no longer contained material. By 2003* the building had been removed. During this analysis, a smokestack, vertical storage tanks (VT), and stains were observed attached to or adjacent to this building.

OS-9: OS-9 is located near the terminus of 20th Street. This open storage area was first observed as being in use in 1978 (Figure 10). The open storage area contained material until 1992*. In 1978 stained ground, probable stained ground, and a probable horizontal storage tank could be seen at this open storage area. No features or conditions of environmental significance were observed at this location in 1980. From 1983 through 1988, stains and probable stains were noted.

OS-10: OS-10 is located near the terminus of 20th Street. It was used to house material from 1978 (Figure 10) to 1998*. In 1978 probable stains and two vertical storage tanks were seen. Probable stains remained present at this open storage area through 1980. In 1983 this open storage area was no longer in use but was in use again in 1988. Possible and probable stains could be seen in 1995.

Waste Disposal Areas

WDA-1: This waste disposal area is part of the SWMU 7.3 - Former Sodium Disposal Facility (see SWMU and AOC section of this report).

WDA-2: This waste disposal area may be part of the SWMU 7.5 -Building 100 Trench (see SWMU and AOC section of this report).

WDA-3: This waste disposal area is located atop the SWMU 7.1 - Building 56 Landfill (see SWMU and AOC section of this report).

Processing Areas

Figures 10 through 15

PA-4: This processing area is located on the northern side of G Street and includes the AOC - Chemistry Laboratory Metals Clarifier (see AOC - Chemistry Laboratory Metals Clarifier in this report). By 1972 (Figure 9) one building had been constructed at PA-4. From 1978 through 2005, additional buildings were constructed, impoundment IM-6 was added, and this processing area appeared to be active. During the analysis period, storage tanks, a crane, a smokestack, possible stains, and possible overhead pipelines (OP) were observed.

PA-5: This processing area is located between J and L streets. Buildings were visible at this location as early as 1957 (Figure 4), but environmentally significant activity was not observed until 1978. During the years of operation, probable storage tanks, stains, and probable overhead pipelines were observed. This processing area remained active through the early 1990s, after which, it appeared to be abandoned. By 2003* all structures related to this processing area had been removed from this location.

Open Storage Areas

Figures 6 through 15

Open storage areas house crates or containers of different sizes. All

open storage areas identified in the analysis will be labeled on the photographic overlays. However, only open storage areas where environmentally significant activity was present will be discussed in the text.

OS-9: OS-9 is located near the AOC - Systems for Nuclear Auxiliary Power Facility (see SWMU and AOC section of this report).

OS-10: OS-10 is located near the AOC - Systems for Nuclear Auxiliary Power Facility (see SWMU and AOC section of this report).

OS-11: OS-11 is located near a building at the terminus of G Street. OS-11 was first noted as active in 1978 (Figure 10) and contained material until 1988. In 1978 possible stains and two possible tank pads were seen. In 1980 probable stains, possible debris (DB) and probable leakage from an unknown source near a building could be seen. Also visible in 1980 was a drainage pathway which directed liquid north through a vegetated area. This drainage pathway then appeared to be blocked by rock outcrops, resulting in a liquid collection area. Stains were also seen at this open storage area in 1983. No features or conditions of environmental significance could be identified after 1983.

OS-16: OS-16 is located alongside the SWMU 7.7 - Rockwell International Hot Laboratory (see SWMU and AOC section of this report).

OS-18: OS-18 is located just west of processing area PA-4. It was used to store material from 1986* (Figure 13) to 1995. Probable stains, horizontal storage tanks, possible debris and ground scars could be seen until 1995.

OS-22: OS-22 is located just north of processing area PA-4. Material was first noted in 1993* (Figure 14) but by 1998* all contained material was removed. In 1995 probable stains could be seen.

OS-23: OS-23 is located just south of processing area PA-4. It was used to house material from 1990* (Figure 14) to 1995. Stains and possible stains were identified through 1993*.

Fill Areas

Figures 4 through 15

FA-1: FA-1 is part of the SWMU 7.3 - Former Sodium Disposal Facility (see SWMU and AOC section of this report).

FA-2: FA-2 is located at the head of a drainage ravine. An access road extends north from Arness Fire Road and terminates at this probable fill area. The deposition of light-toned material was initiated on FA-2 by 1957 (Figure 4) and terminated prior to 1962/63, when medium-toned material and ground scars were visible. By 1965 the fill area and the mound of material had become partially vegetated. Ground scars and scattered vegetation were noted in 1967 and the mound had been removed. From 1972 through 1987*, the fill area was vegetated and there were no signs of disturbance, but in 1988, possible disturbed ground was noted. From 1990* through 2005, this fill area remained covered with vegetation and no activity of environmental significance was observed.

FA-3: Fill area FA-3 is part of the SWMU 7.1 - Building 56 Landfill (see SWMU and AOC section of this report).

FA-4: Fill area FA-4 is part of the SWMU 7.1 - Building 56 Landfill (see SWMU and AOC section of this report).

FA-9: Fill area FA-4 is part of the SWMU 7.1 - Building 56 Landfill (see SWMU and AOC section of this report).

FA-10: FA-10 is located between G and J streets. Deposition activity was initiated after 1983 and ended prior to 1986*. Mounded material covered with vegetation was observed through 2005 and remained undisturbed.

FA-12: FA-12 is located within the boundary of the SWMU 7.3 - Former Sodium Disposal Facility (see SWMU and AOC section of this report).

FA-13: FA-13 is located within the boundary of the AOC - Pond Dredge Area (see SWMU and AOC section of this report).

FA-14: FA-14 is located within the boundary of the AOC - Pond Dredge Area (see SWMU and AOC section of this report).

Impoundments

Figures 7 through 15

IM-2: This impoundment is part of the SWMU 7.3 - Former Sodium Disposal Facility (see SWMU and AOC section of this report).

IM-3: This impoundment is part of the SWMU 7.3 - Former Sodium Disposal Facility (see SWMU and AOC section of this report).

IM-6: This impoundment is identified in the collateral data as the AOC - Chemistry Laboratory Metals Clarifier located within processing area PA-4 (see SWMU and AOC section of this report).

IM-7: This impoundment is part of the SWMU 7.3 - Former Sodium Disposal Facility (see SWMU and AOC section of this report).

Miscellaneous Activity

1965 (Figure 7): Stained ground is observed to the north of G Street.

1978 (Figure 10): North of the terminus of G Street is a probable outfall (OF). Any liquid (none was observed) emitted from the probable outfall would flow north into a drainage ravine.

1980 (Figure 11): Dump-truck sized mounds of light-toned material are located within a borrow pit south of Arness Fire Road. The amount of mounded materials increased through 1983, but by 1988 this material had been removed.

1988 (Figure 13): Near J and L streets are two mounds comprised of tightly packed, dump-truck-sized piles of medium-toned material. Over time these mounds appeared to become weathered, compressed, and vegetated. By 2005 the mounds could not be discerned from the surrounding landscape.

EAST SECTION OF SANTA SUSANA FIELD LABORATORY-AREA IV

Figures 16 through 27 (1957 through 2005)

Solid Waste Management Units (SWMU) and Areas of Concern (AOC)

SWMU 7.4 - Old Conservation Yard (OCY)

SWMU 7.4 - Old Conservation Yard is located in the far eastern part of the Santa Susana Field Laboratory-Area IV, north of E Street. The Old Conservation Yard was first seen as active on the 1957 photographs (Figure 16). It remained active through 1995, but by 1998* all contained material had been removed. Waste disposal area WDA-4, and open storage areas OS-3 and OS-4 are located within the boundary of the Old Conservation Yard.

WDA-4: WDA-4, noted in 1965 (Figure 19), contained possible waste and was located at the terminus of an access road. In 1967 probable debris was noted at this location.

OS-3: An open storage area was active at this location in 1959 (Figure 17), but no conditions of environmental significance were observed. In 1962/63 ground scars and debris were noted at this open storage area, and it contained material until 1978. Possible debris could be seen in 1965 and stains were discerned on the 1967 photographs. By 1967 the areal extent of this open storage area had been increased. By 1972 possible stains and possible debris were noted. By 1978 all material had been removed from this open storage area.

OS-4: An open storage area was active at this location in 1957 (Figure 16), but no features of environmental significance were observed. In 1959 possible stains were noted at this open storage area. Materials were contained at this location until 1998*. In 1959 through 1980, stains, probable stains, and possible stains were noted. Probable debris piles could be seen in 1983 but were removed prior to 1986*. In 1988 a tanker, several transportation trailers (TT), and possible stains were observed. Only transportation trailers were noted by 1995. Refuse containers and stains were identified in 1998* and were removed by 2002*. After 2002* ground scars and vegetation could be seen at this location.

SWMU 7.6 - Radioactive Materials Handling Facility (RMHF)

SWMU 7.6 - Radioactive Materials Handling Facility is located at the north terminus of 12th Street atop a portion of fill area FA-8. The Radioactive Materials Handling Facility is comprised of several buildings and open storage facilities. This area was active from 1959 (Figure 17) through 2005. During this time period, overhead pipelines, a smokestack, stains, dark-toned material, and a crane were observed. In 1965 open storage area OS-1 and a possible aboveground pipeline were visible. This possible aboveground pipeline extended west to impoundment IM-4 (see Impoundments section of this report). This pipeline/drainage channel was observed throughout this analysis. From 1967 through 1980, an aboveground pipeline was seen extending from a building and terminating near the north end of this facility. In 1980 this aboveground pipeline appeared to enter a subsurface feature. In 1995 an area of stained ground was observed. By 2005 earth-moving activity was visible at the base of the Radioactive Materials Handling Facility.

OS-1: The open storage area was in use in 1962/63 (Figure 18), but no features of environmental significance were observed. In 1965 possible stains were noted at this open storage area. Material was contained at this location through the remainder of the analysis period. Possible stains, probable stains, and stains were identified through 1978. Also noted in 1978 were probable debris and a possible crane. From 1980 through 1987*, no environmentally significant features or conditions were observed. In 1988 and 1990*, stains and probable stains were again identified. After 1990* no environmentally significant features or conditions were observed at this open storage area.

SWMU 7.8 - New Conservation Yard (NCY)

SWMU 7.8 - New Conservation Yard is located in the far eastern part of the Santa Susana Field Laboratory-Area IV, south of E Street. No activity was observed at this location until 1965 (Figure 19), when a possible construction area was observed along G Street. A building was added at this location by 1967. No environmentally significant features or conditions were noted with this building through the analysis period. In

1978 an open storage area (OS-6) was observed. This New Conservation Yard remained active through at least 1998*.

OS-6: In 1978 (Figure 22) open storage area OS-6 was in use within the New Conservation Yard. This open storage area remained active through at least 1998*. Stains were first identified within this open storage area in 1978. From 1980 to at least 1983 possible debris and probable debris were identified. Also, a probable drainage ditch connected this open storage area to a natural drainageway to the south. This drainageway directs runoff toward an offsite impoundment. Stains continued to be seen until 1988 and possible stains were noted on the 1990* photographs. In 1995 refuse containers were seen and remained at this open storage through at least 1998*.

SWMU 7.10 - Former Coal Gasification PDU (FCG PDU)

SWMU 7.10 - Former Coal Gasification PDU, located on the eastern side of 17th Street, appears to be a processing area (PA-3). This area was active by 1959 (Figure 17). Additional buildings were added by 1965. By 2005 all structures had been removed from this location.

PA-3: Two buildings were observed at processing area PA-3 in 1959 (Figure 17). Additional buildings were constructed through 1965, when all main structures were in place. This processing area appeared to remain active through at least 1995. By 1998* several buildings and the storage tanks had been removed. By 2002* grounds scars and only one building were observed at this location, but by 2005 all the buildings had been removed. During the years of operation, storage tanks, overhead pipelines, a smokestack, open storage areas, stains and ground scars were identified. From 1978 to 1990* a probable conveyor connected processing area PA-3 to a coal storage area to the south. A drainage channel carried runoff from this processing area into impoundment IM-5 (see Impoundments section of this report) in 1965 and 1967.

AOC - Former Hazardous Materials Storage Area (HMSA)

The AOC - Former Hazardous Materials Storage Area is located near a

group of buildings on the western side of 17th Street. The Former Hazardous Materials Storage Area is located on processing area PA-1 (see Processing Areas section of this report).

The Former Hazardous Materials Storage Area was first noted on the 1959 photographs (Figure 17). In 1959 a new building, a possible below ground/recessed area, and a possible stain were observed. The possible recessed area remained visible in 1962/63 and a possible underground storage tank (UST) was noted. These features could not be confirmed on the 1965 or 1967 photographs and no environmentally significant features could be seen in 1972. By 1978 a probable open storage area was observed housing approximately six to eight objects, each about one-fourth the size of an automobile (features not annotated). In 1980 probable staining was observed, and in 1983 and 1987* an area of dark-toned material was visible. By 1988 no environmentally significant features or conditions were noted. In 1990* and 1992*, areas of possible staining were noted. By 1993* this area no longer appeared active. In 1998* approximately twelve containers, each about the size of an automobile, were observed at this location. By 2002* the containers and the building had been removed from the Former Hazardous Materials Storage Area.

<u>AOC - Sodium Reactor Experiment Area (SRE)</u>

The AOC - Sodium Reactor Experiment Area is located at the terminus of E Street. It was active from 1957 (Figure 16) through 1998*. By 2002* all of the structures were removed from this area. Processing area PA-2, impoundment IM-1, and possible impoundment IM-8 are located on the Sodium Reactor Experiment Area.

PA-2: In 1957 (Figure 16) a collection of buildings was visible at this location. By 1967 a building with two cooling fans was removed. This processing area remained active through at least 1998*. By 2002* all structures had been removed. In 2002* ground scars and vegetation were seen at this location. During the years this processing area was operating, storage tanks, aboveground pipelines, overhead pipelines, open storage areas, stains, light- and dark-toned material, and trailers were identified. Connected to this processing area were several aboveground pipelines. On the 1978 and February 1980* photographs, an excavation area

was noted alongside a building at this processing area. This excavation was filled by 1983.

An aboveground pipeline appeared to connect this processing area to a vertical storage tank located on a rock outcrop immediately to the north. This vertical storage tank was removed by 1978.

IM-1: A drainage channel leads from processing area PA-1 to this impoundment located at the head of a drainage ravine. In 1957 (Figure 16) saturated material was seen in this impoundment. From 1959 through 1983 liquid or possible liquid was observed within this impoundment. By 1986* the impoundment was dry. This impoundment supported vegetation through the remainder of the analysis period and was not utilized.

IM-8: In 1959 (Figure 17) no liquid could be seen in this possible impoundment. An aboveground pipeline appeared to extend from near this possible impoundment to processing area PA-2. By 1962/63 a light-toned object (LT OBJ) was visible at this location and this possible impoundment was likely inoperative.

AOC - SE Drum Storage Yard (SDSY)

The AOC - SE Drum Storage Yard is located near the southern boundary of the Santa Susana Field Laboratory-Area IV. This open storage area was visible only on the 1962/63 photographs (Figure 18) and contained containers at that time. No features or conditions of environmental significance were observed at this location through the analysis period.

Waste Disposal Areas

Figure 19 through 25

WDA-4: This waste disposal area is associated with the SWMU 7.4 - Old Conservation Yard (see SWMU and AOC section of this report).

WDA-5: In 1967 (Figure 20) a possible waste disposal area was noted atop an area of disturbed ground to the northwest of processing area PA-1. In 1972 only a ground scar and partial vegetation were observed.

WDA-6: In 1978 (Figure 22), this possible waste disposal area was located alongside open storage area OS-7 and north of processing area PA-1. Possible solid waste and debris were identified at this location.

WDA-7: This probable waste disposal area is located west of processing area PA-2 on an area of disturbed ground. On the September 1978* photographs, a probable pit containing dark-toned material was observed at this location. By February 1980* the probable pit could not be identified; however, a mound of light-toned material was observed nearby. In October 1980 (Figure 23), the mound of light-toned material was no longer observed, and may have been spread on the ground surface at this location. In addition, a possible ground stain was noted.

WDA-8: In 1988 (Figure 25) this waste disposal area could be seen adjacent to the southern side of G Street. In 1988 solid waste, debris, stains, and disturbed ground were observed. Probable debris was noted at this location in 1987* and in June 1990*. No further activity was observed, and by 1995 this area was partially vegetated.

Processing Areas

Figures 17 through 27

PA-1: This processing area is located on 17th Street and is comprised of several buildings constructed between 1957 and 1959 (Figure 17). A building with two cooling fans was added to this area by 1965. This processing area appeared to be operational until 1998*. From 1959 through 1998* storage tanks, overhead pipelines, stains, open storage areas, a smokestack, and a possible crane were observed. Runoff from this processing area appeared to be directed south and into impoundment IM-5 (see Impoundments section of this report). In 1988 a new grouping of overhead pipelines was observed. These pipelines extended north from this processing area, to a building near a new structure with four cooling fans. By 2003* most structures comprising this processing area had been removed, and only two buildings were observed. The AOC - Former Hazardous Materials Storage Area is associated with this processing area (see SWMU and AOC section of this report).

PA-2: Processing area PA-2 is part of the AOC - Sodium Reactor Experiment Area (see SWMU and AOC section of this report).

PA-3: Processing area PA-3 coincides with the SWMU 7.10 - Former Coal Gasification PDU facility (see SWMU and AOC section of this report).

PA-6: This processing area is located atop fill area FA-5 just west of the AOC - Sodium Reactor Experiment Area. A building was first observed at the PA-6 location in 1978 (Figure 22). By 1980 the building appeared surrounded by an open storage area (OS-14) and in 1983, stains were noted at this location. From 1988 to 1998*, storage tanks, stains, an overhead pipeline, a revetment, open storage, dark-toned material, and medium-toned mounded material were identified on the area. By 2002* only the building and a vertical storage were observed.

<u>Open Storage Areas</u>

Figures 17 through 27

OS-1: OS-1 coincides with the SWMU 7.6 - Radioactive Materials Handling Facility (see SWMU and AOC section of this report).

OS-2: OS-2 is located immediately south of the SWMU 7.6 - Radioactive Materials Handling Facility. This area was first noted in use in 1967 (Figure 20). Stains were identified on the 1967 photographs. From 1972 through 1990*, this open storage area was infrequently used and no environmentally significant conditions or features were noted during this time period.

OS-3: OS-3 is encompassed within the SWMU 7.4 - Old Conservation Yard (see SWMU and AOC section of this report).

OS-4: OS-4 is encompassed within the SWMU 7.4 - Old Conservation Yard (see SWMU and AOC section of this report).

OS-6: OS-6 is encompassed within the SWMU 7.8 - New Conservation Yard (see SWMU and AOC section of this report).

OS-7: OS-7 is located just north of processing area PA-1. It was first noted in use in 1978 (Figure 22) but by 1980 all material had been removed. Probable stains were noted at this open storage area.

OS-13: OS-13 is located near impoundment IM-4. Possible stains were noted in 1980 (Figure 23) through 1983. Heavy equipment (HE) was also seen in 1983. By 1988 contained material and heavy equipment were removed from this open storage area.

OS-14: This open storage was in use west of the AOC - Sodium Reactor Experiment Area in 1980 (Figure 23). No environmentally significant activity was observed that year. In 1983 possible stains were noted within open storage area OS-14. In 1988 this open storage became a component of processing area PA-6 (see Processing Areas section of this report). By 1993* this open storage area was no longer in use.

OS-15: OS-15 is located near the intersection of G and 20th streets. It contained material from 1962/63 (Figure 18), when stains were observed, to 1967. Probable and possible stains could be seen in 1967.

OS-17: OS-17 is located near the intersection of 12th and G streets. It contained material from 1978 (Figure 22) until 2003*. No environmentally significant features were noted until 1988 when stains were observed. These stains could also be seen in 1995. A pool of possible standing liquid was also observed in 1995. Possible stains were observed through 2002*. In 2003* no environmentally significant activity was noted at this open storage area.

OS-19: OS-19 is located north of processing area PA-3 (Figure 26). It contained material from 1990* to 2003*. In 1994* stains were observed. Probable stains continued to be observed in 2002*.

OS-20: OS-20 is located near the intersection of G and 17th streets (Figure 26). It contained material from 1993* through 2005. In 1995 dump-trucks (not annotated), probable refuse containers and stains could be seen. After 1998* no environmentally significant features or conditions could be identified.

OS-24: OS-24 is located near a building adjacent to 10th Street (Figure 26). It contained material from 1992* to 2002*. From 1995 through 2002*, probable and possible stains could be seen. In 2003* dark-toned material was identified and in 2005, ground scars were evident.

Fill Areas

Figures 16 through 27

FA-5: FA-5 is located at the head of a ravine immediately west of the AOC - Sodium Reactor Experiment Area. Deposition activity was initiated after 1954*, and by 1957 (Figure 16) uniform light-toned material was seen at this fill area. From 1959 through 1962/63 deposition activity continued. In 1962/63 the fill area had been configured into an upper section and a lower section. By 1965 deposition activity appeared to have ceased. From 1967 through 1972 no activity was observed. In 1978 a building had been constructed on this fill area, and by 1988 processing area PA-6 was visible (see Processing Areas section of this report).

FA-6: FA-6 is located near the intersection of G and E streets. Deposition activity commenced after 1954*, and by 1957 (Figure 16) uniform light-toned material (not annotated) had been placed and graded at this location. By 1959 a parking area has been constructed on this fill area.

FA-7: FA-7 is located in the far northeast part of Santa Susana Field Laboratory-Area IV. Part of the SWMU 7.4 - Old Conservation Yard (see SWMU and AOC section of this report) is located atop this fill area. By 1965 (Figure 19) uniform light-toned material had been deposited on FA-7. Deposition activity continued through at least 1967, increasing the areal extent of this fill area. By 1972 deposition activity appeared to have ceased.

FA-8: FA-8 is located north of processing area PA-1 along the north boundary of the Santa Susana Field Laboratory-Area IV. Deposition activity commenced after 1957, and by 1959 (Figure 17) uniform light-toned material had been deposited. The areal extent of this fill area increased marginally by 1962/63. Deposition activity ceased thereafter, and in 1965 no changes to areal extent could be identified. The SWMU 7.6 - Radioactive

Materials Handling Facility (see SWMU and AOC section of this report) was constructed atop this fill area.

FA-11: FA-11 is located south of the intersection of G and 20th streets (Figure 23). In February 1980* two mounds of material composed of smaller, dump-truck-sized mounds were on the fill area. Deposition activity continued through the mid-80s, and by 1988 material had been added to the mounds forming one large mound. Through the remainder of this analysis, no environmentally significant activity was noted at this fill area and it became vegetated.

Impoundments

Figures 16 through 27

IM-1: This impoundment is located on the AOC - Sodium Reactor Experiment Area (see SWMU and AOC section of this report).

IM-4: This impoundment, first seen in 1965 (Figure 19), is located to the west of the SWMU 7.6 - Radioactive Materials Handling Facility, atop fill area FA-8. In 1965 liquid was observed within this impoundment. A possible aboveground pipeline/drainage channel was seen near the impoundment from 1965 through 2005, and appeared to direct runoff from the SWMU 7.6 - Radioactive Materials Handling Facility into this impoundment. Liquid was observed in the impoundment at least through 1978, and in 1980 the impoundment was empty. In 1983 possible liquid was noted. Through the remainder of the analysis period, liquid or possible liquid was identified within this impoundment.

IM-5: This impoundment is located south of the intersection of G and 17th streets. From 1965 (Figure 19) through at least 1967, liquid was observed within this impoundment. Runoff from processing area PA-1, including the AOC - Former Hazardous Materials Storage Area, and the SWMU 7.10 - Former Coal Gasification PDU, may have been directed into this impoundment. In 1972, the impoundment appeared empty and dense vegetation was identified within it. This impoundment was not utilized through the remainder of this analysis; however, a drainage pathway was visible at the location.

IM-8: This possible impoundment is located within the AOC - Sodium Reactor Experiment Area (see SWMU and AOC section of this report).

Miscellaneous Activity

1957 (Figure 16): A possible underground structure with an adjoining possible smokestack is observed near 12th Street. It was last observed in 1967.

1959 (Figure 17): Medium-toned mounded material, light-toned mounded material (LTMM) including a mound with a cover tarp, and light-toned material are located immediately north of the Former Coal Gasification PDU. This material was observed from 1959 through 1962/63.

1978 (Figure 22): A large swath of stained ground is located at the eastern boundary of the Santa Susana Field Laboratory-Area IV.

GLOSSARY

Access Road (AR) - A paved or unpaved route of vehicular access.

Berm/Dike - An embankment of either natural or man-made materials that impounds liquids, solids or other materials, or controls flood waters.

Building (B) - A relatively permanent, essentially boxlike construction having a roof.

Cleared Area (CA) - An area from which man has removed trees, shrubs, or other natural vegetative cover.

Container (CONT) - Any portable device in which material is stored, transported, handled, or disposed.

Dark- (DT), Medium- (MT), or Light-Toned (LT) - Tones of features in question are compared with the darkest and lightest tones of gray (if using B&W photography) on the print.

Debris (DB) - The remains of anything that can be identified as being broken down, destroyed, demolished, or dismantled.

Disturbed Ground (DG) - A rough area where the ground surface has been dug up or overturned.

Excavation Area (EX) - An area where earth or other material is being removed in order to alter the ground level (e.g., building construction).

Face - The wall or slope of a mine, extraction, excavation, landfill, or fill area at which work is progressing (e.g., working face, fill face).

Fill (FL) - Earth, stones, or other material that is used to build up the level of an area of ground.

Fill Area (FA) - An area where material is being deposited to fill a depression; or area where materials have been added, altering the elevation of the ground surface.

Graded Area (GR) - An area where the surface of the ground has been leveled or altered by a vehicle pulling or pushing a wide blade.

Ground Scar (GS) - An area of bare soil, apparently the result of human activity.

Impoundment (IM) - A topographic depression, excavation, or diked area, primarily formed from earthen materials and designed to hold accumulated liquid.

Linear (LIN) - An adjective that describes the straight-line nature of features on the terrain or on maps and images.

Liquid (LQ) - Used when discussing impoundments, lagoons, catchment basins, or features that contain a liquid or when discussing discharge from outfalls, at storm drains, or tank trucks.

Material (M) - Raw or waste materials on or in the vicinity of the site.

Mounded Material (MM) - Piles of raw or waste materials on or in the vicinity of the site.

Outfall (OF) - The place where an effluent is discharged into the environment.

Open Storage Area (OS) - An area of open-air (outdoor) storage of containerized, raw or waste materials, within industrial or manufacturing sites.

Processing Area (PA) - A grouping of buildings and associated structures (storage tanks, pipelines, impoundments, open storage areas) focused on research, design, assembly, production, and testing of products and equipment.

Solid Waste (SW) - Any discarded material other than fluids, including solid or semi-solid material resulting from industrial, commercial, mining, and agricultural operations, and from community activities.

Stain (ST) - A residue or discoloration resulting from a spill, discharge, or removed/dispersed materials.

Standing Liquid (SL) - A small, shallow, temporary collection of liquid, not necessarily waste.

Tanks - Vertical tanks (VT), horizontal tanks (HT), pressure tanks (PT), tank farms, and solid waste management units. A large receptacle, container, or structure for holding liquid or gas.

Trench (TR) - A long, narrow excavation unrelated to drainage.

Waste Disposal Area (WDA) - An area where waste materials are discarded.

REFERENCES

MAPS

Source[a]	Figure	Name	Scale	Date
USGS	1	United States	1:2,500,000	1972
USGS	2	Calabasas, CA	1:24,000	1967
USGS	2	Santa Susana, CA	1:24,000	1969

COLLATERAL INFORMATION

EPA. 2009. Collateral data and site map supplied by EPA Region 9 as attachment to Remote Sensing Services Request Form.

LMS (Lockheed Martin Services). 2006. Master Quality Assurance Project Plan. Prepared for EPA Environmental Sciences Division. Contract EP-D-05-088. Las Vegas, Nevada.

California Environmental Protection Agency, Department of Toxic Substance Control website: RFI Site Location Map, Santa Susana Field Laboratory. http://www.dtsc-ssfl.com/files/maps/Fig_1-3_G6_Loc_Map.pdf: last visited 03/10/10.

AERIAL PHOTOGRAPHS

Photo source[a]	Figure[b]	Date of acquisition	Original scale	Film type[c]	Mission I.D.	Source frame #	EPIC ID #
NAS/VIP	-	04-07-39	1:20,000	B&W	AXI	23-25	150670-150672
USGS[d]	-	08-15-47	1:24,000	B&W	GS-EM	46-50	DI0000218
USGS[d]	-	08-24-47	1:24,000	B&W	GS-EM	14-18	DI0000218
USDA	3	12-22-52	1:20,000	B&W	AXI	29-31	86628-86630
USDA	-	01-03-53	1:20,000	B&W	AXI	5-8	86632-86635
WHIT	-	09-07-54	1:32,000	B&W	C20897	L:6A,7,7A,8, R:6A,7,7A,8	150932-150935, 150936-150939
USGS[d]	-	06-26-56	1:21,660	B&W	MPTF	914a,914b	DI0000224
EPA	4,16	08-17-57	1:24,000	B&W	C22962	64,65, 76,77	86637,86638, 86639,86640
USDA/FSA	5,17	08-21-59	1:20,000	B&W	AXI	141-143, 110-112	150785-150787, 150696-150698
WHIT	6,18	1962/1963	1:12,000	B&W	UNK	147,148, 131-133	150962,150963, 150955-150957
UCSB	7,19	03-01-65	1:36,000	B&W	251	60,61	86642,86643
USGS[d]	-	07-20-66	1:21,670	B&W	2016	2016a,2016b	DI0000224
USGS[d]	8,20	08-13-67	1:30,000	B&W	GS-VBUK	100-104, 182-187	DI0000218, DI0000219
CASINC	9,21	04-20-72	1:48,000	B&W	107	10-4, 11-13,11-14	150720, 150721,150722
USGS[d]	-	07-02-73	1:32,500	CIR	UNK	165a,165b	DI0000224
PAS	10,22	05-16-78	1:24,000	CC	PW	152,153	86645,86646
USDA	-	09-21-78	1:40,000	B&W	06111	26-28	150716-150718
CASINC	-	05-12-79	1:24,000	B&W	FC-LA	2-242, 3-241	150725, 150727
EPA	-	02-00-80	1:40,000	B&W	VEN	5-28,5-30	86647,86648
USGS[d]	11,23	10-21-80	1:24,000	B&W	GS-VEZS	247-249	DI0000220
AIRPHO	12,24	08-21-83	1:36,000	B&W	UNK	V-66	150753
USDA/FSA[d]	-	08-29-86	1:60,000	CIR	HAP84	222-224	DI0000237
AIRPHO	-	01-10-87	1:18,000	B&W	UNK	V-67,V-66-2, V-75,V-76	150755,150756, 150757,150758
AIRPHO	-	01-12-87	1:18,000	B&W	UNK	LR-4	150759
PAS	13,25	10-10-88	1:24,000	CC	PWVEN	102-104	86649-86651
USGS[d]	-	07-18-89	1:40,000	CIR	NAPP	10,139-142	DI0000236

AERIAL PHOTOGRAPHS

Photo source[a]	Figure[b]	Date of acquisition	Original scale	Film type[c]	Mission I.D.	Source frame #	EPIC ID #
CASINC	-	06-07-90	1:40,000	B&W	C82	18-20	150728-150730
USDA/FSA[d]	-	09-07-90	1:40,000	CIR	NAPP	49,50	DI0000236
AIRPHO	-	01-15-92	1:36,000	CC	UNK	77,67, 76,66/67	150762,150763, 150764,150765
CASINC	-	05-10-93	1:24,000	B&W	C88	107-110, 137-139	150731-150734, 150735-150737
USDA/FSA	-	06-01-94	1:40,000	B&W	NAPP	195-198, 211-214	150707-150710, 150711-150714
CASINC	14,26	06-19-95	1:24,000	B&W	C113	113-115, 63-65	86652-86654, 150740-150742
CASINC	-	12-07-98	1:24,000	B&W	C-130	143-146 85-88	150743-150746, 150747-150750
USDA/FSA[d]	-	06-05-02	1:40,000	CIR	NAPP	230	DI0000236
USDA/FSA[d]	-	06-11-02	1:40,000	CIR	NAPP	273-275 285-288	DI0000236, DI0000236
USDA/FSA[d]	-	11-10-03	1:40,000	CC	NAIP03	DOQQ	DI0000238
USDA/FSA[d]	-	07-14-04	1:40,000	CC	NAIP04	DOQQ	DI0000238
USDA/FSA[d]	15,27	06-08-05	1:40,000	CC	NAIP05	DOQQ	DI0000238

[a] AIRPHO Air Photographics, Inc., Martinsburg, Virginia
CASINC Continental Aerial Surveys, Inc., Bartow, Florida
EPA United States Environmental Protection Agency, Environmental Sciences Division, Las Vegas, Nevada
NAS/VIP National Aerial Survey Center Corp./Visual Image Presentations, Silver Spring, Maryland
PAS Pacific Aerial Surveys, Oakland, California
UCSB University of California at Santa Barbara, Santa Barbara, California
USDA U.S. Department of Agriculture, Salt Lake City, Utah
USDA/FSA U.S. Department of Agriculture, Farm Service Agency, Salt Lake City, Utah
USGS U.S. Department of Interior, U.S. Geological Survey, Washington, D.C.
WHIT Fairchild Aerial Photography, Whittier College, Whittier, California

[b] Photographs listed with no figure number were analyzed but not placed in this report.

[c] B&W Black-and-white
CIR Color infrared
CC Conventional Color

[d] Digital diapositive (see Methodology section)

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**FIGURE 1. SITE LOCATION MAP, CALIFORNIA (USGS, 1972).
APPROXIMATE SCALE 1:3,600,000**

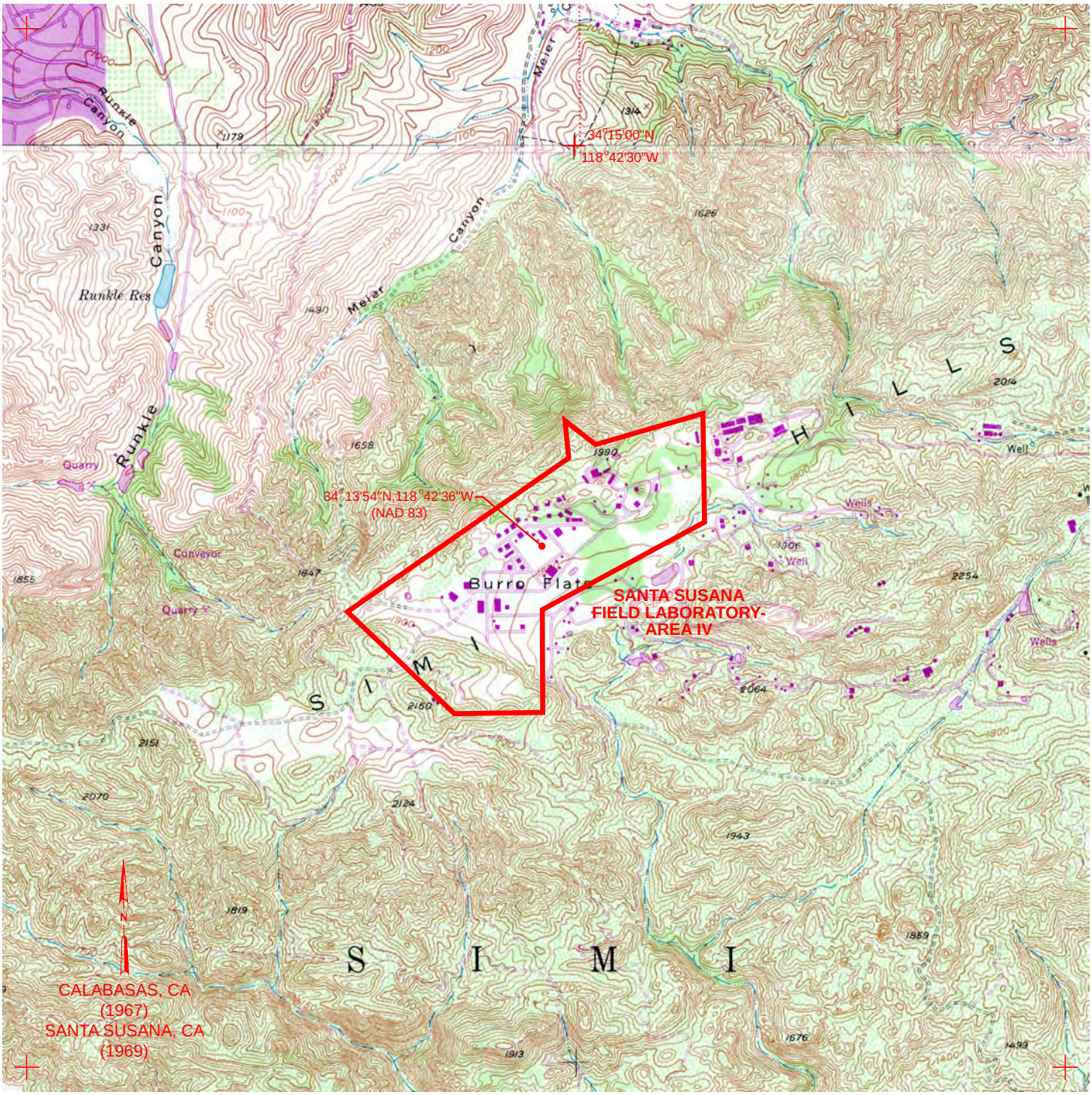

FIGURE 2. LOCAL SITE LOCATION MAP, CALABASAS, CA (USGS, 1967) AND SANTA SUSANA, CA (USGS, 1969). APPROXIMATE SCALE 1:14,370.

Redacted

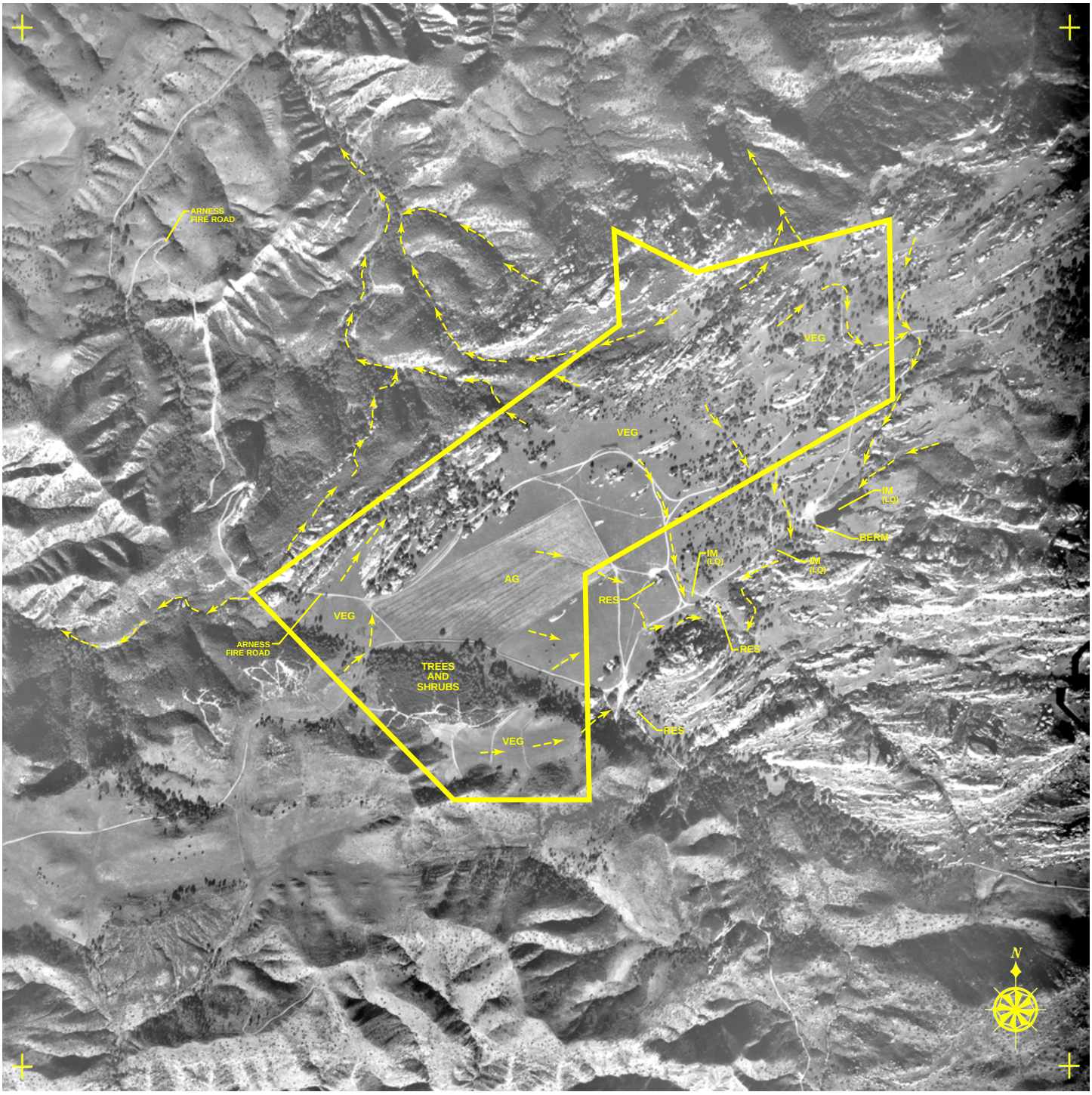

FIGURE 3. SANTA SUSANA FIELD LABORATORY - AREA IV, DECEMBER 22, 1952. APPROXIMATE SCALE 1:7,400.

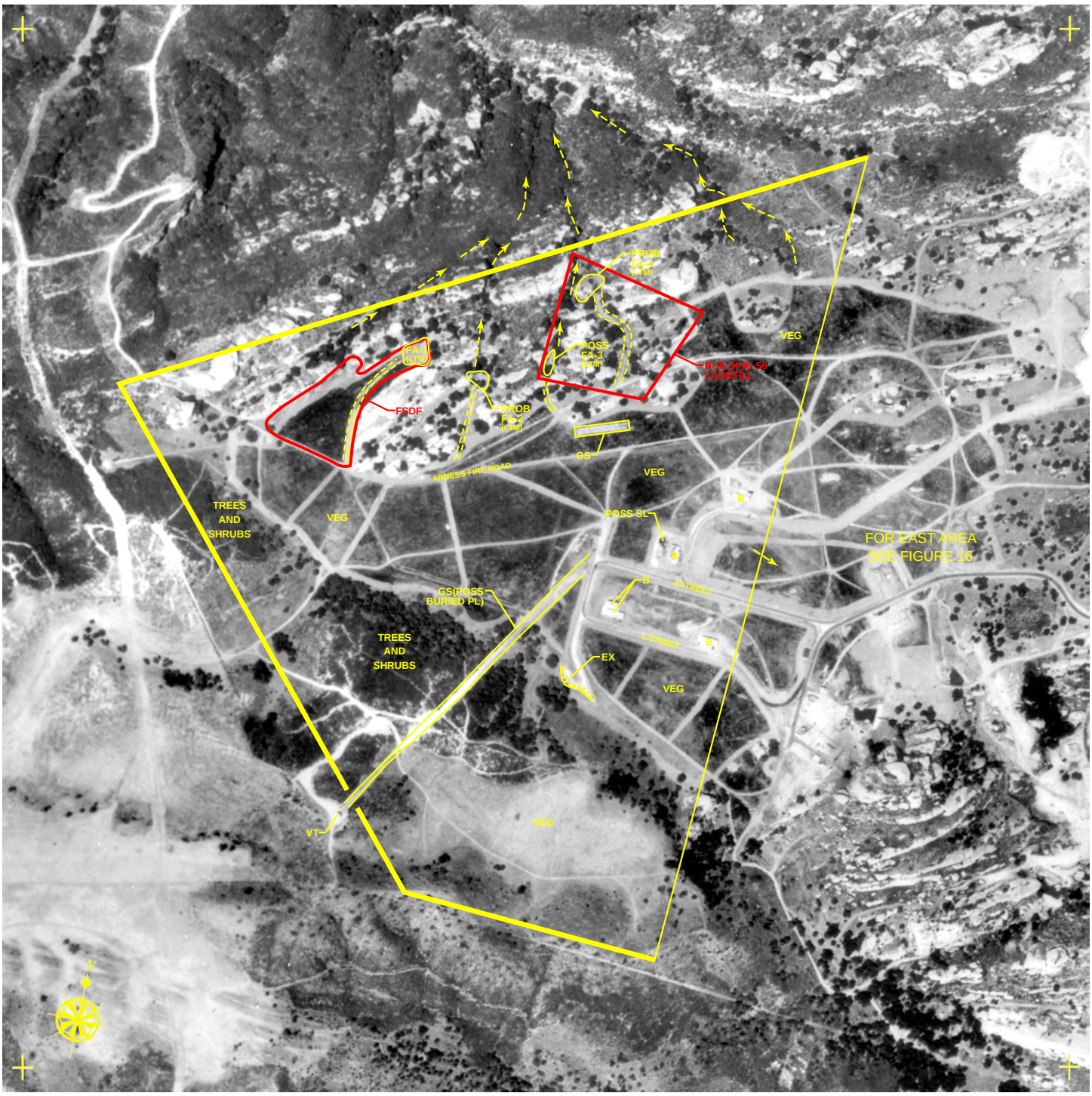

FIGURE 4. SANTA SUSANA FIELD LABORATORY - AREA IV, WEST SECTION, AUGUST 19, 1957. APPROXIMATE SCALE 1:3,750.

Redacted

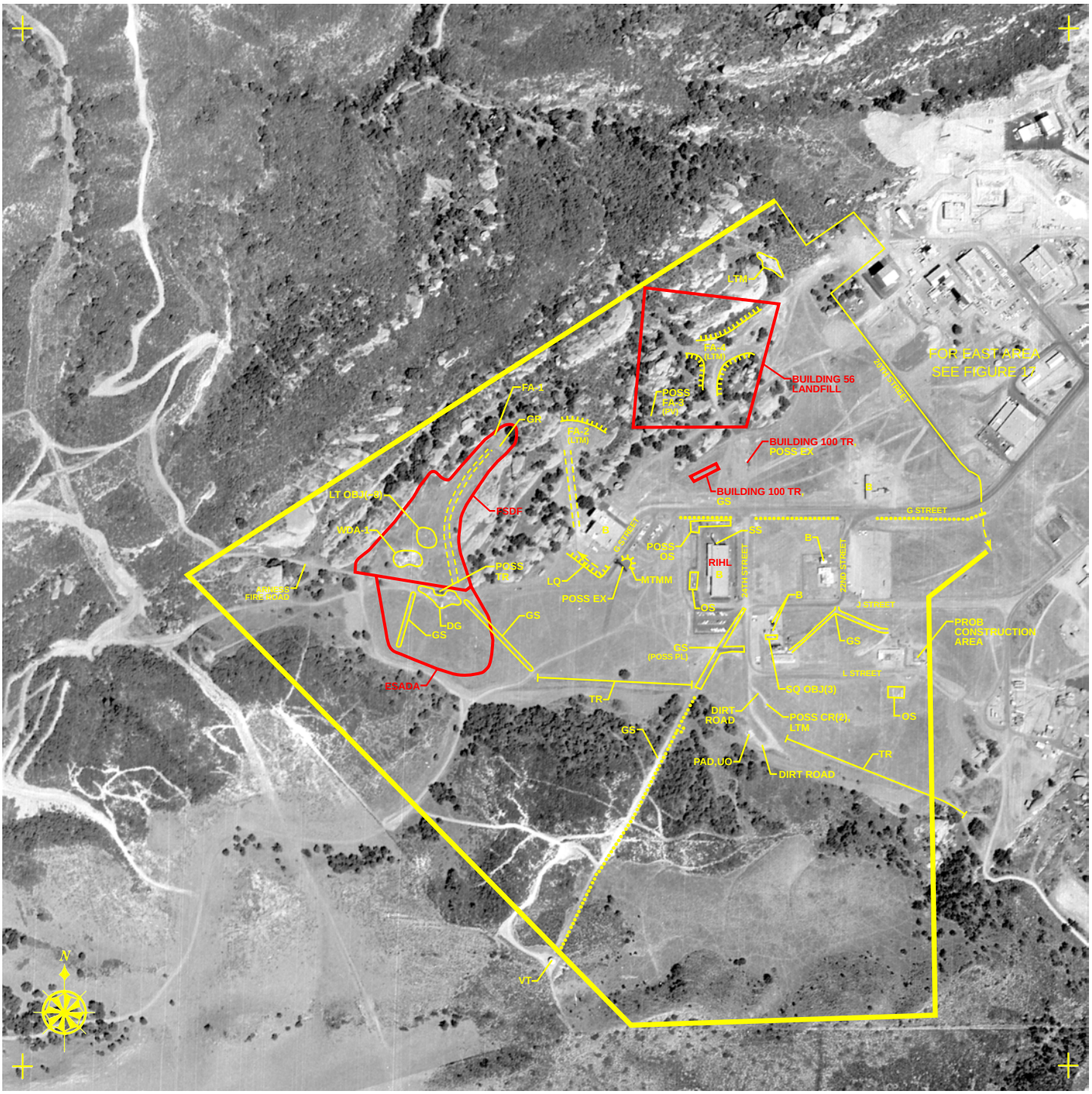

FIGURE 5. SANTA SUSANA FIELD LABORATORY - AREA IV, WEST SECTION, AUGUST 21, 1959. APPROXIMATE SCALE 1:3,500.

Redacted

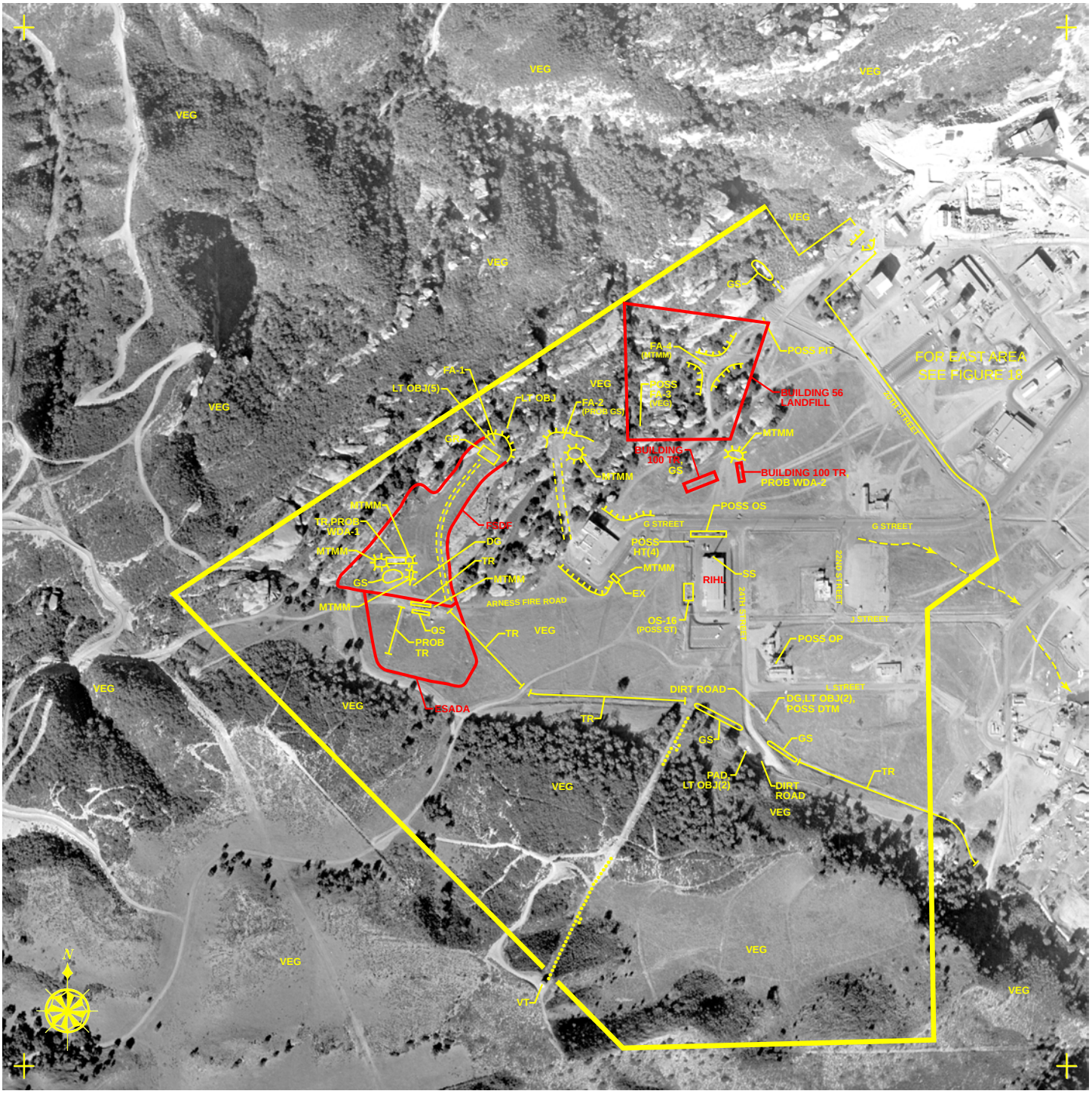

FIGURE 6. SANTA SUSANA FIELD LABORATORY - AREA IV, WEST SECTION, 1962/1963. APPROXIMATE SCALE 1:3,490.

Redacted

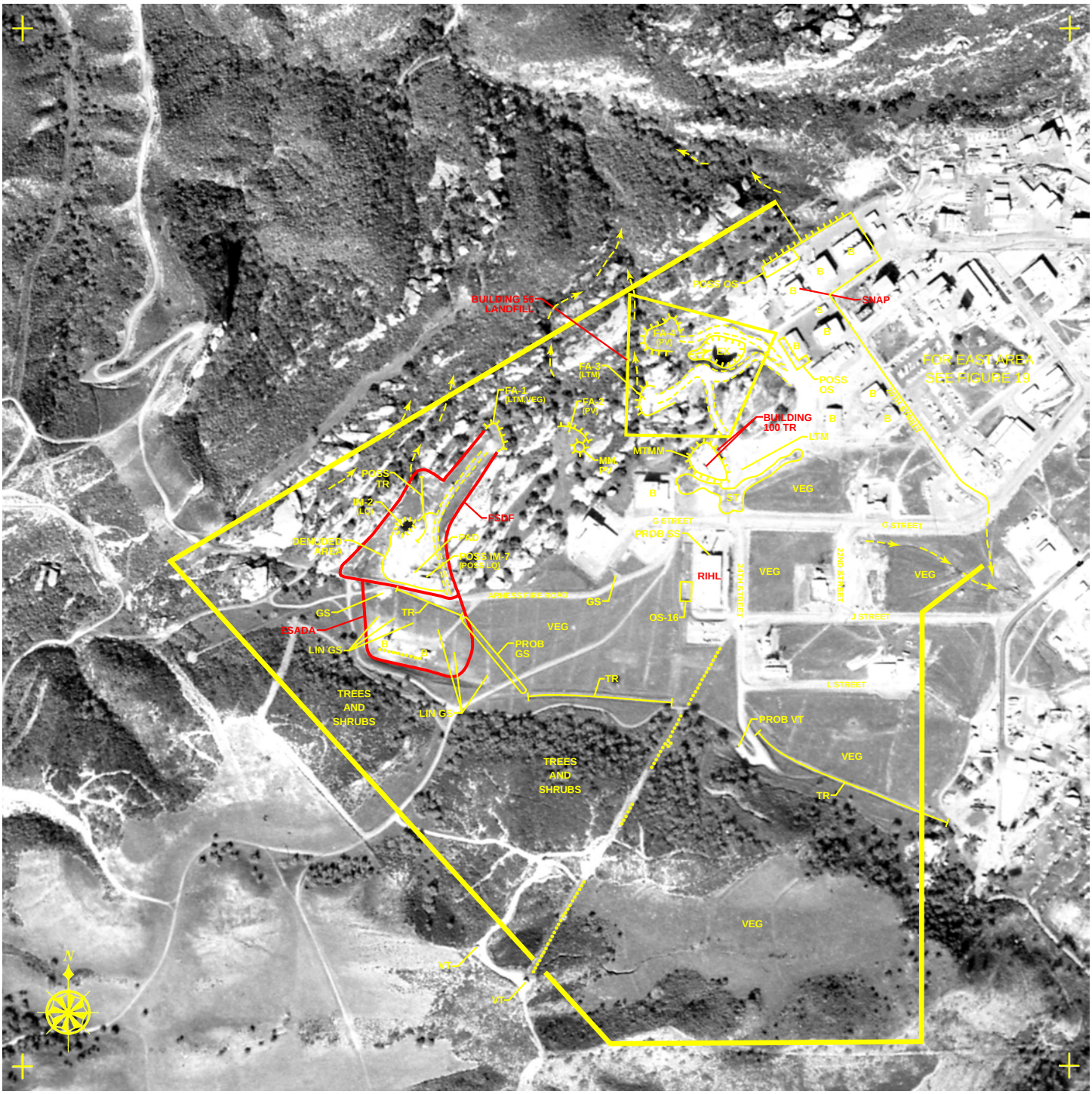

FIGURE 7. SANTA SUSANA FIELD LABORATORY - AREA IV, WEST SECTION, MARCH 1, 1965. APPROXIMATE SCALE 1:3,455.

Redacted

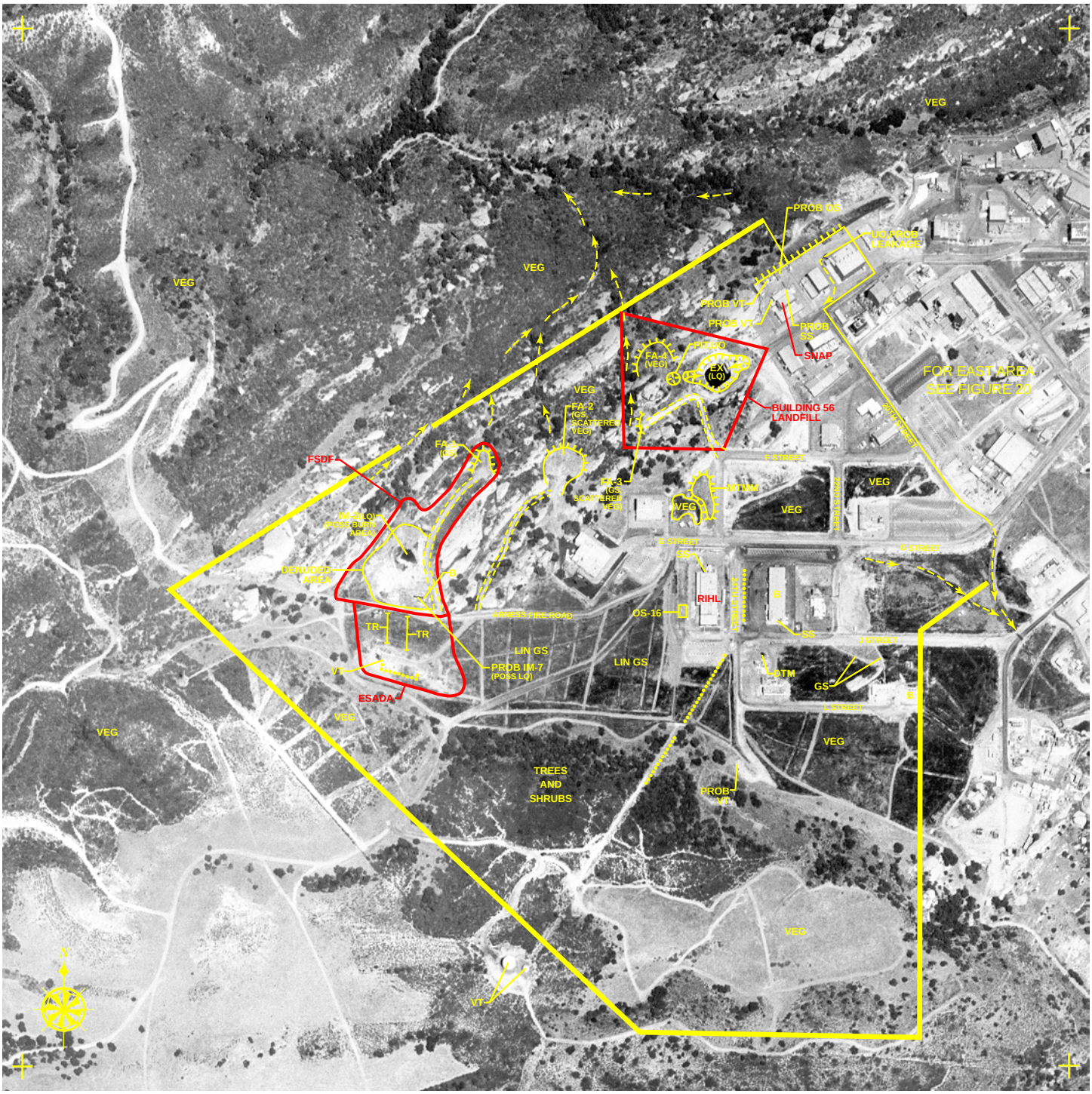

FIGURE 8. SANTA SUSANA FIELD LABORATORY - AREA IV, WEST SECTION, AUGUST 13, 1967. APPROXIMATE SCALE 1:3,430.

Redacted

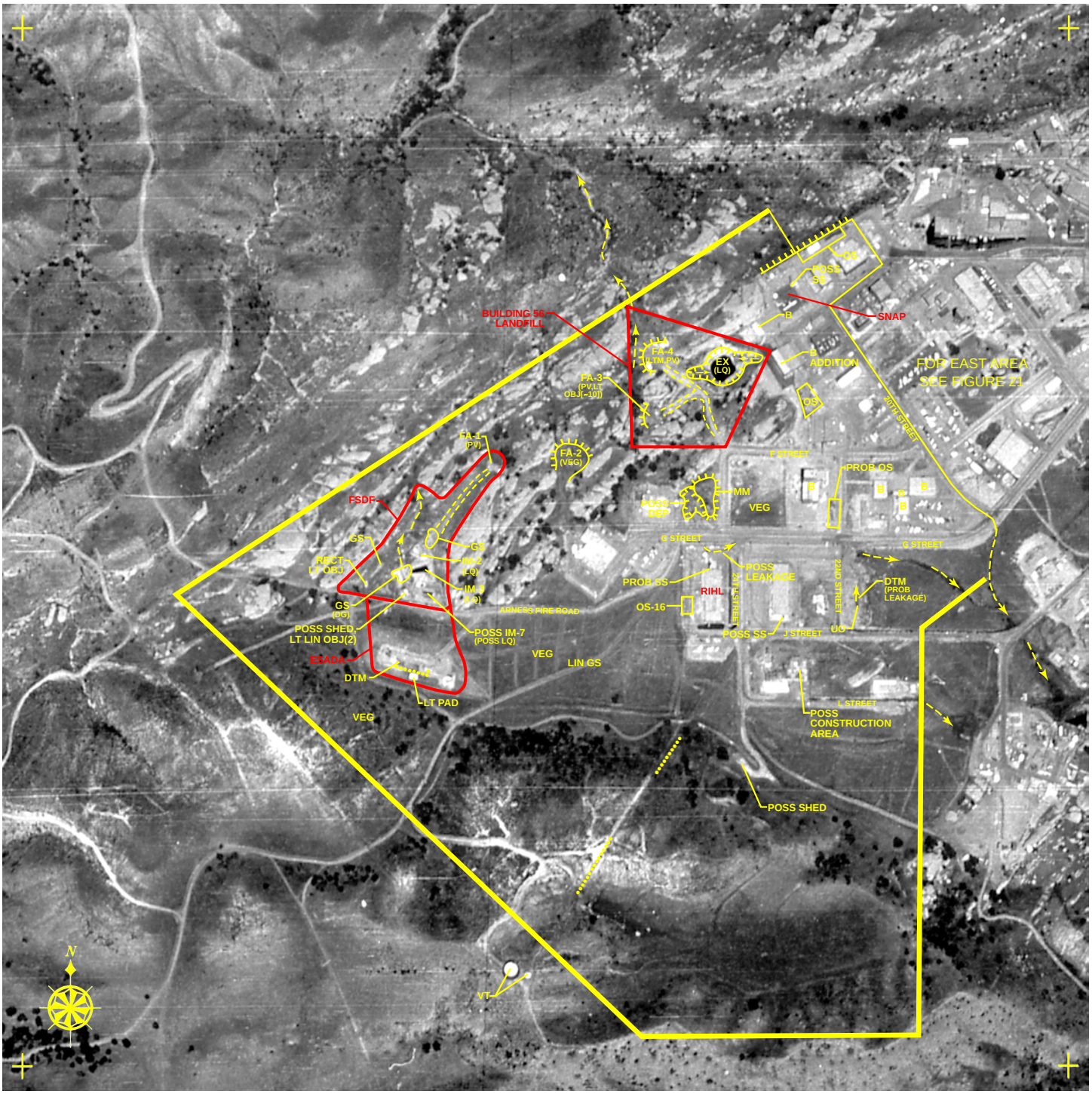

FIGURE 9. SANTA SUSANA FIELD LABORATORY - AREA IV, WEST SECTION, APRIL 20, 1972. APPROXIMATE SCALE 1:3,475.

Redacted

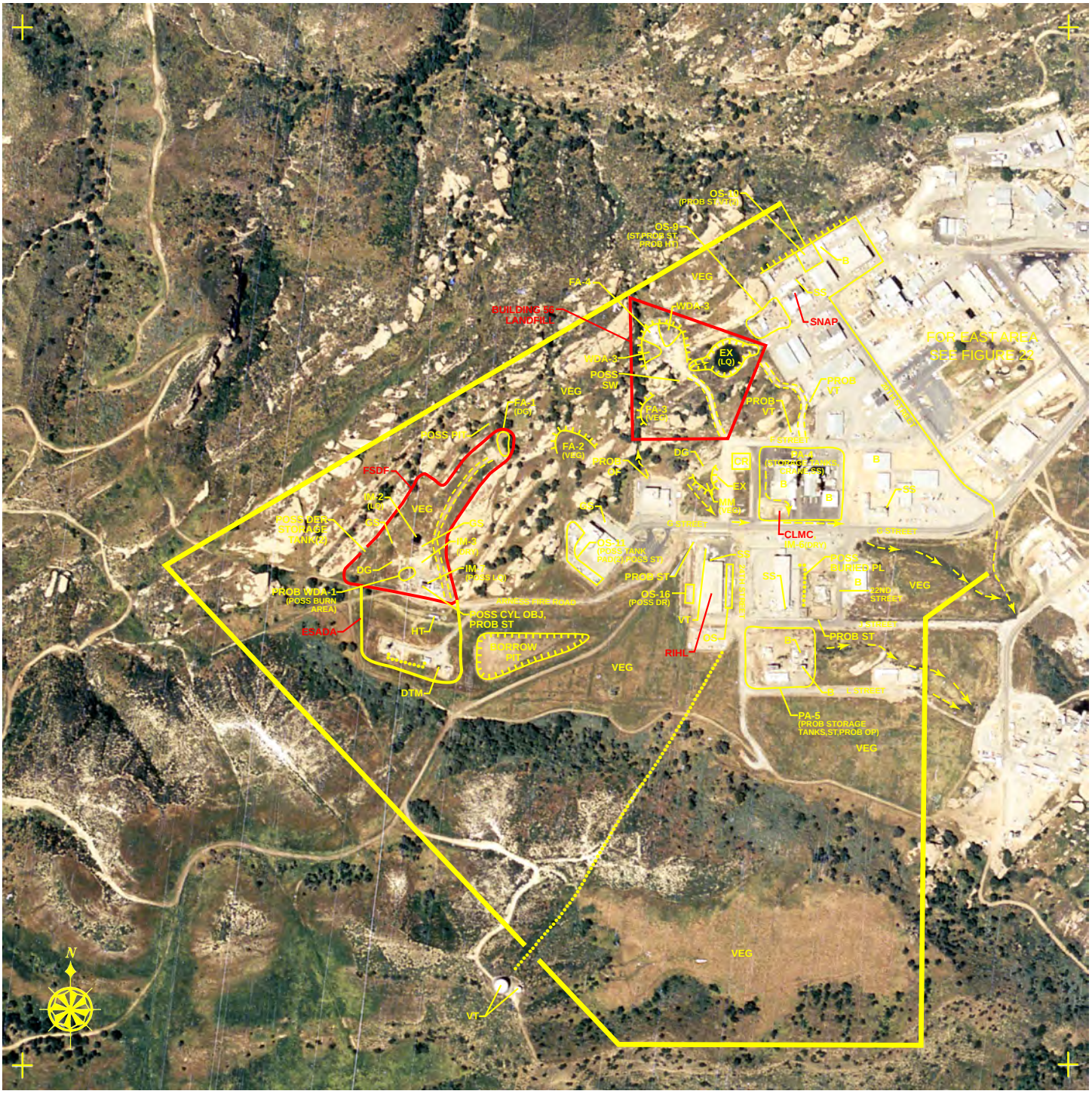

FIGURE 10. SANTA SUSANA FIELD LABORATORY - AREA IV, WEST SECTION, MAY 16, 1978. APPROXIMATE SCALE 1:3,445.

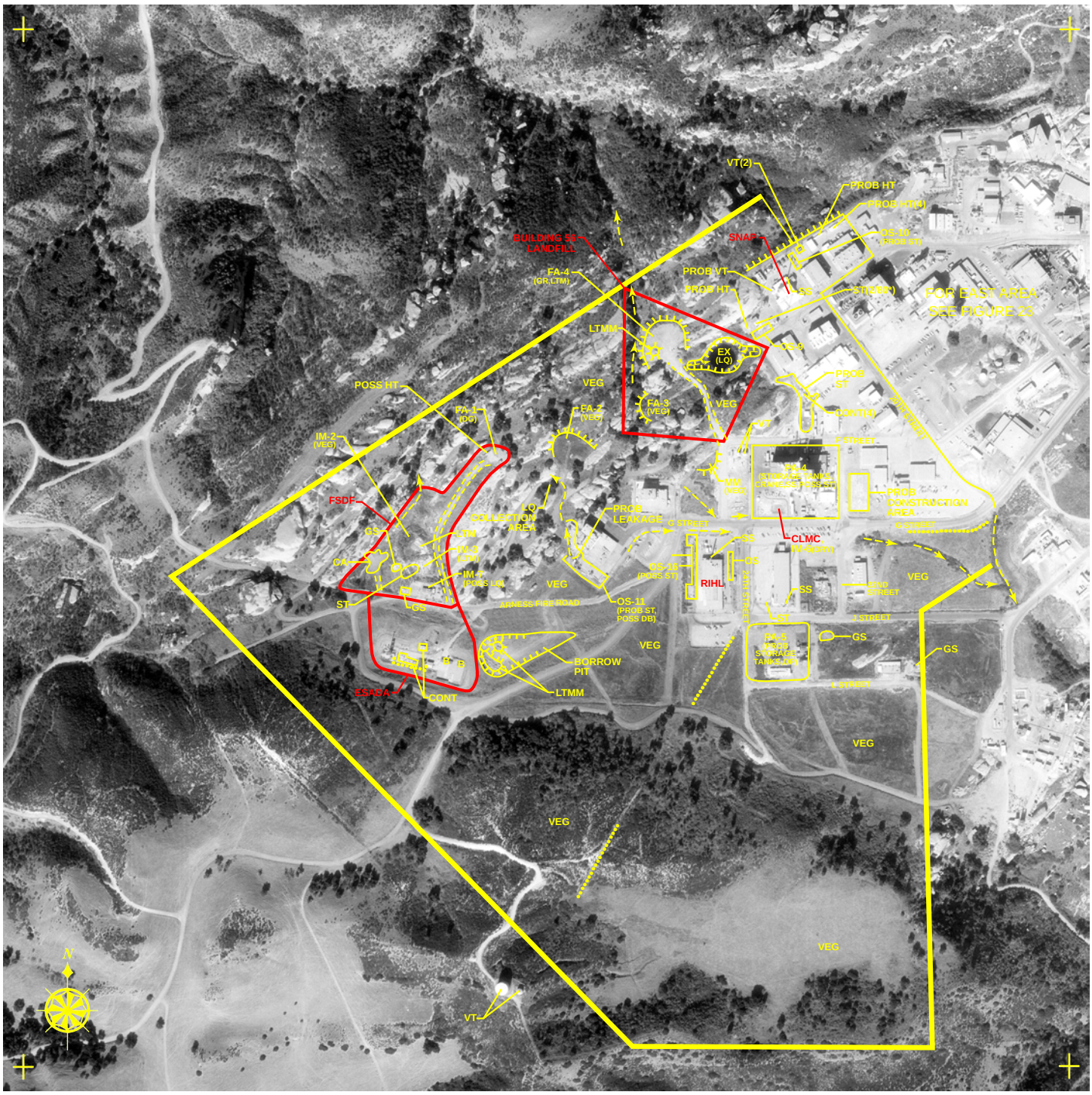

FIGURE 11. SANTA SUSANA FIELD LABORATORY - AREA IV, WEST SECTION, OCTOBER 21, 1980. APPROXIMATE SCALE 1:3,475.

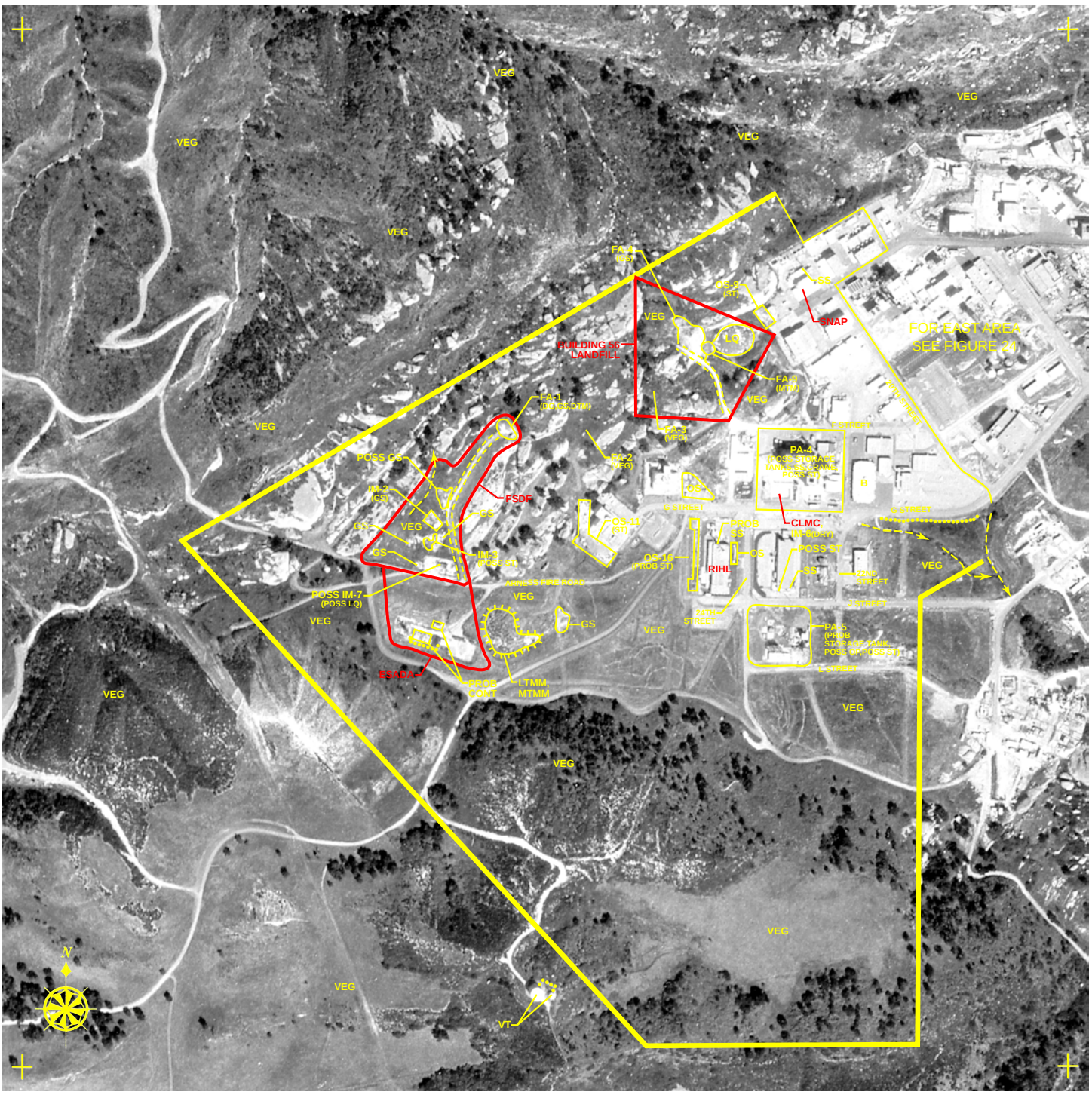

FIGURE 12. SANTA SUSANA FIELD LABORATORY - AREA IV, WEST SECTION, AUGUST 21, 1983. APPROXIMATE SCALE 1:3,520.

Redacted

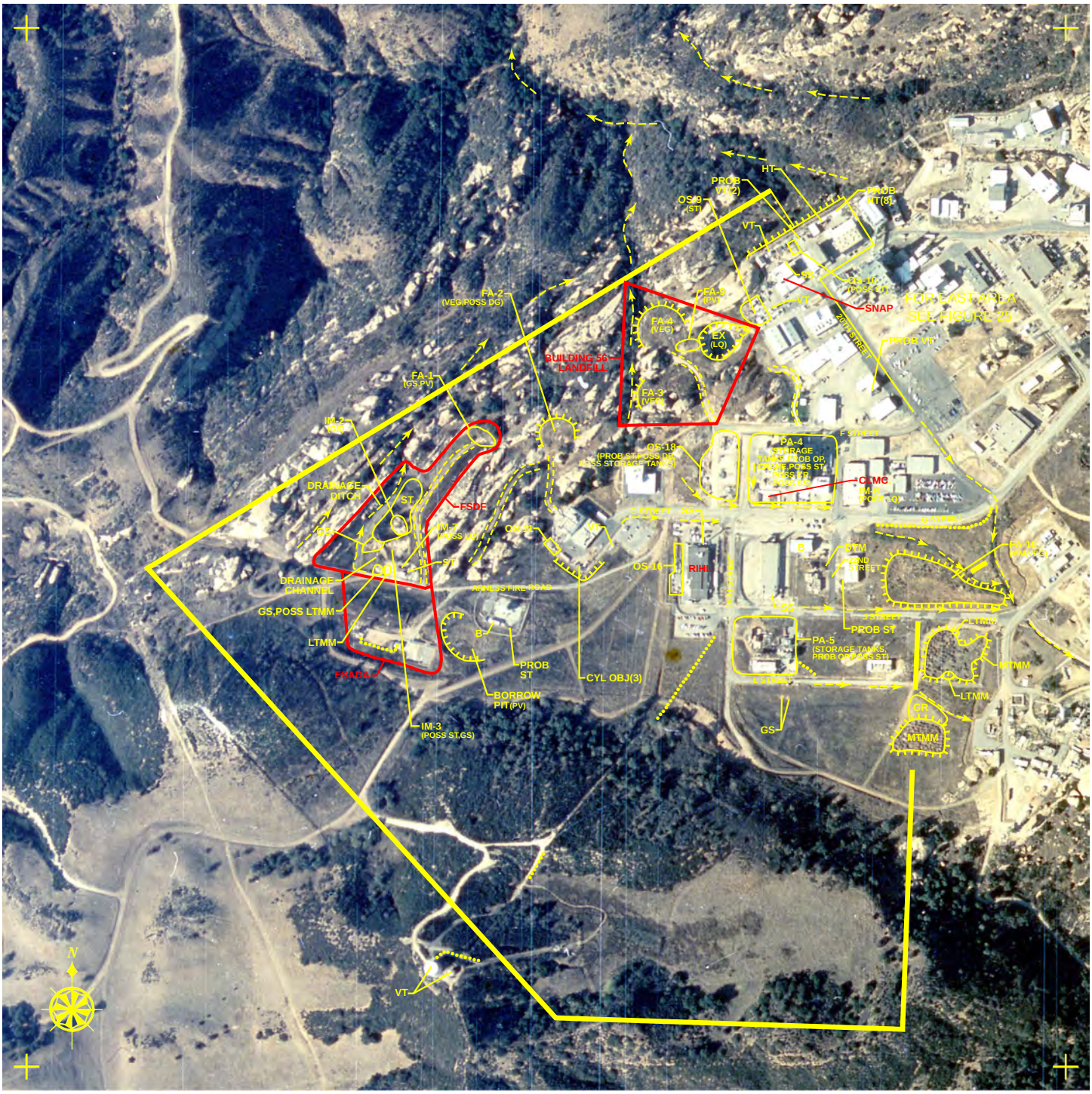

FIGURE 13. SANTA SUSANA FIELD LABORATORY - AREA IV, WEST SECTION, OCTOBER 10, 1988. APPROXIMATE SCALE 1:3,360.

Redacted

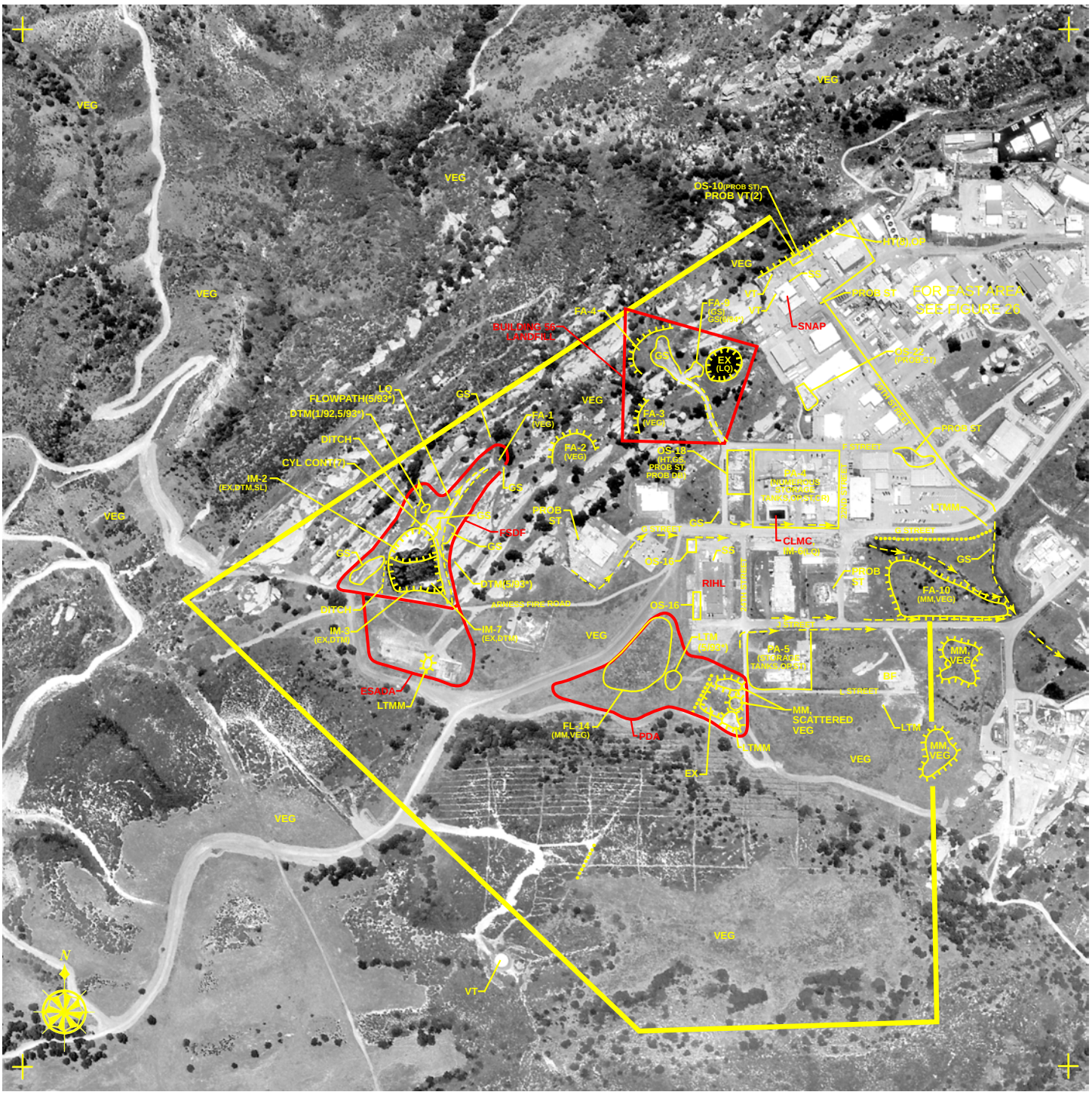

FIGURE 14. SANTA SUSANA FIELD LABORATORY - AREA IV, WEST SECTION, JUNE 19, 1995. APPROXIMATE SCALE 1:3,445.

Redacted

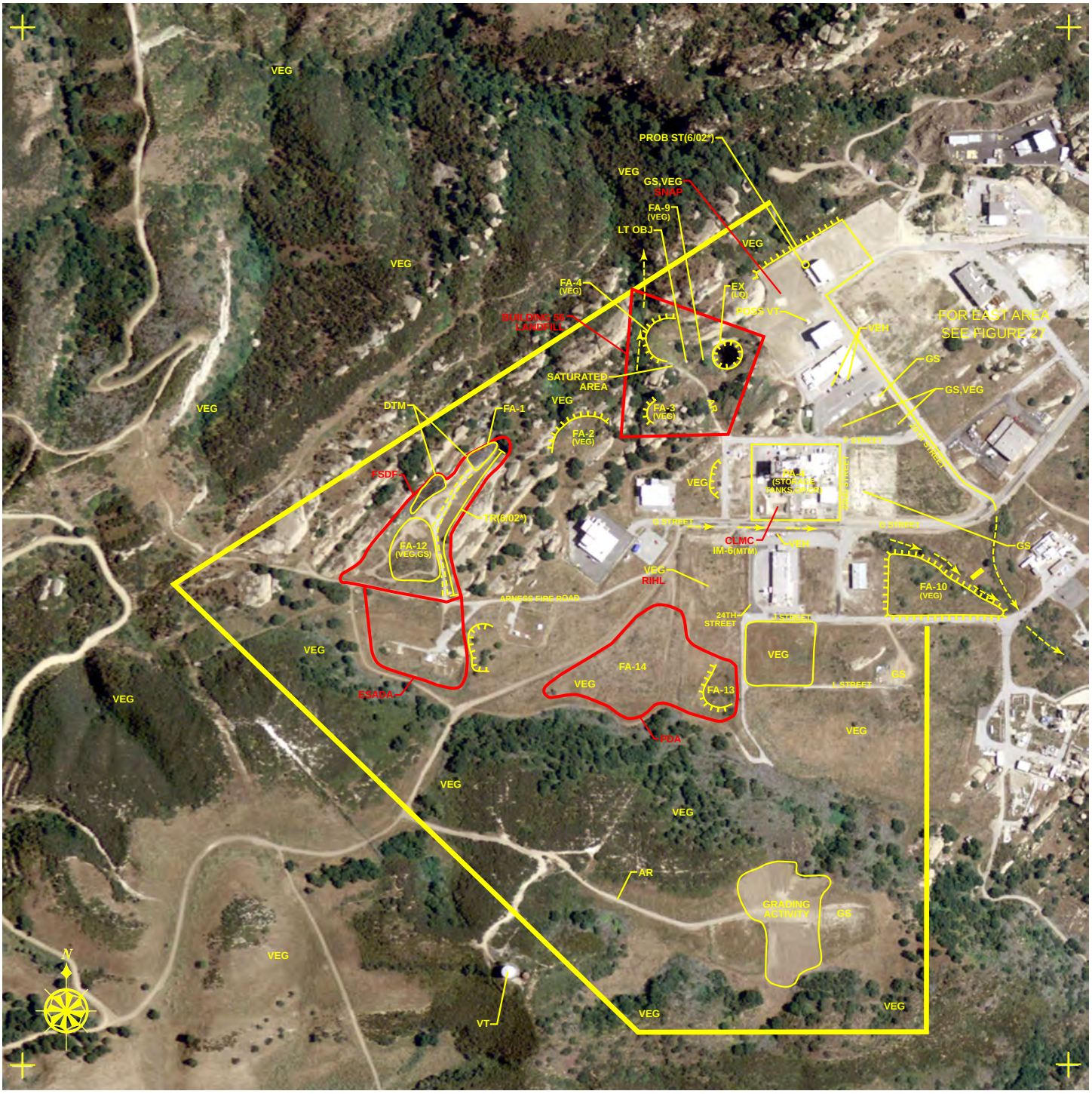

FIGURE 15. SANTA SUSANA FIELD LABORATORY - AREA IV, WEST SECTION, JUNE 8, 2005. APPROXIMATE SCALE 1:3,455.

Redacted

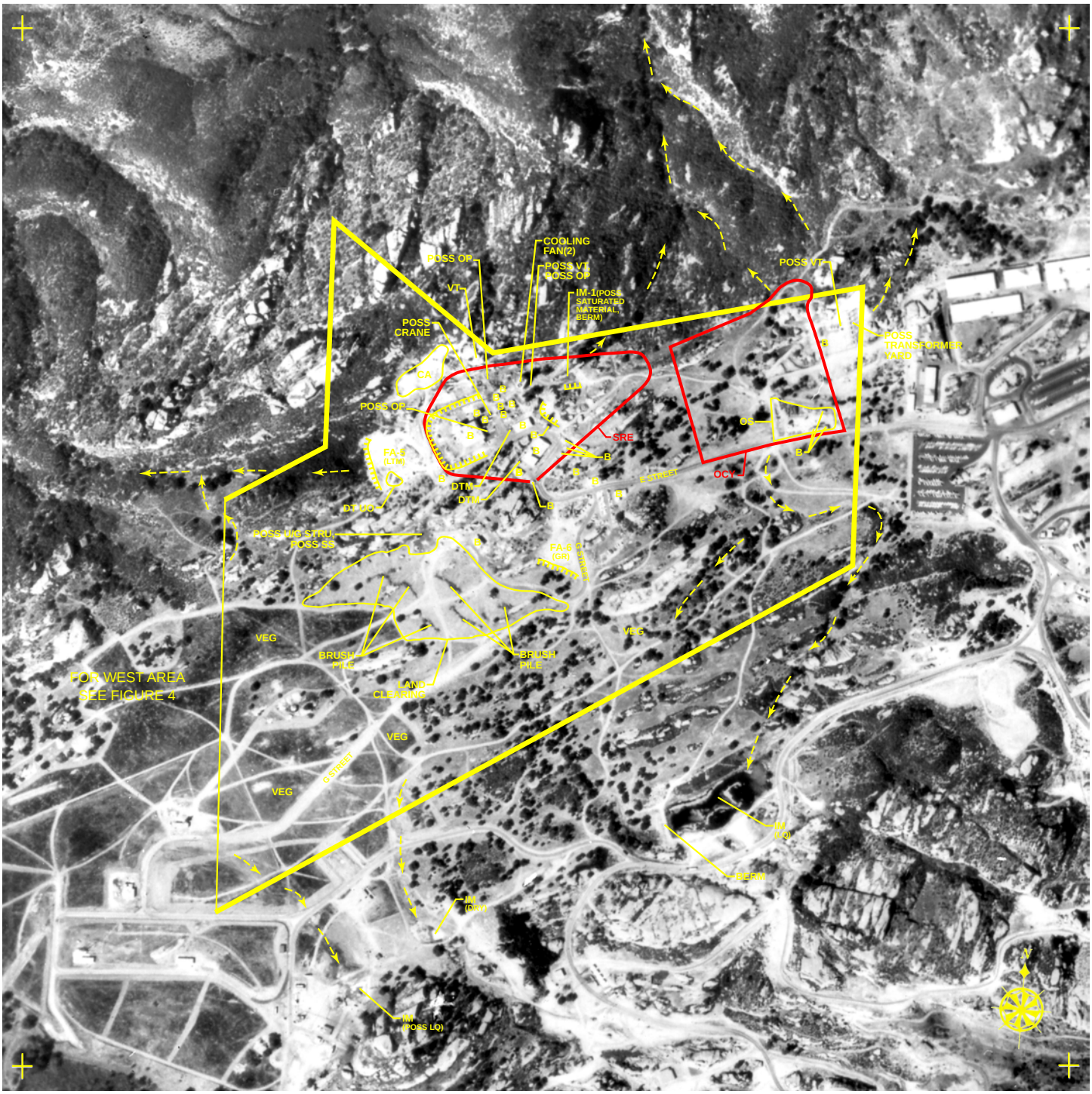

FIGURE 16. SANTA SUSANA FIELD LABORATORY - AREA IV, EAST SECTION, AUGUST 19, 1957. APPROXIMATE SCALE 1:4,020.

Redacted

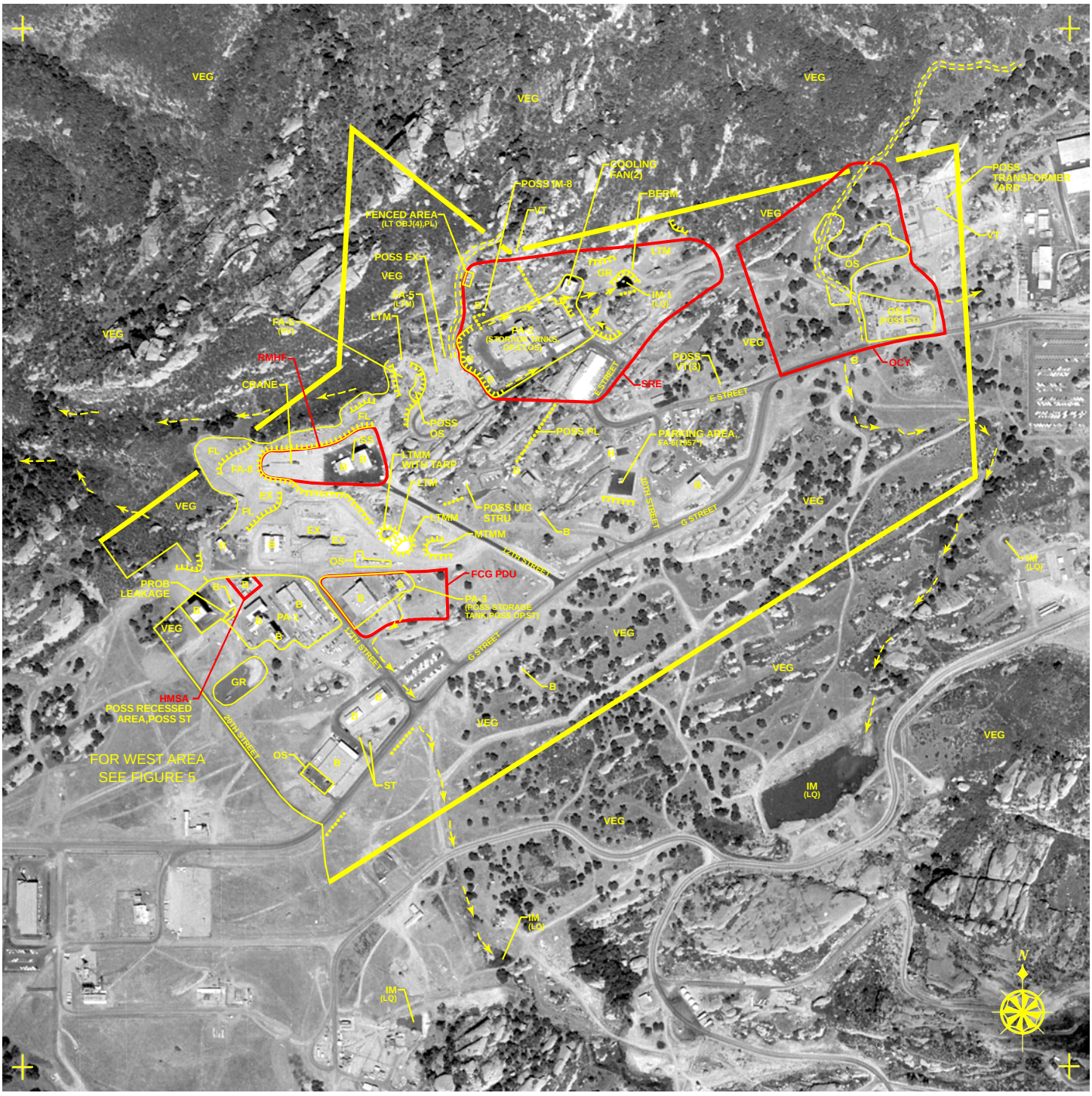

FIGURE 17. SANTA SUSANA FIELD LABORATORY - AREA IV, EAST SECTION, AUGUST 21, 1959. APPROXIMATE SCALE 1:3,430.

Redacted

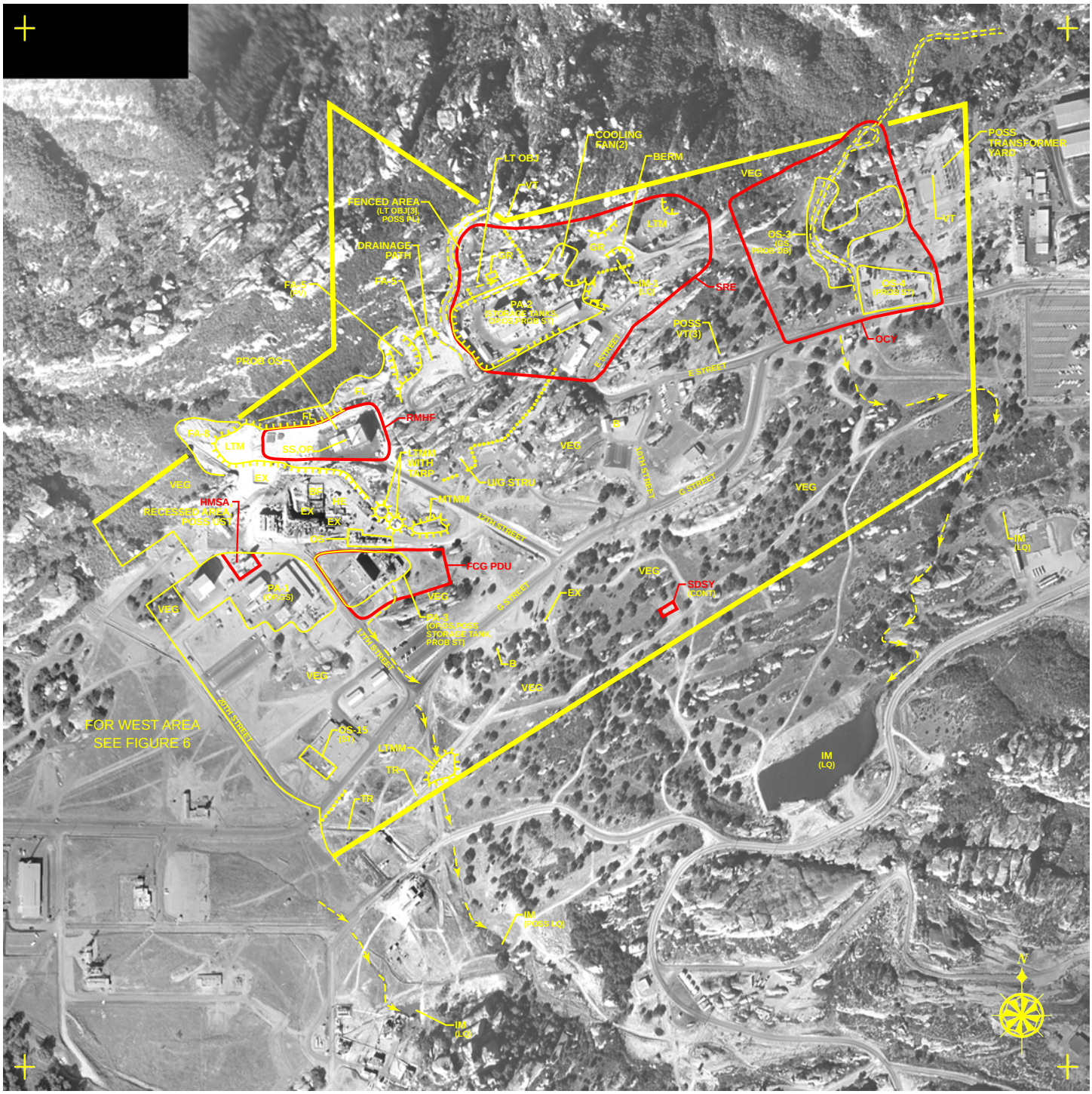

FIGURE 18. SANTA SUSANA FIELD LABORATORY - AREA IV, EAST SECTION, 1962/1963. APPROXIMATE SCALE 1:3,380.

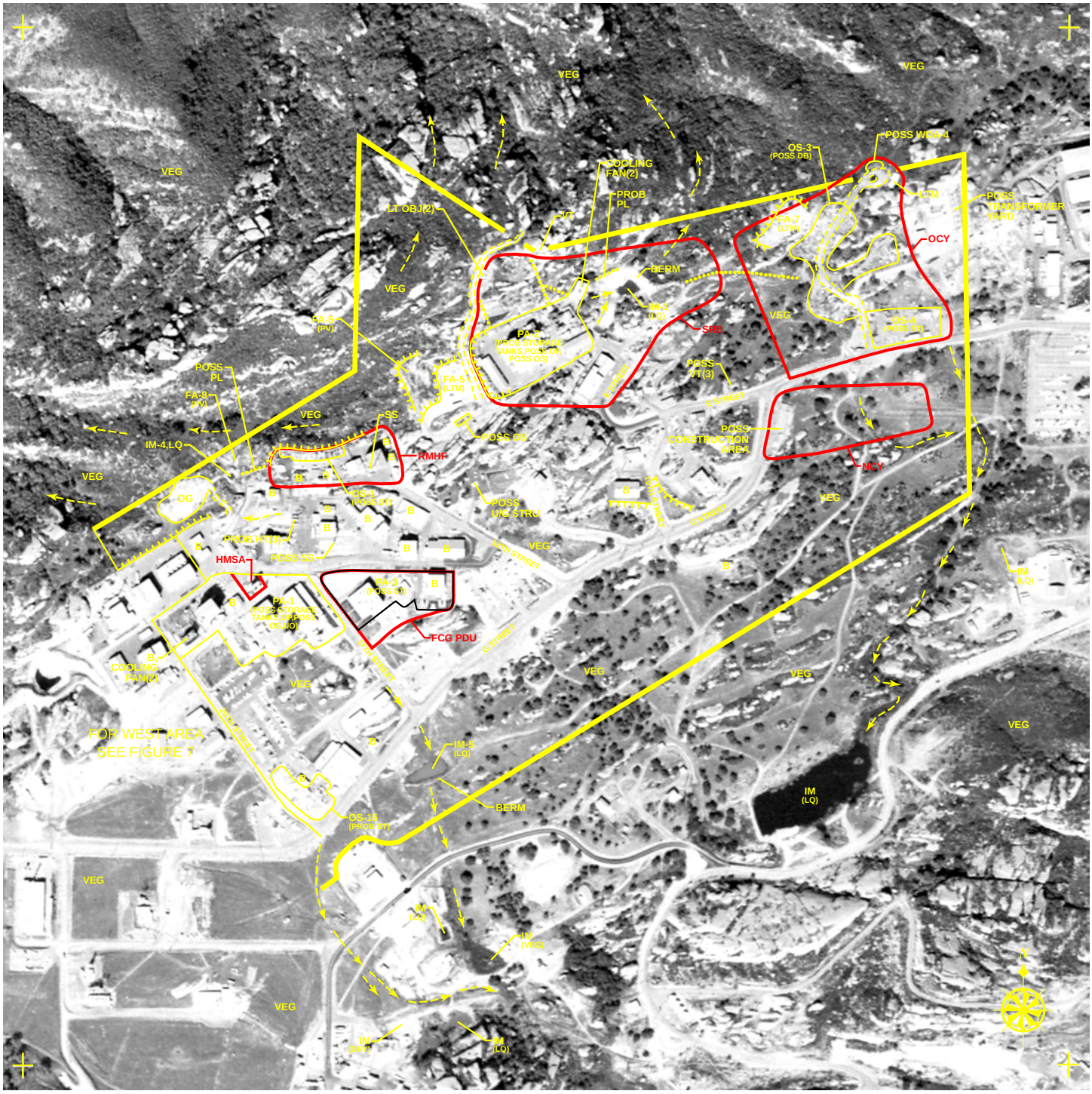

FIGURE 19. SANTA SUSANA FIELD LABORATORY - AREA IV, EAST SECTION, MARCH 1, 1965. APPROXIMATE SCALE 1:3,440.

Redacted

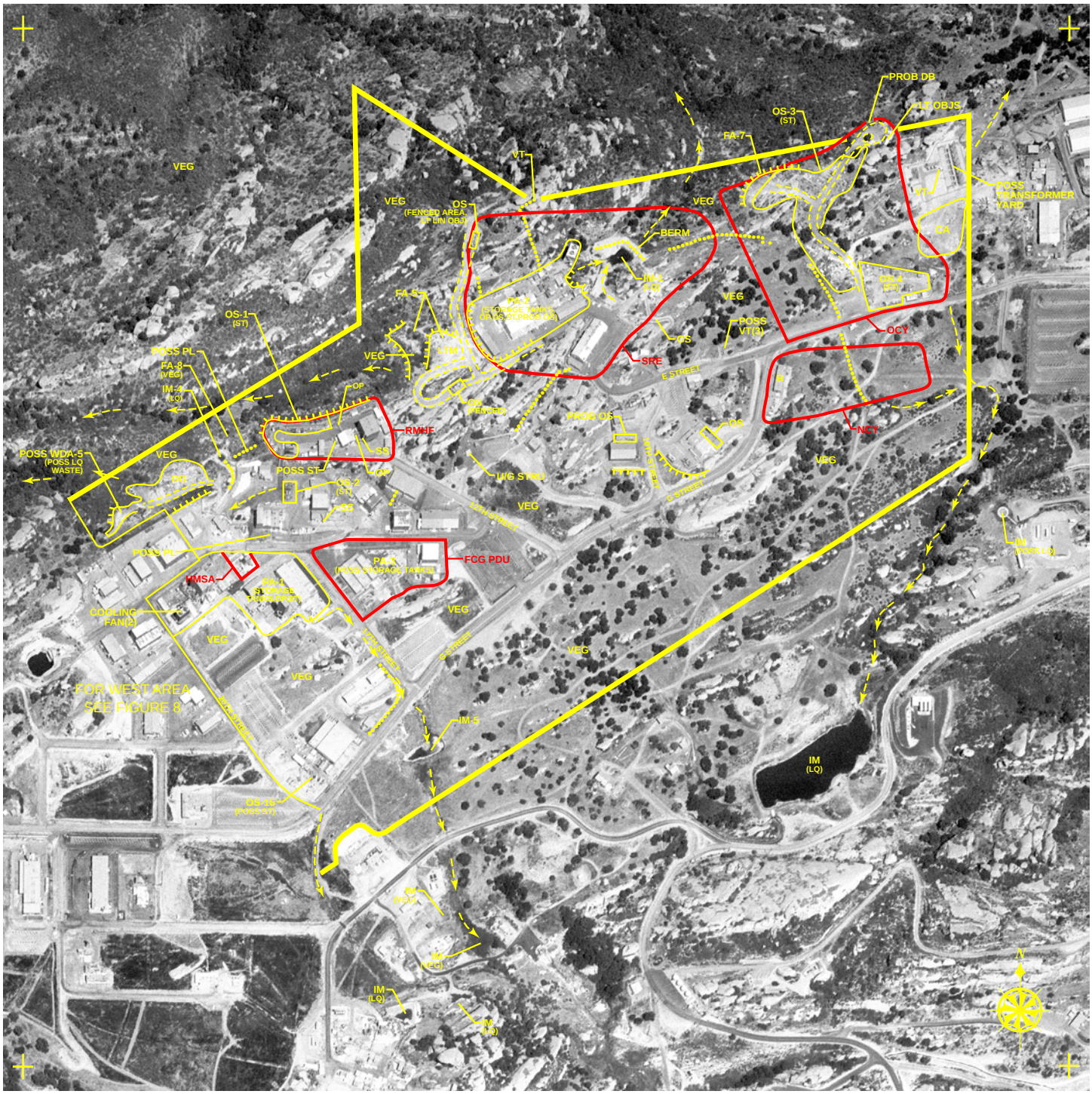

FIGURE 20. SANTA SUSANA FIELD LABORATORY - AREA IV, EAST SECTION, AUGUST 13, 1967. APPROXIMATE SCALE 1:3,350.

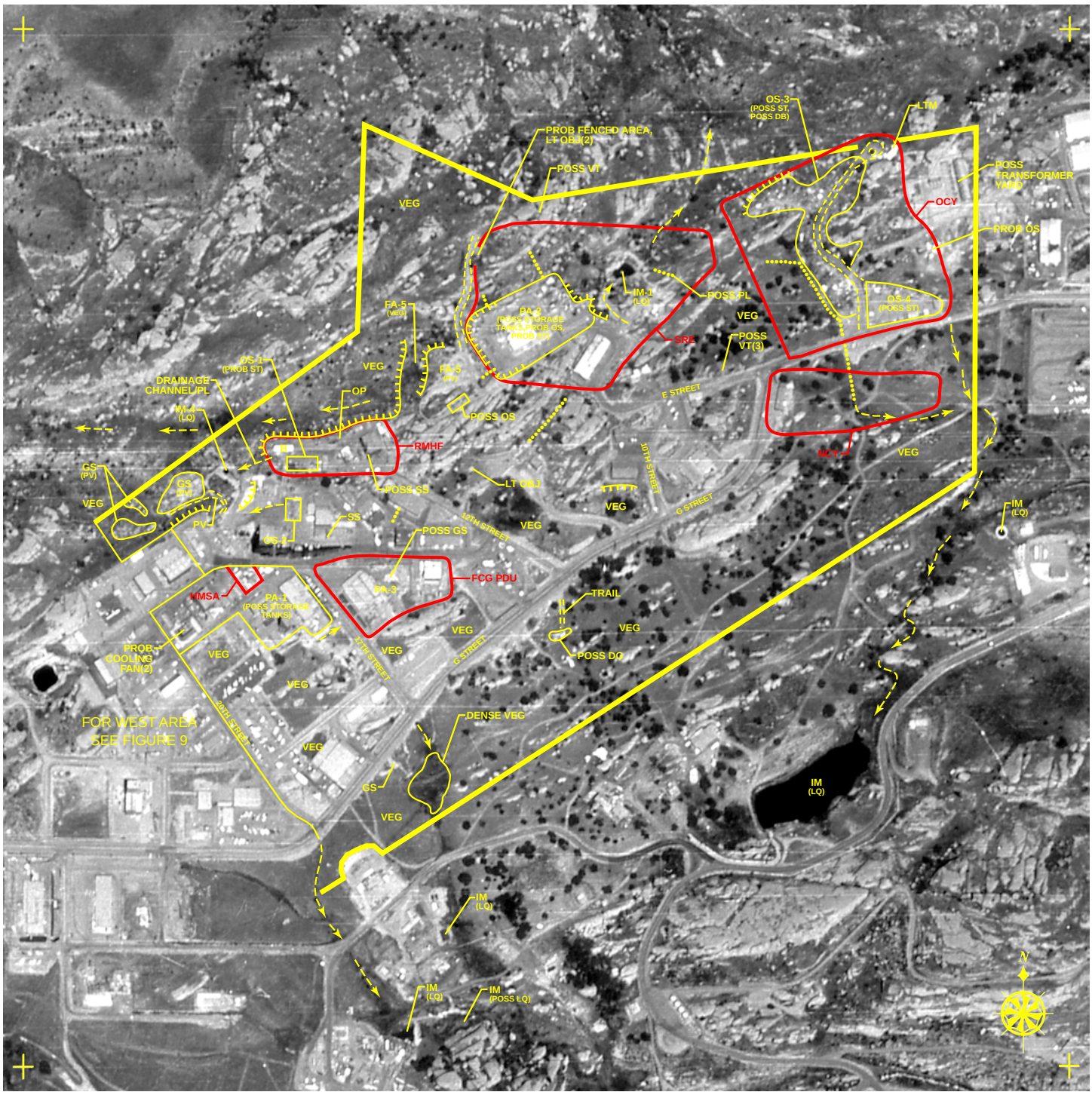

FIGURE 21. SANTA SUSANA FIELD LABORATORY - AREA IV, EAST SECTION, APRIL 20, 1972. APPROXIMATE SCALE 1:3,350.

Redacted

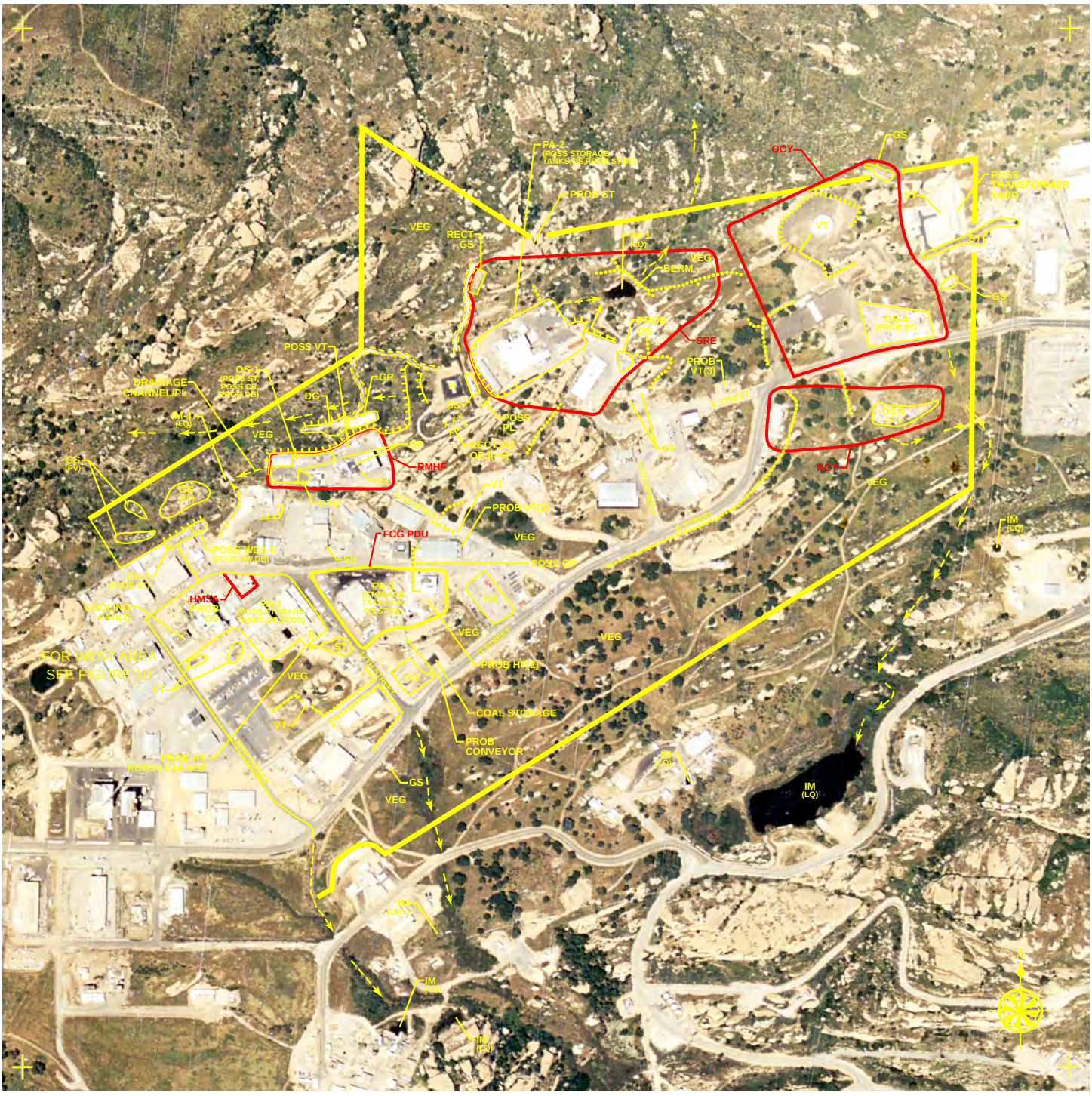

FIGURE 22. SANTA SUSANA FIELD LABORATORY - AREA IV, EAST SECTION, MAY 16, 1978. APPROXIMATE SCALE 1:3,415.

Redacted

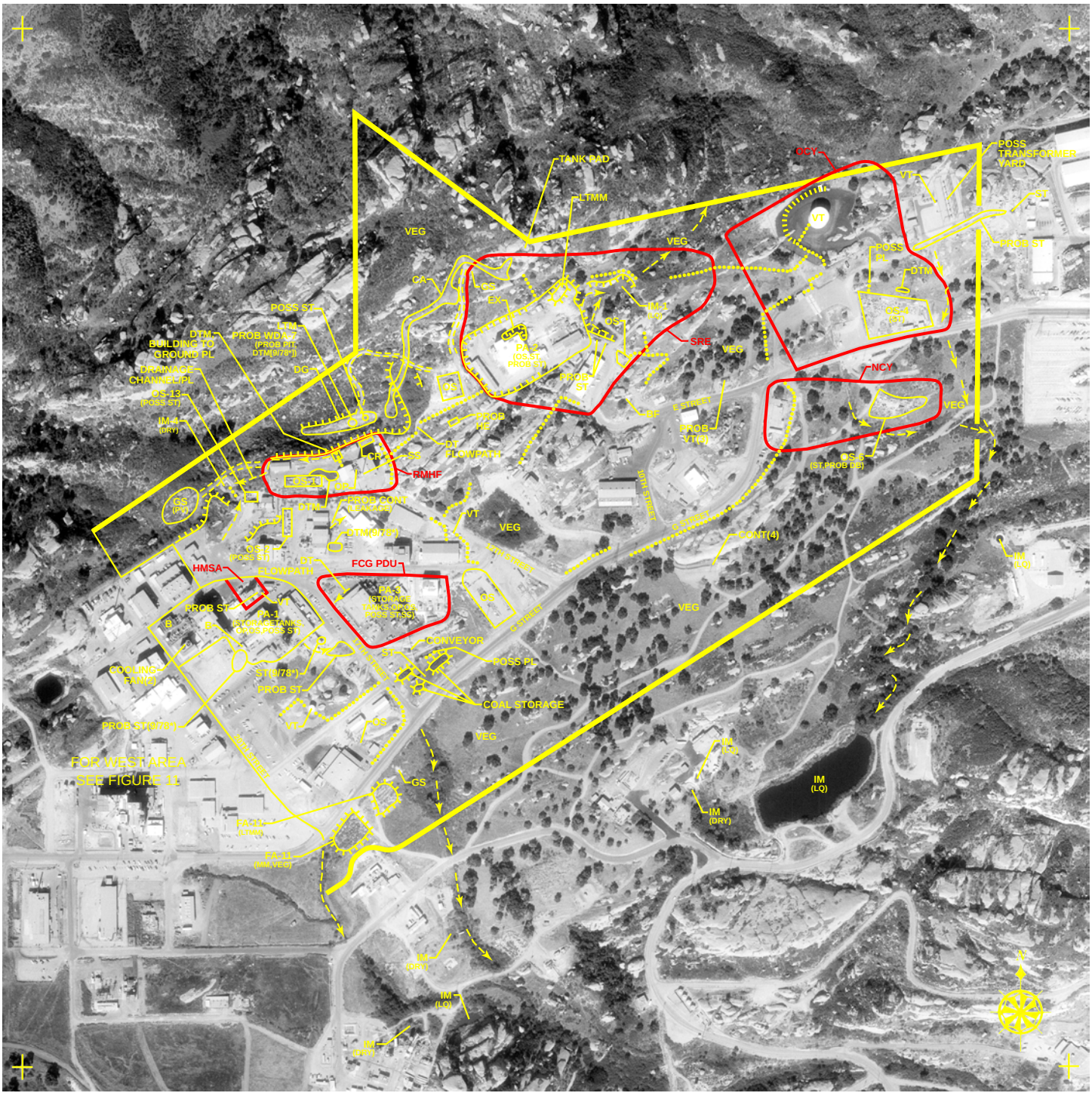

FIGURE 23. SANTA SUSANA FIELD LABORATORY - AREA IV, EAST SECTION, OCTOBER 21, 1980. APPROXIMATE SCALE 1:3,405.

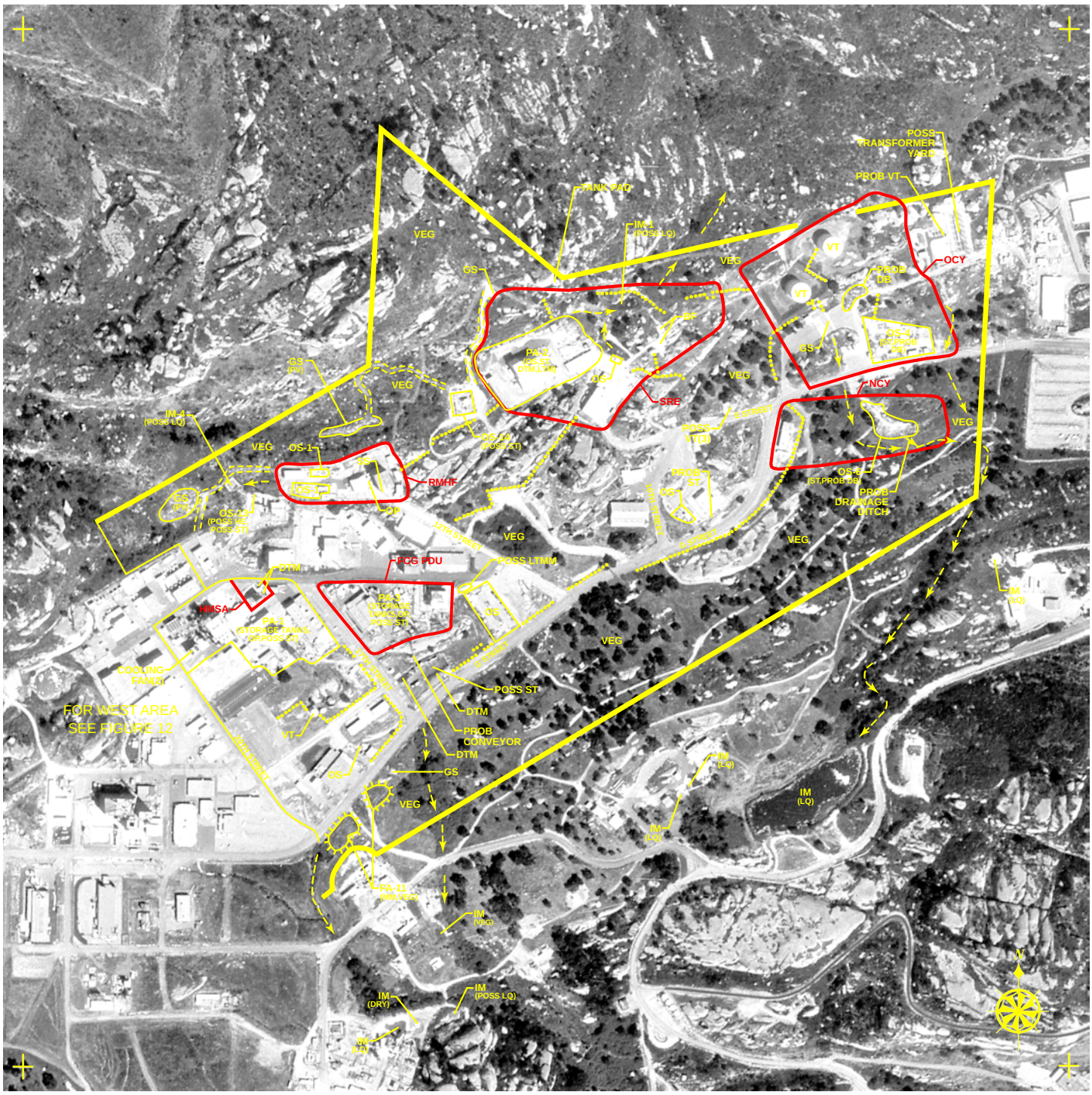

FIGURE 24. SANTA SUSANA FIELD LABORATORY - AREA IV, EAST SECTION, AUGUST 21, 1983. APPROXIMATE SCALE 1:3,455.

Redacted

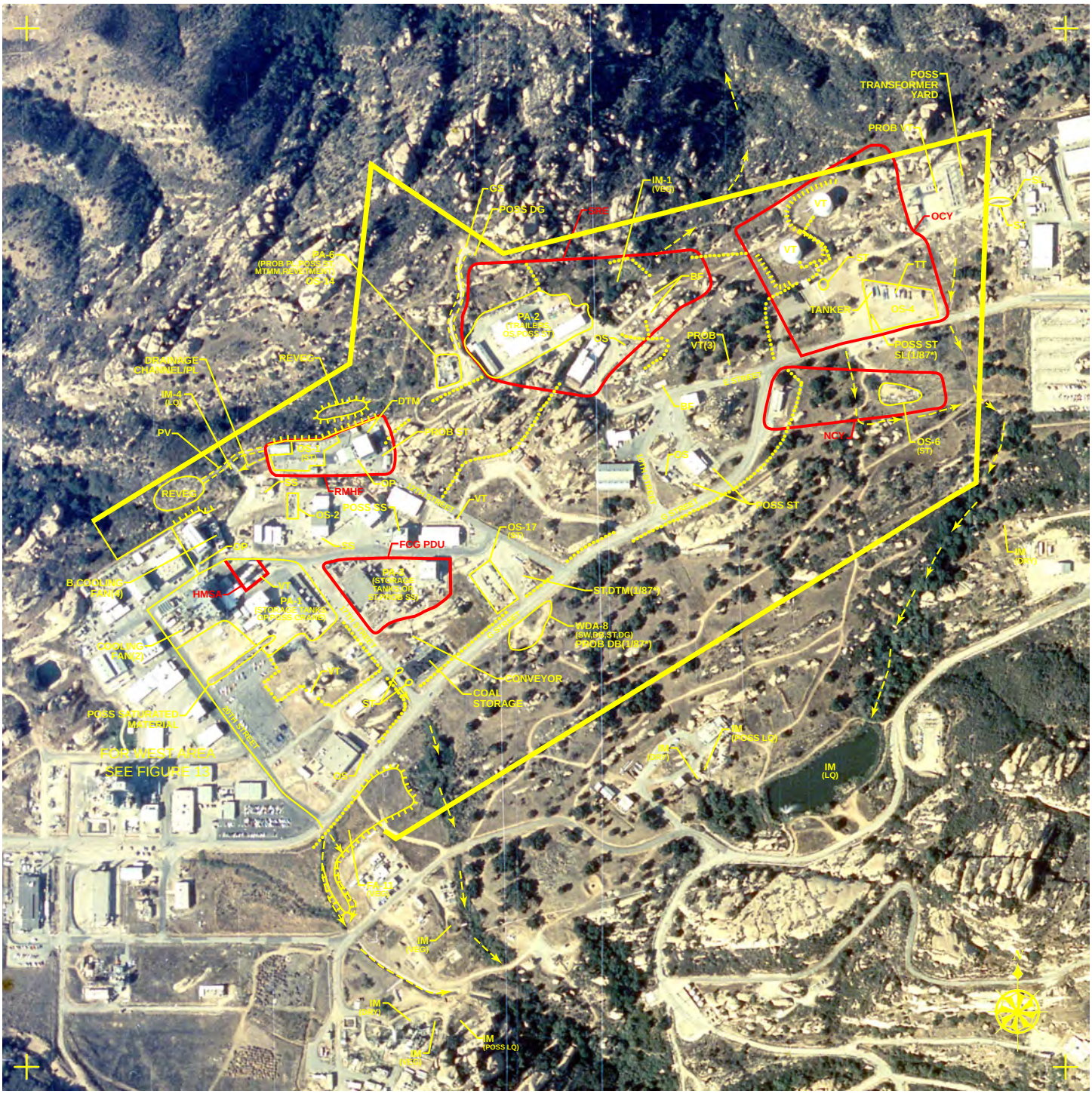

FIGURE 25. SANTA SUSANA FIELD LABORATORY - AREA IV, EAST SECTION, OCTOBER 10, 1988. APPROXIMATE SCALE 1:3,420.

Redacted

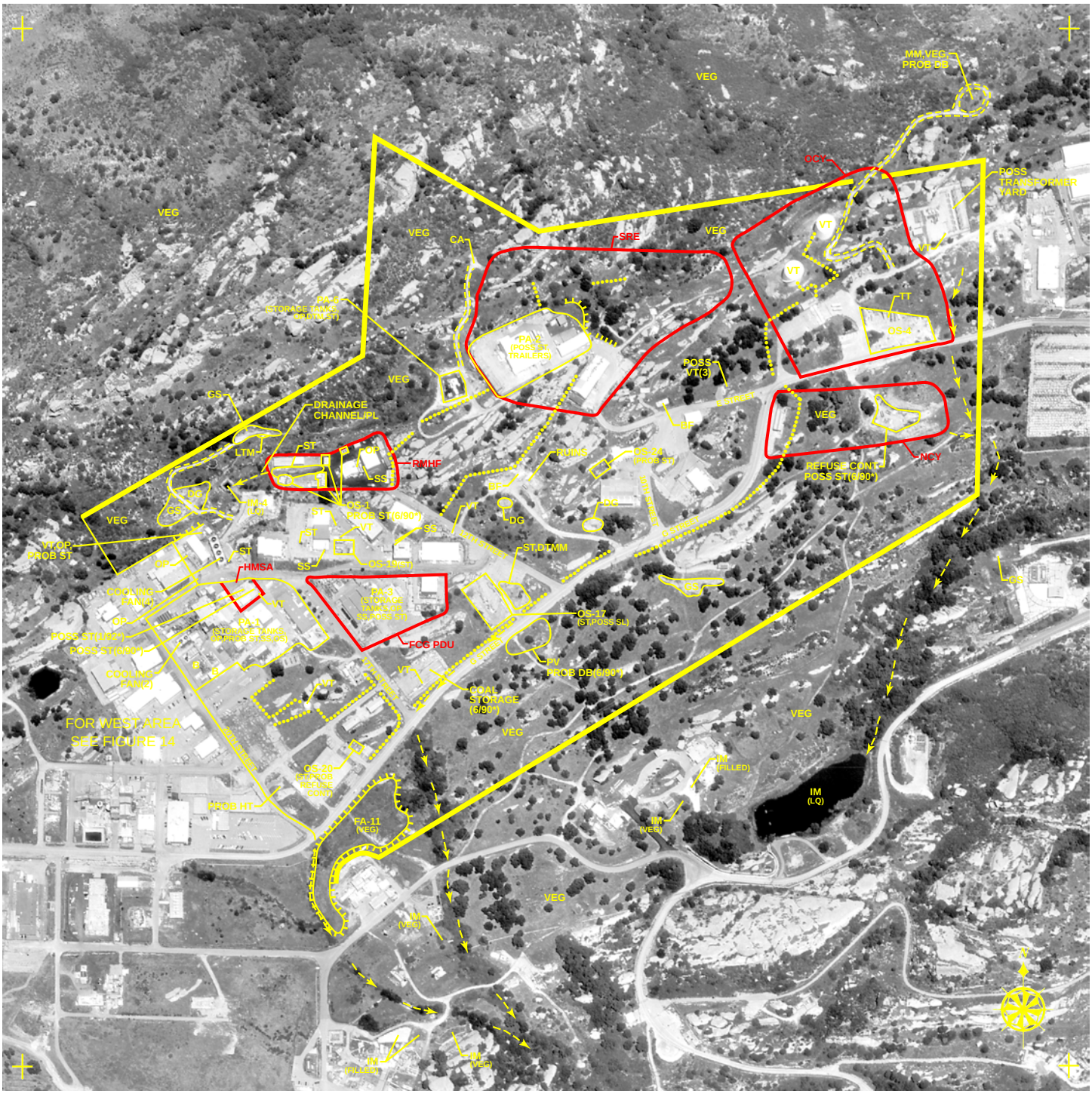

FIGURE 26. SANTA SUSANA FIELD LABORATORY - AREA IV, EAST SECTION, JUNE 19, 1995. APPROXIMATE SCALE 1:3,390.

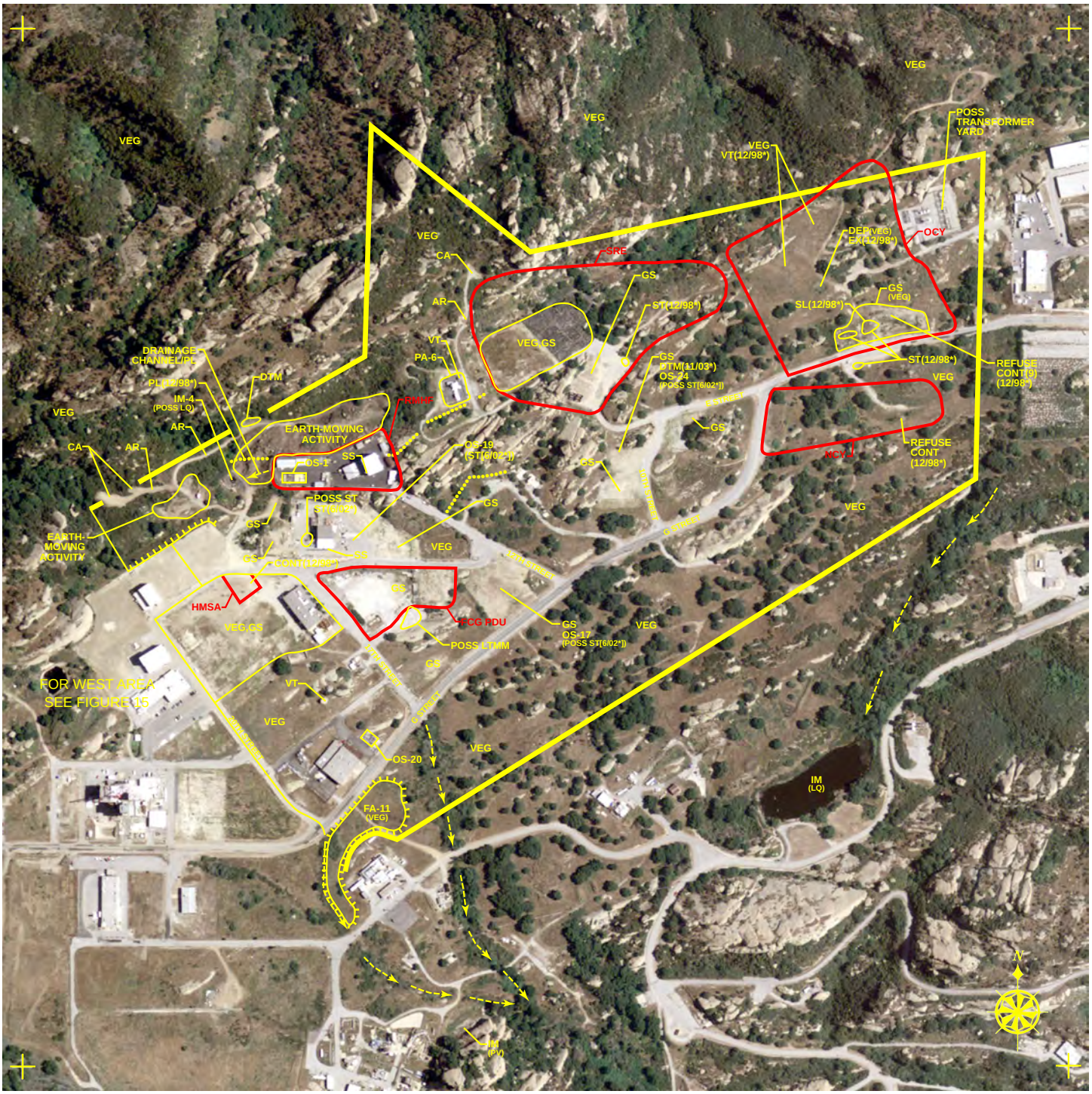

FIGURE 27. SANTA SUSANA FIELD LABORATORY - AREA IV, EAST SECTION, JUNE 8, 2005. APPROXIMATE SCALE 1:3,480.

Redacted

LEGEND

SITE BOUNDARY


DRAINAGE DIRECTION

ACCESS ROAD

ABOVEGROUND PIPELINE (PL)


MOUNDED MATERIAL


EXCAVATION/PIT


FILL FACE


BERM/DIKE

AG	AGRICULTURAL
AR	ACCESS ROAD
B	BUILDING
BF	BUILDING FOUNDATION
CA	CLEARED AREA
CONT	CONTAINER
CR	CRATES
CYL	CYLINDRICAL
DB	DEBRIS
DER	DERELICT
DG	DISTURBED GROUND
DEP	DEPRESSION
DT	DARK-TONED
EX	EXCAVATION
FA	FILL AREA
FL	FILL
GR	GRADED
GS	GROUND SCAR
HE	HEAVY EQUIPMENT
HT	HORIZONTAL TANK
IM	IMPOUNDMENT
LIN	LINEAR
LQ	LIQUID
LT	LIGHT-TONED
M	MATERIAL
MM	MOUNDED MATERIAL
MT	MEDIUM-TONED
OBJ	OBJECT
OP	OVERHEAD PIPELINE(S)
OS	OPEN STORAGE AREA
PA	PROCESSING AREA
PV	PARTIAL VEGETATION
RECT	RECTANGULAR
RES	RESIDENTIAL
REVEG	REVEGETATED
SL	STANDING LIQUID
SS	SMOKESTACK
ST	STAIN
STRU	STRUCTURE
SW	SOLID WASTE
TR	TRENCH
TT	TRUCK TRAILER
U/G	UNDERGROUND
UO	UNIDENTIFIED OBJECT
UST	UNDERGROUND STORAGE TANK
VEG	VEGETATED
VT	VERTICAL TANK
WDA	WASTE DISPOSAL AREA
~	APPROXIMATE
(M/YY*)	FINDING FROM PHOTO NOT REPRODUCED