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30 MAY 1978

FORMAL ENVIRONMENTAL ASSESSMENT

FOR THE

R-2508 COMPLEX ENHANCEMENT PROGRAM

P.E. 35126F

DEPARTMENT OF THE AIR FORCE

AIR FORCE SYSTEMS COMMAND

ELECTRONIC SYSTEMS DIVISION

APRIL 1978

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SECTION 1. INTRODUCTION

A. BACKGROUND INFORMATION

(1) Evolution of the R-2508 Complex Enhancement Plan. The R-2508 Complex is an area over the Upper Mojave Desert in southern California which is used by the Department of Defense for the advancement of weapons system technology. The area, which is approximately 140 miles long and 110 miles wide (Figure 1), consists of seven individually managed restricted areas in which aircraft and other weapons systems are tested and system operators are trained and exercised. The unrestricted airspace which underlies and is adjacent to the R-2508 Complex is used extensively by civil and military aviation. The proximity of unknown and/or uncontrolled aircraft and high performance military weapons systems, combined with the inability to adequately control aircraft within this airspace, creates an environment for potential mid-air collision.

The preservation and enhancement of this airspace resource is an urgent and high priority concern. This concern must be considered along with the knowledge that demands for use of this airspace are continuing to increase and the existing facilities cannot provide the level of services required. Flight test activities conducted in this airspace now involve missile delivery systems and defensive tactics which use vast amounts of airspace that exceed the available restricted airspace. Development of the desert areas for recreation, year-round living, mining and ranching has increased the public demand for air transportation and access to this airspace. Improved performance in civil aviation has increased the ease of access to the area and the numbers of requests for direct route operation are becoming more numerous. The demands for airspace are further complicated by a marked increase in the number of large-scale test, evaluation, and training exercises that are being requested by DOD agencies. These demands added to the normal, long-standing airframe and power plant testing, NASA testing, test pilot school missions, tactical training missions, and civilian contractor test projects, result in an occasional near saturation of airspace and compound problems of efficient use.

Several other factors also exist which emphasize the need to more effectively and efficiently manage and utilize this airspace.

- In the interest of energy conservation, the airline industry has begun to seriously question the need for restricting large areas of airspace. Therefore, they can be expected to support the development of a system which will allow civil and military aviation to use airspace more effectively.

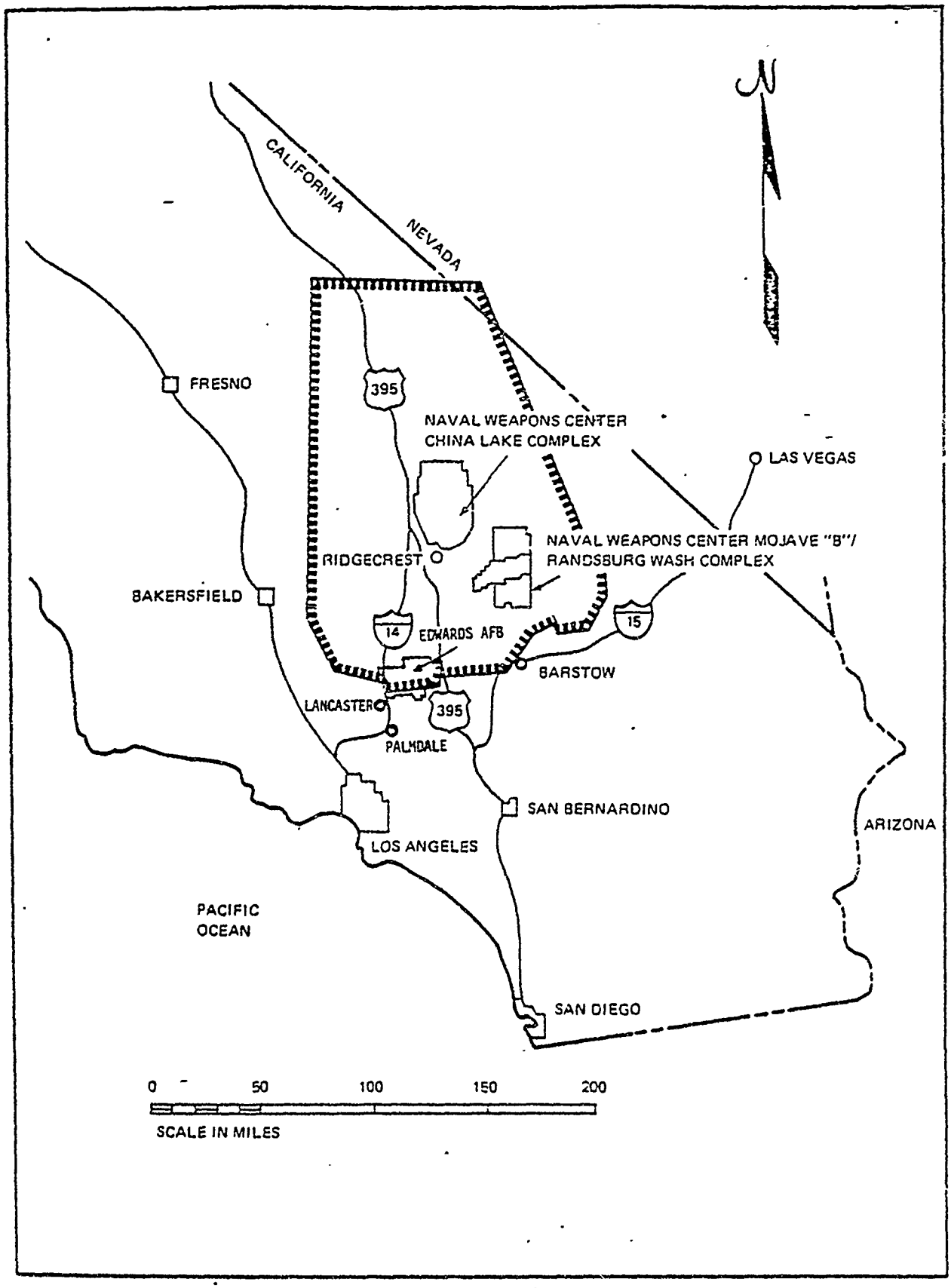


Figure 1 R-2508 Complex Location

- The anticipated construction and operation of the Palmdale Intercontinental Airport will require an air traffic control system that recognizes both military and civil needs and provides a shared use of airspace for all users.

- Airspace encroachment is a frequent occurrence and problem on both sides of the restricted area boundary.

The current enhancement endeavor supports concerns expressed by the Secretary of Defense and the Department of the Interior in the early 1970's regarding increased aviation in southern California. In June 1973, Air Force Communications Service (AFCS), at the request of Air Force Systems Command (AFSC), began a study of R-2508 problems. In September 1973, the Navy also initiated an engineering study of airspace surveillance problems of the R-2508 Complex. In the fall of 1973, the need for a comprehensive study of the entire complex was reaffirmed by the Air Force, Navy, Army and FAA and a joint group was formed to address the R-2508 problems. In March 2974, the R-2508 Joint Task Force was formalized and a list of tasks and target completion dates was established. In July 1974, a separate study of land and airspace in the Upper Mojave desert was also initiated at the direction of the Joint Logistics Commanders (JLC). A portion of the study was devoted to airspace and incorporated the ongoing efforts of the R-2508 Joint Task Force. In March 1974, as a result of this action, the JLC directed commanders of the installations within the R-2508 Complex to continue with the enhancement effort.

In March 1976, the R-2508 Complex Enhancement Plan was published. It discusses, conceptually, the operational and engineering requirements which must be satisfied to develop a centralized airspace management system. It also contains information on the additional personnel required to support the program and on the sites selected for the installation of new radar and communications equipment. The applicable details from the Enhancement Plan are summarized and included in this document.

(2) Existing Airspace Environment. The R-2508 California Restricted Area and the underlying restricted areas (R-2502, R-2505, R-2506, R-2509, R-2515 and R-2524) were originally established by the Air Coordinating Committee (Meeting 397, 1 February 1955) to designate areas for military mission activities which create a hazard to more orthodox flight activities and cannot mix with normal traffic. Known as the R-2508 Complex, this airspace is used for the development and testing of critical military aircraft and weapons systems, as well as training areas for reserve and active duty units. The normal Complex operating hours are 0600 to 1700 local, Monday through Friday, and 0600 to 1200 local, Saturday, with some minor exceptions. When the airspace is not required by the Complex users, it is returned to the Log Angeles Air Route Traffic Control Center (ARTCC) for its use.

The management of the complex during hours of operation has been a difficult task because of a lack of the equipment/facilities and associated sophistication required to monitor, control, and manage the missions of the Complex users. These deficiencies have created a serious mid-air collision potential within the Complex airspace. This situation has been made worse by the increasing numbers of flights within and transiting the area. Near mid-air collisions, having the potential of a considerble loss of life and property, including airframes and weapons systems still in the initial development stage, have occured. Another major problem area of equal concern is the inefficient use of the Complex airspace. Ever increasing fuel shortages and costs, and the equivalent effects of those energy factors on civil aviation necessitate improved and optimized usage of the airspace.

In an effort to correct the equipment/facility deficiencies, the Air Force, Navy and FAA have selectively implemented some new management and control/monitor procedures. Improvements have been made by rerouting air traffic and altering military flying schedules. Such efforts are significant, but insufficient to correct the problems associated with the rapidly growing volume of air traffic affected by the R-2508 Complex. Inadequate radar, communications, and command and control facilities/equipment continue to compound the problem.

The existing airspace configuration (Figure 2) is comprised of the seven restricted areas of the R-2508 Complex, eleven Air Traffic Control Assigned Airspace Ares (ATCAAAs)*, and unrestricted airspace which underlies seven of the ATCAAAs. These seven ATCAAAs are activated whenever R-2508 is in use by the military. Three of the ATCAAAs (Independence, Tehachapi, and Death Valley) underlie R-2508, and four (Porterville, Rosemond, Coyote Lake, and Beatty South) laterally extend R-2508 to meet flight test and training requirements. Four additional ATCAAAs (Bishop, Beatty North, Silver Lake, and Bakersfield) are designated for special flight tests which cannot be contained within normally assigned airspaces. Four work areas (shown in Figure 3) extend from the surface upward excluding all individual restricted areas except R-2508. The supersonic corridor shown in Figure 2 extends from the Colorado River to Gorman and can be activated along with R-2508.

(3) R-2508 Complex Users and Operations. The primary users of the R-2508 Complex are the Naval Weapons Center (NWC), China Lake; the Air Force Flight Test Center (AFFTC), Edwards AFB; George AFB; Ft Irwin, and Air Force Plant 42, Palmdale, CA. These agencies share the use of the Complex airspace and comprise the membership of the R-2508 Complex Control Board (CCB).

*ATCAAA's are areas of defined dimensions outside the boundary of R-2508, in positive control airspace, with clearance required prior to entry.

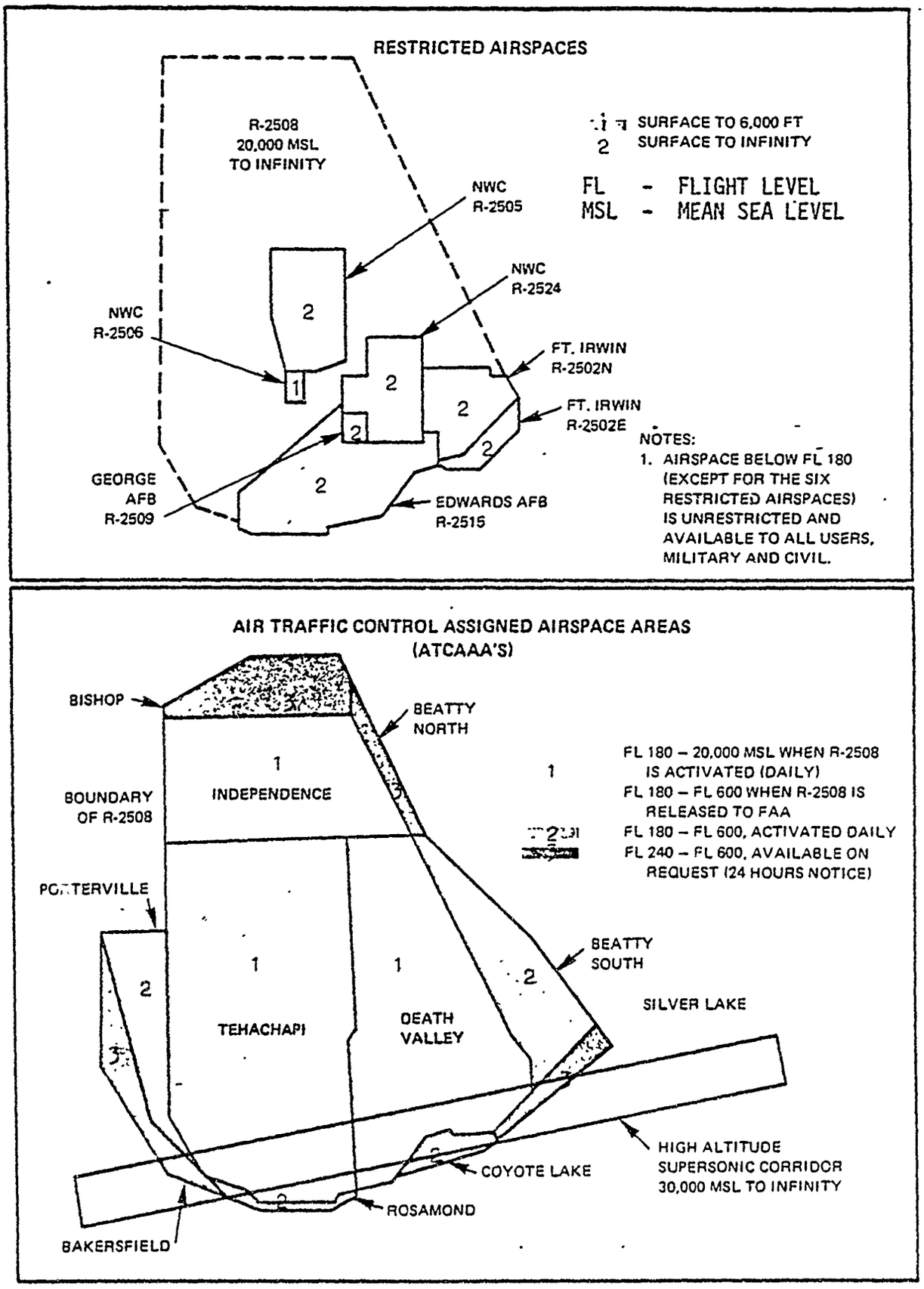


Figure 2 R-2508 Complex Airspace

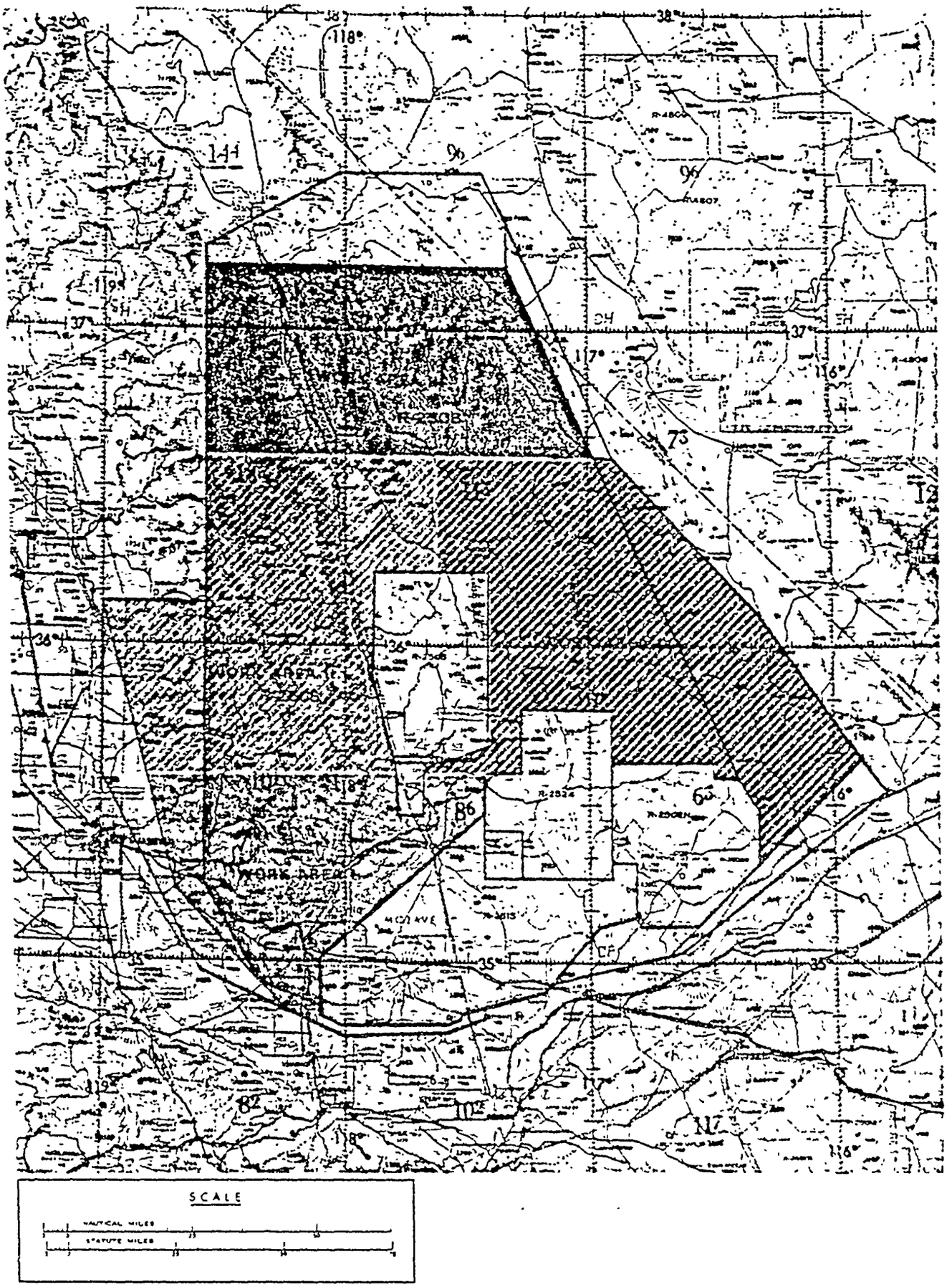


Figure 3 R-2508 Complex Work Areas

Each of the primary users, except for Air Force Plant 42, is assigned control of one or more of the restricted areas within the Complex, as indicated below:

NWC	R-2508, R-2505, R-2524, R-2506
AFFTC	R-2515
Ft Irwin	R-2502
George AFB	R-2509

Military and civilian agencies that conduct flight operations within the R-2508 Complex and who are sponsored by one of the five primary users are called secondary users. These include Army, Navy, Air Force, and civilian operational units and test activities that are temporarily based within the complex or who may operate from nearby airfields and aircraft carriers. Three secondary users are permanently based within the complex: Air Test and Evaluation - Squadron Five is located at the China Lake NWC, California; NASA - Dryden Flight Research Center and the Army Aviation Engineering Flight Activity are located at Edwards AFB, California. Secondary users operate freely under the rules established by the R-2508 CCB. In addition to these secondary users, a primary user becomes a secondary user whenever he uses the airspace of another using agency.

All other aircraft, gliders, and balloons which operate within the R-2508 Complex airspace under existing FAA and/or military regulations, who are not sponsored by a primary user, are called "other" users. Other users may be private, commercial or military aviation. They are not obligated or required to abide by the rules established by the R-2508 Complex Control Board. They may transit the area or operate from local civilian airfields.

The population of the greater Los Angeles area owns approximately 18 percent of the nation's light aircraft. Nevada residents, and those living in and around the R-2508 Complex area also own and operate light aircraft. Several valleys and corridors through the R-2508 Complex form natural flyways for these operators to traverse between the greater Los Angeles area and areas of Nevada, and eastern areas of California. Most of this traffic now flies VFR, on a "see and be seen" basis without controller assistance, below Flight Level (FL) 180. Major traffic routes are shown in Figure 4.

The airspace areas within the R-2508 Complex are used for a variety of activities. These are summarized below.

- R-2508. Extensive flight activity is conducted within and under R-2508 for the purpose of training, weapons, weapon systems, and aircraft testing not requiring weapon release, and flight patterns for various gunnery, bombing, missile, and electromagnetic countermeasures activities. Longer range missiles, higher performance aircraft, increased Air Combat Maneuvering (ACM) training, and more emphasis on

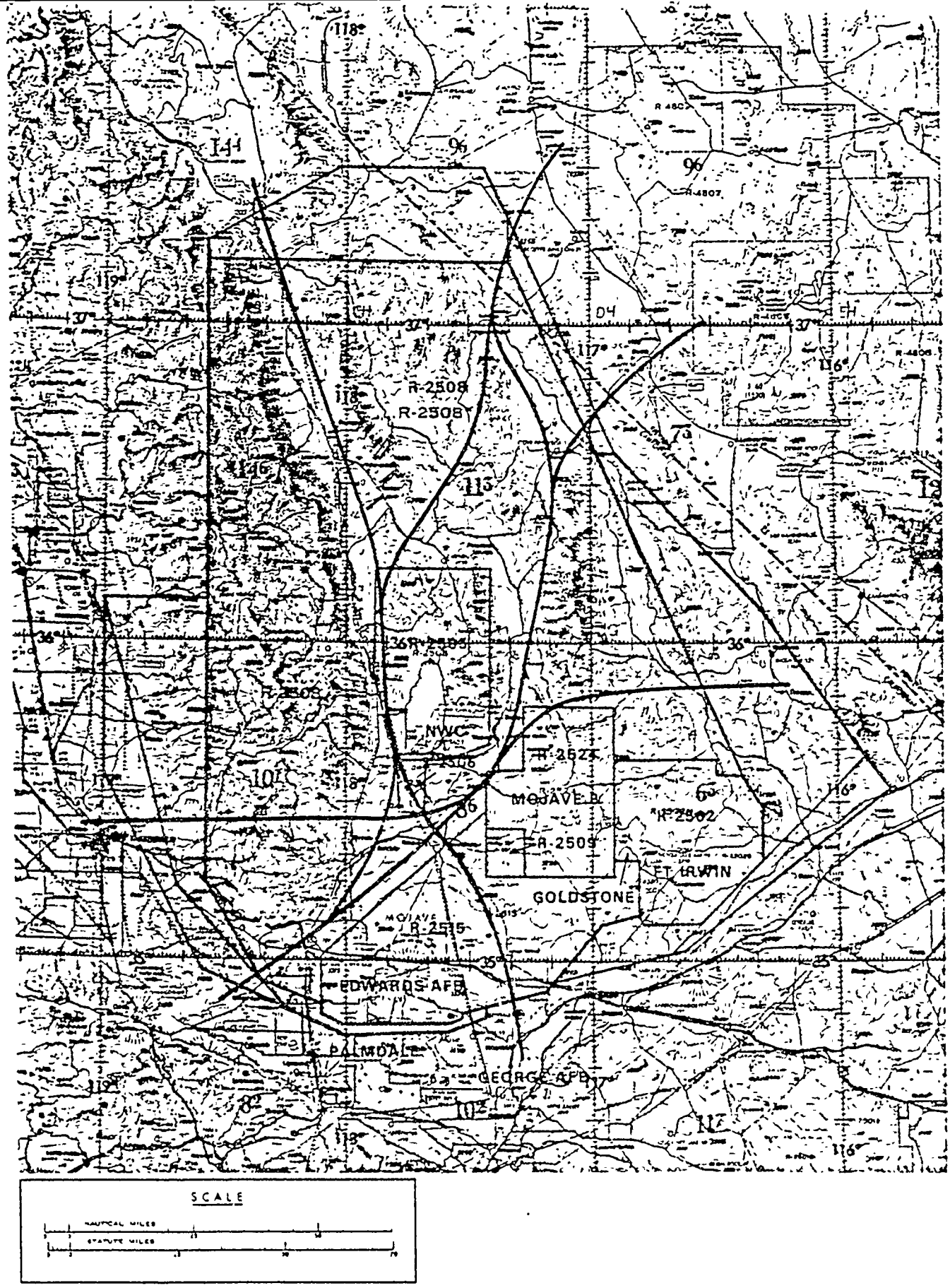


Figure 4. Major Light Aircraft Traffic Routes

lower altitude tactics for both fighter and attack aircraft have required the establishment of ATCAAAs by FAA. Typically, China Lake NWC, George AFB, and Edwards AFB are the primary users.

- R-2502. The R-2502 restricted area consists of two parts, R-2502N and R-2502E, which have been established to facilitate selective release for joint use purposes. This airspace is an essential element in the conduct of flight testing, tactical training, and ground based ordnance operations used primarily be George AFB and Fort Irwin.

- R-2509. This eight by nine nautical mile restricted area provides airspace for operational weapons delivery training conducted as part of tactical aircrew proficiency requirements. It is the primary air-to-ground munitions delivery range for George AFB. The range serves as a bomb, rocket, and gunnery scoring facility for both conventional and nuclear deliveries and is used continuously during daylight hours and, under controlled circumstances, for night operations. It is also used for ingress and egress to R-2524 Echo Range for electronic warfare tests. Electronic equipment related to Echo Range is located on Navy land within R-2509.

- R-2515. This restricted area provides airspace utilized by the Air Force Flight Test Center (AFFTC), Edwards AFB, to accomplish flight test and other related RDT&E activities. The airspace overlies the Edwards AFB Reservation, an area of approximately 470 square miles, which contains the Precision Impact Range Area (PIRA) and other instrumented test areas. The remainder of the R-2515 airspace of approximately 1,360 square miles covers a surface area composed of a mixture of private and public lands. A number of flight test operations are conducted in designated test areas within R-2515 including weapon systems compatibility testing by manned and unmanned test vehicles, supersonic operations at all altitudes, spin and dive testing, stability and control, aircraft performance, flight envelope verification and similar type activities. This area is also used by George AFB and other complex users for transiting to and from range, test areas, and work areas within the R-2508 Complex.

- R-2506. This restricted area provides essential airspace for low altitude high-speed approaches by aircraft to the China Lake NWC instrumented aircraft ranges. By abutting directly to the southwest corner of R-2505, it provides an approach safety corridor six miles wide and 13 miles long, to these ranges.

- R-2524. This restricted area provides airspace for two ground test ranges which are typically used for aerial gunnery, targets for supersonic bombing runs for aircraft using the supersonic corridor, development testing of guided missile fuses, and electronic counter-measure systems checkout and training area for the operating forces of all services.

- R-2505. This restricted area consists of approximately 1,020 square miles of airspace overlying landscape assigned to China Lake NWC. Within this landscape are located most of the instrument ranges, buildings, and facilities of the Center. The China Lake NWC building complex is located in the extreme south central portion of R-2505. The airspace area to the north of these ground facilities provides a safe area for the research, development, test, evaluation, and operational training of naval tactical air warfare related weapons, and weapon systems. The R-2505 airspace with its underlying ranges, facilities, instrumentation, safe areas, realistic target areas, and special test tracks is the primary "outdoor laboratory" and is virtually unlimited in possible test objectives that can be met within the confines of the land mass underlying it. Both fixed and mobile instrumentation units are deployed throughout the six areas to provide data collection from selected components of the test vehicles. The flight requirements and, thus, current uses of this airspace are determined by the test objectives.

- Unrestricted Airspaces. The current military uses of R-2508 Complex unrestricted airspace are those necessary to supplement current uses of the designated restricted areas within the Complex. Sometimes these uses overlap in that both restricted and unrestricted airspace is used for the same purpose. (A limitation on supersonic flight near national parks and monuments located within the complex further dictates what work areas can be used for high-speed, low altitude testing.) Complex unrestricted airspace serves for such general use as ingress and egress to targets and airfields within restricted areas, normal pilot training, maintenance test flights, low altitude Instrument Flight Rules (IFR) traffic, and Visual Flight Rules (VFR) traffic through the complx. Often test objectives can be met at altitudes below 18,000 feet Mean Sea Level (MSL) in unrestricted airspace.

Continuing increase in the performance of aircraft, weapons, and weapon systems programmed for activities within the complex, together with the known growth in civil aviation, indicates a daily potential for conflict of operations conducted in unrestricted airspace. Longer range, lower altitude weapons testing is on the increase. Modern sophisticated weapons release systems require radar coverage over terrain sometimes not located within restricted airspace. These factors contribute to the extensive use of R-2508 Complex unrestricted airspace by all users.

(4) Enhancement Concept. The R-2508 Complex Enhancement Program is a Joint DOD/FAA effort designed to establish a workable airspace management and control system for the entire complex by incorporating the use of existing radar and air traffic management facilities together with new gap-filler type radars and a new central coordinating facility (CCF) to consolidate the one responsible and responsive entity. Consideration for new radar/communications

coverage requirements has been given to those areas where primary users are likely to encounter other air traffic.

The primary objectives of the enhancement effort are:

- To provide increased air safety and utilization of restricted airspace by improving communications and radar surveillance to the R-2508 Complex.

- To establish a system for coordination of all flight activities in the R-2508 Complex.

- To optimize the joint usage of the entire R-2508 airspace for both DOD and civilian aviation uses.

These objectives will be accomplished by augmenting the "see-and-be-seen" flight avoidance procedure presently used in some restricted and unrestricted areas within and adjacent to the R-2508 Complex with a radar service area utilizing present state-of-the-art radar and communications abilities.

This program is intended to be a multi-phased endeavor, utilizing funds spread over a five year period, beginning with FY78. The system is designed to make maximum use of existing structures and equipment to minimize expenditures, socioeconomic and environmental effects. Where new equipment is necessary, consideration will be given to such factors as performance and reliability, cost effectiveness, and flexibility for expansion.

The system is expected to be completely operational in FY83 and will be implemented in three phases:

PHASE 1. A Central Coordinating Facility/Air Traffic Control Facility (CCF/ATCF) and a Mission Control Center (MCC) at Edwards AFB and Mission Control Facilities (MCF) at George AFB, the Naval Weapons Center (NWC) (China Lake), and Fort Irwin will be implemented to provide a coordinated airspace management capability. Data from existing radar facilities at Boron, Paso Robles, Laurel Mountain, and Edwards AFB will be integrated for use at the ATCF, the MCC, and the MCFs. Additionally, a contractor-conducted study has been completed to aid in determining the most cost-effective data processing system available for use in the Complex.

PHASE II. Five unmanned gap-filler surveillance radar systems will be installed at Panamint Valley, Owens Valley, Searles Valley, Fremont Valley, and Velvet Peak to provide low angle coverage to fill in the surveillance voids of the existing long-range radar systems providing coverage of the R-2508 Complex airspace. These installations will include the microwave and landline communications links needed to tie the facilities into the ATCF, CCF and NWC MCF.

The installation and integration of a new data processing system will be initiated at Edwards AFB and the NWC. The radar data from the AN/GPN-12 radar at George AFB will be remoted to Edwards AFB for use at the ATCF. Additional display and communications equipment will be installed in the NWC MCF.

PHASE III. A sixth unmanned gap-filler radar sytem will be installed at Indian Wells Valley and a new long-range radar system may be installed at Laurel Mountain. The latter would replace the older, less sophisticated equipment used during the first two phases of the program. The installation and integration of the data processing system will be completed, giving the control facilities at Edwards AFB and the NWC the capability to display data from all sensors appropriate to their missions. At the completion of this phase, all the facilities within the Complex will have the necessary communications links with other Complex facilities and will have access to the radar and data information required to accomplish their missions.

(a) Airspace Modifications. Implementation of the Surveillance, Communications, and Control Systems outlined in the R-2508 Enhancement Plan will obviate any requirement to expand the restricted areas beyond their present boundaries.

(b) Flight Operations and Modifications. No modifications to the primary users' flight operations are planned, although other users may be required to modify flight paths to avoid areas of concentrated or hazardous military activity. The most significant effect will be an increase in airspace usage which will allow more aircraft both military and civilian to operate safely within the geographical confines of the R-2508 Complex.

(c) Land Use Modifications:

PHASE I

- Edwards AFB. Modifications will be accomplished in Buildings 2580, 3940, 4970 and 2650 at Edwards AFB to receive equipment for the Central Coordinating Facility/Air Traffic Control Facility (CCF/ATCF), Mission Control Center, Space Positioning Facility, and Operations Center, respectively. Modifications, mostly interior, will be minimal and will not change the basic existing land usage. The new operations to be housed in these facilities will be administrative in nature. The enhanced CCF/ATCF facility will ultimately be manned by an increase of 63 personnel, seven of whom may be military. Personnel increases will be realized on an incremental basis, beginning in Phase I, and continuing until the enhanced complex effort is fully functional.

- China Lake NWC. The existing Mission Control Facility (MCF) will receive several new electronic equipment items and a net gain of nine personnel, all of whom are projected to be military.

- George AFB. The existing MCF will receive several new electronic equipment items with no net personnel changes realized.

- Fort Irwin. No personnel or electronics equipment modifications are contemplated at this MCF.

- Rand Mountain. Due to propogation characteristics and restrictions between Laurel Mountain and Edwards AFB, a microwave repeater facility will be added between Laurel Mountain and Edwards AFB. A repeater facility will be added adjacent to an existing government facility on Rand Mountain. The repeater facility will require no property acquisition nor road construction but will require installation of new microwave repeater equipment. Actual repeater antenna peak is about 50 feet above ground level. No personnel will be assigned to this location.

PHASE II.

This increment provides most of the new construction in the area - the unmanned gap-filler radar sites. These radars are placed necessarily within valleys in a central location to be able to scan, without radar interference or undesired feedback, all possible portions of each valley which form a flyway. Radars will provide azimuth and distance surveillance of aircraft operating within the geographic boundaries of the R-2508 area.

A typical facility (Figure 5) will consist of radar and communications electronic and support equipment contained in two 12-foot by 40-foot prefabricated fiberglass buildings assembled side by side on a concrete foundation. A 10-foot by 33-foot prefabricated metal building will house the 75 kilowatt (KW) standby power generator, which is similarly mounted on a concrete foundation. A 1000-gallon fuel storage tank will be installed underground, ajacent to the generator for standby generator fuel storage.

Three antenna supports will be installed at each site. Two antenna supports for small VHF/UHF antennas and a 15 foot high radar antenna mounted on a tower with a planned height of 27 feet.

The plot area (about 100 feet) is to be surrounded and protected by an 8-foot high chain link fence. Sites will be graded level within the fence lines, and probably six feet outside the fence line for weed and fire control. A gravel blanket will be applied to the ground surface within the fences. Access to the site will be provided by constructing a 12-foot wide gravel surfaced road on a 30-foot wide right-of-way from the nearest existing state or county roadway.

Commercial power for each site will be obtained from the nearest power line available. In each case, the shortest possible power line will be installed on a 20-foot wide easement from the source to the

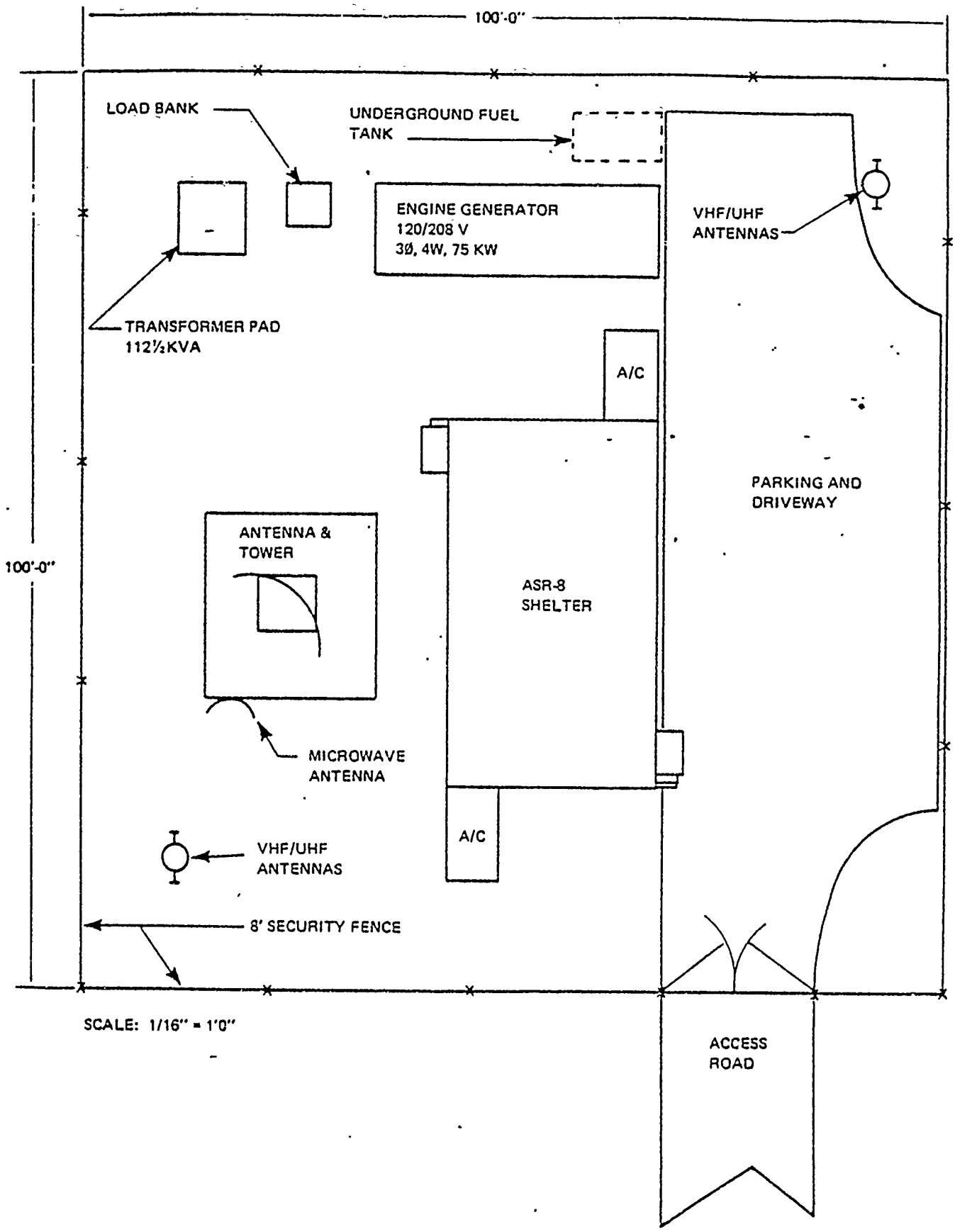


Figure 5 Typical ASR-8 Gap-filler Site - Plot Plan

site. The power line will be installed on poles to within 2000 feet of the radar site and thence underground to the transformer pad at the site. Installation of these lines and any associated environmental assessment necessary will be accomplished by the local utility company from which this utility is to be purchased.

A landline communication link will be employed for the Owens Valley installation. At this site, the telephone lines required will accompany the power line to the site on the same poles. Installation of these lines and any associated environmental assessment necessary will be accomplished by the local telephone company from which these landline services are to be leased.

PHASE III.

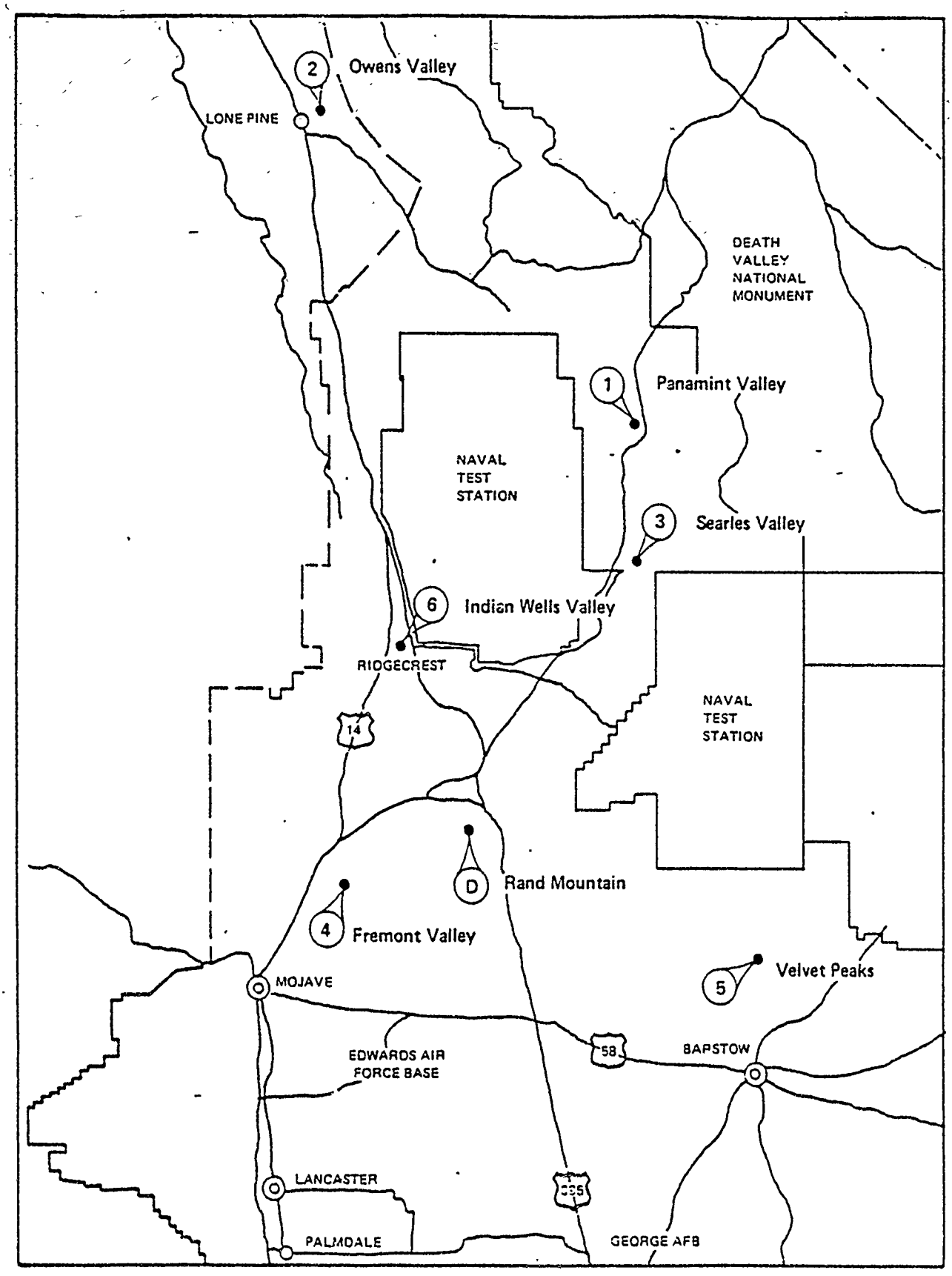
During Phase III, an unmanned gap-filler radar will be installed at the Indian Wells Valley site at the Kern County Airport. Construction and manning will duplicate that of other gap-filler sites completed under Phase II.

An existing radar at the Laurel Mountain facility also may be replaced with a new long-range radar.

B. EXISTING SITE CHARACTERISTICS

(1) Land Use Environment. The R-2508 Restricted Airspace, proposed gap-filler radar sites, and airspace management facilities are located in the Upper Mojave Desert of southern California (Figure 6). The sites would be located in the counties of San Bernadino, Kern, and Inyo. Major urban areas in the vicinity include Lancaster-Palmdale (present estimated vicinity population 50,000), Barstow (present estimated vicinity population 20,000), and Ridgecrest-China Lake (present estimated vicinity population 22,000).

The northern sites are characterized by the intersection of the Great Basin and Mojavian geologic and floristic provinces. The chief physiographic characteristic of the Great Basin is its basin-and-range topography. Examples are the Owens and Panamint Valleys and their surrounding fault-block mountain ranges. As in the remainder of the Great Basin, drainage is into these valleys, which contain many small playas and saline flats such as Owens Lake and Panamint Lake (dry). The elevation of the lands under R-2508 ranges from -282 feet MSL at Death Valley to 14,495 feet MSL at Mount Whitney, the lowest and highest points, respectively, in the contiguous United States. Like the topography, climate and vegetation throughout R-2508 vary greatly. Virtually every mountain and desert plant community is included, ranging from cool, moist coniferous forest to hot, dry desert scrub. Some representative R-2508 climate and plant community data are shown in Table 1.



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Statute Miles

Figure 6 Sites of New Construction

Table 1 R-2508 Climate and Plant Community Data

Location	Plant Community	Average Summer Max.	Average Winter Min.	Average Annual Precip. (Inches)	Average Annual Snowfall (Inches)
Death Valley	Alkali Sink Scrub	115°F	37°F	1.45	0.0
China Lake	Creosote Bush Scrub	102°F	29°F	2.77	1.0
Independence	Shadscale Scrub	80°F	23°F	5	5.1
Sierra Nevada Mtns	Yellow Pine Forest	80°-90°F	20°-30°F	25-50	100-200
Sierra Nevada Mtns	Lodgepole Pine	65°-75°F	10°-20°F	25-40	200-300

The R-2508 Restricted Airspace overlies a sparsely populated region, most of which is federally owned. Major federal owners include the Bureau of Land Management (BLM), the Department of Defense (DOD), the National Park Service, and the Forest Service. This is shown graphically in Figure 7.

(2) Detailed Site Characteristics. Proposed radar and microwave site locations are shown in Table 2 and Figure 8. Existing radars are on government land dedicated to a radar usage. Microwave site A is proposed for placement adjacent to a Bell Telephone microwave site, thus the land is presently dedicated for this type of usage. Microwave sites B, C, and E are proposed for placement on military reservations, adjacent to existing facilities and land that is also dedicated for radar or military support usage. Microwave Site D will be constructed in conjunction with an FAA Remote Center Air-to-Ground communication facility at the same site. Only radar sites 1 through 6 propose construction on land previously not dedicated to this type of usage.

The locations for each of the proposed sites of new construction/dedication are shown on Figure 6.* The following information is provided by the Bureau of Land Management Desert Planning Staff concerning the sites:

- No sites are located in candidate natural areas.

*Appendix A includes a site location plan for each proposed gap-filler radar site and microwave site, and Appendix B includes topographic information for each proposed gap-filler radar site.

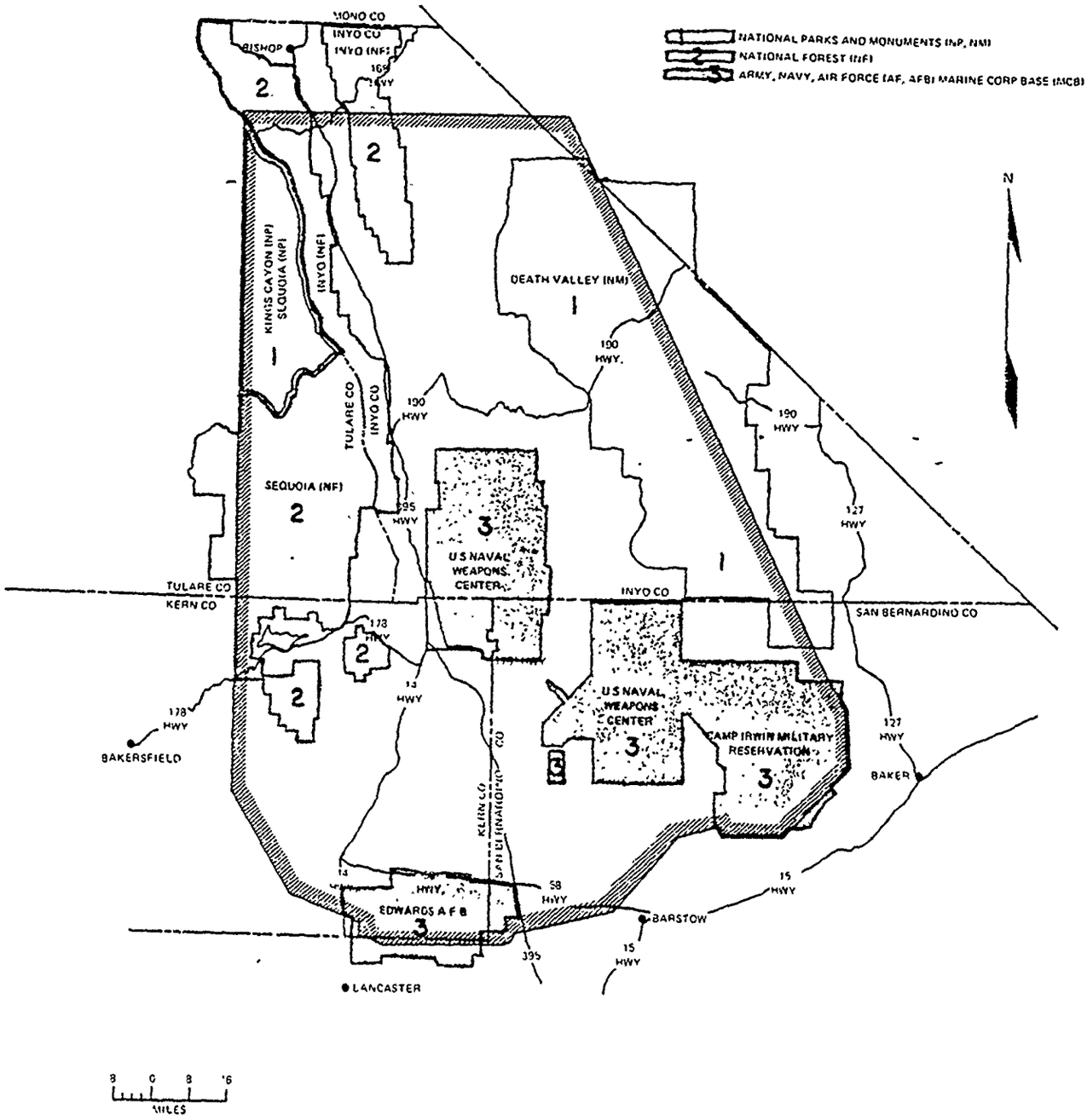

Figure 7 Major Federal Land Owners

TABLE 2 R-2508 RADAR AND MICROWAVE SITE LOCATIONS

SITE	AREA	LONGITUDE	LATITUDE	FEET MSL	LAND OWNERSHIP
		EXISTING RADAR SITES			
	Laurel Mountain (AN/FPS-20)	117°40'55.68"	35°28'46.25"	4485	Military Reservation
	Boron (AN/FPS-67B)	117°34'50"	35°04'54"	3012	FAA
	Edwards AFB (ASR-5)	117°54'38"	34°52'22"	2330	Military Reservation
	Paso Robles (ARSR-1E)	120°21'12"	35°23'44"	3622	Forest Service
	George AFB (AN/GPN-12)	117°22'45.77"	34°36'02.62"	2840	Military Reservation
		PROPOSED GAP FILLER RADAR SITES			
1	Panamint Valley	117°17'01.1"	36°02'31.6"	1315	Bureau of Land Man.
2	Owens Valley	118°01'38.4"	36°37'02.7"	3670	LA Dept of Water Power
3	Searles Valley	117°20'37.8"	35°48'14.4"	1665	Bureau of Land Man.
4	Fremont Valley	117°59'16.0"	35°13'30.5"	2225	Private
5	Velvet Peak	117°00'49.4"	35°03'37.0"	4230	Bureau of Land Man.
6	Indian Wells Valley	117°50'03.9"	35°39'21.3"	2450	Kern County, CA
		EXISTING MICROWAVE SITES			
B	Naval Weapons Center	"G" Range, Bldg. #30884		2283	Military Reservation
C	Laurel Mountain	117°40'55.68"	35°28.46.25"	4485	Military Reservation
E	Edwards AFB ATCF	117°54'05"	34°55'10"	2400	Military Reservation
		PROPOSED NEW MICROWAVE SITES			
A	Slate Range	117°17'14"	35°53'58"	3900	Bureau of Land Man.
D	Rand Mountain	117°40'45.6"	35°20'19.9"	4740	Bureau of Land Man.

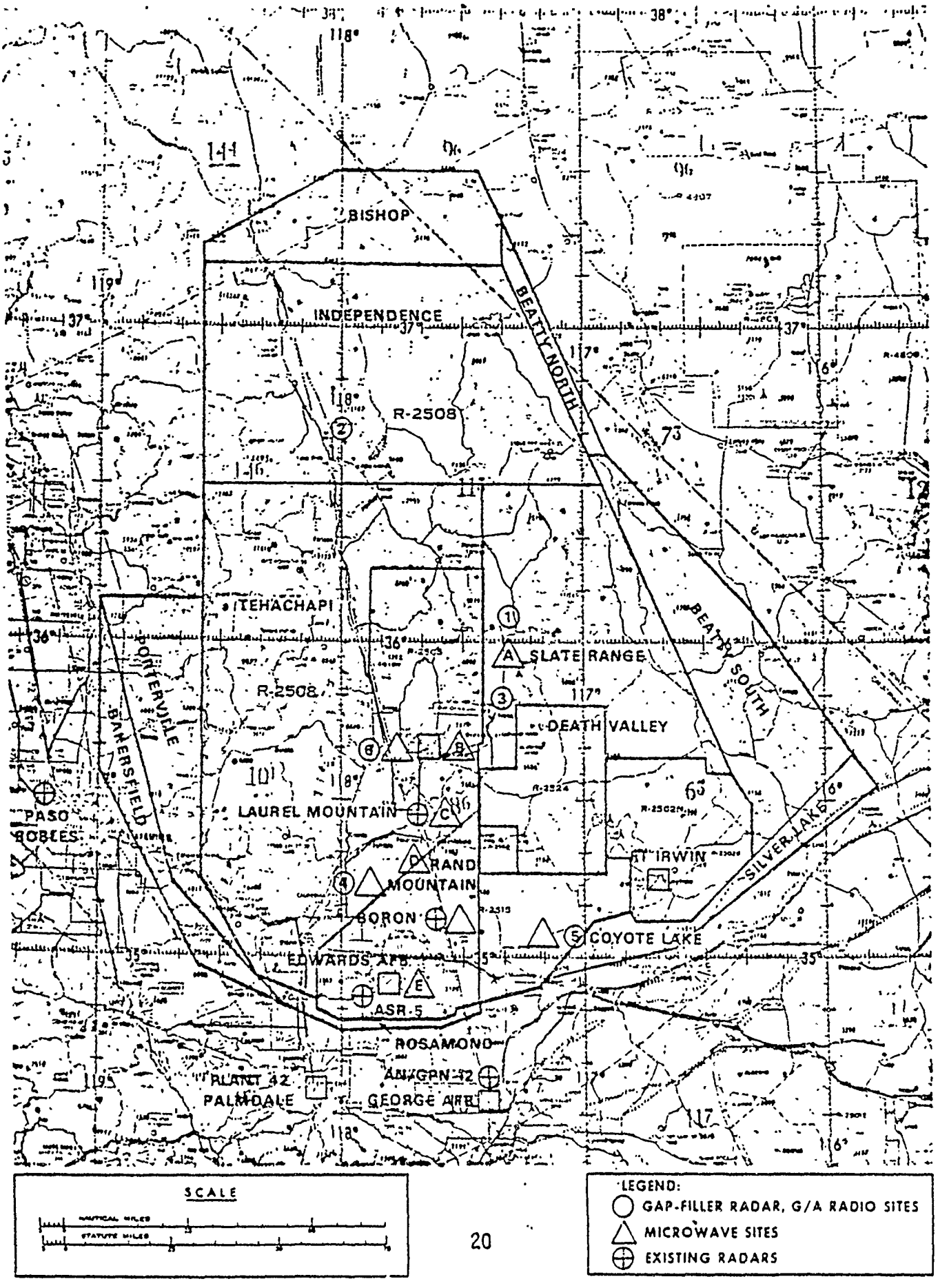

Figure 8 Radar, Ground/Air Radio, Microwave Sites and ATCAAAs

- No sites are located in natural recreation areas.

- Other than the Velvet Peak site, no sites are located in known vertebrate fossile sites.

- No sites are located in identified sensitive areas for wildlife and flora.

- Other than the Rand Mountain site, no sites are located in identified rockhound areas.

- No sites are located in identified rock art (petrogliph/ pictograph) sites.

- No sites are located in bighorn sheep range or on possible crossing routes.

- No sites are located in habitats of significant fish, amphibians, reptiles, upland game, or deer.

- No sites are located in historical sites.

- Soil erodibility for the sites is classified as follows: Severe - Site D; High - Sites 1, 2, 3, 4, 5, 6.

- Identified intensive off-road vehicle use areas are as follows: Sites 1, 3, 5, D.

- Scenic quality is judged to be as follows: Choice - Sites 1 and 5; Common - Sites 2, 3, 4, 6.

The following information concerns each site individually in terms of natural factors at the site (flora, fauna, etc.), and socioeconomic considerations of nearby communities.

(a) Site No. 1 - Panamint Valley. This site lies on the lower east side of the Argus Range at about 1,230 feet MSL, about one-half mile from the intersection of the Trona-Wildrose and Ballarat Roads. The site is 12 miles west of the Death Valley National Monument west boundary, and 8 miles east of the China Lake Naval Weapons Center east boundary. Panamint Valley extends 38 miles to the north. The Slate Range is to the south. Climate here is similar to that of Trona, 22 miles south, averaging 2-3 inches annual precipitation. Average summer maximum temperature is 105-110°F; average winter minimum temperature is 30-35°F. The native plant community is creosote bush scrub of low perennial and annual productivity due to extremely low rainfall.

Based upon information supplied by the Bureau of Land Management Desert Planning Staff this site is not located in any of the following: candidate natural area; natural recreation area; known vertebrate fossile site; identified sensitive area for wildlife or flora; identified rockhound area; identified rock art (petrogliph/ pictograph) site; bighorn sheep range or possible crossing routes; habitat of significant fish, amphibians, reptiles, upland game, or deer; or historical site.

The site is on BLM property which is presently unoccupied. No direct economic benefits are being realized by the property in its existing condition. This site has been identified by BLM as an intensive off-road vehicle use area and its soil erodibility has been classified as "High". On the basis of its primitive character and steep topographic relief, the bureau of Land Management judges the Panamint Valley site vicinity to be of "Choice" scenic quality. The neareast urban center is Searles Valley (1970 population census 3,823) 22 miles south.

The Searles Valley communities (Trona, Argus, West End, and Pioneer Point) have available all commercial and service facilities. Several large industrial plants are located in the area and have an average annual payroll of approximately $15 million.

The estimated Searles Valley population in 1976 was 3631 people. This represents a five percent decrease in permanent population since 1970. It is estimated that an increase of approximately 105 permanent residents will occur as a result of local private industry programs.

The Trona Unified School District includes three schools which have adequate physical facilities available to handle a larger average daily attendance than presently being experienced. The schools had an enrollment of 1050 students in the 1971-72 school year and this figure has dropped to 986 students during the current school year.

(b) Site No. 2 - Owens Valley. This site lies about one-half mile east of the Owens River at an elevation of about 3,680 feet MSL, between the train stops of Lone Pine Station and Mt. Whitney (about 2 miles east of Lone Pine). Owens Lake is approximately 6 miles to the south. Owens Valley extends approximately 55 miles to the north. Climate here is similar to that of Lone Pine, 2 miles west: 4 inches average annual precipitation; average summer maximum temperature 100°F; average winter minimum temperature 25-30°F, typifying a high desert climate. The site is in a relatively natural state, having a native plant community of predominantly shadscale scrub. Land use in the vicinity is mixed, including urban land uses for Lone Pine (1970 population census 1,241), railways, and a short existing microwave tower. Small barren alkali flats are in the proximity of the site. The site borders on the overall range used by the Lone Pine Tule Elk herd; but does not provide habitat for either the elk herd or other threatened, rare, or protected fauna.

Based upon information supplied by the Bureau of Land Management Desert Planning Staff this site is not located in any of the following: candidate natural area; natural recreation area; known vertebrate fossil site; identified sensitive area for wildlife or flora; identified rockhound area; identified rock art (petrogliph/ pictograph) site; bighorn sheep range or possible crossing routes; habitat of significant fish, amphibians, reptiles, upland game, or deer; or historical site.

The site is owned by the city and county of Los Angeles Department of Water and Power and is not presently dedicated for a specific economic or recreational purpose. This site is located near the Southern Pacific Railroad tracks and an oil storage farm. Soil erodibility is "High", and the scenic quality is "Common". The Bureau of Land Management has classified this site not be be an intensive off-road vehicle use area.

Lone Pine is a small community supported primarily by the tourist trade. All commercial services are available, including a large number of motels. The town has a permanent population of 1,241 (based on the 1970 census) and has an all-year tourist trade based on its proximity to Mount Whitney, and on its location as one of the main entrances to Death Valley National Monument.

The estimated Lone Pine population in 1976 was 1345 people. This reflects an eight percent increase since 1970. However, the population in this area has fluctuated over the past several decades, depending primarily on the levels of tourism and local mining activities. The area has no strong policy toward growth.

The Lone Pine School district includes four schools which have adequate physical facilities available to handle a larger daily attendance than is presently being experienced. The current average daily attendance is 500 students. This figure is down from the 1969-70 figure of more than 600 students each day. The district could absorb up to 200 additional children without any difficulty.

(c) Site No. 3 - Searles Valley. This site lies about one-half mile east-southeast from Valley Wells and one-half mile west of the Trona Airport runway, at an elevation of about 1,750 feet MSL. Climate is similar to that of Trona, 4 miles southwest: 2-3 inches annual average precipitation; average summer maximum temperature 105°F; average winter minimum temperature 30°F. The site vicinity is not in a primitive state. It consists of the nearby airport, Valley Wells mining, and manufacturing in the nearby Trona area (1970 population census 3,828). Visibility is usually obscured by the high (over 120 microgram per cubic meter average) particulate air pollution generated by the Searles Valley chemical processing plants. The native plant community in the vicinity is alkali sink scrub, grading at high elevation into creosote bush scrub.

Based upon information supplied by the Bureau of Land Management Desert Planning Staff this site is not located in any of the following: candidate natural area; natural recreation area; known vertebrate fossil site; identified sensitive area for wildlife or flora; identified rockhound area; identified rock art (petrogliph/ pictograph) site; bighorn sheep range or possible crossing routes; habitat of significant fish, amphibians, reptiles, upland game, or deer; or historical site.

The site is located on BLM property. BLM has classified this site's soil erodibility to be "High" and its scenic quality to be "Common". This site has been identified as an intensive off-road vehicle use area. Nearby BLM land is in use as a general aviation airport. Present airport facilities include a 50' x 6000' paved runway with boundary lights, office building, gas pit., 15 hangars and approximately 25 based aircraft. The airport owner- operator is the U.S. Department of Interior.

The local economic factors are discussed in the paragraph concerning the Panamint Valley site.

(d) Site No. 4 - Fremont Valley. This site lies about one-half mile west of the Neuralia Road connecting California City with Red Rock Canyon, at an elevation of about 2220 feet MSL. Climate here is similar to that of China Lake, 40 miles northeast: 3-4 inches average annual percipitation, average summer maximum temperature 102°F; average winter minimum temperature 29°F. The site is in a relatively natural state, consisting of a creosote bush plant community with good annual productivity in favorable years. Predominant land use in the vicinity consist of alfalfa farming by irrigation, and the site is considered arable. The site is near an area considered by the Bureau of Land Management to have a medium-high tortoise breeding density - up to 300 per square mile. The established BLM Tortoise Reserve, closed to motor vehicles, has its western boundary 3 miles to the east. The site is on gently sloping land in Fremont Valley. The El Paso Mountains are on the north, the Mojave Desert on the east and south, and the Tehachapi Mountains on the west. Edwards AFB and Rogers Lake (dry) are 20 miles south of site.

Based upon information supplied by the Bureau of Land Management Desert Planning Staff this site is not located in any of the following: candidate natural area; natural recreation area; known vertebrate fossil site; identified sensitive area for wildlife or flora; identified rockhound area; identified rock art (petrogliph/ pictograph) site; bighorn sheep range or possible crossing routes; habitat of significant fish, amphibians, reptiles, upland game, or deer; or historical site.

The proposed site is located on private land, in an undeveloped land tract near California City. The immediate area is unimproved and is not being used for farming or other productive economic purposes, although private farms and a rural housing area are located about 6 miles to the north. This site is not an intensive off-road vehicle use area. - BLM has designated the scenic quality as "Common" and the soil erodibility as "High" for this location.

This site will be supported from the towns of California City and Mojave. California City is severely overdeveloped, with an extensive utility infrastructure. It has very little industry to support the local economy at this time. Mojave is an older community, with a diversified economic base which provides a sound basis for continued, moderate growth. It is a crossroads for railroad lines and for major highways and is an important point on the Los Angeles aquaduct. -

The California City 1976 population was estimated to be 2100 people. This represents a sixty percent increase since 1970. However, it must be noted that California City is a very widely and extensively advertised "new town" which has developed primarily on speculation. The high growth rate reflects the results of the persistent effort to attract growth. The Mojave 1976 population was estimated to be 2880 people. This represents a twelve percent increase and this rate is expected to continue into the near future.

The Mojave Unified School District covers California City and includes five schools. Excess classroom capacity exists as evidenced by a decrease in the average daily attendance of 1513 students on the 1973-74 school year to 1418 students during the current school year.

(e) Site No. 5 - Velvet Peak. This site lies about 13 miles north of Barstow and five miles west of Big Lane Mountain. It is situated just east of Fossil Canyon and immediately west of Little Lane Mountain. Although climate data were not gathered, its climate, at an elevation of 4,219 feet, is similar to China Lake and Edwards AFB with the average summer maximum temperature near 105°F and average winter minimum temperature near 30°F.

Based upon information supplied by the Bureau of Land Management Desert Planning Staff this site is not located in any of the following:- candidate natural area; natural recreation area; identified sensitive area for wildlife or flora; identified rockhound area; identified rock art (petrogliph/pictograph) site; bighorn sheep range or possible crossing routes; habitat of significant fish, amphibians, reptiles, upland game, or deer.

This site, owned by the BLM, has most unique characteristics, including scenic Joshua Trees, and its primary natural resource is archeological finds. The surrounding area (including Fossil Canyon, Rainbow Basin, and Mud Hills) is known and palenotologically typed as pleistocene-vertebrate (See comments on page 30). The BLM Staff Archaeologist did not find any archaelogical resources on the ground surface at the proposed site. It should be noted that the site occupies a hilltop area which has been previously disturbed by extensive outdoor recreation vehicle use, and this site has been identified as an intensive off-road vehicle use area. The soil erodibility is "High" and the scenic quality is "Choice".

The closest urban area to this site is the city of Barstow, approximately ten miles to the south. The Barstow area has approximately 17,000 residents (1970 census) and has several major employers including the Santa Fe Railroad and the Barstow Marine Base.

(f) Site No. 6 - Indian Wells Valley. This site lies within the boundaries of the Kern County Airport at Inyokern (1970 population of about 550) at an elevation of about 2,450 feet MSL. Climate here is similar to that of China Lake, 10 miles east; 3 inches average annual precipitation; average winter minimum temperature 20°F; average summer maximum temperature 102°F. The site is in a disturbed condition resulting from the airport construction. The native plant community in the vicinity is creosote bush scrub. The site has no unique characteristics. Establishment of a radar facility on the existing airport would be compatible with present land use. The airport is owned and operated by Kern County, California. Facilities for this general aviation airport include three paved runways, office building, 10 hangars, gas pit, and approximately 50 based aircraft.

Based upon information supplied by the Bureau of Land Management Desert Planning Staff this site is not located in any of the following: candidate natural area; natural recreation area; known vertebrate fossil site; identified sensitive area for wildlife or flora; identified rockhound area; identified rock art (petrogliph/pictograph) site; bighorn sheep range or possible crossing routes; habitat of significant fish, amphibians, reptiles, upland game, or deer; or historical site.

This site has been judged to have "Common" scenic quality by the Bureau of Land Management. The location is not an intensive off-road vehicle use area. The soil erodibility for this site is classified as "High".

Approximately 23,000 people reside in the Valley and due to the presence of the US Naval Weapons Center (NWC) at China Lake, the Valley annual payrolls exceed $75 million. Therefore, the economic impact on this area should be negligible. However, at the present time, the housing market is moderately tight, with a vacancy rate of less than 5%. This situation should be substantially altered by

several factors. First, the civilian employment ceiling at NWC has been reduced by 306 positions. Also, NWC, acting through the General Services Administration (GSA), will excess approximately 550 housing units in the near future and more than 400 of these are presently vacant. Some portion of these units will be made available for private purchase.

The Indian Wells Valley experienced a three percent population growth between 1970 and 1976. This trend is expected to continue through 1990. The area General Plan is being revised to accommodate the associated growth level. A major impact to the City of Ridgecrest has been a shift of population from the Navy-owned community of China Lake to Ridgecrest. This shift is expected to continue as residents move off-base.

The Sierra Sands Unified School District includes 13 schools which have adequate physical facilities available to handle a larger daily attendance than is presently being experienced. The average daily attendance dropped from 6945 students in 1974-75 to 6321 students in the current year. Therefore, sufficient capacity exists for absorbing new students.

(g) Site A - Slate Range. This site, owned by BLM, is located atop the Slate Mountain range, which divides Panamint Valley and Searles Valley. Site A is approximately nine miles northeast of the town of Trona. An existing Bell Telephone microwave facility is presently located in the vicinity of this site.

Based upon information supplied by the Bureau of Land Management Desert Planning Staff this site is not located in any of the following: candidate natural area; natural recreation area; known vertebrate fossil site; identified sensitive area for wildlife or flora; identified rockhound area; identified rock art (petrogliph/ pictograph) site; bighorn sheep range or possile crossing routes; habitat of significant fish, amphibians, reptiles, upland game, or deer; or historical site.

(h) Site B - Naval Weapons Center. This site is an existing facility on a military reservation. The socioeconomic environment is discussed in the paragraph concerning the Indian Wells Valley site.

(i) Site C - Laurel Mountain. This site is located approximately ten miles south of the Naval Weapons Center. A USN-operated long range radar is presently installed at the site. Relevant socioeconomic factors are discussed in the earlier paragraph on the Indian Wells Valley site.

(j) Site D - Rand Mountain. This site is located in the Rand Mountain Range, immediately west of the towns of Randsburg and Johannesburg. Climate here is similar to Edwards AFB and China Lake.

The vicinity, with its small towns, was operated as a mining area in past years, and still has a potential for mineral exploration. The area, owned by BLM, is managed by local people as a mineral exploration and development area. Soil erosion potential is classified as "Severe", and the area is designated as open to off-road vehicle use.

Based upon information supplied by the Bureau of Land Management Desert Planning Staff this site is not located in any of the following: candidate natural area; natural recreation area; known vertebrate fossil site; identified sensitive area for wildlife or flora; identified rock art (petrogliph/pictrograph) site; bighorn sheep range or possible crossing routes; habitat of significant fish, amphibians, reptiles, upland game, or deer; or historical site.

(k) Site E - Edwards RAPCON. This site is an existing government facility on a military reservation. The housing market in the immediate area is very bleak, with a vacancy rate of 2.25% as of August 1976. However, the towns of Palmdale and Lancaster, 25 miles to the south, have a combined population of more than 41,000 (1970 census).

SECTION 2. RELATIONSHIP OF PROPOSED ACTION TO LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AFFECTED AREA

The proposed enhancement effort will interact with activities of several public agencies and entities, and will require decision-making by these parties. This will be realized primarily in the need for land withdrawals from the BLM, purchases or leases from Kern County, the City and County of Los Angeles, and the State of California. The FAA will be responsible for real estate acquisition or for obtaining all letters of agreement which are required to insure access for ingress and egress, and easements for clear zones and utilities.

A. AIRSPACE AND OPERATIONS

The airspace overlying the geographic limits of the R-2508 area is dedicated to the combined mission of research, test, development, evaluation of airframes and projectiles, and training of personel. Other users are allowed to mix within the area to the limits previously stated. This mission will not be altered by primary or secondary effects of the enhancement effort. Mixing of users, other than primary, within the Complex airspace area will continue to be allowed, but on a more controlled basis during hours of Complex operation.

During hours of nonoperation of the Complex, normal FAA air traffic service policies will prevail, and will not be altered.

Air Installation Compatible Use Zone (AICUZ) plans will not be altered.

B. LAND USE PLANS, POLICIES, AND CONTROLS

(1) Present Land Ownership at the Sites.

(a) Panamint Valley - U.S. Department of Interior, Bureau of Land Management (BLM).

(b) Owens Valley - City and County of Los Angeles.

(c) Searles Valley - BLM.

(d) Fremont Valley - Private Ownership (recently sold to State of Claifornia for delinquent taxes, title in transit).

(e) Velvet Peak - BLM.

(f) Indian Wells Valley - Kern County, California.

(g) Slate Range - BLM.

(h) Rand Mountain - BLM.

(i) Edwards AFB - DOD.

(j) George AFB - DOD.

(k) Laurel Mountain - DOD.

(l) Naval Weapons Center - DOD.

For the proposed enhancement effort, several ground facilities must be installed. Many facilities, such as the CCF, ATCF, all MCFs, and some repeater sites are existing or would be located on land already withdrawn by the DOD and no change in land usage would be required. Eight sites would, however, require new land acquisition or transfer. The Naval Weapons Center Environmental Engineering Office has determined that no documentation exists concerning other proposed uses of any of the property at, or in the vicinity, of these eight sites. Furthermore, no applications for use of any of the property have been received by BLM. Therefore, we have concluded that the implementation of these eight sites does not impose restrictions on the planned foreseeable uses of the land required to support this program.

(2) Land Use of Individual Sites.

(a) Panamint Valley. This valley is located between the Argus and Panamint Mountain Candidate Natural Areas and south of the similar but more primitive, Saline Valley. The valley has no tourist trade in the normal sense because there are very few tourist facilities. However, a small number of visitors travel to the valley to enjoy desert recreation and to enjoy the primitive scenic beauty. Inyo County Road Department figures indicate an average of 160 vehicles per day travel the Panamint-Wild Rose Road. The BLM has limited vehicle routes to those which existed prior to 1 November 1973.

(b) Owens Valley. This site, located east of the community of Lone Pine, is situated near the Southern Pacific Railroad tracks and a small oil storage tank farm. Land is characterized by patches of barren alkali flats and sparse desert shrubbery on a level profile. The nearest community is no closer than 2 to 3 miles. Land is owned by the City and County of Los Angeles Department of Water and Power.

(c) Searles Valley. Land, owned by BLM, is characterized by low desert shrubbery on level terrain. Due to the radar site proximity to Trona Airport, the land use plans

and policies would not seem to be altered by its presence. The radar equipment should blend easily with the airport visual profile. The airport is isolated from the built-up area of the community of Trona, and is located aproximately one-half mile from Highway 178.

(d) Fremont Valley. Many desert type farms and rural communities are being developed in the Fremont Valley to the north, west, and-south of the site, about three to six miles away. More immediate to the actual site, there is a sparsely populated low desert type plant community on a gently sloping terrain, without housing, farming, or other build-ups, although the land is considered arable.

The BLM considers the near-by area to have a medium-high tortoise breeding density - up to 300 per square mile - and has established a BLM Tortoise Reserve with its western border three miles east of the site, across the Cantil-Calfornia City Road. However, the tortoises in this area should be protected by a properly maintained chain link fence, and by appropriate posting of the access road to caution users to watch for and to avoid local wildlife hazards. The potential for destruction of the natural habitat or food of the tortoises will be negligible.

(e) Velvet Peak. The Velvet Peak vicinity is one of 19 locations designated as national recreational areas by the Secretary of the Interior. The area is presently registered as a national historic landmark, and has been nominated for national natural landmark status.

On 29 Dec 76, a field evaluation of this site was conducted by NWC and BLM personnel to identify environmental or other constraints that would prevent its use as a radar site. The selected site does not appear to have any significant environmental values. The BLM Staff Archaeologist did not find any archaeological resources on the ground surface at the proposed site. Additionally, the site has been highly disturbed by recreational vehicle activity, primarily motorcycles. There is also evidence of an old tower facility on the site.

(f) Indian Wells Valley. The site is located on the Kern County Airport property, owned by Kern County, California. Due to the radar location on the airport, the land use plans and policies would not seem to be altered by its presence. The radar equipment should blend easily with the airport visual profile.

(g) Slate Range. The site is in the vicinity of an existing Bell Telephone microwave site - a dedicated communications site. Because of this the land use plans and policies would not seem to be altered by its presence. The proposed microwave equipment should blend with the existing Bell Telephone installation.

(h) Rand Mountain. Realizing the need for communications facilities in the Mojave, the BLM has designated this site as a "communications site" in the draft Management Plan for the El Paso Range. A microwave site is within the land use plan for this area. The environmental aspects of the Rand Mountain Microwave site have been addressed in a Negative Declaration submitted by FAA dated 26 October 1977.

(i) Other Sites. Edwards ATCF/CCF and ASR-5 site, George MCF and AN/GPN-12 site, Laurel Mountain, and NWC MCF are adjacent to government facilities on military reservations, and involve no change in land use plans.

SECTION 3. PROBABLE IMPACT OF THE R-2508 ENHANCEMENT EFFORT ON THE ENVIRONMENT

The proposed enhancement effort will affect two primary areas of the environment - the airspace/air traffic environment, and the land use environment. Effects will be both adverse and beneficial; however, the adverse effects are not foreseen to be significant. Activites within the complex will not be significantly altered as a result of this program, nor will noise and emission levels be appreciably changed.

A. AIR TRAFFIC ENVIRONMENT

With the addition of the new system of comprehensive radar coverage, there will be a beneficial effect for all airspace users. Users will be able to operate in the complex with greater assurance that separation, airspace to airspace, or aircraft to aircraft, can be achieved through advisory radar coverage. Users will also be visible to the area controllers on radar displays down to very low altitudes and the controllers will therefore be able to advise on hazards and provide traffic information which will contribute to real time flight separation. This capability will enable controllers to allow entry to more non-participating users, thereby optimizing use of this airspace resource. Flight safety and hazard identification capability will be greatly increased.

B. POTENTIAL HARMFUL EFFECTS FROM ELECTROMAGNETIC EMANATIONS

The spectrum of equipment (microwave and radar) operating frequencies will range roughly from 10^8 Hz to 10^{10} Hz. Because a wide range of transmitted power levels will be used over this broad spectrum, there is a potential impact on the natural surrounding environment.

The types of potential effects include:

- Possible human injury due to direct or indirect effects

- Possible injury to flora and fauna

- Possible disruption of public safety services, including police, fire and navigation data links

- Possible disruption of local television, FM, or standard broadcast reception.

Extensive precautions are planned to preclude human injury or loss of life due to RF transmission. Maintenance personnel will exercise all safety precautions for the associated electronic equipment and all equipment will be procured with automatic interlocks and safety devices to preclude accidental improper operation of RF transmitting units or power handling devices. The possibilities of disruption of public safety services, civil and commercial communications, and entertainment reception all pose similar problems involving interference at the radar or microwave site. These interference problems will be avoided by the application of appropriate FAA maintenance procedures and policies (e.g., FAA Order 6310.2A, Maintenance of Airport Surveillance Radar Facilities; FAA Order 6360.1A Maintenance of Air Traffic Control Radar Beacon Interrogator Systems).

(1) Characteristics of Electromagnetic Transmitting Equipment. The possibility exists that three new (to the R-2508 Complex) electromagnetic transmitting systems will be installed as a result of this Enhancement program. The radar system which might be installed at Laurel Mountain during phase III has not been identified at this time. If a decision is made to install that system, a separate Environmental Assessment will be filed for that site. The other two new transmitting systems are the ASR-8 radar and the ATCBI-5 Interrogator. The operating characteristics of these two systems are listed below.

	ASR-8	ATCBI-5
Operating Frequency	2700-2900 MHz	1030 (Transmit)
Peak Power	1.4 MW Max	300 W
Average Power	1094 W	2.52 W
Pulse Width	$.65 \times 10^{-6}$ sec Max	21×10^{-6}sec
Pulse Repetition Frequency	1200 pps Max	400 pps
Antenna Gain	33.8 db	16.612 db

The Electromagnetic Hazard Minimum limits associated with these systems are as follows:

	Criteria	ASR-8	ATCBI-5
Personnel[1]	10 mw/cm^2	150 ft	1 ft
	1 mw/cm^2	475 ft	3 ft
	0.1 mw/cm^2	1500 ft	10 ft
Electronic Explosive Devices[2]	50 mw Recv'd pwr	300 ft	5 ft
Fuels[3]	5 w/cm^2 peak	240 ft	0.5 ft
Cardiac Pacemaker[4]	200 v/m	500 ft	1 ft

[1]Calculations based on formulas in AFR 161-42
[2]Calculations based on formulas in AFM 127-100
[3]Calculations based on formulas in T.O. 31Z-10-4
[4]Based on USAFSAM Jan 78 Evaluation of Potential effects of ASR-8 Radars (on file at ESD/OCN).

The results of these calculations are believed to be very conservative and, in reality, the ranges associated with the different hazards will probably be less than those depicted above. It must be understood that the distances presented above are based on transmitted power in the main beam. Additional calculations (on file at ESD/OCN), based on the 27 foot mounting height and the measured ASR-8 antenna vertical beam pattern, show that the transmitted power required to create personnel hazards do not reach the ground for levels of 10 mw/cm^2 and 1.0 mw/cm^2. Power Levels of 0.1 mw/cm^2 will reach the ground at approximately 400 feet to 1200 feet.

There are several conclusions which can be drawn with respect to the potential harmful effects from the electromagnetic emissions from these systems. The probability of interference with cardiac pacemakers is extremely small. The probability of unacceptable personnel exposure, based on the present 10 mw/cm^2 standard, is also extremely small. Every precaution will be taken to insure that personnel required to work at the sites will be thoroughly and properly trained and that hazard warning signs will be properly posted.

(1) Strong electromagnetic fields do not exist beyond a distance of several hundred feet from the antenna of any of the equipment to be installed during this program. Further- more, normal operations of the proposed ASR-8 radar systems are constrained by safety procedures and physical restraints which will not allow the main beams of the emitters to be directed at or near ground levels within such short ranges of areas of potential risk (radar beams may sweep past distant mountains causing no harmful effects). The ASR-8 antenna will be fixed in vertical tilt to provide the required coverage. Therefore, the possibility that operation of an emitter in violation of prescribed safety standards resulting in main beam illuminations of ground areas is unlikely.

(2) Interference. Because a careful frequency assignment effort will have been completed prior to installation of any of these radars, the transmissions from these equipments will not affect other ground-based equipment. The frequency management office of the FAA Western Region has been analyzing the requirements for frequency allocations and Pulse Repetition Frequency (PRF) assignments. Each gap filler radar site and microwave link will be assessed to ensure that its operation will not interfere with the operation of other systems presently installed and operating within the R-2508 Complex.

There are a few other generalities which can be made concerning this equipment.

(a) Local television, FM or standard broadcast reception will not experience interference. The ground equipment does not operate in these frequency bands. All RF emitter

operations will be maintained within Office of Telecommunications Policy (OTP) specifications and harmonic suppression and band width limitations will be met to preclude out-of-band interference.

(b) Aeronautical radio location equipment in the near vicinity of the R-2508 Beacon Interrogator Systems may be affected within the band just above 1000 MHz. The Beacon Interrogator which transmits at 1030 MHz tends to be directional and only emits a few watts of average power. The small power output precludes interference with other equipment outside the immediate area of the Interrogator antenna. The presently selected sites for these R-2508 Beacon Interrogators are not in the vicinity of any known aeronautical radio location equipment.

(c) Above 2000 MHz, the R-2508 Enhancement equipment is highly directional in character and interference in this region is generally unlikely.

(d) Some types of service, notably television remote pickup, etc., may occasionally be adversely affected, as will some amateur bands, provided the equipment being operated is within the horizon limitation. Again, operation of the R-2508 Enhancement equipment will be maintained in accordance with OTP standards to preclude such interference.

It is very doubtful that the proposed R-2508 Complex transmitters will cause disruption of FCC-allocated service. Furthermore, there is a considerable history of such operations conducted by both the DOD and FAA, and consequently procedures and safeguards have been developed to insure that such operations will be conducted with minimal interference to participating and nonparticipating equipments.

C. LAND USE ENVIRONMENT

Development of radar sites, associated repeaters and air-ground communications systems, will commit use of land for construction of government facilities, and the affected plots of land will be necessarily restricted to government communications activities. Additional development of existing government sites (such as Edwards AFB, Laurel Mountain, etc.) will not impair their natural productivity, nor create additional natural environmental loads, and may be desregarded from further discussions on the natural environment.

(1) General Site Impacts. The primary impacts common to most new sites will be on the soils as a result of site preparation and construction activities. These activities are normally limited to excavation for the tower and shelter foundation, and grading and paving of the parking lot and access road surfaces. The short term effects of these activities will include a significant increase in noise and dust. The long range impact will be primarily visual and will vary according to each site.

TABLE 3 SUPPORT REQUIREMENTS AT RADAR/MICROWAVE SITES

SITE	NEW GRAVEL ROAD REQUIRED	TYPE COMM REQUIRED	COMM INSTALLING AGENCY	NEW POWER LINE REQUIRED	POWER INSTALLING AGENCY
Panamint Valley	1,320'	Microwave	FAA Western Region	18,500'	Southern Calif. Edison
Owens Valley	1,200'	Landline-5,200'	Continental Tel. Co.	4,500'	Southern Calif. Edison
Searles Valley	1,100'	Microwave	FAA Western Region	1,100'	Southern Calif. Edison
Fremont Valley	955'	Microwave	FAA Western Region	11,250'	Southern Calif. Edison
Indian Wells Valley	1,000'	Microwave	FAA Western Region	8,000'	Southern Calif. Edison
Velvet Peak	300'	Microwave	FAA Western Region	.5 miles	Southern Calif. Edison
Rand Mountain	Existing	Microwave	FAA Western Region	75'	Southern Calif. Edison
Slate Range	1,000'	Microwave	FAA Western Region	500'	Southern Calif. Edison

Table 3 lists, for the new radar and microwave sites, the required new access road which must be constructed and the length of new utility or telephone services to be installed. All distances are calculated by shortest distance to nearest source or nearest county or state road. The installing agency for power or telephone services will be responsible for determining the route of the service line and environmental impacts other than those covered by the site impacts will be addressed by the installing agency. The environmental impacts of the road construction have been addressed in this assessment.

The six new gap-filler radar sites and the Slate and Rand microwave repeater sites will be unmanned. Normal maintenance will require a site visit by two maintenance personnel in one vehicle on a one day a month schedule. Bottled water will be available at the site for drinking. A portable chemical toilet will be located at each of the gap-filler radar sites, but no toilet facilities will be available at the two microwave repeater sites. No wastes (liquid or solid) will be accumulated at any of the sites, and the chemical toilets will be serviced on a regular basis. Trash will be removed from the site during maintenance visits.

Each of these new radar and microwave sites will have a standby diesel generator. The fuel storage tanks will be buried at the site. The diesel generator will be housed in a prefabricated building and will be properly exhausted to reduce noise and pollutants. The expected operation of the diesel plant is less than one hour per month for maintenance. Unscheduled operation of the diesel generator will only occur during commercial power loss.

(2) Individual Site Impacts.

(a) Panamint Valley. The principal impact here would be visual. As previously stated, the BLM considers Panamint Valley as a choice scenic resource. The valley is in a primitive condition between two candidate Natural Areas. The road scarring, addition of power poles, and a radar tower would significantly reduce the primitive appearance and scenic value of a portion of the valley. Impact on cultural and other natural features would be small.

(b) Owens Valley. Due to the nearby urban and railroad land use, the impact here would be small. The site is located close to the range boundary of the Lone Pine Tule Elk herd, but no impact to this herd should occur.

(c) Searles Valley. Due to the adjacent airport, impact here would be small. No unique cultural or natural features would be affected.

(d) Fremont Valley. Due to nearby agricultural land use, no unique cultural or natural values would be adversely affected.

(e) Velvet Peak. Primary impacts here would be the scarring associated with site preparation and construction. No endangered or threatened wildlife species would be affected.

(f) Indian Wells Valley. Due to the adjacent airport, impact here would be small. No unique natural or cultural features would be affected.

(g) Slate Range. Visual and land use impacts at this site involve little changes as there already exists a telephone microwave site at this location.

(h) Rand Mountain. This site would receive only minor changes in scenic value. Land use plans would not be affected.

(i) Laurel Mountain. A long range radar presently exists at this site and the installation of new equipment at this location will make no impact on natural or cultural features.

(j) Naval Weapons Center. This is a military reservation which will involve only equipment installation under the R-2508 Enhancement Plan. This installation will not affect visual or land use characteristics at this location.

(k) Edwards AFB. Neither the ATCF nor the ASR-5 site will have any impacts on natural or cultural features, as they presently exist and only equipment installations will be performed at these locations.

(l) George AFB. The equipment installations at the George AFB AN/GPN-12 radar site will not affect any environmental features at George AFB. This site presently exists.

D. SOCIOECONOMIC CONDITIONS

In total, 100 new personnel (19 of whom may be military) are projected to be required for the enhancement effort and would be assigned incrementally over the three phases of the term. Twelve of these personnel would be associated with facilities located at China Lake NWC and Laurel Mountain, and would probably live near their work locations. The remaining 88 personnel associated with the Gap-Filler Radar sites and the ATCF would be assigned to Edwards AFB and would probably live in the adjacent surrounding communities. For purposes of this study, likely bedroom communities for Edwards AFB with their 1970 population are: Lancaster (30,948), Palmdale (8,521), Mojave (2,593), California City (1,309). While those for China Lake NWC are: Ridgecrest (12,800(1976)), and Inyokern (less than 1,000). Aggregate totals are: Edwards AFB area (43,371) and China Lake NWC area (13,800).

It is expected that 12 additional military personnel would be assigned to the China Lake NWC-Laurel Mountain (Ridgecrest) area, and an aggregate of 88 additional personnel (7 of whom may be military) would be assigned to the Edwards AFB vicinity. Using a conservatively high regional secondary job multiplier of 2.0, and a conservatively high average family size of 3.5, this would produce about 24 and 176 new households at China Lake NWC-Laurel Mountain and Edwards AFB areas respectively, and an associated population increase of about 84 and 616. Regional increases would amount to 0.6% and 1.4% over the 4 to 5 years of the project implementation. Population increases of this size would place very minor additional requirements on the housing markets, shopping areas, and other suppliers of consumer needs, generating land use requirements within the communities. However, in these areas, much land area is available for growth and human habitation.

Both the Edwards AFB and China Lake NWC areas have exhibited substantial growth since 1960, adding new shopping areas, housing projects and other communal amenities. A site visitation in August 1975 at both areas revealed housing tracts and single residences under construction, and no significant signs of a depressed economy (e.g., boarded up commercial buildings, closed schools, significant numbers of structures in need of repairs, etc.). It appears as if both desert community areas are healthy and capable of growth.

SECTION 4. ALTERNATIVES TO THE PROPOSED R-2508 ENHANCEMENT EFFORT

In formulating our proposal we have envisioned several alternative solutions.

A. CONTINUE R-2508 AIRSPACE OPERATIONS WITH NO CHANGES

This alternative would preclude any impact to the natural environment at each of the new gap-filler radar and microwave sites. However, as a more serious adverse effect, it would preclude the implementation of any solutions to the problems being experienced during the course of present Complex operations.

B. DISCONTINUE R-2508 AIRSPACE OPERATIONS

This alternative is not consistent with the national defense objectives. The primary users of the R-2508 Complex provide major contributions in research, development, test and evaluation, and combat training in direct support of national defense objectives. Continued utilization of this airspace is essential to fully accomplish mission activities in a timely and cost effective manner.

C. MOVE R-2508 AIRSPACE OPERATIONS TO ANOTHER LOCATION

The economics of moving the test elements of the R-2508 Complex or even of transiting test projects to far afield areas, does not favorably compare with the relatively minor cost of this project and its limited environmental effects. And, of other land possibilities considered, this land on which the R-2508 Complex operates, is the most environmentally suitable for this operation -- that is, a relatively low level of adverse environmental effects occurs at this location (a sparsely populated desert), as compared with others.

D. ADD RADAR/COMMUNICATIONS FACILITIES, BUT AT DIFFERENT SITES THAN THOSE SELECTED

The engineering design for radar and microwave placement stresses the need to avoid unnecessary uses of radar and microwave facilities, landlines, and service roads. Locations for gap-filler radars were chosen to give maximum coverage of their respective valleys, based on the required degree of air traffic control. Gap-fillers are normally placed in valleys to monitor low-flying aircraft and to project entry points with respect to the longer range radar which can view only over the tops of mountains due to line of sight operation. The use of Gap-fillers minimizes gaps in the coverage of long range radar. Within each valley the site chosen seems to be both representative of the area, and a point of the least local environmental imapct (e.g., gap-fillers at the airports do not alter land uses and are compatible).

The one possible exception is the facility proposed for Velvet Peak. The purpose of this radar is to view into Superior Valley and the Southern areas of R-2508. Prior to January 1977, this site was believed to have significant environmental values. However, a BLM/NWC survey contradicted this assumption and indicated that the selected location would be the best location for the proposed radar site. In the event that this decision is reversed, this assessment shall be amended to reflect the new site and associated environmental effects or a new assessment will be published, BLM has indicated that other nearby suitable peak locations are available for use, (e.g., the peak (elevation 4082 feet) immediately east of Murphy's Well, the peak (elevation 4140 feet) south of Superior Valley and north of Murphy's Well, or Big Lane Mountain, where a microwave tower presently exists). The engineering feasibility of the different possible locations will not be assessed until it is determined that the primary site is not available for use. It is important to note that there exists an atmosphere of mutual understanding between BLM and DOD and the BLM has agreed to work to ensure that the environmental impact of this siting will be minimized.

SECTION 5. PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED SHOULD THE PROGRAM BE IMPLEMENTED

A. AIR QUALITY

Minor increases in dust and fossil fuel emissions from construction equipment are anticipated at the proposed construction sites during the estimated construction periods. The equipment used by the contractor will be required to meet all State and Local codes for emission standards. The increase in pollutants expected from the proposed construction activities will be extremely light. On site diesel generator exhaust systems will be installed to meet all state and local codes and will not allow adverse affects. These generators are scheduled to operate only a few minutes a month for maintenance and only operate otherwise in the event of a commercial power loss.

Continued mission operations will produce a minimal level of engine emissions which cannot be avoided. These emissions are not considered to adversely affect the surrounding environment and no significant change in level of mission activity is anticipated.

B. NOISE

Every possible effort is made to minimize adverse public reaction to noise generated by mission operations. R-2508 Complex users will continue to employ management and control techniques which will insure that only mission essential operations are conducted in this area and that optimum avoidance of populated areas is practiced.

The implementation of diesel generators at the gap-filler and microwave sites will not add appreciably to the noise congestion. These sites are not located directly in populated areas and proper exhaust and muffler systems will be installed. Scheduled operation of these devices is less than an hour a month each. Unscheduled operation occurs only in the event of commercial power loss.

C. EFFECTS UPON AIR TRAFFIC ENVIRONMENT

It is difficult to determine the actual affected traffic population because quantitative information on the frequency and types of civil users presently traversing the R-2508 Complex at these altitudes is not available. However, in all but the most exceptional cases, civil users will be allowed to transit the Complex. If a civil user wishes to fly through the Complex, for his own safety, he may be required to vector around the primary user's operation, using positive airspace separation as a controlling factor.

D. EFFECTS ON LAND USE

Natural brush and foliage in the areas to be graded and graveled at the construction sites will be removed. Removal of foliage from these areas will not significantly affect the natural vegetation of any area.

Land areas and scenic relief will be scarred by roads, fences, concrete slabs, power lines, and mechanical turrets operating in the midst of natural landscapes.

The implementation of the facilities required for this program should not restrict the forseeable uses of adjacent or nearby property.

E. MITIGATING FACTORS

Construction contractors will be required to take all action possible to reduce fossil emissions and dust and to properly clean up debris from the site areas. The contractors will also be required to restrict construction activities to the immediate construction areas so as to not damage or disturb the adjacent environment.

To help the visual appearance, the new facilities can be painted a passive color, perhaps a desert beige, to blend with the surroundings. Adequate fence maintenance will keep humans and wildlife from entering the facility. Underground power will be installed where economically feasible. At the Fremont Valley facility, a posting of the access road to keep traffic slow, and alerted to the presence of tortoises, would lessen the possibility of harm to the tortoise community. Good air traffic scheduling techniques and judicious management of this airspace will lessen the possibility of denying access to "other users". The incremental

personnel influx to the area should lessen possible adverse impacts by allowing the accepting communities to thoughtfully plan their growth, at a growth rate to which they have been accustomed.

SECTION 6. RELATIONSHIP BETWEEN LOCAL SHORT-TERMED USE OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

There will be minor increases in emissions and some removal of natural foliage during the radar and microwave site construction activities. However, it is our determination that the short term effects will be offset by the increased long term safety to the flying public and the increased efficiency in the management of the Complex activities.

SECTION 7. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES THAT WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

The proposed action will be limited to the addition of seven new radar/microwave sites, and construction or alterations of physical facilities, on existing land areas presently used for communications, administrative and industrial functions. Since the proposed equipment can be dismantled and sites are capable of being restored to original condition, there will be no direct irreversible commitment of resources. Indirect commitments will be limited to that normally associated with construction and operation of these airspace control devices; that is, labor, material, and energy expenditures. There also exists a possibility that some land areas may be removed from future considerations as wild life or natural areas, due to road scarring and site disruptions. While not likely, the most possible examples are Panamint Valley and Velvet Peak.

The proposed action would scar and occupy the landscape of the immediate site and service road for an undetermined time. And, as regeneration of desert vegetation is a slow process, any attempt to vacate and restructure the site would likewise be slow, but not impossible.

SECTION 8. CONSIDERATIONS THAT OFFSET THE ADVERSE ENVIRONMENTAL EFFECTS

A. OPERATIONAL SAFETY

The Complex primary users will have the benefit of knowing the location of the majority of the other airborne traffic within the Complex. Potential in-flight conflicts will be reduced through improved flight planning and newly available in-flight radar service. The Complex users will have the benefit of in-flight monitoring at lower altitudes than presently possible. The added comprehensive radar coverage will permit users to operate in the Complex with greater assurance that separation, airspace to airspace, or aircraft to aircraft, can be achieved through advisory radar coverage. Users, down to very low altitudes, will be visible to the radar controllers; and, where possible, will receive hazard advisories and positive real-time flight coordination. The increased capability to detect low-altitude traffic will enhance the ability of the controllers to provide advisory service to primary users who will normally be in radio contact with at least one controlling agency.

B. AIRSPACE UTILIZATION

The improved capability for real-time control of the Complex airspace will enable controllers to allow entry to more non-participating users, having known operational requirements. Expanded air traffic control services will be available to civil users, including those transiting the Complex via Instrument Flight Rules (IFR) routes.

C. ECONOMIC BENEFIT

The equipment installation and maintenance activities associated with this program will create short-term and long-term employment in an arid area which might otherwise not receive economic benefits.

Real-time use of mission/restricted airspace will provide fuel savings for civil and non-participating military aircraft. Route shortening through operational/non-hazardous areas will be permitted when such airspace usage will not derogate the military mission.

SECTION 9. DETAILS OF UNRESOLVED ISSUES

No identified unresolved issues exist at this time.

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5. Documents of the Histories of the R-2508 Complex and Its Users.

6. The Environmental Narrative Portion of the Comprehensve Plan of Many of the Complex Users.

7. John C. Mitchell, et al "Empirical Studies of Cardiac Pacemakers Interference", Journal of Aerospace Medicine, Vol 45, No. 2, Feb 74.

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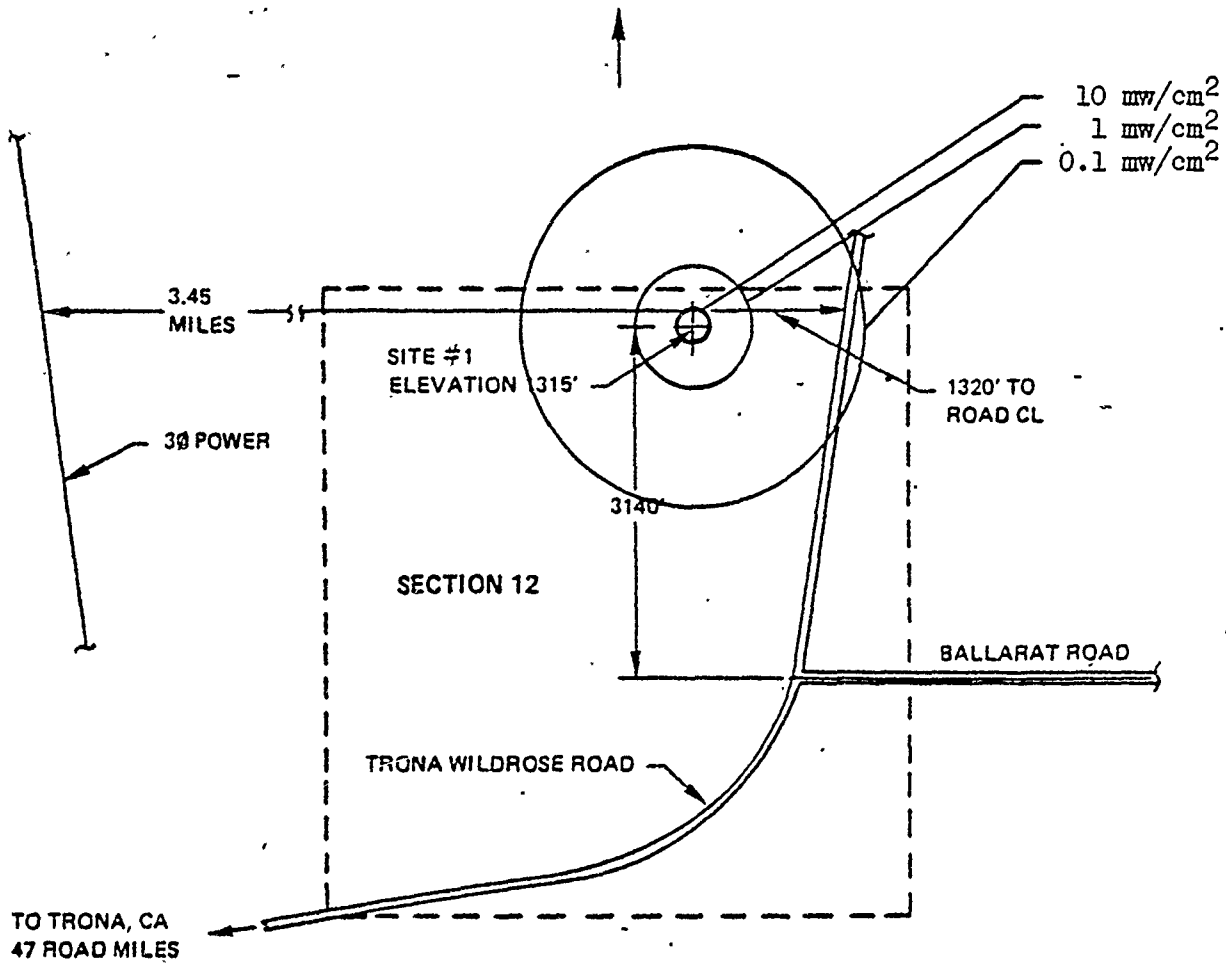
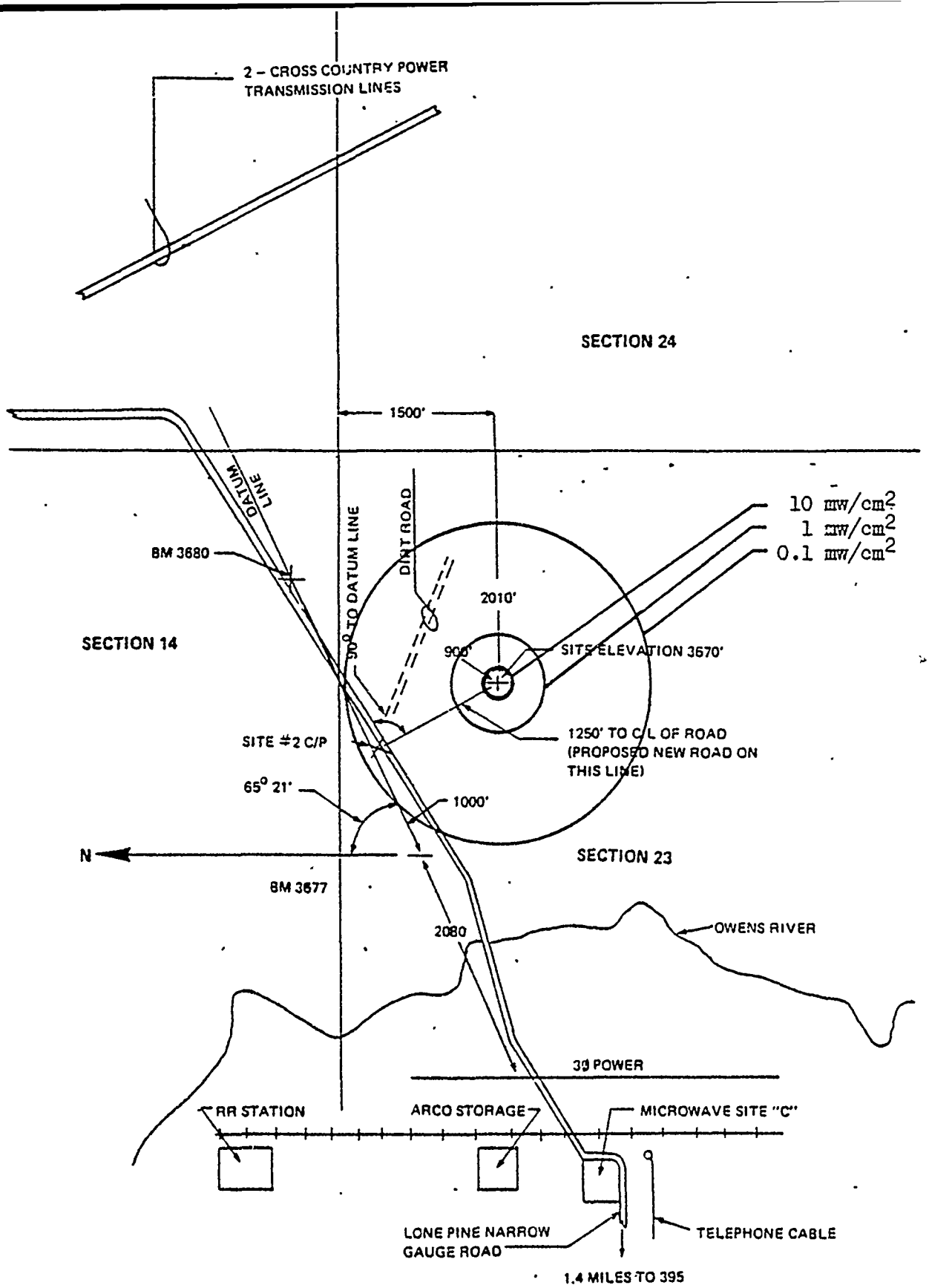
APPENDIX A

SITE LOCATIONS

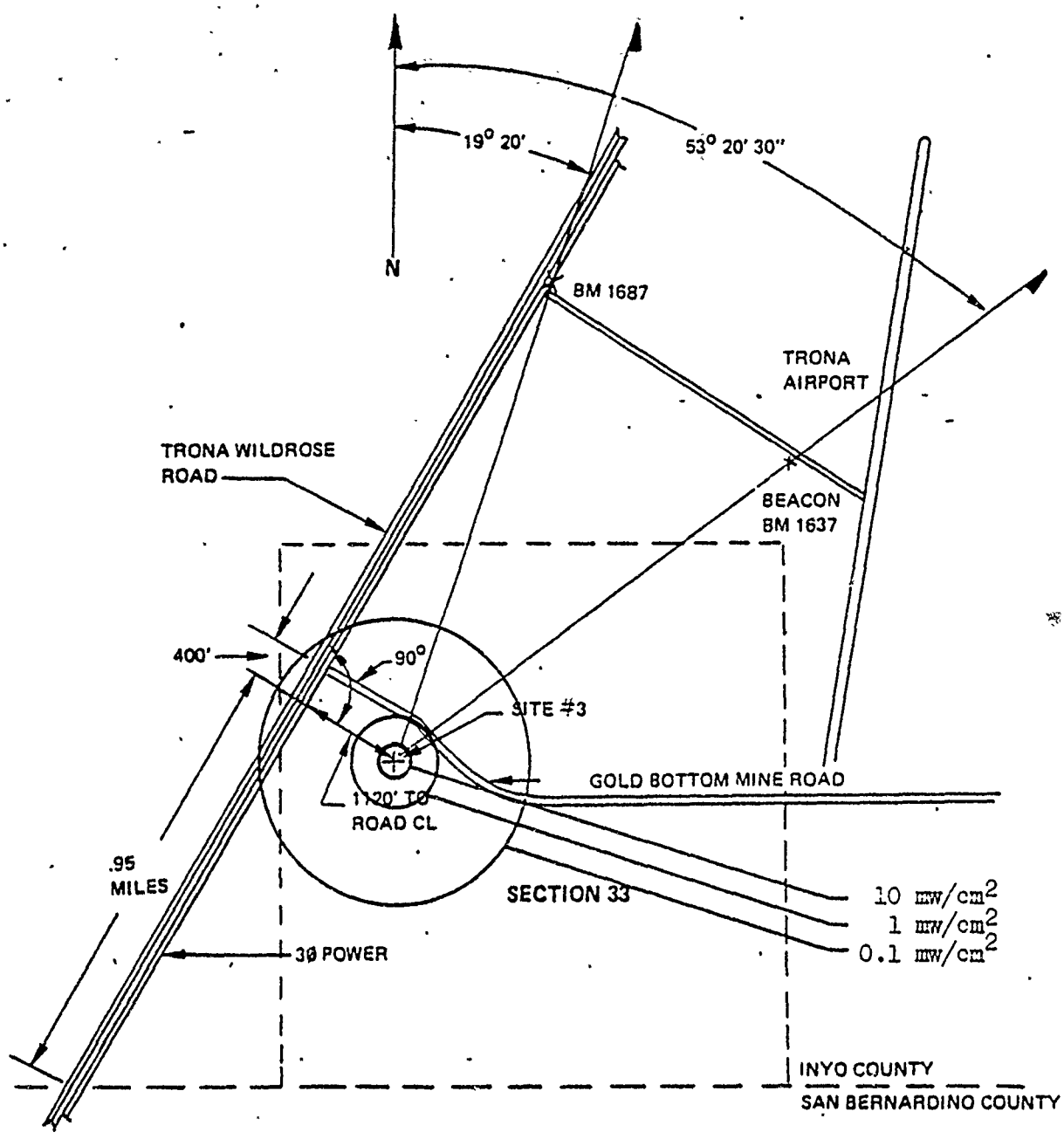
NOTE: The Radio Frequency power level contour lines on the Gap Filler Radar Site Locations Plans are based on the distances presented on Page 34.



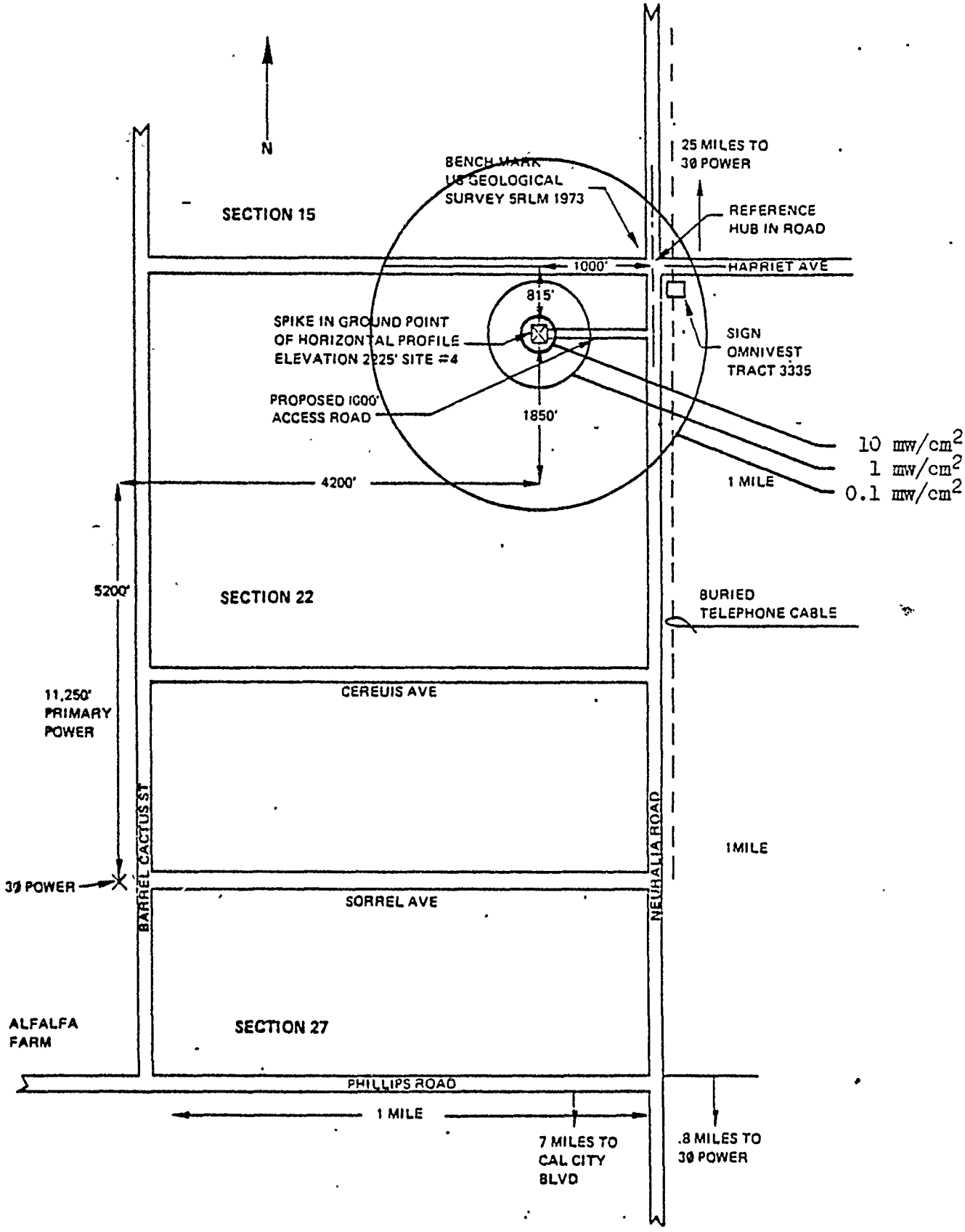
Panamint Valley–Site Location Plan



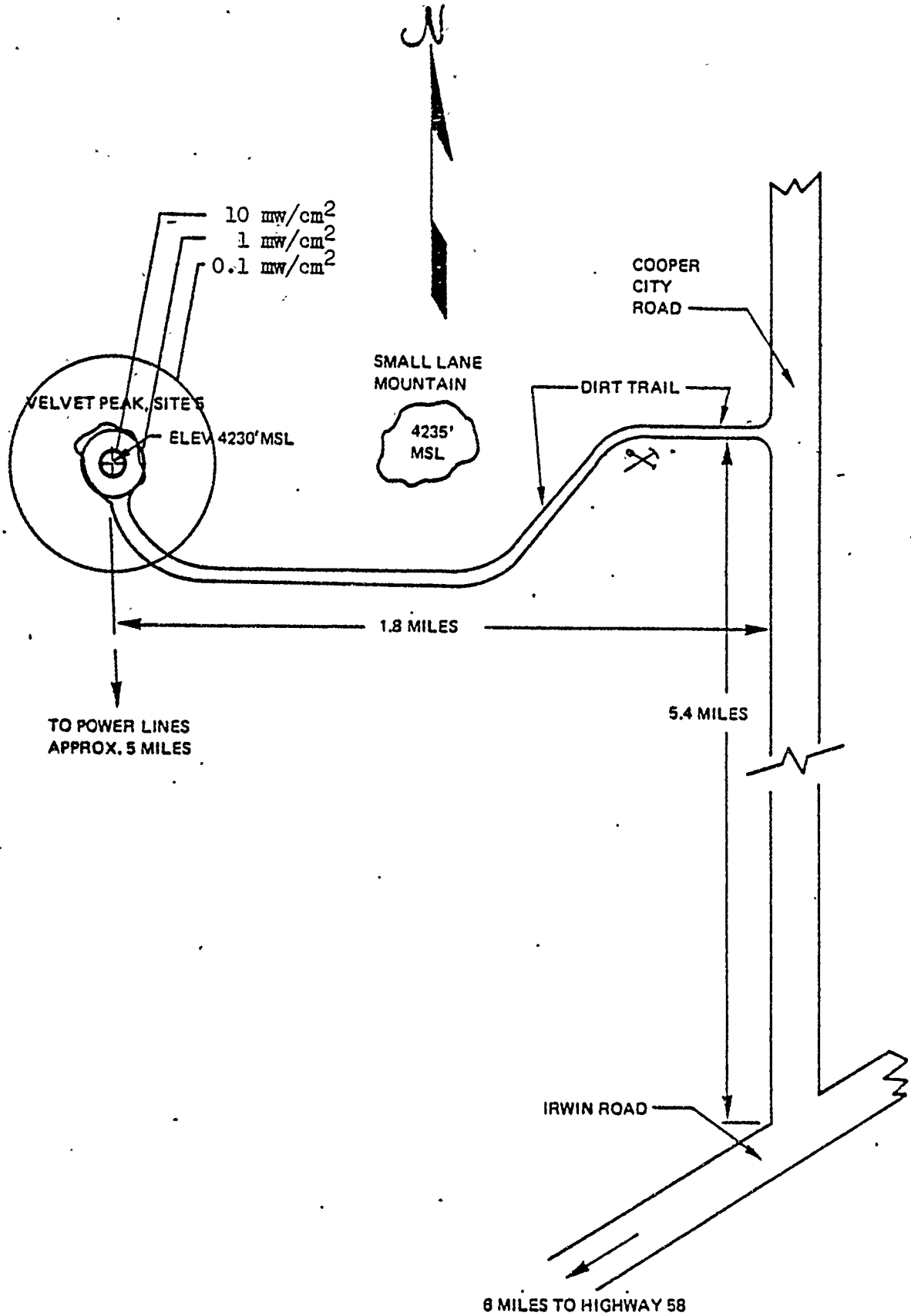
Owens Valley–Site Location Plan



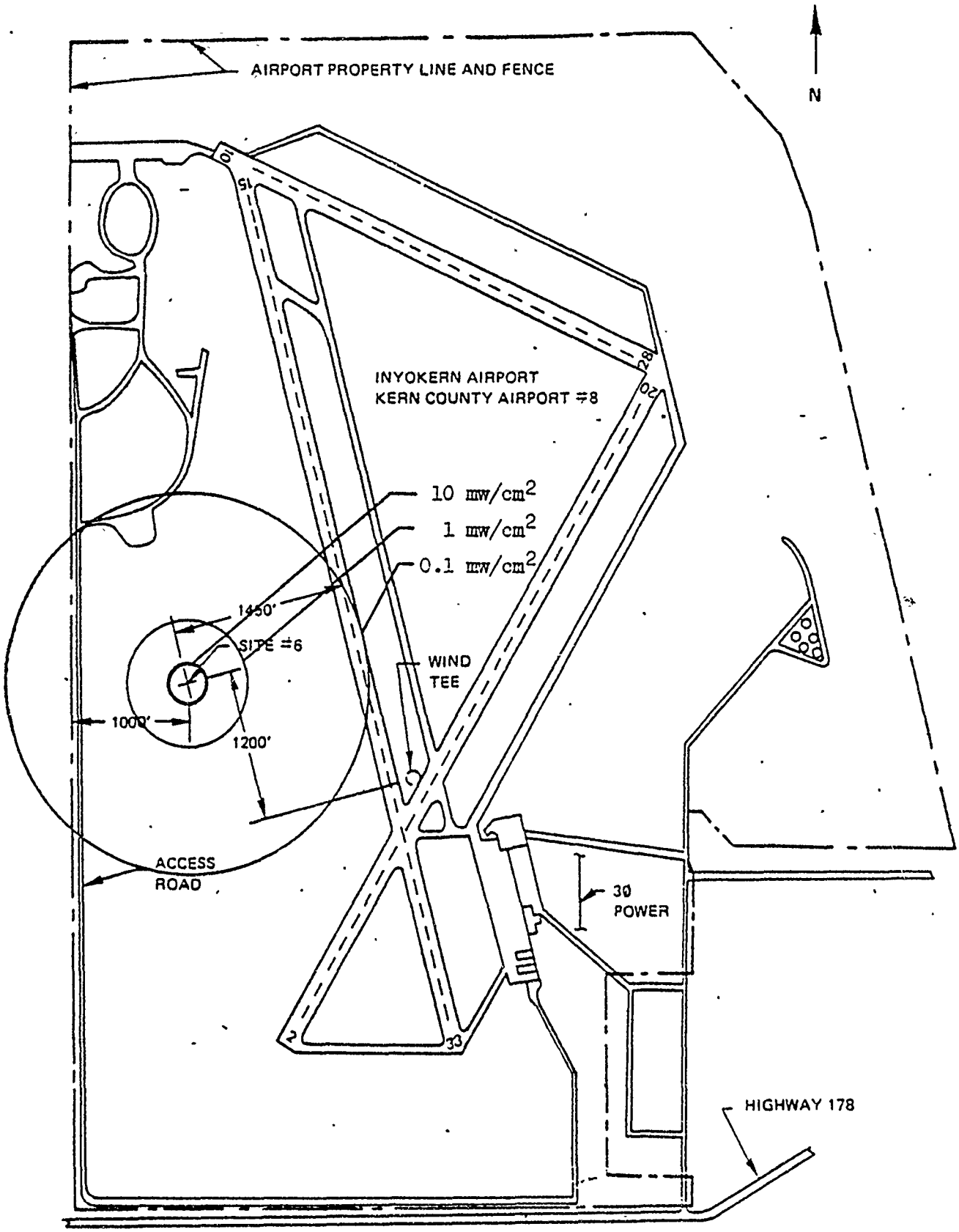
Searles Valley—Site Location Plan



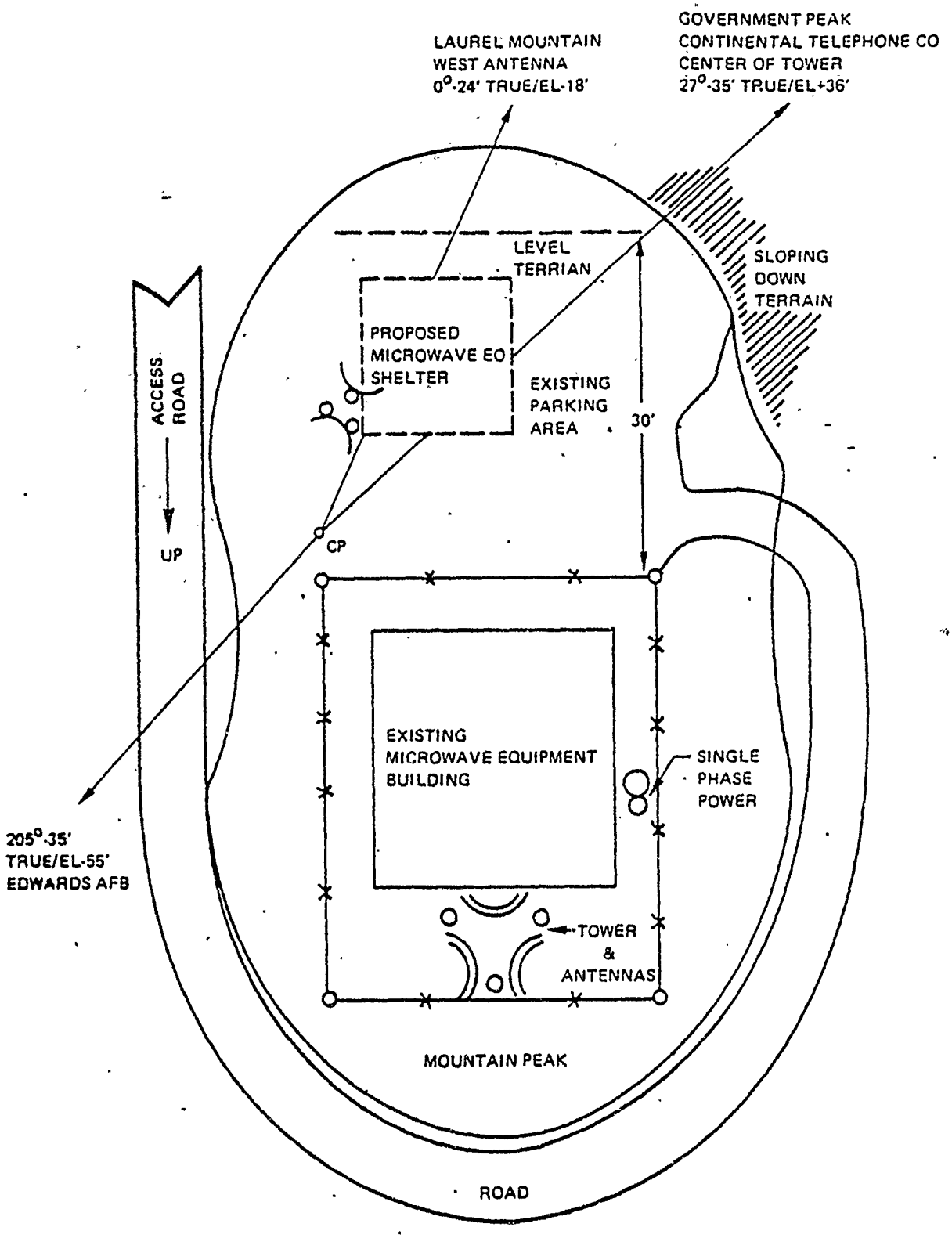
Fremont Valley–Site Location Plan



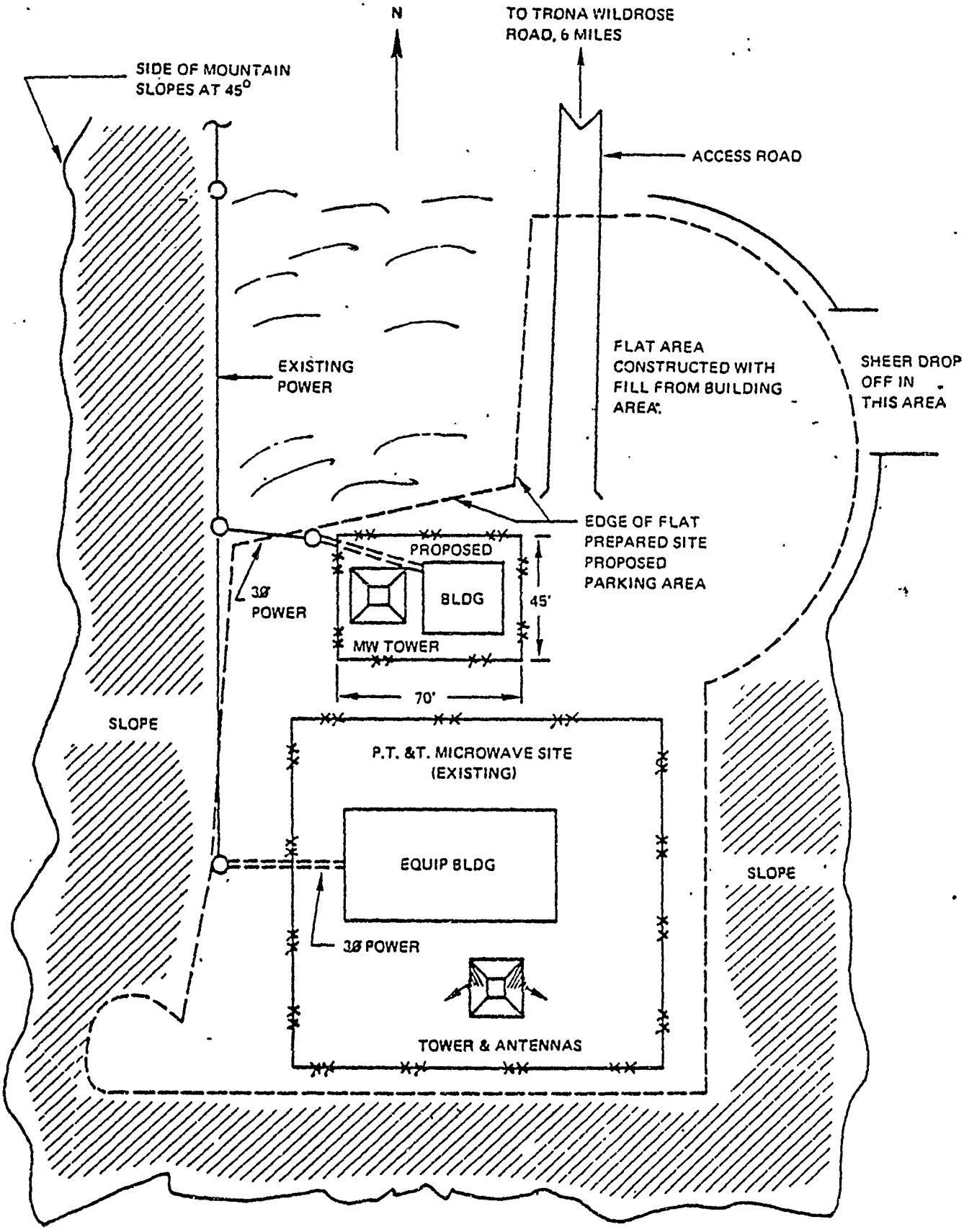
Velvet Peak–Site Location Plan



Indian Wells Valley–Site Location Plan



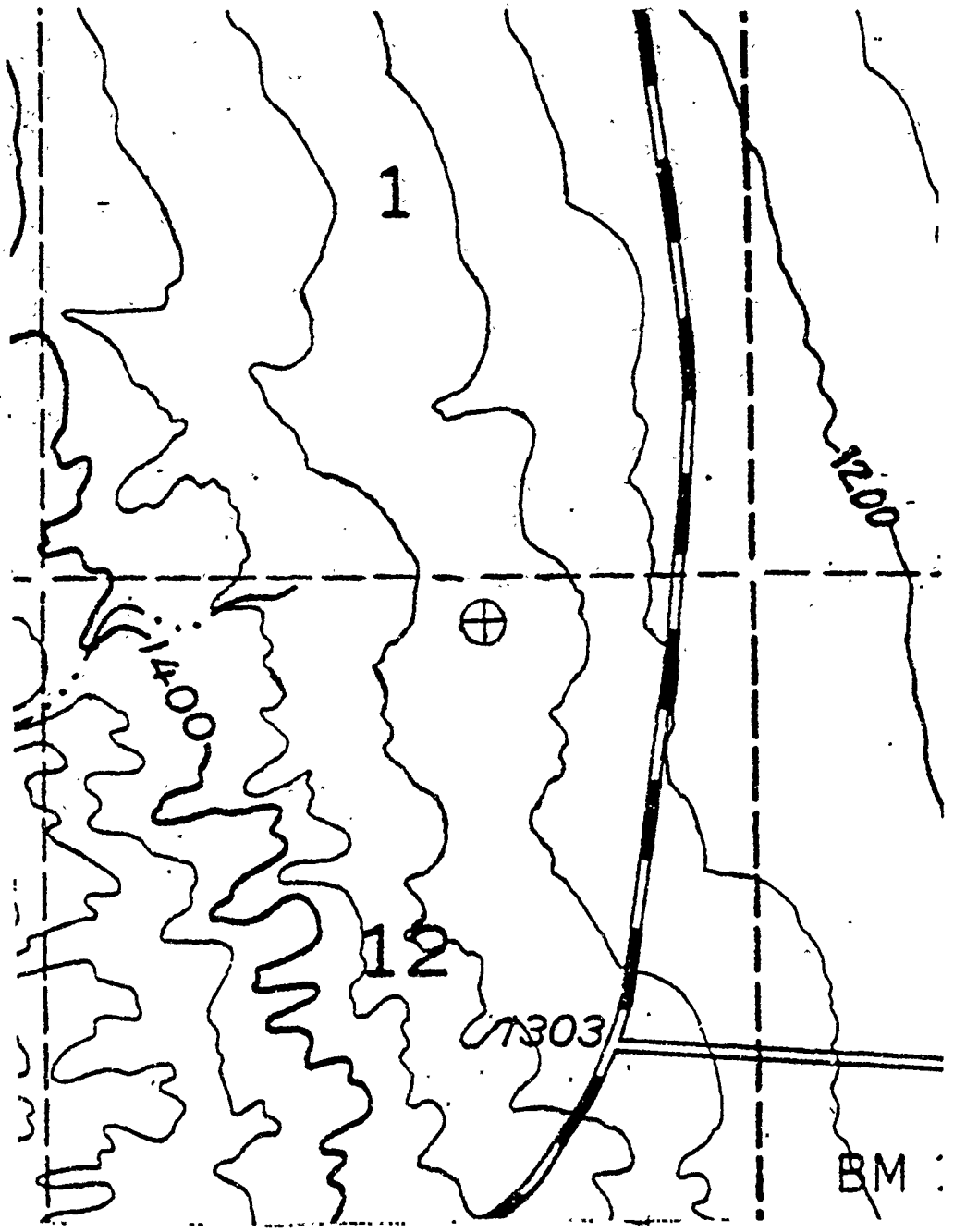
Rand Mountain Microwave Relay Site—Site Location Plan



Slate Range Microwave Relay Site–Site Location Plan

APPENDIX B

GAP FILLER SITE TOPOGRAPHIC MAPS



SCALE 1:15625 Contour interval 40 Feet.

16°
TRUE NORTH
MAGNETIC NORTH
Approx Mean Declination, 1951

0 ½ 1 MILE

0 1000 2000 3000 FEET

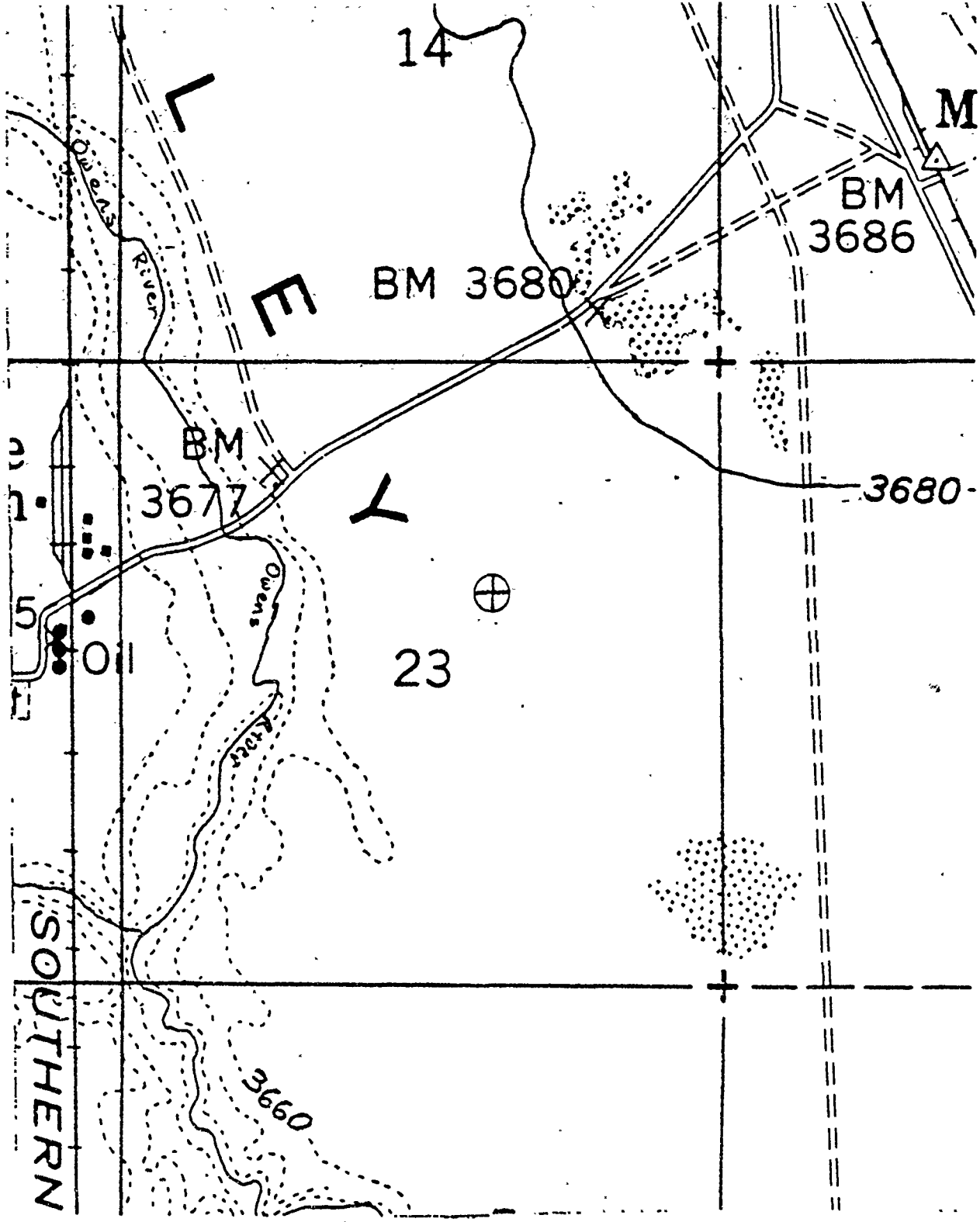
Light Duty

Medium Duty
2 Lane Roads

SITE LOCATION
36°02'31.6"N
117°17'01.1"W

NOTE: This reproduction is enlarged from U.S. Geological Survey Map entitled MATURANGO PEAK, CALIF. N3600-W11715/15, 1951.

PANAMINT VALLEY - SITE TOPOGRAPHIC MAP



SCALE 1:15625 Contour Interval 40 Feet. Dotted lines are 20 foot contours.

0 ½ 1 MILE

0 1000 2000 3000 FEET

SITE LOCATION
36°37'02.7"N
118°01'38.4"W

Unimproved Dirt Road

Light Duty 2 Lane Road

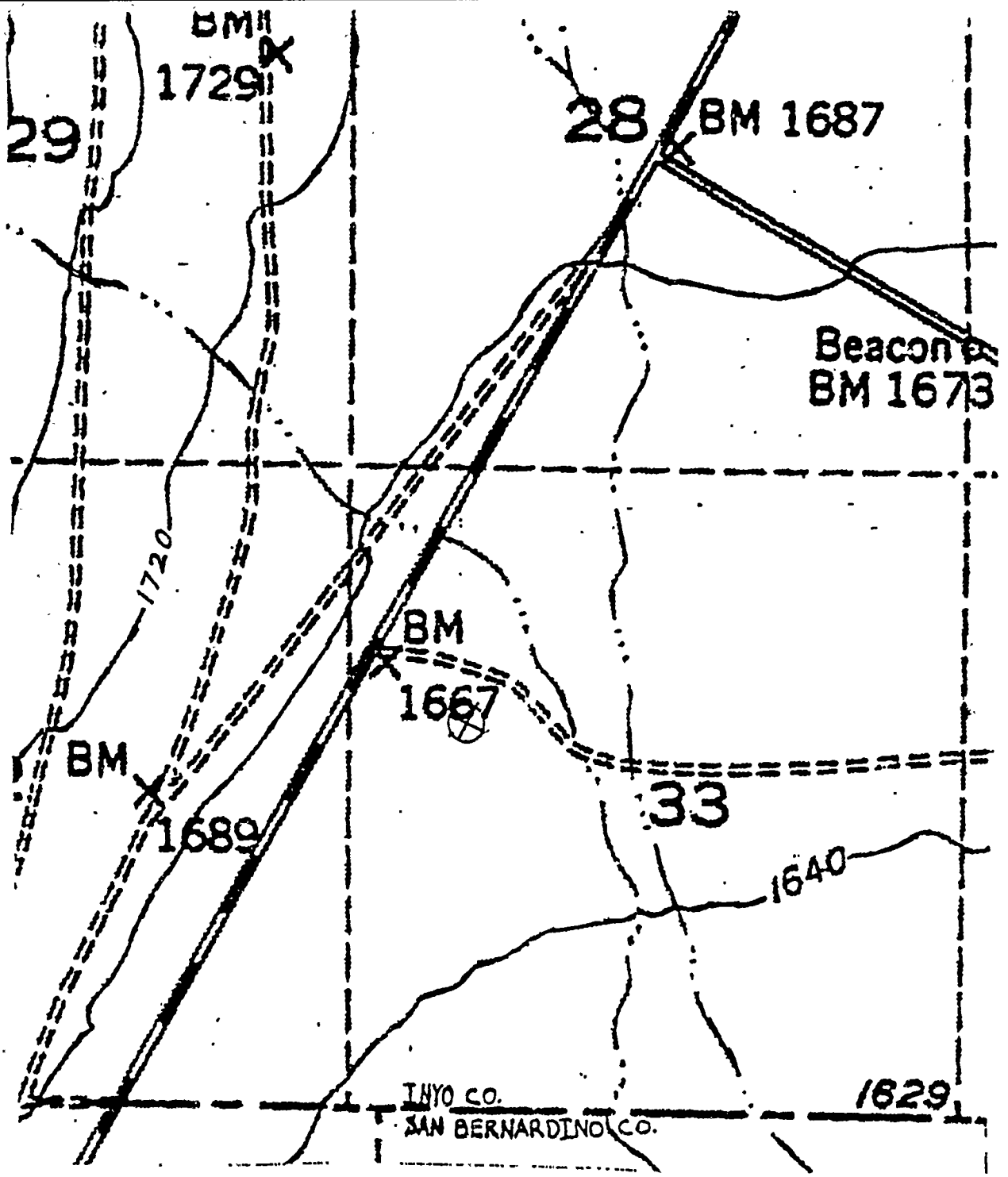
16.5° MN

0°40' GN

Approx Mean Declination, 1958

NOTE: This reproduction is enlarged from U.S. Geological Survey Map entitled LONE PINE, CALIF. N3630-W11800/15, 1958.

OWENS VALLEY - SITE TOPOGRAPHIC MAP



SCALE 1:15625 Contour Interval 40 feet.

0 ½ 1 MILE

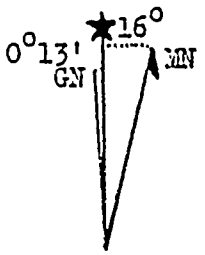
0 1000 2000 3000 FEET

Unimproved dirt road

Light duty 2 lane road

Medium duty 2 lane road

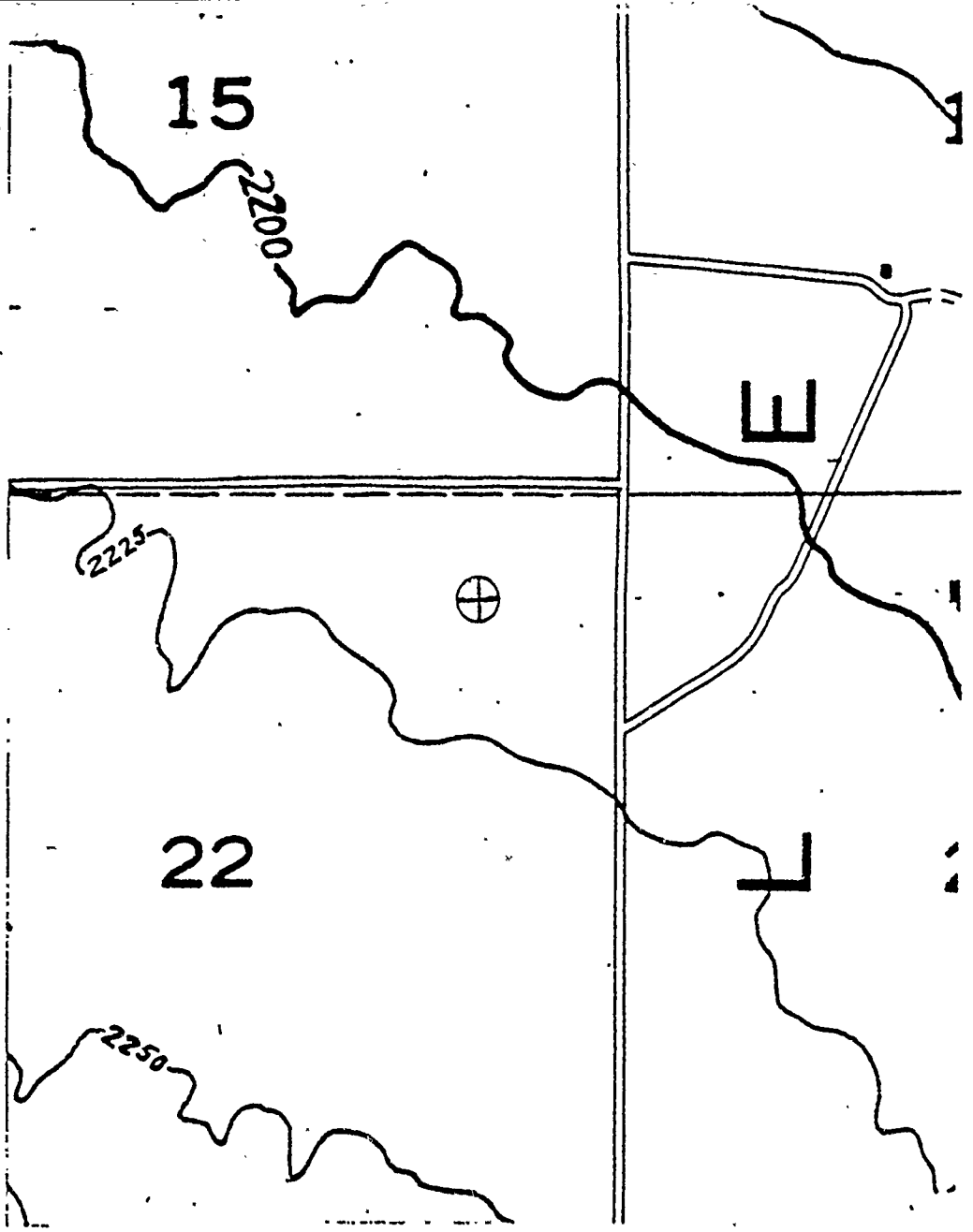
SITE LOCATION
35°48'14.4"N
117°20'37.8"



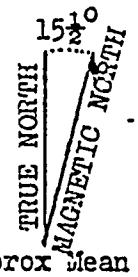
Approx Mean Declination, 1949

NOTE: This reproduction is enlarged from U.S. Geological Survey Map entitled TRONA, CALIF N3545-W117 15/15, 1949.

SEARLES VALLEY - SITE TOPOGRAPHIC MAP



SCALE 1:15625 Contour Interval 25 Feet.



Approx Mean Declination, 1956

0 ½ 1 MILE

0 1000 2000 3000 FEET

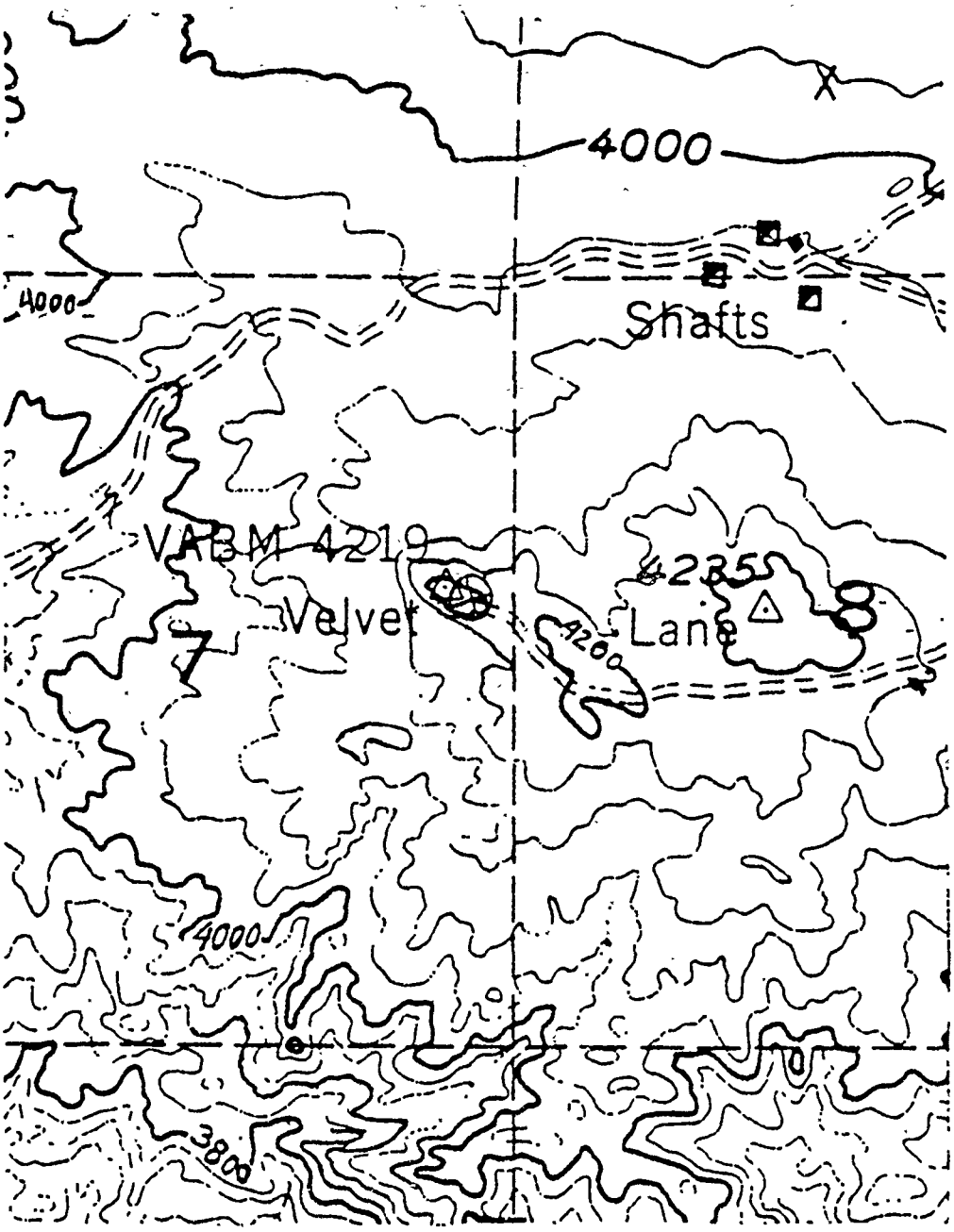
Unimproved Dirt Road

Light Duty 2 Lane Road

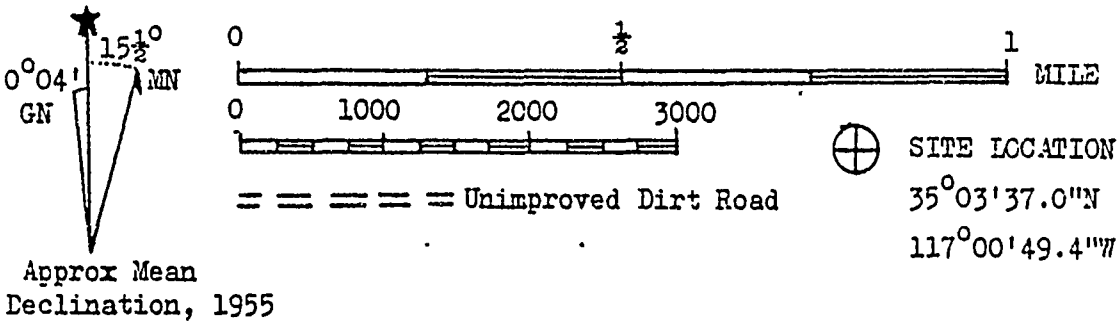
SITE LOCATION
35°13'30.5"N
117°59'16"W

NOTE: This reproduction is enlarged from U.S. Geological Survey Map entitled CASTLE BUTTE, CALIF. N3500-W11745/15, 1956.

FREMONT VALLEY - SITE TOPOGRAPHIC MAP

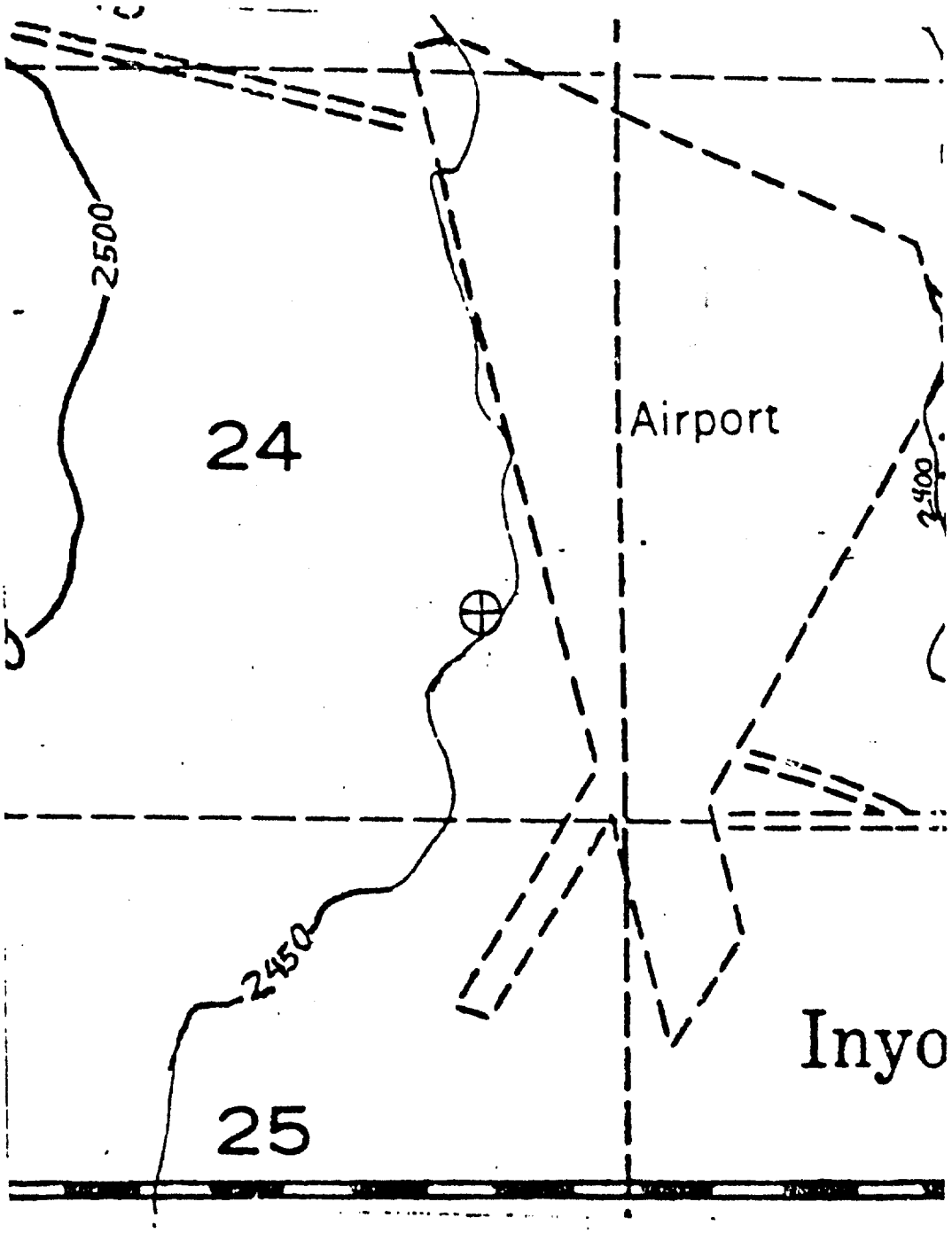


SCALE 1:15625 Contour Interval 40 Feet.

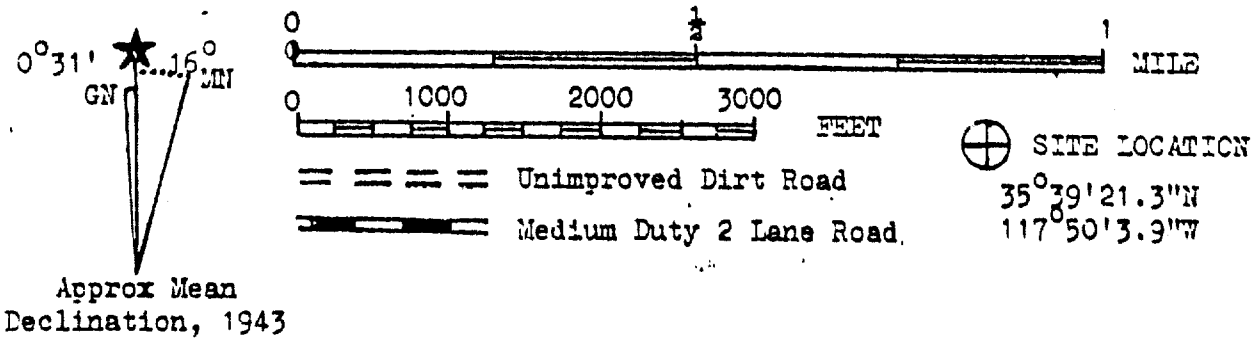


NOTE: This reproduction is enlarged from U.S. Geological Survey Map entitled OPAL MOUNTAIN, CALIF. N3500-W11700/15, 1955.

VELVET PEAK - SITE TOPOGRAPHIC MAP



SCALE: 1:15625 Contour Interval 50 Feet.



NOTE: This reproduction is enlarged from U.S. Geological Survey Map entitled INYOKERN, CALIF. N3530-W11745/15, 1943.

INDIAN WELLS - SITE TOPOGRAPHIC MAP