GROUND WAVE EMERGENCY NETWORK
FINAL OPERATIONAL CAPABILITY

ENVIRONMENTAL ASSESSMENT
FOR
SOUTHERN NEVADA RELAY NODE
SITE NO. RN 8W918NV

5 March 1993

Electronic Systems Center
Air Force Material Command, USAF
Hanscom AFB, Massachusetts 01731-1623

REPORT DOCUMENTATION PAGE

Form Approved
OMB No 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	5 MAR 93	ENV. ASSESSMENT

4. TITLE AND SUBTITLE
GROUND WAVE EMERGENCY NETWORK
SOUTHEAN NEVADA RELAY NODE

5. FUNDING NUMBERS

6. AUTHOR(S)
AIR FORCE MATERIAL COMMAND

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
ELECTRONIC SYSTEMS CENTER
HANSCOM AFB, MA.
01731-1623

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
UNITED STATES AIR FORCE

10. SPONSORING / MONITORING AGENCY REPORT NUMBER
SIO #
RN 8W 918 NV

11. SUPPLEMENTARY NOTES
N/A

12a. DISTRIBUTION / AVAILABILITY STATEMENT
APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED

12b. DISTRIBUTION CODE
A

13. ABSTRACT *(Maximum 200 words)*

THE GROUND WAVE EMERGENCY NETWORK (GWEN) IS A RADIO COMMUNICATION SYSTEM DESIGNED TO RELAY EMERGENCY MESSAGES BETWEEN STRATEGIC MILITARY AREAS IN THE CONTINENTAL UNITED STATES.

14. SUBJECT TERMS	15. NUMBER OF PAGES
GWEN	200
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLAS	UNCLAS	UNCLAS	UL

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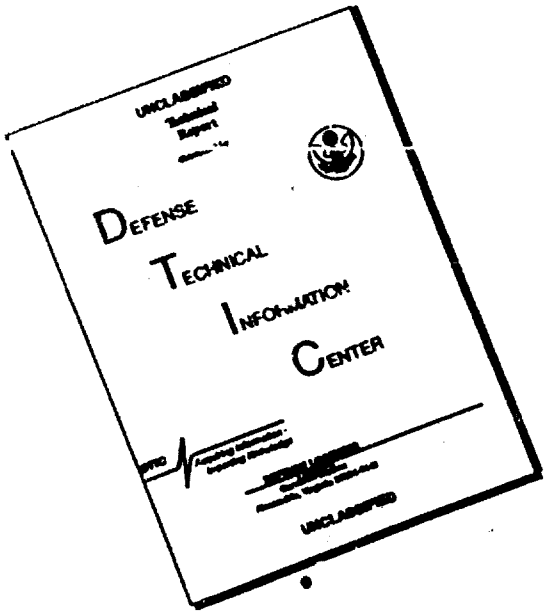

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PREFERRED GWEN SITE REPORT
SOUTHERN NEVADA

The U.S. Air Force is proposing to construct a relay node for the Ground Wave Emergency Network (GWEN) in southern Nevada. The Air Force has followed the siting process described in Section 5 of the Final Environmental Impact Statement (FEIS) for the Final Operational Capability (FOC) phase of the GWEN program to identify alternative Candidate GWEN Sites (CGSs). The six CGSs identified in Southern Nevada are referred to as the Department of Energy (DOE) A, DOE B, Cook, Hernstadt, Bureau of Land Management (BLM) A, and BLM B sites.

This report summarizes the process of selecting the preferred site from the six CGSs. This PGSR, along with a site-specific Environmental Assessment (EA) and Finding of No Significant Impact (FONSI), is being distributed for information and comment in compliance with the Air Force's process of Interagency and Intergovernmental Coordination for Environmental Planning (IICEP).

Operational, environmental, and developmental suitability; construction and real estate acquisition costs; and public comments and concerns are all factors which have been considered in arriving at the selection of the preferred site.

Without an **operationally suitable** location, connectivity of the relay node in Southern Nevada to the GWEN network cannot be achieved. Ground conductivity measurements are acceptable at all six CGSs. During the site-specific studies, no radio frequency interference was detected in the GWEN frequency bands which would interfere with the operation of the GWEN receiver. Operations at any of the sites would pose no interference with other known systems. Therefore, all six CGSs are operationally suitable.

The next major factor considered in the selection of the preferred site was **environmental suitability**. The environmental suitability of each CGS was determined from information provided by an independent field analysis and is documented in the EA. The EA for the six CGSs was completed in March 1993. The environmental analysis found that construction of a GWEN relay node at the Hernstadt site would have significant visual impact to two local recreational areas within 1.5 miles of the site. All six CGSs have potential significant impact to the desert tortoise. Based on a formal consultation with the U.S. Fish and Wildlife (USFWS) under Section 7 of the Endangered Species Act, the USFWS approves construction of the relay node at all six CGSs. However, terms and conditions are required by the USFWS, which include tortoise-proof fencing and a certified biologist on site during construction. A FONSI for these six sites was completed on 6 April 1993. Thus, five CGSs are environmentally suitable, but none of these five are environmentally favored over the others.

All six CGSs are **suitable for development** as a GWEN relay node. The FAA has approved construction of the GWEN relay node at any of the six CGSs, however, they require painting and red obstruction lights at DOE A, Herstadt, and BLM A site. **Construction cost** is also a consideration in the selection of the preferred site. Construction costs for the Hernstadt and DOE A sites are high. Construction costs at the other four sites are acceptable and are not significantly different. Therefore, developmental suitability and construction cost are not major discriminators between the last four sites.

Real estate negotiations have been completed for the purchase of the Cook site. The DOE and BLM sites require a no cost right-of-way release. Negotiations for the Hernstadt site were completed for a purchase, however, the option was allowed to expire because of the significant visual impacts and high construction costs. All sites are acceptable to the Air Force, however, since the DOE and BLM sites are no cost they are favored.

With operational, environmental, and developmental factors evaluated and acquisition and construction costs considered, the Air Force prefers the DOE B site. The DOE B site is preferred because it is operationally, environmentally, and developmentally suitable and is a no cost acquisition.

I have therefore selected the DOE B site as the Air Force's preferred site for development as the GWEN relay node in southern Nevada. After reviewing the information received during the IICEP process, I will direct the final land acquisition activities and construction of the GWEN relay node.

STEPHEN T. MARTIN, LT COL, USAF
Program Manager, GWEN

13 Apr 93
(Date)

FINDING OF NO SIGNIFICANT IMPACT

NAME OF ACTION: GROUND WAVE EMERGENCY NETWORK
SOUTHERN NEVADA RELAY NODE

DESCRIPTION OF PROPOSED ACTION ALTERNATIVES:

The U.S. Air Force plans to construct a radio communications relay node in southern Nevada (Nye County) as part of the Ground Wave Emergency Network (GWEN) communications system. Six action alternatives associated with six candidate GWEN sites (CGSs) in southern Nevada and the no action alternative have been considered and evaluated in an environmental assessment (EA).

GWEN is a radio communications system designed to relay emergency messages between strategic military areas in the continental United States. The system is immune to the effects of high-altitude electromagnetic pulse (HEMP) energy surges caused by nuclear detonations in the ionosphere that would disrupt conventional communications equipment. A failure of such equipment would prevent timely communications among top military and civilian leaders and strategic Air Force locations and prevent U.S. assessment and retaliation during an attack. GWEN is an essential part of a defense modernization program to upgrade and improve our nation's communications system, thereby strengthening deterrence.

The GWEN system is a network of relay nodes, receive-only stations, and input/output stations. The relay node in southern Nevada would be part of the Final Operational Capability (FOC) phase of the GWEN system and would establish essential links with adjacent nodes in the network.

In September 1987, the U.S. Air Force Electronic Systems Division, Hanscom Air Force Base, Massachusetts published a Final Environmental Impact Statement (FEIS) for the GWEN FOC that addressed the system as a whole and identified expected environmental effects common to all sites. Section 5 of the FEIS described a siting process that is designed to minimize the potential for environmental impacts. This process has three distinct phases: network definition, regional screening, and individual site evaluation. Network definition identified the need for a relay node in southern Nevada. Regional screening resulted in the identification of six CGSs in southern Nevada that met the exclusionary and evaluative criteria described in that FEIS. Individual site evaluation examined the relative suitability of the CGSs through site-specific technical studies. The EA is a part of the third phase and is tiered from that FEIS. It addresses the potential environmental effects of the six action alternatives and the no action alternative.

The proposed relay node in southern Nevada will be an unmanned facility located on approximately 11 acres of land and, once constructed, will resemble an AM radio broadcast station. The facility will consist of a 299-foot-tall, low-frequency (LF) transmitter tower, three equipment shelters, an access road, and associated fences. The tower will be supported by 24 guy wires, including 12 top-loading elements. At the request of the FAA, a tower at CGS-1, -3, or -5 will be painted in alternating bands of white and orange and will have red obstruction lights due to their proximity to an airport. An equipment shelter at the tower base will contain an antenna tuning unit. An 8-foot-high chain link fence topped with barbed wire will surround the tower base and associated equipment shelter. A radial ground plane, composed of 60, 0.128-inch-diameter copper wires buried about 12 inches underground, will extend out about 330 feet from the tower base. A 4-foot-high fence will be installed around the perimeter of the copper radials.

A second equipment area located at the site perimeter will contain two shelters housing a back-up power group (BUPG) with two internal fuel storage tanks and radio processing equipment. The BUPG will operate during power outages and for testing purposes. An LF receive antenna, consisting of a pair of 4-foot-diameter rings mounted on a 10-foot pole, and an ultrahigh-frequency (UHF) antenna, used for communicating with airborne input/output terminals and consisting of a 9-foot-high whip-like antenna mounted on a 30-foot-high pole, will also be located in this area. An 8-foot-high chain link fence topped with barbed wire will enclose the entire equipment area. A 10-foot-wide gravel road will connect this area to the tower base. A 12-foot-wide gravel road will provide access to the site from a public road.

The station will use existing commercial three-phase electric power and telephone service. Power and telephone service will be brought to the site through either overhead or buried lines, depending on local utility practices. In its ready status, the antenna will transmit in the LF radio band at 150 to 175 kilohertz for a total of 6 to 8 seconds per hour.

Five action alternatives are discussed in this Finding of No Significant Impact (FONSI). Visual impacts on recreational facilities could be significant on the Hernstadt site (CGS-4). Therefore, this FONSI does not discuss this site.

ANTICIPATED ENVIRONMENTAL EFFECTS

The EA evaluated potential impacts to the physical, biological, and socio-cultural environment from construction and operation of the relay node.

The project would have no significant impacts on physical resources. Erosion and increased runoff would be minimized by using proper erosion control techniques during construction and restoring the vegetation to preexisting natural conditions. Impacts to mineral resources are not anticipated. Paleontological resources are not likely to occur on any of the sites; therefore significant impacts to them are not anticipated. No prime farmland would be removed from production for the project. Water quality would not be significantly affected because increases in copper concentrations due to corrosion of the ground plane would be negligible. Impacts to air quality would be negligible. During construction, temporary and insignificant increases in emissions would occur, and during operation, emissions from the BUPG would not be sufficient to result in violation of air quality standards.

The project would have no significant impacts on biological resources. The sites are located on habitat suitable for the desert tortoise, a federally listed threatened species. The U.S. Fish and Wildlife Service (USFWS) has determined during formal consultation that the proposed project is not likely to jeopardize the continued existence of the desert tortoise. Furthermore the Air Force will implement mitigation measures that, in the opinion of the USFWS, will minimize any incidental effects to tortoises living on or near the preferred GWEN site (PGS). Consultation with the USFWS determined that no other federally listed threatened or endangered species would be affected by the project. None of the sites contains federal jurisdictional wetlands and none is within a 100-year floodplain. The Nevada Natural Heritage Program indicated that no state-listed threatened or endangered species are known to occur on any of the five sites. Bird-tower collisions may occur but would not be significant because the tower would be located away from primary bird habitats and migratory routes.

The project would have no significant impacts on socio-cultural resources. Construction would have a small, beneficial impact on the local economy, in part by providing temporary employment for contractors and construction workers. Community support systems would not be significantly affected. Land use and noise impacts would not be significant. The relay node signal would not interfere with commercial television or radio broadcasts, amateur radio operations, garage door openers, or pacemakers. Radio-frequency emissions outside the fenced area around the tower base would not pose a health hazard to humans or animals. The Nevada Department of Conservation and Natural Resources was consulted and has concurred that the project would not affect significant cultural resources. Significant impacts to Native American traditional, religious or sacred sites are not anticipated. A visual analysis conducted in accordance with the criteria developed in the FOC FEIS concluded that the relay node facility would not cause significant visual impacts.

CONCLUSIONS:

No significant impacts to the surrounding environment would be caused by construction and operation of the proposed relay node on the DOE A (CGS-1), DOE B (CGS-2), Cook (CGS-3), BLM A (CGS-5), or BLM B (CGS-6) site. Therefore, an environmental impact statement for a GWEN relay node at the cited locations in southern Nevada is not required.

Robert A. Zongol
Chairman
HQ ESC Environmental Protection Committee

6 Apr 93
Date

ADDENDUM TO THE SOUTHERN NEVADA (#918) ENVIRONMENTAL ASSESSMENT

At the request of the Department of Energy (DOE), the DOE B site (CGS-2) will have one of two alternate obstruction marking and lighting configurations: red lights and a paint scheme of alternating sections of orange and white; or a dual lighting system combining red and white lights on an unpainted tower. The selected alternative would replace the configuration described in the environmental assessment: an unpainted tower with a single white strobe light. Both alternate configurations are in accordance with Federal Aviation Administration (FAA) Advisory Circular 70/7460-1G which provides FAA standards for tower obstruction marking and lighting. For the painted tower and red lighting configuration, the red obstruction lights would be a top-mounted single flashing red beacon and two steady-burning lights on opposite sides of the tower mid-point. The lights will operate at night only. The dual lighting system includes red lights that are used for nighttime, and a white strobe light for daytime and twilight.

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SUMMARY

The Ground Wave Emergency Network (GWEN) is a radio communication system designed to relay emergency messages between strategic military areas in the continental United States. The system is immune to the effects of high-altitude electromagnetic pulse (HEMP) energy surges caused by nuclear bursts in the ionosphere that would disrupt conventional communications equipment such as telephones and shortwave radios. A failure of such equipment would prevent timely communications among top military and civilian leaders and strategic Air Force locations and prevent U.S. assessment and retaliation during an attack. GWEN is an essential part of a defense modernization program to upgrade and improve our nation's communications system, thereby strengthening deterrence.

The GWEN system consists of a network of relay nodes, receive-only stations, and input/output stations. Each relay node, such as the one proposed in southern Nevada, consists of a guyed radio tower facility similar to those used by commercial AM broadcast transmitters.

A Final Environmental Impact Statement (FEIS) for the GWEN Final Operational Capability (FOC) was published in September 1987 by the Electronic Systems Division, Hanscom Air Force Base, Massachusetts. That FEIS addressed the GWEN system as a whole, identifying expected environmental effects common to all sites. Section 5, beginning on page 5-1 of the FEIS describes a siting process that is designed to minimize the potential for environmental impacts. This process has three distinct phases: network definition, regional screening, and individual site evaluation.

Phase 1, network definition, identified the geographic coordinates that met the operational needs and technical constraints of the network. Each set of coordinates became the center of a circular site search area (SSA) with a 9-mile radius (250 square miles). The SSA discussed in this Environmental Assessment (EA) was centered 4 miles north of the only community in the SSA, Amargosa Valley (formerly Lathrop Wells), in Nye County, southern Nevada, at latitude 36.70° N and longitude 116.40° W.

Phase 2, regional screening, involved the application of exclusionary and evaluative criteria to the SSA to avoid environmentally sensitive areas. The remaining areas, called potential areawide sites (PAWS), became the focus of the siting process. A field investigation for southern Nevada was conducted in February 1990. Eight sites were identified during automobile-based surveys as potential candidate GWEN sites (PCGSs). Two of these PCGSs were located outside the SSA to afford adequate siting opportunities on both private and public land. These sites were evaluated under the same siting criteria as sites within the SSA. Attempts were made to contact the owners of the sites to determine their interest in selling or leasing land to the Government. Rights-of-entry were granted to investigate four privately owned PCGSs. Four PCGSs, two on Department of Energy (DOE) land and two on Bureau of Land Management (BLM) land, did not require rights-of-entry. Following evaluation against the environmental siting criteria set forth in the FEIS, six of the eight PCGSs were recommended as candidate GWEN sites (CGSs) for further review. These CGSs were described in the Preliminary Site Evaluation Report (PSER) of April 27, 1990.

Phase 3, individual site evaluation, involves evaluating the relative suitability of the candidate sites through site-specific technical studies. This EA is a product of those evaluations and discusses the six siting alternatives in southern Nevada. It addresses only those criteria that apply to the candidate sites. The seventh alternative, no action, would impair performance of the GWEN system but leave the environment unchanged.

To be suitable for construction and operation, a site should measure at least 700 by 700 feet (approximately 11 acres), be relatively level and undeveloped, be free of natural or man-made obstructions, and have soils capable of supporting relay node structures. The site should also be close to all-weather roads, commercial three-phase power, and telephone lines to minimize costs. To operate effectively, the site must be located at least a minimum distance from obstructions that could affect reception and transmission. These include buildings and towers, high-voltage power lines, and other communications systems or sources of radio-frequency interference. Specific minimum distances depend on height and power levels of identified obstructions or interfering sources.

This EA shows that construction and operation of a GWEN relay node on the Hernstadt site (CGS-4) could have significant visual impacts on recreational facilities, as discussed in Section 4.5 of this EA.

The project would have no significant impacts if constructed on the DOE A (CGS-1), DOE B (CGS-2), Cook (CGS-3), BLM A (CGS-5), or BLM B (CGS-6) site. During the 6-week construction period, the project would cause temporary and insignificant air quality and noise impacts and slight increases in traffic. It would have a small, beneficial impact on the local economy, in part because it would provide temporary employment for contractors and construction workers. If constructed on any of the above five sites, the project would have no significant impacts on air quality; water quality; land use; mineral resources; known paleontological resources; biological resources, including threatened and endangered species; or cultural resources that are listed, eligible, or potentially eligible for listing on the National Register of Historic Places. Visual impacts would not be significant. Radio-frequency emissions outside the fenced area around the tower base would not pose a health hazard to humans or animals.

1.0 PURPOSE AND NEED FOR ACTION

The proposed action covered by this Environmental Assessment (EA) includes construction and operation of a relay node of the Ground Wave Emergency Network (GWEN) in southern Nevada (see Figure 1.1 of this EA). This relay node will provide essential connections with adjacent nodes in the network. The major features of a GWEN relay node and associated environmental impacts common to all sites are addressed in the Final Environmental Impact Statement (FEIS) for the Final Operational Capability (FOC) phase of GWEN, which was published in September 1987 by the Electronic Systems Division, Hanscom Air Force Base, Massachusetts. This EA is tiered from that FEIS and addresses site-specific conditions at the candidate GWEN sites (CGSs) for this particular site search area (SSA).

The purpose of GWEN is to provide to the President and the National Command Authority a strategic communications network that is immune to the effects of high-altitude electromagnetic pulse (HEMP) and will carry critical attack warning and force execution data. . As a result, GWEN will remove any possibility of potential aggressors taking advantage of the electromagnetic pulse generated by a high-altitude nuclear burst. A HEMP surge would disrupt the nation's electric power line transmission capability, cripple electronic devices, and adversely affect skywave communications networks based on conventional electronics. GWEN provides a low-frequency (LF) ground wave communication network that will not be affected by HEMP effects. It thereby strengthens deterrence by removing the option of beginning an attack against the United States by using HEMP effects.

A partial GWEN network, called the Thin Line Connectivity Capability (TLCC), has been completed. It contains 8 input/output stations, 30 receive-only stations, and 54 relay nodes. The TLCC provides a limited level of HEMP-protected communications to strategic forces and the National Command Authority.

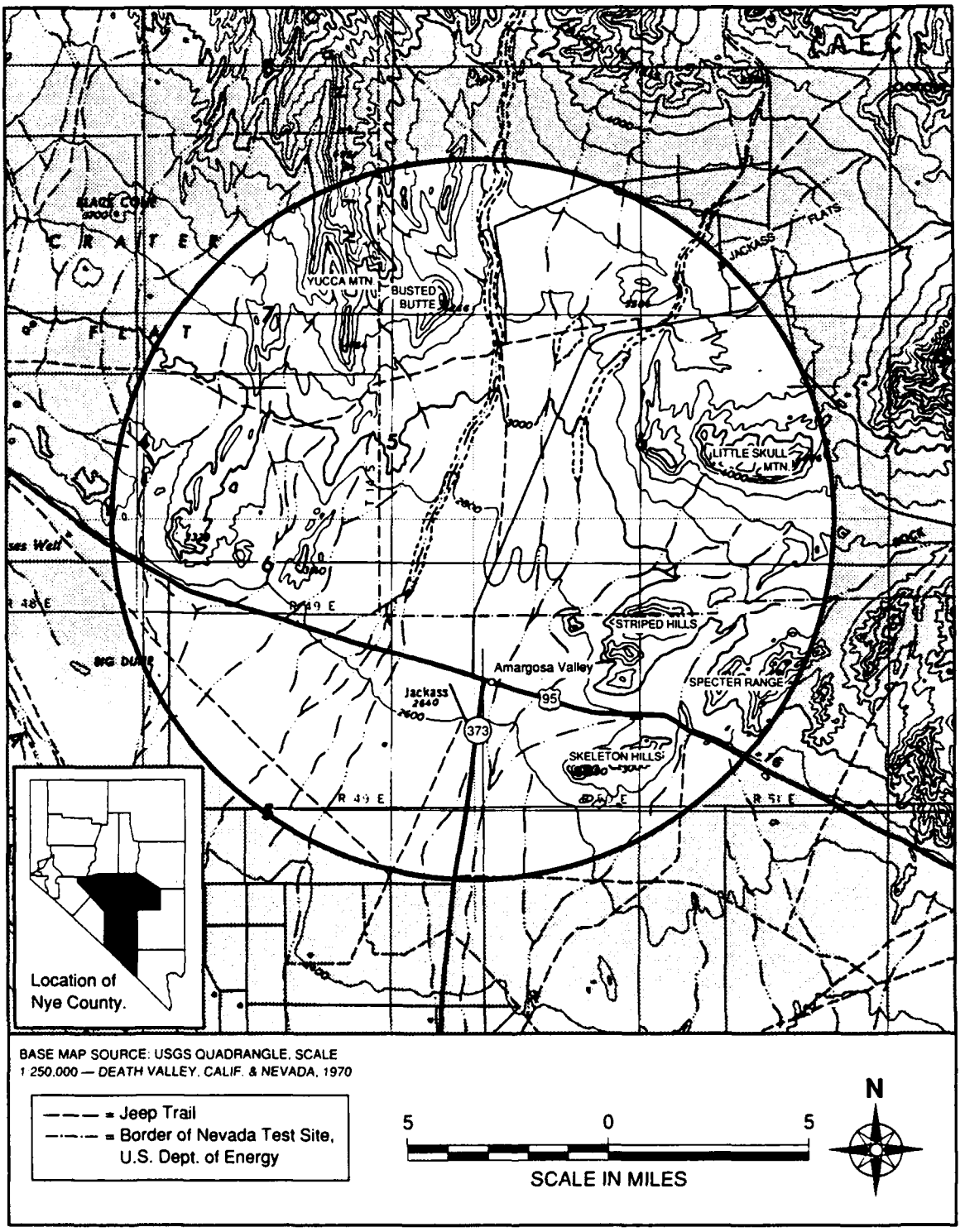

FIGURE 1.1 SOUTHERN NEVADA SITE SEARCH AREA (SSA), NYE COUNTY, NEVADA

The FOC phase of GWEN will add 29 relay nodes. The FOC will allow communication along several routes, thereby enhancing system availability and ensuring that vital communications will be maintained.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

The six action alternatives are site-specific applications of the standard relay node design presented in the FEIS. Consequently, they share a number of features that are discussed in Section 2.1 of this EA. The site-specific features are discussed in Sections 2.2 through 2.7 of this EA. Site descriptive data was obtained during field investigations conducted in February 1990. Figure 2.1 of this EA shows the CGSs in relation to the major features of the SSA. Figure 2.2 and Appendix B of this EA show the locations of the six CGSs in relation to local roads and surrounding topography, respectively.

2.1 Common Features of the Action Alternatives

2.1.1 Site Selection Process

The process used to select sites is described in Section 5, beginning on page 5-1 of the FEIS. This process has three distinct phases: network definition, regional screening, and individual site evaluation. Appendix A of this EA provides a diagram of the site selection process. The environmental criteria used in this process are defined in Tables 5-1 and 5-2, pages 5-7 through 5-14 of the FEIS.

Phase 1, network definition, involved locating network nodes to optimize their performance while serving a predetermined number of users. A typical GWEN ground wave has an effective range of about 150 to 200 miles. Thus, relay nodes could not be located independently; changing the location of one would affect the connectivity with other nodes in the network. Once the optimal coordinates of the relay nodes were identified, a 9-mile-radius SSA was defined around each point to provide suitable opportunity for siting a relay node near that point. The 9-mile radius was chosen because it provided a reasonably sized search area consistent with the technical constraints on the relay node. If a significant portion of an SSA fell within an environmentally highly sensitive area such as a national park or wilderness area, an alternative was selected and its connectivity evaluated. This process was repeated until all relay nodes fell outside such areas.

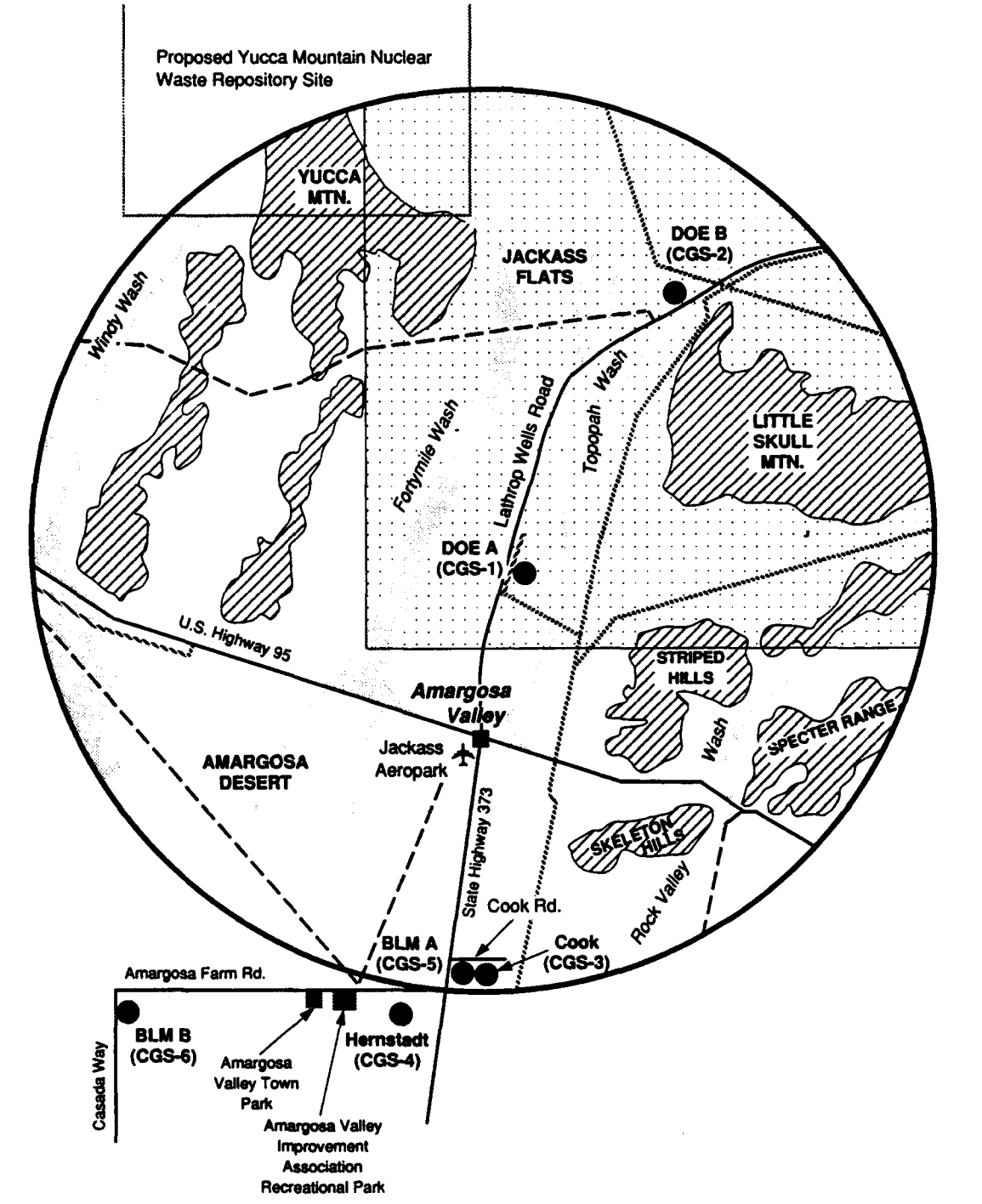

FIGURE 2.1 LOCATIONS OF CANDIDATE GWEN SITES (CGSs) RELATIVE TO SELECTED MAJOR FEATURES AND ROADS WITHIN AND NEAR THE SOUTHERN NEVADA SITE SEARCH AREA

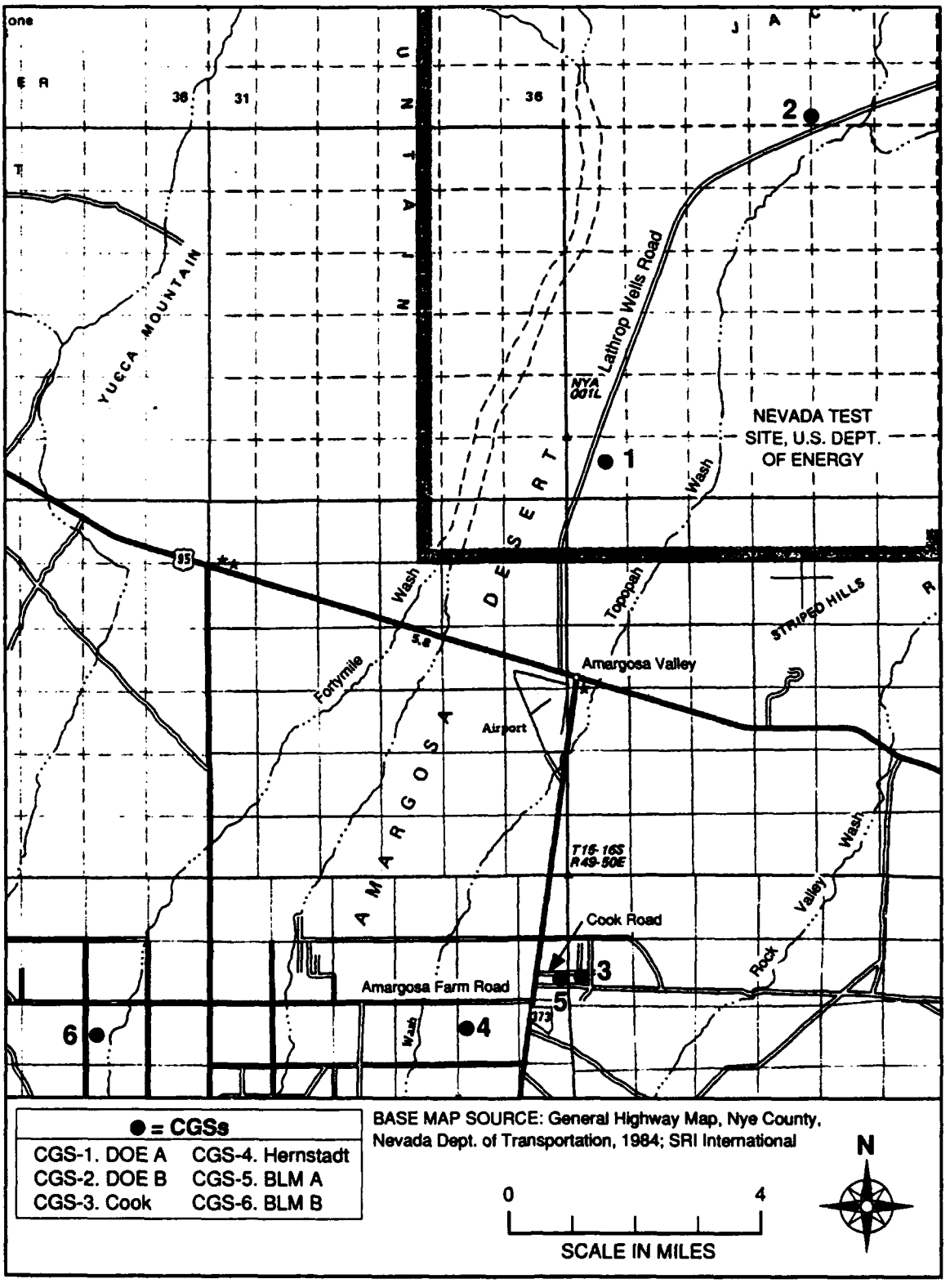

FIGURE 2.2 LOCATIONS OF CANDIDATE GWEN SITES (CGSs) IN NYE COUNTY

Phase 2, regional screening, involved the application of exclusionary and evaluative criteria to the SSA to identify areas that might contain operationally acceptable sites outside environmentally sensitive areas. The resulting search areas, called potential areawide sites (PAWS), were submitted to appropriate federal, state, and local officials for review. The PAWS were then redefined, as appropriate, by incorporation of the comments of the reviewers, and a field investigation was conducted to find suitable candidate sites for a GWEN relay node within the redefined PAWS.

A field investigation for southern Nevada was conducted in February 1990. Eight sites were identified during automobile-based surveys as potential candidate GWEN sites (PCGSs). Two of these PCGSs were located outside the SSA to afford adequate siting opportunities on both private and public land. These sites were evaluated under the same siting criteria as sites within the SSA. Attempts were made to contact the owners of the sites to determine their interest in selling or leasing land to the Government. Rights-of-entry were granted to investigate four privately owned PCGSs. Four PCGSs, two on Department of Energy (DOE) land and two on Bureau of Land Management (BLM) land, did not require rights-of-entry. Following evaluation against the environmental siting criteria set forth in the FEIS, six of the eight PCGSs were recommended as candidate GWEN sites (CGSs) for further review. These CGSs were described in the Preliminary Site Evaluation Report (PSER) of April 27, 1990.

Phase 3, individual site evaluation, of which this EA is a part, is then used to determine the relative suitability of the candidate sites through site-specific technical studies. This EA presents the results of the environmental portions of those studies and covers site-specific impacts associated with construction of a relay node in southern Nevada. These are summarized in Sections 4.2 through 4.7 of this EA. The findings of this EA and site-specific studies of operational parameters will be used to select a preferred GWEN site (PGS).

2.1.2 Relay Node Construction and Operation

A typical relay node site is located on approximately 11 acres of land (see Figure 2.3 of this EA). It is an unmanned facility consisting of a 299-foot-tall, three-sided, 2-foot-

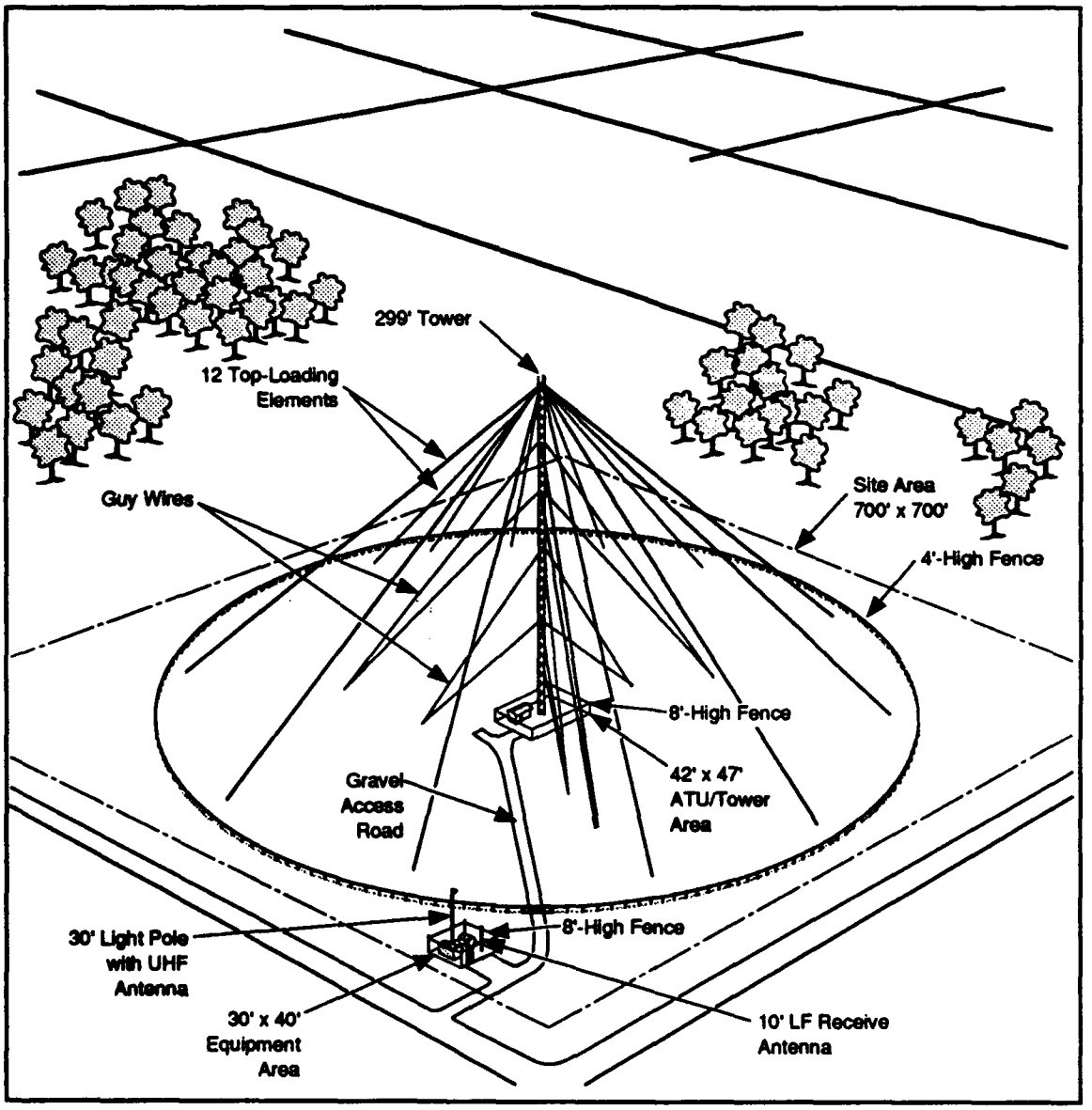

FIGURE 2.3 TYPICAL LAYOUT OF FOC RELAY NODE STATION

wide LF transmitter tower, three equipment shelters, an access road, and associated fences. The tower has a base insulator and lightning protection and is supported by 24 guy wires, including 12 top-loading elements to further strengthen the signal and provide additional structural support.

These guy wires and top-loading elements are attached to the tower and 18 buried concrete anchors. The sizes of these anchors and their depth of burial vary with local soil and bedrock properties. However, the guy-wire anchors typically are rectangular blocks buried 5 feet below the surface. If bedrock occurs at or near the surface, the anchors are special rock-embedded rods. The tower base is concrete with a cross-section area resembling an inverted T. The size of this foundation is determined by soil conditions.

A radial ground plane, composed of 60 buried copper wires, extends out from the base of the tower. Each wire is 0.128 inch in diameter, about 330 feet long, and buried approximately 12 inches underground. The ground plane helps to strengthen the broadcast signal, and the number and length of the wires depend on the soil conductivity at the site. A 4-foot-high fence is installed around the perimeter of the ground plane to protect the ground plane and guy anchors and to prevent inadvertent exposure to electric shock resulting from the buildup of static electric charge. At the request of the United States Fish and Wildlife Service (USFWS), this fence will be tortoise-proof to protect the desert tortoise, a threatened species.

In addition to the main tower, the relay node has two other antennas. One is an LF receive antenna made up of a pair of 4-foot-diameter rings mounted on a 10-foot pole. The second is an ultrahigh-frequency (UHF) antenna used for communicating with airborne input/output terminals. It is a 9-foot-high whip-like antenna mounted on a 30-foot-high pole. Both antennas are located within the equipment area at the perimeter of the site, which is enclosed by an 8-foot-high fence.

The siting and design of the tower are coordinated with the Federal Aviation Administration (FAA) to ensure compliance with FAA standards and regulations. At the request of the FAA, a tower constructed at the DOE A (CGS-1), Cook (CGS-3), or BLM A (CGS-5) site will be painted due to its proximity to an airport. The tower will be painted in alternating bands of white and orange, four orange bands and three white bands, each approximately 42 feet wide. The tower will also be equipped with a blinking red light at the top that emits 20 to 40 flashes per minute and is rated at 1,500 candelas. Two steadily burning red lights, rated at not less than 32.5 candelas, will be located at an intermediate level on the tower. A tower constructed at one of the other three sites (DOE B, CGS-2; Hernstadt, CGS-4; or BLM B, CGS-6) will be unpainted and equipped with a white strobe light at the top that emits 40 flashes per minute and is rated at 20,000 candelas for daytime and twilight use and 2,000 candelas for nighttime use. To minimize glare at ground level, the light will be focused upward and horizontally outward.

GWEN operates intermittently in the LF radio band at 150 to 175 kilohertz (kHz). For comparison, the low end of the AM band for commercial broadcasts is 530 kHz. The peak broadcast power for each GWEN tower is from 2,000 to 3,000 watts, depending on local soil conditions. In its ready status, GWEN typically transmits between 6 and 8 seconds per hour. GWEN does not interfere with commercial television, radio broadcasts, amateur radio operations, garage door openers, or pacemakers, as noted in Section 2.1.1.1, page 2-3 of the FEIS.

All equipment shelters are anchored to concrete pads. One shelter, located at the base of the tower, houses the antenna tuning unit (ATU). Two other shelters are located side by side in the equipment area enclosed at the perimeter of the property. One houses radio-processing equipment, and the other houses a 70-horsepower, back-up diesel generator and two aboveground fuel tanks. The generator operates 2 hours per week for testing purposes and during power outages. Locked, 8-foot-high chain link fences topped with barbed wire secure the equipment shelter areas at the base of the tower and at the perimeter of the site to provide safety and to inhibit unauthorized entry. A 12-foot-wide gravel road provides access to the equipment area enclosure at the perimeter of the property. A 10-foot-wide gravel road leads from the equipment enclosure to the tower.

Fuel is stored in two aboveground steel tanks inside the generator shelter. Tank capacities are 559 gallons and 461 gallons. Each tank pipes fuel separately to the back-up power group (BUPG) and is equipped with two outlet shut-off valves, one controlled manually and one controlled automatically. If a leak occurs, fuel will flow into a floor drain leading to a tightly capped pipe extending outside the BUPG. Once approximately 2 gallons of fuel accumulate in the pipe, a "liquid spill" signal is sent to the GWEN Maintenance Notification Center, which will dispatch maintenance personnel. However, if a leak were not detected, an explosion inside the shelter would be extremely unlikely due to the high flash point of diesel fuel. If a tank at the GWEN station failed, the entire contents of one tank could be released and contained inside the BUPG shelter. Refer to Section 4.12.1.1, beginning on page 4.12-1 of the FEIS for further discussion on diesel fuel spills and leaks.

The station uses existing commercial three-phase electric power and telephone service but does not require water, septic, or sewer systems. Power and telephone service are brought to the site through either overhead or buried lines, depending on local utility practices. Power and telephone service are generally brought underground from the site boundary to the equipment shelter area.

Temporary increases in air pollutant emissions will occur during construction, primarily from greater use of heavy machinery than is required in normal farming operations. Emissions resulting from operations of the facility will be limited to the operation of the BUPG, which will operate only 2 hours every week for testing purposes and for additional periods as required during power outages. Thus, the generator will operate for a total of 152 hours per year, if commercial power outages totaled 48 hours. If the generator runs at 100 percent load during the projected 152-hour operating time, total emissions in one year will be less than 350 pounds per pollutant, as documented in Section 4.3.1, beginning on page 4.3-1 of the FEIS.

Noise levels generated by construction equipment are discussed in Section 4.5.1.1, beginning on page 4.5-1 of the FEIS. Under worst-case assumptions, levels could reach 78 dBA at the site boundary from on-site activity and 92 dBA at distances of 50 feet from equipment installing the off-site access road. Noise generated during GWEN operation

would come from the BUPG, which will operate only 2 hours per week and during commercial power outages. The BUPG will be located at least 50 feet within the site boundary with its exhaust side oriented toward the tower area. Noise levels due to intermittent operation of the BUPG will be less than 72 dBA at the site boundary, which is within the standards typically set for lands under agricultural use (70 to 75 dBA). At 50 feet beyond the site boundary, the noise level would drop below 65 dBA, which is within the standards typically set for residential and mixed residential/agricultural use (55 to 65 dBA). These noise levels and standards are discussed in Section 3.5.3, page 3.5-2 and Section 4.5.1, pages 4.5-1 through 4.5-6 of the FEIS.

Construction will require as many as 20 workers at any given time and take about 6 weeks. Standard earth-moving and erection equipment will be used, as detailed in Table 2-1, page 2-14 of the FEIS. Erosion control techniques that are consistent with local practices will be used during construction. Vegetation removal and grading will be minimal at all of the sites. The site's vegetation will be restored to its preexisting natural condition.

After construction is completed, personnel requirements will be limited to periodic maintenance by a contractor who will service the equipment, cut the surface growth, remove snow from the access road, and perform other services, as needed. Security services will be arranged with local authorities. The projected life of the facility is 15 to 25 years. Upon decommissioning, the tower and other structures will be removed, as discussed in Section 2.1.4, page 2-18 of the FEIS.

2.2 Alternative 1: DOE A Site (CGS-1)

The DOE A site is on the Nevada Test Site, 675 feet east of Lathrop Wells Road and approximately 3.4 miles north of the Lathrop Wells Road/U.S. Highway 95 intersection, in the southwest quarter of the northeast quarter (SW1/4 NE1/4) and the northwest quarter of the southeast quarter (NW1/4 SE1/4) of Section 31, Township 14S, Range 50E. The 780-foot access road would be from Lathrop Wells Road and would require upgrading 750 feet of dirt road and constructing 30 feet of new road.

Three-phase power would be obtained from overhead lines 25 feet west of the site. Telephone lines would be connected to an underground cable that ends 0.48 mile north of the site.

Appendix B, Figure B.1 of this EA, provides a map showing the surrounding topography.

2.3 Alternative 2: DOE B Site (CGS-2)

The DOE B site is on the Nevada Test Site, 430 feet north of Lathrop Wells Road and 10.2 miles north of the Lathrop Wells Road/U.S. Highway 95 intersection, in the SE1/4 SE1/4 of Section 34 and the SW1/4 SW1/4 of Section 35, Township 13S, Range 50E. The 443-foot access road would be from Lathrop Wells Road and would require upgrading 430 feet of gravel road and constructing 13 feet of new road.

Three-phase power would be obtained from overhead lines 37 feet north of the site. Telephone lines would be connected to an overhead cable 0.5 mile to the east.

Appendix B, Figure B.2 of this EA, provides a map showing the surrounding topography.

2.4 Alternative 3: Cook Site (CGS-3)

The Cook site is 175 feet south of Cook Road and approximately 0.6 mile east of State Highway 373, in the NW1/4 SW1/4 of Section 7, Township 16S, Range 50E. The 175-foot access road would be from Cook Road. An excavated area in the west central portion of the site would be filled.

Three-phase power would be obtained from overhead lines 155 feet north of the site. Telephone lines would be connected to an overhead cable at the same location.

Appendix B, Figure B.3 of this EA, provides a map showing the surrounding topography.

2.5 Alternative 4: Hernstadt Site (CGS-4)

The Hernstadt site, just outside the southern SSA boundary, is 0.4 mile south of Amargosa Farm Road and approximately 1 mile west of the Amargosa Farm Road/State Highway 373 intersection, in the SW1/4 NW1/4 of Section 14, Township 16S, Range 49E. The 0.4-mile access road would be from Amargosa Farm Road.

Three-phase power would be obtained from overhead lines 0.4 mile (2184 feet) north of the site. Telephone lines would be connected to an underground cable at the same location.

Appendix B, Figure B.4 of this EA, provides a map showing the surrounding topography.

2.6 Alternative 5: BLM A Site (CGS-5)

The BLM A site is 20 feet south of Cook Road and 0.4 mile east of the Cook Road/ State Highway 373 intersection, in the NE1/4 SE1/4 of Section 12, Township 16S, Range 49E. The 20-foot access road would be from Cook Road.

Three-phase power would be obtained from overhead lines 90 feet east of the site across an unnamed gravel road. Telephone lines would be connected to an overhead cable at the same location.

Appendix B, Figure B.5 of this EA, provides a map showing the surrounding topography.

2.7 Alternative 6: BLM B Site (CGS-6)

The BLM B site is outside the SSA boundary to the southwest, 28 feet east of Casada Way and 0.4 mile south of the Casada Way/Amargosa Farm Road intersection, in the SW1/4 NW1/4 of Section 13, Township 16S, Range 48E. A jeep trail cuts off the northeast corner of this site. The 28-foot access road would be from Casada Way.

Three-phase power would be obtained from overhead lines 92 feet west of the site across Casada Way. Telephone lines would be connected to an underground cable 20 feet west of the site.

Appendix B, Figure B.6 of this EA, provides a map showing the surrounding topography.

2.8 No Action Alternative

The no action alternative is deletion of the southern Nevada relay node from the GWEN network. Adoption of this alternative would mean a consequent degradation in the performance of the system due to a lack of connectivity to other nodes in the system.

3.0 AFFECTED ENVIRONMENT

This section discusses the environmental setting of the proposed GWEN project in southern Nevada. Section 3.1 of this EA describes the general characteristics of the SSA, and Sections 3.2 through 3.7 of this EA describe the unique characteristics of each CGS within the SSA. Site descriptive data was obtained during field investigations conducted in February 1990. U.S. Geological Survey 7.5 minute topographical maps were used as data sources for distances, physiographic features, and topography (USGS 1983a-f, 1984a-b, 1986a-c, and 1987).

3.1 Site Search Area

Presented below is information on the physical, biological, and socio-cultural settings of the SSA.

3.1.1 Physical Setting

The SSA in southern Nevada is a circular, 250-square-mile area in Nye County, centered 4 miles north of the community of Amargosa Valley, at the southern end of the Great Basin subprovince of the Intermountain Plateaus physiographic province of the United States. The most prominent features of the SSA are Yucca Mountain in the northwest, Little Skull Mountain in the northeast, and Fortymile Wash, which crosses the SSA from north to south. In the north, Fortymile Wash follows a well-defined streambed between Yucca and Little Skull mountains; as it enters the more gently sloped southwestern portion of the SSA it spreads out to form a dendritic network of intermittent streams. Runoff from the Striped and Skeleton hills and Specter Range in the southeastern SSA also contributes to the formation of that network. The southwest corner of the Nevada Test Site occupies the entire northeast quadrant of the SSA and extends into the other three quadrants as well.

This region is characterized by north-south trending mountains (ranging from 3,600 feet above mean sea level [MSL] to 4,950 feet above MSL) created by block faulting. Four major rock types occur in the area. The oldest are crystalline rocks from the Precambrian

era (formed more than 600 million years ago) that in this area are generally not exposed. Overlaying these rocks are sedimentary deposits of later Precambrian and Paleozoic age (formed 600 million to 250 million years ago), which underwent strong faulting and folding and formed early mountains that subsequently were eroded to rolling plains. The Specter Range and Skeleton Hills in the southeastern portion of the SSA are examples of such rock types. Volcanic rocks of Tertiary age (formed 15 million to 10 million years ago) comprise the third rock type. Yucca Mountain, in the northwestern portion of the SSA and at the southern end of the Nevada volcanic field (active between 40 million and 10 million years ago), is an example of such volcanic rock that has been exposed to renewed fault activity. Finally, thick deposits of Quaternary age alluvium (formed less than 2 million years ago) cover the underlying material in the flatter areas, including Jackass Flats and the Amargosa Desert. This alluvium has eroded from the previously deposited volcanic material (DOE, 1986).

The SSA is within the Walker Lake seismic region, a seismically active region that contains many faults, most of them well north of the SSA. The Las Vegas shear zone, which also contains active faults, is east of the SSA. Several small earthquakes occurred near the SSA from 1854 to 1960: three earthquakes of Richter magnitude 4.0 to 4.9 had their epicenters 8 to 16 miles east of the SSA, and one earthquake of Richter magnitude 5.0 to 5.9 was centered about 25 miles northwest (Goter, 1988; Howard *et al.*, 1978; King, 1967; Kinney, 1966; Seimmons *et al.*, 1964; Stover, 1986). However, no surface ruptures are reported along fault lines within the SSA and the surrounding area. On the basis of historic seismic activity, the SSA could be subject to a strong earthquake with associated hazards including ground shaking and secondary ground failure. Primary rupture of ground surface along a fault line is unlikely. Facilities sited away from areas of shallow groundwater and potentially unstable slopes and embankments would be at a very low risk from seismic activity (Manitakos, 1989).

Mineral resources within and around the SSA consist mostly of isolated deposits of base and precious metals and various industrial minerals. Sand and gravel deposits, common throughout the area, are chiefly extracted from shallow surface pits and used for road construction. The potential for the development of geothermal energy resources is low (DOE, 1986).

Paleontological resources are abundant within the sedimentary rocks that underlie the SSA. Fossils of marine invertebrates predominate but are not considered scientifically significant. Moreover, any fossils occurring on the CGSs, all of which are located on alluvium, would be out of their proper geologic contexts and therefore would provide only limited amounts of information (Lugaski, 1991).

Soils of the Great Basin are Grey Desert soils, which are sandy soils that tend to be very limy just a few inches below the surface. Even the surface is slightly limy due to the small amount of precipitation available for leaching. Organic layers are thin to nonexistent, whereas salt concentrations are usually high (Hunt, 1967). The Cook (CGS-3), Hernstadt (CGS-4), BLM A (CGS-5), and BLM B (CGS-6) sites contain soils of the Shamock series and the Yermo-Arizo and Sanwell-Yermo associations. These soils are typically moderately to strongly alkaline, with pH values ranging from 7.4 to 9.0. Water erosion hazard is slight; wind erosion hazard is slight to high. Permeability is moderate to very rapid; runoff is slow to moderate. The seasonally high water table is greater than 6 feet below the surface. None of the soils is designated as prime farmland (Ragland, 1990, 1991) and none is hydric (SCS, 1987). The soils on the DOE A (CGS-1) and DOE B (CGS-2) sites have not been mapped. However, the characteristics of these soils are expected to be very similar to those of the other four CGSs because the geologic, hydrologic, and climatic conditions of all six CGSs are very similar (Manitakos, 1991). The soils on each CGS are discussed in Sections 3.2 to 3.7 of this EA.

The SSA and the surrounding area contain no perennial surface water. The only reliable sources of surface water in the Amargosa Valley are springs. Spring runoff and heavy precipitation are channeled by a series of drainage basins or washes to the normally dry Amargosa River approximately 3 miles southwest of the SSA. The four washes that cross portions of the SSA are Windy Wash, Fortymile Wash, Topopah Wash, and Rock Valley Wash. Local flooding can occur when runoff exceeds the channel capacity of those washes (DOE, 1986). None of the CGSs is within a 100-year floodplain (FIA, 1983). The distances from each CGS to the nearest surface water or wetlands are given in Sections 3.2 to 3.7 of this EA.

The SSA lies in the Alkali Flat-Furnace Creek Ranch groundwater basin, which is part of the larger Death Valley groundwater system. In this region, groundwater generally flows south to southwest and discharges at Alkali Flats about 5 miles southwest of the SSA and sometimes at Furnace Creek in Death Valley. In the northern SSA groundwater is obtained from aquifers of welded tuff, whereas farther south it comes from aquifers of valley-fill alluvium composed of tuff detritus. Water from both types of aquifers is a sodium and potassium bicarbonate type, and its high quality makes it suitable for all purposes (DOE, 1986).

The local climate is characterized by high solar insolation, limited precipitation, low relative humidity, and large daily temperature fluctuations. Overall weather patterns are influenced by continental air masses from the Pacific Ocean that dump large amounts of precipitation on the western side of the Sierra Nevada Mountains and hence contain limited amounts of moisture when they reach the SSA. Lower elevations have hot summers and mild winters with large daily and seasonal temperature fluctuations. Average annual daily temperature is around 40°F. July and August are the hottest months, with average temperatures of 77°F; December is the coldest month, with an average temperature of 36°F. Precipitation is about 5 to 6 inches annually (DOE, 1986). Of this amount, 5% to 10% is in the form of snow (Visher, 1954). Most of the precipitation occurs during winter months, but thunderstorms, particularly during July and August, can also account for significant amounts. Winds are generally light, although high winds associated with winter storm fronts or thunderstorms can reach speeds beyond 60 miles per hour. Tornadoes, sandstorms, and flash flooding may also occur but are not common (DOE, 1986).

Air quality in the SSA is unclassified for criteria pollutants, although it is not expected to exceed the ambient air quality standards that have been set by the State of Nevada (Nevada Administrative Code [NAC] 445.843) (McCleary, 1990). However, elevated levels of ozone could occur as pollutants transported into the local area, and elevated levels of suspended particulates could occur via transportation into the local area or from local sources of fugitive dust (DOE, 1986). Federal air quality standards are discussed in Section 3.3, pages 3.3-1 to 3.3-7 of the FEIS.

3.1.2 Biological Setting

The SSA includes two vegetational zones: the Mojave Desert zone and the transition zone. The Mojave Desert zone is a warm, dry desert that occurs at elevations up to 4,000 feet above MSL. Creosote bush, the predominant species, commonly occurs in association with other shrub species, including bursage and burro bush at lower elevations and boxthorn and hopsage at higher elevations. The transition zone, with elevations from 4,000 to 5,000 feet above MSL, contains a mixture of vegetation common to upper and lower deserts, such as creosote bush, bursage, blackbush, ephedra, boxthorn, hopsage, buckwheat, and indigo bush (DOE, 1986).

The CGSs are less than 3,300 feet above MSL and contain the creosote bush-burro bush community. Creosote bush is the dominant plant species on all the CGSs except the DOE B site (CGS-2), which has predominantly burro bush and hopsage, with creosote bush occurring at a much lower density. No annual forb growth was present at any CGS during the on-site desert tortoise survey, and only the DOE B site (CGS-2) contained any grasses (Knowles, 1991).

Despite harsh conditions, a wide variety of animals may occur in the SSA. A survey by others for the site characterization of the Yucca Mountain Nuclear Waste Repository Site, which extends into the northwestern part of the SSA, recorded eleven species of small mammals. These included Merriam's kangaroo rat, the long-tailed pocket mouse, deer mouse, little pocket mouse, and canyon mouse (DOE, 1986). Large mammal species that may occur in the SSA include the desert kit fox, coyote, wild horse, and burro (USDA, 1977). Jackrabbits, kit fox dens, and wild horse or burro scat were observed on some of the CGSs during the GWEN cultural resources survey (Rafferty, 1991a); during the Yucca Mountain survey, eight species of lizards (most commonly the western whiptail or side-blotched lizard), four species of snakes, and one species of tortoise were observed (DOE, 1986).

Sixty-six species of birds are recorded as either seasonal or permanent residents in the area, and many others visit during spring and fall migrations. Most are associated with the more diverse vegetational areas at the higher elevations. The Nevada Test Site (and,

by extension, the SSA) serves as a winter feeding ground for large flocks of migrating passerines, especially sparrows and finches. Some stay on as winter residents and feed on the abundant tumbleweed seed, an important food source. Migratory waterfowl and shorebirds visit the temporary lakes that form on Yucca and Frenchman flats, about 10 miles northeast of the SSA. However, none have been reported in the sagebrush and desert communities within the SSA (BLM, 1979). Raptor species that may occur in the SSA include the red-tailed hawk, Swainson's hawk, and ferruginous hawk (BLM, 1979; DOE, 1986).

The *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (GPO 1989-236-985/00336) states that an area must meet three criteria to be designated as wetland: hydric soils; hydrophytic vegetation; and wetlands hydrology, which includes a shallow water table and standing water for at least 7 days of the growing season (FICWD, 1989). This manual was used as the basis for wetland delineation. On the basis of field investigations (Chamberlain, 1990; Knowles, 1991) and soils data (Ragland, 1990, 1991; SCS, 1987; Manitakos, 1991), none of the CGSs examined as part of this EA meets these three criteria, nor do the areas within 300 feet of the CGSs.

No designated wildlife conservation areas occur within the SSA (Knowles, 1991; Williams, 1990). The closest conservation area is the California State Burro Sanctuary, 5 miles southwest of the SSA. The Desert Wildlife Range is 18 miles east of the SSA (BLM, 1986).

In compliance with Section 7 of the Endangered Species Act of 1973 as amended (16 United States Code [USC] 1531, *et seq.*, at 1536), a list of threatened and endangered species that could occur in the SSA was requested during informal consultation with the USFWS. In 1990, the USFWS identified the Mojave population of the desert tortoise (*Gopherus agassizii)* as the only threatened or endangered species that might be affected by the project. The spotted bat (*Euderma maculatum),* a candidate for federal listing, may also occur in the SSA (Appendix C, Buchanan, 1990, pages C-4 through C-7 of this EA).

Further consultation in 1992 and 1993 established that 12 more candidate species had been added to the list: the loggerhead shrike (*Lanius ludovicianus*), the black tern (*Chlidonias niger*), the western least bittern (*Ixobrychus exilis hesperis*), the white-faced ibis (*Plegadis chihi*), the chuckwalla (*Sauromalus obesus*), the large aegialian scarab beetle (*Aegialia magnifica*), Rulien's miloderes weevil (*Miloderes rulieni*), and five plant species: the white-margined penstemon (*Penstemon albomarginatus*), Amargosa penstemon (*Penstemon fruticiformis* ssp. *amargosae*), Beatley phacelia (*Phacelia beatleyae*), Cane Spring evening primrose (*Camissonia megalantha*), and sanicle biscuitroot (*Cymopterus ripleyi saniculoides*) (Appendix C, Harlow, 1992, 1993, pages C-45 to C-47, and C-48 to C-50 of this EA).

The desert tortoise is found throughout the Sonoran, Mojave, and Colorado deserts of southern California, southern Nevada, southwestern Utah, and Arizona. The Sonoran population occurs east and south of the Colorado River; the Mojave population occurs west and north of the Colorado River (Knowles, 1991).

The threatened Mojave desert tortoise is found in creosote bush-burro bush, creosote bush-Joshua tree, and shadscale vegetation associations. The tortoise prefers sandy and gravelly soils of desert valleys and alluvial fans and ranges up to 5,000 feet above MSL in mountain washes and steep-sided canyons. A tortoise typically spends 90 percent of its life underground in self-constructed burrows or pallets, which provide a cool, humid, shaded environment in summer and a relatively warm environment in winter. It sometimes uses caliche caves for shelter and as communal hibernation sites. Tortoises emerge from hibernation in early March to feed on succulent forbs, their preferred food, and grasses. Activity remains high through mid-May and declines rapidly in early June as daytime temperatures increase and the forbs dry out. During the summer, early morning and late afternoon activity usually continues, and heavy rains in late summer may spur increased tortoise activity. Low level activity occurs during fall until hibernation begins in mid- to late-November (Knowles, 1991).

The six CGSs lie at the northern end of the known range of the desert tortoise, and, based on surveys by the BLM, the local populations of the tortoise are scattered and of low density. Also, no desert tortoise conservation areas, which are areas containing high

quality desert tortoise habitat, occur within southern Nye County. In late March 1991, a biologist qualified to identify desert tortoise sign surveyed the CGSs, following USFWS guidelines, to determine whether any tortoises were present on the CGSs, in areas adjacent to them (zones of influence), or along access roads and utility line corridors. The biologist surveyed consecutive 10-yard (9-meter) transects across the sites and surveyed all access roads and utility line corridors associated with each CGS. In addition, the biologist surveyed transects at 10, 100, 200, 400, and 800 yards from the perimeter of each CGS to cover the zone of influence around each site (Knowles, 1991).

No live tortoises were observed at any of the CGSs, but tortoise sign was present on and in the 800-yard zone of influence of the DOE A (CGS-1) and DOE B (CGS-2) sites, as discussed in Sections 3.2 and 3.3 of this EA. One tortoise sign was also found within the zone of influence of the BLM B site (CGS-6), as discussed in Section 3.7 of this EA. No tortoise sign was found on, within the zone of influence of, or in areas of utility lines and access roads of the Cook (CGS-3), Hernstadt (CGS-4), or BLM A (CGS-5) sites (Knowles, 1991).

The spotted bat ranges throughout the Intermountain West in a variety of habitats, including ponderosa pine forests and caves. It is most frequently found in California, Arizona, New Mexico, southern Colorado, and southern Utah; its most common habitat is rough, desert-like terrain with suitable roosting cliffs and with a water source within a few miles. The preferred daytime roosts are horizontal rock crevices or vertical rock surfaces of high cliffs and canyons, generally at elevations of 6,000 to 8,000 feet. Moths are the preferred prey (Allen, 1979; Barbour and Davis, 1969; Zeveloff and Collett, 1988).

The loggerhead shrike is found throughout the United States in a variety of habitats, primarily open country with sparse vegetation of low shrubs and herbs. The loggerhead shrike occurs in the southern Great Basin and in southern Arizona (Jaeger, 1961), and may occur within the SSA as suitable habitat is present. It prefers areas with nearby perching sites such as fences, woody vegetation, or hedgerows. It forages for insects, small mammals, and small birds using short, straight flights from these nearby perches (Ehrlich *et al.*, 1988; Ransom, 1981). Breeding pairs occupy areas of 13 to 40 acres although solitary birds defend somewhat smaller territories (Jaeger, 1961). It forages in

the northern Great Basin and adjacent areas from March through October and overwinters in the southern United States and areas further south. It breeds in April, May, and June (Thomas, 1979).

The black tern is an insectivorous species that nests in marshes, sloughs, and wet meadows. It forages in open meadows, marshes, and freshly plowed fields, frequently following the plow (Ehrlich *et al.*, 1988).

The western least bittern is a wetlands species that nests in emergent vegetation or low shrubs in marshes. It feeds on fish, insects, amphibians, small mammals, and possibly the eggs of other birds. It uses a stalk and strike forage technique, often standing motionless in the water and spearing fish or other prey (Ehrlich *et al.*, 1988).

The white-faced ibis is a wetlands species that breeds from California eastward to Idaho and winters in southern California and Mexico. It generally nests on the ground, in aquatic vegetation, but may nest in shrubs or low trees. A wetlands forager, the white-faced ibis feeds on crustaceans, fish, worms, mollusks, and insects (Ehrlich et al., 1988; Ransom, 1981).

The chuckwalla is a lizard, typically 5 to 8 inches long, that is broadly distributed in the deserts of the southwestern United States, including the deserts of southern Nevada (Jaeger, 1961). However, it is restricted to rocky areas within those deserts; when alarmed it takes refuge in rock crevices or underneath rocks (Jaeger, 1961; Ransom, 1981).

The large aegialian scarab beetle is a small dung beetle restricted to western North America (Borror *et al.*, 1976). In Nye County it is found only in the Big Dune area about 1 mile west of the SSA and at least 4.5 miles from the nearest CGS (Hamlin, 1993).

Rulien's miloderes weevil is one of four species of weevils in genus *Miloderes* restricted to California, Arizona, and Nevada. All species occur in Nevada (Arnett, 1985). These species feed on plants and their larvae generally burrow in the plant tissues (Arnett, 1985; Borror *et al.*, 1976).

The white-margined penstemon is an herb with shoots 7 to 10 inches high and an elongated, deeply buried, fleshy root. Reported habitats are characterized by deep, coarse sands and creosote bush cover (Munz, 1968) or drifting sands (Rickett, 1966). This species is abundant on sandy soils below the western portion of the Specter Range (northern Amargosa Valley) (Beatley, 1976).

The Amargosa penstemon is a subspecies of *Penstemon fructiciformis* found in rocky habitats within creosote bush and pinyon-juniper dominated vegetation (Munz, 1968). It occurs in washes in the *Larrea-Ambrosia-Atriplex* stands at elevations of 3,300 feet to 5,200 feet on the southern face of the Specter Range and in the northwestern portions of the Spring Mountains (Beatley, 1976).

The Beatley phacelia is an annual that occurs in washes and nearby loose talus in northern Frenchman Flat. It is restricted to light-colored tuff bedrock areas in *Atriplex*-dominated communities or in some *Cologynae*- and juniper-dominated vegetations on whiterock talus in the western portion of Emigrant Valley (Beatley, 1976).

The Cane Spring evening primrose is found in soils derived from the light-colored volcanics west and north of Frenchman Flat, on talus slopes, and on bare soil in washes near Cane Spring (Beatley, 1976).

The sanicle biscuitroot, a member of the carrot family, is widely distributed in coarse sandy soils and some gravelly talus (Beatley, 1976). It is found in sands in northeastern Frenchman Flat, most of Yucca Flat, and the western portion of Emigrant Valley.

The Nevada Natural Heritage Program database did not identify any state listed rare, threatened, or endangered species as occurring in the SSA. However, two sensitive plant species have been recorded within the SSA. Ripley's gilia (*Gilia ripleyi*) is a perennial herb that occurs in limestone crevices at elevations of 3,000 to 4,000 feet above MSL or in association with creosote bush scrub. Brickell's hazardia (*Haplopappus brickellioides*) is a rigidly branched round shrub 1 to 3 feet high that also inhabits creosote bush scrub and, rarely, rocky canyons at elevations of 3,000 to 6,500 feet above

MSL (Cooper, 1991; Munz, 1968). Although uncommon, these plants are more abundant and widespread than was previously believed and are not subject to any identifiable threat (Cooper, 1991).

3.1.3 Socio-Cultural Setting

Southern Nevada has been occupied for at least the past 13,000 years. During the late Pleistocene era (11,000 to 8,000 B.C.), the climate of the area was wetter than today and supported an abundance of big-game species. Prehistoric peoples traditionally hunted those species, although only one site in southern Nevada can be dated to that period, suggesting that big-game hunting did not occur in the area. From 8,000 to 5,000 B.C., increasing aridity and decreasing rainfall led to the eventual extinction of the Pleistocene big-game species, and human settlement patterns began to change. Evidence suggests that people of this period originally oriented their subsistence toward lakes and lower elevation grassland resources. As the lakes dried up, subsistence patterns gradually shifted toward seasonal hunting and gathering to exploit the rich resources of the woodland/grassland ecotone along the mountain ranges (Rafferty, 1991a).

With the onset of full desert conditions around 5,000 B.C., seasonal movement patterns altered to cover a wider variety of resource zones during periods when flora and fauna were available. These pre-Paiute cultures persisted until approximately A.D. 500. The period from A.D. 0 to 1150 marks the Virgin Anasazi occupation of the area. The Virgin Anasazi came from Arizona and entered Nevada along the Muddy and Virgin River valleys. Initially they practiced pithouse architecture and limited horticulture along streams and rivers, with some hunting and gathering. Eventually they shifted to aboveground pueblo architecture and agriculture as their dominant subsistence mode, accompanied by the use and manufacture of increasingly sophisticated ceramics. From A.D. 1150 until 1900, the modern Paiute peoples were visible in the cultural record. They are generally thought to have been hunter-gatherers who had seasonal movement patterns like pre-Paiute people but supplemented their subsistence with limited horticulture. Many Paiute and Shoshonean cultural remains have been recorded on the Nevada Test Site (Rafferty, 1991a).

The California gold strike of 1849 brought Euro-Americans to the project area. In 1849 the Bennett-Arcan party and its offshoots, the Jayhawker and Brier parties, traversed the Amargosa Desert on their way to Death Valley goldfields. The Brier Party may have come down Fortymile Wash (DOE, 1986). Southern Nye County remained mostly unsettled until the late 1800s and early 1900s when gold and silver deposits were discovered. Gold was discovered in 1869, and silver was discovered in 1890 at the northwest corner of Spring Mountain, 15 miles southeast of the SSA. Gold was also discovered in the Bullfrog Hills in 1904, 14 miles northwest of the SSA. Small camps and towns such as Johnnie, Stirling, Bullfrog, and Rhylolite arose almost overnight in conjunction with those deposits, only to be abandoned a few years later after the deposits were depleted (Paher, 1970). The development of those areas spurred new transportation to service them and fuel their expansion. Initially, stagecoach routes, such as the Las Vegas to Bullfrog Stage Route developed in 1905, provided the sole means of access; later railroads were constructed, such as the Topopah to Tidewater Railroad in 1907, to carry people and goods to the remote mining towns (Rafferty, 1991a).

The Nevada State Historic Preservation Officer (SHPO) was consulted, as required by the National Historic Preservation Act (16 USC 470, *et seq.*). The Nevada SHPO stated that archaeological surveys on the Nevada Test Site have revealed a long and varied record of prehistoric occupation, although little work has been conducted near Amargosa Valley. The Nevada SHPO determined that none of the CGSs had been surveyed for archaeological or historic resources and recommended that an archaeological survey be conducted (Appendix C, Baldrica, 1990, page C-37 of this EA).

In December 1990, a BLM Class III cultural resources inventory was conducted for the six CGSs. The inventory consisted of background research and an on-site archaeological survey of each CGS and its associated access road and utility line right-of-way. Background research revealed that several archaeological surveys have been conducted within the SSA (Rafferty, 1991a). Surveys conducted on the Nevada Test Site and on the Yucca Mountain Site have produced the most significant results (Appendix C, Baldrica, 1990, page C-37 of this EA). Surveys conducted in the Amargosa Valley have not yielded significant cultural remains (Rafferty, 1991a).

An archaeologist qualified in the State of Nevada conducted an on-site archaeological survey of each CGS and its associated access road and utility line right-of-way. Ten pedestrian transects spaced at 20-meter (66-foot) intervals were employed to survey each CGS. Additional transects were employed as necessary to ensure complete coverage of the access roads and utility line rights-of-way. One isolated find was recorded on the DOE A site (CGS-1), and two small finds consisting of one and three artifacts, respectively, were found on the DOE B site (CGS-2). None of the three finds is considered eligible for the National Register of Historic Places (NRHP). No artifacts were found on the other four CGSs (Rafferty, 1991a).

For reasons discussed in Section 4.8.1.3, beginning on page 4.8-2 of the FEIS and Section 4.1.3 of this EA, historic properties that occur within 1.5 miles of a CGS are potentially subject to adverse visual impacts from the relay node facility. Although the Nevada SHPO did not recommend an inventory to identify historic properties within 1.5 miles of each CGS, a literature search was conducted to confirm the presence or absence of such properties. Based on that search, no properties that are listed or eligible for listing on the NRHP occur within 1.5 miles of the DOE A (CGS-1), DOE B (CGS-2), or BLM B (CGS-6) sites. The search identified three possible routes of the Las Vegas to Bullfrog Stage Route within 1.5 miles of the Hernstadt site (CGS-4). Two of those routes also occur within 1.5 miles of the Cook (CGS-3) and BLM A (CGS-5) sites (Rafferty, 1991a). The stage route was an important source of transportation for people, goods, and materials during the mining boom in the Beatty area in the early 1900s and helped contribute to the early viability of Las Vegas (Rafferty, 1991b).

Subsequent field work conducted in June 1991 determined that only one segment of one of the three possible routes within 1.5 miles of the Hernstadt site (CGS-4) is a relatively undisturbed part of the stage route and therefore is potentially eligible for the NRHP. Miller's Well No. 1, which is associated with the stage route and is also within 1.5 miles of the Hernstadt site (CGS-4), was also surveyed. The potentially eligible segment and the well are discussed in Section 3.5 of this EA. The routes within 1.5 miles of the Cook (CGS-3) and BLM B (CGS-6) sites were partially to highly disturbed and had lost any historical integrity. Therefore they are not eligible for the NRHP (Rafferty, 1991b).

In compliance with the American Indian Religious Freedom Act of 1978 (42 USC 1996), the Bureau of Indian Affairs (BIA), the Nevada SHPO, the BLM, and the Nevada State Indian Commission were consulted in order to locate tribes associated with the project area (Allan, 1992; Baldrica, 1992; Myhrer, 1990; Sutherland, 1992a, 1992b). Based on the recommendations of these organizations, seven tribal organizations were notified of the GWEN project and information was requested regarding traditional, religious, or sacred sites within the SSA: the Moapa-Paiute Tribal Council, the Moapa Cultural Committee, the Las Vegas Indian Center, the Chemeheuvi Tribal Council, the Colorado River Indian Tribes in Arizona, the Las Vegas Colony of Southern Paiutes, and the Inter-Tribal Council of Nevada. No response has been received to letters or to several attempts at telephone communication. According to a representative of the BLM, responses are unlikely due to the small size of the GWEN project (Myhrer, 1990).

The Federal Government owns almost all land within the SSA, with jurisdiction split between the DOE and the BLM. The DOE manages the Nevada Test Site, which is not accessible to the public. The BLM manages the remainder of the public lands in the SSA, portions of which are leased for cattle grazing. Small blocks of private land exist in the southwestern portion of the SSA and support the only farming and ranching operations in the area. Those lands are irrigated to support livestock and crops such as alfalfa, small grains, orchard products, and melons (BLM, 1978; DOE, 1986).

All of the CGSs are on land that is not zoned (Williams, 1991b).

U.S. Highway 95, a two-lane paved highway, is the major road in the SSA. It crosses the SSA from east to west, passing just south of the Nevada Test Site. State Highway 373, also a two-lane paved highway, goes directly south from Amargosa Valley to Death Valley Junction, 23 miles south of the SSA. Lathrop Wells Road, a two-lane paved road, goes north from Amargosa Valley into the Nevada Test Site. The remainder of the roads, most of them in the southwest portion of the SSA, are gravel or dirt roads that serve local traffic only. No railroads currently exist within the SSA, but a rail access spur is planned between U.S. Highway 95 and the southern boundary of the Nevada Test Site as part of the proposed Yucca Mountain Nuclear Waste Repository (DOE, 1986). Jackass

Aeropark, an unattended facility that is not subject to instrument approaches and does not have refueling facilities, is 1 mile southwest of Amargosa Valley (NOAA, 1988).

Ambient noise levels in the uninhabited desert areas of the SSA are primarily due to wind and generally have an upper limit of 38 dBA. For small rural communities and areas near local roads, noise levels are generally estimated to be about 50 dBA, primarily from the operation of farm equipment and local traffic (DOE, 1986), although planes on low-level training flights from Nellis Air Force Base near Las Vegas can occasionally generate higher noise levels. Nye County has no local noise ordinance (Williams, 1991a).

In 1984, Nye County had an estimated population of 17,750, almost double its 1980 population of 9,058 (DOE, 1986). The population has traditionally fluctuated as a result of boom and bust mining activities, but the county is currently attempting to stabilize its population by attracting companies with long-term interests in the area (Copeland, 1991b). The town of Amargosa Valley is an unincorporated area of approximately 400 square miles. Within this larger administrative area three definite population clusters occur—the community of Amargosa Valley (formerly Lathrop Wells), which has a population of 45 and is the only cluster within the SSA; the Amargosa Farm area approximately 6 miles south of the SSA; and the American Borate housing complex, approximately 10 miles south (DOE, 1986).

The major economic sectors in Nye County are mining, services, and civilian government. In 1985, the service industry was the largest employer, providing about 67 percent of all jobs. The mining industry accounted for about 15 percent of the work force, and local government jobs accounted for about 12 percent. Agriculture is also an important activity, producing alfalfa, hay, and dairy products (DOE, 1986). In 1984, the per capita income in Nye County was $11,509 (Census Bureau, 1988).

In southern Nye County, most recreational facilities are maintained by local special-purpose districts (DOE, 1986). The Amargosa Valley Improvement Association owns a 40-acre recreational park 0.5 mile northwest of the Hernstadt site (CGS-4), and the town of Amargosa Valley is constructing a 40-acre recreational park 1.3 miles northwest of

CGS-4. Both of these parks are on the south side of Amargosa Valley Road. A science museum highlighting the research conducted on the Nevada Test Site has been proposed within the town of Amargosa Valley, at the junction of State Highway 373 and U.S. Highway 95 (Copeland, 1991a). Most other recreational activities are southeast of the SSA near Las Vegas (DOE, 1986).

The visual setting is natural in character. Most of the SSA and the surrounding area retains its original desert vegetation. Views within the Amargosa Valley are generally unobstructed and consist of flat expanses of land dotted with creosote bush and bursage highlighted against a backdrop of low rough hills lined with erosional veins. This uniformity is only occasionally broken by roads, mostly unpaved, that provide a minor contrast by adding clear, linear elements to the view. The complexity of the skyline, as defined in Section 4.8.1.3, page 4.8-10 of the FEIS, is generally low but is moderate in those places where the distant hills are more irregular. Other than utility poles and roads, evidence of human activity is limited to concentrated population areas.

3.2 Alternative 1: DOE A Site (CGS-1)

The site, on the Nevada Test Site, is on flat desert land having less than 2 percent slope. Although soils on the site have not been mapped, soils 1.5 miles south of the Nevada Test Site have been mapped. The geologic, hydrologic, and climatic conditions at this CGS are almost identical to those farther south. Consequently, the soils on this site can be classified as haplargids, whose upper layer has little organic matter. This soil is generally dry although it may be moist for periods of less than 3 months. These very gravelly to gravelly fine sandy loams have moderately rapid permeability and a moderate to high potential for wind erosion. They are moderately to very strongly alkaline (pH $\geq$ 7.9) and have a seasonally high water table of greater than 6 feet from the surface (Manitakos, 1991).

Drainage on the site is to the south. The nearest surface water is a wash that is 3,900 feet east and is associated with Topopah Wash.

Vegetation on and surrounding the site consists primarily of creosote bush and burro bush (Knowles, 1991). A large cleared area exists north of the site.

The on-site desert tortoise survey revealed 21 desert tortoise sign on and within 800 yards of the CGS. These included 5 burrows and 1 pallet on the site, and 1 burrow, 13 pallets, and 1 drinking site within 800 yards of the CGS. Two of the burrows on the site were in good condition and probably had been used within the last year. The remainder were in fair to poor condition. Based on the amount of sign, this site could be within the home range of two tortoises. No annual growth of forbs (the preferred food of the desert tortoise) was evident, nor were indicators present to indicate forb growth in the recent past (Knowles, 1991).

The on-site archaeological survey revealed one isolated find (26NY1742), an obsidian flake, in the northeast corner of the CGS. The find is not considered eligible for the NRHP because it is isolated, surficial, and subject to alluvial action (Rafferty, 1991a). The Nevada SHPO reviewed this finding and concurs with this determination (Appendix C, Baldrica, 1992, pages C-38 and C-39 of this EA)..

The nearest residential community, Amargosa Valley, is 4.4 miles south.

3.3 Alternative 2: DOE B Site (CGS-2)

The site is on flat desert land having less than 2 percent slope. Although soils on the site have not been mapped, soils 1.5 miles south of the Nevada Test Site have been mapped. The geologic, hydrologic, and climatic conditions at this CGS are almost identical to those farther south. Consequently, the soils on this site can be classified as haplargids, whose upper layer has little organic matter. This soil is generally dry although it may be moist for periods of less than 3 months. These very gravelly to gravelly fine sandy loams have moderately rapid permeability and a moderate to high potential for wind erosion. They are moderately to very strongly alkaline (pH $\geq$ 7.9) and have a seasonally high water table of greater than 6 feet from the surface (Manitakos, 1991).

Drainage on the site is to the south. The nearest surface water is Topopah Wash, 1,580 feet south.

Vegetation on and surrounding the site consists primarily of burro bush and hopsage, with small amounts of creosote bush. Grass species were also present, primarily galleta grass. This site had been heavily grazed by cattle the year before the desert tortoise survey was conducted (Knowles, 1991).

The on-site desert tortoise survey identified 7 desert tortoise sign on and within 800 yards of the CGS. These included 1 burrow and 2 pallets on the site, and 2 burrows and 2 pallets within 800 yards of the CGS. All were in fair to poor condition and did not show recent signs of use. No annual growth of forbs (the preferred food of the desert tortoise) was evident, nor were indicators present to indicate forb growth in the recent past (Knowles, 1991).

The on-site archaeological survey revealed two isolated finds on the CGS. Three artifacts (26NY1743) were found in the southwest corner of the CGS; one artifact (26NY1744) was found in the west center of the CGS. The finds are not considered eligible for the NRHP because they are isolated, surficial, and subject to alluvial action (Rafferty, 1991a). The Nevada SHPO reviewed this finding and concurs with this determination (Appendix C, Baldrica, 1992, pages C-38 and C-39 of this EA).

The nearest residential community, Amargosa Valley, is 9.7 miles south.

3.4 Alternative 3: Cook Site (CGS-3)

The Cook site is on flat, level land with an overall slope of less than 2 percent. Soils on the site are in the Sanwell-Yermo association, composed of Sanwell gravelly fine sandy loam and Yermo very gravelly sandy loam. The permeability of Sanwell soils is moderate to rapid; permeability of the Yermo soils is moderately rapid. Water erosion hazard is slight, whereas wind erosion hazard is moderate to high for Sanwell and slight

for Yermo soils. Both soils are moderately to strongly alkaline (pH 7.9 to 9.0) and have a seasonally high water table of greater than 6 feet (Ragland, 1990, 1991).

Drainage is to the south. The nearest surface water shown on USGS topographic maps is a wash about 200 feet west of the site. This and other rainwater drainage channels on and around the site are dynamic in nature and can be subject to sudden flooding after rainstorms. In the past, Cook Road has been washed out and storm runoff has flowed across CGS-3. However, there is no evidence of a permanent wash or drainage channel on CGS-3.

Vegetation on and surrounding the site consists primarily of creosote bush and burro bush (Knowles, 1991).

The on-site desert tortoise survey revealed no desert tortoise sign on or within 800 yards of the CGS. No annual growth of forbs (the preferred food of the desert tortoise) was evident, nor were indicators present to indicate forb growth in the recent past (Knowles, 1991).

The on-site archaeological survey revealed no archaeological resources on the CGS or within the power line and access corridors (Rafferty, 1991a).

The nearest residential community, Amargosa Valley, is 4.8 miles north.

3.5 Alternative 4: Hernstadt Site (CGS-4)

The Hernstadt site is on flat, level land with an overall slope of less than 2 percent. Soils on the sites are in the Sanwell-Yermo association, which is discussed in Section 3.4 of this EA.

Drainage is to the southwest. The nearest surface water is a wash 1,200 feet east.

Vegetation on and surrounding the site consists primarily of creosote bush and burro bush (Knowles, 1991).

The on-site desert tortoise survey revealed no desert tortoise sign on or within 800 yards of the CGS. No annual growth of forbs (the preferred food of the desert tortoise) was evident, nor were indicators present to indicate forb growth in the recent past (Knowles, 1991).

The on-site archaeological survey revealed no archaeological resources on the CGS or within the power line and access corridors (Rafferty, 1991a).

One segment of the historic Las Vegas to Bullfrog Stage Route that is within 1.5 miles of this site is potentially eligible for the NRHP. The exact location of the segment is omitted at the request of the Nevada SHPO (Baldrica, 1991). That segment is relatively undisturbed and has not been altered from its original path since 1907. Many historic artifacts dating to the period of the stage line's operation are scattered alongside the route and further support the conclusion that the eligible segment is an original portion of the route. The Las Vegas to Bullfrog Stage Route is important because it is associated with two important events in the history of southern Nevada: the Bullfrog silver strike and the founding and economic survival of Las Vegas. Prior to construction of the railroad, the stage route was the primary means of transporting people and goods to the mining boom towns near Beatty. The route is also significant because it provides insight into the life-style and habits of people during the early twentieth century through the study of the artifacts associated with the route (Rafferty, 1991b).

Miller's Well No. 1, which was associated with the Las Vegas to Bullfrog Stage Route, also occurs within 1.5 miles of this CGS. No structural remains exist at the well, and much post-1950 debris has been deposited there. Consequently it is only significant for its potential to yield significant information through further archaeological research (Rafferty, 1991b).

The Amargosa Valley Improvement Association Recreational Park, a 40-acre area that contains ballparks, a drag racing track, and two buildings for community events, is 0.5 mile northwest of the site along the south side of Amargosa Farm Road. The town of Amargosa Valley is constructing a recreational park with ballparks and a swimming pool

1.3 miles northwest of the site. The nearest residential community, Amargosa Valley, is 5.9 miles north.

3.6 Alternative 5: BLM A Site (CGS-5)

The BLM A site is on flat, level land with an overall slope of less than 2 percent. Soils on the sites are in the Sanwell-Yermo association, which is discussed in Section 3.4 of this EA.

Drainage is to the south. The nearest surface water is a wash 100 feet east.

Vegetation on and surrounding the site consists primarily of creosote bush and burro bush (Knowles, 1991).

The on-site desert tortoise survey revealed no desert tortoise sign on or within 800 yards of the CGS. No annual growth of forbs (the preferred food of the desert tortoise) was evident, nor were indicators present to indicate forb growth in the recent past (Knowles, 1991).

The on-site archaeological survey revealed no archaeological resources on the CGS or within the power line and access corridors (Rafferty, 1991a).

The nearest residential community, Amargosa Valley, is 4.8 miles north.

3.7 Alternative 6: BLM B Site (CGS-6)

The BLM B site is on flat, level land with an overall slope of less than 2 percent. Soils on the site are in the Yermo-Arizo association, composed of Yermo very gravelly sandy loam and Arizo very gravelly sandy loam. The permeability of Yermo soils is moderately rapid; the permeability of Arizo soils is very rapid. Water erosion hazard is slight; wind erosion hazard is moderate for Arizo and slight for Yermo soils. Yermo soils are moderately to strongly alkaline (pH 7.9 to 9.0); Arizo soils are moderately alkaline (pH 7.9 to 8.4). Both have a seasonally high water table of greater than 6 feet (Ragland, 1990, 1991).

Drainage is to the south. The nearest surface water is a wash 250 feet northeast.

Vegetation on and surrounding the site consists primarily of creosote bush and burro bush (Knowles, 1991).

The on-site desert tortoise survey identified one pallet within 800 yards of the CGS. The pallet was in very poor condition, and the lack of other sign in the area suggests it was dug by a transient tortoise. No annual growth of forbs (the preferred food of the desert tortoise) was evident, nor were indicators present to indicate forb growth in the recent past (Knowles, 1991).

The on-site archaeological survey revealed no archaeological resources on the CGS or within the power line and access corridors (Rafferty, 1991a).

The nearest residential community, Amargosa Valley, is 8.8 miles northeast.

4.0 ENVIRONMENTAL CONSEQUENCES OF ACTION ALTERNATIVES

This section discusses the potential impacts of the GWEN project on the environmental setting of the six CGSs in southern Nevada. Several impacts that would be common to some or all of the action alternatives are discussed in Section 4.1 of this EA. Impacts that are unique to each action alternative are discussed in Sections 4.2 through 4.7 of this EA. Significant visual impacts on recreational facilities could occur at the Hernstadt site (CGS-4), as indicated in Section 4.5 of this EA. There would be no significant impacts at the other five sites.

4.1 Common Features

Presented below is information on the physical, biological, and socio-cultural impacts common to some or all of the action alternatives.

4.1.1 Physical

Impacts from **construction** activities would not be significant. Construction would require localized earth-moving, including excavation and backfilling for placement of foundations and guy-wire anchors. Less than 3,800 square feet would be covered with concrete and gravel for the tower base and the equipment area enclosures. Similar coverage would be required for on-site access roads and parking; incidental activities during construction would disturb a similar amount. In total, about 0.25 acre would be occupied by foundations and the on-site access roads. Construction of the off-site access road and installation of utility lines would have no significant impacts because the sites are on relatively level terrain and the access road would require little grading. The amount of land disturbed for the access road and its right-of-way would range from 480 to 50,688 square feet, depending on the site selected.

The ground plane would be installed using machines that bury wire approximately 1 foot below the surface with minimal disturbance of the soil surface. This process would require moving a small tractor or similar equipment over much of the 11-acre site, but it

would not significantly disturb the existing vegetation or create a significant erosion hazard.

Impacts on **mineral resources** are not anticipated. No economically exploitable mineral resources are located on any of the CGSs (DOE, 1986). If any resources are present under a site, development of that site would only deny access to a small portion of those resources for the lifetime of the project and would not result in any significant impact.

Impacts on **paleontological resources** are not anticipated because any fossils occurring on the CGSs would be predominantly marine invertebrates and would not be in their proper geologic context (Lugaski, 1991). However, if any fossils are found during construction, work that might affect them will be suspended while the Nevada Bureau of Mines and Geology is notified and the significance of the find is evaluated.

Erosion and increase in storm water runoff would be negligible, if any. All sites have slopes of less than 2 percent, so any required grading to level the site would be minimal. In addition, standard measures for erosion control would be used during and after site construction. The site's vegetation will be restored to its preexisting natural condition.

No CGS lies within a **100-year floodplain** (FIA, 1983).

No **prime farmland** would be removed from production for the project, as none of the sites contains designated prime farmland (Ragland, 1990).

No significant impacts on **drinking water** are expected, as discussed in Sections 3.2.4.1 and 4.2.1.1, pages 3.2-2 and 4.2-3 of the FEIS. Corrosion of the ground plane is not anticipated to raise copper concentrations in any aquifer or surface water body by more than 20 micrograms per liter (ug/l). This represents only 2 percent of the 1 milligram per liter (mg/l) copper concentration permitted by the State of Nevada for potable water supply (NAC 445.248). The Nevada standard is the same as the Environmental Protection Agency (EPA) standard, which is intended to maintain the aesthetic properties

that relate to public acceptance of drinking water and is not related to public health. A threshold for the effects of copper on human health has not been determined (EPA, 1985).

Impacts on **surface water or wetlands** that support aquatic plants and animals could occur when the site is less than 300 feet from surface water or wetlands, if the soil is acidic, or the depth to the seasonally high water table is less than 3 feet from the ground plane (4 feet from the surface), as discussed in Section 4.2.1.1, page 4.2-3 of the FEIS. Although intermittent surface water occurs on one site (CGS-3) and within 300 feet of two sites (CGS-5 and CGS-6), no impacts are expected because the soils on the CGSs are moderately to strongly alkaline and the depth to the seasonally high water table is greater than 6 feet below the surface. Under those conditions, the potential for transport of copper away from the immediate area of the ground plane and into surface water would be negligible.

Impacts on **air quality** would be negligible. Temporary increases in air pollutant emissions would occur during construction, primarily from emissions by heavy machinery and dust created by construction activities. For all CGSs except the DOE A (CGS-1) and the DOE B (CGS-2) sites, the State of Nevada does not require a permit for construction activities that disturb less than 20 acres of land [NAC 445.705 (h)]. For the DOE A (CGS-1) and the DOE B (CGS-2) sites, an existing DOE land disturbance permit with the State of Nevada Department of Conservation and Natural Resources, Division of Environmental Protection, would cover any construction activities on the Nevada Test Site. Air pollution emissions would also result from operation of the BUPG. At 100 percent load, the BUPG is rated at 70 brake horsepower. This is well below the standards set by the State of Nevada, which requires permits for stationary internal combustion engines with a rating of greater than 250 horsepower [NAC 445.705 (k)(l)]. Hence, the project would not result in violation of Nevada Primary and Secondary Ambient Air Quality Standards.

4.1.2 Biological

Impacts on **wildlife and wildlife habitats** would be negligible. The vegetation of the CGSs is common throughout the entire SSA and the surrounding area. None of the sites contains or is within 300 feet of wetlands or washes vegetated with desert riparian plant species. Consequently, no critical or exceptionally valuable wildlife habitat would be at risk.

Bird collisions with the tower may occur but are not expected to be significant. Section 4.4.1.5, page 4.4-5 of the FEIS states that the majority of bird collisions occur in adverse weather conditions when the visibility of man-made structures is obscured and birds may be forced to lower their flight level. Generally, songbirds (passerines) are more likely to collide with a tower or the guy wires than are raptors or waterfowl (Avery *et al.,* 1980). Areas with high concentrations of bird flight activity, feeding and nesting habitats, known migration corridors, raptor roosting areas, and prominent topographical features such as high ridges and waterways that could concentrate avian flight lanes were avoided during the siting process.

No federally listed **threatened or endangered species** would be jeopardized at any of the CGSs. The USFWS identifies only one threatened species (the desert tortoise) and thirteen candidate species (six animal species: spotted bat, loggerhead shrike, black tern, western least bittern, white-faced ibis, and chuckwalla; two invertebrates: large aegialian scarab beetle and Rulien's miloderes weevil; and five plant species: white-margined penstemon, Amargosa penstemon, Beatley phacelia, Cane Springs evening primrose, and sanicle biscuitroot) as potentially occurring in the SSA. Based on the results of the on-site desert tortoise survey, up to two desert tortoises may inhabit the area containing the DOE A site (CGS-1), one tortoise may inhabit the area containing the DOE B (CGS-2) site, and transient individual tortoises could occur on and around the other four CGSs.

Because the desert tortoise could be affected, formal consultation with the USFWS was undertaken, as required by Section 7 of the Endangered Species Act of 1973 (16 USC 1531, *et seq.*, at 1536). The USFWS determined that construction and operation of the

proposed relay node is not likely to jeopardize the continued existence of the desert tortoise (Appendix C, Harlow, 1992, pages C-8 to C-36 of this EA). However, the USFWS indicated that the project could result in the incidental taking of desert tortoises. To minimize the incidental taking, all the reasonable and prudent measures recommended by the USFWS in their Biological Opinion will be implemented (Appendix C, Harlow, 1992, pages C-8 to C-36 of this EA).

The spotted bat would not be affected because none of the CGSs is near its habitats of high cliffs and canyons, ponderosa pine forests, and caves. In addition, if any bats were to forage within the vicinity of the tower, their sensitive echolocation system would protect them from collision with the tower.

Impacts on the loggerhead shrike would not be significant. The CGSs contain shrike habitat, so shrikes may be in the project area and may use nearby fenceposts and utility lines as perches. However, given the foraging behavior of the shrike, which consists of short, direct flights from nearby perches, the probability of a shrike colliding with a guy wire while foraging is very low and potential impacts are not considered significant.

Impacts on the chuckwalla would not be significant. It is restricted to rocky areas, which do not occur on any of the CGSs. The CGSs are located on the broad alluvial fans with fine textured to gravelly loam soils, rather than the rocky, very coarsely textured terrain, such as talus slopes and rocky outcrops that are required by the chuckwalla.

Impacts on the black tern, western least bittern, and the white-faced ibis would not be significant. They all require wetland habitat for breeding and foraging, and this habitat is absent from the CGSs. The CGSs are located on flat desert land covered with creosote bush and burro bush; no streams cross the sites and no wetlands come within 300 feet.

Impacts on the large aegialian scarab beetle are not expected. Within Nevada this species of beetle is only found in the Big Dune area (Hamlin, 1993), which is about 1 mile west of the SSA and at least 4.5 miles from the nearest CGS.

Impacts on Rulien's miloderes weevil would not be significant. Each of the CGSs is vegetated with locally and regionally abundant plant species, primarily creosote bush, burro bush, and hopsage. The vegetation on the sites will be left largely undisturbed after tower construction, so no adverse effect on weevil habitat is expected and, therefore, no adverse effect on the weevil.

Impacts on the five candidate plant species would not be significant because their habitats do not occur on the CGSs. All require coarse-textured soils, whereas the CGSs are all on fine-textured to gravelly loam soils (the gravels and sands are inclusions) 100 to 3,900 feet from the nearest wash. The white-margined penstemon and Amargosa penstemon require coarse deep sands or rocky habitats; the Beatley phacelia requires washes or nearby loose talus; Cane Springs evening primrose and sanicle biscuitroot are found on coarse sandy soils, gravelly talus, or washes. None of these habitats is found on the CGSs.

No state-listed threatened or endangered species would be affected. Although the Nevada Natural Heritage Program has records for two sensitive plant species occurring in the SSA (Ripley's gilia and Brickell's hazardia), the plants are more abundant or widespread than was previously believed and are therefore not subject to any identifiable threat (Cooper, 1991).

4.1.3 Socio-Cultural

Local employment would be increased slightly, primarily through use of local subcontractors for earth-moving and possibly for some of the facility's maintenance.

Impacts on **community support systems** would not be significant because the relay node will be unmanned and will use modest amounts of power (comparable to that used by an average single-family house). Security needs will be met through agreements with local police officials to monitor the integrity of the site during routine patrols, as detailed in Section 4.6.1.1, page 4.6-1 of the FEIS.

Impacts on **land use** would not be significant. All candidate sites are unzoned land, and a GWEN facility would not require a special permit or a public hearing (Williams, 1991b). Where possible, care was taken in the site selection process to maintain setbacks from institutional uses such as schools, churches, recreational areas, and areas zoned residential. The tower would not significantly affect property values because non-noxious, nonresidential land uses, such as the proposed relay node, have no systematic effect on housing values, as stated in Section 4.7.1.3, page 4.7-8 of the FEIS.

Noise impacts from construction and operations would not be significant. Sections 4.5.1.1 and 4.5.1.2 on pages 4.5-1 to 4.5-4 of the FEIS estimate that worst-case noise levels from construction would be 96 dBA within 50 feet of the center of the site and 92 dBA within 50 feet of the noise emission sources for construction of the access road. Occupational Safety and Health Act (OSHA) regulations [29 CFR 1910.95(a)] allow worker exposures of 3.5 and 6 hours, respectively, to such noise levels. Given the intermittent nature of the construction work, those durations are not expected to be exceeded. However, should the durations rise above allowed levels, appropriate administrative or engineering measures shall be taken or protective equipment shall be used to reduce the worker exposure to within permitted levels as required by 29 CFR 1910.95(b). Construction noise impacts to surrounding areas are also not expected to be significant. As discussed in Section 4.5.1.1 of the FEIS, short-term significant impacts could occur if noise-sensitive uses were exposed to noise levels exceeding 75 dBA. Under worst-case scenarios, these levels would occur at 130 feet from the edge of the CGS and 400 feet from the centerline of the acess road. No noise sensitive land uses occur within these areas for any of the six CGSs. Operational noise from the back-up generator would be less than 72 dBA at the site boundary. At 50 feet beyond the site boundary the noise level would drop below 65 dBA, as discussed in Section 2.1.2 of this EA. Although Nye County has no noise ordinance (Williams, 1991a), this noise level is within the standards typically set for residential and mixed residential/agricultural use (55 to 65 dBA), as stated in Section 3.5.3, page 3.5-2 of the FEIS. No dwellings occur within 50 feet of the site. In addition, the BUPG would only operate at this noise level for 2 hours per week during testing and during commercial power outages.

Impacts on **public health and safety** would not be significant, as discussed in Sections 4.11 and 4.12, beginning on pages 4.11-1 and 4.12-1, respectively, of the FEIS. Shock and burn risks would be associated with the buildup of electrical charges on ungrounded metallic objects inside the inner exclusionary (8-foot) fence located approximately 20 feet from the tower base. However, a grounded person within the outer exclusionary (4-foot) fence located approximately 330 feet from the tower base who touches an ungrounded object while the tower was transmitting would experience only a mild shock, sufficient to cause the individual to break contact but not cause harm. Furthermore, because the transmission periods would total between 6 and 8 seconds per hour during normal operations, the risk of even these mild shocks would be insignificant. Only a determined effort to enter the inner exclusionary zones, within the 8-foot fence, would put a person at increased risk of higher shock and a higher specific absorption rate, dependent on the period of prolonged grasping contact with an ungrounded metallic object. Fire hazards at the relay node facility would be low, as discussed in Section 4.12.1.1, page 4.12-1 of the FEIS. Radio-frequency emissions would not cause adverse health effects, as discussed in Section 4.4.1.6, pages 4.4-6 and 4.4-7 of the FEIS. Subsequent to the publication of the FEIS, further study confirmed the conclusion of the FEIS that there is no evidence of adverse effects of GWEN radio-frequency emissions on public health (NRC, 1992).

The relay node would operate in the LF band and therefore would not interfere with pacemakers, emergency communications, commercial and amateur radios, televisions, or garage door openers, as noted in Section 2.1.1.1, page 2-3 of the FEIS.

Impacts on **archaeological resources** would not be significant. The on-site archaeological survey identified three archaeological sites, none of which qualify for the NRHP. Therefore, there will be no effect to archaeological resources listed, eligible, or potentially eligible for the NRHP (Rafferty, 1991a). The Nevada SHPO concurs with this determination (Appendix C, Baldrica, 1991, pages C-38 and C-39 of this EA). If any archaeological resources are found during construction, work that might affect them will be suspended while the Nevada SHPO is notified, in accordance with the provisions of 16 USC 470, *et seq.*, at 470f.

Impacts on **historic properties** would not be significant. No historic properties occur within 1.5 miles of five of the six CGSs. One potentially eligible property, a segment of the historic Las Vegas to Bullfrog Stage Route, occurs within 1.5 miles of the Hernstadt site (CGS-4) (Rafferty, 1991b). However, the proposed relay node would have no adverse effects on that property, as discussed in Section 4.5 of this EA. The BLM and the Nevada SHPO concur that there would be no adverse effects at CGS-4 and that there would be no effect on NRHP listed or eligible properties at any of the other five CGSs (Appendix C, Baldrica, 1991, pages C-38 to C-40 of this EA; Collins, 1991, pages C-41 to C-44 of this EA).

Significant impacts on **Native American traditional, religious, or sacred sites** are not anticipated. Based on the recommendations of the BIA, the Nevada SHPO, the BLM, and the Nevada State Indian Commission, seven tribal organizations were notified of the GWEN project and information was requested regarding traditional, religious, or sacred sites within the SSA: the Moapa-Paiute Tribal Council, the Moapa Cultural Committee, the Las Vegas Indian Center, the Chemeheuvi Tribal Council, the Colorado River Indian Tribes in Arizona, the Las Vegas Colony of Southern Paiutes, and the Inter-Tribal Council of Nevada. No response has been received to letters or to several attempts at telephone communication. The BLM indicated that responses are unlikely due to the small scope of the GWEN project (Myhrer, 1990).

Visual impacts associated with a GWEN tower are discussed in Sections 3.8 and 4.8, pages 3.8-1 and 4.8-1, respectively, of the FEIS. The FEIS discussion is based on an unpainted tower. However, field analysis indicates that painting the tower does not increase visibility of the tower beyond 0.5 mile (Thompson, 1991). Therefore, the results of the visual analysis in the FEIS would be the same, regardless of whether the tower is painted or unpainted. The significance of a visual impact would depend on the visual dominance of the GWEN facility and the sensitivity of the affected views. Visual dominance is the degree to which a GWEN facility would compete with other features of the existing landscape for the attention of the viewer. Section 3.8.4, beginning on page 3.8-3 of the FEIS defines four levels of dominance, called Visual Modification Classes (VMC):

- VMC 1, not noticeable: the tower would be overlooked by all but the most interested viewers

- VMC 2, noticeable, visually subordinate: the tower would be noticeable to most viewers without being pointed out but would not compete with other features for their attention

- VMC 3, distracting, visually codominant: the tower would compete with other features in the landscape for the viewer's attention

- VMC 4, visually dominant, demands attention: the tower would be the focus of attention and tend to dominate the view.

Visual sensitivity is a measure of the public's reaction to a proposed change of the affected view and is a function of the viewer's activity, awareness, goals, and values. Consequently, the more sensitive the view, the stronger will be the public reaction to any alteration of it. Areas defined in the FEIS as having high visual sensitivity include national and state parks; designated scenic routes; designated national, state, or local historic sites where setting is important to their historic significance; and travel routes providing primary access to these sites. Examples of areas having medium visual sensitivity would be locally popular, but undesignated, beaches or public use areas and the travel routes that provide primary access to them. Travel routes that pass near or provide access to high sensitivity views but primarily serve other destinations are considered medium sensitivity. Travel routes are considered sensitive on segments within 0.5 mile of the property and 1.5 miles of the tower, based on FEIS criteria and review by visual analysis specialists (Duffey, 1991). Low visual sensitivity includes those views from sites, areas, travel routes, and sections of travel routes not identified as medium and high in sensitivity.

Significant visual impacts would occur if the relay node facility were to dominate or codominate (VMC 4 or 3) a high-sensitivity view or dominate (VMC 4) a medium-sensitivity view. If the relay node facility cannot be seen from medium-to-high sensitivity

routes or areas, then visual impacts are not considered significant. Distance is the primary factor in determining visual dominance and therefore visual impacts. At distances greater than 3 miles, a GWEN tower would not be visible to the unaided eye. At 1.5 to 3 miles, the tower would be visually subordinate if noticeable (VMC 2) but more usually would not be noticed (VMC 1) because of its lack of mass. If a viewer at this distance actively sought the tower, it would appear as a thin vertical line on the horizon. Within 1.5 miles, the tower becomes a more important component of the view. In addition, other aspects of the tower's setting, such as focal point sensitivity, skyline complexity, competing feature interest, and topographic and vegetative screening, become important considerations in determining the level of visual impact.

USGS topographic maps and a windshield survey were used to determine whether high or medium sensitivity views were within 1.5 miles of the CGSs. Except on the Hernstadt site (CGS-4), visual impacts would not be significant because the other five CGSs have no high or medium sensitivity views within 1.5 miles of their boundaries.

4.2 Alternative 1: DOE A Site (CGS-1)

No significant impacts are expected.

4.3 Alternative 2: DOE B Site (CGS-2)

No significant impacts are expected.

4.4 Alternative 3: Cook Site (CGS-3)

No significant impacts are expected.

4.5 Alternative 4: Hernstadt Site (CGS-4)

Significant impacts are expected.

Visual impacts on the Amargosa Valley Improvement Association Recreational Park would be significant. This park is 0.5 mile northwest of the CGS and is considered to have high visual sensitivity as defined in Section 3.8.4, page 3.8-5 of the FEIS. When viewed from the park, the tower would be seen against a skyline that is moderately complex because of the irregular appearance of the distant hills. There would be no competing feature interest, no vegetative or topographic screening, and no focal point sensitivity. The tower would therefore be dominant (VMC 4) when viewed from the park, causing significant visual impacts.

The Amargosa Valley Town Park, 1.2 miles northwest, is also considered high sensitivity. When viewed from that park, the tower would be seen against a skyline that is moderately complex because of the irregular appearance of the distant hills. There would be no competing feature interest, no vegetative or topographic screening, and no focal point sensitivity. The tower would therefore be distracting (VMC 3) when viewed from the park, resulting in significant visual impacts.

Visual impacts to travel routes leading to high sensitivity views would also be significant. Those segments of Amargosa Farm Road passing within and near the Amargosa Valley Improvement Association Recreational Park and the Amargosa Valley Town Park are considered to have medium sensitivity because the road passes near high sensitivity areas while primarily serving other destinations, as discussed in Section 3.8.4, page 3.8-5 of the FEIS. The tower would be 0.4 mile south of Amargosa Farm Road. For a motorist traveling west, prior to entering either park, the tower would appear to the south against a skyline that is moderately complex because of the irregular appearance of the distant hills. There would be no vegetative or topographic screening, no competing feature interest, and no focal point sensitivity. The tower would therefore be dominant (VMC 4), creating a significant visual impact. For a viewer traveling east on that road, the views are similar, although the distance to the tower would be greater. Prior to entering the Improvement Association park, the tower would be approximately 0.6 mile distant. A school next to the park would provide competing feature interest, and the tower would be, at most, codominant and distracting (VMC 3) and would therefore not cause a significant visual impact. Prior to entering the town park, the tower would be 1.6 miles away. Appearing as a thin grey line on the horizon, it would be noticeable but

visually subordinate to other features in the view, including a school building north of Amargosa Farm Road across from the park, and would not cause a significant impact.

Impacts on **historic properties** would not be significant. That segment of the historic Las Vegas to Bullfrog Stage Route that comes within 1.5 miles of this CGS would not be significantly impacted by the proposed relay node facility. Modern development in the vicinity of the CGS diminishes the importance of the property's setting to its NRHP eligibility. In addition, this potentially eligible segment is not the only portion of the route in existence, as the route continues north past Miller's Well No. 1 and south from the eligible segment that was studied. Therefore, segments in other locations quite likely exist in a relatively undisturbed state. When the stage route as a whole is considered, a solitary tower structure does not represent a significant impact on the integrity of the resource and would therefore cause no adverse effects to the stage route (Rafferty, 1991b).

4.6 Alternative 5: BLM A Site (CGS-5)

No significant impacts are expected.

4.7 Alternative 6: BLM B Site (CGS-6)

No significant impacts are expected.

4.8 No Action Alternative

No environmental impact would result from adoption of the no action alternative.

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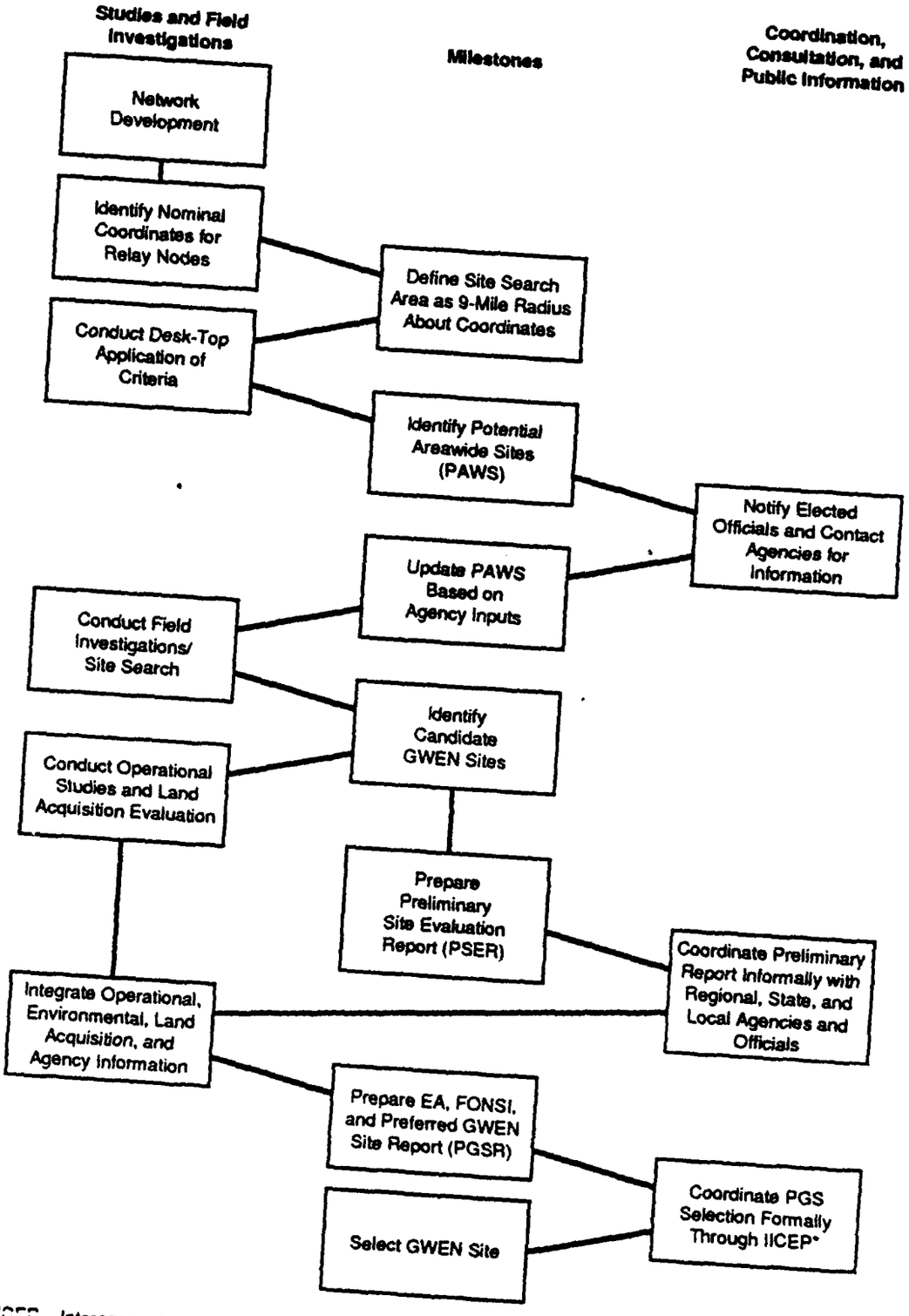
APPENDIX A

SITE SELECTION PROCESS

SITE SELECTION PROCESS

Figure A.1 of this EA shows the sequence of events during the selection of individual GWEN sites. Figure A.2 of this EA describes the screening process used during the field investigation to choose the candidate GWEN sites (CGSs). The environmental siting criteria applied in the site selection process are defined in Tables 5-1 and 5-2, pages 5-7 through 5-14 of the FEIS.



*IICEP - Interagency/Intergovernmental Coordination for Environmental Planning.

FIGURE A.1 GROUND WAVE EMERGENCY NETWORK SITE SELECTION PROCESS

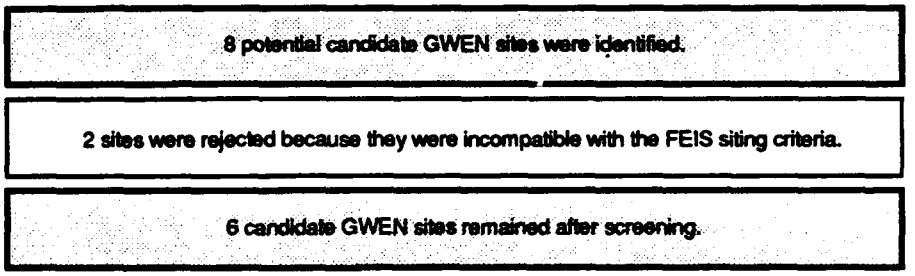


FIGURE A.2 RESULTS OF USING FEIS SITING CRITERIA TO SCREEN POTENTIAL CANDIDATE GWEN SITES IN AND NEAR THE SOUTHERN NEVADA SITE SEARCH AREA

APPENDIX B

TOPOGRAPHIC SETTINGS OF CANDIDATE GWEN SITES

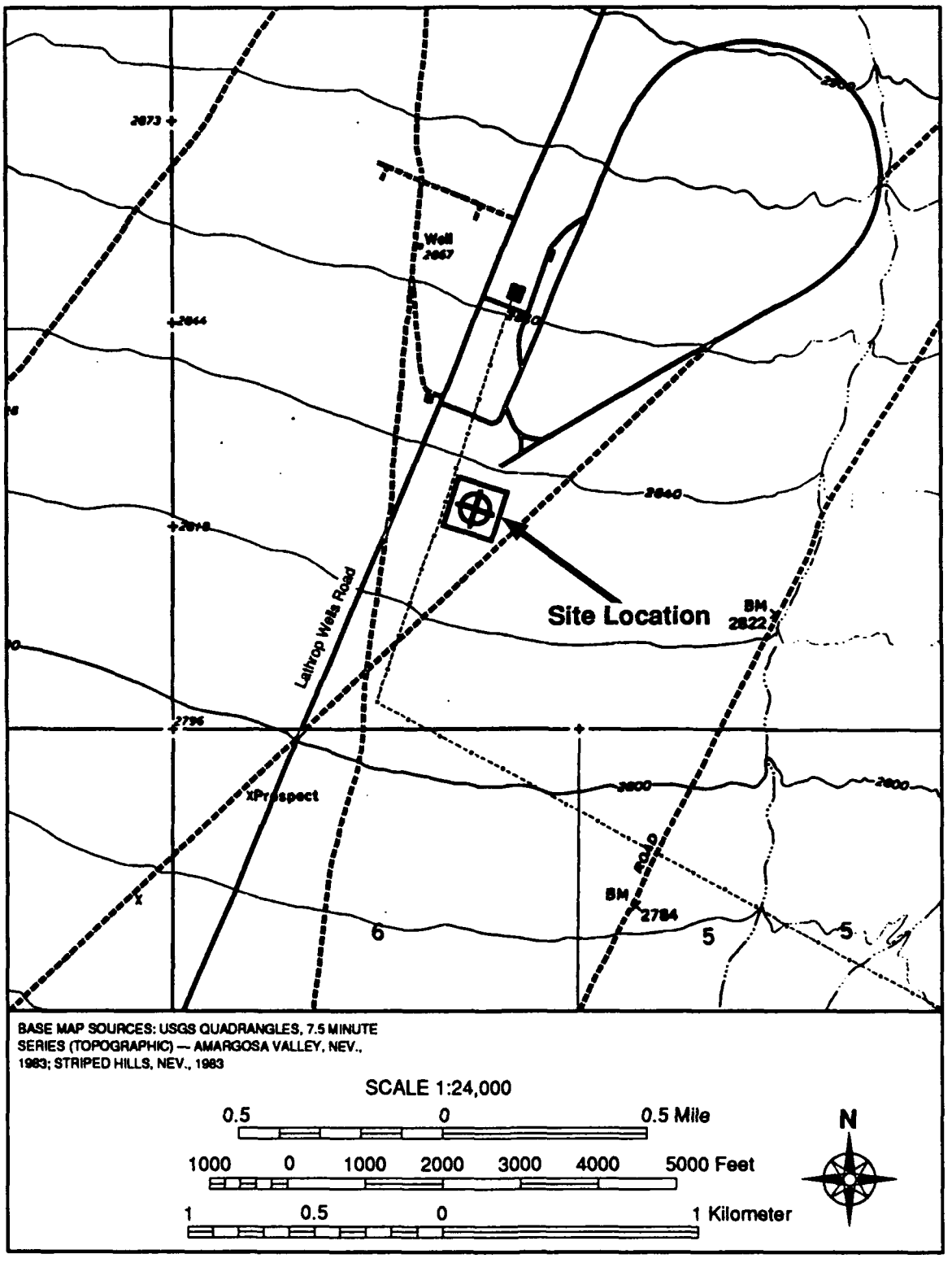


FIGURE B.1 TOPOGRAPHIC SETTING OF THE DOE A SITE (CGS-1)

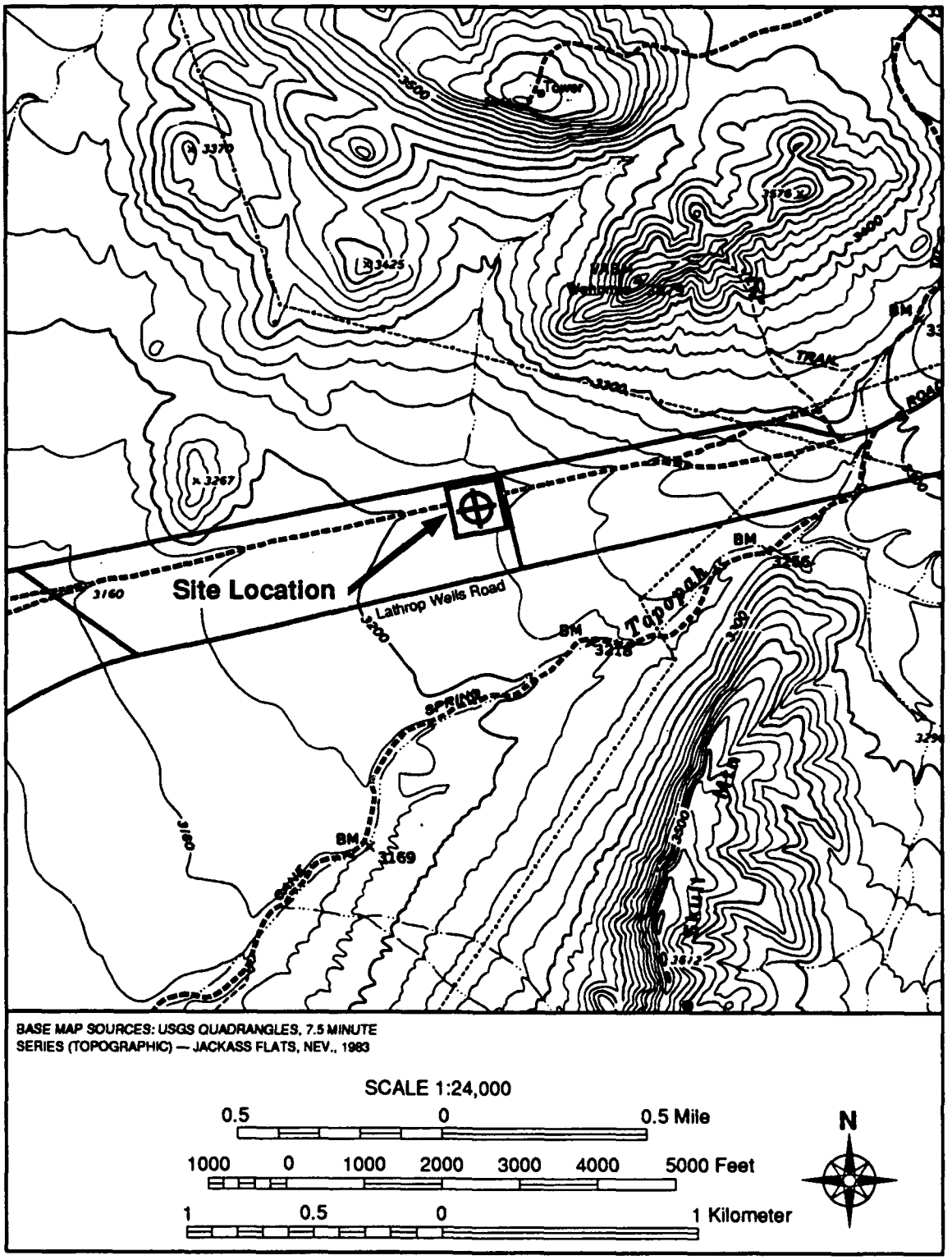


FIGURE B.2 TOPOGRAPHIC SETTING OF THE DOE B SITE (CGS-2)

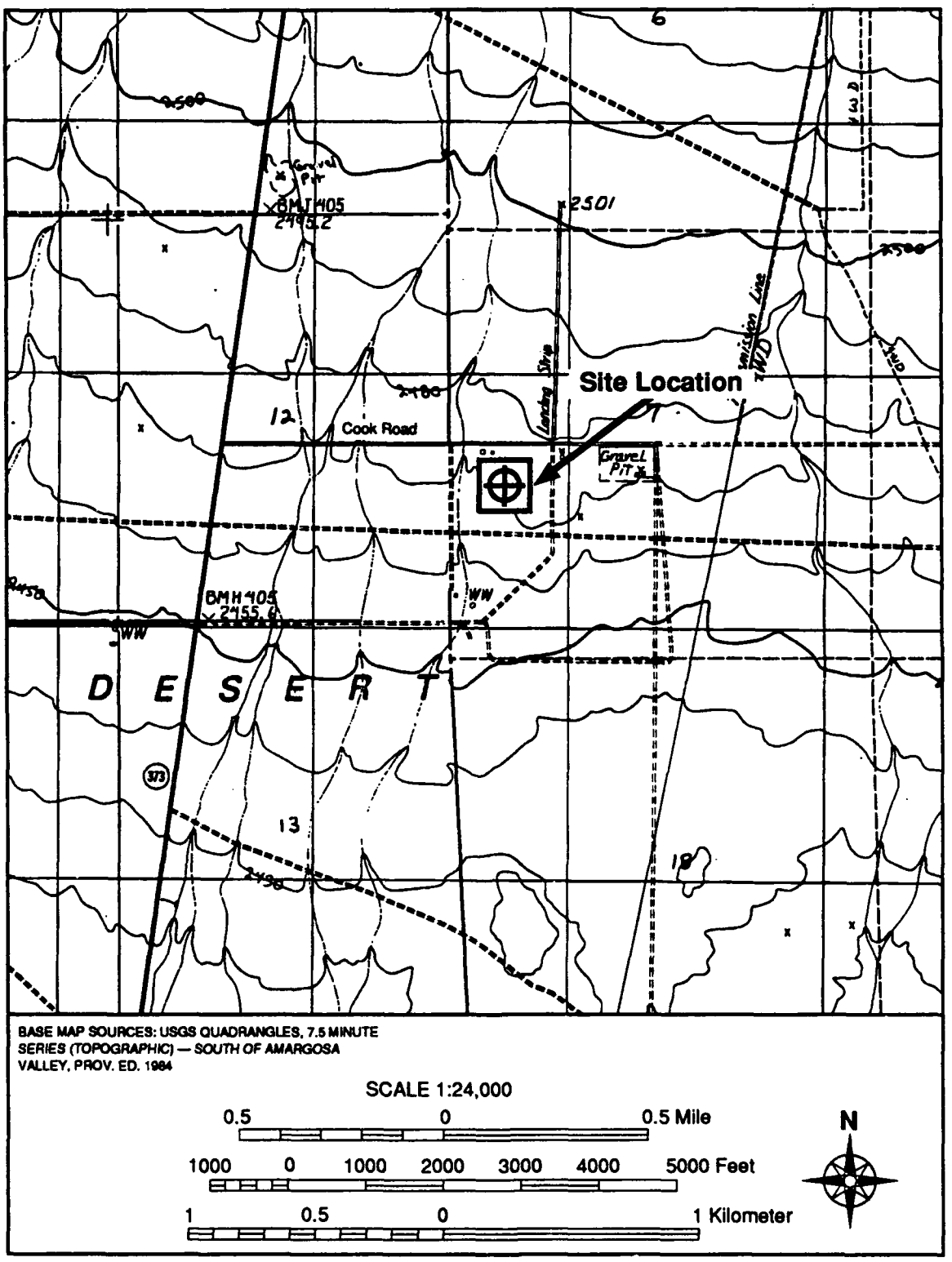


FIGURE B.3 TOPOGRAPHIC SETTING OF THE COOK SITE (CGS-3)

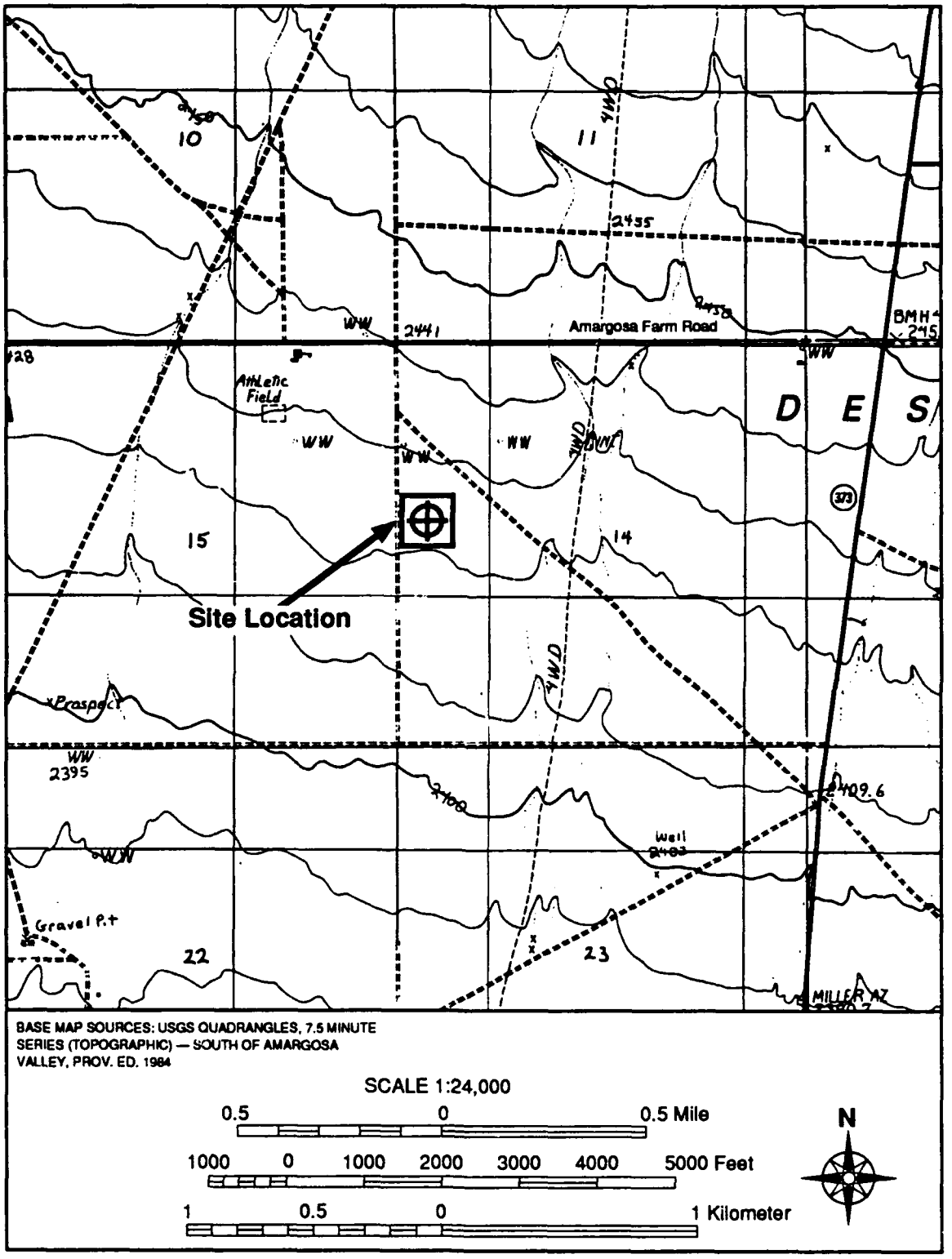


FIGURE B.4 TOPOGRAPHIC SETTING OF THE HERNSTADT SITE (CGS-4)

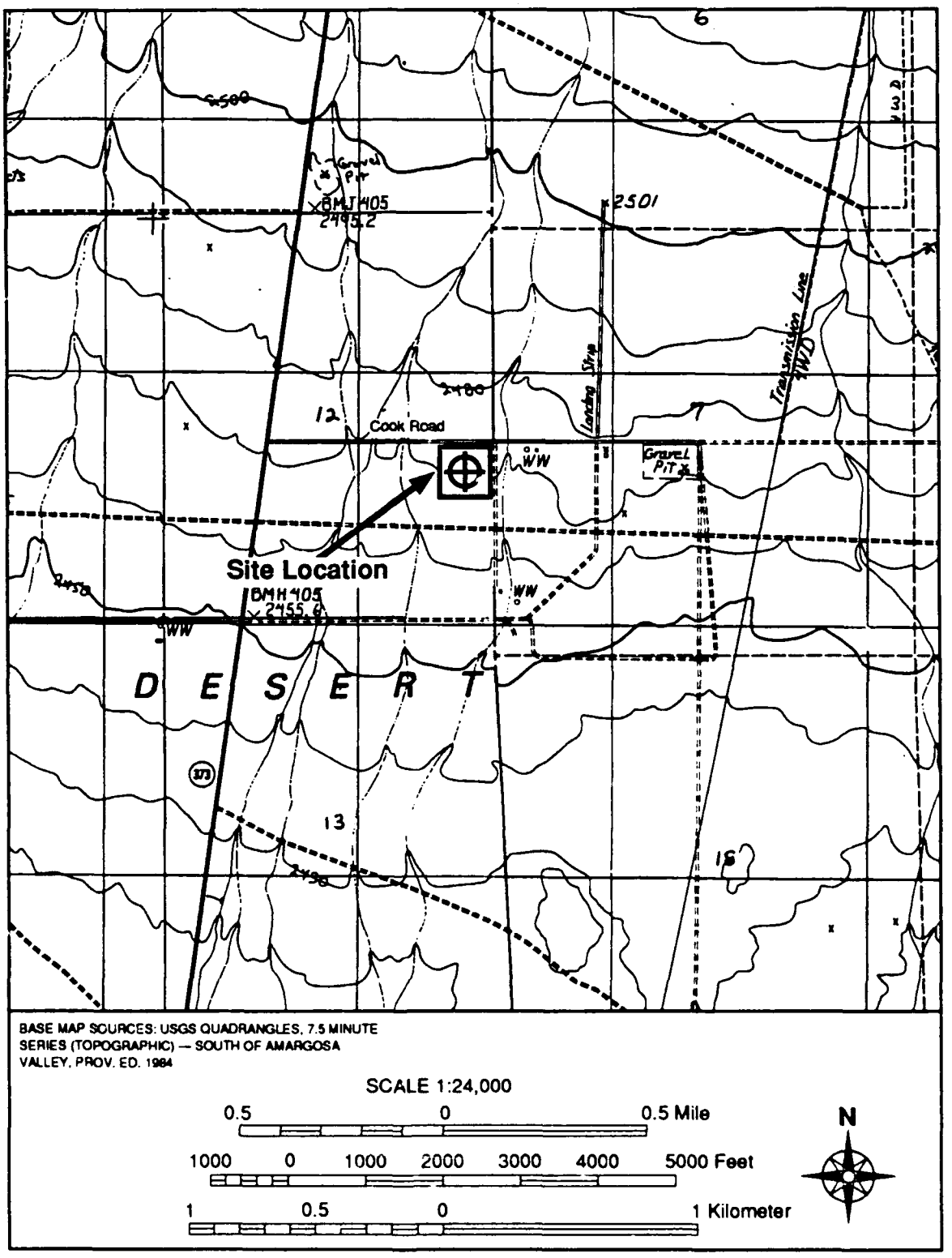


FIGURE B.5 TOPOGRAPHIC SETTING OF THE BLM A SITE (CGS-5)

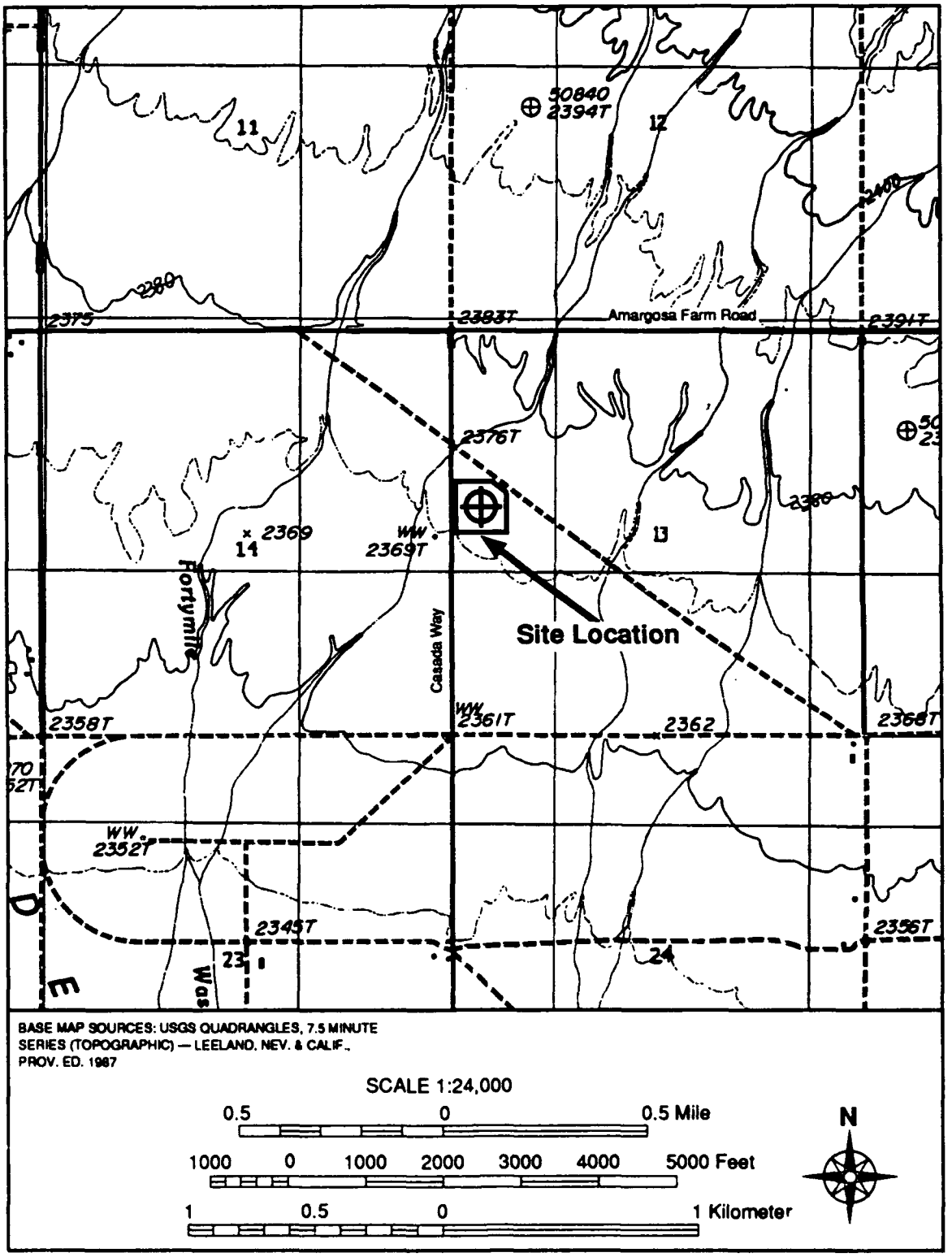


FIGURE B.6 TOPOGRAPHIC SETTING OF THE BLM B SITE (CGS-6)

APPENDIX C

CORRESPONDENCE

CORRESPONDENCE

Appendix C documents contacts with the following federal and state agencies and Native American groups:

Individual	Agency	Date	Response
C. Buchanan, Acting Field Supervisor	U.S. Department of the Interior, Fish and Wildlife Service, Reno, Nevada	03-16-90	Attached
D. Harlow, Field Supervisor	U.S. Department of the Interior, Fish and Wildlife Service, Reno, Nevada	02-24-92 05-27-92 01-13-93	Attached Attached Attached
A. Baldrica, Deputy State Historic Preservation Officer	Nevada Department of Conservation and Natural Resources, Divison of Historic Preservation and Archeology, Carson City, Nevada	06-01-90 10-30-91 12-18-91	Attached Attached Attached
B. Collins, District Manager	U.S. Department of the Interior, Bureau of Land Management, Las Vegas, Nevada	03-14-91 09-10-91	Attached Attached
T. Lovella, Chairperson	Moapa-Paiute Tribal Council, and Moapa Band of Paiutes, Moapa, Nevada	A letter was sent 10-31-90. No response has been received to the letter or to several attempts at phone communication.	

Individual	Agency	Date Response
R. Alvarez, Chairperson	Chemeheuvi Tribal Council, Chemeheuvi Valley, California	A letter was sent 10-31-90. No response has been received to the letter or to several attempts at phone communication.
R. Arnold	Las Vegas Indian Center, Las Vegas, Nevada	A letter was sent 10-31-90. No response has been received to the letter or to several attempts at phone communication.
A. Drennan, Sr., Chairperson	Colorado River Indian Tribes, Parker, Arizona	A letter was sent 10-31-90. No response has been received to the letter or to several attempts at phone communication.
T. Turner, Chairman	Moapa Cultural Committee, Moapa, Nevada	A letter was sent 10-31-90. No response has been received to the letter or to several attempts at phone communication.
D. Austin, Chairman	The Las Vegas Colony of Southern Paiutes, Lovelock, Nevada	A letter was sent on 12-16-92. No response has been received to the letter or several attempts at phone communication.
D. Crawford, Executive Director	Inter-Tribal Council of Nevada, Reno, Nevada	A letter was sent on 12-16-92. No response has been received to the letter or to several attempts at phone communication.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

RENO FIELD STATION
4600 Kietzke Lane, Building C-125
Reno, Nevada 89502-5093

March 16, 1990
File No.: 1-5-90-SP-151

Mr. John Chamberlain
SRI International
333 Ravenswood Avenue
Menlo Park, CA 94025

Dear Mr. Chamberlain:

The Fish and Wildlife Service (Service) has reviewed your letter dated January 22, 1990, requesting background resource data, regulatory information, and our concerns regarding the proposed GWEN radio communications relay node site in the vicinity of Lathrop Wells, Nevada. An environmental assessment (Assessment) is to be prepared for a series of candidate sites for the facility. Our primary concerns regarding biological resources that may be affected by the project are provided below.

Endangered and Threatened Species

The possible presence of federally listed endangered or threatened species in the project area should be determined. If endangered or threatened species may be affected, then the Air Force must initiate consultation with the Service under Section 7 of the Endangered Species Act of 1973, as amended (the Act). The Air Force should refrain from conducting project related activities on the site until consultation is completed.

A determination should be made if species which are candidates for Federal listing as endangered will be affected by the project. Although such species receive no protection under the Act, early detection of their presence may avoid conflicts at a later date should they become listed. Should the Assessment reveal that a candidate species will be affected by the project, we urge you to seek technical assistance from our office. We will assist in developing the necessary planning alternatives to avoid conflict should a candidate species become listed before completion of the project.

We are providing you with a list of endangered and candidate species that may be present in the area of or be affected by the project (Attachment A). To the best of our knowledge, no threatened or proposed species occur within the project area. This fulfills our requirement to provide a list of species under Section 7(c) of the Act. Please see Attachment B for the Air Force requirements. Attachment C provides references regarding the listed species.

Wildlife Populations and Habitat

Positive and negative impacts, both direct and indirect, to terrestrial and aquatic wildlife and habitats should be identified for each alternative, including access and utility corridors, and all ancillary facilities. Negative impacts to be addressed should include but not be limited to, destruction or alteration of breeding, nesting, cover, and foraging habitat for wildlife. Descriptions of habitat should include both qualitative and quantitative information. Areas with sensitive resources such as rare or endangered species, unique habitat types, wetland and riparian habitats, raptor nesting sites, and wildlife corridors should be identified.

Although we are unaware of any critical avian habitats or common avian flyways within the Site Search Area, washes vegetated with desert riparian plant species, in particular desert willow (Chilopsis linearis) and mesquite (Prosopis pubescens and P. glandulosa) provide important nesting, foraging, and cover habitat for migratory birds. We recommend the desert in the vicinity of such areas be avoided, particularly the larger complexes such as Fortymile Wash and Rock Valley Wash, if such habitat is present.

The Service also has special concerns for wetland ecosystems. The Assessment should identify wetlands, if any, in the vicinity of the candidate sites and describe measures to ensure these sensitive resources are not affected by the project.

Potential for Bird Collisions with Tower

The Assessment should address the potential for collisions by birds with the tower of the relay node station if this can be a problem with this type of facility. We recommend that measures be developed to reduce the possibility of such collisions occurring.

Cumulative Effects

The Assessment should include an analysis of cumulative impacts on wildlife resources in the area. Impacts from past, present, and reasonably foreseeable future military, mining, grazing, and other actions within the Site Search Area, including private lands, should be considered in this analysis.

We recommend that the Air Force develop measures to avoid, reduce, or compensate for habitat losses and other negative impacts to wildlife resources that will result from this project. The assessment should discuss these measures in detail, including revegetation of disturbed areas following project construction.

In addition to consulting with the Air Force under Section 7 of the Endangered Species Act should the desert tortoise be affected by the project, we will comment on any public notice issued for a Corps of Engineers permit pursuant to Section 404 of the Clean Water Act for discharge of dredged or fill material into wetlands or waters of the United States.

We appreciate the opportunity to comment on this project. If you have any questions regarding our comments, please contact Mary Jo Elpers at (702) 784-5227.

Sincerely,

Chester C. Buchanan
Acting Field Supervisor

Attachments

cc: Regional Office (AFWE), Portland, OR
Nevada Department of Wildlife, Las Vegas and Reno, NV
Bureau of Land Management, Reno and Las Vegas, NV
Environmental Protection Agency, San Francisco, CA
Corps of Engineers, Sacramento, CA

ATTACHMENT A. Listed species that may be present in or be affected by the GWEN radio communications relay node site near Beatty, NV

File #1-5-90-SP-151

Common Name	Scientific Name	Status
Endangered Species		
Reptile		
Desert Tortoise	Gopherus agassizii	E
Candidate Species		
Mammal		
Spotted Bat	Euderma maculatum	2

Status:

E = Federally listed endangered species

2 = Category 2 candidates for listing as an endangered or threatened species. Comprises taxa for which the information now in possession of the Service indicates that proposing to list as endangered or threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threat are currently not available to support proposed rules.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
FISH AND WILDLIFE ENHANCEMENT
RENO FIELD OFFICE
4600 Kietzke Lane, Building C-125
Reno, Nevada 89502-5093

February 24, 1992
File No.: 1-5-92-F-4

Lt. Colonel Stephen T. Martin
Program Manager, GWEN
Headquarters Electronic Systems Division
Department of the Air Force
Hanscom AFB, Massachusetts 01731-5000

Dear Colonel Martin:

This Biological Opinion responds to your letter dated September 30, 1991, for formal consultation with the Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act). At issue are those impacts that the installation and operation of a Ground Wave Emergency Network (GWEN) relay node in southern Nevada may have on the desert tortoise (*Gopherus agassizii*), a federally listed threatened species. Your request was received on October 4, 1991, and consultation was initiated at that time.

This Biological Opinion was prepared using information contained in your letter dated September 30, 1991; a Biological Assessment prepared for the Mojave Desert Tortoise at Six Candidate GWEN Sites in Nye County, Nevada (Faunawest Consultants 1991); information obtained from telephone conversations between my staff and representatives of the Air Force; and information contained in our files.

Biological Opinion

It is our Biological Opinion that the action of installing and operating a GWEN relay node on one of the six candidate sites in Nye County is not likely to jeopardize the continued existence of the desert tortoise. Critical habitat has been designated for the Beaver Dam Slope desert tortoise subpopulation in Utah, but not for the subpopulations in Arizona, California, and Nevada. Therefore, no critical habitat will be destroyed or adversely modified by activities associated with construction and operation of the relay node.

Description of the Proposed Action

The Air Force is the lead agency in a proposal to construct and operate a GWEN relay node on one of six candidate GWEN sites (CGSs) in southern Nye County, Nevada (Figure 1). GWEN is a communication system consisting of radio towers similar to those used by commercial radio broadcasting stations (Figure 2), and provides a communication network for transmitting critical warning and response messages to the President of the United States that would be immune from high-altitude electromagnetic pulses generated by a nuclear blast in the

upper atmosphere (Faunawest Consultants 1991). This GWEN relay node is an unmanned low frequency radio relay station. The facility will communicate with terminals at existing military sites and with GWEN relay nodes at 150-to 200-mile intervals throughout the country.

Only one of the six candidate sites will be developed (Figures 3-8). Development of the GWEN facility would impact approximately 11 acres of relatively undisturbed tortoise habitat including permanent disturbance of 8 acres and temporary disturbance of 3 acres.

Sites CGS-1 and CGS-2 are located approximately 3.5 miles and 9.5 miles north, respectively, of the town of Amargosa Valley (formerly Lathrop Wells) on land managed by the Department of Energy (DOE). Sites CGS-3 and CGS-4 occur approximately 5 miles south of Amargosa Valley, on private land. Sites CGS-5 and CGS-6 occur on land managed by the Bureau of Land Management (Bureau), and are 5 miles south and 9 miles southwest of Amargosa Valley, respectively. The GWEN relay node will consist of a radio transmission tower complex, an equipment complex (support facility), an access road, and electrical and telecommunication connections (Figure 2). The circular tower complex comprises the majority of the GWEN relay node (700 feet x 700 feet). It will be surrounded by a 4-foot-high barbed-wire fence, and will contain a radio tower, supporting guy wires, and a ground plane. The 42-foot x 47-foot tower area will be the only portion of the tower facility to be graded, and it will be fenced with chain-link fencing when completed. Twelve guy wires will be attached to the ground at six anchor locations around the tower. The ground plane will consist of 50 to 150 0.128-inch-diameter copper wires buried 12 inches below the soil surface and extending 328 feet radially around the tower. Ditches for the ground plane wires will be made with a ditch-witch.

The tower complex will be connected to an equipment complex by a 10-foot-wide unpaved service road of undetermined length. The 30-foot x 40-foot equipment complex will be enclosed by an 8-foot-high chain-link fence. A 25 kilowatt diesel fuel generator and two fuel tanks holding 559 gallons and 461 gallons will be stored in an enclosure within the equipment complex. The enclosure is designed to contain a fuel spill, and an alarm will sound when 2 gallons of fuel have accumulated on the floor drain. The generator will be used during power failures or weekly tests. Commercial power will be supplied to the equipment complex from the existing overhead commercial powerline along the existing paved road. Power will be run via an underground conduit from the equipment complex to the antenna on the site. A graded gravel access road will be built from an existing road to the GWEN relay node site. The length of the road will vary between 13 feet and 175 feet depending on the site that is chosen, and road width will be 12 feet. No road currently exists where the access road is planned at each site.

Construction of the GWEN relay node will take approximately 4 to 5 weeks. After construction is completed, no personnel will be required on or near the site except during initial testing and road maintenance. The generator will be tested remotely once a week, and fuel will be delivered to the site

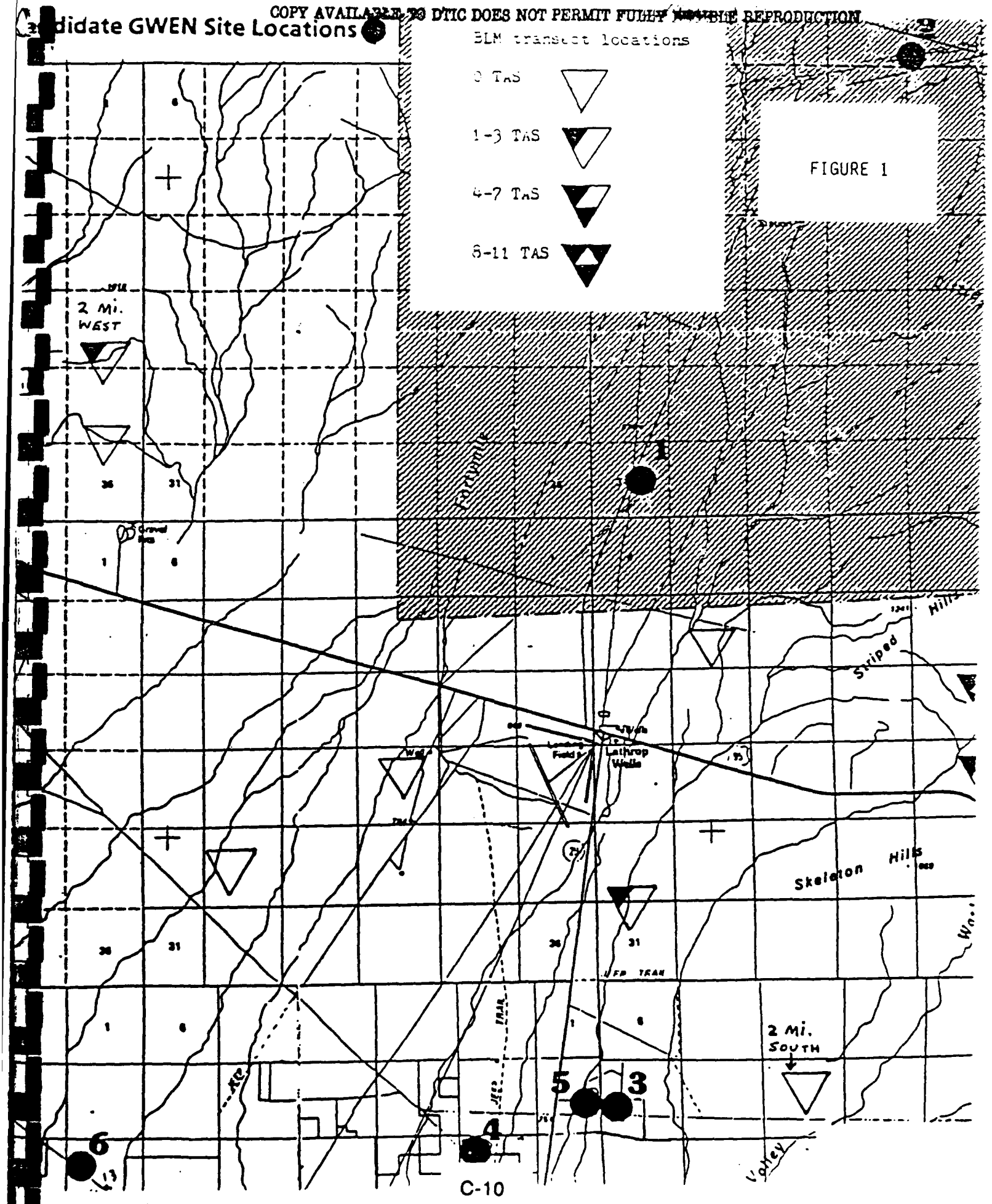
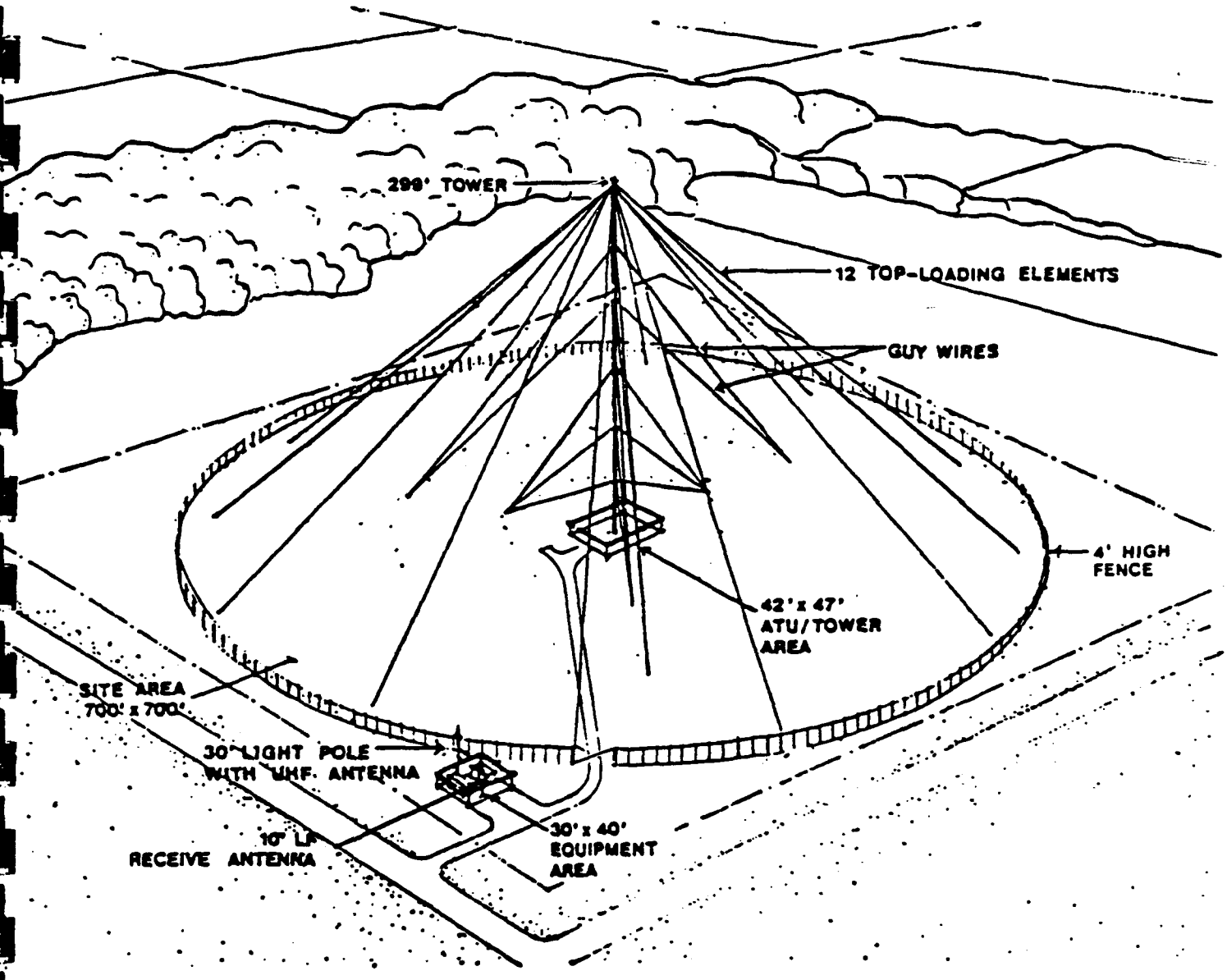


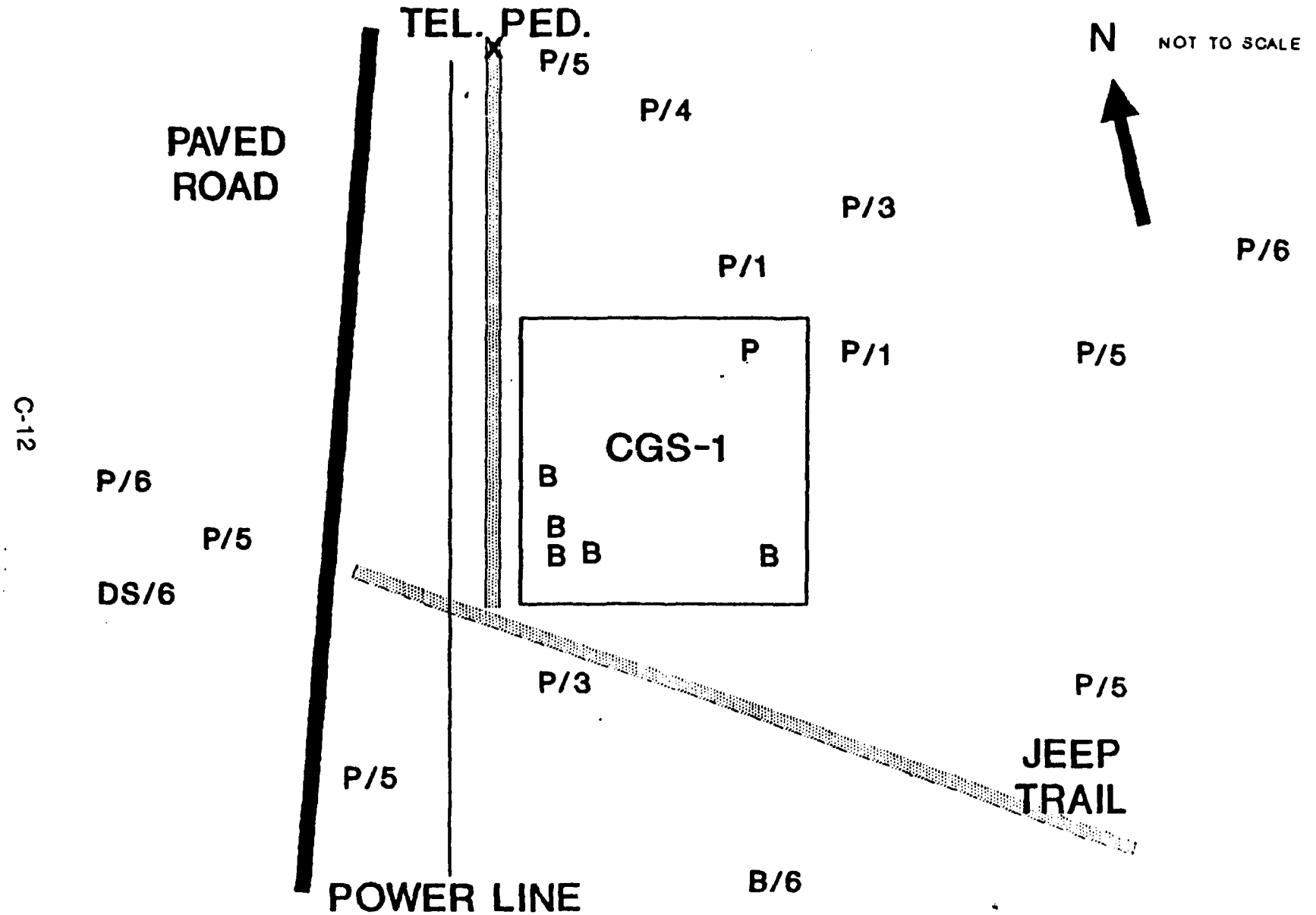
Figure 1. General locations of six candidate ground wave emergency network sites and total adjusted sign (TAS) for relative tortoise density transects conducted by BLM.

FIGURE 2



TYPICAL PROPOSED LAYOUT OF RELAY NODE (RN) STATION

General layout of a typical relay node (RN) station.



C-12

FIGURE 3

Figure 2. Map of CGS-1 showing approximate location of tortoise sign (P = pallet, B = burrow, DS = drinking site) and transect

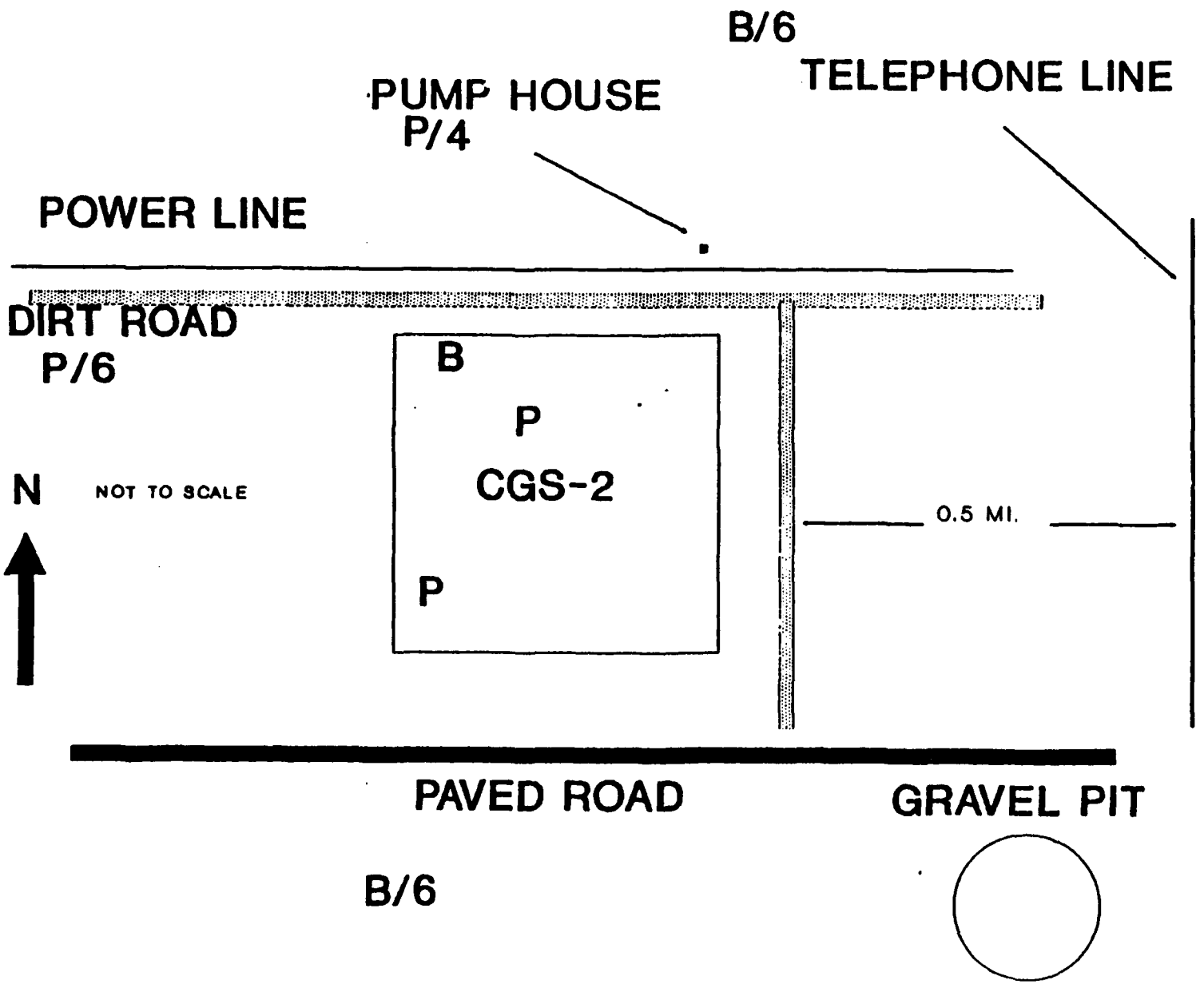
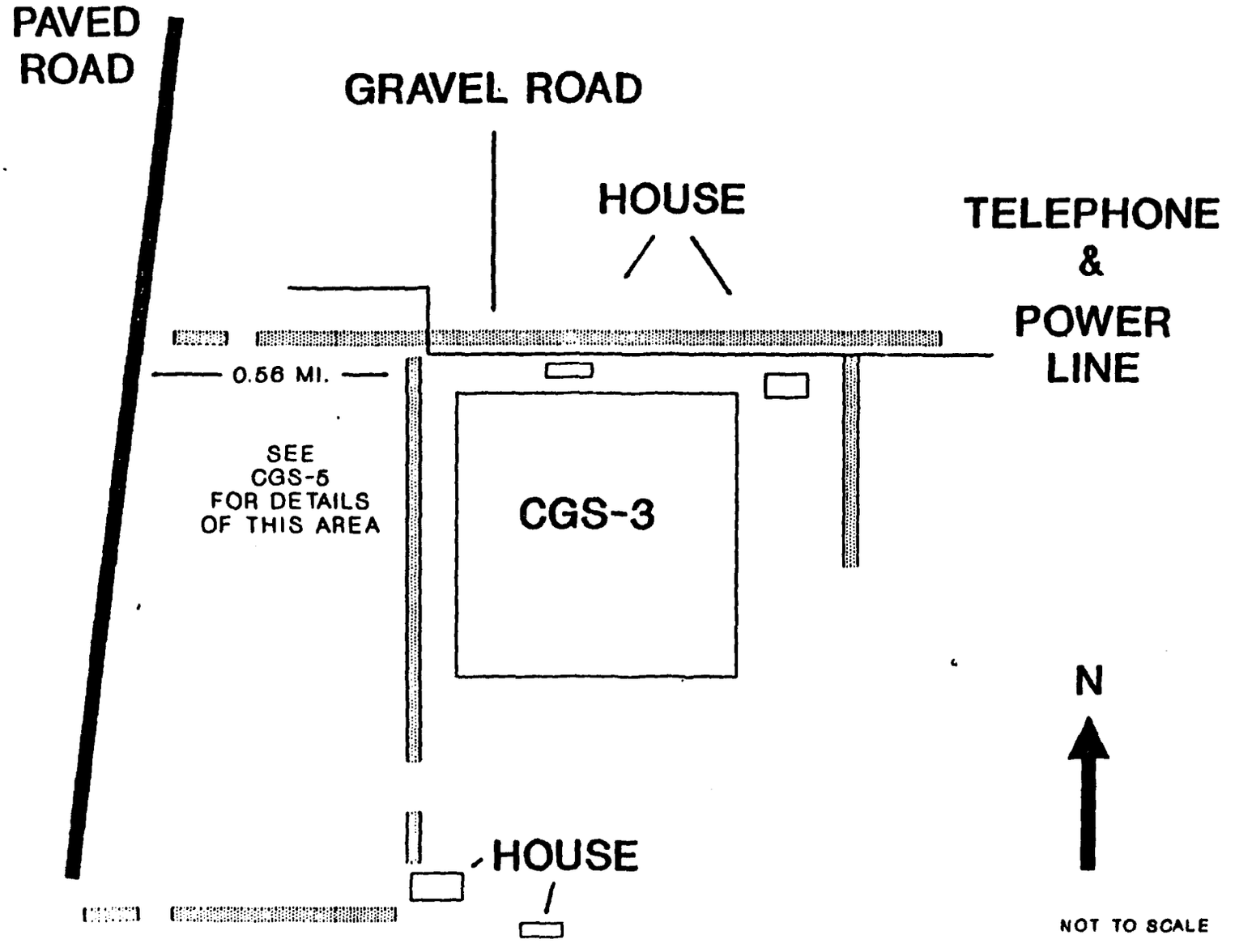


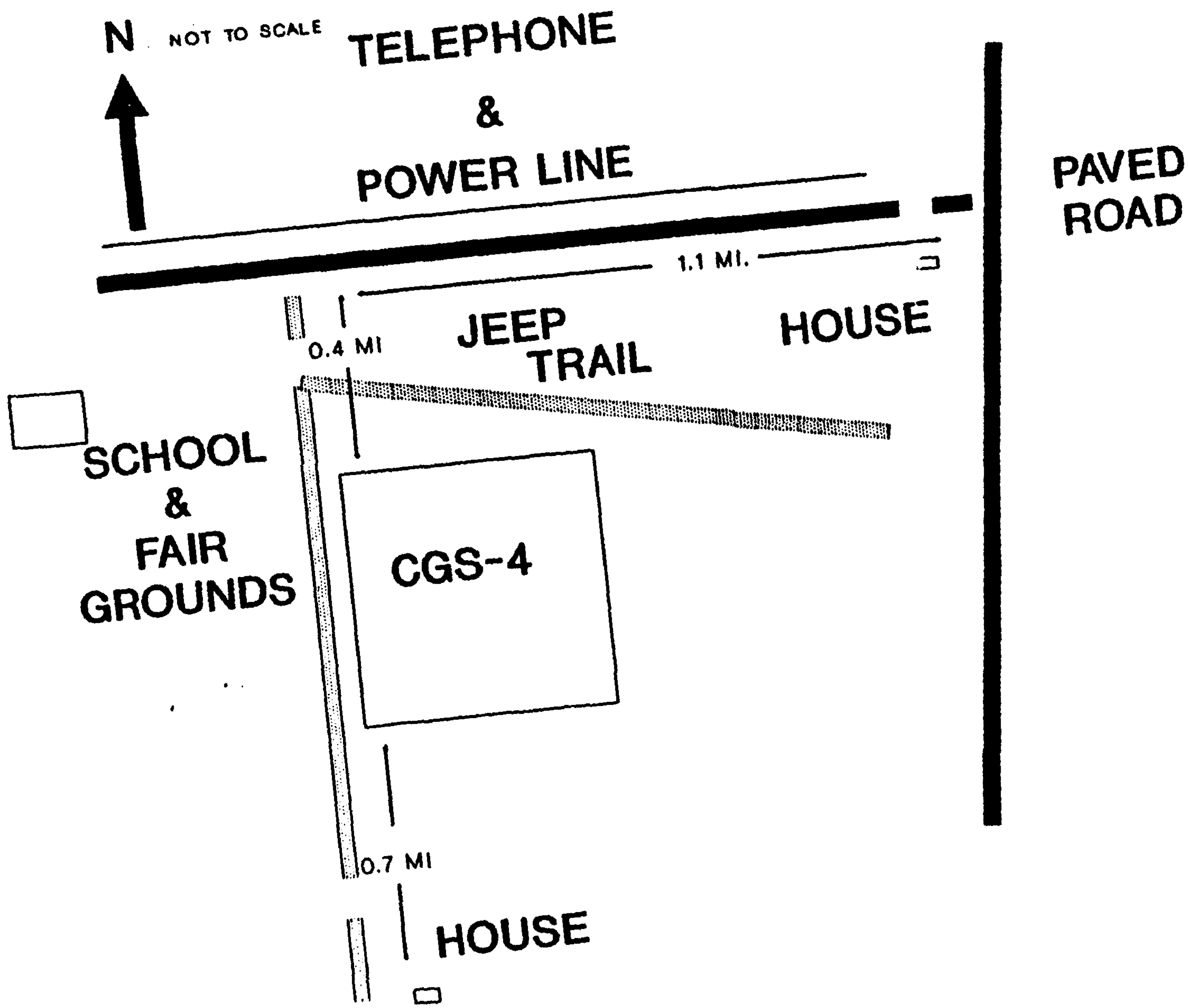
Figure 3. Map of CGS-2 showing approximate location of tortoise sign (P = pallet, B = burrow) and transect line where the sign



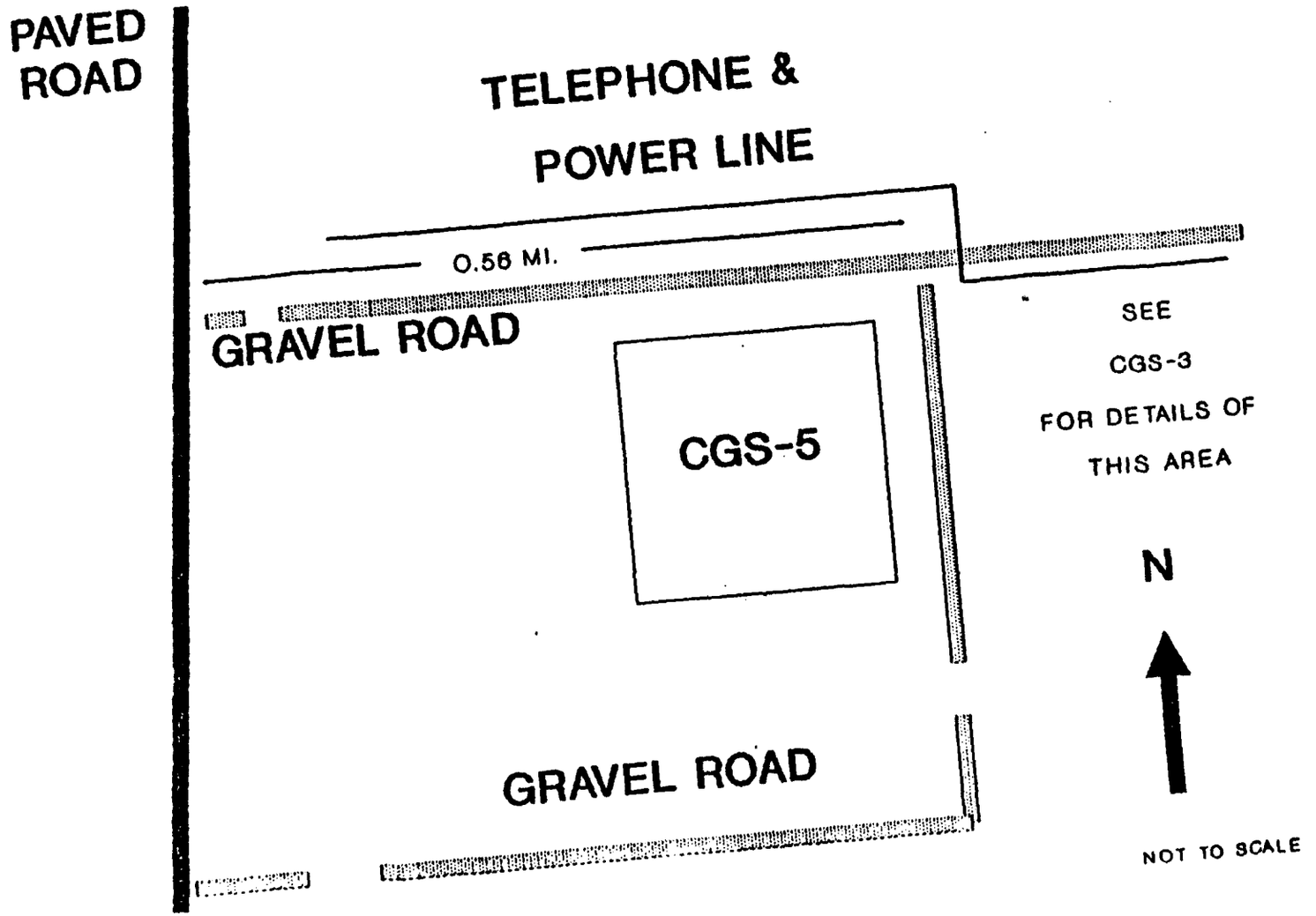
Map of CGS-3.

FIGURE 5

FIGURE 6



Map of CGS-4.



Map of CGS-5.

FIGURE 7

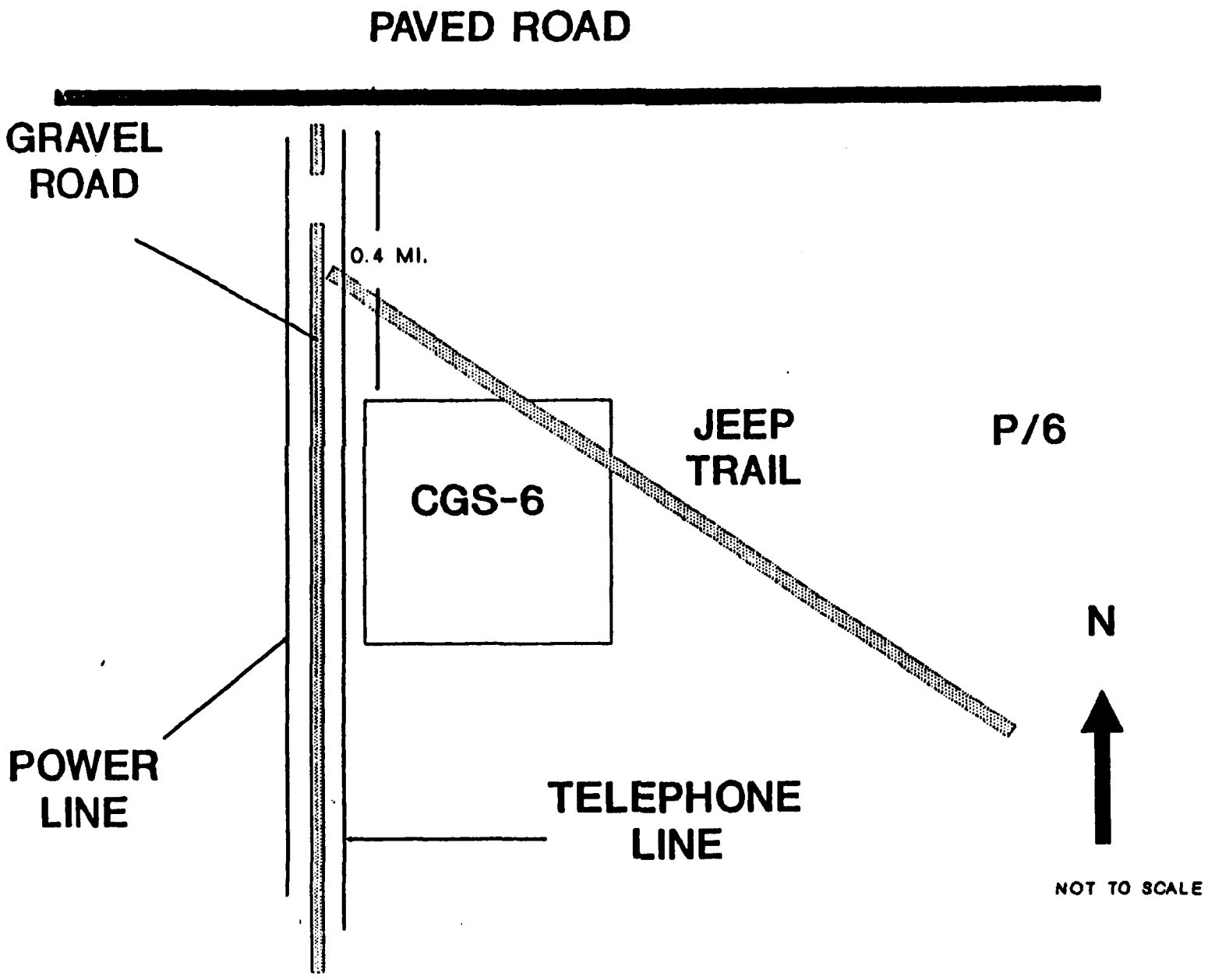


FIGURE 8

Map of CGS-6 showing approximate location of tortoise sign (P = pallet) and transect line where the sign was found

quarterly or as needed. The graded access road will be maintained as needed by a maintenance company contracted by the Air Force. The lifespan of this facility is estimated at 15 to 25 years. At that time, the GWEN relay node facility could be decommissioned and auctioned to private broadcasting companies.

Several mitigation measures are proposed by the Air Force to minimize the take of desert tortoises: (1) All tortoises will be removed from the site by an experienced tortoise biologist immediately prior to the start of construction; (2) the construction site survey will consist of a maximum of three complete searches; (3) any tortoises found on the site during surveys occurring in the winter will be handled according to Service protocol and moved offsite to an approved over-wintering facility; (4) a qualified tortoise biologist will be on call if construction occurs during the tortoises' winter hibernation period (late November-late February); (5) a biologist will be onsite if construction activities occur outside of the tortoises' winter hibernation period; (6) construction traffic will be limited to existing roads and immediately around each structure; (7) prior to construction activities, all construction workers will be required to attend a Service-approved seminar about tortoise safety taught by a qualified tortoise biologist; (8) wooden fence posts and power poles will be raven-proofed; (9) a litter control program will be implemented at the site by the Air Force which will include covered trash cans and removal of trash to a designated solid waste disposal facility. Additional project information can be found in the Biological Assessment for the proposed GWEN relay node (Faunawest Consultants 1991).

Species Account and Environmental Baseline

The desert tortoise is a large, herbivorous reptile that is generally active when annual plants are most common; i.e., spring, early summer, and autumn. Tortoises usually spend the remainder of the year in burrows or dens, escaping the extreme weather conditions of the desert. Desert tortoises potentially occur in the United States throughout much of the Mojave and Sonoran Deserts of Arizona, California, Nevada, and southwestern Utah, and in Mexico from Sonora to northern Sinaloa. In Nevada, the native range of this species is generally restricted to Clark County and those portions of Nye and Lincoln Counties south of 37 degrees North latitude and below approximately 1,330 meters elevation (4,000 feet).

On August 20, 1980, the Service determined the Beaver Dam Slope population of the desert tortoise, in southwestern Washington County, Utah, to be threatened and designated 309 square miles of critical habitat (Fish and Wildlife Service 1980). Subsequently, the Mojave population of the desert tortoise was listed by emergency rule as endangered on August 4, 1989, and by final rule as threatened on April 2, 1990 (Fish and Wildlife Service 1989 and 1990). The Mojave population includes all desert tortoises north and west of the Colorado River in California, southern Nevada, northwestern Arizona, and southwestern Utah.

The burrowing habits of tortoises, which vary greatly with geographic locality (Burge 1978, Luckenbach 1982), represent unique adaptations to the extreme environments they occupy. Burrows function primarily as thermoregulatory aids and may also aid in water conservation and protection from predators. Shelters may be located under bushes, in banks or beds of washes, rock outcrops, or caliche caves.

Desert tortoises grow an average of 9 millimeters per year, with the greatest amount of growth following winters of high precipitation and the increased production of winter annuals in the spring (Medica et al. 1975). Turner et al. (1987) estimated that tortoises reach sexual maturity at 17-20 years. Egg laying occurred from May through July. Nests were dug in sandy soil and usually resembled undisturbed ground. Females often urinated on the nest before and after filling it (Paterson 1971). Clutch size varied from 2 to 14 eggs (mean of 5 eggs) (Grant 1936, Ernest and Barber 1972). Larger females generally had larger clutches. Forage must be sufficient to allow females to accumulate energy reserves for egg production (Turner et al. 1986). Tortoises were able to increase egg production in years of good rainfall by increasing the number of clutches (Turner et al. 1984). The quality and quantity of available food was also important in clutch success (Mayhew 1968).

Incubation varies from 90 to 120 days in the wild, and eggs hatch between August and October. Observations by Luckenbach (1982) indicated that hatchlings spent little time on the soil surface. They dug or found an existing burrow, and began dormancy shortly after hatching, ignoring food and water. Occasionally, the eggs over-wintered and hatched in the spring. Peak tortoise activity usually coincided with the abbreviated period of annual bloom in the spring. Luckenbach (1982) considered this spring bloom to be critical to tortoise survival and reproduction.

The six proposed GWEN node sites are in the Amargosa Valley. The habitat is a predominantly Mojave Desert Shrub community dominated by creosote (*Larrea tridentata*) and bursage (*Ambrosia dumosa*). No new annual forbs were present on the sites when they were surveyed in March, despite recent rains. Galleta grass is present at CGS-4, which was heavily grazed (80-90%) by cattle the previous year. The CGSs are located on level land and there are no major washes found on the sites. The soil is primarily sandy with a veneer of gravel on the surface.

Through the Bureau document entitled *Desert Tortoise Habitat Management on Public Lands; A Rangewide Plan* (Spang et al. 1988), the Bureau was directed to categorize all tortoise habitat into three categories based on: (1) Importance of the habitat to maintaining viable populations; (2) resolvability of conflicts; (3) tortoise density; and (4) tortoise population status (stable, increasing, or decreasing). Criteria used to categorize public lands as category I habitat include: (1) Habitat is essential to the maintenance of large viable populations; (2) conflicts are resolvable; (3) a medium to high density population exists or is contiguous with a medium or high density tortoise population; and (4) tortoise population is increasing, stable, or decreasing. Criteria used to categorize public

lands as category II habitat include: (1) Habitat is essential to the maintenance of viable populations; (2) most conflicts are resolvable; (3) a medium to high density population exists or is contiguous with a medium or high density tortoise population; and (4) the tortoise population is stable, or decreasing. Criteria used to categorize public lands as category III habitat include: (1) Habitat is not essential to the maintenance of viable populations; (2) most conflicts are not resolvable; (3) a low to medium density population exists that is not contiguous with a medium or high density tortoise population; and (4) the tortoise population is stable, or decreasing.

The goal for management of public lands within category I habitat is to maintain stable, viable populations; protect existing tortoise habitat values; and increase tortoise populations. The goal for management of public lands within category II habitat is to maintain stable, viable tortoise populations and halt further declines in tortoise habitat values. The goal for management of public lands within category III habitat is to limit tortoise habitat loss and population declines by mitigating impacts. The proposed installation of this site will disturb approximately 11 acres of category III habitat. None of the sites is in a Tortoise Management Area or Potential Tortoise Management Area, as identified by the Clark County Short-Term Habitat Conservation Plan for the Desert Tortoise (Regional Environmental Consultants 1991).

Roads and powerlines exist near sites CGS-1 and CGS-2. Other developments near these sites include a building complex 1 mile north of CGS-1 and a graded loop road immediately adjacent to CGS-1 and CGS-2. Habitat surrounding CGS-1 and CGS-2 is relatively undisturbed. Habitat surrounding CGS-3, CGS-4, and CGS-5 is considerably disturbed. Sites CGS-3 and CGS-5 are adjacent to private residences and a small garbage pit. Site CGS-4 is adjacent to a school, fair grounds, and a former agricultural field. Habitat adjacent to CGS-6 is relatively undisturbed, but there is extensive agricultural activity 1 mile to the south and west of that site.

The six proposed sites were surveyed for tortoises by a contracted tortoise biologist in March 1991. Spring rains preceded the survey period. The consultant searched for tortoises or their sign along 10-meter-wide transects walked across the proposed sites. The consultant completely surveyed the six CGS sites, proposed access roads, and service corridors. Zones of influence, at 10, 100, 200, 400, and 800 yards from the perimeter of the CGSs were also surveyed. The habitat was described as containing a low to moderate density of tortoises.

No live tortoises were found during the survey. However, tortoise sign was found in sites CGS-1 and CGS-2 and in the zones of influence of CGS-1, CGS-2 and CGS-6. The majority of sign (5 burrows, 1 pallet) was found at CGS-1. One burrow and 12 pallets were found in the zones of influence for CGS-1. Two of the burrows on CGS-1 were in good condition, indicating use by tortoises during the last year. Two burrows and pallets were found in CGS-2, and two burrows and pallets were found in its zones of influence. An inactive pallet was found on CGS-6. No tortoise sign was found on CGS-3, CGS-4, or CGS-5.

The Bureau has surveyed tortoises along transects in Amargosa Valley and reported that tortoises in this valley occur in low densities in a scattered distribution. The heterogeneous habitat in the area may explain the uneven distribution of tortoise sign among the surveyed sites. Also, levels of human activity on CGS-1 and CGS-2 are considerably less than on the other sites. The highest potential to impact the tortoise could come from development of CGS-1 or CGS-2, compared to the other sites.

Effects of the Proposed Action on the Listed Species

All potential GWEN relay node sites occur in desert habitat which supports a tortoise population of medium to low density. The GWEN relay node could disturb approximately 11 acres of relatively undisturbed desert tortoise habitat. Approximately 3 acres would be temporarily disturbed during construction activities, and 8 acres would be permanently disturbed by the installation of the GWEN relay node system and construction of an access road (approximately 0.05 acres) to the site. Construction of a ground plane around the tower by burying wires would result in habitat unusable by tortoises.

Tortoises may be directly and/or indirectly taken due to development of the GWEN relay node site unless preventive and protective measures are implemented prior to, during, and after the site is used by the Air Force. Tortoises located within the CGSs will be moved prior to surface disturbance. Additional tortoises may be harmed by collisions with vehicles because of increased traffic on roads when installation and operation of the site begins, and the access road is maintained. Because access to the site will be facilitated by maintained roads, tortoises and habitat adjacent to the project area may be indirectly taken during operation of the station by activities such as vandalism, off-road driving, and dumping. Tortoises, especially juveniles, may also be indirectly taken by raven predation. Ravens are attracted to the trash generated by human activity (Bureau of Land Management 1990, Berry 1985).

The Service does not anticipate the impacts related to construction and operation of the GWEN relay node site to appreciably reduce the likelihood of survival and recovery of the desert tortoise in the wild. The removal and relocation of wild tortoises existing on this project site represents a small impact to the wild Mojave Desert tortoise population, when total tortoise numbers and geographical extent are considered. The protective and/or mitigative measures offered by the Air Force will minimize the adverse impacts of this project to the resident tortoise population.

Cumulative Effects

Cumulative effects are those effects of future non-Federal (State, local government, or private) activities on endangered and threatened species or critical habitat that are reasonably certain to occur during the course of the Federal activity subject to consultation. Future Federal actions are subject to the consultation requirements established in section 7 of the Act, and are not considered cumulative to the proposed action.

The action area associated with this project is the Amargosa Valley, which is primarily Federal land. Any future activities on Federal lands in the valley will be subject to section 7 consultation pursuant to the Act. Certain actions on Federal lands, such as livestock use in unauthorized areas or at unauthorized levels, off-highway use not associated with organized events, and dumping, are difficult to control and may contribute to continued habitat loss and degradation.

Actions on private lands will continue to contribute to habitat degradation and loss. Clark County has developed a short-term Habitat Conservation Plan (HCP) for the desert tortoise in Las Vegas Valley and a portion of Eldorado Valley, Clark County, Nevada (Regional Environmental Consultants 1991), which is required as part of the application documentation for a section 10(a)(1)(B) permit for incidental take under the Act. A section 10(a)(1)(B) permit was issued on July 24, 1991. This 3-year permit will apply to desert tortoises found on private property within a specified portion of Clark County. All non-Federal construction activities in specified portions of Clark County must conform to the conditions set forth in the HCP to ensure compliance with section 9 of the Act. The HCP provides, among other stipulations, a $550 per-acre fee to compensate for the loss of habitat. These funds would be used to carry out provisions of the HCP which may include securing desert tortoise habitats outside the urban areas of Clark County, and funding management and research. Clark County is proceeding with preparation of a long-term HCP and will apply for a second section 10(a)(1)(B) permit, which if approved, would become effective at the end of the 3-year permit. This second permit will apply to incidental take of tortoises on private property throughout Clark County.

Incidental Take

Section 9 of the Act, as amended, prohibits any taking (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behaviors such as breeding, feeding, or sheltering. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to, and not intended as part of the agency action, is not considered a prohibited taking provided that such taking is in compliance with this incidental take statement. The measures described below are nondiscretionary and must be undertaken by the agency or made a binding condition of any grant or permit issued to the applicant, as appropriate.

Based on the results of the tortoise surveys, the Service anticipates that the following take could occur as a result of the activities associated with the installation and operation of the GWEN relay node site. The level of anticipated take is based on the density of tortoise burrows and other sign observed during the surveys.

1. Prior to surface disturbance, two (2) tortoises, and one (1) nest, containing an undeterminable number of eggs, may be taken in the form of harassment through the removal of tortoises or eggs: (a) excavated from burrows or nests, and/or (b) found above ground within the proposed 11-acre site or access and service roads.

2. One (1) tortoise and one (1) nest containing an undeterminable number of tortoise eggs may be taken in the form of direct mortality through accidental death during any phase of the GWEN relay node operation (including vehicles on the access road).

3. A total of 8 acres of tortoise habitat on Federal or private lands may be taken in the form of permanent disturbance and 3 acres may be taken in the form of temporary disturbance during the installation of the GWEN relay node.

Reasonable and Prudent Measures

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the incidental taking authorized by this Biological Opinion:

1. Measures shall be taken to ensure compliance with all conditions required within this Biological Opinion.

2. Measures shall be implemented to minimize take of tortoises from activities related to the installation or operation of the GWEN relay node site.

3. Measures shall be implemented to minimize take of desert tortoise habitat from activities related to the installation or operation of the GWEN relay node site.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Air Force must comply with the following terms and conditions which implement the reasonable and prudent measures described above:

1. To implement reasonable and prudent measure number 1, the following terms and conditions shall be implemented:

   a. The Air Force shall designate an individual or individuals as a contact representative who will be responsible for overseeing compliance with the terms and conditions contained in this Biological Opinion and provide coordination with the Service.

   b. All employees (Air Force and contractors) shall be informed, through an educational program, of the occurrence of the desert

tortoise in the project area and of the threatened status of the species. They shall be advised as to: (1) The definition of "take" and potential penalties (up to $25,000 in fines and 6 months in prison) for taking a species listed as threatened under the Endangered Species Act; and (2) the terms and conditions included in this Biological Opinion. The Service shall review the program prior to its implementation.

2. To implement reasonable and prudent measure number 2, the following terms and conditions shall be implemented:

   a. The outer fences around the tower and equipment complexes shall be tortoise-proof. The permanent tortoise-proof fences shall consist of 36-inch wide, 1-inch mesh hardware cloth, of which 12 inches are buried and 24 inches extend above ground, firmly attached to a chain-link or stock fence with a minimum height of 4 feet. In areas where conditions preclude burying the hardware cloth, the fence shall be constructed so clearance between the ground and the bottom edge of the hardware cloth is maintained.

   b. There shall be a qualified tortoise biologist working with each group of heavy equipment used to construct the outer fences. The tortoise-proof fencing will be inspected at least once every month to ensure that it is intact, and that zero clearance between the ground and the bottom of the fence is maintained.

   c. Following installation of tortoise-proof fences and prior to any surface-disturbing activities, biologists trained in tortoise-handling protocol shall thoroughly search the fenced area for tortoises, using techniques providing 100-percent coverage. All tortoise burrows, and other species' burrows which may be utilized by tortoises, will be examined, with a fiber-optic scope if necessary, to determine occupancy of each burrow by tortoises. All areas will be searched completely three times, unless no tortoises are located after two complete searches.

   d. Tortoises and nests found within 500 feet of the inside of the fence shall be removed by a qualified tortoise biologist and released out of harm's way into undisturbed Federal habitat no more than 1,000 feet from the fence, in accordance with Appendix A. Burrows will be excavated by hand to allow removal of any tortoise and eggs contained therein. Tortoises removed from the project shall be placed in the shade of a shrub or in a natural unoccupied burrow similar to the hibernaculum in which it was found, or in an artificially constructed burrow following protocol provided in Appendix A. The definition of "take" includes capture. Therefore, any unauthorized person who removes a tortoise from its natural habitat could be found guilty of take. Tortoises shall be moved solely for the purpose of moving them out of harm's way. Tortoises collected from further than 500 feet from the inside of the fence

shall be provided to the Dewey Transfer Facility in Las Vegas. Payment of the fee for the transfer of tortoises to the Dewey Transfer Facility shall be the responsibility of the Air Force.

e. A tortoise biologist will accompany each group of heavy equipment used outside a fenced area, such as in road construction.

f. After the fenced areas are cleared of tortoises and the road is constructed, a tortoise biologist shall remain on call. If a tortoise is found during construction activities, all activity will cease until the tortoise is removed by a tortoise biologist in accordance with Appendix A.

g. All vehicles utilizing the access roads associated with the GWEN relay node shall be driven at speeds not to exceed 15 miles per hour, except during emergencies.

h. All access roads into the GWEN relay node site requiring maintenance or repair with heavy equipment or large trucks shall be inspected for desert tortoises and their burrows prior to initiation of the work. The inspection shall be conducted by a qualified desert tortoise biologist and shall provide 100-percent coverage of the repair area no more than 1 day prior to initiation of the needed work. Tortoises and tortoise burrows found within the repair area shall be protected from harm. Any take of tortoises must be within the limits established by this Biological Opinion.

i. A litter control program shall be implemented during GWEN relay node construction and operation. The program shall include covered trash receptacles, prompt removal, and proper disposal offsite to avoid attracting ravens.

3. To implement reasonable and prudent measure number 3, the following term and condition shall be implemented:

a. The Air Force shall designate a representative responsible for overseeing compliance with the protective stipulations for the desert tortoise and providing coordination between the Air Force and the Service.

b. Prior to surface-disturbing activities, the Air Force shall provide $2982 as mitigation for the permanent loss of 8 acres, and temporary loss of 3 acres of tortoise habitat associated with the installation of the GWEN relay node. The mitigation rate is based on $324 per acre of habitat permanently lost and $130 per acre temporarily lost, but will be indexed for inflation based on the Bureau of Labor Statistics Consumer Price Index beginning January 1, 1992.

These funds shall be directly deposited into Desert Tortoise Habitat Conservation Fund Number 236-8290, administered by Clark County, for the purpose of securing tortoise management areas, habitat enhancement, and tortoise research. Clark County is serving as the administrator (banker) of these funds required by the Service through section 7 consultations. Clark County receives no benefit from administering these funds. None of these funds shall be used to develop the Clark County Desert Tortoise HCP. These funds are independent of any other fees collected by the county for desert tortoise conservation planning. These funds shall be held in an interest-bearing account, and the accrued interest also shall be expended on desert tortoise conservation measures. Proposed expenditures shall be approved by the Service. Should funds not be expended on desert tortoise conservation measures approved by the Service within two (2) years of their placement in the county fund, these funds shall be transferred to the Nature Conservancy for such purposes.

Total payment must be made prior to any surface-disturbing activity on Federal land in order for the Air Force to be in compliance with the provisions of the Act. Payment shall be by certified check or money order payable to Clark County, and delivered to:

Clark County
Department of Administrative Services
225 Bridger Avenue, 6th Floor
Las Vegas, Nevada 89155
(702) 455-3530

The payment shall be accompanied by a cover letter from the payee that identifies the project and the Biological Opinion that is requiring the payment, the amount of payment enclosed, and the check or money order number. The cover letter shall also identify the name and address of the payee, the name and address of the Federal agency responsible for authorizing the project, and the name and address of the Service office issuing the Biological Opinion. This information will be used to notify the payee, the authorizing Federal agency, and the Service that the payment has been received.

b. All habitat disturbance shall be restricted to areas identified in this Biological Opinion; i.e., relay node site, and access and service roads. All equipment and materials shall be stored within the boundaries of these areas or within previously disturbed areas. All vehicle traffic shall be restricted to existing access roads to, and around, the GWEN relay node site.

Reporting Requirements

Sick or injured desert tortoises shall be delivered to Dewey Transfer Facility in Las Vegas, Nevada, or any other qualified veterinarian for appropriate treatment or disposal. Care must be taken in handling sick or injured animals to ensure effective treatment and care. Upon locating dead, injured, or sick desert tortoises, initial notification must be made to the Reno Field Office and the Service's Division of Law Enforcement, Special Agent Edward Dominguez, in Las Vegas, Nevada, at telephone number (702) 388-6380. Dead tortoises suitable for preparation as museum specimens shall be frozen immediately and provided to an institution holding appropriate Federal and State permits per their instructions. Should no institutions want the tortoise specimen, or if the specimen is too damaged (i.e., crushed, spoiled, etc.) for preparation as a museum specimen, then the specimen may be cremated or buried in the desert. In conjunction with the care of sick or injured tortoises, or the preservation of biological materials from a dead tortoise, the the Air Force has the responsibility to ensure that information relative to the date, time, and location of the tortoise when found, and the possible cause of injury or death of each tortoise be recorded and provided to the Service.

The Air Force shall notify this office of all tortoises killed, injured, or removed from this parcel within 3 days of each occurrence. Within 1 month of removing tortoises, the Air Force will provide the Service with a report detailing all tortoise-related activities undertaken due to the installation of the GWEN relay node site. This will include activities of wildlife biologists, actual numbers of tortoises accidentally injured or killed, number of tortoises removed from the site, disposition of tortoises removed, and which candidate site was developed.

If, during the course of action, the amount or extent of the incidental take limit is reached, the Air Force shall immediately notify the Service in writing. If the incidental take limit is exceeded, the Air Force must immediately cease the activity resulting in the take and reinitiate consultation with the Service to avoid violation of section 9 of the Act. Operations must be stopped in the interim period between the initiation and completion of the new consultation if it is determined by the Service that the impact of the additional taking will cause an irreversible and adverse impact on the species as required by 50 CFR 402.14(i). The Air Force shall provide an explanation of the causes of the taking.

Conservation Recommendations

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations have been defined as Service suggestions regarding discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, or regarding development of information. The recommendations provided here relate only to

the proposed action and do not necessarily represent complete fulfillment of your agency's section 7(a)(1) responsibility for this species.

1. Because no tortoise sign was found on CGS sites 3, 4, or 5, construction of the GWEN relay node should occur on one of these, instead of CGS sites 1, 2, or 6.

2. Because a significant percentage of the habitat occupied by the desert tortoise is on Federal lands, the Air Force should conduct a cumulative effects analysis of its actions on the desert tortoise throughout its range on Air Force lands. This program could include development of a model to assess the effects of past, ongoing, and future projects on the tortoise and its habitat through use of the Geographic Information System.

In order for the Service to be kept informed of actions that either minimize or avoid adverse effects, or that benefit listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

Conclusion

This concludes formal consultation on the proposed installation and operation of a GWEN relay node site in southern Nevada by the Air Force as outlined in your September 30, 1991, request. As required by 50 CFR § 402.16, reinitiation of formal consultation is required if: (1) The amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action that may impact listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action.

We appreciate the assistance and cooperation of your staff during this consultation process. If we can be of further assistance, please contact Mark Maley or Randy McNatt at (702) 784-5227.

Sincerely,

David L. Harlow

David L. Harlow
Field Supervisor

Attachment

cc:
HCP Coordinator, Southern Nevada Project Office, The Nature Conservancy, Las Vegas, Nevada
Director, Nevada Department of Wildlife, Reno, Nevada
Regional Manager, Nevada Department of Wildlife, Las Vegas, Nevada
District Manager, Bureau of Land Management, Las Vegas district, Las Vegas, Nevada.
State Director, Bureau of Land Management, Reno, Nevada
Chief, Division of Endangered Species, Fish and Wildlife Service, Washington, D.C.
Senior Resident Agent, Division of Law Enforcement, Fish and Wildlife Service, Reno, Nevada
Special Agent, Division of Law Enforcement, Fish and Wildlife Service, Las Vegas, Nevada
Field Supervisor, Fish and Wildlife Service, Phoenix, Arizona
Field Supervisor, Fish and Wildlife Service, Salt Lake City, Utah
Field Supervisor, Fish and Wildlife Service, Ventura, California
Field Supervisor, Fish and Wildlife Service, Laguna Nigel, California
Assistant Regional Director, Fish and Wildlife Enhancement, Fish and Wildlife Service, Portland, Oregon (AFWE-EHC) Attn: Richard Hill
(all w/o atch)

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Appendix A

Desert Tortoise Handling and Overwintering Procedures

(Note: Much of the information contained herein was obtained from Chapter III, *Protocols for Handling Live Tortoises*, in the *Interim Techniques Handbook for Collecting and Analyzing Data on Desert Tortoise Populations and Habitats*. This handbook is a cooperative effort between federal and state agencies. Primary editor is Dr. Cecil Schwalbe of the University of Arizona, Tucson, Arizona. The information on handling tortoise eggs was developed by the Reno Field Office in consultation with Dr. Schwalbe, Betty Burge of Las Vegas, Nevada, and the Service's Ventura Field Office.

1. All desert tortoises shall be handled carefully. This includes lifting the animal slowly, fully supporting the animal in an upright position, and completing various measurements in the minimum amount of time. A tortoise can be damaged or die of intestinal torsion. If a tortoise must be turned over on its back, this should be done gently. The field worker shall turn the tortoise over by carefully rolling it over on its side, then to its back, returning the tortoise to the upright position by rolling it back in the same direction. The tortoise shall not be rolled end over end, side over side, or spun.

   Blows, butting, or overturning can fatally damage tortoises. Females are particularly at risk because they may develop egg yolk-peritonitis if their eggs are broken and yolk seeps into their peritoneal cavity. Handling of potentially gravid females shall be done very carefully.

   To prevent hyperthermia on warm days, a tortoise must be kept in the shade (of the field worker, a pack, other equipment, etc.) except during photography. Tortoises shall not be weighed, measured, etc. when air temperatures exceed 90°F (32°C) at 1.5 m (4.9 ft) above ground unless measures are taken to insure the animal does not overheat. Tortoises shall be placed in shaded areas during handling. If the animal will be held for a longer period, it shall be kept individually in a clean, previously unused cardboard box and placed in a shaded, cool location. The tortoise shall be returned to the site of capture or relocation at sunrise on the following day. CAUTION! TEMPERATURES ARE MUCH HIGHER NEARER THE GROUND. Take extreme caution to avoid overheating a tortoise whenever surface temperatures exceed 86°F (30°C). Shield the bulb of the thermometer from direct solar radiation and wind when measuring temperatures.

2. Because of the threat of Upper Respiratory Tract Disease Syndrome (URTD), all tortoises shall be handled so as to minimize the chances of spreading the disease, even if URTD has not been documented in a given locality. All personnel handling tortoises must be initially trained using protocols developed by Dr. Cecil Schwalbe of the University of Arizona. These protocols will minimize the spread of URTD.

All personnel handling tortoises shall wear disposable latex or plastic gloves to prevent transmission of diseases among tortoises. Not more than one tortoise shall be handled with each pair of gloves. All equipment that comes in contact with any tortoise shall be sterilized before it is used on another tortoise. For example, triangular files for notching, calipers for measuring shell length, rules, and other equipment should be sterilized by soaking in 95% isopropyl or ethyl alcohol for at least 20 minutes before using on another tortoise. A 25% solution of chlorine bleach may also be used, but bleach is extremely corrosive and may damage many types of equipment. Wooden rules shall not be used; they are difficult to sterilize because of the porosity of the wood. Use metal or plastic rules instead.

To avoid sterilizing spring scales or weighing straps prior to weighing each tortoise, use individual "T-shirt" bags, the plastic bags with two handles that are used to bag groceries. The handles of the bag can be used to suspend the tortoise from the scale during weighing.

The field worker's clothes shall be changed completely, including shoes, before visiting other tortoise sites. Dr, Schwalbe defines a site as follows: "As a general rule, a single valley or desert mountain range would be considered one site, unless there were special circumstances, such as URTD confirmed in one part of a valley, but not thought to occur in other parts of that valley. In such an instance, a change of clothes would be necessary before visiting other parts of that valley. " Always visit the site with known occurrence of URTD last to minimize the chance of spreading the disease. Vehicle undercarriages and tires shall be washed when travelling between sites where URTD is known or suspected to occur. The field worker is not required to wash vehicles if there are no confirmed reports of URTD on a study site. The field worker shall consider that wet soil carrying microbes will adhere to vehicles, and such microbes are less likely to die before a new study area is visited. It is advisable to wash a vehicle after driving in wet soil if feasible.

When transported by vehicle or confined, each tortoise shall be contained in a newly-purchased, clean cardboard box of an appropriate size. Boxes shall be discarded after use. Tortoises shall never be placed in automobile trunks or on floorboards in an unconfined manner. Tortoises shall never be placed in the bed of a truck over the catalytic converter as this area of the metal bed may become extremely hot. Tortoises must not be left unattended in vehicles; this measure is intended to eliminate accidental mortality caused by overheating. Truck beds and floorboards must be padded and travel shall be at speeds which eliminate unnecessary vibrations.

3. Tortoises found actively moving on the surface, and to be removed from the project site, shall be released between 150 and 1000 feet from the outer boundary of the project area nearest the capture point. Relocated tortoises shall be placed under a shrub in the shade. Tortoises shall be monitored at the release site until they exhibit normal behavior.

Should the capture occur late in the day so the animal will not have sufficient time to find a suitable burrow for the night, the tortoise shall be placed in a clean cardboard box as described above. It shall be held in an appropriate place, safe from predators and danger of hyperthermia, until release can occur in the morning.

4. Tortoises removed from burrows (for approved removal from the project site and release into the wild) between November 1 and March 15, shall be transported in cardboard boxes to the approved over-wintering site. Each tortoise shall be placed in an artificial burrow within a fenced enclosure with one tortoise per enclosure. Each enclosure must be separate from adjacent pens so that one tortoise can not place its head or limbs through the fence and physically contact a tortoise in an adjacent enclosure. Fencing does not need to be buried but shall be stable enough to prevent escape of tortoises.

   The main chamber of the burrow shall be constructed of plywood, and the roof placed approximately 2.5 feet below the soil surface. The burrow's tunnel shall be eight to 10 feet long with a gentle slope (e.g., about 4:1). The tunnel shall be stabilized on the top with PVC pipe cut in half. The pipe shall be no smaller than 15 inches in diameter, and soil shall be used to adjust tunnel to tortoise size. After placement of the tortoise in the burrow, the entrance of the tunnel shall be partially blocked with loose topsoil.

   The weight of excavated tortoises will be compared to the weight regressions developed by Dr. Michael Weinstein for the tortoises at the Honda project. If a tortoise is determined to be underweight, the tortoise shall be placed in a room at a temperature of 90° to 100°F and allowed to soak in fresh water for 2 to 3 hours. After rehydration and drying, the tortoise shall be cooled to hibernation temperature slowly and placed in an artificial burrow. This procedure shall be implemented only by persons instructed in this manner of treatment.

   Beginning in February, activity of the tortoises within the artificial burrows shall be monitored to determine an appropriate release time. Tortoises shall be released in the morning hours when temperatures are conducive to activity. The appropriate time for release will probably occur in the third week of March.

   Each tortoise shall be released between 150 and 1000 feet from the outer boundary of the project area nearest the capture point. Released tortoises shall be placed under a shrub in the shade. Releases shall occur at a temperature that is suitable for activity, with a reasonable expectation that the temperature will remain within the tortoise's thermal preference long enough for the tortoise to adjust to its surroundings. Tortoises shall be monitored at the release site until they are exhibiting normal behavior. To facilitate this measure, each tortoise must be accompanied by one of the approved biologists. There shall be no mass releases of animals.

5. Tortoise eggs shall be moved to artificial nests either in the wild or at an approved facility. Biologists must receive special training in the procedures outlined below, but such training can be obtained after a nest is actually found. If this is done, the nest shall be carefully covered with soil so as not to move the eggs and protected until on-site training is provided. The responsible Federal agency shall ensure that this training is made available.

Nests shall be carefully excavated by hand at a time of day when the air temperature 6 inches above the ground is approximately equal to the soil temperature adjacent to the eggs. Immediately upon finding a nest, use of large tools shall be discontinued, and the biologist shall use his or her hands to carefully excavate the nest. Before disturbance of nest contents, each egg shall be gently marked with a small dot on the top using a felt-tipped pen to establish the egg's orientation in the nest. When nest contents are handled, eggs must be maintained in their original orientation at all times. Because egg shells become extremely fragile in the last few weeks before hatching, special care shall be taken with eggs found between August and mid-October. Because these eggs are very fragile, some may break during handling. This will be lethal to egg contents. Such an accident can be expected to occur until techniques are developed to avoid this type of incident. Broken eggs shall be buried nearby and left in the field, or the contents preserved and provided to qualified researchers.

The biologist shall measure and record the depth of the nest below the soil surface, the location of the nest in relation to any adjacent shrub (ie, whether on the north, south, east, or west side of the shrub), the species of shrub and its approximate foliage volume, and the soil type. Place approximately one inch of soil from the nest area in a bucket and carefully transfer the eggs to the bucket, maintaining the orientation of the eggs. Cover the eggs with soil that is free of cobbles and pebbles, to a depth equivalent to that of the original nest.

If good tortoise habitat is available in the general area, the eggs shall be relocated between 150 to 1,000 feet from outer boundary of the project site. Prepare a nest with the same depth, orientation, location in relation to the same shrub species, and in the same soil type as the original nest. Carefully transfer the eggs, maintaining their original orientation, to the new nest. The eggs shall be replaced so that they touch one another. Gently cover the eggs with soil, from which cobbles and pebbles have been removed, so that all the air spaces around the eggs are filled. Relocated nests in the wild shall be monitored by a qualified biologist. The monitoring program shall be developed in consultation with the Service.

If a suitable site for a new nest is not available in the wild, the eggs shall be prepared for incubation in a suitable holding facility. Place a small amount of soil in a bucket and transfer the eggs to the bucket

using the technique specified above, making sure the eggs are touching one another. Carefully fill the bucket to the depth of the original nest, but leave the top of the soil layer 3 inches below the rim of the bucket so that hatchlings cannot escape. Bury the bucket in soil in a safe location at an approved holding facility.

The biologist shall record in detail all the procedures used in moving eggs. Personnel caring for incubating eggs at a facility shall maintain a record of where the eggs were found, method of incubation, length of time and conditions under which the eggs were incubated, observations of eggs during the incubation period, information about hatchling health and behavior, and disposition of the hatchlings.

6. Should any deviation from the procedures outlined above be necessary, the approved biologist shall contact the Fish and Wildlife Service as soon as possible.

7. A final report, containing all the information noted above and including release information, must be supplied to the Service and the responsible Federal agency within one month of the final releases or disposition of tortoises.

BOB MILLER
Governor

STATE OF NEVADA

ROLAND D. WESTERGARD
State Historic Preservation Officer

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF HISTORIC PRESERVATION AND ARCHEOLOGY
Capitol Complex
Carson City, Nevada 89710
(702) 687-5138

June 1, 1990

Major Robert T. Veale, USAF
Deputy Program Manager, GWEN
Department of the Air Force
Headquarters Electronic Systems Division (AFSC)
Hanscom Air Force Base, MA 01731-5000

Dear Major Veale:

This letter is in response to your request for comments on a preliminary site evaluation report for six sites under consideration for the location of a Ground Wave Emergency Network relay node in southern Nevada. We've checked the National Register of Historic Places and our files; properties listed on or determined eligible for inclusion in the Register are not located at any of the six sites. None of the sites have been surveyed for archeological or historic properties.

Archeological surveys on the Nevada Test site have revealed a long and varied record of prehistoric occupation. Little work, however, has been conducted near Lathrop Wells and we know little about prehistoric utilization of the valley. As per 36CFR800.4, the Division recommends a professional archeologist survey the preferred site or sites and document survey findings in a report to be submitted to us for review.

If you have any questions on what is needed or how to proceed, please call me.

Sincerely,

Alice M Baldrica

ALICE M. BALDRICA, Deputy
State Historic Preservation Officer

/AMB

BOB MILLER
Governor

STATE OF NEVADA

PETER G. MORROS
Director

RONALD M. JAMES
State Historic Preservation Officer

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF HISTORIC PRESERVATION AND ARCHEOLOGY

123 W. Nye Lane, Room 208
Capitol Complex
Carson City, Nevada 89710
(702) 687-5138

October 30, 1991

Lt. Colonel Stephen T. Martin, USAF
Program Manager, GWEN
Dept. of the Air Force
Headquarters Electronic Systems Division
Hanscom Air force Base, MA 01731-5000

Dear Lt. Col. Martin:

I have reviewed an addendum to the cultural resources report (BLM CRR 5-2116p) resulting from an intensive archeological survey of six candidate *GWEN communications* sites in Amargosa Valley, Nye County, Nevada. The addendum documents the identification of a segment of the Las Vegas to Bullfrog State Route in the area of potential effect. No other historic properties were identified in any of the six GWEN candidate sites.

The route, which your agency and the Bureau of Land Management consider eligible for inclusion in the National Register of Historic Places, lies nearest (within 1.5 miles) to the proposed Hernstadt GWEN site (CGS-4). Your agency and the BLM have determined that the construction of the facility at this location would constitute no adverse effect to the historic stage line. At the other five sites, construction would not require further consultation and the project would not effect properties listed on or determined eligible for inclusion in the National Register.

I concur with your determination that construction of a GWEN facility at CGS 1, 2, 3, 5 or 6 would have no effect on National Register listed or eligible properties. However, the Division would require additional information on the location of the facility at CGS-4 (photographic simulations, color scheme of the tower) prior to concurring with a determination of no adverse effect.

If you have any questions regarding what is needed please call me.

Sincerely,

ALICE M. BALDRICA, Deputy
State Historic Preservation Officer

cc: Keith Myhrer, Bureau of Land Management
Daniel Rutledge, SRI International

BOB MILLER
Governor

STATE OF NEVADA

RONALD M. JAMES
State Historic Preservation Officer

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF HISTORIC PRESERVATION AND ARCHEOLOGY
123 W. Nye Lane, Room 208
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Carson City, Nevada 89710
(702) 687-5138

December 18, 1991

Colonel Stephen T. Martin
Headquarters Electronic Systems Division (AFSC)
Department of the Air Force
Hanscom Air Force Base, MA 01731-5000

Dear Colonel Martin:

The Division has received your correspondence dated Nov. 22, 1991 and the GWEN tower photographs. After reviewing the photographs and your letter, the Division concurs with the Air Force that construction of the proposed relay node on the Hernstadt site (CGS-4) would constitute No Adverse Effect upon the Las Vegas to Bullfrog Stage Route near that GWEN site.

Sincerely,

Alice M. Baldrica

Alice M. Baldrica, Deputy
State Historic Preservation Officer

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
LAS VEGAS DISTRICT OFFICE
4765 VEGAS DRIVE
P.O. BOX 26569
LAS VEGAS, NEVADA 89126

TAKE PRIDE IN AMERICA

IN REPLY REFER TO

8100
(NV-054)

MAR 14 1991

Lt. Col. Steven Martin
Program Manager
GWEN
Department of Air Force
Electronics Systems Division, AFSC
Hanscom AFB, MA 01731-5000

Dear Lt. Col. Martin:

I have reviewed Cultural Resources Report 5-2116(P)/ARSN 4-10-1a authored by Kevin Rafferty of Archaeological Research of Southern Nevada. The document describes the results of A Class III inventory of six locations for the Air Force Ground Wave Emergency Network project in Amargosa Valley, Nye County, Nevada. The report meets Federal and Nevada BLM guidelines and is accepted without changes.

The Area of Potential Effect for the six locations totals 87 acres. Three of the proposed communication sites, CGS-4, CGS-5 and CGS-6, with a total of 38 acres, are situated on lands managed by BLM. Site CGS-3 is on private lands within the block of BLM land holdings. The two remaining sites are on lands managed by DOE. No cultural resources were found on the communication site locations on BLM or private lands, consequently, there will be no effect to cultural resources on BLM lands as a result of this proposed project.

Sincerely,

for Ben Collins
District Manager

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
LAS VEGAS DISTRICT OFFICE
4765 VEGAS DRIVE
P.O. BOX 26569
LAS VEGAS, NEVADA 89126

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

8100
(NV-050)

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Lt. Col. Steven Martin
Program Manager - GWEN
Department of the Air Force
Electronics System Division. AFSC
Hanscom AFB, MA 01731-5000

Dear Lt. Col. Martin:

I have reviewed the addendum to Cultural Resource Report 5-2116(P)/ARSN 4-10-2 authored by Kevin Rafferty of Archaeological Research of Southern Nevada. The document describes the recordation and assessment of a portion of the Las Vegas-Bullfrog historic stagecoach road (26NY7810/BLM 53-5860), and recordation of a glass scatter (26NY7811/BLM 53-5861) and an isolated artifact (26NY7812/BLM 53-5862) that may have been associated with use of the road. The result of the new assessment revises the initial inventory report and determination of no effect for the project on BLM-managed lands, stated in my previous letters dated 3/14/91 and 4/18/91.

Three historic segments were located. Historic research supports the assumption that two of the segments (LVB-1 and 2 on Map 3:page 4 of the report) are remnants of the Las Vegas to Bullfrog stagecoach road. A lack of historical references to the segment designated as LVB-3, which has been totally disturbed, as an exact route of the Las Vegas-Bullfrog road indicated to the recording archaeologist it may have been the portion of a later route. Using the evaluation guidance in Nevada BLM Technical Report 17 (Myhrer *et al.* 1990) on the archaeology of the Old Spanish Trail/Mormon Road, portions of each segment were rated. A 1.5 mile portion of segment LVB-1 was rated as relatively undisturbed (Map 6:page 20), a 0.5 mile portion of LVB-1 as totally disturbed, portions of segment LVB-2 as both totally disturbed and partially disturbed, and all of segment LVB-3 as totally disturbed.

The portion of segment LVB-1 rated as relatively undisturbed is considered to retain sufficient integrity to qualify for eligibility for nomination to the National Register of Historic Places (NRHP) under 36 CFR 60.4 (a):associated with the historic ranching and mining development of southern Nevada. The remaining portion of segment LVB-1 and segments LVB-2 and LVB-3 do not retain sufficient integrity and are not eligible for nomination to the NRHP.

The project area locations for CGS #3 and #5 are at least 1.5 miles from the eligible portion of segment LVB-1 and placement of the towers would have no affect on the cultural resource. In contrast, the northeast corner of the project area for CGS #4 is adjacent to the relatively undisturbed segment. Access to the location would be from the northwest corner of the parcel along an existing road, heading north along the west boundary of Section 14 (Map 6:page 20 of the report). The eligible portion of the road would be physically avoided, but construction of the tower would have an effect on its visual setting (36 CFR 60.4).

The following evaluation reflects discussions among Keith Myhrer, BLM Area Archaeologist, Alice Baldrica of the Nevada State Historic Preservation Office, and Daniel Rutledge of SRI. Although placement of the proposed tower would have an effect on the visual integrity of the eligible portion of the Las Vegas to Bullfrog Road, it would not be adverse. The isolated tower would be located adjacent to an existing road and would compose a relatively minimal intrusion on the visual horizon. Construction and maintenance would require only a few personnel. The tower would also be located at the north end of the eligible portion of the trail, providing an opportunity for an unobstructed view of the road when walking southeast.

In summary, the 1.5 portion of segment LVB-1 of the Las Vegas to Bullfrog stagecoach road (26NY7810 / BLM 53-5860) is considered eligible for nomination to the NRHP. Based on the argument that the tower would have a minimal affect on its visual integrity, there would be no adverse effect to the eligible portion of the historic road. The no effect evaluation for the project on BLM-managed lands stated in my letter of 4/18/91 has been revised to a no adverse effect determination. If you have any questions please call Keith Myhrer at (702) 647-5079.

Sincerely,

BEN F. COLLINS
Ben Collins
District Manager

cc: Pat Barker (NV-932)

Daniel Rutledge
Research Analyst
Environmental Assessment Program
SRI International
333 Ravenswood Ave.
Menlo Park, CA 94025

Alice Baldrica
Division of Historic Preservation
and Archaeology
123 West Nye Lane, Room 208
Carson City, Nevada 89710

United States Department of the Interior

FISH AND WILDLIFE SERVICE
FISH AND WILDLIFE ENHANCEMENT
RENO FIELD OFFICE
4600 Kietzke Lane, Building C-125
Reno, Nevada 89502-5093

May 27, 1992

File No.: 1-5-92-SP-211
1-5-92-SP-229
1-5-92-SP-230

Lt. Col. Stephen T. Martin
Program Manager, GWEN
Department of the Air Force
Hanscom Air Force Base, Massachusetts 01731

Dear Lt. Col. Martin:

Subject: Species List for the Proposed Ground Wave Emergency Network (GWEN) Project in Northeastern Nevada

As requested by your letter dated April 23, 1992, we have attached a list of the threatened and endangered species that may be present in the subject project area (Attachment A). To the best of our knowledge, no proposed species occur within the area. This list fulfills the requirement of the Fish and Wildlife Service (Service) to provide a species list pursuant to section 7(c) of the Endangered Species Act of 1973, as amended (Act). Please reference the species list file number shown on Attachment A in all subsequent correspondence. A list of published references dealing with the distribution, life history, and habitat requirements of the listed species is also attached (Attachment C). This information may be helpful in preparing the biological assessment for this project, if one is required. Please see Attachment B for a discussion of the responsibilities Federal agencies have under section 7(c) of the Act and the conditions under which a biological assessment must be prepared by the lead Federal agency or its designated non-Federal representative.

If you determine that a listed species may be affected by the proposed project, you should initiate consultation pursuant to 50 CFR § 402.14. Informal consultation may be utilized prior to a written request for formal consultation to exchange information and resolve conflicts with respect to a listed species. If a biological assessment is required, and it is not initiated within 90 days of your receipt of this letter, you should informally verify the accuracy of this list with our office. If, through informal consultation or development of a biological assessment, or both, you determine that the proposed action is not likely to adversely affect the listed species, and the Service concurs in writing, then the consultation process is terminated and formal consultation is not required.

Lt. Col. Stephen T. Martin

Also, for your consideration, we have included a list of the candidate species that may be present in the project area (Attachment A). These species are currently being reviewed by the Service and are under consideration for possible listing as endangered or threatened. Candidate species have no protection under the Act, but are included for your consideration as it is possible that one or more of these candidates could be proposed and listed before the subject project is completed. Should the biological assessment reveal that candidate species may be adversely affected, you may wish to contact our office for technical assistance. One of the potential benefits from such technical assistance is that, by exploring alternatives early in the planning process, it may be possible to avoid conflicts that could otherwise develop, should a candidate species become listed before the project is completed.

Please contact Robin Hamlin at (702) 784-5227 if you have any questions regarding the attached list or your responsibilities under the Act.

Sincerely,

David L. Harlow

David L. Harlow
Field Supervisor

Attachments

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES THAT MAY OCCUR IN THE AREA OF THE PROPOSED

GWEN Project near Lathrop Wells, Nevada

File Number: 1-5-92-SP-229

Listed Species

Reptiles		
T	desert tortoise	Gopherus ag[illegible]izii

(T)--Threatened

Candidate Species

Mammals		
2	pygmy rabbit	Brachylagus idahoensis
2	spotted bat	Euderma maculatum
Birds		
2	ferruginous hawk	Buteo regalis
2	loggerhead shrike	Lanius ludovicianus
Reptiles		
2	chuckwalla	Sauromalus obesus
Plants		
2		Camissonia megalantha
2		Cymopterus ripleyi saniculoides
2	white margined penstemon	Penstemon albomarginatus
2	Amargosa penstemon	Penstemon fruticiformis amargosae
2	Beatley phacelia	Phacelia beatleyae

(2)--Category 2: Taxa for which existing information indicated may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

United States Department
of the Interior
Fish and Wildlife Service
Reno Field Station
Attn: Mr David L. Harlow
4600 Kietzke Lane, Building C-125
Reno, NV 89502-5093

RE: U.S. Air Force Ground Wave Emergency Network (GWEN) Project in Southern Nevada

---

This is to verify that no changes have been made to the list of federally-designated threatened, endangered, or candidate species sent on May 27, 1992.

David L. Harlow _____ Date _____

Changes have been made to the list of federally-designated threatened, endangered, or candidate species since our correspondence to you on May 27, 1992. Enclosed is a new list of species.

X David L. Harlow

David L. Harlow Jan 13 1993
Date

United States Department of the Interior

FISH AND WILDLIFE SERVICE
FISH AND WILDLIFE ENHANCEMENT
RENO FIELD OFFICE
4600 Kietzke Lane, Building C-125
Reno, Nevada 89502-5093

January 13, 1993
File No. 1-5-92-SP-211-AMD
1-5-92-SP-229-AMD
1-5-92-SP-230-AMD

Lt. Col. Stephen T. Martin
Program Manager, GWEN
Department of the Air Force
Hanscom AFB, Massachusetts 01731

Dear Lt. Col. Martin:

Subject: Species List for the Proposed Ground Wave Emergency Network (GWEN) Project in Nevada

This responds to your letter dated December 17, 1992, requesting an updated list of threatened and endangered species that may be present within the subject project area. Enclosed are amended lists for the proposed Tuscarora, Lathrop Wells, and Reese River Valley project sites in Nevada.

Please contact Robin Hamlin at (702) 784-5227 if you have any questions regarding the enclosed list or your responsibilities under the Act.

Sincerely,

David L. Harlow
Field Supervisor

Enclosures

cc:
SRI International, Menlo Park, California (Attn: Louise Forbush)

CANDIDATE SPECIES THAT MAY OCCUR IN THE AREA OF THE PROPOSED

GWEN Project near Lathrop Wells, Nevada

File Number: 1-5-92-SP-229 AMD

Listed Species

Reptiles		
T	desert tortoise	*Gopherus agassizii*

(T)--Threatened

Candidate Species

Mammals		
2	spotted bat	*Euderma maculatum*
Birds		
2	black tern	*Chlidonias niger*
2	western least bittern	*Ixobrychus exilis hesperis*
2	loggerhead shrike	*Lanius ludovicianus*
2	white-faced ibis	*Plegadis chihi*
Reptiles		
2	chuckwalla	*Sauromalus obesus*
Invertebrates		
2	Large aegialian scarab beetle	*Aegialia magnifica*
2	Rulien's miloderes weevil	*Miloderes rulieni*
Plants		
2	Cane Spring evening primrose	*Camissonia megalantha*
2	sanicle biscuitroot	*Cymopterus ripleyi* var. *saniculoides*
2	white-margined penstemon	*Penstemon albomarginatus*
2	Amargosa penstemon	*Penstemon fruticiformis* ssp. *amargosae*
2	Beatley phacelia	*Phacelia beatleyae*

(2)--Category 2: Taxa for which existing information indicates may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

APPENDIX D

GLOSSARY

GLOSSARY

Abbreviations and Units of Measure

AM	Amplitude Modulation
ATU	Antenna tuning unit
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
Btu	British thermal unit
BUPG	Back-up power group
CGS	Candidate GWEN site
dBA	Decibels on the A-weighted scale, which is a measure of the intensity of the sounds people can hear
DOE	Department of Energy
EA	Environmental Assessment
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement; in this document, the term refers to the FEIS for the GWEN Final Operational Capability that was released in September 1987 by the U.S. Air Force, Electronic Systems Division, Hanscom Air Force Base, Massachusetts

FEMA	Federal Emergency Management Agency
FIA	Federal Insurance Agency
FICWD	Federal Interagency Committee for Wetland Delineation
FOC	Final Operational Capability, the third phase of development of GWEN
FONSI	Finding of No Significant Impact
GPO	Government Printing Office
GWEN	Ground Wave Emergency Network
HEMP	High-altitude electromagnetic pulse
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning, the formal review process for the EA
kHz	Kilohertz
LF	Low frequency
mg/l	Milligrams per liter
MSL	Mean sea level
µg/l	Micrograms per liter
NAC	Nevada Administrative Code
NDOT	Nevada Department of Transportation

NOAA	National Oceanic and Atmospheric Administration
NRC	National Research Council, the principle operating agency of the National Academy of Sciences and the National Academy of Engineering
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Act
PAWS	Potential areawide sites; the portion(s) of an SSA left after application of those siting criteria that do not require a field survey, such as the location of national and state parks
PCGS	Potential candidate GWEN site; any site that is identified from roadside surveys as suitable for further investigation
PGS	Preferred GWEN site; the CGS identified by the Government that represents the Government's preferred location for a relay tower
PGSR	Preferred GWEN Site Report
PSER	Preliminary Site Evaluation Report
SCS	Soil Conservation Service
SHPO	State Historic Preservation Officer; the person responsible for administering the National Historic Preservation Act at the state level, reviewing National Register of Historic Places nominations, maintaining data on historic properties that have been identified but not yet nominated, and consulting with federal agencies concerning the impacts of proposed projects on known and unknown cultural resources

SSA	Site search area; the 250-square-mile area within which four to six CGSs are identified; the SSA is the area within a 9-mile radius of a set of nominal coordinates in the network design. It is used as a manageable range in which to conduct siting investigations
TLCC	Thin Line Connectivity Capability; the second phase of development of GWEN
UHF	Ultrahigh frequency (band); specifically 300 to 3,000 megahertz
USAF	United States Air Force
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VMC	Visual Modification Class

Definitions

Air pollutant	An atmospheric contaminant, particularly the 15 atmospheric contaminants specified in federal and most state regulations
Alluvium	Clay, silt, sand, gravel, or similar detrital material deposited by running water
Anaerobic	Occurring in the absence of free oxygen

Anasazi	A prehistoric Native American group, best known for their fine pottery and unique cliff dwellings, that existed in the southwest region of the United States 700 to 1,550 years ago. The Virgin Anasazi was the subgroup that lived along the Virgin River
Aquifer	A water-bearing stratum of permeable rock, sand, or gravel
Block faulting	A type of normal faulting in which the earth's crust is divided into structural or fault blocks of different elevations and orientations. The process by which block mountains are formed
Caliche	A crust of calcium carbonate that forms on the stony soil of arid regions
Candela	A unit of measure of the intensity of light equal to the brightness of one candle
Class III cultural inventory	A BLM designation for a professionally conducted continuous intensive survey of the entire area of potential effect. The goal is to locate and record all cultural resources having exposed indications in the potential area of effect
Cultural resource	Prehistoric, Native American, and historic sites, districts, buildings, structures, objects, and any other physical evidence of past human activity
Dendritic	A branching tree-like configuration
Ecotone	The transition area between two ecological communities that usually exhibits some characteristics of both communities

Evaluative criteria	Applied to portions of a potential siting area for a GWEN facility to determine its suitability. Areas that rank low against evaluative criteria may be excluded from consideration, or given a low priority in the site selection process
Exclusionary criteria	Criteria used to eliminate or exclude highly sensitive areas or areas that do not meet the limits of acceptable performance from consideration for GWEN facilities
Federal jurisdictional wetland	As defined in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (GPO 1989-236-985/00336), a wetland is a class of habitats distinguished by the presence of saturation to the surface or standing water during at least 1 week of the growing season (wetland hydrology), a soil type characteristic of saturated or poorly drained conditions (hydric soils), and the predominance of plants that only or mostly occur on wet sites (hydrophytic vegetation)
Floodplain	Land adjacent to a river that is commonly covered by water during high flow periods
Forb	An herb other than grass
Fugitive dust	Wind-blown dust
Ground plane	A part of the antenna system consisting of buried copper wires that extend radially from the base of a GWEN tower for a distance of approximately 330 feet
Historic properties	For purposes of this EA, historic properties are those aboveground structures and resources that are listed or eligible for listing on the National Register of Historic Places

Hydric soil	A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part
Limy	A soil condition of high lime content
Paleonto-logical	Pertaining to fossils or the study of fossils
Paleozoic era	Geologic period of time from 245 million to 570 million years ago
Pallet	Shallow, individual summer holes used by the desert tortoise
pH	A measure of acidity in which the lower the number, the more acid the substance; 7 represents neutrality
Precambrian era	Geologic period of time that preceded the appearance of hard-bodied, multicellular life forms more than 570 million years ago
Prime farmland	Land that contains soils having high crop production either naturally or through modification; the U.S. Soil Conservation Service is responsible for designating prime farmland
Quaternary period	Geologic period of time from 2 million years ago to the present
Richter scale	A commonly used seismic intensity scale, based on readings from a seismograph, which was developed in 1935
Scat	Animal dung

Sedimentary rock	Rock formed by the consolidation of particles deposited by water or wind
Shear zone	A tabular zone of rock that has been crushed and broken by many parallel fractures due to shear strain
Tertiary period	Geologic period of time from 2 million to 66 million years ago
Top-loading element	Portions of the GWEN antenna that extend diagonally from the top of the tower, which strengthen the signal and provide additional structural support, like guy wires
Tortoise sign	Evidence of tortoise activity such as burrows, pallets, tracks, scat, feeding sites, courtship rings, and drinking sites
Wash	A broad, usually dry, shallow bed of an intermittent stream, occasionally swept by a torrent of water; a term common in the southwestern United States
Zone of influence	The area where desert tortoises on adjacent lands may be directly or indirectly affected by project exploration, construction, maintenance, operation, monitoring, dismantlement, enhancement, and abandonment

APPENDIX E

AGENCIES CONTACTED OR CONSULTED

AGENCIES CONTACTED OR CONSULTED

Federal

U.S. Department of Agriculture
- Soil Conservation Service

U.S. Department of Energy,
- Nevada Operations Office

U.S. Department of Interior
- Bureau of Indian Affairs
- Bureau of Land Management, Las Vegas District
- Fish and Wildlife Service, Reno Field Office

State

Nevada Department of Conservation and Natural Resources
- Division of Environmental Protection
  - Air Quality Section
- Division of Historic Preservation and Archaeology
- Division of State Parks

Nevada Department of Transportation

Nevada Department of Wildlife

Nevada Natural Heritage Program

University of Nevada, Reno
- Mackey School of Mines

Local

Armagosa Valley Town Advisory Council

Nye County Planning Department

Native American Groups

Chemeheuvi Tribal Council

Colorado River Indian Tribes

Las Vegas Indian Center

Moapa Cultural Committee

Moapa-Paiute Tribal Council

Moapa Band of Paiutes