# MOODY AIR FORCE BASE

# DIGITAL AIRPORT SURVEILLANCE RADAR

# ENVIRONMENTAL ASSESSMENT

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## EXECUTIVE SUMMARY

This environmental assessment (EA) has been completed as part of the National Environmental Policy Act (NEPA) process, in compliance with U.S. Air Force (USAF) instruction AFI 32-7061. According to this instruction, the EA provides analysis sufficient to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI) and to aid federal agencies in complying with NEPA when no EIS is required.

This EA describes the proposed project to install a Digital Airport Surveillance Radar (DASR) at Moody Air Force Base (AFB) in Georgia. This proposed action is part of the Department of Defense (DoD) National Airspace System (NAS) Program, which involves installation of new air traffic control equipment on U.S. Army, U.S. Navy, and USAF bases throughout the country. DoD NAS is a component of the aviation system capital investment plan developed by the Federal Aviation Administration (FAA) to modernize approach control systems in the United States and its territories.

The NAS program will comprehensively upgrade air traffic control systems infrastructure by systematically replacing analog systems with state-of-the-art, digital technology. The purpose of the DASR component of the NAS program is to detect and process aircraft position and weather conditions at airfields. The DASR system will use the ASR-11 radar to accurately locate aircraft, in terms of range, azimuth, and altitude; provide information regarding aircraft identification code; identify emergency conditions; and report six discreet weather precipitation levels. The ASR-11 at Moody AFB is needed to replace the older existing AN/GPN-20 Airport Surveillance Radar.

The DASR facilities at Moody AFB would consist of: primary and secondary radar electronics, rotating antenna, 87-foot tower, utility cabling, an uninterrupted power supply, an emergency generator, power conditioning, electronic equipment grounding systems, a fuel storage system, foundations for the ASR-11 antenna tower, equipment shelter, and engine generator shelter, an unpaved access road, fencing, and security systems. Facility construction would be within a 0.45 acre site (140 feet by 140 feet), including a concrete pad foundation for an equipment shelter and antenna, a 1,000 gallon above-ground fuel storage tank for the emergency generator, and miscellaneous site improvements (minor re-grading and installation of geotextile fabric beneath six inches of crushed stone). If needed, facility construction may extend up to 160 feet by 160 feet to allow for gradual site grading upon project completion. Once the new DASR system is operational, the existing AN/GPN-20 will be dismantled and structures will be razed. The ground would be reclaimed by Moody AFB.

Six areas were initially identified and evaluated as potential ASR-11 sites. Three sites were eliminated primarily due to conflicts with operational criteria. The three remaining alternative sites on Moody AFB have been identified as potential locations for the ASR-11, based on operational, construction, and environmental siting criteria contained in the *National Airspace System Digital Airport Surveillance Radar Siting Plan* and the Moody AFB Final Site Survey Report. The three remaining sites (4, 5, and 6) were evaluated in this EA.

Site 4 is on Moody AFB in an industrial/aircraft operations and maintenance area located between the hush houses and Davis Street. Site 5 is also located in an industrial/aircraft operations and maintenance area within a grassy triangle between Werewolf Run, Lancers Lane, and Davis Street. While both Site 4 and Site 5 are located in areas known to contain subsurface contamination, only Site 5 is designated as an IRP site. Site 6 is located in the southwest corner of the base, west of State Route 125, near the intersection of Beatty Road and George Register Road, along the fringe of the base golf course. Site 6 is also located near on-base military family housing and off-base civilian housing.

If excavation were to reach the groundwater level at Site 4 or Site 5, monitoring and potentially treatment of water may be required due to the subsurface contamination present at these sites; however, the required depth of excavation for the ASR-11 facility is not anticipated to reach groundwater depth and no impacts resulting from installation in these areas are expected. Further, no compounds with concentrations above risk-based values are expected to be encountered in the surface or subsurface soils at these sites; therefore soil contamination does not represent a concern at either site.

Installation of the ASR-11 facility at any of the alternative sites would result in the permanent clearing of vegetation within the approximately 140-foot by 140-foot area, and along the access routes to the facility. The clearing would result in minimal long-term impacts for all sites. However, each of the three sites would also require the clearing and pruning of trees within a radius of approximately 2000 feet from the ASR-11 location in order to provide an adequate line of sight. Tree removals would be required initially, before facility operation, and long-term maintenance of tree heights surrounding the future ASR-11 site would continue through the life of the facility. Tree removals for Site 4 and Site 5 would occur entirely on base property. Tree removals required for Site 6 would occur both on base and privately-owned property. The anticipated tree removals and continued maintenance in the vicinity of Site 6 would result in impacts to the aesthetic characteristics of the surrounding area.

Issues that must be addressed during construction at any of the sites are elevated noise levels, increased dust, traffic and access disruption, aesthetic effects, site stability, and groundwater and storm water management issues. Potential impacts in these areas would be reduced using standard mitigation measures as outlined below:

- During the construction period, sheeting or supports of some kind may be used in the areas excavated for the tower footings and utility trenches in order to prevent collapse of these excavated areas.
- Groundwater levels would be monitored and maintained as necessary.
- To minimize noise impacts during construction, mufflers would be used on construction equipment and vehicles. Noise barriers may also be used to reduce noise levels. These barriers would have the benefit of providing a visual buffer.
- All equipment and vehicles used during construction would be maintained in good operating condition so that emissions are minimized, thus reducing the potential for air quality impacts.
- Dust will be controlled onsite by using water to wet down disturbed areas.
- All areas disturbed for the DASR system construction would be seeded with a grass mixture or covered with a geotextile fabric and crushed stone to stabilize the disturbed soils, in order to minimize the potential for erosion and sedimentation.
- All hazardous materials used during construction of the ASR-11 would be handled and disposed of in accordance with Moody AFB policies and protocols and all applicable state and federal regulations.
- Traffic management measures will be developed to facilitate traffic flow and pedestrian access.

Potential future impacts associated with operation of the ASR-11 facility would be minimized through use of mitigation measures including the following:

- All hazardous materials used during operation of the ASR-11 would be handled and disposed of in accordance with Moody AFB policies and protocols and all applicable state and federal regulations.
- Due to the potential for RFR hazards during operation, warning signs, indicating the safe distance from the operating radar, would be installed at the facility perimeter.

All three sites are acceptable from an environmental perspective, however Site 6 is less preferable than Sites 4 and 5 due to anticipated aesthetic impacts to the base golf course and nearby off-base residences. The presence of subsurface contamination at Site 4 and Site 5 is not anticipated to present difficulties for construction or operation of an ASR-11 because neither installation nor operation will require excavation or disturbance at the depths where the most substantial contamination is known to be found. Table ES-1 provides a summary of the potential environmental impacts associated with each of the alternative sites. The Air Force has selected Site 5 as the preferred ASR-11 location; however, this EA identifies potential impacts associated with placing the ASR-11 at each of the alternative sites equally.

**Table ES-1. Environmental Impact Summary Matrix for the Alternative ASR-11 Sites at Moody AFB**

| Category | No Action Alternative | Existing AN/GPN-20 Removal | Site 4 | Site5 | Site 6 |
|---|---|---|---|---|---|
| **Land Use** | **No Impact** | Land currently occupied by the AN/GPN-20 could be reclaimed by Moody AFB. | ASR-11 compatible with existing land use | | ASR-11 presence and construction may disrupt surrounding recreational and residential land uses. |
| **Socioeconomics** | No Impact | Installation of ASR-11 and dismantling of AN/GPN-20 both expected to have short-term minor contributions to the local economy; no long-term impacts are expected. | | | |
| **Utilities and Transportation** | No Impact | No impacts to utilities anticipated. Minor short-term impacts are possible to on-base traffic during dismantling. | In general, Site 5 appears to be the closest site to existing utilities, followed by Site 4 and then Site 6 being the furthest and the resulting impacts are expected to be greater as the distance from existing utilities increase. Minor short-term impacts to on-base traffic are possible at Site 4 and Site 5 due to construction and utility trenching. Impacts to traffic at Site 6 anticipated to be greater due to a greater distance required for utility trenching which would require the crossing of State Route 125. Construction of ASR-11 at Site 6 would also involve trenching within and across residential and recreational areas. | | |
| **Noise** | No Impact | Installation of ASR-11 and dismantling of AN/GPN-20 both expected to result in short-term noise impacts due to construction activities. Operation of the ASR-11 system would not generate excessive or persistent levels of noise, therefore no long-term impacts are anticipated. | | | |
| **Air Quality** | Short term impacts from removal of existing AN/GPN-20 and installation of ASR-11 expected to consist of dust generation from construction activities and anticipated to be minimal, however moderate impacts are anticipated at Site 6 due to a greater area expected to be disturbed through utility trenching and the location of sensitive receptors proximate to site (residential and recreational land use). Long term impacts associated with all alternatives consist of evaporative loss from aboveground storage tank and emissions from on-site emergency generator; however, neither sources are anticipated to represent a substantial impact to air quality. | | | | |
| **Geology and Soils** | No Impact | No Impact | No Impact | No Impact | No Impact |
| **Surface Water and Groundwater** | No Impact | No surface water resources are located proximate to sites and no construction or dismantling activities are expected to encounter groundwater. | | | No surface water resources are located proximate to site however groundwater may be encountered during late winter or early spring if excavation were to occur during this time period. |
| **Biological Resources** | Future maintenance of tree heights in radar line-of sight expected | No Impact | Immediate and future maintenance of tree heights in radar line-of-sight would be required at all sites, however maintenance for Site 4 and Site 5 would occur entirely on base property whereas Site 6 would require tree height maintenance on privately owned property. | | |
| **Aesthetic Resources** | No Impact | No Impact | No Impact | No Impact | Short and long-term impacts to surrounding residential and recreational land uses |
| **Cultural Resources** | No known cultural resources exist within or near existing or proposed radar locations, therefore no impacts are anticipated. | | | | |
| **Pollution Prevention and Hazardous Waste** | Hazardous materials used during operation of facility will continue being handled in compliance with all applicable regulations and base policies, therefore no impacts are expected. | No Impact | No impacts expected – construction of ASR-11 not anticipated to occur at depths where most substantial contamination is found. Hazardous materials used during operation of facility will be handled in compliance with all applicable regulations and base policies, therefore no impacts are expected. | | Hazardous materials used during operation of facility will be handled in compliance with all applicable regulations and base policies, therefore no impacts are expected. |
| **Electromagnetic Energy** | No impact expected - due to the potential for RFR hazards during operation, warning signs, indicating the safe distance from the existing radar, are installed at the facility perimeter | No Impact | No impacts expected – due to the potential for RFR hazards during operation, warning signs, indicating the safe distance from the operating radar, would be installed at the facility perimeter. | | |

# 1.0 PURPOSE AND NEED FOR ACTION

## 1.1 INTRODUCTION

The National Environmental Policy Act (NEPA; 42 U.S.C. Sections 4321-4347) is the basic national charter for protection of the environment (CEQ, 1978). NEPA establishes policy, sets goals, and provides the process for carrying out the policy and achieving the goals. NEPA procedures were established to ensure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. To implement NEPA, the U.S. Air Force (USAF) has issued internal instruction AFI 32-7061 (USAF, 2000a) that contains policies, responsibilities, and procedures dictating how NEPA should be implemented for USAF projects.

This environmental assessment (EA) has been prepared in compliance with AFI 32-7061. According to this instruction, the environmental assessment is a written analysis which serves to (1) provide analysis sufficient to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI); and (2) aid federal agencies in complying with NEPA when no EIS is required. If this EA were to determine that the proposed project would significantly degrade the environment, significantly threaten public health or safety, or generate significant public controversy, then an EIS would be completed. An EIS involves a comprehensive assessment of project impacts and alternatives and a high degree of public input. Alternatively, if this EA results in a FONSI, then the action would not be the subject of an EIS. The EA is not intended to be a scientific document. The level and extent of detail and analysis in the EA is commensurate with the importance of the environmental issues involved and with the information needs of both the decision-makers and the general public.

The proposed action addressed in this EA is the construction of a Digital Airport Surveillance Radar (DASR; specifically, an ASR-11) at Moody Air Force Base (AFB) in Georgia. This proposed action is part of the Department of Defense (DoD) National Airspace System (NAS) Program, which involves installation of new air traffic control equipment on U.S. Army, U.S. Navy, and USAF bases throughout the country. These radars are also being installed at commercial airports under the authority of the Federal Aviation Administration (FAA). The implementation of the NAS program

at DoD bases was previously evaluated in a programmatic EA and FONSI (USAF, 1995a), which fully detail the need for the program. The programmatic EA and FONSI are available on the internet at http://www.hanscom.af.mil/ESC-BP/pollprev/products.htm. Environmental review at FAA airfields is being conducted separately.

The programmatic EA for the NAS program committed to completing site-specific NEPA documentation tiered from the programmatic EA for individual NAS sites. This EA addresses the site-specific impacts of locating an ASR-11 on Moody AFB, and evaluates the consequences of constructing and operating an ASR-11 on both the natural and man-made environments.

## 1.2 PURPOSE OF THE ACTION

The NAS program was developed to modernize military air traffic control systems in the United States and its territories. DoD NAS is a component of the aviation system capital investment plan developed by the FAA. Pursuant to the Program Management Directive (USAF, 1994a), the DoD must provide services within its delegated airspace which are comparable to the services which FAA provides to civil aircraft in civilian airspace. These services include: flight following, separation, expeditious handling, radar approach control, and landing.

The purpose of the DASR component of the USAF NAS program is to detect and process aircraft position and weather conditions in the vicinity of USAF airfields. The DASR will serve to accurately locate aircraft, in terms of range, azimuth, and altitude; provide information regarding aircraft identification code; identify emergency conditions; and report six discrete weather precipitation levels. The new radar facility will not increase or decrease the current number of flights, change aircraft patterns, or otherwise alter existing base operations.

## 1.3 NEED FOR THE ACTION

The NAS program is comprehensively upgrading air traffic control systems infrastructure by systematically replacing analog systems with state-of-the-art digital technology. The ASR-11 at Moody AFB is needed to replace the existing AN/GPN-20 airport surveillance radar, which was installed around 1995. The ASR-11 will improve system reliability, provide additional weather data, reduce maintenance cost, improve performance, and provide digital data input to proposed new digital automation system air traffic controller displays. The proposed new ASR-11 will take advantage of the significantly increased capabilities of digital technology.

# 2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The proposed action is the installation of an ASR-11 at Moody AFB in Georgia (Figure 2-1) to replace the existing AN/GPN-20 radar facility. The Air Force has selected a preferred site (Site 5) for the radar based on operational and base considerations. Alternatives to the proposed action include no action, or installation of the ASR-11 at an alternative site. The no-action alternative consists of **not** constructing the ASR-11 facility and would involve the continued use of the existing AN/GPN-20 system. Three sites, including Site 5, (Figure 2-2) were identified on Moody AFB, in accordance with the NAS Siting Plan (USAF, 1995a). This EA discusses and evaluates potential impacts associated with the placement of the ASR-11 at each of the three alternative sites and also summarizes the potential impacts associated with the no-action alternative.

## 2.1 PROPOSED ACTION: DASR AT MOODY AFB

### 2.1.1 DASR System

The DASR system would detect and process aircraft position and weather conditions at the airfield. The DASR system would consist of two subsystems: the Primary Surveillance Radar and the Monopulse Secondary Surveillance Radar. The purpose of the subsystems would be to accurately locate aircraft, in terms of range, azimuth, and altitude.

The Primary Surveillance Radar would transmit electromagnetic waves in the form of radio frequency pulses, which backscatter from the surface of aircraft. The radar would measure the time required for an echo to return and the direction of the signal in order to determine the aircraft range and azimuth, respectively. By comparing variations in returned signal parameters, such as phase differences between pulses, the radar could separate moving targets from stationary clutter, such as mountains and trees. The primary radar would also report six discrete weather precipitation levels (from mild to hazardous) via a processing channel dedicated to weather detection and reporting.

The Monopulse Secondary Surveillance Radar (also called the beacon radar) would be a cooperative system consisting of ground-based beacon interrogator/receiver systems and existing aircraft based transponders. The secondary radar would obtain additional information, such as identification code, barometric altitude, and emergency conditions, from an aircraft transponder. Various processing


Source: ESRI

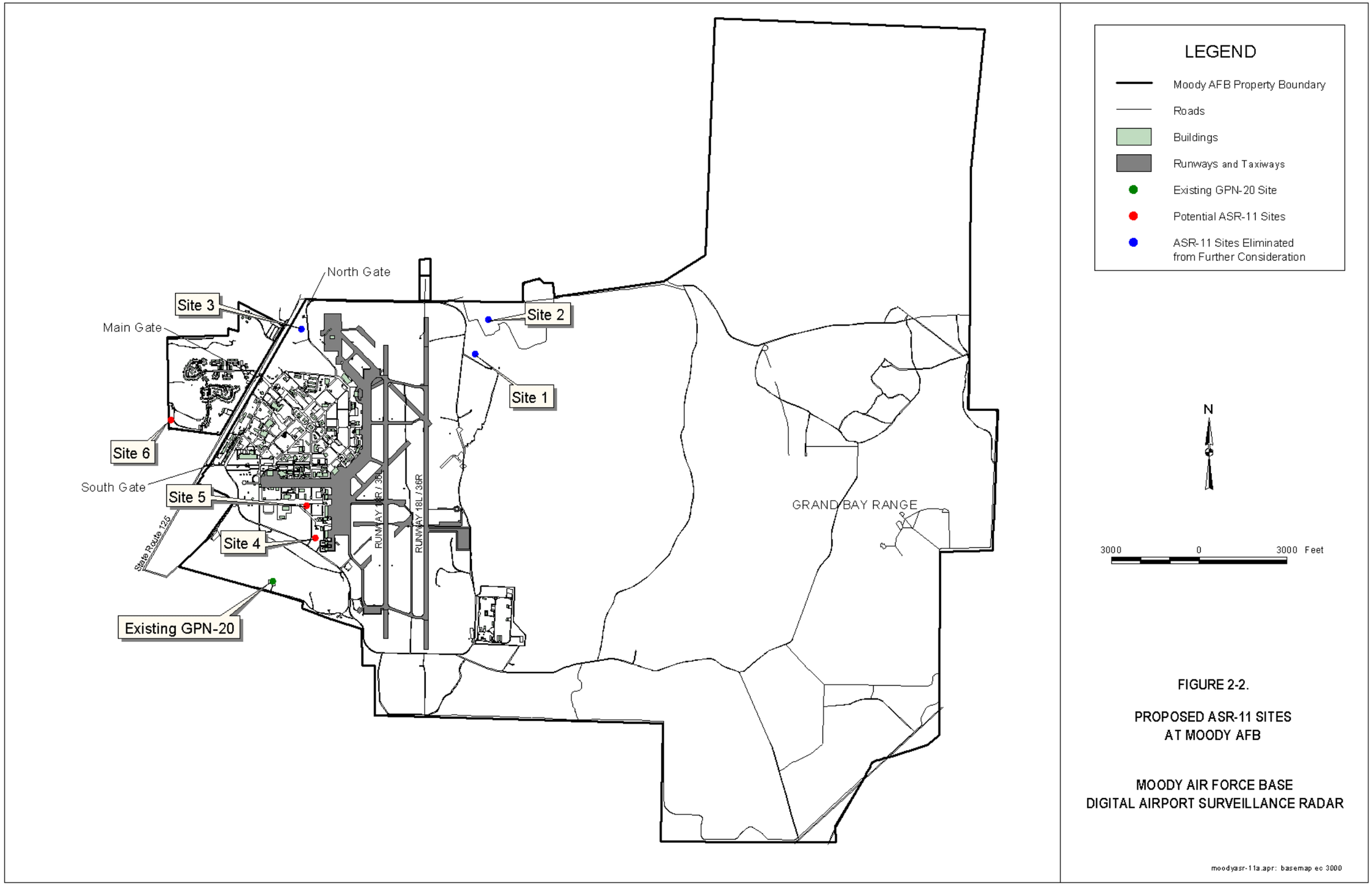
N

40 0 40 Miles

FIGURE 2-1.

MOODY AFB LOCATION MAP

vicinitymap.apr: layout1




Source: Moody AFB

techniques would be used to decipher both overlapping responses from multiple aircraft (synchronous garble) and aircraft responses to other beacon systems (asynchronous interference). The beacon radar would also provide rapid identification of aircraft in distress. The DASR system would provide highly accurate target data to the Moody AFB Local Control Facilities and Military Control Towers. The ASR-11 would have clutter rejection, target accuracy, and probability of detection that are equal to or better than the existing AN/GPN-20.

The DASR facilities at Moody AFB would consist of: primary and secondary radar electronics, rotating antenna, 87-foot tower, utility cabling, an uninterrupted power supply, an emergency generator, power conditioning, electronic equipment grounding systems, a fuel storage system, foundations for the ASR-11 antenna tower, equipment shelter and engine generator shelter, an unpaved access road, fencing, and security systems. Facility construction would be within a 0.45 acre site (140 feet by 140 feet), including a concrete pad foundation for the equipment shelter and antenna (USAF, 2000b), a 1,000 gallon above-ground fuel storage tank for the emergency generator, and miscellaneous site improvements (minor re-grading and installation of geotextile fabric beneath six inches of crushed stone). If necessary, facility construction may extend up to 160 feet by 160 feet to allow for gradual site grading upon project completion.

Depending on the site chosen, approximately 250 to 2,000 feet of utility trenching between the edge of the site and existing duct banks/manholes would be required to connect the ASR-11 to existing electric lines (USAF, 2000). The telephone connections and fiber optic connections may be made in a common utility conduit; however, the new telephone cable may connect to an existing cable at a different location within the utility conduit than the fiber optic connection. Between 2,830 and 5,630 feet of fiber optic cable, depending on the site chosen, would be required to connect the ASR-11 to the new Radar Approach Control (RAPCON).

No new roads would be constructed with the exception of a short driveway to access the radar tower. Once the new DASR system is operational, the existing AN/GPN-20 would be dismantled and structures would be removed to existing grade. Any subsequent below-ground activities (removal of footings, etc.) would be the responsibility of Moody AFB. Upon completion, the ground would be reclaimed by the base.

### 2.1.2 Alternative ASR-11 Sites

Three alternative sites on Moody AFB have been identified as potential locations for the ASR-11, based on the siting criteria contained in the *National Airspace System Digital Airport Surveillance Radar Siting Plan* (USAF, 1995a). The three sites evaluated in this EA were identified based on operational, construction, and environmental criteria. The operational criteria included the following (FAA, 1992):

- The site should not be located closer than 0.5 mile from the end of any existing or planned runway.
- The site should not be located closer than 0.5 mile from any point of required detection coverage.
- The site should not be located closer than 2,500 feet from any existing or planned electronic equipment installation or facility.
- The site should not be located less than 0.5 mile from National Weather Bureau radars and radiosonde equipment.
- The site should not be located closer than 1,500 feet to any above-ground object which would interfere or cause degradation in the ASR-11 operation.

Operational characteristics of the new ASR-11 as compared to the existing AN/GPN-20 are shown in Table 2-1.

Construction criteria included siting the ASR-11 in an area with a slope of less than 20 percent and away from occupied existing structures, railroads, highways, runways and taxiways, or power lines. The environmental criteria for siting included avoiding a number of sensitive resources, including: ecological/wildlife refuges, preserves, conservation areas and sanctuaries; wild and scenic rivers; prime and unique farmlands; historical, archaeological, and cultural sensitive sites; wetlands; threatened and endangered species habitat; designated hazardous waste sites; and floodplains. The details of the siting process are described in the Integrated Site Survey Report prepared by Raytheon Systems Company (USAF, 2000).

**Table 2-1. Comparison of Characteristics of Existing AN/GPN-20 and Proposed ASR-11**

| | Existing AN/GPN-20 | Proposed ASR-11 |
|---|---|---|
| **Frequency** | 2700-2900 MHz | 2700-2900 MHz;<br>2 frequencies separated by at least 30 MHz |
| **Power Peak** | 500 kW (magnetron | 19.5 kW (1 microsec)<br>18.0 kW (89 microsec) |
| **Average** | 875 Watts | 1600 Watts (Solid state) |
| **Pulse Repetition Frequency** | 700-1200 pulses/second | 720-1050 pulses/second |

Sources: U.S. Air Force, 1991a and 1995a

Initial site selection screening criteria applied in September 1999 identified six sites (Sites 1 through 6, Figure 2-2) for consideration at the in-briefing, held October 18, 1999. Sites 1 and 2 are located approximately 1,800 to 2,400 feet from the east end of runway 18L/36R. Sites 1 and 2 were both eliminated from further consideration due to the close proximity to runway 18L/36R, which raised safety concerns for approaching and departing aircraft. While Site 3 was initially chosen as a possible ASR-11 radar location during the October 1999 in-briefing, it was rejected later during a November 24, 1999 teleconference. The base rejected this site due to concern that the antenna structure might be an obstruction to an HH-60 helicopter flyway.

Sites 4, 5, and 6 were selected for further investigation (Figure 2-2; Figures 2-3 through 2-5). Site 4 is located in an industrial area behind the hush houses approximately 2,500 feet northeast of the existing radar. Site 5, which is northeast of the existing radar, is located in an area adjacent to Werewolf Run, across from Building 8401. Site 4 and Site 5 are located within areas known to contain subsurface contamination. Site 6 is located at the edge of the Moody AFB golf course west of the Military Family Housing, along the golf course perimeter road.

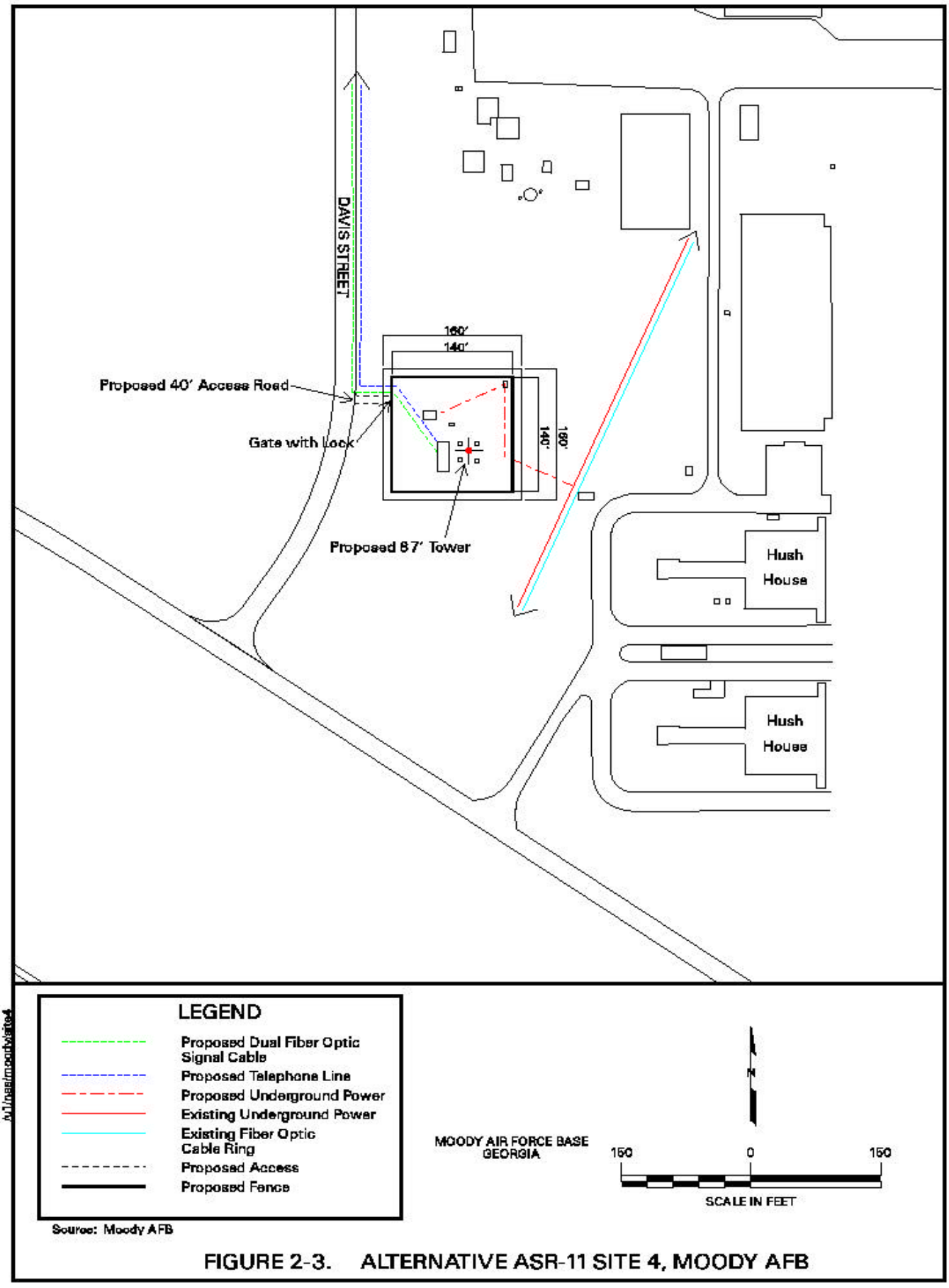
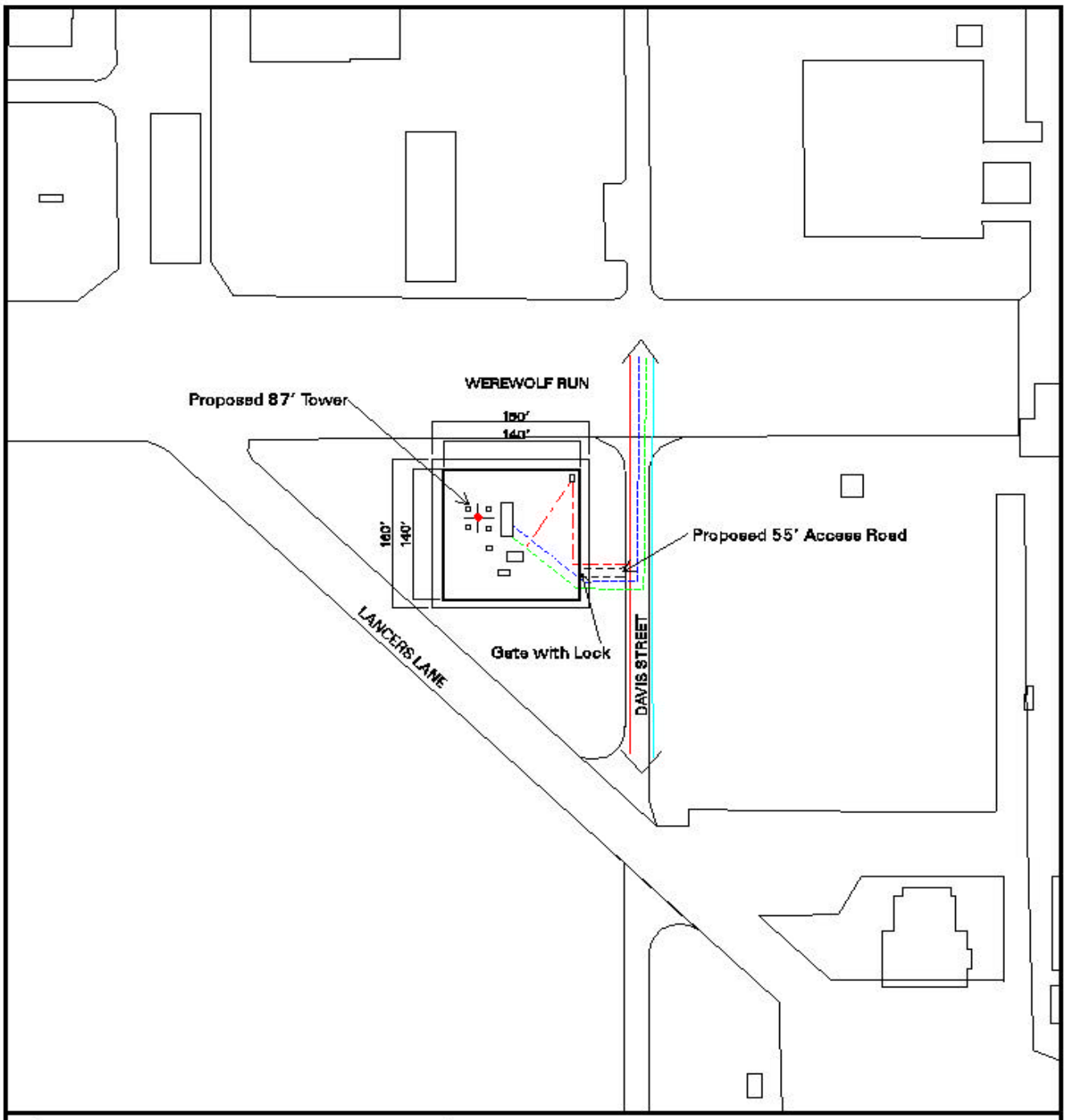



FIGURE 2-3. ALTERNATIVE ASR-11 SITE 4, MOODY AFB



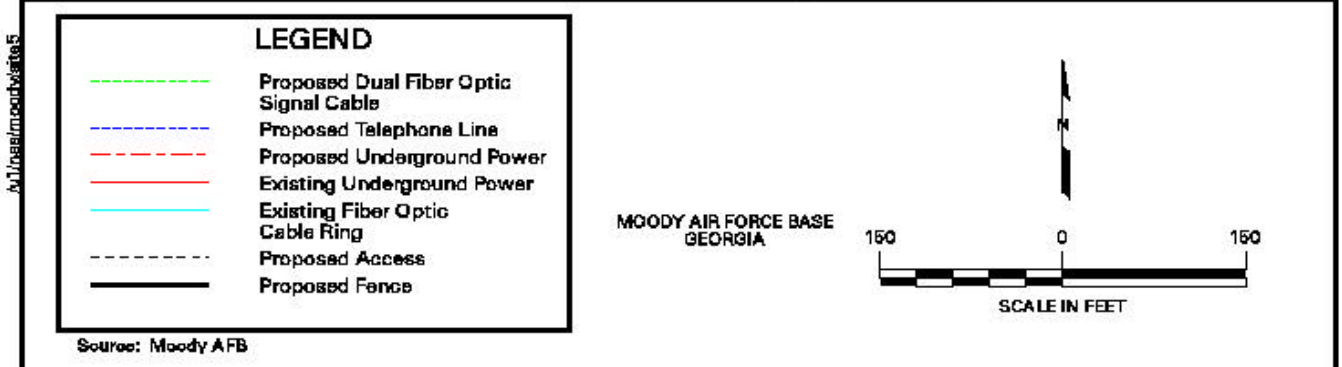




FIGURE 2-4. ALTERNATIVE ASR-11 SITE 5, MOODY AFB

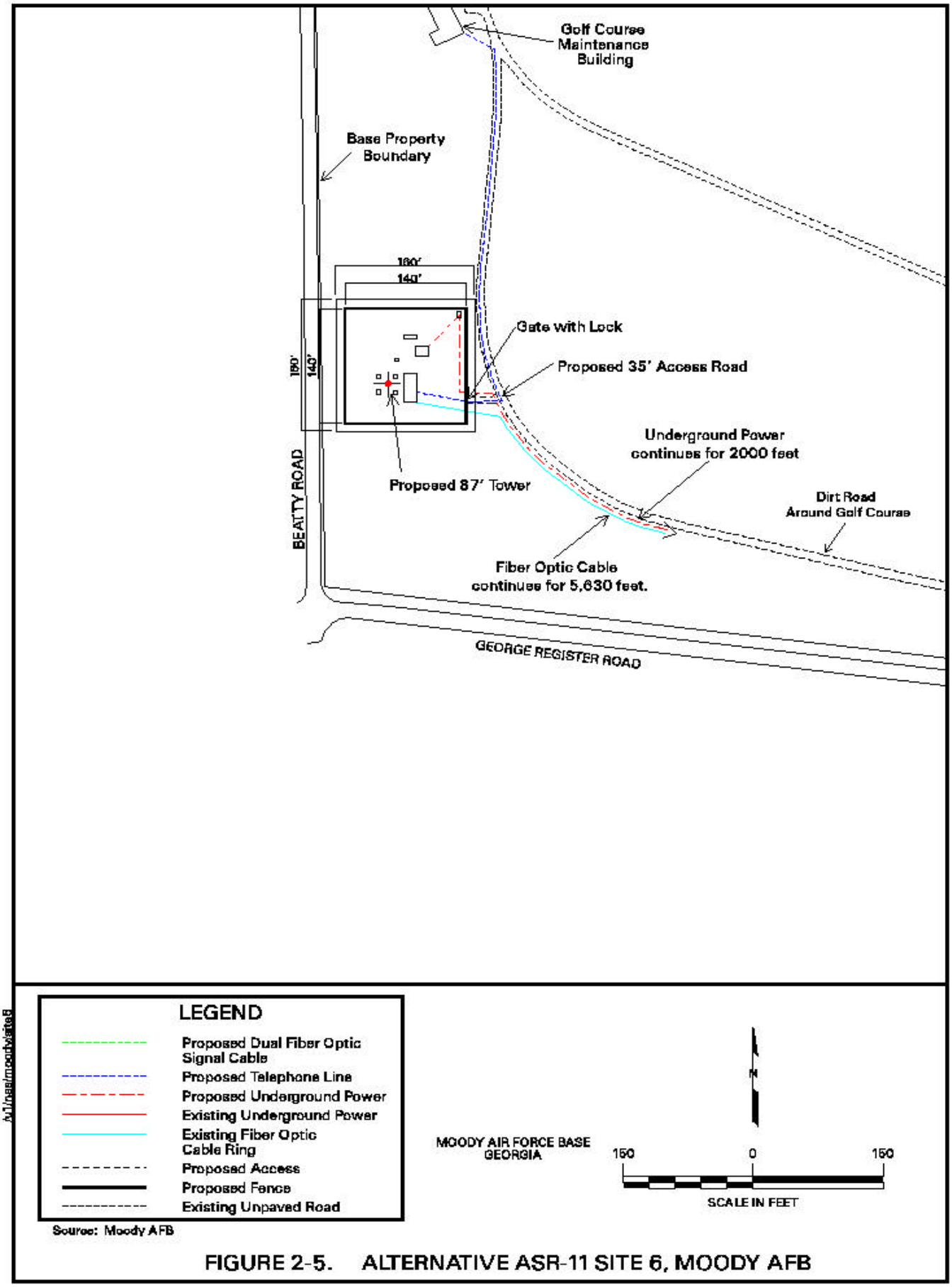



FIGURE 2-5. ALTERNATIVE ASR-11 SITE 6, MOODY AFB

## 2.2 NO ACTION ALTERNATIVE

Implementation of the No Action Alternative would result in the continued use of the AN/GPN-20 radar. Continued use and reliance on the AN/GPN-20 radar would deny Moody AFB of the improved technology offered by the new DASR system. Moody AFB would not benefit from the improved system reliability, additional weather data, reduced maintenance costs, and improved performance provided by the ASR-11 radar.

In this EA, conditions reflecting the No Action Alternative are discussed for each of the twelve main environmental parameters evaluated in Chapter Three. For each parameter, the No Action Alternative is characterized in the section addressing Future Baseline Without the Project.

# 3.0 AFFECTED ENVIRONMENT

The existing environmental conditions and future conditions without the project are described for each site in order to provide a baseline against which potential impacts related to construction and operation of the ASR-11 can be determined. General conditions on Moody AFB are presented for each of the parameters and site specific detail is included, as available. Environmental conditions at the existing AN/GPN-20 are also described in order to assess any potential issues associated with its removal. The following information was obtained from several documents/reports obtained from Moody Environmental Flight staff and supplemented with data collected during site visits conducted in the Fall of 1999.

## 3.1 LAND USE

The purpose of this section is to characterize land uses throughout Moody AFB and in the vicinity of the base. This section addresses land use attributes of the existing AN/GPN-20 site, as well as the alternative ASR-11 alternative sites: Site 4, Site 5, and Site 6.

### 3.1.1 Existing Conditions

Moody AFB is located in Lowndes and Lanier Counties in south-central Georgia, with a majority of the base, including the entire main base, located within Lowndes County. The base is located approximately ten miles northeast of Valdosta and six miles southwest of Lakeland (Figure 2-1).

The closest major cities to Moody AFB include Atlanta, approximately 230 miles to the north, and Jacksonville, Florida, about 120 miles to the southeast. Interstate 75 passes approximately twelve miles to the west and State Route 125 offers the primary access route to the base.

Moody AFB occupies 11,402 acres of federally owned land. The facilities consist of the main base (5,039 acres), the Grand Bay Range (5,874 acres) and the Grassy Pond Recreational Annex (489 acres). The main base consists of 1,990 improved acres (Table 3.1-1), 3,018 undeveloped (forested) acres, and Mission Lake with a surface area of 30 acres. In addition, easements and rights-of-way account for an additional 403 acres.

**Table 3.1-1 Land Use of Developed Areas within Moody AFB**

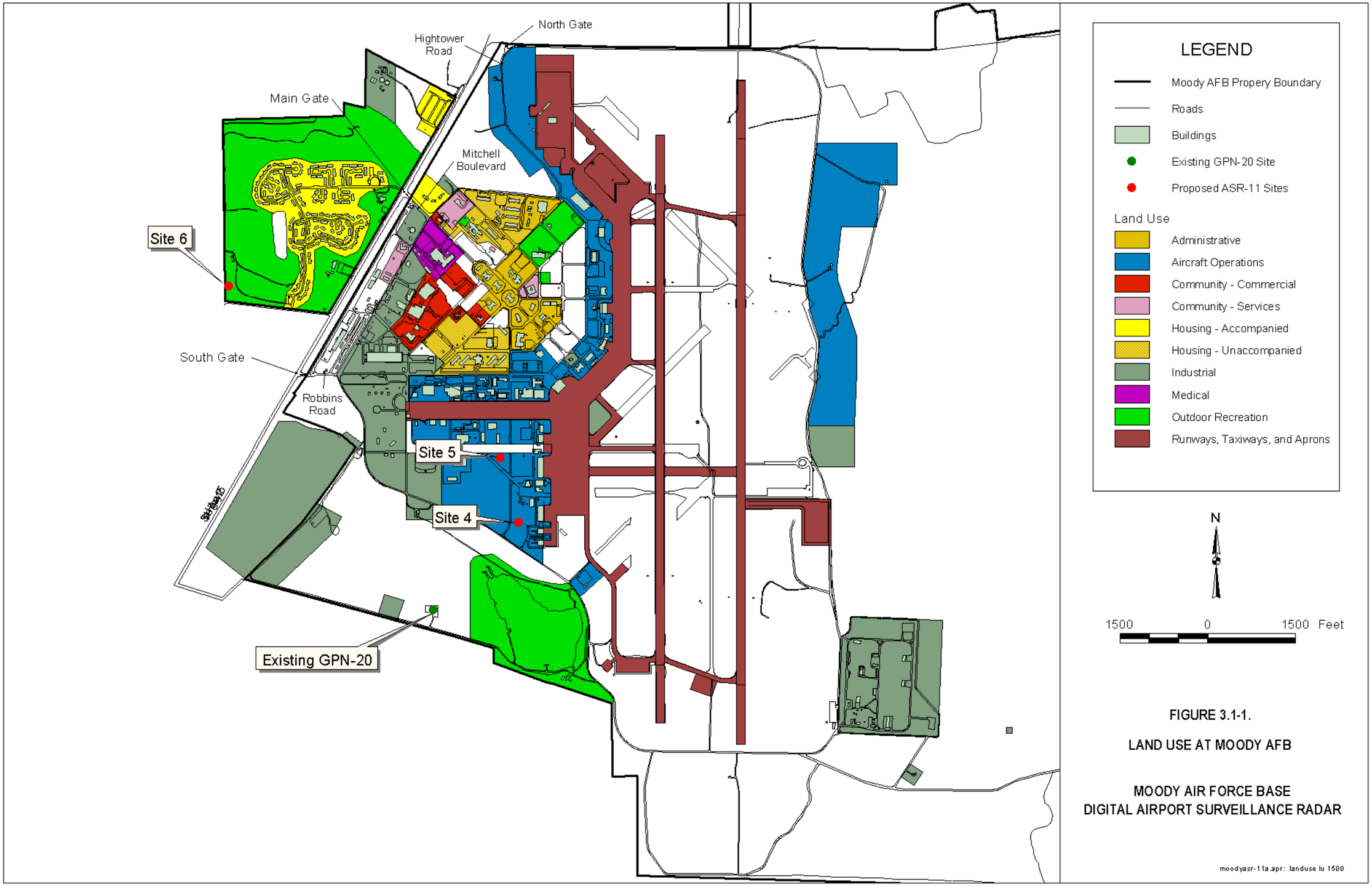
| Land Use | Acreage |
|---|---|
| Buildings | 758 |
| Munitions Area | 62 |
| Trailer Park | 10 |
| Family Housing | 67 |
| Runway Area | 981 |
| Sports Fields | 9 |
| Golf Course | 94 |
| Driving Range | 8 |
| Total | 1990 |

Source: U.S. Air Force, 1996a

State Route 125 divides the main base into eastern and western sections. Land uses on the base west of State Route 125 primarily consist of family housing, a golf course, a trailer area, and a sewage treatment plant (Figure 3.1-1). The section of the base east of State Route 125 contains the primary operations facilities (airfield, aircraft operations and maintenance, industrial facilities, administrative support, community commercial facilities, community service facilities, and medical services) in addition to some housing and recreational areas.

Land uses in the areas surrounding Moody AFB consist primarily of undeveloped wetland areas to the east and the south, and rural residential, agriculture and wetlands towards the west and the north. In the immediate vicinity of the base, land uses consist mainly of sparsely populated open space and agricultural lands with several residential subdivisions located southwest of the base and small areas of commercial development along State Route 125.

**Site 4.** Site 4 is located in the industrial area approximately 325 feet north of Burma Road, northwest of the hush houses and approximately 5,700 feet from the air traffic control tower. The site is located at an elevation of approximately 217 feet above mean sea level. Site 4 is located within an area known to contain subsurface contamination. This area is generally flat with slopes less than one percent. Existing vegetation consists of grasses, shrubs, and immature pine trees.




Source: Moody AFB

**Site 5.** Site 5 is located in an industrial area east of the intersection of Werewolf Run and Lancers Lane. The site is located within a grassy triangle between Werewolf Run, Lancers Lane, and Davis Street. A fuel station with two large aboveground diesel storage tanks is located southwest of the site along Lancers Lane. Site 5 is located approximately 5,830 feet from the air traffic control tower at an elevation of approximately 225 feet above mean sea level. This site is located within and adjacent to areas of known subsurface contamination. This area is generally flat with slopes less than one percent. Vegetation in this area consists primarily of grasses. Two parking lots are located to the north of the site, the larger along Werewolf Run.

**Site 6.** Site 6 is located in an open space/recreational area on the western side of the base across State Route 125, approximately 375 feet north of Radar Site Road near the base golf course driving range. The site is located at the edge of the base golf course; however, a narrow corridor of trees separate the site from the nearest fairway. This site is near a small maintenance shed where golf course maintenance equipment is stored. Site 6 is located approximately 9,110 feet from the air traffic control tower at an elevation of approximately 245 feet above mean sea level. This site is visible to off-base housing along Beatty Road. Some of the residential structures proximate to the site are used as apartments by migratory workers. There is also a contractor storage area located just south of this site that is in the process of being removed. This area is generally flat with slopes less than one percent. Vegetation in the area of Site 6 consists of grasses, shrubs and trees.

**Existing AN/GPN-20.** The existing AN/GPN-20 is located adjacent to Stone Road along the southwestern boundary of the main base, approximately 1,200 feet west of Mission Lake and approximately 7,650 feet from the air traffic control tower. The AN/GPN-20 was constructed on top of a closed landfill, which is also a known hazardous waste site. The area surrounding the facility consists primarily of undeveloped land. However, an area of trees has been cleared to the east of the AN/GPN-20 site for construction of a runway rapid repair training area, and there is a large concrete area to the west of the facility that is used for composting activities. This area is generally flat with slopes less than one percent. Existing vegetation to the north consists of grasses, shrubs and nearby mature trees.

### 3.1.2 Future Baseline Without the Project

The 1995 Moody AFB General Plan (USAF, 1995b) indicates that future plans for the base include an expansion of runway 18L/36R from 8,000 feet to 9,300 feet. Though definite plans do not yet exist, privately owned land adjacent to the Military Family Housing area (near Site 6) has been identified as a future housing expansion alternative. Overall, minimal changes in land use patterns are expected in the future at Moody AFB. Alterations and expansion of the airfield operations/ maintenance and housing will likely present the most significant changes, and as a result, currently undeveloped land may be reduced to support the developmental activities (USAF, 1995b).

In the future without the project, the currently under-utilized parking in the vicinity of Site 4 and Site 5 is anticipated to become more heavily utilized due to future pilot training activities in the nearby industrial area adjacent to the runways. Moody AFB is currently considering two proposals for expansion of the golf course in the vicinity of Site 6. If Moody AFB is able to acquire adjacent private property, the proposed expansion would create nine additional holes on the land which is now privately owned, and the existing nine holes on Moody AFB would be maintained. However, if Moody AFB is unable to obtain private property, the addition of nine new holes would be clustered around the existing golf course within base property. Thus, the existing driving range would be eliminated and an additional 2 to 3 holes would be added to the course in this area; a portion of this proposed expansion is anticipated to occur within the area of Site 6 (USAF, 1999b). There are no significant land use changes anticipated at the site of the existing AN/GPN-20.

## 3.2 SOCIOECONOMICS

### 3.2.1 Existing Conditions

This section addresses the population, employment, general economic condition, and housing of the study area. Socioeconomic data specific to the alternative ASR-11 site locations and the existing AN/GPN-20 radar system do not exist. However, there are data for the general area of Moody AFB and Lanier and Lowndes Counties.

**3.2.1.1 Population.** The population of Georgia has increased approximately 20 percent per decade since 1980 with a slightly greater increase during the last nine years (Table 3.2-1). This rate of population growth in the state of Georgia is not entirely representative of the counties of Lanier and Lowndes. The population of Lanier County actually decreased by 2.2 percent from 1980 to 1990, however, there is a projected 25.8 percent growth in population from 1990 to 1999. Lowndes County appears to have grown steadily by approximately 12 percent per decade since 1980.

**Table 3.2-1. Population Trends within Georgia and Lanier and Lowndes Counties**

| Area | 1980 Census | 1990 Census | % Change | 1999 Estimate | % Change |
|---|---|---|---|---|---|
| Georgia | 5,463,105 | 6,478,216 | 18.6 | 7,788,240 | 20.2 |
| Lanier County | 5,654 | 5,531 | -2.2 | 6,959 | 25.8 |
| Lowndes County | 67,972 | 75,981 | 11.8 | 85,413 | 12.4 |

Source: Georgia Institute of Technology, 1999; U.S. Bureau of the Census, 1990

The population associated with Moody AFB is approximately 11,493 (USAF, 1995b) (Table 3.2-2). Almost half of this population consists of off-base families and nearly 40 percent consist of active duty military personnel. In addition, approximately 15,000 military retirees and their dependents reside within a 75 mile radius of Moody AFB (USAF, 1995b).

**Table 3.2-2. Moody Air Force Base Population**

| Category | Number | Percent of Total |
|---|---|---|
| Active Duty Military | 4,424 | 38.5 |
| Family Members on-base (estimated) | 636 | 5.5 |
| Family members off-base (estimated) | 5,400 | 47.0 |
| Appropriated Fund Civilians | 400 | 3.5 |
| Non-Appropriated Fund Civilian | 321 | 2.8 |
| Contractor Personnel | 312 | 2.7 |
| **TOTAL** | **11,493** | |

Source: U.S. Air Force, 1995b

The entire portion of Moody AFB west of State Route 125, the surrounding civilian houses, and properties are located in Census Block Group number 010100-1 (Figure 3.2-1). The larger portion of the base, east of State Route 125, is located within Census Block Groups 010100-2 and 950200-4.

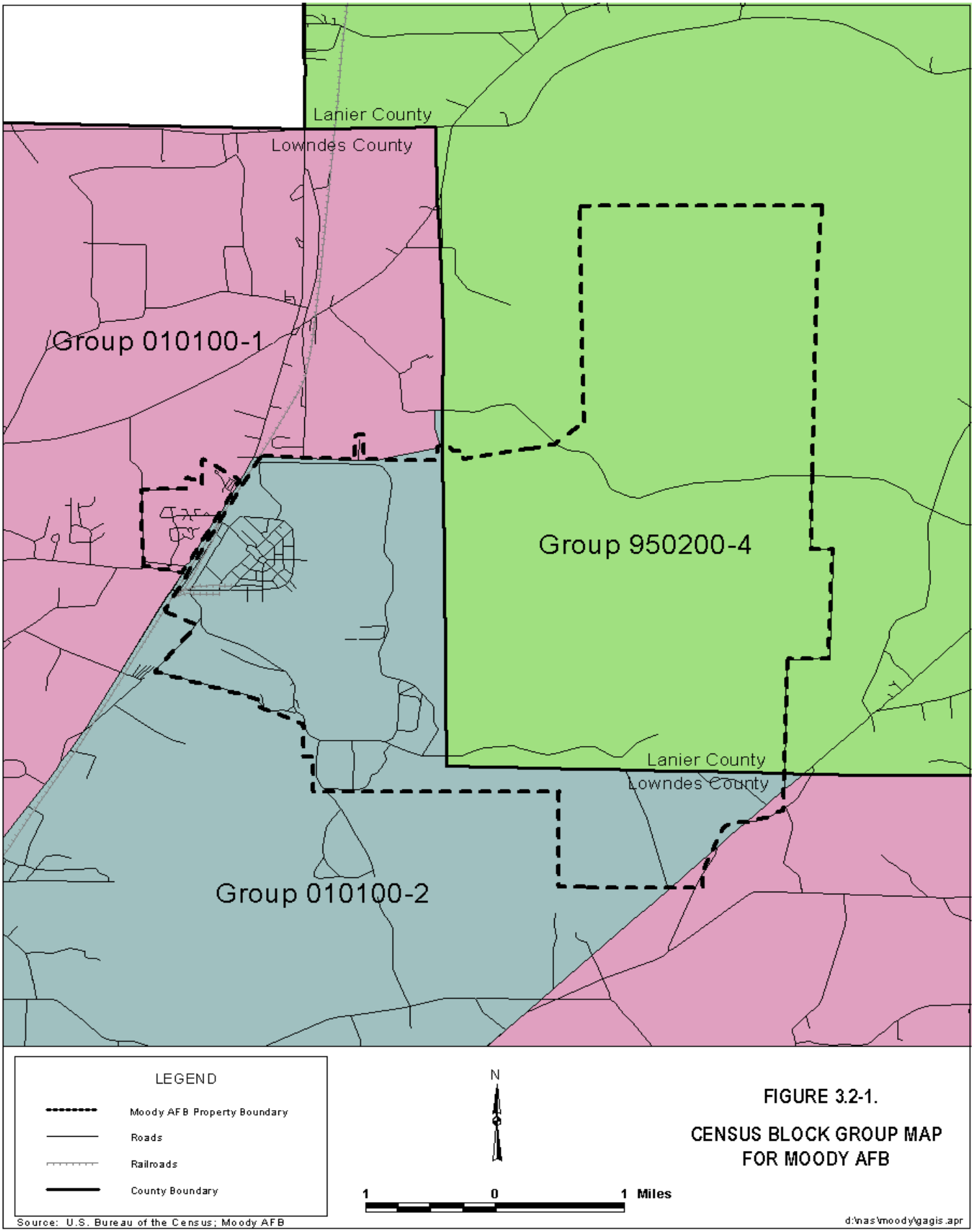



FIGURE 3.2-1.

CENSUS BLOCK GROUP MAP FOR MOODY AFB

Census Block Groups 010100-1 and 010100-2 are located within Lowndes County; the military base comprises approximately two percent of the total land area of Block Group 010100-1 and approximately 22 percent of 010100-2. Census Block Group 950200-4 is located entirely within Lanier County; the base portion of this block group comprises approximately 26 percent of its total land area. In general the ethnicity characteristics of the populations within the three Census Block Groups, Lanier and Lowndes Counties, and the state of Georgia overall are comparable (Table 3.2-3). The percentage of persons below the poverty level is comparable among the state, counties, and Block Groups 010100-1 and 950200-4; however, the percentage of persons below the poverty level is substantially lower in Block Group 010100-2.

**Table 3.2-3. Income and Ethnicity Statistics for Georgia, Lowndes County, Lanier County, and Census Blocks for the Areas of Moody Air Force Base.**

| | Georgia | Lowndes County | Lanier County | Census Block Groups | | |
|---|---|---|---|---|---|---|
| | | | | Lowndes County | | Lanier County |
| | | | | 010100-1 | 010100-2 | 950200-4 |
| Total Persons | 6,478,216 | 75,981 | 5,531 | 4,202 | 3,278 | 1,032 |
| Number of Households | 2,366,615 | 26,311 | 1,965 | 1,333 | 809 | 350 |
| Percent Below Poverty Level | 14.7 | 19.9 | 25.9 | 17.2 | 7.8 | 20.2 |
| **ETHNICITY PERCENTAGES** | | | | | | |
| White | 71.0 | 66.6 | 71.9 | 67.6 | 77.3 | 71.0 |
| Black | 27.0 | 31.9 | 26.6 | 28.3 | 18.5 | 27.8 |
| American Indian | 0.2 | 0.3 | 0.7 | 0.6 | 0.5 | 0.1 |
| Asia/Pacific Islander | 1.2 | 0.9 | 0.4 | 1.8 | 2.4 | 1.0 |
| Hispanic | 1.7 | 1.3 | 1.2 | 3.5 | 3.2 | 0.8 |
| Non-White and White Hispanic | 29.9 | 34.2 | 28.5 | 34.0 | 23.9 | 29.7 |
| Other | 0.7 | 0.4 | 0.5 | 1.8 | 1.2 | 0.1 |

Source: U.S. Bureau of the Census, 1990

**3.2.1.2 Employment.** Civilian employment at Moody AFB consists of 400 appropriated fund civilians, 321 non-appropriated fund civilians, and 312 contractor personnel. These 1,033 civilians account for approximately nine percent of the total installation population (Table 3.2-2) and 2.2 percent of the total civilian labor force of Lanier and Lowndes Counties combined (Table 3.2-4). In addition, Department of Defense expenditures within the community have created an estimated 1,087 ancillary jobs (USAF, 1995b).

**Table 3.2-4. Labor Force, Employment, and Unemployment Data for Georgia, Lanier County, and Lowndes County for Month of March 2000**

| Area | Labor Force | Employed | Unemployed | Unemployment Rate (percent) |
|---|---|---|---|---|
| Georgia | 4,132,803 | 3,991,525 | 141,278 | 3.0 |
| Lanier County | 3,627 | 3,449 | 178 | 5.0 |
| Lowndes County | 43,831 | 41,447 | 2,384 | 5.0 |

Source: Georgia Department of Labor, 1998a and 1998b

As of March 2000 the civilian labor force totaled 4,132,803 in the state of Georgia and 47,458 in Lanier and Lowndes Counties combined (Table 3.2-4). The labor force of Lanier and Lowndes Counties is approximately 1.1 percent of the statewide labor force. Of this 1.1 percent, approximately 92.4 percent is located in Lowndes County. Although the unemployment rates for Lanier and Lowndes Counties are each 2.0 percent higher than the state unemployment rate for March 2000 (Table 3.2-4), the rate fluctuations within each geographic area appear to be consistent over the last decade with a gradual decrease in unemployment rates.

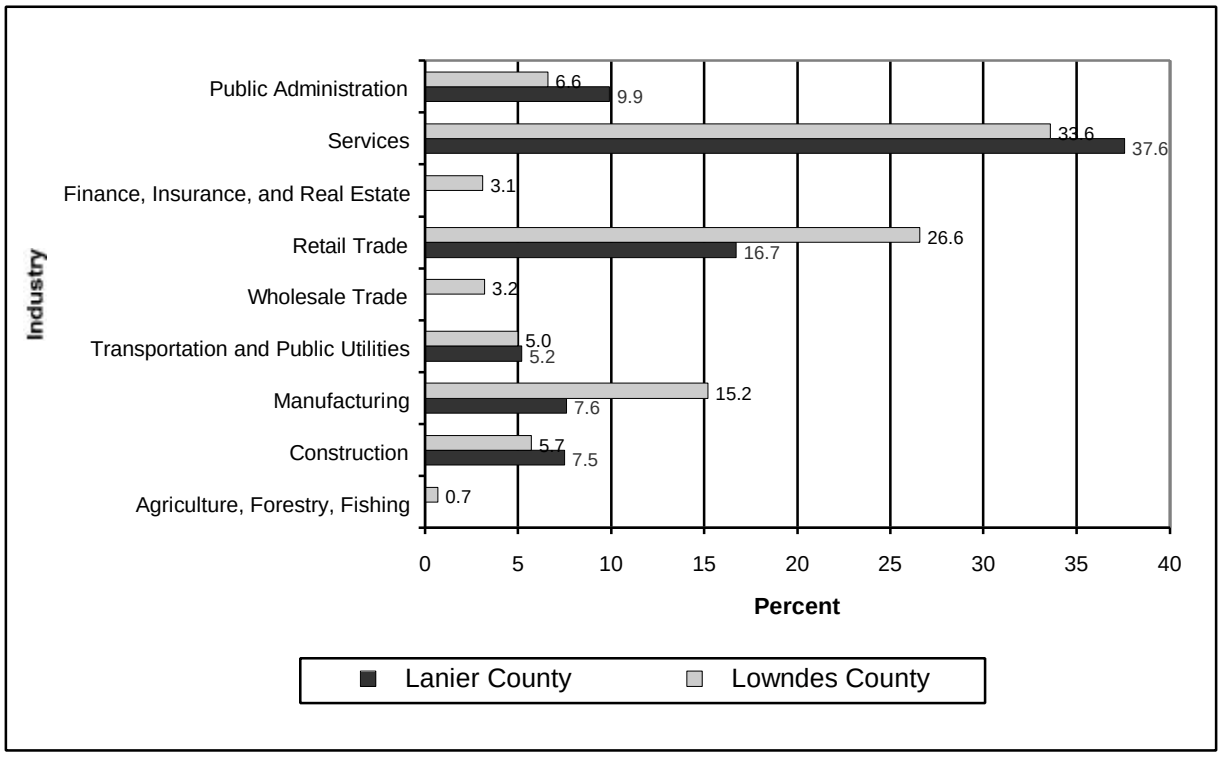
Prior to the 1970s, the economy of the Lanier/Lowndes area was primarily based on agriculture and forest products, with some light industrial activities. The economy has shifted toward the retail trade, manufacturing, and distribution over the last 30 years (USAF, 1999a). Currently the retail trade and service industry are the most significant employers in Lanier and Lowndes Counties (Figure 3.2-2).

**3.2.1.3 Expenditures of Moody AFB.** Moody AFB contributes approximately $116 million annually to the area economy through payroll expenditures. Additionally, annual expenditures of $30 million are contributed to the area economy through service contracts and $7 million are contributed

through local purchase. In total, this $153 million contributed annually to the southeastern Georgia economy accounts for a significant portion of the expenditures throughout the region as a whole (USAF, 1995).

**3.2.1.4 Housing.** In 1990 (the last year for which these data are available) the number of housing units in Lanier and Lowndes Counties combined was 31,108, which is 1.2 percent of the total housing units in the State of Georgia (USBC, 1990) (Table 3.2-5). While Lowndes County has a

**Figure 3.2-2. Employment by Industry for Lanier County and Lowndes County**




Source: Georgia Department of Labor, 1998a and 1998b

higher number of housing units located near urbanized areas, both of these counties are sparsely populated with a substantial portion of the population residing in rural areas. As displayed in Table 3.2-5, 100 percent of the housing units in Lanier County are located in rural areas and 46 percent of the housing units in Lowndes County are located in rural areas. The proportion of vacant housing units in Lanier and Lowndes Counties is comparable to the state of Georgia as a whole, with a vacancy rate of approximately 10 percent for all three areas.

**Table 3.2-5. Housing Units in Georgia, Lanier County and Lowndes County in 1990**

| Area | Housing Units | Vacant | Located in Urban Areas | | Located in Rural Areas | |
|---|---|---|---|---|---|---|
| | | | Inside Urbanized Areas | Outside Urbanized Areas | Farm | Non-Farm |
| Georgia | 2,638,418 | 271,803 | 1,367,464 | 332,658 | 28,775 | 909,521 |
| Lanier County | 2,202 | 237 | 0 | 0 | 117 | 2,085 |
| Lowndes County | 28,906 | 2,595 | 0 | 15,604 | 235 | 13,067 |

Source: U.S. Bureau of the Census, 1990

On Moody AFB, Military Family Housing is divided into three separate areas: family housing units, senior officer housing, and privately-owned mobile homes. The family housing units located west of the cantonment area, across Bemiss Road, make up the largest housing area with 300 family units in 129 buildings. The senior officer housing is a small area consisting of only three units. This housing area is located on the base adjacent to the North Gate at the intersection of Mitchell Boulevard and Georgia Street. The privately-owned mobile homes are located northeast of the family housing area on the west side of Bemiss Road. There are 39 rental spaces available at the mobile home area (USAF, 1995b). In total, on-base housing consists of 142 buildings and 1,370 units.

### 3.2.2 Future Baseline Without the Project

The socioeconomic characteristics of Lanier and Lowndes Counties are expected to follow current trends in the near future. State projections indicate that the service and retail industries will continue to be the largest growth industries at least through 2006, followed closely by transportation and communications/public utilities (Georgia Department of Labor, 2000a). It is not expected that any substantial impacts would result from changes at Moody AFB unless there is a major expansion or reduction in base operation. Presently there is no indication of any changes planned at Moody AFB that would substantially affect the population, housing, or employment.

## 3.3 UTILITIES AND TRANSPORTATION

### 3.3.1 Existing Conditions

The utility service at Moody AFB, including availability in the vicinity of the alternative ASR-11 sites, is discussed in this section. The utilities include water, wastewater, solid waste, electricity, telephone, fiber optics, and natural gas. Transportation is described in section 3.3.1.8.

**3.3.1.1 Water Supply.** Moody AFB has an internal water system, with no need for outside water sources. Water for the cantonment and family housing areas is obtained from three wells adjacent to the water treatment plant and ground level storage reservoir. These three wells produce approximately 94,800 gallons per hour (gph). Based on daily pump use (16 hours per day), the wells produce approximately 1.5 million gallons per day (mgd). Water is aerated, chlorinated, and fluorinated prior to storage in a 500,000 gallon ground storage tank. From here the water is drawn by two 400 gallons per minute (gpm) pumping stations into a 250,000 gallon elevated storage tank. Seven other wells are located throughout the base, providing potable and non-potable water for fire protection, air conditioning, recreation, and personnel support in remote areas of the base. These systems are not interconnected with the base's central potable water system. The water distribution system for the base is comprised of 24 miles of cast iron pipe and polyvinyl chloride (PVC) looped mains, with PVC lines installed in more recently developed areas, such as the golf course irrigation system and the 71$^{st}$ Air Control Squadron (ACS) area. Water distribution within the cantonment and family housing area is accomplished through 10- and 12- inch pipes following the outer loop roads (Georgia and Savannah Streets, and Robbins and Robinson Road), and inner loop roads (Burger, Burrell, George, and Hickam Streets). Six and eight inch pipes supply the remainder of the cantonment and family housing areas (USAF, 1995b).

No water distribution system lines are near **Site 4, Site 6**, or the existing **AN/GPN-20** radar, however, a water distribution system line is located near **Site 5** along Lancer Lane.

**3.3.1.2 Wastewater Treatment.** Domestic and industrial wastewater is discharged directly to an on-base treatment facility, located adjacent to the military family housing area. The wastewater treatment plant uses a biological treatment system with trickling filters, clarifiers, and chlorination prior to discharging into Beatty Branch. The National Pollutant Discharge Elimination System (NPDES) permit, issued by the Georgia Department of Natural Resources, Environmental Protection Division, allows for an average discharge rate of 0.75 mgd with a maximum of 1.125 mgd. Currently the treatment plant is run at capacity. All sludge produced by the plant is anaerobically digested, dewatered, and disposed of in a local landfill. The treatment plant was built in the 1940s, but had a significant upgrade during 1995.

None of the proposed ARS-11 sites (**Site 4**, **Site 5**, and **Site 6**) nor the existing **AN/GPN-20** is located near sanitary sewer lines.

**3.3.1.3 Solid Waste.** Solid waste at Moody AFB is collected and transported by a private contractor. Dumpsters located throughout the base are emptied on a weekly basis and refuse is hauled to an off-base county landfill for disposal. Offices on Moody AFB provide office paper and corrugated cardboard recycling, while curbside pick-up of commingled paper, glass, aluminum, and plastic is offered for the military family housing area. A dedicated recycling building located on the main base area also offers recycling of all the above materials. All recyclables are collected and transported for recycling by the same private contractor that collects the base's solid waste. Construction and demolition debris is disposed of on a case by case basis by the contractor performing the work (USAF, 2000d).

**3.3.1.4 Electricity.** Electrical power is supplied to Moody AFB by the Colquitt County Electrical Company. Electrical power enters the base through the Oglethorpe Substation on the southwestern side of the base. Currently the substation capacity is 12,000 kilovolt-amperes (kVA). Representatives from the 347 CES Electrical Shop have suggested that the current system could sustain moderate growth (USAF, 1995). The base currently has an average monthly usage of 3.6 million-kilowatt hours (kwh). An update of all electrical distribution systems was completed in the 1988 FY, except within the military family housing areas. Moody AFB has 116,676 linear feet (lf) of primary overhead

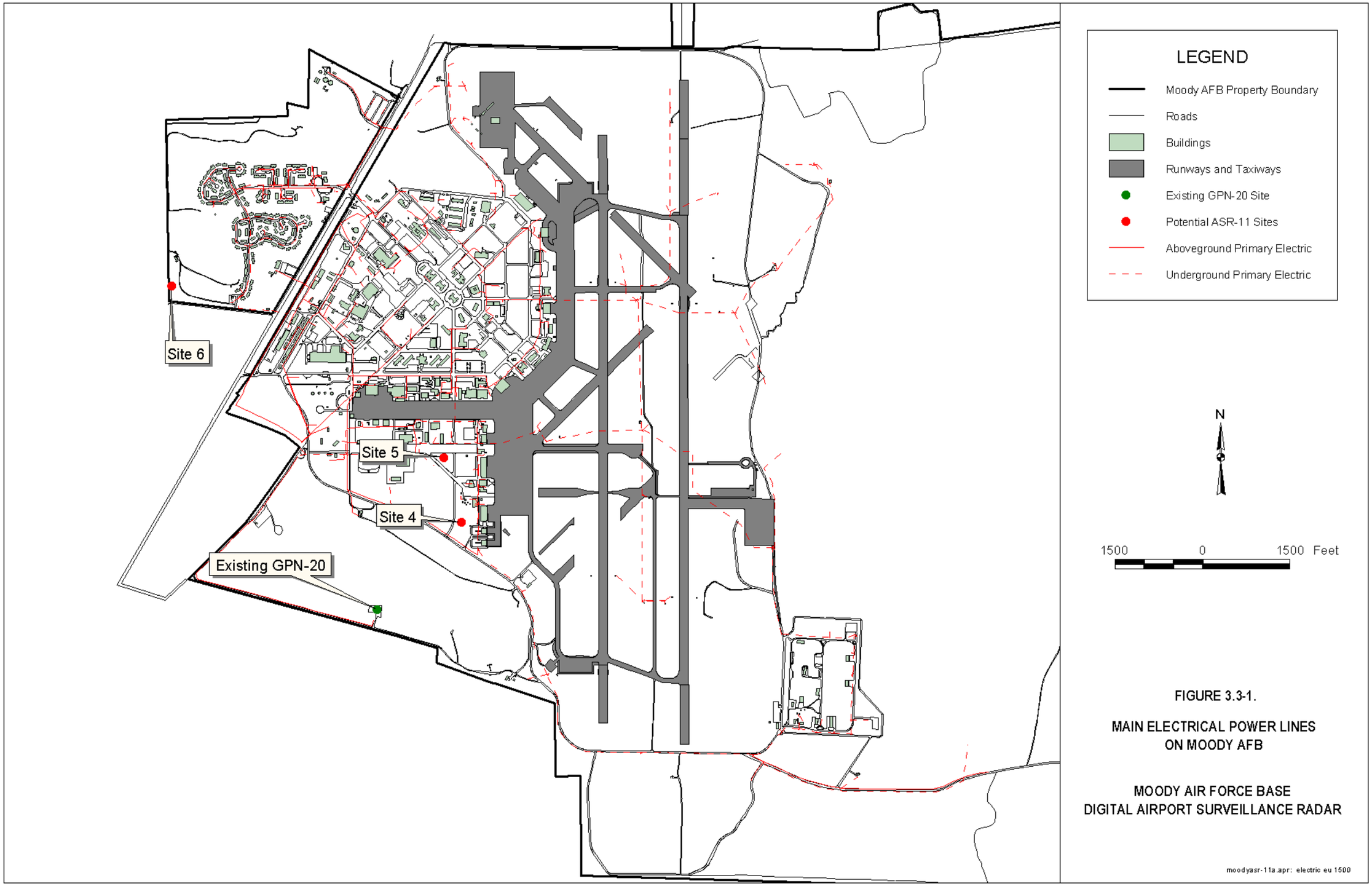
distribution electrical lines, 84,136 lf of secondary overhead lines, 148,297 lf of primary underground distribution lines, and 127,136 lf of secondary underground lines. The primary electrical distribution system within the base is depicted on Figure 3.3-1.

Electrical power currently exists in the vicinity of each of the alternative ASR-11 sites. **Site 4** is approximately 260 feet from underground power lines running behind the hush houses. **Site 5** is approximately 250 feet from underground lines running along Davis Street. **Site 6** is approximately 2,000 feet from distribution lines at the existing RAPCON building.

**3.3.1.5 Telephone.** All telephone systems within the base are government owned but are maintained by outside contractors. The base telephone system is comprised of a dial central office, private branch exchanges, remote switching terminals, and customer premise equipment. The dial central office, located at 5118 Austin Ellipse, has a total line capacity of 4,300 lines with 4,000 currently in use. Current demands on incoming and outgoing trunks can occasionally cause access problems to customers on base. An additional 16 trunks are expected to be installed to connect with incoming and outgoing city trunks to alleviate this problem. Layouts of the existing communications facilities are the responsibility of the Moody AFB Communications Squadron, which maintains paper plans indicating the location and nature of the communication lines. The Communications Squadron is also responsible for communicating with Tinker AFB personnel and advising them of any updates to the communication facilities at Moody AFB.

**Site 4** is approximately 2,050 feet and **Site 5** is approximately 1,025 feet from the current telephone line system at Building 797. **Site 6** is approximately 600 feet from the current telephone line system servicing the golf course maintenance building. The existing **AN/GPN-20** is not located near the main telephone line system.

**3.3.1.6 Fiber Optic Cable.** Currently, a 32,950-foot fiber optic cable ring encircles the runways. **Site 4** is approximately 150 feet west of the existing fiber optic cable ring, **Site 5** is approximately 150 feet west of the existing fiber optic cable ring, and **Site 6** is approximately 5,000 feet from the existing fiber optic cable ring.




Source: Moody AFB

**3.3.1.7 Natural Gas.** Natural gas service to Moody AFB enters at two points on both sides of Bemiss Road south of the main gate. Currently there is a total of 74,646 linear feet of active pipeline, with 12,430 linear feet of sterile or inactive gas lines.

There are no natural gas lines in the immediate vicinity of **Sites 4**, **6**, or the existing **AN/GPN-20** site. However, **Site 5** is near a natural gas pipeline running along Werewolf Run.

**3.3.1.8 Transportation.** The major highway (I-75) within the vicinity of Moody AFB is located 12 miles west of the base and runs through the town of Valdosta. State Highway 125 is the main connection between the base and the town of Valdosta and I-75. Local commercial airline service is provided by Valdosta Regional Airport, and flights from this airport connect directly with major airlines at Atlanta-Hartsfield International Airport. Other commercial air support exists at Tallahassee and Jacksonville airports, 79 and 120 miles away, respectively. Four railway systems service the town of Valdosta: Georgia Southern and Florida Railroad, Seaboard Coast Line Railroad, Central of Georgia Railroad, and Valdosta Southern Railroad. All have sidings in Valdosta where heavy equipment may be loaded. At one time, on-base sidings existed for the Central of Georgia Railroad, but they have recently been removed. While fuel and freight are trucked into the base, local and regional transportation has little effect on the Moody AFB. Military airlift is the primary means of force deployment.

Automotive traffic enters the base through three security checkpoints. These entrance checkpoints are located at Hightower Road (North Gate), Mitchell Boulevard (Main Gate), and Robbins Road (South Gate). Traffic networks on the base are classified into two groups, arterials or collectors. Arterials carry the majority of traffic within the base, while the collectors carry traffic to local streets or specific destinations within the base. The four main arterials are Mitchell Boulevard, Austin Ellipse, Robbins Road, and Robinson Road. There are a total of nine collectors within the base which include Berger, Burrell, Davis, Dexter, George, Georgia, and Hickman Streets, Darque Boulevard, and Robinson Road (USAF, 1995b).

Traffic congestion within the base is minimal and generally occurs at the entrance gates only during the start and end of every workday. Modified work schedules have been implemented to alleviate some of the traffic congestion. The Georgia Department of Transportation completed a study of State Highway 125 to assess the environmental impacts of increasing the width of the road to accommodate left hand turning lanes, and separating the current four lanes with an elevated grass median (Georgia DOT, 1997). The estimated annual daily traffic load for 1993 was 20,000 vehicles, with a projected increase in traffic load to 24,500 for 2010 (Georgia DOT, 1997). Most of the base work force (officers, enlisted, civilian, and contractors) lives off-base, with limited resident on-base work force. The majority of individuals traveling to the base come from Valdosta to the south (USAF, 1998).

Parking on the base is considered adequate, with only limited periods of overcrowding around the 7000 block of Robbins Road due to mobility operations. Deployed individuals usually park within their respective squadron areas during these periods (USAF, 1995b).

There are no passenger air terminal operations on the base, except for limited non-deploying personnel who can travel by military aircraft when space is available. There is limited airdrop operation within the base, mainly for airdrop training.

All the alternative sites are located near existing roads. **Sites 4** and **5** are accessed from Davis Street. **Site 6** is accessed from the golf course perimeter road. The existing **AN/GPN-20** is located south of Mission Lake and is not proximate to on-base collectors or arterials.

### 3.3.2 Future Baseline Without The Project

No substantial change in wastewater treatment, solid waste, natural gas, or transportation conditions are anticipated at Moody AFB in the near future. Some small scale improvements are planned for the water, electrical, and telephone systems. Changes to water service involve the replacement of Wells #1 and #2 with two new wells, as well as the installation of a protective security barrier around water sources (USAF, 1995b). The Moody AFB General Plan has stated that system upgrades are continuing as overhead electrical and telephone distribution lines are being replaced by underground

lines. Upgrades to the telephone system will also include the expansion of fiber optic and copper cable systems to support the Air Rescue beddown, pending approved funding (USAF, 1995b). In the future without the project, the currently under-utilized parking in the vicinity of Site 4 and Site 5 is anticipated to become more heavily utilized due to future pilot training activities in the nearby industrial area adjacent to the runways, which may increase traffic congestion in this area.

## 3.4 NOISE

The existing noise environment of Moody AFB in general is discussed in this section, as well as the noise environments of the three alternative ASR-11 sites and the existing AN/GPN-20 location. Many federal agencies use the day-night average sound level to describe noise and to predict community effects from long term exposure to noise. In addition, this noise level classification system is used to determine the appropriateness of a given use of specific land (land use compatibility) relative to the average level of environmental noise experienced at the location. These guidelines are described in the *Air Installation Compatible Use Zone (AICUZ) Program Handbook* (USAF, 1991). Noise levels below 65 decibels are considered to be compatible with residential land use. Residential land use is discouraged in areas with a noise level between 65-70 decibels, strongly discouraged in areas with sound levels between 70 and 75 decibels, and considered generally unacceptable for areas with noise levels exceeding 75 decibels.

### 3.4.1 Existing Conditions

The primary source of noise in the vicinity of Moody AFB is a result of normal base operation and aircraft usage and maintenance. Noise contours generally follow the shape of the runways with the area of highest decibels (85 and higher) in the immediate area of the runway and extended areas of higher level noise following the flight paths in the areas of aircraft approach and departure corridors. On the eastern portion of the base the noise contours are evenly distributed, while to west of the runways the noise contours are much more uneven (USAF, 1999a). This effect appears to be a result of noise blockage/absorption by buildings located on this portion of the base.

The proposed **Site 4** is located in an area with a range of 75-80 decibels, **Site 5** in an area with a range of 70-75 decibels, and **Site 6** below 65 decibels. The existing **AN/GPN-20** is located in an area with a range of 75 to 80 decibels.

### 3.4.2 Future Baseline Without the Project

It is not anticipated that there would be any substantial change in ambient noise conditions at any of three alternative DASR sites or at the AN/GPN-20 in the future without the project. Although the F16 drawdown currently underway at Moody AFB is anticipated to result in reduced noise levels in the some areas, neither the noise conditions at the three alternative sites nor the existing AN/GPN-20 are expected to be substantially affected. No other major changes in land use activities are expected to occur in the vicinity of the alternative sites, and thus future noise levels are anticipated to be similar to those predicted subsequent to the F-16 drawdown (USAF, 1999a).

## 3.5 AIR QUALITY

Existing air quality characteristics in the vicinity of the three alternative ASR-11 sites are discussed in this section. Information was compiled from regional data and is expected to describe site specific characteristics.

The U. S. Environmental Protection Agency (EPA) defines ambient air in 40 CFR Part 50 as "that portion of the atmosphere, external to buildings, to which the general public has access." In compliance with the 1970 Clean Air Act and the 1977 and 1990 Clean Air Act Amendments, EPA has developed ambient air quality standards and regulations. The National Ambient Air Quality Standards (NAAQS) were enacted for the protection of the public health and welfare, allowing for an adequate margin of safety. To date, EPA has issued NAAQS for six criteria pollutants (Table 3.5-1): carbon monoxide, sulfur dioxide ($SO_2$), ozone ($O_3$), nitrogen dioxide ($NO_2$), lead (Pb), and particulates (e.g., PM-10, particles with a diameter less than or equal to 10 micrometers (μm)). The State of Georgia has adopted all NAAQS as their own (GA DNR, 2000).

**Table 3.5-1. National and Georgia[1] Ambient Air Quality Standards**

| Air Pollutant | Averaging Time | Primary | Secondary |
|---|---|---|---|
| Carbon Monoxide (CO) | 1-hour[2]<br>8-hour[2] | 35 ppm[5]<br>9 ppm | 35 ppm<br>9 ppm |
| Nitrogen Dioxide ($NO_2$) | Annual[3] | 0.053 ppm | 0.053 ppm |
| Sulfur Dioxide ($SO_2$) | 3-hour[2]<br>24-hour<br>Annual | ----------<br>0.14 ppm<br>0.03 ppm | 0.050 ppm<br>----------<br>---------- |
| Particulates (PM-10)[a] | 24-hour<br>Annual | 150 $\mu g/m^3$<br>50 $\mu g/m^3$ | 150 $\mu g/m^3$<br>50 $\mu g/m^3$ |
| Particulates (PM-2.5)[b] | 24-hour<br>Annual | 65 $\mu g/m^3$<br>15 $\mu g/m^3$ | 150 $\mu g/m^3$<br>50 $\mu g/m^3$ |
| Ozone ($O_3$) | 1-hour[4]<br>8-hour | 0.12 ppm<br>0.08 ppm | 0.12 ppm<br>0.08 ppm |
| Lead (Pb) | Quaterly Average[3] | 1.5 $\mu g/m^3$ | 1.5 $\mu g/m^3$ |

[1] Georgia has adopted all NAAQS
[2] Not to be exceeded more than once a year
[3] Not to be exceeded
[4] Not to be exceeded more than one day per year
[5] ppm = parts per million by volume
[a] Particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers
[b] Particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
Sources: Environmental Protection Agency, 1998 (40 CFR 50); Georgia Department of Natural Resources, 2000

### 3.5.1 Existing Conditions

The climate at Moody AFB is classified as humid subtropical. This climate is typified by long, humid summers and short, mild winters. Spring and Fall are usually short and mild. The average annual temperature for the base is 68°F and monthly mean temperatures vary from 52°F in January to 82°F in July/August. Mean annual precipitation recorded for the base is 47 inches. Wind speed at the base averages only 4 knots, with a maximum recorded speed of 65 knots. Wind direction is generally from the north in the winter, from the west during the spring and early summer, and from the east during the late summer and fall (USAF, 1996a).

Moody AFB is included in the Georgia Title V Permit Program, and all base facilities are managed under this all-inclusive permit. The Title V Permit consolidates all federal, state, and local air quality requirements into one permit. Air emissions on the base are separated into two categories: mobile and stationary. Mobile sources include aircraft, aircraft engine testing, on- and off-road vehicles, and maintenance equipment. Stationary sources include fuel storage tanks, fuel distribution, aircraft ground equipment operations, and surface painting and corrosion control facilities for aircraft.

As of August 1999 the State of Georgia is an attainment state for all six major air pollutants listed in Table 3.5-1, with the exception of the 1-hour $O_3$. The $O_3$ non-attainment area within Georgia is limited to Atlanta, approximately 230 miles north of Moody AFB. Due to the relative location of Moody AFB to the State of Florida, air quality of this state may impact the air quality of the base and surrounding area. All counties within the State of Florida are in attainment with NAAQS, as of June 2000 (EPA, 2000). Within the vicinity of Moody AFB, there are no major air quality monitoring stations, with the exception of an $SO_2$ station in Albany, Georgia, which monitors air quality for an entire year, every three years. The last year that the Albany station was utilized was in 1998, and a maximum $SO_2$ value of 0.058 ppm was recorded. This value is lower than EPA $SO_2$ 24-hour standard (Table 3.5-1). The annual mean level of $SO_2$ at the Albany station was 0.001, which is lower than the EPA annual $SO_2$ standard (Table 3.5-1).

Under the 1990 Clean Air Act Amendment, a facility such as Moody AFB is considered a major air emission source and may be required to pay permit fees based on actual emissions from stationary sources. During a 1994 base-wide air emissions inventory it was determined that actual emissions (Table 3.5-2) were well below the State standards for a facility within an attainment county, so no fees were required to be paid by the base (USAF, 1994b).

### 3.5.2 Future Baseline without the Project

Without the project, air quality in the vicinity of the three proposed ASR-11 sites and the existing AN/GPN-20 is expected to remain stable.

**Table 3.5-2. Moody AFB Pollutant Emission Quantities, 1994 Data**

| Pollutant | Emissions (tons/year) |
|---|---|
| Carbon Monoxide (CO) | 514.9 |
| Nitrogen Oxide ($NO_2$) | 218.2 |
| Sulfur Oxide ($SO_2$) | 1,295.7 |
| Particulate Matter (PM) | 25.2 |
| Fine Particulate Matter (PM-10) | 18.7 |
| Volatile Organic Compounds (VOC) | 13.8 |
| Lead (Pb) | 0.01 |

Source: U.S. Air Force, 1994b

## 3.6 GEOLOGY AND SOILS

### 3.6.1 Existing Conditions

General characteristics of soils and geology (including topography and geologic hazards) on the base are discussed in this section. Site-specific data relevant to the three alternative ASR-11 sites are provided as available.

**3.6.1.1 Soil Resources.** Moody AFB is located within the Georgia Coastal Plain, and is located within the Tifton Upland District of the Lower Georgia Coastal Plain. Upland soils within this region were formed from deep sedimentary sands and clays. These soils tend to be very deep and well drained (USAF, 1996a). These soils comprise most of the current developed area within the base, and have excellent properties for construction where deep excavation is not required. The Tifton–Urban Land complex is the predominant soil series on the base. The following soil associations are also found on the base: Tifton–Pelham–Fequay, Dasher or Swamp–Istokpoga, Mascotte–Albany–Pelham, and Leefield–Pelham–Clarendon. Figure 3.6-1 shows the soil types found within Moody AFB.


LEGEND

- Moody AFB Property Boundary
- Roads
- Buildings
- Runways and Taxiways
- Existing GPN-20 Site
- Proposed ASR-11 Sites

Soil Classifications

| Soils | | | |
|---|---|---|---|
| At | B.P. | Le | |
| Ba | Bm | Mn | |
| Cn | Da | NkC | |
| DoB | FsB | Oa | |
| Gr | Ija | Pe | |
| Jo | | Ro | |
| | | Se | |
| | | SuC2 | |
| | | TfA | |
| | | TfB | |
| | | TuB | |
| | | water | |

N

3000 0 3000 Feet

FIGURE 3.6-1.

EXISTING SOIL CONDITIONS

MOODY AIR FORCE BASE
DIGITAL AIRPORT SURVEILLANCE RADAR

moodyasr-11a.apr: soils w8h 3000

Source: Moody AFB

The soils in the vicinity of **Sites 4** and **5** are primarily comprised of the Tifton–Urban Land complex (TuB), with slopes ranging from 0 to 5 percent. Tifton soils are well drained and nearly level. The surface layers are dominated by brown loamy sand about 8 inches thick. The subsoil is sandy-clay loam and extends to a depth of 60 inches or more. This soil is generally good for construction activities, but must be tested to determine the likelihood of sinkhole development. Soils in the vicinity of **Site 6** are primarily Tifton Loamy Sand (TfB). TfB is characterized by slopes ranging from 2 to 5 percent. TfB is considered a prime farmland soil of the area and is well drained.

The current **AN/GPN-20** site is located west of Mission Lake in an area comprised primarily of Stilson Loamy Sand (Se). Se is typically a dry permeable soil with a sandy surface layer and loamy subsoil. Se is also typically found in low uplands or depressions.

**3.6.1.2 Geology.** Moody AFB lies within the Georgia Coastal Plain and is underlain by more than 2,000 feet of Cenozoic Age marine sediments. The surrounding landscape is characterized by flat to sloping plateaus with shallow river valleys and karst topography. The most important stratigraphic unit is Suwanee Limestone, which contains the upper Florida Aquifer. This limestone formation is the reason for the karst topography. Karst topography is characterized by sinkholes formed by the natural action of underground water moving through the limestone bedrock. As water moves within the limestone bedrock, the water dissolves the surrounding stone and may cause the surface to collapse forming sinkholes. Karst formations are more common in the area around the base due to the thin overburden material and higher elevation of the underlying limestone (USAF, 1995b). Due to the likelihood of sinkhole formation at all possible site locations, soil sampling to determine soil stability should be conducted before any construction activity is undertaken (USDA, 1979).

### 3.6.2 Future Baseline Without the Project

The geology and soil conditions at the base are not expected to change in the future without the project. It is expected that the above existing conditions will continue to represent the area of the alternative ASR-11 and existing AN/GPN-20 sites.

## 3.7 SURFACE WATER AND GROUNDWATER

### 3.7.1 Existing Conditions

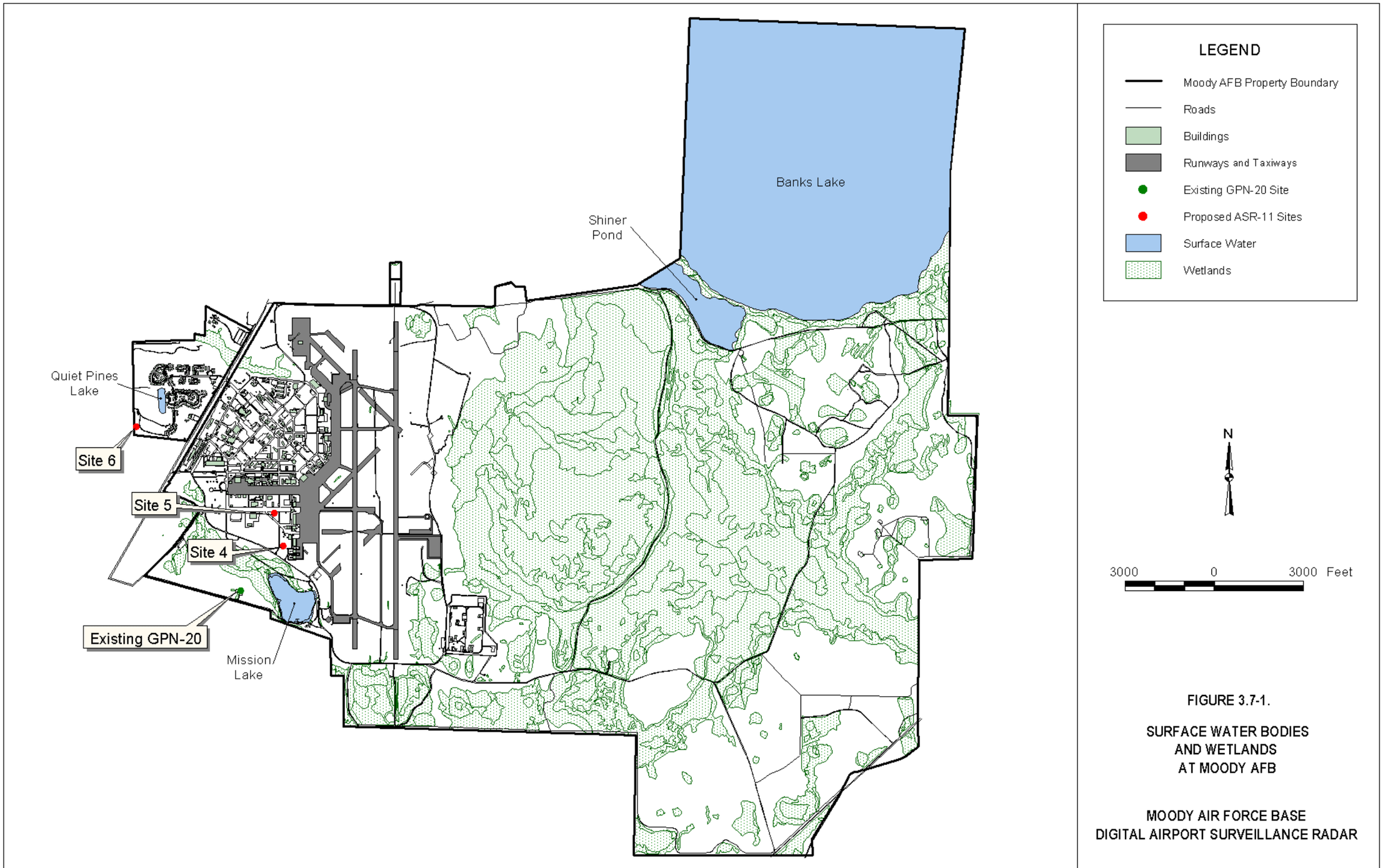
Surface water and groundwater are discussed in this section in regard to the three ASR-11 site locations. The characteristics for surface water and groundwater on the base are expected to generally describe the area around the three alternative ASR-11 sites.

**3.7.1.1 Surface Water.** Moody AFB is located within the Suwanee River Basin, which flows southeast into the Gulf of Mexico. The base lies between the Withlacoochee River to the west and the Alapaha River to the south. Lotic systems within the base are limited to a few small streams (USAF, 1996a). Lentic systems, which include five lakes and ponds, comprise the majority of water within the base (USAF, 1995b). Figure 3.7-1 shows locations of existing surface water bodies at Moody AFB.

Most of the surface water on the base is part of the Grand Bay/Banks Lake wetland complex, which comprises over 13,000 acres within the coastal plain of Georgia (USAF, 1996a). Wetlands from this complex cover approximately 6,500 acres of the base property, primarily within the eastern portion of the base (USAF, 1999a).

Lentic systems found on the main base include Quiet Pines Lake (3 acres), Mission Lake (30 acres), Shiner Pond (100 acres), and Banks Lake. Banks Lake occupies approximately 13 square miles; however, only 25 percent of the lake is open water, while the rest consists of shrub or forested swamp. Quiet Pines Lake is located between the housing area and golf course, and is stocked for fishing. Mission Lake is located southwest of the runways, and is the primary source for outdoor recreation on the main base. Shiner Pond is located west of the Grand Bay Weapons Range and south of Banks Lake, which is located in the northeastern portion of the base. Two other ponds are located on the Grassy Pond Recreation area 25 miles southwest of the base.

There are four lotic systems within Moody AFB. In the northeast portion of the base, Mill Creek drains the northern part of Banks Lake and approximately one-third of the shrub swamp known as Old Field Bay. Mill Creek is a tributary of Big Creek, which in turn flows into the Alapaha River. Surface water




Source: Moody AFB

from the northwest region of the base flows into Beatty Branch, which flows into Cat Creek, and then to the Withlacoochee River. All water leaving the southern portions of the base drains through Grand Bay Creek, which includes a major portion of the Grand Bay open marsh and creek swamp region. The drainage of the southwestern part of the base flows into Mission Lake, which in turn flows into Grand Bay and subsequently into Grand Bay Creek.

The surface water of Moody AFB is considered a "blackwater" system. This type of system is characterized by very soft water, acidic pH (4.5 to 6.5), poor buffering capacity, and relatively low fertility. A "blackwater" system typically has a brown tint due to high humic acid concentrations in the water derived from the breakdown of organic matter.

Storm water is discharged from the base through a series of drainage ditches, with five major storm drain outfalls along Burma Road. Storm water from these outfalls eventually flows into Mission Lake. Storm water from the northwest portion of the base forms the headwaters of Beatty Creek. The Moody AFB is included under the Air Force group storm water permit application (USAF, 1996a).

**Site 4** is located approximately 900 ft west from Mission Lake. **Site 5** is not located near any significant surface water body. **Site 6** is approximately 1,000 ft south of Quiet Pines Lake, located between the golf course and housing area. The existing **AN/GPN-20** radar is located approximately 1,000 feet west of Mission Lake (See Figure 3.7-1).

**3.7.1.2 Groundwater.** Within the area of the base, groundwater occurs in two water-bearing zones; the surficial aquifer system and the Floridan aquifer system. While groundwater is available within 10 to 20 feet of the surface, the main water-bearing zone is an artesian aquifer containing naturally high concentrations of sulfide, hydrogen sulfide, and iron. The presence of these compounds is a result of gypsum and celestite in the host rock (USAF, 1996a).

The water quality of the surficial aquifer is generally good, with a yield of approximately 50 gallons per minute (gpm). The host substrate of the surficial aquifer is primarily fine to coarse sands, gravel, silt, clayey silt, and clays.

The Floridan aquifer, which lies approximately 150 feet below the surface and is usually artesian in nature, supplies most of the water in the region, and yields are usually plentiful. Local demands on the aquifer include commercial, industrial, domestic, irrigation, and municipal use. The base's primary water supply comes from the Floridan aquifer.

The groundwater table is within 10 to 20 ft of the ground surface for all alternative ASR-11 locations (**Sites 4**, **5**, and **6**) and the existing **AN/GPN-20** location.

### 3.7.2 Future Baseline Without the Project

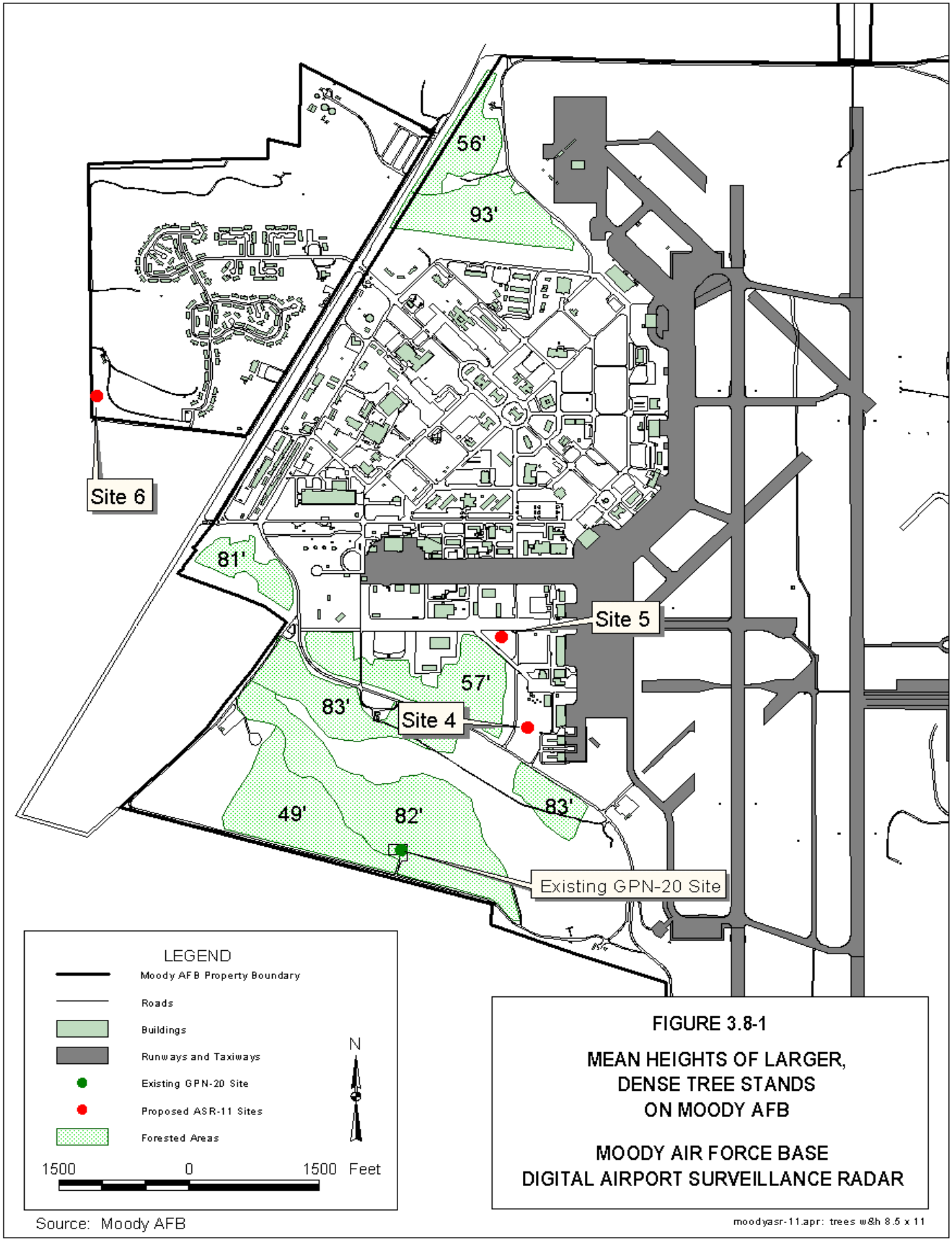
No substantial changes in surface or groundwater conditions are expected to occur in the future without the project. Implementation of Best Management Practices during normal activities on the base will help to reduce non-point source pollution from storm water. For example, booms have been installed at the five major storm water discharge points along Burma Road. These booms are designed to remove oil in storm water runoff. The Moody AFB Spill Prevention and Response Plan (USAF, 1997) describes various methods of dealing with spills of toxic compounds which might enter groundwater. Implementation of this plan would help reduce the likelihood of groundwater contamination.

## 3.8 BIOLOGICAL RESOURCES

This section contains descriptions of biological resources, including vegetation, wetlands, and wildlife, for Moody AFB and its vicinity, including the proposed ASR-11 sites and the existing AN/GPN-20 site.

### 3.8.1 Existing Conditions

**3.8.1.1 Vegetation.** A variety of native and exotic tree and shrub species are found throughout the developed portions of Moody AFB. A majority of the trees in these improved areas consist of loblolly pine and slash pine. The mean heights for tree stands located on the main base range from 49 feet to 103 feet (Figure 3.8-1). The majority of the grasses throughout these areas consist of common bermuda, cartpetgrass, centipedegrass, and common bahia species (USAF, 1996a). A listing of vegetation typically occurring on Moody AFB can be found in Table 3.8-1.


56'
93'
Site 6
81'
Site 5
57'
83'
Site 4
49'
82'
83'
Existing GPN-20 Site
LEGEND
Moody AFB Property Boundary
Roads
Buildings
Runways and Taxiways
Existing GPN-20 Site
Proposed ASR-11 Sites
Forested Areas
N
1500
0
1500 Feet
Source: Moody AFB
FIGURE 3.8-1
MEAN HEIGHTS OF LARGER, DENSE TREE STANDS ON MOODY AFB
MOODY AIR FORCE BASE
DIGITAL AIRPORT SURVEILLANCE RADAR
moodyasr-11.apr: trees w&h 8.5 x 11

A majority of the undeveloped upland areas throughout Moody AFB are characterized by pine flatwoods habitat. The most common species in these areas include longleaf pine and slash pine, with an understory consisting of palmetto, gallberry, blueberry, bracken fern and wax myrtle. These pine flatwoods also contain a variety of vines, the most common being yellow jasmine, and greenbrier. Pitcher plants also occur in moist sites throughout the flatwoods and in some open marsh areas. Also found in upland areas are clear-cut areas and pine plantations approximately 20 years old (USAF, 1996a).

Approximately 65 acres of Moody AFB support mixed oak-pine forests, with an overstory of mature live oak, laurel oak, water oak, and slash pine. The understory of these areas consist primarily of understory woody shrubs, blueberries, bracken fern, broomsedge, and other grasses (USAF, 1996a).

The wetlands associated with the weapons range/Grand Bay Wildlife Management Area (GBWMA) are dominated by the scrub-shrub cover type characteristic of the Carolina Bay habitat, i.e. blackgum-cypress swamp and open water. Understory vegetation consists primarily of heaths, redbay, wax myrtle, cinnamon fern, and greenbrier, while adjacent areas contain stands of pond pine, evergreen shrubs, and saw palmetto (USAF, 1996a).

**Site 4.** Site 4 is located in a transitional area between grassland and a grove of loblolly pines. The site itself contains tall bahia grass with a few young pines trees. To the north and the east of Site 4 tree coverage is minimal; however, pine tree stands ranging from 57 feet to 83 feet are located to the south and the west of the site (Figure 3.8-1).

**Site 5.** Site 5 consists entirely of mowed grass. Immediately southeast of Site 5 is a stand of pine trees with a mean height of 57 feet. There are also pine tree stands located further to the south and southwest, with a mean height of 83 feet.

**Table 3.8-1 Vegetation Commonly Found on Moody Air Force Base Property**

| Scientific Name | Common Name |
|---|---|
| **EMERGENTS** | |
| Nymphaea | Water lily |
| Pontederiaceae | Water hyacinth |
| *Brasenia schreberi* | Water shield |
| *Cabomba caroliniana* | Fan wort |
| *Nymphoides aquatica* | Big floating heart |
| **GRASSES AND HERBACEOUS COVER** | |
| *Axonopus compressus* | Cartpetgrass |
| *Cynodon dactylon* | Common bermuda |
| *Eremochloa ophiuroids* | Centipede grass |
| *Paspalum notatum* | Bahia species |
| *Pteridium aquilinum* | Bracken fern |
| *Myrica cerifera* | Wax myrtle |
| *Jasminum humile* | Yellow jasmine |
| *Sarracenia purpurea* | Pitcher plant |
| Ericaceae | Heaths |
| *Persea borbonia* | Red bay |
| *Osmunda cinnamomea* | Cinnamon fern |
| *Andropogon virginicus* | Broom sedge |
| Smilacaceae | Greenbriers |
| **SHRUBS** | |
| *Ilex* spp. | Gallberry |
| *Vaccinium* spp. | Blueberry |
| *Magnolia virginiana* | Sweet bay |
| *Cyrilla racemi flora* | Titi |
| *Lyonia lucida* | Shining fetterbush |
| *Clethra alnifolia* | Sweet pepperbush |
| **TREES** | |
| *Pinus taeda* | Loblolly pine |
| *Pinus elliotti* | Slash pine |
| *Pinus palustris* | Longleaf pine |
| *Quercus virginiana* | Live oak |
| *Quercus laurifolia* | Laurel oak |
| *Quercus nigra* | Water oak |
| *Quercus michauxii* | Basket oak |
| *Carya glabra* | Pignut hickory |
| *Pinus serotina* | Pond pine |
| Palmae | Palmetto |
| *Acer* spp. | Maple |
| *Nyssa sylvatica* | Blackgum |
| Cupressaceae | Cypress |
| *Acer rubrum* | Red maple |

Source: U.S. Air Force, 1996a

**Site 6.** Site 6 is located on the fringe of the base golf course with a scattered trees to the north and east, throughout the golf course area, ranging from 50 feet to 80 feet. There are no significant on-base forest stands in the area of Site 6 (Figure 3.8-1); however, a few large trees are located to the south of this site on privately owned property.

**AN/GPN-20.** The existing AN/GPN-20 is located to the south of a stand of pine trees with a mean height of 82 feet (Figure 3.8-1). Although Figure 3.8-1 displays tree stands surrounding the site, eastern and western portions of the surrounding area have been recently cleared. To the east of the site, a large area of trees has been cleared in order to provide for a runway rapid repair training area and to the west of the site is a large concrete area used for composting activities. In addition, a privately owned agricultural field virtually devoid of trees is located to the south.

**3.8.1.2 Wetlands.** Moody AFB property contains approximately 5,500 acres of wetlands. Wetlands located on the main base area are depicted on Figure 3.7-1. East of the base, an association of major wetlands, known as Carolina Bays, comprise the Grand Bay/Banks Lake Complex. This complex is comprised of several Carolina Bays (one to four miles across) and shallow lakes, interconnected by cypress-blackgum swamp. The Grand Bay/Banks Lake Complex covers over 13,000 acres, exclusive of the Okefenokee Swamp, and is the largest freshwater lake-swamp system in the Coastal Plain of Georgia (USAF, 1996a).

Within the Grand Bay/Banks Lake Complex is the Grand Bay Wildlife Management Area (GBWMA). The GBWMA comprises 8,171 acres of federally and state owned lands in Lanier and Lowndes Counties. Approximately 60 percent of this area consists of creek and bay swamp habitat, while 33 percent are primarily pine flatwoods with the remainder open fields and hardwood/pine stands.

No wetlands are located at or immediately adjacent to any of the alternative ASR-11 sites (**Site 4**, **Site 5**, or **Site 6**). There is a small wetland area in the vicinity of the existing **AN/GPN-20** site (Figure 3.7-1).

**3.8.1.3 Wildlife.** The vast areas of forested and wetland habitats throughout much of the undeveloped portions of Moody AFB properties provide habitat for a variety of wildlife species. In particular, birds can be found in large numbers throughout Moody AFB (Table 3.8-2), since the expanse of wetlands attract many wading bird species. During the fall and throughout the winter,

**Table 3.8-2 Birds Commonly Found on Moody Air Force Base Property**

| Scientific Name | Common Name |
|---|---|
| *Ardea herodias* | Great blue heron |
| *Egretta caerulea* | Little blue heron |
| *Nycticorax violaceus* | Yellow crowned night heron |
| *Nycticorax nicticorax* | Black crowned night heron |
| *Butorides striatus* | Green heron |
| *Casmerodius albus* | Great egret |
| *Egretta thula* | Cattle egret |
| *Eudocimus albus* | White ibis |
| *Anhinga anhinga* | Anhinga |
| *Botaurus lentiginosus* | American bittern |
| *Ixobrychus exilis* | Least bittern |
| *Aytha collaris* | Ring-neck duck |
| *Anas americana* | American widgeon |
| *Anas crecca* | Green winged teal |
| *Anas discors* | Blue winged teal |
| *Bucephala albeola* | Buffelhead |
| *Aix sponsa* | Wood duck |
| *Cathartes aura* | Turkey vulture |
| *Pandion haliatus* | Osprey |
| *Buteo jamaicensis* | Red tailed hawk |
| *Buteo lineatus* | Red-shouldered hawk |
| *Meleagris gallopavo* | Wild turkey |
| *Colinus virginianus* | Northern bobwhite |
| *Gallinula choropus* | Common moorhen |
| *Cyanocitta cristata* | Blue jay |
| *Thryothorus ludovicianus* | Caroline wren |
| *Mimus polyglottus* | Northern mocking bird |
| *Zenaida macroura* | Morning dove |
| *Piranga rubra* | Summer tanager |
| *Dendroica petechia* | Yellow warbler |

Source: U.S. Air Force, 1996a

the Grand Bay Complex provides habitat for a variety of ducks that remain in the area ranging from days to weeks. Blue winged teal are noted to stop over in the area in mid September and ring-necked ducks utilize the wetlands in January through mid-February. Wood ducks are present throughout the winter and summer months (USAF, 1996a).

Mammals commonly found at Moody AFB include those listed in Table 3.8-3. In general, these mammals are found throughout Moody AFB with higher concentrations in the eastern and less developed areas of the base. Amphibian species found on Moody AFB include spring peeper (*Hyla crucifer*), southern chorus frog (*Pseudacris nigrita*), eastern newt (*Notophthalmus viridescens*), and tiger salamander (*Ambystoma tigrinum*). Reptile species include common box turtle (*Terrapene carolina*), ground skink (*Scincella lateralis*), eastern glass lizard (*Ophisaurus ventralis*), southern water snake (*Nerodia fasciata*), and rough earth snake (*Virginia striatula*). The open water areas of the base support sport fishing commonly consisting of the following species: bluegill (*Lepomis marcochirus*), largemouth bass (*Micropterus salmoides*), bowfin (*Amia calva*), chain pickerel (*Esox niger*) and warmouth (*Lepomis gulosus*) (USAF, 1996a; USAF, 1995c).

**Table 3.8-3 Mammals Commonly Found on Moody Air Force Base Property**

| Scientific Name | Common Name |
|---|---|
| *Didelphis viginiana* | Virginia opossum |
| *Sylvilagus aquaticus* | Swamp rabbit |
| *Procyon lotor* | Raccoon |
| *Lynx rufus* | Bobcat |
| *Lutra canadensis* | Otter |
| *Sylvilagus floridanus* | Eastern cottontail |
| *Urocyon cinereoargenteus* | Gray fox |
| *Mephitis mephitis* | Striped skunk |
| *Odocoileus virginianus* | White tailed deer |
| *Sciurus carolinensis* | Gray squirrel |
| *Neotoma floridana* | Eastern wood rat |

Source: U.S. Air Force, 1996a

Due to the lack of water at each of the alternative sites, amphibians and fish are not expected to be present. Although amphibians are not expected to utilize the immediate area of the existing AN/GPN-20, the adjacent wetland area may sustain amphibian species. Wildlife species present at

**Site 4** and **Site 5** are minimal due to disturbance from the adjacent industrial activities and other airport operations. **Site 6** likely has a greater number and/or more diverse wildlife species than the other two alternative sites due to its distance from primary base activities. However, activities associated with the golf course, roadways, and residential properties may limit the wildlife species found in this area. Similar to Sites 4 and 5, the existing **AN/GPN-20** site has been altered by base activities; however, due to a further distance from the main base and a greater forest area proximate to the site, higher concentrations of wildlife are expected to inhabit this area than Sites 4 or 5. It should also be mentioned that the recent clearing of trees adjacent to the AN/GPN-20 site for the rapid runway repair facility might have reduced the number and/or diversity of the species inhabiting the area due to a reduction in habitat.

**3.8.1.4 Threatened and Endangered Species.** On Moody AFB, a total of 22 species of plants, fish, amphibians, reptiles, mammals, and birds are listed as federal and/or state endangered, threatened, special concern, unusual, rare, or candidate species (Table 3.8-4) (USAF, 1996a). Of these 22 species, two are listed as state endangered species and two are listed as federal endangered species (USAF, 1996a). It should also be noted that the Peregrine falcon, though listed as a state endangered species, has recently been removed from the federal list of endangered species. In addition, three species are listed as state threatened species while only one of these species, the Eastern indigo snake, is considered threatened according to the federal status (USAF, 1995c).

There are no known threatened or endangered species located in the areas of **Site 4**, **Site 5**, or **Site 6** (USAF, 1996). However, there is known gopher tortoise habitat to the northwest of the existing **AN/GPN-20**. It should also be mentioned that indigo snakes frequently use gopher tortoise burrows as habitat, although reported sightings are infrequent and it is believed that there is not a self-sustaining population of indigo snakes on Moody AFB (USAF, 1995c).

### 3.8.2 Future Baseline Without the Project

Without the project, the status of vegetation, wetlands, wildlife and endangered species is expected to remain similar to existing conditions in the areas of the proposed ASR-11 sites as well as the existing AN/GPN-20 site. There are no planned land use changes that are expected to alter current

**Table 3.8-4 Rare Species Occurring at Moody AFB.**

| Scientific Name | Common Name | Federal Status | State Status |
|---|---|---|---|
| **THREATENED AND ENDANGERED SPECIES** | | | |
| *Drymarchon corais couperi* | Eastern indigo snake | Threatened | Threatened |
| *Gopherus polyphemus* | Gopher tortoise | Candidate | Threatened |
| *Neofiber alleni* | Round-tailed muskrat | Candidate | Threatened |
| *Mycteria americana* | Wood stork | Endangered | Endangered |
| *Haliaeetus l. leucocephalus* | Southern bald eagle | Threatened | Special Concern |
| *Falco peregrinus* | Peregrine falcon | None | Endangered |
| **OTHER SPECIES OF CONCERN** | | | |
| *Amphicarpum muhlenbergianum* | Blue maidencane | None | Special Concern |
| *Epidendrum conopseum* | Green-fly orchid | None | Unusual |
| *Pieris phillyreifolia* | Climbing heath | None | Special Concern |
| *Rhapidophyllum hystrix* | Needle palm | None | Special Concern |
| *Sarracenia minor* | Hooded pitcher plant | None | Unusual |
| *Acanthrarchus pomotis* | Mud sunfish | None | Special Concern |
| *Fundulus chrysotus* | Golden topminnow | None | Special Concern |
| *Pseudobranchus striatus* | Dwarf siren | None | Special Concern |
| *Kinosternon barii* | Striped mud turtle | None | Special Concern |
| *Aimophilia aestivalis* | Bachman's sparrow | Candidate | Rare |
| *Botaurus lentiginosus* | American bittern | None | Special Concern |
| *Grus canadensis pratensis* | Florida sandhill crane | None | Special concern |
| *Grus canadensis tabida* | Greater sandhill crane | None | Special concern |
| *Nycticorax nycticorax* | Black-crowned night heron | None | Special Concern |
| *Pandion haliaetus* | Osprey | None | Special Concern |
| *Lanius ludovicianus migrans* | Migrant loggerhead shrike | Candidate | Special Concern |

Source: U.S. Air Force, 1996a

characteristics of biological resources at **Site 4** or **Site 5**. Although Moody AFB plans to expand the golf course in the vicinity of **Site 6**, the proposed expansion is not anticipated to alter the characteristics of the biological resources near the site, since it is already somewhat disturbed and typical of a golf course setting.

## 3.9 AESTHETIC RESOURCES

The purpose of this section is to characterize the aesthetic resources of the project area in order to provide a framework for determining the potential changes that could occur as a result of the construction and operation of the ASR-11 at the alternative sites. Figures 3.9-1, 3.9-2, and 3.9-3 show the locations from which photographs were taken during the site survey in October 1999.

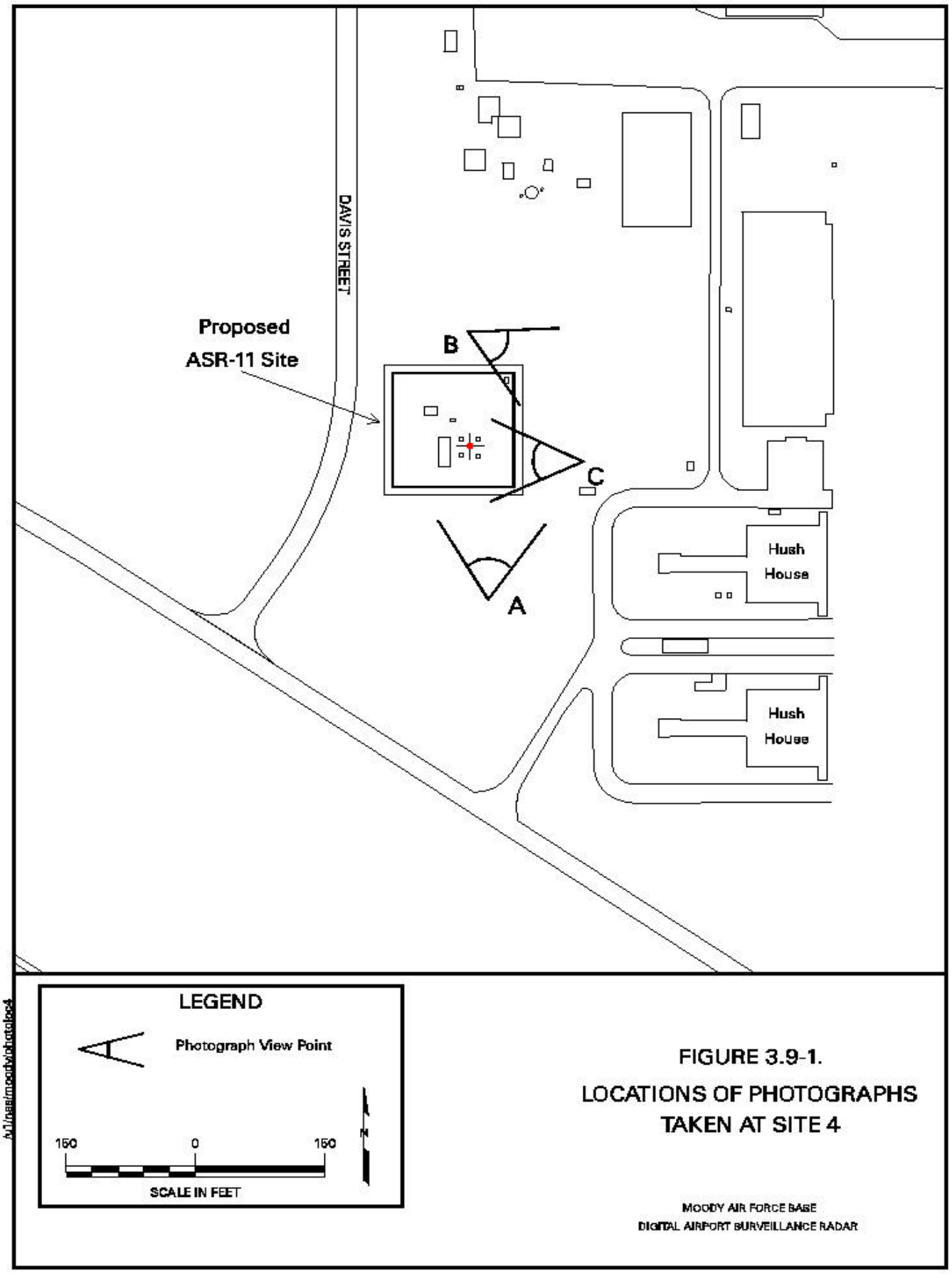
### 3.9.1 Existing Conditions

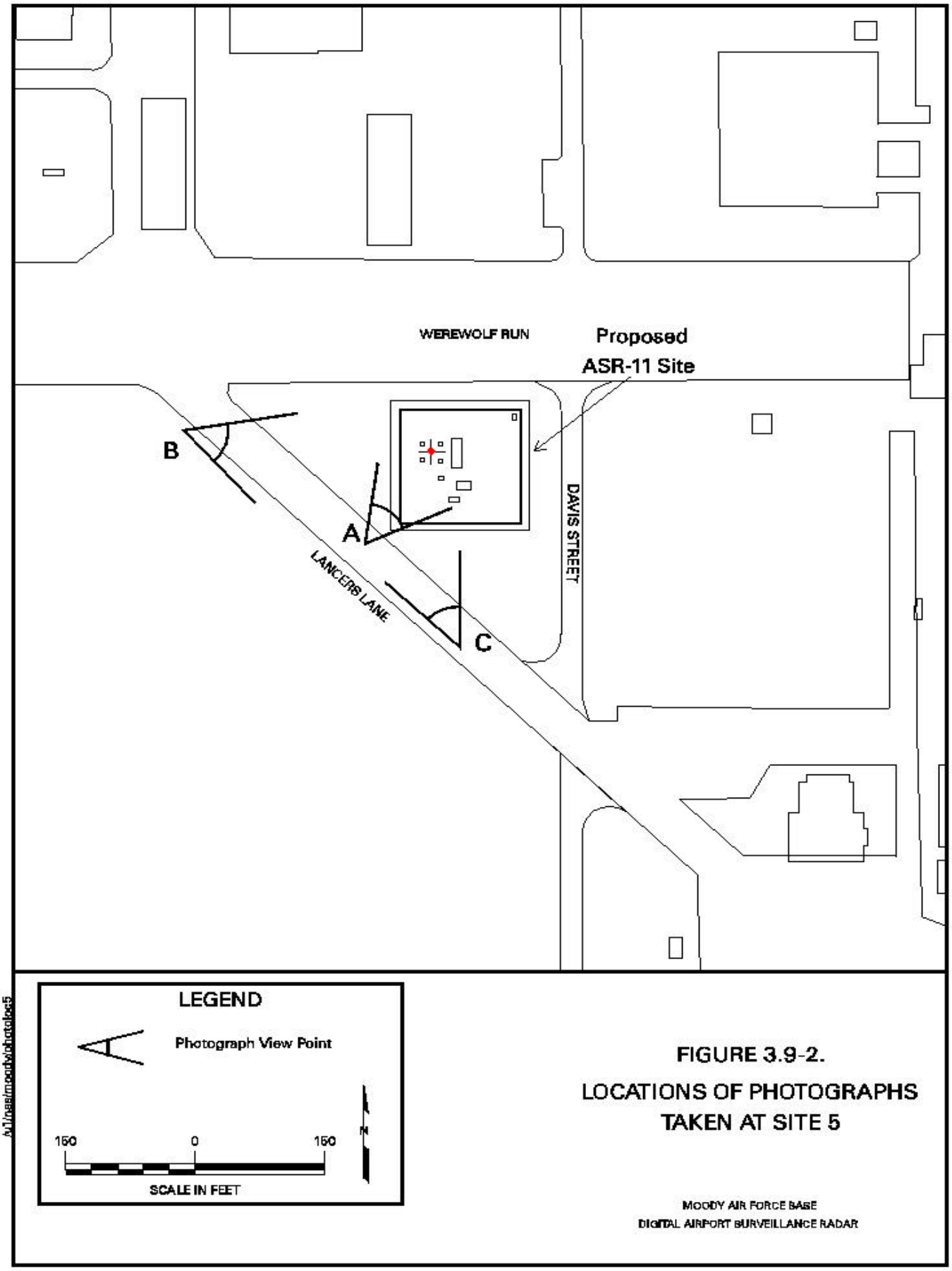
Typical of the region, Moody AFB is generally flat and free of substantial topographic features. Throughout the developed portion of the base, the vegetation is fairly uniform consisting of trees, shrubs, and grassy areas. The largest section of developed land on Moody AFB properties consists of the main base area in the northwestern portion of the property. A majority of the undeveloped areas on Moody AFB properties consists of wetlands, woodlands, fields, and open water.

Many buildings (approximately 40) on Moody AFB were constructed around the 1950s and their architecture reflects this time period. There is what may be described as a functional aesthetic quality on the main portion of the base, with features like runways, aircraft hangars, lights, antennae, and towers considered an integral part of the Moody AFB landscape. These basic features and the typical base activities give the impression of an organized and functional military installation.

**Site 4.** Site 4 is located in an aircraft operations and maintenance/industrial area on Moody AFB. The area is generally flat and existing vegetation consists of grasses, shrubs, and immature trees.
Site 4 is located approximately 1,800 feet northeast of the existing AN/GPN-20. Views extending to the north, southeast, and west are displayed in Figure 3.9-4. Across the grassy field to the north, buildings within the industrial/aircraft operations and maintenance areas are clearly visible.

To the southeast of Site 4, and much closer than the buildings located to the northeast, are the hush houses also within the industrial area. Views to the south and west of the site consist mainly of grasses and trees.


DAVIS STREET
Proposed
ASR-11 Site
B
C
A
Hush
House
Hush
House
LEGEND
Photograph View Point
150
0
150
SCALE IN FEET
N
FIGURE 3.9-1.
LOCATIONS OF PHOTOGRAPHS
TAKEN AT SITE 4
MOODY AIR FORCE BASE
DIGITAL AIRPORT SURVEILLANCE RADAR


WEREWOLF RUN
Proposed
ASR-11 Site
B
A
C
DAVIS STREET
LANCERS LANE
LEGEND
Photograph View Point
150
0
150
SCALE IN FEET
N
FIGURE 3.9-2.
LOCATIONS OF PHOTOGRAPHS
TAKEN AT SITE 5
MOODY AIR FORCE BASE
DIGITAL AIRPORT SURVEILLANCE RADAR

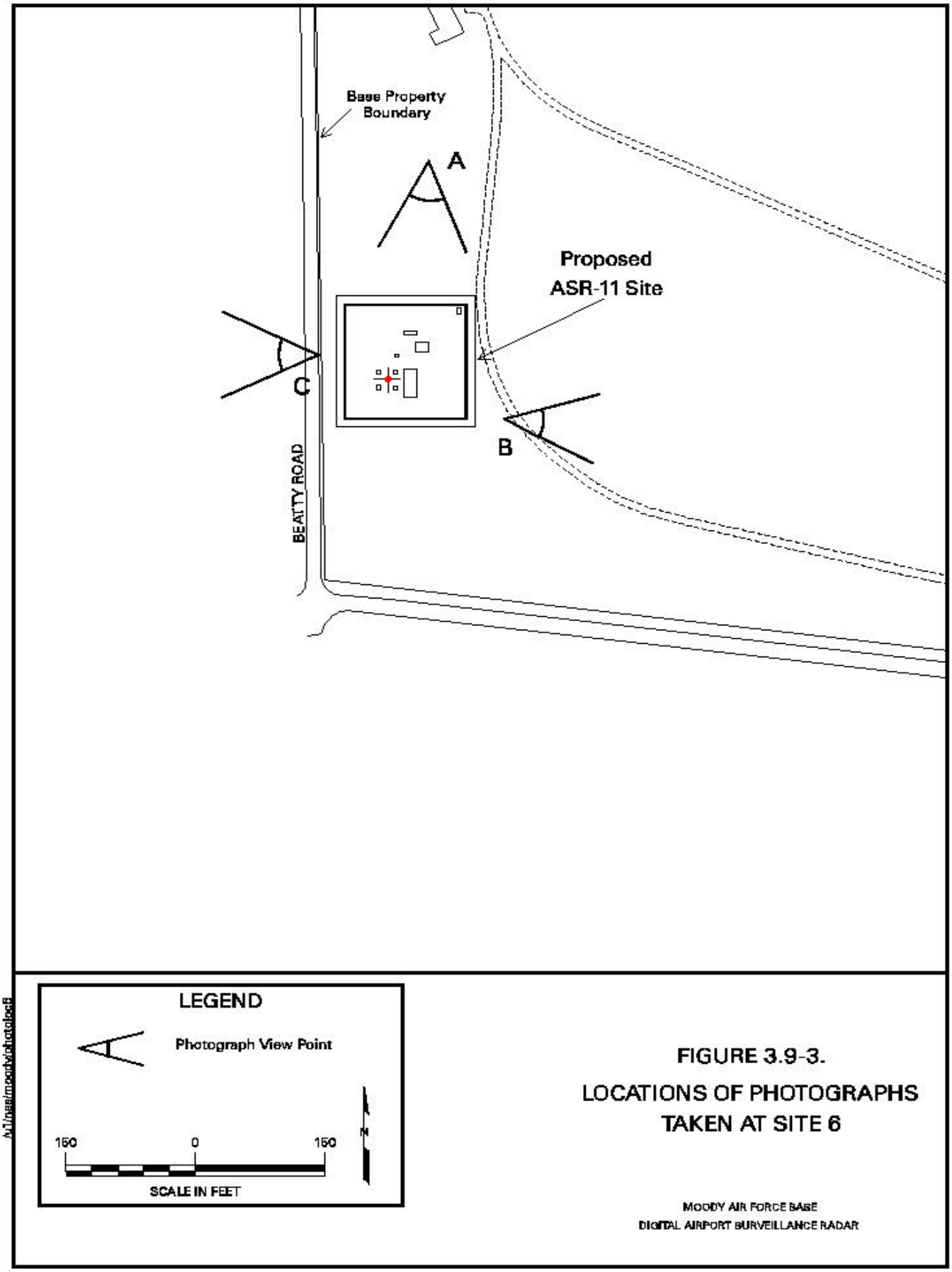



FIGURE 3.9-3.

LOCATIONS OF PHOTOGRAPHS TAKEN AT SITE 6

MOODY AIR FORCE BASE
DIGITAL AIRPORT SURVEILLANCE RADAR

A - View North from Site 4
(Davis Street is to the left, behind the small pine trees. Runways are to the right)

B - View Southeast From Site 4
(towards the hush houses)

C - View West From Site 4
(looking towards Davis Street, near proposed access road to ASR-11 site)

**Figure 3.9-4. Photographs of Alternative Site 4 - October, 1999 Site Visit**

**Site 5.** Site 5 is also located in an aircraft operations and maintenance/industrial area, approximately 900 feet north of Site 4. Therefore, views from Site 5 are similar to those discussed in Site 4. However, as apparent in the photographs displayed in Figure 3.9-5, Site 5 is located in closer proximity to some of the base roads and structures. This area is generally flat and the vegetation of this area consists primarily of mowed grass. The site is clearly visible from most areas of base activity within the surrounding aircraft operations and maintenance/industrial areas (see views to northeast, southeast, and northwest of Site 5 in Figure 3.9-5).

**Site 6.** Site 6 is located on the western fringe of the base golf course, west of the driving range. This site is visible from other areas of the golf course and the military family housing area. Private off-base housing is also clearly visible from this site, as depicted in the photographs taken toward the south and west (Figure 3.9-6). To the east of Site 6, across the golf course driving range, are on-base military residences. Though not immediately adjacent to the site, these structures are clearly visible due to the flat grade, mowed grass and few trees separating them from the site.

**Existing AN/GPN-20.** The immediate area surrounding the existing AN/GPN-20 consists mainly of open space. This area is generally flat and vegetation consists of grasses, shrubs and mature trees. Though the AN/GPN-20 is visible from utilized areas of the base, it does not detract from the aesthetics of the base or appear incompatible with the surrounding land usage. In addition, at the time of the site visit, a large area of trees to the east of the site had been recently cleared to provide for a rapid runway repair facility (photograph taken toward the east in Figure 3.9-7) and a large concrete area had been placed to the west of the AN/GPN-20 to be used for composting activities. A privately owned off-base agricultural field can be seen to the south of the existing site (Figure 3.9-7). The photograph taken north/northeast towards the AN/GPN-20 displays the flat grade of the site and trees in the background.

### 3.9.2 Future Baseline Without the Project

In the future without the project, increased training activities at Moody AFB are expected to increase the demand for parking in the vicinity of Werewolf Run, near **Site 5**. This currently under-utilized parking area is anticipated to be more fully utilized; however, parking lot expansion is not anticipated

A - View Northeast Into Site 5
(from Lancer's Lane toward the grassy triangle where ASR-11 would be constructed)

B - View Southeast near Site 5
(looking southeast along Lancer's Lane toward service station)

C - View Northwest near Site 5
(service station is to left; grassy triangle is to right)

**Figure 3.9-5. Photographs of Alternative Site 5 - October, 1999 Site Visit**

A - View South/Southwest across Site 6
(Beatty Road and private residence visible off-base)

B - View East from Site 6
(looking toward driving range)

C - View West from Site 6
(looking across dirt road toward agricultural field off-base)

**Figure 3.9-6. Photographs of Alternative Site 6 - October, 1999 Site Visit**

Top Photo: View East from Radar toward Runway Rapid Repair Area
Above Photo: View South from Radar Site toward Agricultural Field Off-base
Below: View North/Northeast toward Existing Radar and Pine Trees between Radar and Main Base

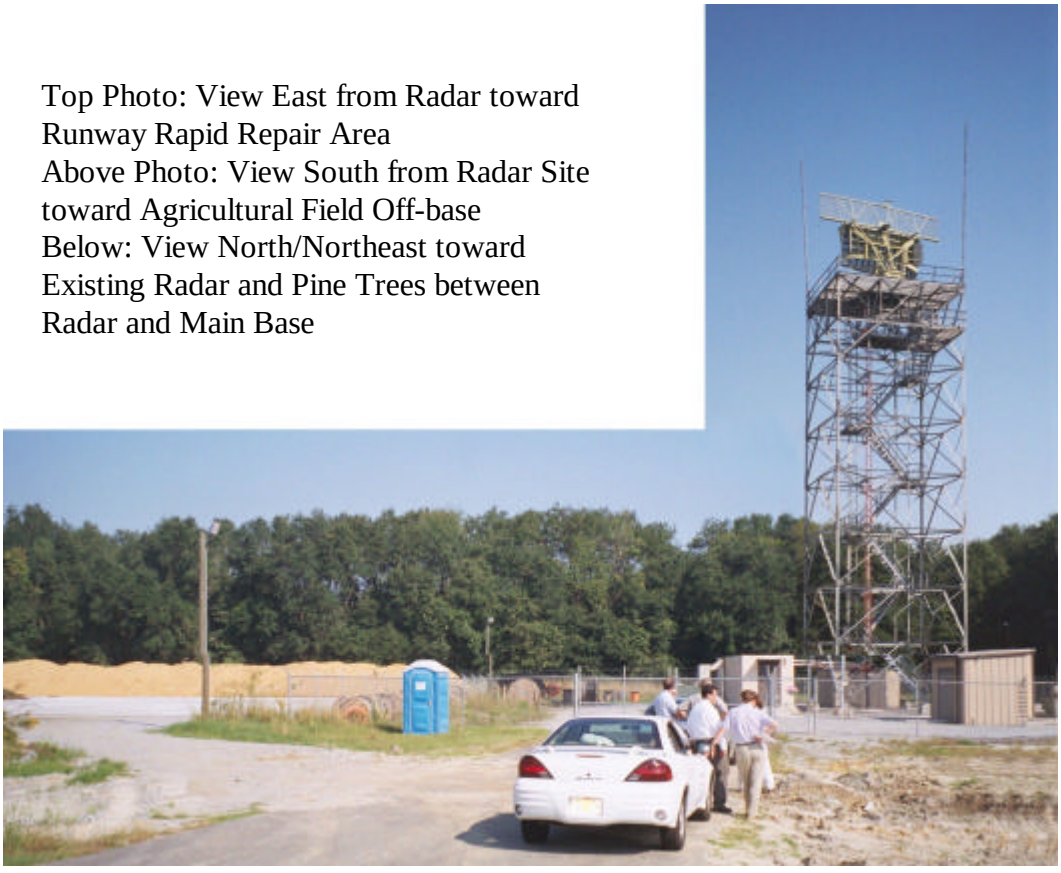


**Figure 3.9-7. Photographs of AN/GPN/20 Site - October, 1999 Site Visit**

to be necessary at this time. Therefore, the anticipated increase in training operations is not expected to impact the aesthetic characteristics in the vicinity of Site 5. The proposed golf course expansion in the vicinity **Site 6** is similarly not expected to alter the aesthetic characteristics of the surrounding area. If the additional holes are constructed on-base, the proposed expansion would occur on property already used and/or maintained as golf course property; should the additional holes be constructed off-base, adjacent open land would be converted to recreational space, but the overall aesthetics would generally be similar to the existing grassy fields and occasional trees, with a slightly more manicured appearance. There are no planned land use changes in the immediate vicinity of **Site 4** that are anticipated to substantially alter the future aesthetic conditions of its surroundings.

The aesthetic characteristics of the area of the existing **AN/GPN-20** site are not expected to substantially change in the future without the project.

## 3.10 CULTURAL RESOURCES

This section identifies cultural resources of Moody AFB and indicates if any known resource areas are located in the vicinity of the existing AN/GPN-20 site and the alternative ASR-11 sites.

### 3.10.1 Existing Conditions

**3.10.1.1 Archaeological Sites.** A cultural resources survey of Moody AFB was conducted in 1994 and 1995, and the findings of this study are presented in a 1996 Cultural Resources Survey. The survey revealed 21 archeological sites and 39 isolated finds. The isolated finds constituted fewer than five artifacts found at each location; these sites are not eligible for inclusion on the National Register of Historic Places (NRHP). Of the 21 archeological sites, 11 were prehistoric in nature, 2 were historic, and 8 possessed both prehistoric and historic components. Only five of these 21 sites are considered eligible for listing on the NRHP, while the remaining 16 do not possess the necessary qualities to be recommended to the NRHP (USAF, 1996b). The base does not publicly identify the location of the archeological sites to protect the potentially eligible sites from unauthorized investigations or disturbance (USAF, 1999a).

None of the alternative ASR-11 sites (**Site 4**, **Site 5**, and **Site 6**) nor the existing **AN/GPN-20** is located on sites potentially eligible for the NRHP. In addition, neither the existing AN/GPN-20 nor the alternative sites are located on any of the other archeological sites or isolated finds.

**3.10.1.2 Historic Structures.** A majority of the development that exists at the base occurred after 1951. Few structures built during the World War II period still exist, and those remaining have been significantly modified (1999a). Only one structure on Moody AFB has been identified as eligible for listing on the NRHP (USAF, 1999c). This structure is a 200,000-gallon capacity steel water tower that was constructed in 1941. The water tower is located west of runway 18R/36L, near the runway aprons and approximately 2000 feet north-northwest of alternative Site 5 (the closest alternative site to the water tower).

None of the alternative ASR-11 sites (**Site 4**, **Site 5**, and **Site 6**) nor the existing **AN/GPN-20** is located near structures potentially eligible for the NRHP. Due to the height of the water tower and the relatively flat topography of the area, the water tower is clearly visible from Site 4 and Site 5; however, due to screening provided by trees, the water tower is not visible from Site 6 at ground level.

### 3.10.2 Future Baseline Without the Project

It is not anticipated that there would be any substantial change in cultural resource conditions in the future without the project because there are no cultural resources at or in the vicinity of the alternative sites or the existing AN/GPN-20.

## 3.11 POLLUTION PREVENTION AND HAZARDOUS WASTE

### 3.11.1 Existing Conditions

The following sections describe current conditions and practices on the base with regard to pollution prevention and hazardous waste.

**3.11.1.1 Pollution Prevention.** Overall on Moody AFB a number of pollution prevention policies and procedures have been implemented, including: development and implementation of a hazardous waste management plan; a base permanent pollution prevention program; a plan for spill prevention, control, and countermeasures; and closure of the old base landfill (USAF, 1997). The overall implementation of these policies and procedures on the base is expected to reduce existing and potential pollution. The base Permanent Pollution Prevention Program encourages the use of environmentally friendly substances in place of hazardous chemicals whenever possible. The use of "smart washers" containing grease eating enzymes, for instance, has lessened the need for petrochemical based cleaning substances in the aircraft and ground vehicle maintenance shops. Oil-water separators are used to prevent hydrocarbons such as oil and grease from entering the sewage system (USAF, 1997).

No specific pollution prevention measures have been identified at **Site 6**. **Site 5** is located within an existing Installation Restoration Program (IRP) site, as described in greater detail below, and current activities at the Site 5 IRP location include monitoring of groundwater and soils to determine the extent of the contamination. Cleanup has not yet begun at this IRP location. No specific pollution prevention measures have been identified at **Site 4**; however, as discussed in the following section, Site 4 is located within an area containing subsurface contamination and groundwater monitoring wells are located in areas surrounding the site. Cleanup measures around the base at various IRP sites include landfill caps, soil vapor extraction, air sparging, shallow removal actions, bio-venting, and select natural attenuation as applicable (USAF, 1995b).

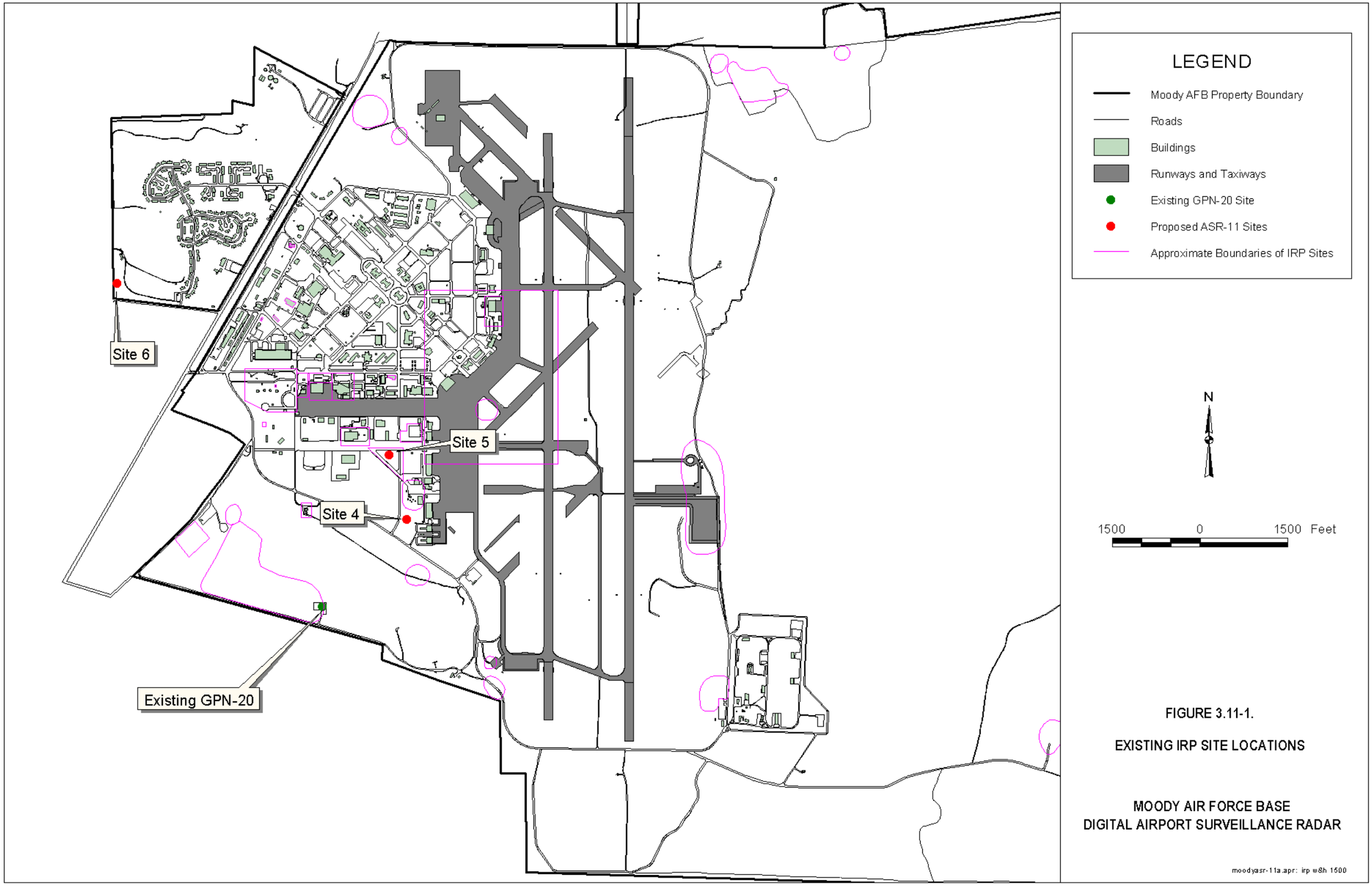
**3.11.1.2 Hazardous Waste.** The Moody AFB is considered a large-quantity generator of hazardous waste under EPA identification number GA-0570024109. A significant portion of this hazardous waste is produced from the maintenance and operation of jet aircraft. Much of the waste generated by the base is recycled through the Defense Reutilization and Marketing Office (DRMO). Examples of hazardous materials used and recycled on the base are waste oil, jet fuel, antifreeze, brake fluid, waste paint, paint stripper, degreasers, batteries, and film development chemicals containing silver. Other compounds such as parts cleaning solvents are collected, removed, and recycled off-base by a contractor (Safety Kleen) (USAF, 1996a).

Collection points of hazardous materials are found throughout the base, and are managed by designated Satellite Accumulation Point Managers (78 satellite accumulation sites). At each satellite accumulation point a 55-gallon metal drum or other suitable container is used to hold hazardous material until it is full and ready for removal. Once the appropriate container is filled, the Satellite Accumulation Manager arranges to transport the wastes to a 90-day accumulation point. At the 90-day holding point materials are analyzed, identified, and prepared for shipment, after which the material is sent to the DRMO, to await final reuse or disposal.

Past activities on the base have led to the release of hazardous waste materials. Due to these past activities, the base has implemented an Installation Restoration Program (IRP). There are a total of 35 IRP sites located throughout the base, most of which are displayed on Figure 3.11-1. Two locations have been identified as having contamination levels above action levels. These two sites are the southwest landfill and the former and current fire department training area. The recommended remedial action for the landfill consists of a 30-acre soil cap and groundwater monitoring. Remedial action for the fire department training area includes soil excavation of approximately 0.25 acres, transportation to an off-site solid waste landfill, soil cap, and groundwater monitoring (USAF, 1996a).

There are four primary IRP sites within the immediate vicinity of Site 4 and Site 5. No IRP sites are located in the vicinity of Site 6. The existing AN/GPN-20 lies on top of the southwest landfill IRP site. The number of IRP sites in the vicinity of Site 4 and Site 5 is attributed to their location within an industrial area.

**Site 4** is located approximately 250 feet south of an IRP site. This site is known to contain trichloroethene (TCE), with the greatest concentrations and most widespread plume occurring between 40 and 70 feet below ground surface (bgs). TCE concentrations in this area exceed Georgia's Maximum Concentration Level (MCL) between approximately 40 and 50 feet bgs. Historic and current soil sampling indicate that there is no TCE contamination above the soil/groundwater interface. Four other Volatile Organic Compound (VOC) constituents were detected in this area: cis-1,2-dichloroethene (DCE), carbon tetrachloride, 1,1-DCE, and 1,2-dichloroethane. None of these VOC constituent concentrations exceed Georgia MCLs (IT, 2000).




Source: Moody AFB

**Site 5** is within the Underground Waste Fuel Storage IRP location (tank removed in 1984), southeast of the multiple shops building IRP site, southwest of an IRP site previously containing an underground storage tank (UST) for jet fuel storage (tank and contaminated soil removed in 1990), and northwest of the IRP site noted in the discussion of Site 4. The plumes of contamination from the Underground Waste Fuel Storage area and the multiple shops building area intersect and appear to contribute to the same plume for many contaminants at various depths. Though groundwater contamination can still be found at levels exceeding Georgia MCLs in the area of the former jet fuel UST IRP site located to the northeast of Site 5, the monitoring well located in the center of the tank pit was abandoned after a 1995/1996 investigation because it no longer contained free product. The jet fuel UST IRP site has been recommended as a No Further Action site (IT, 2000).

In general, sampling in the area of Site 5 from 1990 to present has revealed the presence of a variety of compounds including total petroleum hydrocarbons, benzene, ethyl benzene, xylenes, napthalene, phenol, styrene, tolulene, TCE, methalene chloride, lead, and 2-methylnapthalene. Groundwater testing performed in 1995 using direct-push technology indicated that six VOCs are found in this area at levels above Georgia MCLs. TCE was the predominant VOC detected in this area, with the highest concentrations found to the west of Site 5. Sampling of inorganic constituents performed in 1996 revealed the presence of analytes at concentrations exceeding Georgia MCLs. The most recent groundwater sampling (1999) has revealed the greatest concentrations of benzene occurring at a depth around 40 feet bgs, greatest concentrations of TCE occurring around at depths of 50 to 60 feet bgs, and the greatest concentrations of cis-1, 2-dichloroethene occurring at depths between 40 to 50 feet bgs. Although traces of arsenic, lead, and thallium have been detected in the soils around Site 5 above established background values, they are not anticipated to present a problem with the placement of the ASR-11 at this location. Soils in the area of Site 5 have been overturned and regraded since removal of the tank, as a result of construction activities in the area, and the contamination that was originally present at Site 5 is no longer present in the surface or subsurface soils; therefore, no cleanup actions have been recommended (IT, 2000).

**Site 6** is not located near any IRP sites. The existing **AN/GPN-20** site is located on top of the former Southwest Landfill IRP site. The landfill has been capped and groundwater is routinely monitored.

### 3.11.2 Future Baseline Without the Project

It is anticipated that remediation of past hazardous waste sites will continue, as well as management of hazardous materials and newly generated wastes. Continuing pollution prevention measures on the base may reduce potential for new sources of contamination to arise at any of the sites.

## 3.12 ELECTROMAGNETIC ENERGY

### 3.12.1 Existing Conditions

Electrical currents and components generate electrical fields and magnetic fields. These may be stationary or dynamic. Depending on the equipment, electromagnetic radiation that propagates outward may be created. Electromagnetic radiation, electrical fields and magnetic fields are localized effects. The electromagnetic environment at a particular location and time is the sum of all the localized electric and magnetic fields plus electromagnetic radiation arriving from both natural and manmade sources. Electric fields, magnetic fields, and electromagnetic radiation are of interest here because of the potential for health effects from some frequency ranges and the potential for electromagnetic interference on other electronic equipment. Electromagnetic radiation is discussed first in this introduction.

Electromagnetic radiation travels at a uniform speed ($3 \times 10^8$ m/sec in a vacuum; the speed of light). It is often useful to consider electromagnetic radiation as a wave, and to describe it in terms of frequency (where 1 Hz means 1 cycle per second and 1 kHz means 1000 cycles per second). Some parts of the electromagnetic spectrum are more commonly described in terms of wavelength, which is inversely related to frequency.

The spectrum of electromagnetic radiation includes visible light, which has frequencies on the order of $5 \times 10^{14}$ Hz (specifically, wavelengths from 400 nanometers (nm) to 760 (nm). Electromagnetic radiation with frequencies higher than that of visible light include ultraviolet light, X-rays, and gamma-rays. These types of electromagnetic radiation are described as “high energy” and have the potential to “excite” electrons, to thereby ionize molecules, and to thus affect body chemistry. Especially in high absorbed doses, high frequency electromagnetic radiation can adversely affect health (NSC, 1979).

Electromagnetic radiation with frequencies lower than that of visible light include infrared light and radio waves. Frequencies below $10^{12}$ Hz ($10^{6}$ MHz) are categorized as radio waves. These include frequencies used for AM radio; short-wave, television, and FM broadcast bands; pagers; cellular telephones; mobile radios; radar; and microwave technologies. These frequencies are non-ionizing, and have the following known health effects: (1) effects caused by directly heating body tissues and (2) electromagnetic interference with electronic medical devices such as pacemakers.

The heating of tissues caused by exposure to radio frequency radiation (RFR) at relatively low incident power densities can normally be accommodated. However, in some tissues, heat produced at higher radiation intensities may exceed temperature regulating mechanisms so compensation for heat gain may be inadequate. Thus, exposure at high intensities can cause thermal distress or irreversible thermal damage. Eye tissues are particularly vulnerable (NSC, 1979).

Electromagnetic interference with medical devices has become an issue because medical devices increasingly use sensitive electronics at the same time that RFR and other electromagnetic sources are proliferating (FDA, 1996). Medical equipment which may be susceptible to interference from RFR includes cardiac pacemakers, defibrillators, ventilators, apnea monitors, and electric wheelchairs (VTDPS, 1996; IEEE, 1998). Medical device manufacturers are expected to design and test their products to ensure conformance with standards for protection against radio frequency interference (IEEE, 1998). Nevertheless, users of medical devices are generally advised to keep RFR emitters as far away from their devices as is practical (IEEE, 1998).

There is currently considerable interest on the part of some researchers, the news media, and the public regarding the possibility of other health effects from non-ionizing radiation (and/or other electrical or magnetic fields). However, there is no scientific consensus that non-ionizing radiation presents any other health risks (USAF, 1995a) and no consensus about a mechanism by which non-ionizing radiation could have any such effects (i.e., effects other than those associated with heating of tissue and interference with medical devices).

Existing equipment at the AN/GPN-20 radar emits electromagnetic radiation in the radio frequency range. Locations close to and directly in front of the antenna (whether rotating or stationary) are considered unsafe when the radar is operating, on the basis of the potential for heating of body tissues. Similarly, on the tower immediately below the antenna is considered unsafe. The intensity of the radar energy diminishes with distance, so there would be less tissue heating at greater distances.

Within electronic systems for radar, any high-voltage tubes capable of emitting X-rays are typically shielded with lead, and shielding on other equipment is typically adequate to limit transmitted radiation to acceptable levels. While there are unshielded components present at the AN/GPN-20 site such as incandescent light bulbs, there is no indication or expectation that significant levels of electromagnetic radiation other than RFR is emitted into the environment by the AN/GPN-20 system.

Magnetic fields and electric fields other than electromagnetic radiation are also created by electrical equipment. In everyday situations, high-voltage power lines, televisions, computer monitors, fluorescent lights, light dimmer controls, improperly grounded equipment, and appliances used with non-polarized extension cords create measurable electric fields. Transformers, alternating current (A/C) adapters, motors (e.g., analog clocks and kitchen appliances), power lines, vehicles, and old electric blankets create measurable magnetic fields.

The presence of various electrical components in the AN/GPN-20 radar system inevitably means that there are a variety of magnetic and electrical fields in the vicinity of the AN/GPN-20 equipment. As noted above, there is currently considerable interest on the part of some researchers, the news media, and the public regarding the possibility of health effects from electrical or magnetic fields. However, no scientific consensus exists that electrical or magnetic fields present health risks other than those associated with medical devices. A 1996 National Academy of Science report, *Possible Health Effects of Exposure to Residential Electric and Magnetic Fields,* concluded that:

> *The current body of evidence does not show exposure to these fields presents a human-health hazard. Specifically, no conclusive and consistent evidence shows that exposures to residential electric and magnetic fields produce cancer, adverse neurobehavioral effects, or reproductive and developmental effects.* (National Academy of Science, 1996).

### 3.12.2 Future Baseline Without the Project

Without the project, the future electromagnetic field conditions in the vicinity of the three ASR-11 sites and the existing AN/GPN-20 are expected to remain similar to those currently present. There is no planned change in land use at the site locations that would substantially alter the electromagnetic field characteristics in the area.

# 4.0 ENVIRONMENTAL CONSEQUENCES

The No Action alternative would leave existing AN/GPN-20 and air traffic control equipment in place. In addition, no new construction, renovation, or operations would be required. Since the no action alternative would involve no alteration to any of the three proposed ASR-11 sites at Moody AFB, this alternative would result in no impact to environmental resources. Thus, the environmental consequences of the No Action alternative would be identical to those identified in Section 3.0, Future Baseline without the Project. However, selecting the No Action alternative, and thereby having to maintain the existing AN/GPN-20, would require relying on existing radar equipment that is not capable of meeting future user requirements for transmitting digital signal data to new digital automation system air traffic controller displays. The existing radar also does not meet user requirements for increased target detection, weather reporting and improved reliability.

The proposed action would involve the construction of a new ASR-11 facility and the removal of the existing AN/GPN-20. Potential impacts associated with the action alternative involve those resulting from construction (short-term) and operation (long-term) of the DASR system. The potential impacts are described in this section for each of the alternative ASR-11 sites (Site 4, Site 5, and Site 6). Impacts are presented by environmental parameter. Mitigation measures that may be required to reduce impacts are described in Section 6.0.

## 4.1 LAND USE

### 4.1.1 Short-term Impacts

Short-term impacts associated with the construction of the ASR-11 and removal of the AN/GPN-20 would include temporary disruption of land uses due to elevated noise levels, increased dust, interference with roadway access, and visual effects. Construction of the ASR-11 facility would also include the installation of a temporary construction staging area approximately 75 feet by 100 feet adjacent to the ASR-11 site. This staging area will be used by construction personnel to store equipment for use during construction of the ASR-11. Construction of the ASR-11 at either **Site 4** or **Site 5** would have minimal impacts on land use. Both sites are located in an industrial/aircraft

operations and maintenance area where DASR construction activities would be unlikely to disrupt the adjacent operations. However, **Site 6** is located in a recreational/open space area adjacent to both on-base and off-base residences. Thus, DASR construction activities at this site may disrupt the existing land use and may disturb the surrounding residents, as well as persons using the golf course and associated recreational facilities.

The installation of utilities, such as power, telephone, and fiber optic cable to each of the sites could temporarily affect land uses along the proposed alignment routes. While specific alignments would not be defined until final design, it is anticipated that land uses along the alignments will be affected by elevated noise levels and increased dust associated with open trench excavation. Installation of utilities for the proposed ASR-11 at alternative Site 6 would result in greater impacts to the surrounding areas than at Site 4 and Site 5, due to the proximity of Site 6 to active recreational areas and to residences.

Installation of utilities for Site 4 and Site 5 would occur largely in the industrial/aircraft operations and maintenance area and the primary disruptions would result from utility installation across and along roadways on base property. However, for Site 6, in addition to the disruption across and along roadways on base property, the utility construction would also involve the crossing of State Route 125 and trench excavation adjacent to both on-base and off-base residential areas, as well as recreational areas. As a result, these activities would have the potential to disturb the surrounding residents as well as persons using the recreational facilities (golf course and driving range). While there would be short-term disruption in the vicinity of Site 6, the duration of construction is relatively short and the nature of the impact would be typical of routine utility construction.

Upon the successful completion of the construction of the ASR-11, the existing **AN/GPN-20** radar would be dismantled. Impacts to surrounding land uses related to removal of the AN/GPN-20 would be minimal. This land could be reclaimed by Moody AFB.

### 4.1.2 Long-term Impacts

Installation of the ASR-11 at **Site 4** or **Site 5** would be generally compatible with the surrounding land uses. The location of the ASR-11 in these general areas would not interfere with the surrounding industrial activities (operation of the hush houses or fueling facility). The ASR-11 at either of these locations is also expected to be compatible with future pilot training activities, including the associated increase in parking facility utilization. Construction of the ASR-11 at Site 5 may interfere with future monitoring and cleanup activities, however, it is anticipated that future design could accommodate, or reasonably relocate, these alternatives. The potential for the nearby hush houses to generate unsuitable levels of vibration, which might interfere with the operation of the ASR-11, should be considered, if Site 4 is selected.

Installation of the ASR-11 at **Site 6** would result in the placement of a potentially incompatible land use in a recreational/open space area, which is also in close proximity to on-base and off-base residential areas. The placement of the ASR-11 at Site 6 may also interfere with future plans for golf course expansion, depending upon whether Moody AFB elects to expand the golf course on existing base property or to acquire additional adjacent privately owned land.

## 4.2 SOCIOECONOMICS

### 4.2.1 Short-term Impacts

Construction of the ASR-11 at any of the three alternative sites would require similar work efforts, and would, therefore, have similar effects on socioeconomic conditions at the base. Construction at **Site 4**, **Site 5**, or **Site 6** would not adversely impact the socioeconomic conditions at Moody AFB. There would be a slight short-term increase in the revenue generated in the surrounding area due to construction employees utilizing local businesses for supplies and personal use. During the construction period, the work crew would consist of approximately 10 persons.

Upon the successful completion of the construction of the ASR-11, the existing AN/GPN-20 radar would be dismantled and packed for shipment and possible reuse at another location. No effects on socioeconomic conditions are anticipated as a result of this activity.

### 4.2.2 Long-term Impacts

In the absence of other independent activities at Moody AFB, socioeconomic conditions would return to the existing conditions once the ASR-11 construction was completed. The new radar facility would not be staffed, and would therefore have no long-term effects on socioeconomic conditions.

### 4.2.3 Environmental Justice

Under its instructions for the Environmental Impact Analysis Process (32 CFR Part 989), the Air Force must demonstrate compliance with Executive Order 12898, entitled *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, to determine the effects of Federal programs, policies, and activities on minority and low income populations.

**Site 4** and **Site 5** are located within Moody AFB property and distant from neighboring off-base residential housing. **Site 6** is located in the southwestern corner of the base property west of State Route 125. West of this location, on the opposite side of Beatty Road, are privately-owned off-base agricultural fields and a few rural-residential houses. To the south of this site is privately-owned off-base civilian housing. The population that would most likely to be affected by the installation of the ASR-11 at the Site 6 location is contained within Census Block Group number 010100-1 (Figure 3.2-1). Census Block Group number 010100-1 has fewer persons below the poverty level than both the Lanier and Lowndes County averages, as well as the poverty level of adjacent Census Block Group number 950200-4, located on the eastern side of Moody AFB (Table 3.2-3). The number of persons below the poverty level within 010100-1 is only slightly higher (2.5 percent) than the Georgia poverty level. Although the number of persons below the poverty level is notably lower in Census Block Group 010100-2 to the south of the base, this socioeconomic characteristic of 010100-2 is atypical of Georgia state and especially the county averages for Lanier and Lowndes. Thus, the population within Census Block Group number 010100-1 is not uncharacteristic of the surrounding population with regard to income.

The ethnicity of the population within Census Block Group number 010100-1 is comparable to that of the surrounding Census Block Groups, Lowndes and Lanier Counties, and the state of Georgia overall (Table 3.2-3). There are slight variations among the areas, however the overall ratios among the various ethnicities are fairly constant.

As demonstrated in other parts of Section 4.0, the proposed DASR installation is not expected to have significant human health or environmental impacts. Therefore, the proposed project is not expected to pose adverse health or environmental impacts to residents of adjacent neighborhoods, regardless of income or ethnicity. Thus, the proposed project is consistent with the objectives of Executive Order 12898.

## 4.3 UTILITIES AND TRANSPORTATION

The following describes potential short- and long-term effects of the installation of a DASR system on utilities. Fiber optic cable connections, which must be made from each alternative site to Building 5118, are depicted in Figures 4.3-1, 4.3-2, 4.3-3, respectively.

### 4.3.1 Short-term Impacts

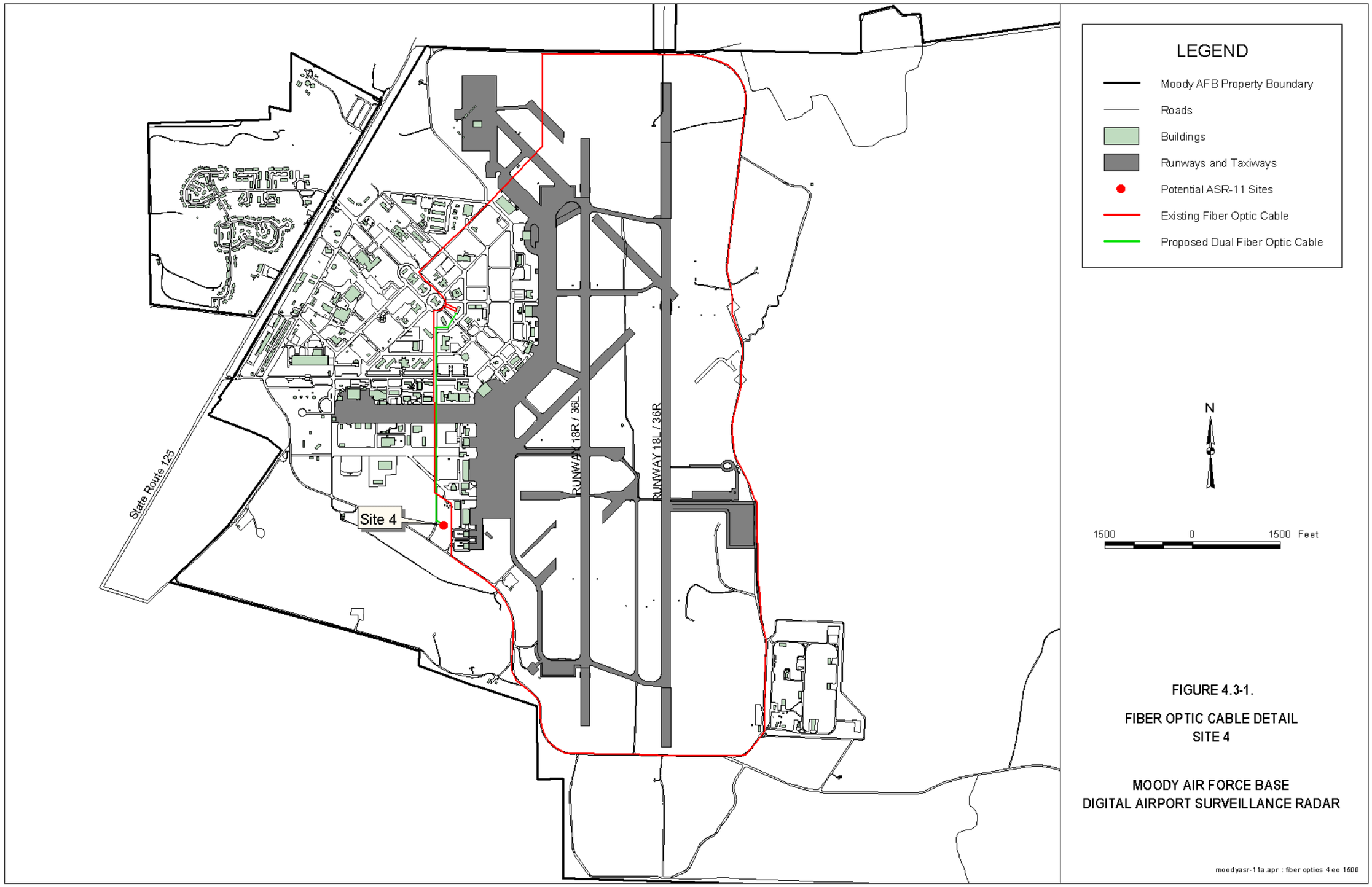
Various lengths of open trench excavation would be needed to provide utility connections, such as electrical, telephone, and fiber optic for the ASR-11 future operation (Table 4.3-1). The ASR-11 would not require water or wastewater services. Although these utilities will be required, to a limited extent, during construction.

**Table 4.3-1. Required Lengths of New Utility Connections**

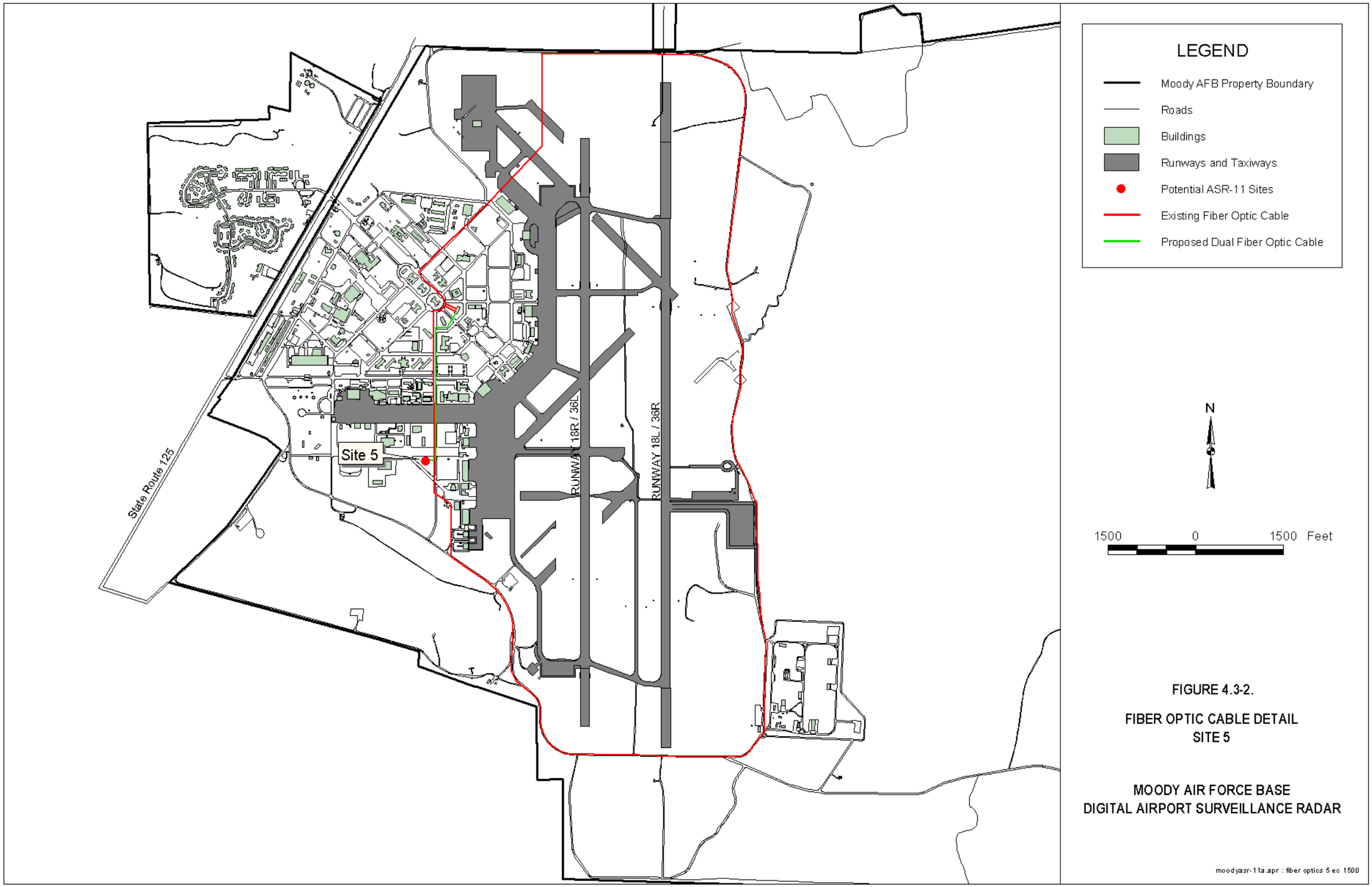
| ASR-11 Alternative Site | Length of Electric Power Conduit Required | Length of Telephone Cable Required | Length of Fiber Optic Cable Required |
|---|---|---|---|
| Site 4 | 260 feet | 2,050 feet | 150 to 3,910 feet* |
| Site 5 | 250 feet | 1,025 feet | 150 to 2,830 feet* |
| Site 6 | 2,000 feet | 600 feet | 2,000 to 5,630 feet* |

Source: Raytheon, 2000

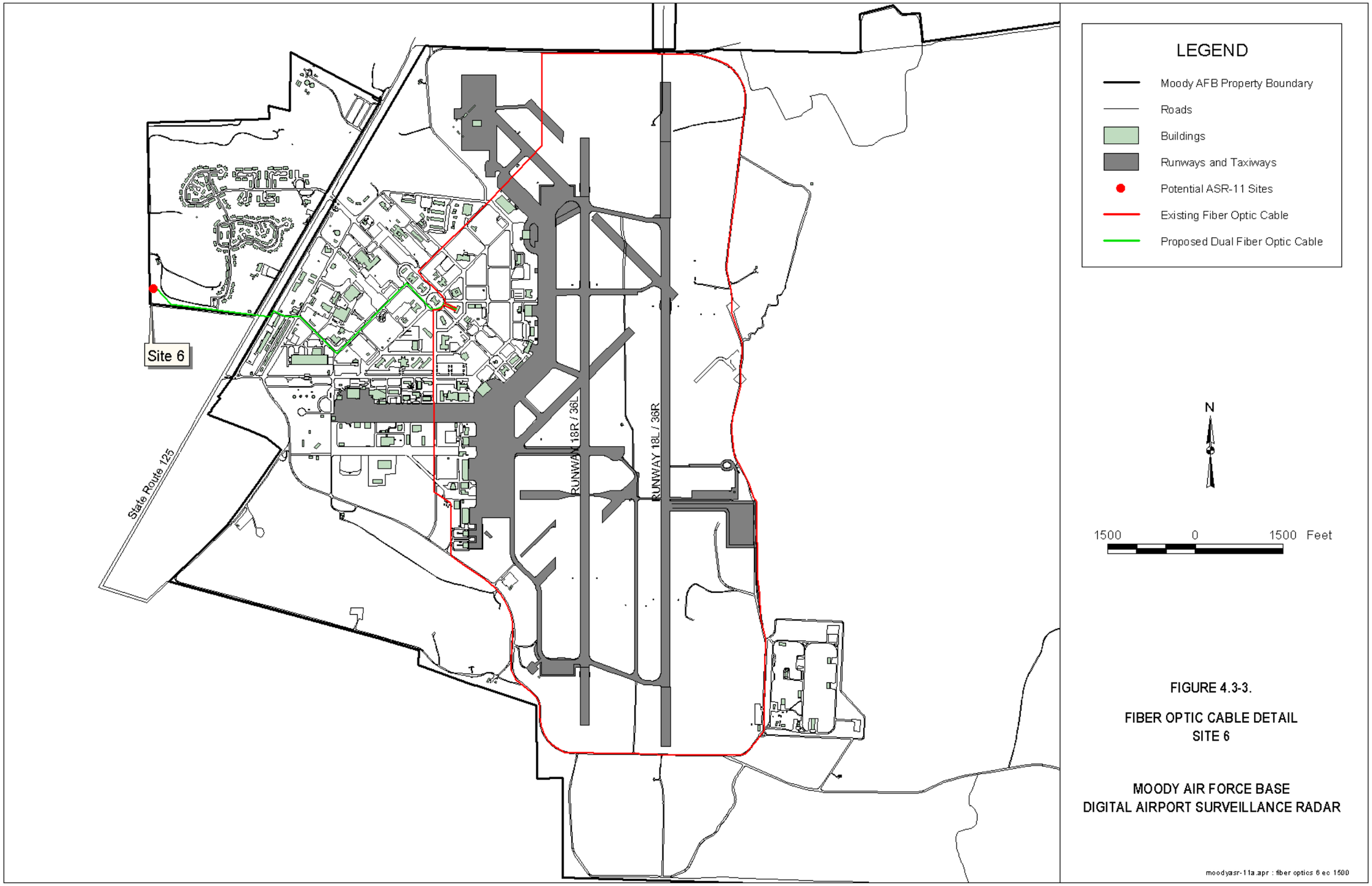
*The largest value for each of the ASR-11 alternative sites represents the preferred fiber optic cable route.




Source: Moody AFB




Source: Moody AFB




Source: Moody AFB

**4.3.1.1 Water Supply.** A temporary increase in water demand would occur during construction. A water source would be supplied on site by mobile water tanks. It is not anticipated that the water demand (both workers' personal need and dust control) during construction of the ASR-11 would adversely impact the water supply at Moody AFB due to the limited number of construction workers, short construction period, and the adequate water supply of the Floridan aquifer.

**4.3.1.2 Wastewater Treatment.** There would be an insignificant short-term increase in demand for sewage treatment during construction. Portable wastewater units would be on site and waste would be transported to the nearby treatment facility.

**4.3.1.3 Solid Waste.** As the existing AN/GPN-20 is dismantled, there would be a need to remove solid waste material that may not be able to be re-used in the future. All solid waste would be handled in accordance with standard base procedures. Any hazardous materials would be disposed of following Moody AFB policies and protocols and relevant state and federal regulations (see Section 4.11 on hazardous waste).

**4.3.1.4 Electricity.** Adequate electrical power is available to each of the alternative ASR-11 sites. Underground power lines would be run from the Equipment Shelter to **Site 4**, at a distance of 260 feet. Similar to Site 4, electrical power can be routed to **Site 5** from the existing Equipment Shelter, at a distance of 250 feet. **Site 6** would be supplied with electricity from the existing RAPCON building, by way of 2000 feet of underground cable. Short-term impacts causing disruption of power to the immediate area around the alternative ASR-11 sites are expected while connections are made.

**4.3.1.5 Telephone.** Telephone lines would be extended from the existing locations identified in Section 3.3.1.5. The final route and distance to the new ASR-11 site will be determined when the final site and design are selected. Telephone line connections for **Site 4** can be made at Building 797, at a distance of 2,050 feet. Telephone line connections for **Site 5** can also be made at Building 797, at a distance of 1,025 feet. Telephone line connections to **Site 6** would be made from established lines at the golf course maintenance Building 1560, at a distance of 600 feet. No disruption to telephone service in the immediate area of the alternative ASR-11 sites is expected.

**4.3.1.6 Fiber Optic Cable.** Fiber optic cable will either be run through a newly built conduit or through pre-existing conduits. For **Sites 4** and **5**, there are currently three alternatives for running the fiber optic cable to the new ASR-11 radar. The currently favored proposal for Site 4 would involve running the cable along Brookley and Davis streets to the Moody AFB Communications Squadron (Building 5118), at a distance of 3,910 feet. Once the cable is in place at Build 5118, the new cable can be connected directly into the existing fiber optic cable ring. Excavation, to place the fiber optic cable conduit underground, would be needed, as well as a new manhole every 300 feet in areas below a road surface. The two alternative proposals, for running new fiber optic cable from the new ASR-11 radar station at Site 4 would require less excavation than the primary alternative for running the cable. One alternative would require a similar length of cable, but would use existing conduits and manholes if they were adequate for the new cable. The second alternative involves a much shorter length of cable, at a distance of 150 feet. This alternative would splice into the existing fiber optic ring near Site 4, and not at the junction point at Building 5118. This alternative is not preferred due to the difficulty of splicing fiber optic lines and the risk of disruption to the base fiber optic network.

Proposals for Site 5 are similar to Site 4, but with shorter fiber optic cable lengths. The distance from Site 5 to Building 5118 is 2,830 feet. The length of cable needed for the other two proposed alternatives are 2,350 feet when using existing conduits and 150 feet when splicing into the fiber optic ring near Site 5.

Fiber optic cable for **Site 6** would run from the alternative ASR-11 site along the perimeter golf course road, across Bemiss Road (GA State Highway 125), up Alabama Road, George Street, Austin Ellipse, and Bradley Circle to the Moody AFB Communications Squadron (Building 5118). At this point, it would be connected with the existing fiber optic cable ring around the base. This distance is approximately 5,630 feet. A second proposal suggests running the fiber optic cable 2,000 feet to the existing RAPCON. With the latter alternative, a number of issues would need to be considered, such as the future land use around the existing RAPCON, condition of existing cable, and the ability to meet duct banks under GA State Highway 125 (which is proposed to be expanded).

**4.3.1.7 Natural Gas.** Natural gas is not required for the installation of the proposed ASR-11 radar. Therefore, no impacts are expected to occur with regard to natural gas on Moody AFB. During the construction of the utility conduits at Site 5, care would be needed to avoid gas lines along Werewolf Run.

**4.3.1.8 Transportation.** Impacts to transportation within Moody AFB would be minimal. The small size of the project would not produce a volume of construction related traffic that would impact existing conditions. Personal vehicles and small trucks of the contractor and subcontractors would be on site or at an area designated by the Air Force. There would be a period of approximately 10 hours where cement trucks would enter the base for the foundation placement. The foundation concrete must be placed continuously, thus necessitating the 10-hour period. Heavy vehicles, including cement trucks, are frequently on base roads. Therefore, the cement trucks and other construction vehicles necessary for construction are not expected to have an impact on base roads. Construction related activities would not adversely impact existing traffic conditions.

### 4.3.2 Long-term Impacts

It is not anticipated that future utility and transportation conditions at Moody AFB would be affected as a result of operating the proposed ASR-11 radar system. The addition of electrical power, telephone lines, and fiber optic cable at any of the alternative radar sites would not have a significant effect on the utilities in the area. The operation of the ASR-11 radar system would not require water resources, wastewater treatment, collection of solid waste, or natural gas resources; therefore, no impacts to those utilities are anticipated. No long-term impacts to traffic are anticipated. There would be minimal additional unpaved road due to the new ASR-11 installation. The unpaved road would be limited to the small access road, and allow future access to the new ASR-11 radar station. All three sites have the same road width, and the longest access road would be at Site 5, at a distance of 55 feet. Thus, the new road would not affect the existing transportation network on base. Discontinuing the operations at the existing AN/GPN-20 radar is not expected to affect area utilities or transportation.

## 4.4 NOISE

### 4.4.1 Short-term Impacts

Construction of the radar tower and supporting infrastructure, including connections to power and telephone, and installation of the fiber optic cable, would result in elevated noise levels as grading and minor excavation occur, and as construction of the tower proceeds. Noise impacts are expected to be minimal at **Site 4** and **Site 5** due to the existing elevated noise levels found in these areas. Short-term noise impacts have a greater potential to affect the areas surrounding **Site 6**, due to the lower existing noise levels and the neighboring recreational and residential land uses. Typical construction equipment noise levels may be reduced by using well-maintained equipment and by installing mufflers and engine jackets (Table 4.4-1). Construction of the tower and supporting infrastructure is anticipated to take approximately three weeks, and therefore, any elevated noise levels would be of very short-term duration.

Dismantling of the existing **AN/GPN-20** would also result in temporary elevated noise levels; however, these are anticipated to be of short duration, and at a distance from sensitive noise receptors.

### 4.4.2 Long-term Impacts

It is not anticipated that there would be any long-term noise impacts as a result of operation of the ASR-11 radar. Noise levels generated by the ASR-11 would be maintained at a level consistent with current Occupational Safety and Health Administration (OSHA) regulations as specified in CFR Title 29, Part 1910. Noise from ASR-11 equipment located in operational areas would be designed not to exceed 55 decibels at any time. Noise from the DASR system equipment located in general work areas should not exceed 65 decibels, including periods when the cabinet doors are open. The antenna pedestal with its drives, mounted on the tower, will be designed not to produce noise levels in excess of 55 decibels outdoors on the ground at a distance of 100 feet from the tower, which correlates to the area just outside the proposed fence surrounding the site.

**Table 4.4-1. Construction Equipment Noise Levels in dBA ($L_{eq}$) at 50 Feet**

| Equipment | Field Measurements | Well-Maintained Equipment with Mufflers and Engine Jackets | Best Technology (Specialized Mufflers and Shields) |
|---|---|---|---|
| Air Compressor | 81 | 71 | 65 |
| Back Hoe | 85 | 80 | 76 |
| Concrete Mixer | 85 | 83 | 75 |
| Concrete Pump | 82 | 80 | 75 |
| Concrete Vibrator | 76 | 70 | - - |
| Crane, Derrick | 88 | 80 | 66 |
| Crane, Mobile | 83 | 80 | 76 |
| Dozer | 87 | 83 | 76 |
| Generator | 78 | 71 | 78 |
| Grader | 85 | 80 | 65 |
| Jack Hammer | 88 | 80 | 76 |
| Loader | 84 | 80 | 75 |
| Paver | 89 | 80 | 76 |
| Pile Driver | 101 | 90 | 76 |
| Pneumatic Tool | 85 | 75 | 80 |
| Pump | 76 | 71 | 65 |
| Rock Drill | 98 | 90 | 65 |
| Roller | 80 | 75 | 80 |
| Saw | 78 | 70 | 70 |
| Scraper | 88 | 83 | 65 |
| Shovel | 82 | 80 | 78 |
| Truck | 88 | 83 | 76 |
| Truck Alarms | 94 | 89 | 75 |

Source: Bolt, Beranek and Newman, 1974

## 4.5 AIR QUALITY

### 4.5.1 Short-term Impacts

The short-term air quality impacts of constructing an ASR-11 would be similar at all of the three alternative sites. Site clearing and construction vehicle traffic would generate fugitive dust during the construction period. The disturbed area at any of the three ASR-11 alternative sites would be minimal. Proposed access roads for all three alternative sites are similar, ranging from 35 feet (Site 6) to 55 feet (Site 5).

Distance for electrical connections between the alternative sites and existing utility connection sites varies greatly between **Site 6** and **Sites 4** and **5**. Both Sites 4 and 5 are similar distances from existing electrical connections (approximately 250 feet); however, Site 6 is 2,000 feet from the nearest electrical connection location. The distance of telephone line connections varies among each of the three alternative sites, with the greatest distance at Site 4, and the shortest distance at Site 6. The distance of fiber optic cable connection varies for each of the three alternative sites. Depending on the method for final connection, Sites 4 and 5 may be equal in distance or Site 4 may be greater (see Section 4.3.1.6). Under the currently favored proposals for fiber optic cable connection, Site 6 would be the greatest distance from a connection point into the fiber optic ring around the base (see Section 4.3.1.6).

The amount of dust generated during construction is expected to vary in proportion to the length of new conduits required for the different utilities. Both Sites 4 and 5 are not located near any sensitive receptors, but Site 6 is located near an off-base residential area and on the fringe of the base golf course. All dust would be minimized by applying water as needed during construction. Consequently, no adverse short-term dust impacts are anticipated at any of the sites.

All construction vehicles and equipment would produce emissions that could temporarily affect air quality. However, because the number of vehicles required to perform the work and the construction duration is limited, emissions are not anticipated to cause an exceedence of NAAQS in the vicinity of the final ASR-11 radar site.

Similar to the installation of the new ASR-11, dismantling of the existing AN/GPN-20 radar would generate some fugitive dust and some vehicle and equipment emissions. The nominal emission and dust generated during the AN/GPN-20 dismantling are not anticipated to cause an exceedence of either the state or federal AAQS.

### 4.5.2 Long-term Impacts

Operation of the ASR-11 radar station at any of the three alternative sites would produce identical emissions, which are not anticipated to have any adverse impact on air quality. Sources of emission during the operation of the ASR-11 would include the operation of the emergency diesel generator at the ASR-11 site, and evaporative loss of fuel from the above-ground storage tank at the radar site. As described in the Programmatic EA for the NAS program (USAF, 1995a), the emergency generator is anticipated to be operated approximately once a week for testing and during occasional power outages. The emissions anticipated to be produced by the emergency generator would be far below the 100 tons per year threshold, which requires review under the Prevention of Significant Deterioration regulations. Emissions are therefore expected to have no adverse impact on air quality (USAF, 1995a). The evaporative loss from the associated above-ground storage tank (AST) is also expected to be minimal, and to have no adverse impact on air quality. Maintenance traffic to Site 6 would need to use the unpaved perimeter road around the golf course, which may generate fugitive dust during operation of the ASR-11 radar. This is expected to be minimal due to the limited number of times when maintenance vehicles will be using the road. At either Site 4 or 5 minimal fugitive dust is expected to be generated by maintenance vehicles, since travel on dirt roads would not be necessary and the gravel access road at both sites is less than 50 feet.

## 4.6 GEOLOGY AND SOILS

### 4.6.1 Short-term Impacts

The construction of the ASR-11 radar station would have similar effects on the soil at each of the alternative ASR-11 sites. Excavation for the footings of the radar tower typically does not exceed 7 feet in depth. Excavation for the utility trench is typically four feet deep, and may be up to 10 feet wide. The temporary construction staging area would be removed upon project completion and

would not be anticipated to substantially impact geology or soils. The dismantling of the AN/GPN-20 would not require any ground disturbance. Therefore, there would be no impact to the soil or geology from dismantling.

### 4.6.2 Long-term Impacts

There would be no long-term impacts to the existing soils or geology if the ASR-11 were constructed at any of the alternative sites.

## 4.7 SURFACE WATER AND GROUNDWATER

### 4.7.1 Short-term Impacts

It is not anticipated that installation of the ASR-11 radar station at any of the three alternative sites would have adverse impacts on surface water because there are no surface water features in the vicinity of any of the three alternative sites. Neither the excavation for the radar tower footings (approximately 7 to 8 feet deep) nor the excavation for the utility conduits is expected to penetrate the water table at **Sites 4** or **5**; therefore, no impacts resulting from contact with the groundwater contamination are expected. Excavation at **Site 6** may reach the high groundwater table in the late winter and early spring; therefore, measures would have to be taken during construction activities to handle and discharge groundwater appropriately. All three alternative sites have moderately permeable soil, therefore stormwater runoff is not expected to be a problem; however, during construction, all activities will follow the base best management practices (BMP) guidelines to prevent sedimentation and erosion during storm events (USAF, 1997).

### 4.7.2 Long-term Impacts

There would be no long-term impacts to the surface water or groundwater if the ASR-11 were to be constructed at any of the three alternative sites. Final design of the DASR facility will accommodate any surface water flow. There would be minimal change in stormwater runoff at any of the three sites and along access roads. Removal of the AN/GPN-20 is not anticipated to have an impact on stormwater runoff.

## 4.8 BIOLOGICAL RESOURCES

The following describes potential short- and long-term effects of the installation of a DASR system on biological resources. The biological resources addressed in this section consist of vegetation, wetlands, wildlife, and threatened and endangered species.

Moody AFB personnel requested that this EA for the DASR facility consider impacts to trees that may need to cleared not only for construction, but also for maintaining a clear line-of-sight for the radar during operation. Consultation with environmental personnel at Moody AFB indicated that the base had recently cleared trees as far as 2000 feet from the existing GPN-20 in order to approve visibility. Thus, 2000 feet was selected as a reasonable distance for evaluating the potential impacts due to tree clearing or tree-topping. Further consultation with base personnel indicated that large, dense stands of loblolly and slash pine are extremely difficult to individually top and thus these trees are generally cut at ground level. For the purpose of this assessment, impacts related to tree-clearing are discussed both in terms of short and long term impacts. Section 4.8.1.1 (short-term) discusses the extent of tree-clearing required for the ASR-11 to provide adequate coverage immediately upon installation. Section 4.8.2.1 (long term) describes the additional trees that may be cleared during a 20-year operational period, as the pine trees continue to grow.

### 4.8.1 Short-term Impacts

The short-term impacts of installing an ASR-11 would be relatively similar at any of the three alternative sites because all of the sites possess similar biological characteristics.

**4.8.1.1 Vegetation.** The construction of the ASR-11 will require the clearing of vegetation in the immediate areas of the facility, along its access route, and within the temporary construction staging area. The anticipated total area of clearing for each three alternative sites will be approximately three-quarters of an acre. It should be mentioned that the temporary construction staging area will be selected based primarily on the site's existing suitability for staging activities, therefore clearing of vegetation is expected to be minimal. The vegetation found at all three alternative sites is typical of the rest of the base and elimination of unique plant communities is not anticipated to occur as a result of the proposed project. The removal of vegetation for ASR-11 construction will consist of grasses

and a few immature trees at **Site 4**, mowed grass at **Site 5**, and grass and shrubs at **Site 6**.
For all three alternative sites, trees in the areas surrounding the proposed ASR-11 locations may require removal in order to provide a clear 360-degree line of sight for the radar. For optimal radar performance, there must not be any obstructions within a 2000-foot radius of the radar at heights that would exceed its focal point.

**Site 4.** Within the 2000-foot radius of Site 4, there are four major forest stands. Two of these stands have a mean height of 83 feet; the stand furthest south has a mean height of 82 feet, and the stand immediately to the west has a mean height of 57 feet (Figure 4.8-1). The stands with mean heights of 83 feet are located at approximately the same elevation as Site 4 and will most likely contain trees that have the potential to interfere with operation of the ASR-11. These trees may require removal. The forest stand located to the south with a mean height of 82 feet is partly located in an area of lower elevation than Site 4 which may reduce the number of trees that must be removed. However, some tree removals would be anticipated in this area also. It should also be mentioned that some clearing has already occurred in this area to eliminate screening for the existing AN/GPN-20 and to provide for a rapid runway repair facility. The tree stand located to the west of Site 4 with a mean tree height of 57 feet is located at approximately the same elevation as Site 4. A majority of the trees found in this area are not tall enough to cause substantial interference with the ASR-11 in the near future, and as such may not require initial removal.

**Site 5.** The 2000-foot radius around Site 5 encompasses much of the same area as the Site 4 radius, with the exception of a lesser area of the southern 82-foot stand and the eastern 83-foot stand. However, the Site 5 radius encompasses a greater portion of the western 57-foot stand and the western 83-foot stand (Figure 4.8-1). Site 5 is located approximately eight feet higher in elevation than Site 4, therefore potential interference with the ASR-11 performance caused by trees found in areas of lower elevation may be less substantial than at Site 4. Similar to Site 4, it is anticipated that trees found in the two 83-foot areas and the 82-foot area will require removal and it is anticipated that fewer trees in the 57-foot area will require initial removal.

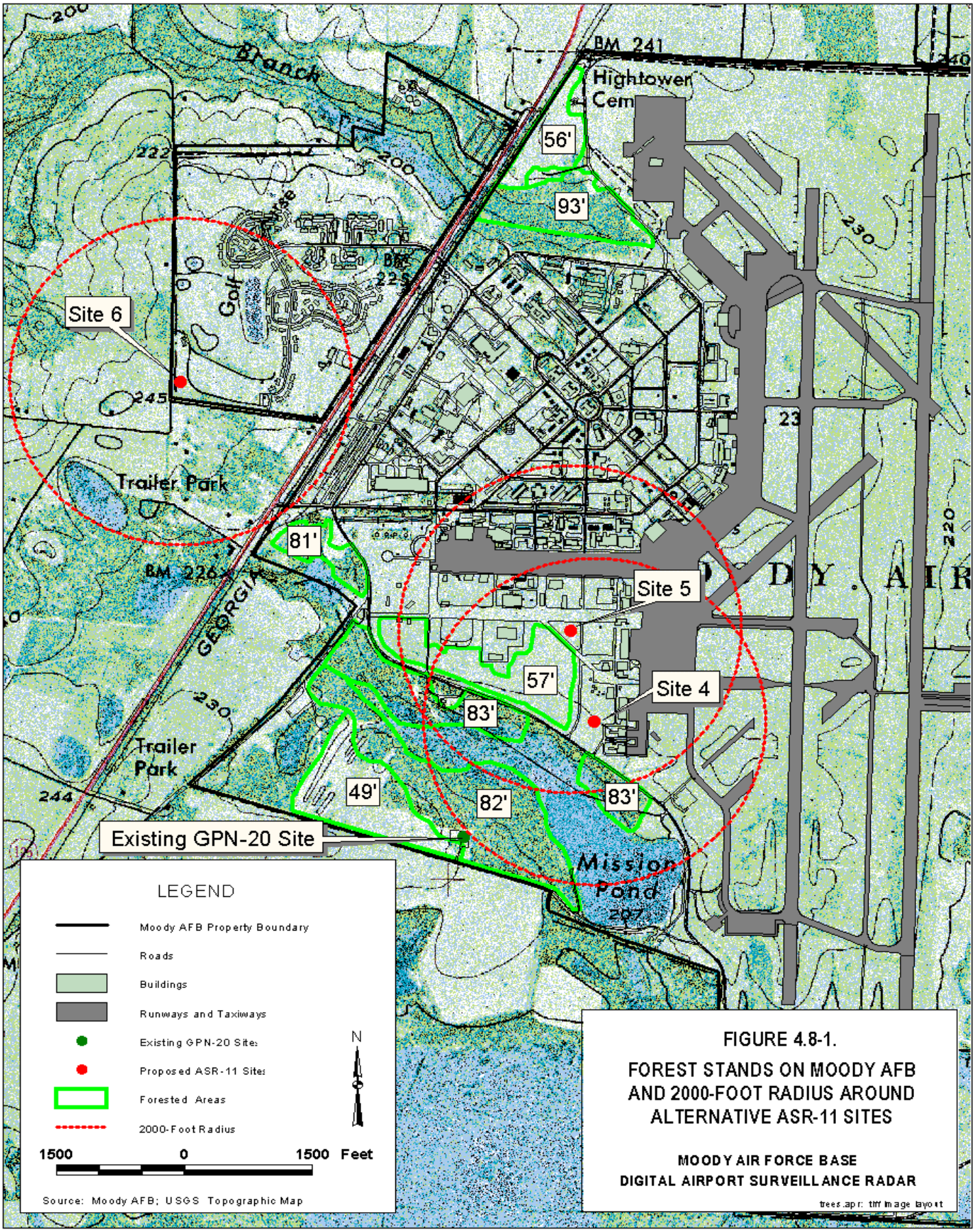



FIGURE 4.8-1.

FOREST STANDS ON MOODY AFB AND 2000-FOOT RADIUS AROUND ALTERNATIVE ASR-11 SITES

MOODY AIR FORCE BASE
DIGITAL AIRPORT SURVEILLANCE RADAR

trees.apr: tiff image layout

**Site 6.** As depicted on Figure 4.8-1, there are no major on-base forest stands within the 2000-foot radius of Site 6. However, it is anticipated that selective on-base tree removals may be required and tree removals would also be required off-base on privately owned property. Placement of the ASR-11 at this location would require the base to obtain permission from the surrounding property owners in order for the base to remove or top the height of trees in the future as needed. Figure 3.9-4 depicts views off-base from Site 6 to the south/southwest and the west. The large open field/agricultural area to the west is anticipated to preclude the necessity for many tree removals in this area. A majority of the off-base tree removals would be anticipated to occur to the south of Site 6 (see south/southwest photograph in Figure 3.9-4). To the south and the west of the 2000-foot radius, there are slight decreases in elevation which may allow for taller trees in these areas to remain. However, a majority of the area within the 2000-foot radius is at approximately the same elevation; therefore, differences in elevation are anticipated to have minimal impact on the extent of tree removals.

Dismantling the existing AN/GPN-20 is not anticipated to result in the destruction of vegetation; therefore, there would be no short-term impacts on vegetation associated with this activity.

**4.8.1.2 Wetlands.** There are no wetlands in the vicinity of **Site 4**, **Site 5**, or **Site 6**; therefore, no impacts to wetlands are anticipated to result from the construction of the ASR-11 facility. Dismantling of the existing AN/GPN-20 is not anticipated to impact the small wetland area located adjacent to the AN/GPN-20, as displayed in Figure 3.7-1. Dismantling activities are expected to occur outside of the wetland area and the wetland appears to have already been disrupted or displaced by recent clearing activities to the east of the site. Due to the existing gravel access road and minimal anticipated activity associated with dismantling the AN/GPN-20, no significant impacts to wetlands are anticipated.

**4.8.1.3 Wildlife.** Construction of the ASR-11 would require disturbing approximately three-quarters of an acre for installation of the temporary construction staging area, antenna foundation, and other site improvements and grading. Due to the relatively limited area proposed for disturbance, the construction of the ASR-11 facility is not anticipated to substantially impact wildlife in the area.

Wildlife populations found in the areas of **Site 4** and **Site 5** are likely to be accustomed to periodic noise intrusions, because of the persistent nature of the airfield operations. Because **Site 6** is located away from primary base operations and the surrounding land uses are likely to provide wildlife habitat, some brief displacement of wildlife populations may occur in the area during construction.

The dismantling of the **AN/GPN-20** is not anticipated to have any adverse impact on wildlife due to the anticipated short-duration disturbance and the limited wildlife habitat provided by the immediate area.

**4.8.1.4 Threatened and Endangered Species.** There are no threatened or endangered species expected to be encountered at the alternative ASR-11 sites (**Site 4**, **Site 5**, and **Site 6**). The gopher tortoise habitat, located northwest of the existing **AN/GPN-20** site, does not appear to intersect the areas of anticipated disturbance. In addition, the anticipated duration of dismantling activities is expected to be minimal, therefore no impacts to the gopher tortoise or its habitat are expected to occur as a result of the removal of the AN/GPN-20.

### 4.8.2 Long-term Impacts

Operation of the ASR-11 at any of the three alternative sites has the potential to result in limited long-term impacts on biological resources, as noted below.

**4.8.2.1 Vegetation.** Installation of the ASR-11 facility at any of the alternative sites would result in the permanent clearing of an approximately 140-foot by 140-foot area for the ASR-11 in addition to the short access driveway to the facility. Upon project completion, disturbed areas outside of the permanently cleared areas would be landscaped, including the temporary construction staging area. Due to the minimal size of the permanently cleared areas, this removal of vegetation is not anticipated to represent a significant impact. Long term maintenance of trees surrounding the future ASR-11 site will continue through the life of the facility.

Placement of the ASR-11 at **Site 4** or **Site 5** would require long-term maintenance of the surrounding forested areas. Depending on the extent of the tree removals in the forest stands with mean heights

of 82 and 83 feet, these areas would have to be periodically evaluated for further removal. The frequency of future evaluations and possible removals is entirely dependent upon the numbers and heights of the trees left standing. Likewise, in the area to the west of these sites with a mean tree height of 57 feet, tree heights would also have to be periodically evaluated to determine the need for removals. Pine tree growth rates have been calculated based on mean heights of trees found in forest stands of varying ages on other portions of the base. Based on this information, it is assumed that the growth rate is approximately 2.5 feet per year. At this rate, trees not initially removed at a height of 57 feet will require clearing within approximately 13 years in order to prevent the trees from exceeding the focal point of the radar (95 feet).

Similarly, future impacts associated with the placement of the ASR-11 at **Site 6** are dependent upon the extent of tree clearing and the heights of those trees left standing. Because these trees are located on private property, it is unlikely that clear-cutting would be the preferred method of radar line-of-sight maintenance. Assuming that the tallest trees left remaining within the 2000-foot radius are approximately 50 feet, future tree removals would not be expected for approximately 16 years (based on a 2.5 feet per year growth rate).

**4.8.2.2 Wetlands.** Due to the absence of wetlands from the proposed ASR-11 sites and the minimal disturbance associated with the dismantling of the existing AN/GPN-20 facility, no long-term impacts to wetlands are anticipated.

**4.8.2.3 Wildlife.** Each of the three ASR-11 sites is located in an area characterized by minimal wildlife use (although Site 6 may be somewhat more utilized; see Section 3.8.2.3). Consequently, the presence and operation of the DASR system should not interfere with wildlife. The ASR-11 tower could theoretically pose an obstacle to birds flying through the area of the site. However, as discussed in the Programmatic EA for the NAS program (USAF, 1995a), the relatively low height of the ASR-11 antenna is not anticipated to pose a substantial threat to birds flying through the area.

**4.8.2.4 Threatened and Endangered Species.** There are no threatened or endangered species expected to be encountered at any of the alternative ASR-11 sites, therefore, no impacts are

anticipated to result. Similarly, no long-term impacts to the gopher tortoise habitat, located to the northwest of the existing AN/GPN-20, are expected to result.

## 4.9 AESTHETIC RESOURCES

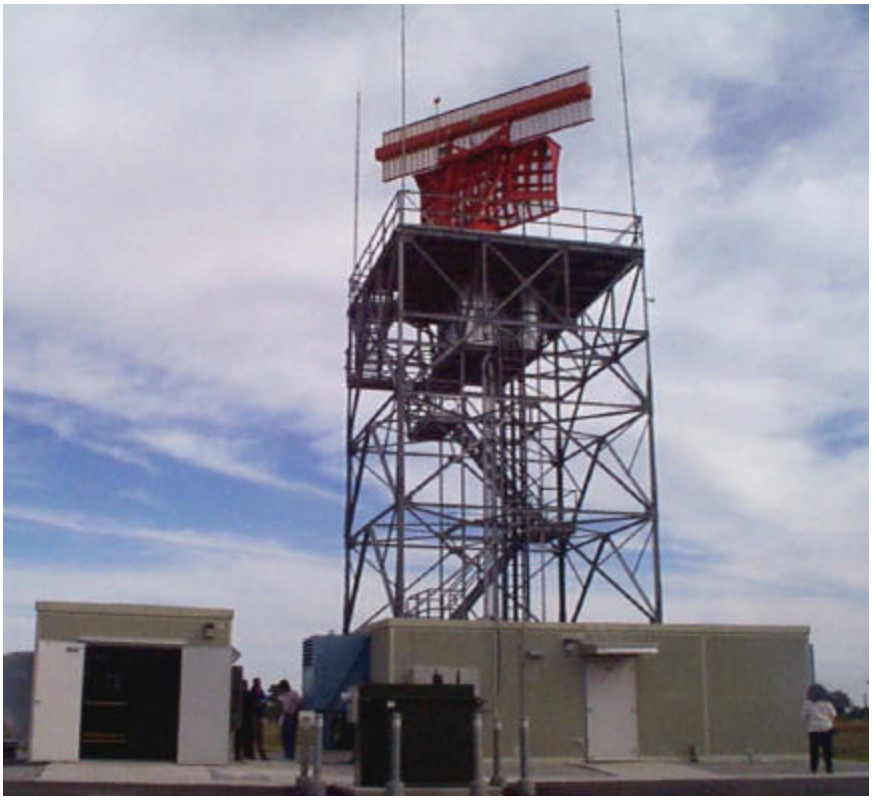
### 4.9.1 Short-term Impacts

The construction of the ASR-11 at **Site 4** or **Site 5** and the dismantling of the **AN/GPN-20** would not adversely impact the aesthetic resources at Moody AFB. The aesthetic value of these areas is linked to the military function of the base; views of radar facility construction activity associated with installing the ASR-11 and removing the AN/GPN-20 would not significantly alter the aesthetic resources at the sites. However, the potential for aesthetic impacts as a result of construction activities at **Site 6** is greater than the other alternative sites due to the proximity of both recreational and residential land uses to this alternative site. Due to the short expected duration of ASR-11 construction (approximately three weeks), these impacts associated with the construction activities are not expected to be substantial.

### 4.9.2 Long-term Impacts

The long-term presence and operation of the ASR-11 at **Site 4** and **Site 5** would be consistent with the aesthetic character of the military structures and facilities in the vicinity (see Figure 4.9-1 for a photograph of an ASR-11). Likewise, removing the existing AN/GPN-20 would not significantly alter the aesthetic resources of the base. Construction of the ASR-11 at **Site 6** may result in a long term impacts on the aesthetic character of the surrounding area. The presence of a radar facility in such close proximity to both recreational and residential areas represents a change in the visual character of the immediate vicinity. Although the ASR-11 will not generate a substantial amount of noise and the facility will be un-manned, the visual impact may be undesirable to the surrounding residents. In addition, trees that currently provide some buffer between the residences and the base may need to be removed, thus further contributing to the visual impact.

**Figure 4.9-1 ASR-11 Radar Facility**



Operation of the ASR-11 facility would involve the introduction of lighting into the area of the selected alternative location. Lighting fixtures to be installed at the ASR-11 facility would generally consist of the following: two red, steady burning, 116-watt obstruction lights on top of the antenna; 200-watt areas lights on each stair landing of the tower to provide illumination for authorized personnel; two 1,000-watt outdoor area lights to be projected downward to illuminate the area within the fenced footprint; and fluorescent indoor area lighting installed in the two buildings on the site. The tower stairway lights and outdoor area lighting will be illuminated only when needed for nighttime maintenance activities. Impacts associated with lighting at Site 4 and Site 5 are expected to be minimal due to their location within the functional areas of the base; however, at Site 6 the red steady-burning lights on the antenna tower may impact the aesthetics of an area proximate to both on- and off-base residences.

## 4.10 CULTURAL RESOURCES

### 4.10.1 Short-term Impacts

Based on cultural resource surveys for Moody AFB, cultural resources are not likely to be present within the proposed project areas for the three alternative sites or the existing AN/GPN-20 facility. The closest known archeological resource found on the base is located approximately 2000 feet from the existing **AN/GPN-20** facility and **Sites 4** and **5** (USAF, 1996b). There are no known cultural resources in the vicinity of **Site 6**. Neither the construction activities associated with installing the ASR-11 nor the dismantling of the existing AN/GPN-20 is anticipated to impact any cultural resources. In addition, trenching that will be required for utilities servicing any of the three potential ASR-11 sites is not anticipated to impact cultural resources.

### 4.10.2 Long-term Impacts

No long-term impacts to cultural resources related to the operation of the ASR-11 at any of the three alternative sites or the removal of the existing AN/GPN-20 are anticipated.

## 4.11 POLLUTION PREVENTION AND HAZARDOUS WASTE

### 4.11.1 Short-term Impacts

**4.11.1.1 Pollution Prevention.** The construction phase of the ASR-11 radar system would comply with applicable Moody AFB policies and guidelines for pollution prevention. In addition, a pollution prevention plan has been developed for the NAS program. This plan prohibits the use of all Class I ozone depleting chemicals and directs the contractor to minimize the use of Class II ozone depleting chemicals, and toxic substances. Consequently, hazardous waste generation is anticipated to be reduced to the maximum extent possible during construction of the radar facility and the dismantling of the existing AN/GPN-20 radar. Similar pollution prevention measures would be implemented during ASR-11 construction regardless of the alternative site at which the facility is constructed.

**4.11.1.2 Hazardous Waste.** At each of the three alternative ASR-11 sites, some hazardous materials and waste would likely be used and generated during the ASR-11 construction, including: equipment fuel, engine oil, hydraulic oil, grease, and other equipment operation and maintenance material. Refueling of equipment may also take place at the alternative ASR-11 site selected for construction. Any hazardous materials used during the ASR-11 construction would be used, stored, transported, and disposed in accordance with base, military, state, and federal regulations.

**Site 4** is located adjacent to an IRP site and **Site 5** is located within an IRP site. If excavation for either of these sites were to reach the groundwater level, monitoring and potentially treatment of water may be needed; however, the required depth of excavation for the ASR-11 facility is not anticipated to reach groundwater depth and no impacts resulting from installation in these areas are expected. In addition, no compounds with concentrations above risk-based values are expected to be encountered in the soils at these sites (IT, 2000). Base personnel have stated that siting the proposed ASR-11 at Site 5 would not be problematic with regard to the IRP site as long as the radar is not located in the western corner (intersection of Werewolf Run and Lancer Lane). Also, a number of groundwater monitoring wells are located in the area of Site 5. Efforts will be made during design to avoid these monitoring wells, however, in the event that they can not be completely avoided, then coordination with Georgia DNR would be required (USAF, 2000c). No contaminated soils are expected to be encountered at **Site 6**. Penetration of groundwater at Site 6 is possible, but no contaminated soils or groundwater are expected to be encountered at this site.

The existing AN/GPN-20 radar may be painted with lead paint. The AN/GPN-20 will be dismantled and transported off-site. The contractor will be required to separately and properly package, mark, and dispose of hazardous materials encountered during the dismantling of the AN/GPN-20 and facilities equipment. Small pieces of lead paint may chip off of the AN/GPN-20 radar during the dismantling process; however, substantial amounts of lead paint would not be left on site as a consequence of the decommissioning of the radar. As part of the dismantling, the area will be surveyed prior to final site decommissioning, and, if present, lead paint chips will be collected and disposed of in accordance with applicable Moody AFB policies and procedures.

### 4.11.2 Long-term Impacts

**4.11.2.1 Pollution Prevention.** As indicated above, a pollution prevention plan has been developed for the NAS program, which prohibits the use of all Class I ozone depleting chemicals, and directs the contractor to minimize the use of Class II ozone depleting chemicals and toxic substances. In addition, operation of the ASR-11 radar system would comply with all applicable Moody AFB policies and guidelines for pollution prevention. Consequently, hazardous waste generation is anticipated to be reduced to the maximum extent possible during the operation of the ASR-11 facility.

**4.11.2.2 Hazardous Waste.** Operation of the radar facility at any of the three alternative sites would include the installation of a 1,000-gallon AST for the storage of diesel fuel to be used for emergency generation. The fuel tank would be affixed with the National Fire Protection Agency Fire Diamond label to indicate the presence of hazardous material/chemicals. The tank would comply with all federal, state, and base spill control requirements, including a leak detention system overfill alarm and double-wall and/or secondary containment as specified in 40 CFR 112.

In addition, hazardous materials and waste would likely be used and generated during operation, including: equipment fuel, engine oil, hydraulic oil, grease, and other equipment operation and maintenance material. All hazardous waste would be used and disposed of in accordance with applicable regulations and base policies. Consequently, it is not anticipated that any soil or groundwater contamination would occur as a result of operating the radar.

## 4.12 ELECTROMAGNETIC ENERGY

### 4.12.1 Short-Term Impacts

Construction at any of the ASR-11 alternative sites on Moody AFB is not expected to generate RFR at levels that would be harmful to human health. Some low levels of RFR could be generated from commonly used devices at construction sites, such as cellular telephones or portable computers. However, any RFR generated, and any other electric or magnetic fields, would be typical of that which exists throughout the human environment and is not anticipated to be harmful to human health.

Dismantling of the existing AN/GPN-20 would occur only after operation of the radar has ceased. Consequently, there should be no RFR hazard to workers involved in the AN/GPN-20 dismantling. Similar to the ASR-11 construction, dismantling activities at the AN/GPN-20 site could generate low levels of RFR from commonly used devices; however, these are not anticipated to be harmful to human health.

### 4.12.2 Long-Term Impacts

Operation of the ASR-11 radar at any of the three alternative sites would generate identical levels of electric and magnetic fields, including RFR. As discussed in Section 3.12, the RFR generated by the existing AN/GPN-20 is only hazardous at close distances to the radar when it is operating. Similarly, the RFR generated by the ASR-11 would only be hazardous at close ranges, while the radar is operating (see below). The tower immediately below the radar would be in the spillover region, and would be hazardous to humans while the radar is operating. At any of the three alternative sites, the facility would be sited a sufficient distance from occupied buildings that the radar operation would not pose a RFR hazard to personnel within the general vicinity of any of the ASR-11 sites. To advise personnel in the area of the RFR hazard at close ranges, signs would be posted at the perimeter of the ASR-11 facility warning against approaching the antenna while it is in operation. There would be no RFR generated from the antenna, and therefore no RFR hazard, when the antenna is not in operation.

The following comparison to various RFR safety standards is adapted from the October 1997 *Radiofrequency Impact Analysis for Airport Surveillance Radar-11* (FAA, 1997), prepared for the FAA.

Terms such as “safety standards” and “exposure standards” generally refer to, and are frequently used interchangeably with, specifications or guidelines on maximum public or occupational exposure levels to electromagnetic fields. Such levels are usually expressed as maximum power densities or field intensities in specific frequency ranges for stated exposure durations. Exposure guidelines have been developed by private organizations such as the American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE), and the National Council on Radiological

Protection (NCRP, now called the National Council on Radiation Protection and Measurements) as voluntary guidelines for occupational or general public exposure, or both. Governmental agencies such as the Federal Communications Commission (FCC) and various state and municipal bodies have adopted such guidelines or variations thereof as enforceable stands. The draft version of FAA Order 3910.3B, Radiation Safety Program (1997) adopts the ANSI/IEEE exposure guidelines.

The ANSI/IEEE (1992) guidelines cover the frequency range from 0.003 MHz to 300,000 MHz, and separately specify the maximum permissible exposure (MPE) in "uncontrolled environments" (accessible by the general population) and "controlled environments" (such as occupational exposure). In the ASR-11 frequency band of 2,700-2,900 MHz, the MPE for uncontrolled environments is 1.80-1.93 milliwatts per square centimeter ($mW/cm^2$) averaged over a 30-minute period. The guideline level for controlled environments is 9-10 $mW/cm^2$ averaged over a 6-minute period.

In 1988, the International Radiation Protection Association (IRPA) published guidelines (1988) for occupational and public exposure to RFR in the frequency range 0.001 MHz to 300,000 MHz. At the ASR-11 frequency, the MPE for occupational exposure is 5 $mW/cm^2$ averaged over a 6-minute period. The MPE for non-occupational exposure is 1 $mW/cm^2$ averaged over a 6-minute period. The MPE for pulsed RFR is set at 1,000 times that MPE for time-averaged exposure. Thus, at ASR-11 frequency, the MPE for pulsed RFR is 1,000 $mW/cm^2$ peak pulse power density. The NCRP also published guidelines for human exposure. For RFR at ASR-11 frequency, the MPE for occupational exposure is 5 $mW/cm^2$, averaged over 6 minutes. The corresponding MPE for exposure of the general population is 1 $mW/cm^2$, averaged over 30 minutes.

In August 1996, the FCC adopted a hybrid standard based in part on the ANSI/IEEE (1992) guidelines and in part on the NCRP guidelines. For occupational exposure to RFR in the ASR-11 frequency band, the FCC MPE is the same as the NCRP guideline level.

The power density of the ASR-11 beam varies considerably between the near-field (within 260 feet of the antenna) and the far-field (greater than 260 feet away) (FAA, 1997). Thus, far-field conditions apply to almost all the receptors near the proposed radar sites and are presented herein. Any differences in power densities would be conservative, because near-field calculations lead to lower predicted power densities than do far-field calculations. The power density of the ASR-11 signal can be represented by peak pulse power - the maximum power level of a single pulse - or as the power averaged over a time period, usually several or more minutes. At a distance of 23 meters (75 feet) from the ASR-11 antenna, the peak power density of the ASR-11 signal will be 945 $mW/cm^2$, less than the 1,000 $mW/cm^2$ MPE for peak power density established by the IRPA, as discussed above. The peak power density will decrease rapidly with distance from the antenna. At all locations more than 23 meters (75 feet) from the ASR-11 antenna, the ASR-11 signal will comply with the MPE for peak power density established by the IRPA.

The average (mean) power radiated by the ASR-11 is 2.1 kilowatts (kW). At any point near the ASR-11 in normal operation (i.e. antenna is rotating), the average power density is lower than the peak density by the factor 0.00034. For the ASR-11 frequency range (uncontrolled environments), the ANSI/IEEE MPE is 1.8 to 1.93 $mW/cm^2$, averaged over 30 minutes. The average power density of the ASR-11 signal decreases with distance from the antenna and will fall below 1.9 $mW/cm^2$ at a distance of 10 meters (33 feet) from the radar antenna. Since the ASR-11 will be mounted on a tower greater than 10 meters in height, persons at ground level would not be exposed to RFR levels exceeding the ANSI/IEEE MPE. At distances of more the 13 meters (43 feet) from the ASR-11 antenna, the ASR-11 signal will comply with the MPE levels for the general population, 1.0 $mW/cm^2$, set forth in IRPA, NCRP, and FCC guidelines, discussed above. Thus, no impacts to nearby receptors are anticipated at any of the three alternative sites. At all locations near the radar, the ASR-11 signal will comply by an even wider margin with the guideline levels for occupational exposure set forth by ANSI/IEEE, IRPA, NCRP, and FCC. As a precautionary measure, signs would be posted at the perimeter of the DASR facility advising personnel and the public against approaching the radar facility during operation.

On infrequent occasions, the ASR-11 antenna will remain stationary and transmit a signal for maintenance and testing purposes. This type of operation is expected to occur no more than once every several months. In maintenance mode, the ASR-11 signal will be directed at a fixed location above the horizon for up to several minutes at a time. Because the beam will be stationary, average power densities will be higher than during normal operation. In this mode, average power density of the main beam within 153 meters (500 feet) of the ASR-11 will exceed the ANSI/IEEE guideline levels. During this mode of operation, the ASR-11 will be under the direct control of an operator at the radar site and exposure of humans within that distance of the radar is highly unlikely. At locations greater than 153 meters (500 feet) from the ASR-11 antenna, the average power density of the signal from the ASR-11 operating in maintenance mode will comply with the ANSI/IEEE MPE for uncontrolled environments. At locations greater than 205 meters (672 feet) from the ASR-11 antenna, the average power density of the signal from ASR-11 operating in maintenance mode will comply with the IRPA, NCRP, and FCC MPEs for uncontrolled environments.

# 5.0 COMPARISON OF ENVIRONMENTAL CONSEQUENCES AND SELECTION OF ENVIRONMENTALLY PREFERRED ALTERNATIVE

The three alternative sites have similar existing conditions, although Site 6 differs from Sites 4 and 5 with regard to land use and subsurface contamination. Site 6 is characterized by open space/recreational land use without subsurface contamination, while Sites 4 and 5 are characterized by industrial/aircraft operations and lie within and/or adjacent to IRP sites. All sites are characterized by similar socioeconomic, air quality, geologic, hydrologic, and archaeological and cultural resource conditions, with noise levels greater at Sites 4 and 5. Site 4 is characterized by an unmowed grassy area with several young pine trees, Site 5 is a manicured grass/herbaceous area, and Site 6 is on the fringe of the base golf course and is predominantly grass, with a few shrubs. No surface water resources or wetlands and no known threatened or endangered species are present at any of the sites. No significant differences in electromagnetic effects are expected at any of the sites.

No short-term impacts are expected at any of the three sites for socioeconomic, utilities, geologic, hydrologic, archaeological and cultural resources, and hazardous waste. Also, no construction activities for Site 6 will occur within or near existing IRP sites. While both Site 4 and Site 5 are located in areas known to contain subsurface contamination, only Site 5 is designated as an IRP site; both sites are located proximate to other IRP sites. Construction activities within Site 4 or Site 5 would be unlikely to encounter contaminated groundwater due to the limited subsurface excavation activity during construction. A depth of 7 to 8 feet would be required to install footings for the ASR-11 tower. Contaminated groundwater would not be encountered until a depth of approximately 35 to 40 feet. Short-term impacts may occur to land use, air quality, noise, and biological resources at each of the three alternative sites. The three alternative sites are at various distances from existing electric, telephone, and data communication lines, and from existing roads. Site 5 appears to be generally closest to existing utilities, Site 4 somewhat more distant, and Site 6 appears to be the furthest, especially for data communication lines. The longer length of trench required for conduits would lead to potentially greater short-term impact on adjacent land uses due to increased dust and noise levels. Tree removal may be necessary in the vicinity of each of the three alternative sites to allow for adequate coverage by the new ASR-11 radar system. At Site 6, trees located on private property may also need to be removed.

No long-term impacts are anticipated at any of the three sites for socioeconomic, utilities, noise, air quality, geologic, hydrologic, and archaeological and cultural resources. Sites 4 and 5 have similar aesthetic characteristics due to proximity to industrial activities on the base and would be consistent with the military aesthetic value of the base. However, Site 6 is located near the perimeter of the base, between the intersection of Beatty and George Register Road and the base golf course. Locating the new ASR-11 at Site 6 would result in a long-term impact to the aesthetic character of this residential and recreational area. Long-term impacts to biological resources are anticipated at all three alternative sites due to the removal of trees to allow for adequate radar coverage, and continual maintenance of the tree-line will be needed to maintain future radar coverage. Also, at Site 6, trees located on private property may need to be removed. Although the radar would generate RFR while operating, persons at ground level would not be exposed to RFR levels exceeding the maximum permissible exposure (MPE) levels for the general population, since the ASR-11 will be mounted on a tower greater than 87 feet in height. As a precautionary measure, signs would be posted at the perimeter of the DASR facility advising personnel and the public against approaching the radar facility during operation. There are no other facilities within close proximity to any of the sites, so other activities are not expected to be disrupted. During the DASR operation, fuel and other hazardous materials may be used at the site, such as engine oil and grease. However, use and disposal of any hazardous materials would occur in compliance with Moody AFB protocols and guidelines as well as applicable state and federal regulations. Consequently, it is anticipated that operational use of hazardous materials will not adversely affect the natural or human environments.

In summary, construction and operation of the ASR-11 facility would result in minimal short-term and long-term impacts at either Site 4 or 5. Both Sites 4 and 5 would be acceptable locations for the ASR-11 facility from an environmental perspective. Site 6 is less preferable due to the greater impacts that could result from the more extensive utility construction and construction of the radar in proximity to recreational and residential areas. Due to operational and other base considerations, the Air Force has selected Site 5 as the preferred ASR-11 location.

# 6.0 MITIGATION

Most of the impacts that may occur at any of the sites during construction and operation of the DASR system are minor in nature and few mitigation measures would be required. To minimize noise impacts during construction, mufflers would be used on construction equipment and vehicles. In addition, all equipment and vehicles used during construction would be maintained in good operating condition so that emissions are minimized, thus reducing the potential for air quality impacts. Dust will be controlled on-site by using water to wet down disturbed areas. The small area (approximately 140 feet by 140 feet) that will be permanently cleared for the DASR facility would be covered with a geotextile fabric and crushed stone to stabilize disturbed soils, in order to minimize the potential for erosion. In addition, all other areas disturbed outside of the 140 by 140-foot ASR-11 facility area, including surrounding area required for grading and the temporary staging area, will be seeded to restore the vegetative covering. Ten to 20 feet of fill may be needed to raise the height of the radar tower, thus reducing impacts to the surrounding trees at each of the three alternative sites. All hazardous materials used during construction would be handled and disposed of in accordance with Moody AFB policies and protocols and all applicable state and federal regulations. Traffic management measures will be developed to facilitate traffic flow and pedestrian access. Site 6 may require additional landscaping to minimize impacts to aesthetic resources within the area of the base golf course and off-base residential area.

During operation of the ASR-11, diesel fuel would be stored at a AST and some hazardous materials, such as equipment oil or grease, may be used at the site. Similar to the construction period, all hazardous materials used during operation would be used and disposed of in accordance with Moody AFB policies and protocols and all applicable state and federal regulations in order to minimize the potential for media contamination. Additionally, due to the potential for RFR hazards at close distance during operation of the ASR-11, warning signs indicating the safe distance from the operating radar will be installed at the facility perimeter.

## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| A/C | Alternating current |
| AFB | Air Force Base |
| AM | Amplitude modulation (radio) |
| AN/GPN-20 | (airport surveillance radar designation) |
| ANSI | American National Standards Institute |
| ASR-11 | (airport surveillance radar designation) |
| AST | above-ground storage tank |
| CFR | Code of Federal Regulations |
| DASR | Digital Airport Surveillance Radar |
| dBA | decibel, A-weighted |
| DCE | dichloroethene |
| DoD | (U.S.) Department of Defense |
| DRMO | Defense Reutilization and Marketing Office |
| EA | Environmental Assessment |
| EIS | Environmental Impact Statement |
| EPA | United States Environmental Protection Agency |
| °F | degrees Fahrenheit (temperature) |
| FAA | Federal Aviation Authority (Department of Transportation) |
| FCC | Federal Communications Commission |
| FM | Frequency modulation (radio) |
| FONSI | Finding of no significant impact |
| GA DNR | Georgia Department of Natural Resources |
| GA DOT | Georgia Department of Transportation |
| Hz | hertz |
| IEEE | Institute of Electrical Electronics Engineers |
| IRP | Installation Restoration Program |
| IRPA | International Radiation Protection Association |
| kHz | kilohertz |
| kVA | kilovolt-amperes |
| kW | kilowatts |

| | |
|---|---|
| $L_{eq}$ | equivalent sound level |
| m | meters |
| MCL | Maximum Concentration Level |
| m/sec | meters per second |
| $mg/m^3$ | milligrams per cubic meter |
| MHZ | megahertz |
| MPE | Maximum Permissible Exposure |
| MW | megawatts |
| $mW/cm^2$ | milliwatts per square centimeter |
| $\mu g/m^3$ | micrograms per cubic meter |
| µm | micrometers (microns) |
| NAAQS | National Ambient Air Quality Standards |
| NAS | National Airspace System |
| NCRP | National Council on Radiological Protection |
| NEPA | National Environmental Policy Act |
| nm | nanometers |
| NPDES | National Pollutant Discharge Elimination System |
| OSHA (U.S.) | Occupational Safety and Health Administration |
| PM-2.5 | Particulate matter below 2.5 microns |
| PM-10 | Particulate matter below 10 microns |
| ppm | parts per million (by volume in air) |
| RAPCON | Radar Approach Control |
| RCRA | Resource Conservation and Recovery Act |
| RFR | Radiofrequency radiation |
| TCE | trichloroethene |
| USAF | United States (Department of the) Air Force |
| UST | Underground storage tank |
| VOC | Volitile Organic Compound |

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# APPENDIX A: LISTING OF AGENCIES AND INDIVIDUALS CONTACTED

## LISTING OF AGENCIES AND INDIVIDUALS CONTACTED

Moody AFB, Civil Engineering, Commander (347 CEF), Lt. Colonel Guy Wells

Moody AFB, Civil Engineering, Chief Engineer (347 CES/CEC), William Bryan

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