

**McGUIRE 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 NEPA process, in compliance with USAF instruction AFI 32-7061. According to this instruction, the environmental assessment is a written analysis which serves to provide 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 McGuire Air Force Base (AFB) in New Jersey. This proposed action is part of the 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.

The NAS program was developed to modernize military approach control systems in the United States and its territories. DoD NAS is a component of the aviation system capital investment plan developed by the Federal Aviation Administration (FAA). Pursuant to the Program Management Directive, 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 at 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 discreet weather precipitation levels. The USAF NAS program will comprehensively upgrade air traffic control systems infrastructure by systematically replacing analog systems with state-of-the-art, digital technology. The ASR-11 at McGuire AFB is needed to replace the older existing Airport Surveillance Radar (AN/GPN-20). While the existing AN/GPN-20 at McGuire AFB was installed in December 1997, the proposed new DASR system will take advantage of the significantly increased capabilities of digital technology now available in radars.

Three alternative sites on McGuire 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*. The three sites evaluated in this EA (Site CE-1, Site CE-3, Site 5) were identified based on operational, construction, and environmental criteria.

Site CE-1 is located on the northwest side of McGuire AFB, approximately 500 feet south of Wrightstown-Cookstown Road and 1,000 feet west of the existing GPN-20 radar site, in the southwest corner of a semi-vacant lot currently used by base contractors as a storage lot. Utilities can be extended from the existing GPN-20 or a electrical sub-station located to the west. The site is on an undeveloped lot with Bellmarsh Avenue to the west, Fritche Avenue to the north, West Arnold Avenue to the east, and Drivas Avenue to the south.

Site CE-3 is located near the southeastern corner of McGuire AFB, approximately 2,500 feet east of the end of Runway 06/24, inside the gated Ground to Air Transmit/Receive (GATR) complex containing Building 1506. The site, located near the eastern Fort Dix/McGuire AFB property line, is proximate to the McGuire AFB airfield to the west and undeveloped areas used for training to north, east, and south. Additionally, Site CE-3 is bordered by and/or contains freshwater wetlands under the jurisdiction

of the Army Corps of Engineers (ACOE) and the New Jersey Pinelands Commission. Utilities can be extended from the existing Building 1506 to Site CE-3.

Site 5 is located on the eastern side of McGuire AFB, at the end of the cul-de-sac at East Fourth Street. The site is located within a well-maintained grassy area near the base golf course and the Trunked LMR antenna. Utilities can be extended to Site 5 from administration and housing buildings, which are located to the west of Site 5 on East Fourth Street.

While Site CE-3 was recommended for detailed analysis because preliminary evaluation indicated that radar coverage from this location would be excellent, it was recognized that the site poses several engineering, operational, and environmental concerns. Engineering concerns include the feasibility of constructing the ASR-11 at the site, due to the low shear strength of the underlying fine sands, and potential difficulties with running a fiber optic line to the site and providing grounding for electrical utilities within a potentially wet environment. Operational concerns center on possible interference with existing radio operations at the GATR facility. Environmental concerns stem from the potential location of wetlands regulated by the New Jersey Pinelands Commission and ACOE on and adjacent to the site. These concerns have been evaluated as part of this EA.

Of the three alternative ASR-11 sites, one site does not emerge as an environmentally preferred site. Site CE-1 and Site 5 feature characteristics that would generally make either of these locations an acceptable location for the ASR-11 facility from an environmental perspective. However, Site CE-3, which is characterized by substantial wetland resources and may be unacceptable from an operations standpoint, is not an environmentally preferred site.

Site CE-1 is located in an area zoned for aircraft operations/maintenance, and would generally be compatible with the construction and operation of the ASR-11 facility. No significant adverse impacts associated with land use, socioeconomics, utilities, transportation, noise, air quality, geology, surface water, groundwater, biological resources, aesthetic resources, or cultural resources would be anticipated if Site CE-1 were selected as the preferred alternative. Site CE-1 has the advantage of being located closest to the existing GPN-20, the site of the new RAPCON, and therefore, requires the shortest fiber optic cable link. There is potentially contaminated groundwater in the vicinity of Site CE-1, but as stated in Section 5.7, groundwater is not expected to be encountered at Site CE-1 or Site 5.

Site 5 is located in an area classified as outdoor recreation, and would also generally be compatible with the construction of the DASR facility, although there would be a loss of open space and there may be impacts to users of the adjacent golf course. No significant adverse impacts associated with socioeconomics, utilities, transportation, noise, air quality, geology, surface water, groundwater, biological resources, or hazardous waste would be anticipated if Site 5 were selected as the preferred alternative. Site 5 is located in close proximity to the National Register-eligible SAGE building, as well as the base golf course; however, construction of the ASR-11 at this location would not significantly alter the aesthetics of the site. Measurements recently conducted by the Air Force revealed a low probability of the ASR-11 causing interference to the telephone switching system or the trunked LMR repeater; thus, the site was not precluded from an operational perspective. One disadvantage for Site 5 is its distance from the proposed RAPCON; Site 5 would require approximately 8,800 feet of fiber optic cable to connect to this communications facility.

As indicated above, several conditions at Site CE-3 make it less acceptable for ASR-11 installation and

operation. The recently completed electromagnetic compatibility study indicated that the minimum separation distance between the ASR-11 tower and the GATR antennas, as set forth in the guidelines for siting VHF and UHF ground radio sites, cannot be met at Site CE-3 due to the physical size of the GATR site compound. Based on the wetland investigation conducted and conversations with the New Jersey Pinelands Commission, it appears that Site CE-3 would be regulated as a wetland. Assuming that the Pinelands Commission concurs that wetlands are located within Site CE-3, and the Air Force wishes to pursue this location as the preferred alternative, a lengthy and difficult permitting process would ensue. The Pinelands Commission would require the Air Force to apply for a Waiver from Strict Compliance with the Pinelands standards, which includes a detailed feasibility/ alternatives analysis. The Air Force would need to demonstrate to the Commission's satisfaction that no other location on the base is acceptable for the installation of the proposed ASR-11. Due to the substantial environmental and operational disadvantages at Site CE-3, it is recommended that Site CE-3 not be selected as the location for the proposed ASR-11 facility.

Issues that must be addressed during construction 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 can be reduced using standard mitigation measures.

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 will be monitored and maintained as necessary. 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. Noise barriers may also be used to reduce noise levels. These barriers would have the benefit of providing a visual buffer. Dust will be controlled onsite by using water to wet down disturbed areas. All areas disturbed for the DASR 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 would be handled and disposed of in accordance with McGuire AFB policies and protocols and all applicable state and federal regulations. Traffic management measures will be developed to ensure traffic flow and pedestrian access is maintained.

During operation of the DASR, fuel would be stored in an above-ground storage tank (AST), and some hazardous materials, such as 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 McGuire 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 during operation, warning signs, indicating the safe distance from the operating radar, will 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 promulgated an internal instruction that contains policies, responsibilities, and procedures dictating how NEPA should be implemented for USAF projects (AFI 32-7061; USAF, 1995a).

This environmental assessment (EA) has been completed as part of the NEPA process, in compliance with USAF instruction AFI 32-7061 (USAF, 1995a). 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) at McGuire Air Force Base (AFB) in New Jersey. This proposed action is part of the 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, 1995b), which fully detail the need for the program. Environmental review at FAA

airfields is being conducted separately.

The programmatic EA for the NAS program committed to completing site-specific NEPA documentation tiered to the programmatic EA for individual NAS sites. This EA addresses the site-specific impacts of locating a DASR on McGuire AFB, and evaluates the consequences of the DASR construction on both the natural and man-made environments.

1.2 PURPOSE OF THE ACTION

The NAS program was developed to modernize military approach control systems in the United States and its territories. DoD NAS is a component of the aviation system capital investment plan developed by the Federal Aviation Administration (FAA). Pursuant to the Program Management Directive (USAF, 1994), 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 at 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 discreet weather precipitation levels.

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 McGuire AFB is needed to replace the existing GPN-20 airport surveillance radar. 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. While the existing GPN-20 at McGuire AFB was installed in December 1997 (USAF, 1999c), the proposed new ASR-11 will take advantage of the significantly increased capabilities of digital technology.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

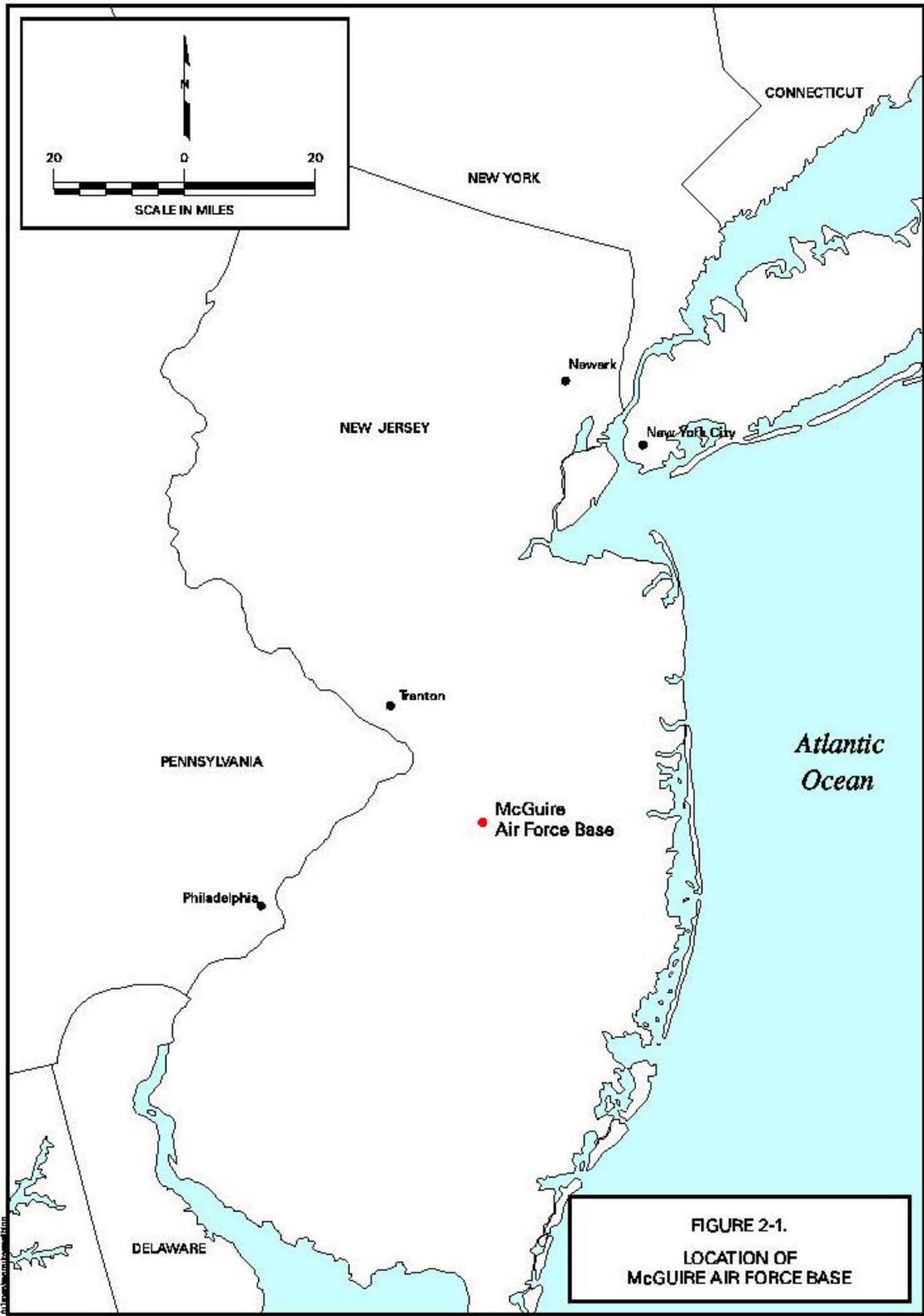
The proposed action is the construction of a DASR at McGuire AFB (Figure 2-1). Three alternative sites (Figure 2-2) for the DASR on McGuire AFB have been identified, in accordance with the NAS Siting Plan (USAF, 1995b). The only alternative to constructing the DASR at McGuire AFB is the No-Action Alternative, which would result in the continued use of the existing GPN-20 system.

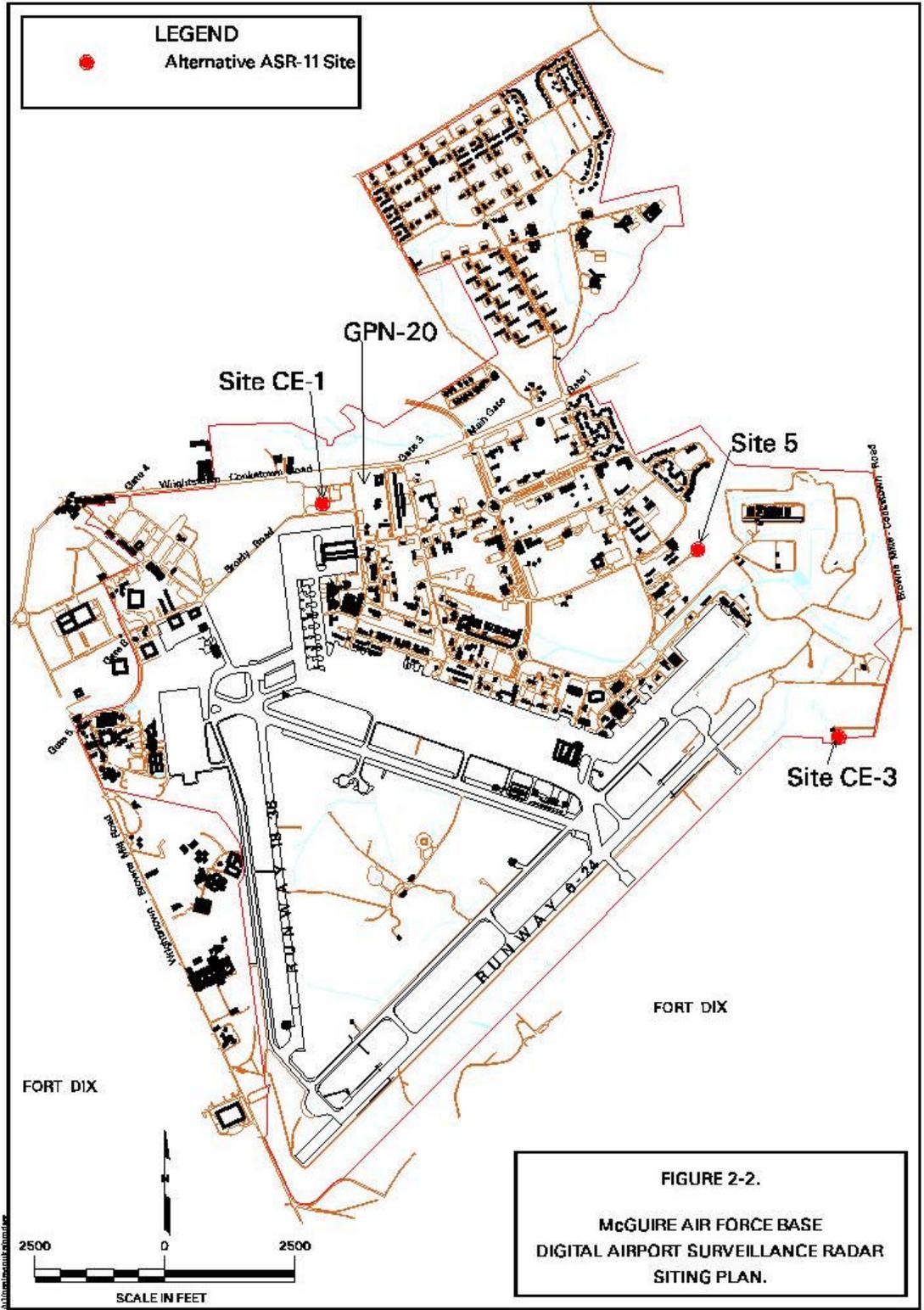
2.1 PROPOSED ACTION: DASR AT McGUIRE AFB

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 radar and the integrated secondary surveillance radar. The purpose of the subsystems would be to accurately locate aircraft, in terms of range, azimuth, and altitude.

The primary 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 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 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 McGuire AFB Local Control Facilities (LCF) and Military Control Towers (MCT). The DASR system would have clutter rejection, target accuracy, and probability of detection that are equal to or better than the existing GPN-20.

The DASR facilities at McGuire AFB would consist of: primary and secondary radar electronics; rotating antenna(s); tower; interconnecting cabling; an uninterruptable power supply; an emergency generator; power conditioning; electronic equipment grounding systems; a fuel storage system; foundations for the ASR-11 and antenna; an unpaved access road; fences; and security systems. Specific facility construction at McGuire AFB would require approximately a one-half acre site, which would contain concrete pad foundations for the tower and related structures; an above ground fuel storage tank for the emergency generator; and miscellaneous site improvements (minor regrading and reseeding for erosion control outside the fenceline). Approximately 300 and 1200 feet of utility trenching, depending on the site chosen, between the edge of the site and existing duct banks/manholes would be required to connect the DASR to existing telephone and electric lines. In addition, between 1,000 and 18,500 feet of fiber optic cable, depending on the site chosen, would be required to connect the ASR-11 to the Radar Approach Control (RAPCON). No new roads would be constructed with the exception of a short driveway to access the radar tower. Once the ASR-11 is operational, the existing GPN-20 would be dismantled, structures would be razed, and the ground would be reclaimed in accordance with the desires of McGuire AFB. The GPN-20 components will be dismantled and moved to another location for re-use.

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

The operational characteristics of the new ASR-11 as compared to the existing GPN-20 are shown in Table 2.1-1.

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 Preliminary Site Survey Report prepared by Raytheon (USAF, 1999).

Initial site selection screening criteria applied in July 1998 identified six sites (Sites 1 through 6, Figure 2-3) for consideration at the in-briefing, held August 12, 1998. Of the six initial sites, only three were considered to have reasonable developmental potential. Two sites (3 and 4) on Fort Dix property were eliminated from further consideration at the request of the US Army; Site 1 was eliminated from further consideration since construction at this site, proximate to the existing radar, would have required significant downtime of the existing radar.

Each of the remaining three sites accepted for further consideration had possible disadvantages that required further analysis. Site 2 was located near a proposed medical facility, and thus the public perception of health risks associated with radiation from the proposed ASR-11 was considered to preclude development of the ASR-11 at this location. Site 5 was located adjacent to the golf course, near the land mobile radio (LMR) antenna, and there was some concern that the proposed radar and

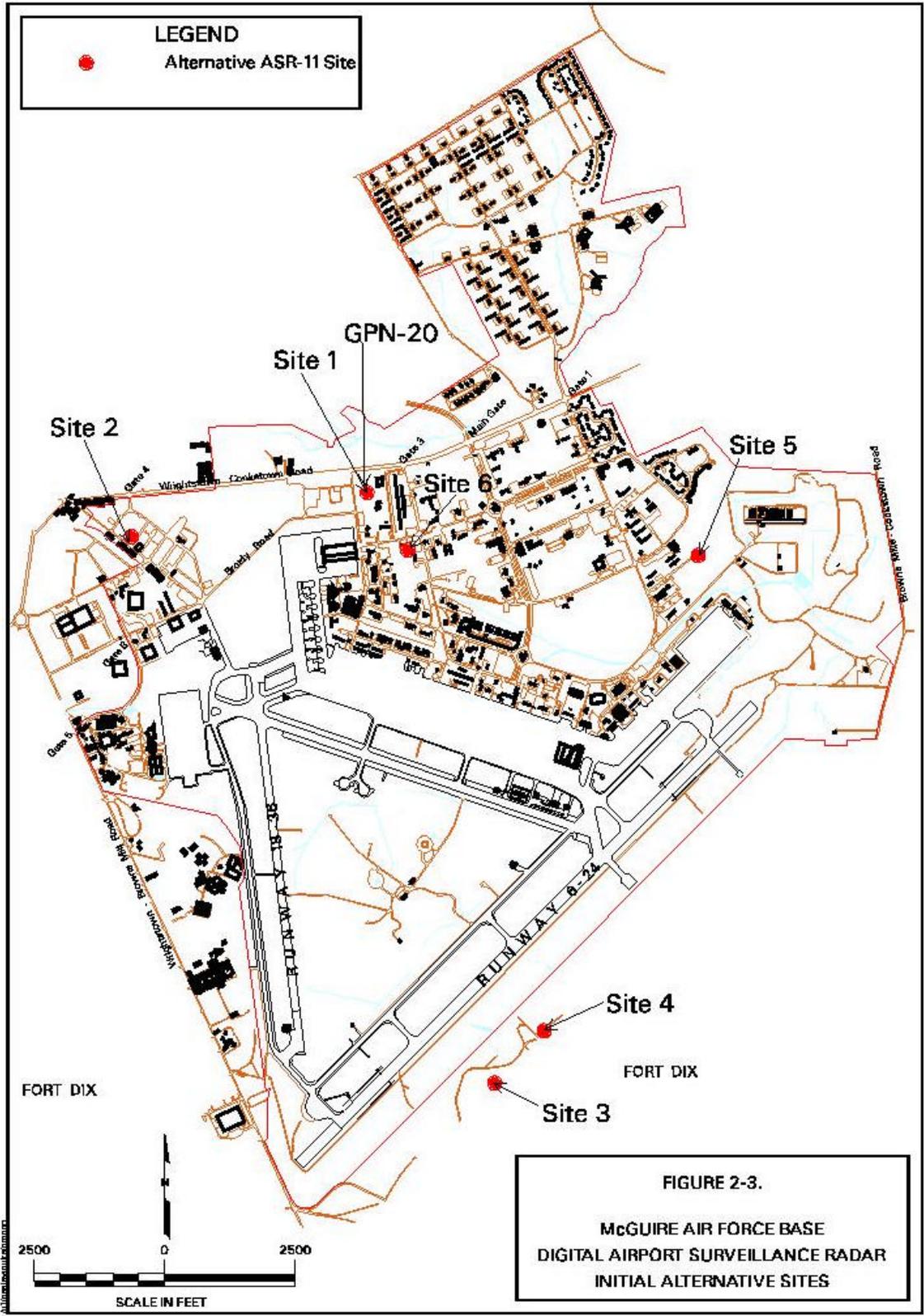


Table 2.1-1. Comparison of Characteristics of Existing GPN-20 and Proposed ASR-11

	GPN-20^(a)	ASR-11
Frequency	2730-2802 MHZ / 1030 MHZ	2700-2900 MHZ 2 frequencies separated by at least 30 MHZ
Power Peak	0.8 microsec (56 dBm)	19.5 kilowatts (1 microsec) 18.0 kilowatts (89 microsec)
Average Power	0.8 microsec (56 dBm)	1600 Watts (solid state)
Pulse Repetition Frequency	1013 pulse/second	720-1050 pulse/second

(a) Source: McGuire AFB Radar Maintenance, 1999.

existing antenna/electrical equipment would be incompatible with one another. Concern was also expressed that development of a radar system at Site 6 would interfere with operations of the existing flight simulator or with a new hangar proposed nearby. Given the concerns at each of the three remaining sites (Sites 2, 5, and 6), it was agreed that additional candidate sites should be investigated.

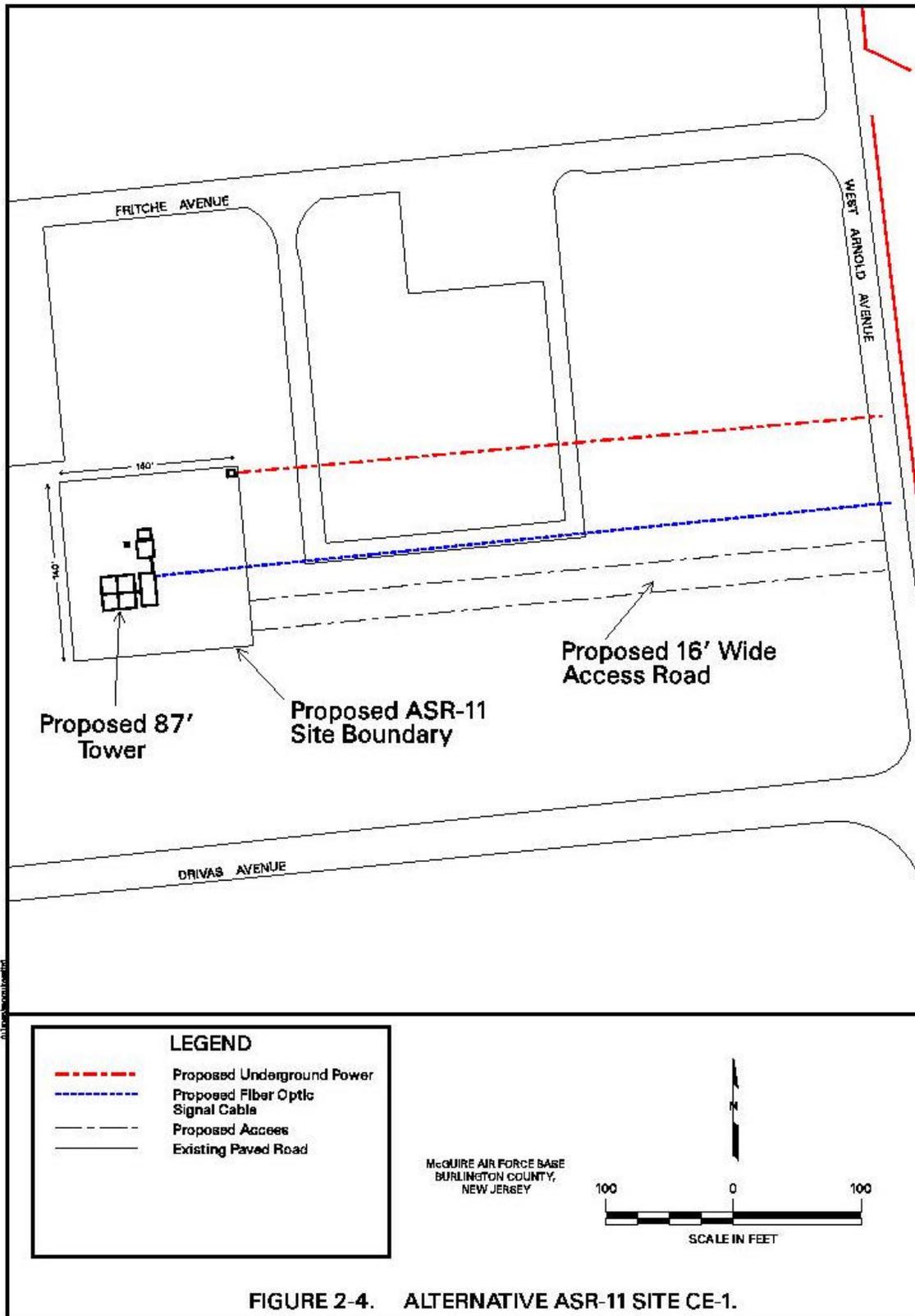
A radar coverage analysis was conducted to determine whether the potential sites would be feasible from an engineering and operations perspective. An electromagnetic interference (EMI) Study of Site 5 was conducted to determine if the proposed ASR-11 would interfere with a telephone switch or the Trunked LMR System, both of which are located in Building 1901, proximate to Site 5.

As a result of the additional evaluation, Site 2 was eliminated because there was concern that the site would be too close to a new ASuper Clinic≡ medical facility and that the site would have negative effects on the community=s visual character. Site 6 was eliminated because it would provide poor radar coverage. Thus, of the six originally proposed candidate sites, only one site (Site 5) remained. The Downselect Teleconference held on September 23, 1998 proposed two additional sites (Site CE-1 and Site CE-3); a third potential site also suggested at the teleconference (Site CE-4) was determined not to provide the minimum 140-foot by 140-foot footprint required for the ASR-11 and appurtenances. Both sites CE-1 and CE-3, as well as Site 5, were determined to provide approximately 80 percent or greater radar coverage; thus, these sites were proposed for detailed survey and are evaluated in this EA.

Figures 2-4 through 2-6 illustrate planned layouts of the ASR-11 and supporting facilities at each of Sites

CE-1, CE-3, and 5. Site CE-1 is located on the northwest side of McGuire AFB, approximately 500 feet south of Wrightstown-Cookstown Road and 1,000 feet west of the existing GPN-20 radar site, in the southwest corner of a semi-vacant lot currently used by base contractors as a storage lot. Utilities can be extended from the existing GPN-20 or a electrical sub-station located to the west. The site is on an undeveloped lot with Bellmarsh Avenue to the west, Fritche Avenue to the north, West Arnold Avenue to the east, and Drivas Avenue to the south. Site CE-3 is located near the southeastern corner of McGuire AFB, approximately 2,500 feet east of the end of Runway 06/24, inside the gated Ground to Air Transmit/Receive (GATR) complex containing Building 1506. The site, located near the eastern Fort Dix/McGuire AFB property line, is proximate to the McGuire AFB airfield to the west and undeveloped areas used for training to north, east, and south. Additionally, Site CE-3 is bordered by and/or contains freshwater wetlands under the jurisdiction of the Army Corps of Engineers (ACOE) and the New Jersey Pinelands Commission. Utilities can be extended from the existing Building 1506 to Site CE-3. Site 5 is located on the eastern side of McGuire AFB, at the end of the cul-de-sac at East Fourth Street. The site is located within a well-maintained grassy area near the base golf course and the Trunked LMR antenna. Utilities can be extended to Site 5 from administration and housing buildings, which are located to the west of Site 5 on East Fourth Street.

While Site CE-3 was recommended for detailed analysis because preliminary evaluation indicated that radar coverage from this location would be excellent, it was recognized that the site poses several engineering, operational, and environmental concerns. Engineering concerns include the feasibility of constructing the ASR-11 at the site, due to the low shear strength of the underlying fine sands, and potential difficulties with running a fiber optic line to the site and providing grounding for electrical utilities within a potentially wet environment. Operational concerns center on possible interference with existing radio operations at the GATR facility. Environmental concerns stem from the potential location of wetlands regulated by the New Jersey Pinelands Commission and ACOE on and adjacent to the site. These concerns have been evaluated as part of this EA.



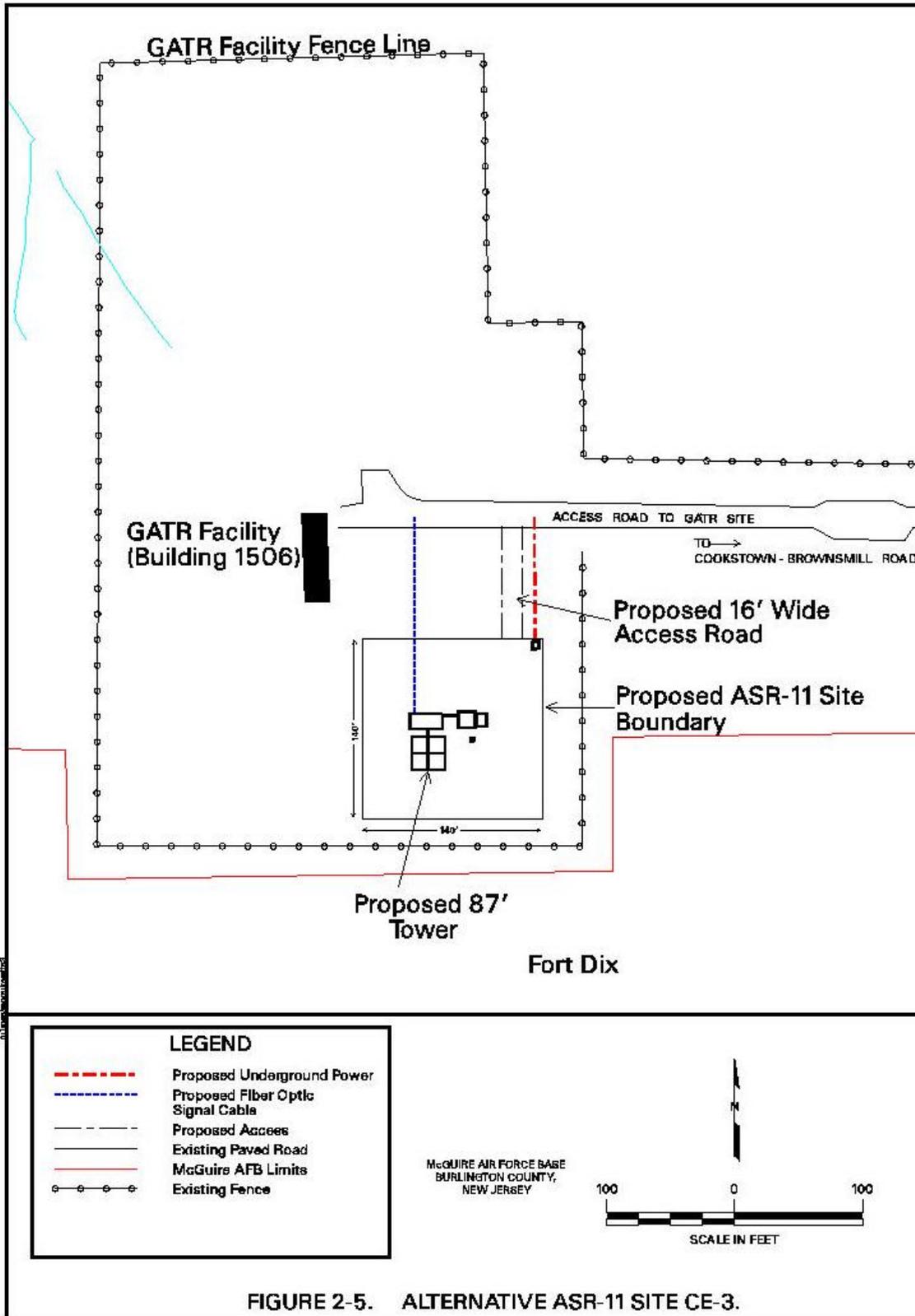


FIGURE 2-5. ALTERNATIVE ASR-11 SITE CE-3.

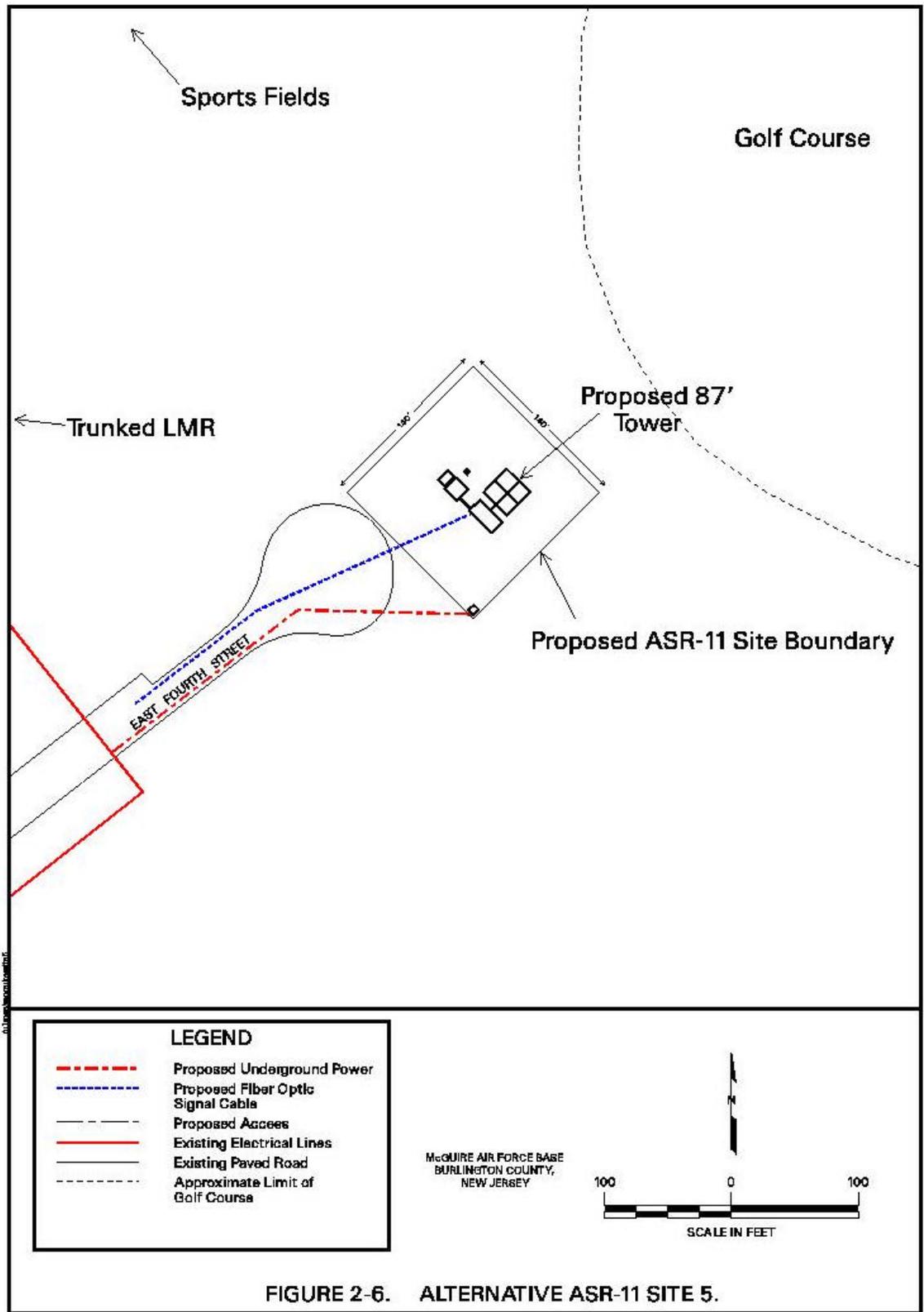


FIGURE 2-6. ALTERNATIVE ASR-11 SITE 5.

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 or operation of the DASR can be determined. General conditions on McGuire AFB are presented for each of the parameters and site specific detail is included, as available. Environmental conditions at the existing GPN-20 are also described in order to assess any potential issues associated with its removal. The following information was obtained from several documents obtained from McGuire Environmental Flight staff and supplemented with data collected during site visits conducted in the Summer and Fall of 1998.

3.1 LAND USE

The land uses at the three alternative ASR-11 sites and the site of the existing GPN-20 are discussed in this section. The site specific data were obtained from referenced documents and site visits.

3.1.1 Existing Conditions

McGuire AFB is located in New Hanover Township in Burlington County, New Jersey. Burlington County is the largest county in the state of New Jersey, having a size of 530,000 acres. The predominant land uses in the county are agriculture and low-density residential (USAF, 1994b). There has been major development throughout the past decade along the area's main transportation routes (Interstate 295, and Routes 70 and 72). More than 50 percent of Burlington County is in the New Jersey Pinelands National Reserve. One million acres of primarily undeveloped mixed forest protected by the New Jersey Pinelands Protection Act of 1979.

McGuire AFB is located within the northern edge of the New Jersey Pinelands National Reserve. The Pinelands Commission, which was established to manage the entire reserve, has the authority to review all development plans and zoning documents for counties, townships, and municipalities within the reserve's limits, and reviews certain activities on military and federal installation areas.

Land uses on McGuire AFB include administrative, aircraft operations and maintenance, airfield, community, housing (family), housing (unaccompanied), industrial, medical, open space, outdoor

recreation, and water (USAF, 1995e). The majority of the 3,596 acre base is airfield, supporting the two active and one inactive runways (see Figure 3.1-1). Table 3.3-1 lists the typical uses and facilities found on McGuire AFB.

Site CE-1. Site CE-1 is located approximately 1,000 feet west of the existing GPN-20 radar. The existing land use at the alternative ASR-11 site is industrial. The site is a semi-vacant lot located approximately 500 feet south of Wrightstown-Cookstown Road and is used by contractors for storage. The lot is approximately 10 acres and is bordered by Bellmarsh Avenue, Fritche Avenue, West Arnold Avenue, and Drivas Avenue, to the west, north, east, and south, respectively. Adjacent to the site, near Broidy Road, is a mobile home storage area, which is partially in the clear zone associated with Runway 18/36. Clear zones are established for the protection of human life. An area at the end of each runway, 3,000 feet by 3,000 feet, is acquired by the US Air Force. Development of populated facilities in these areas is restricted. Site CE-1 is located just east of the clear zone. Site CE-1 is also located 1,000 east of Beverly Park, which abuts the Broidy Road mobile home storage area. Beverly Park contains a picnic area with pavilions for group and organized functions. The park is also located in the clear zone associated with Runway 18/36.

Site CE-3. Site CE-3 is located on McGuire AFB at the Ground to Air Transmit/Receive (GATR) site, approximately 2,400 feet east of the end of Runway 06/24 and just north of the McGuire AFB/Fort Dix Army Installation boundary. The function of the GATR is air defense communications. Land use classifications updated in May 1999 show the GATR site as industrial (USAF, 1999e) Numerous radio antennas are located on the GATR site and a couple on on the alternative ASR-11 site. Building 1506 associated with the GATR is located north of Site CE-3. The South Run watercourse also lies north of the alternative ASR-11 site. The land to the west of the site is McGuire AFB airfield, while the land to the north, east, and west is undeveloped land used for training.

Site 5. Site 5 is located at the end of East Fourth Street on a maintained grassy area that has no specified use. The current land use classification for the alternative ASR-11 site is outdoor recreation. Site 5 is adjacent to one of the golf course fairways and is approximately 250 feet southeast of the LMR Trunk Antenna. Two soccer fields and a baseball field are located approximately 700 feet northwest of Site 5, and housing and administrative buildings are located approximately 500 feet to the west.

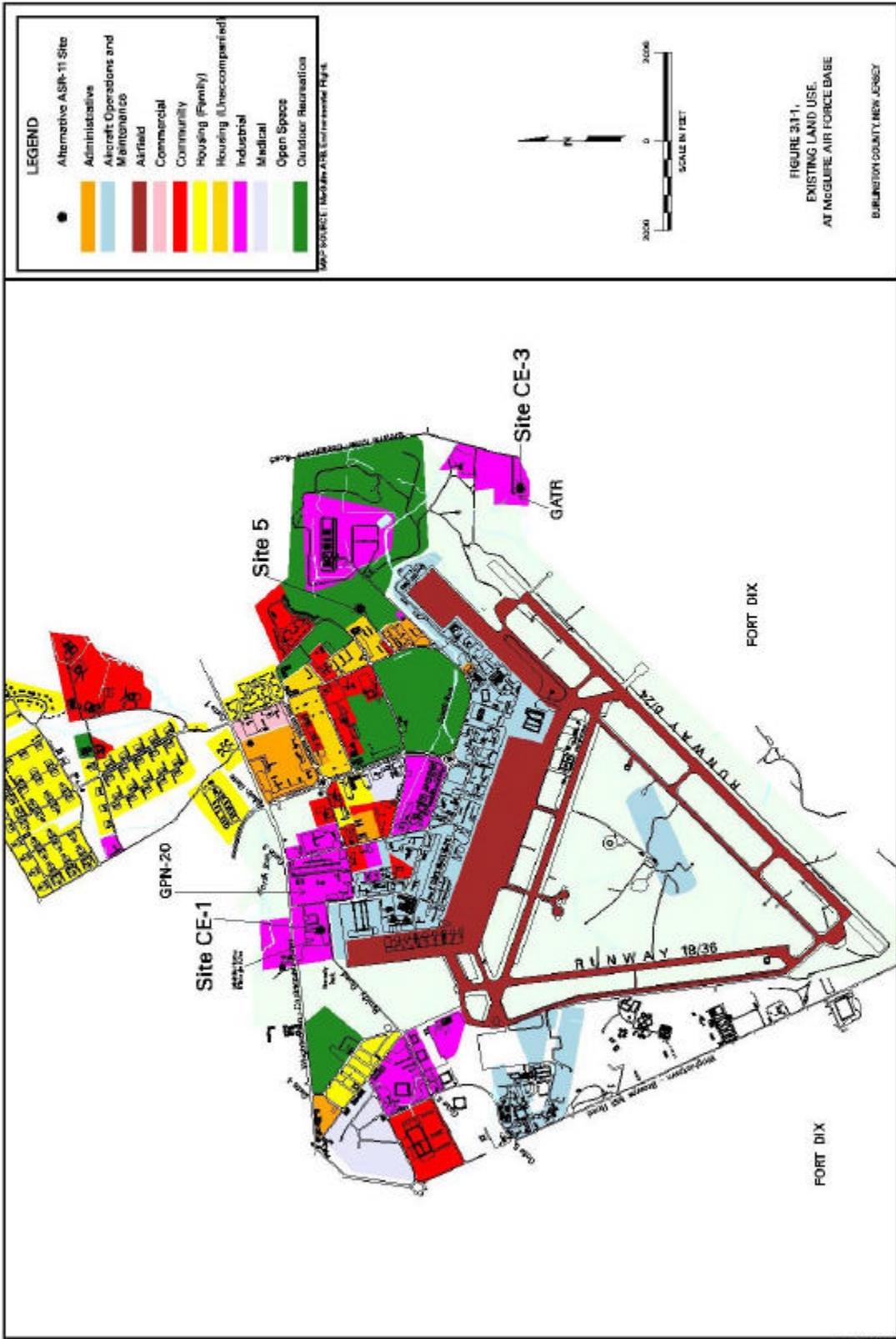


Table 3.1-1. Existing Land Use Descriptions at McGuire AFB

Administration	Personnel, headquarters, legal and other support activities
Aircraft Operations and Maintenance	Aircraft maintenance hangars and docks, control towers, flight training facilities, flight operations buildings
Airfield	Runways, taxiways, aircraft parking aprons, associated clearance and safety zones
Community	Commissary, base exchange, service stations, clubs, chapels, library
Housing (Family)	Single- and multi-family housing
Housing (Unaccompanied)	Airmen dormitories, unaccompanied officer quarters
Industrial	Utility systems, building maintenance facilities, base support supply warehouse
Medical	Medical centers, hospitals, clinics
Open Space	Buffer areas, out-lease areas
Outdoor Recreation	Swimming pools, tennis courts, golf course, soccer fields, baseball field, other facilities
Water	Rivers, lakes, streams, wetlands

Source: (USAF, 1995e)

GPN-20. The existing GPN-20 is located approximately 250 feet south of Wrightstown-Cookstown Road, between Warehouse Road and West Arnold Avenue. The existing land use is industrial.

3.1.2 Future Baseline Without the Project

The 1995 McGuire AFB General Plan (USAF, 1995e) indicated that the future land use of Site 5 would continue to be outdoor recreation. The future land use for Site CE-1 is to be aircraft operations and maintenance. Future land use for the GATR site (Site CE-3) is expected to remain industrial based on recent revisions made to the AFB land use map. The 1995 McGuire AFB General Plan states that the mobile home storage area near alternative Site CE-1 and Broidy Road is to be removed and the land would be an industrial land use area. As of the Fall 1998 site visits, the mobile home storage area remained.

McGuire CEV staff have indicated that the base intends to extend Runway 06/24 approximately 2000 feet

to the east of its existing terminus (with an additional 1000-foot overrun area); this would bring the eastern terminus of the runway closer to Site CE-3. Future land use conditions at Site CE-3 are not expected to change as a result of the proposed runway expansion. No other future land use changes have been identified in the areas of the alternative sites.

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 GPN-20 radar system do not exist. However, there are data for the general area surrounding and including McGuire AFB.

3.2.1.1 Population. Burlington County is characterized by a mixture of agribusiness and industry. The manufacturing sector of the local economy is located primarily within the Delaware River communities, which have advantageous transportation access to the major urban areas, such as Philadelphia and Trenton. The immediate area surrounding McGuire AFB is in the heart of the agricultural sector. Burlington County is the largest farming community in New Jersey and the second largest cranberry producing county in the United States.

The population of Burlington County grew at an average annual rate of 2.5 percent, for the period between 1960 and 1990. Census data from 1990 indicated a total county population of 395,066; unemployment was estimated at 4 percent, and the annual per capita income was \$17,707 (USAF, 1995e).

New Hanover Township, which encompasses McGuire AFB, experienced a nearly 50 percent population decrease between 1980 and 1990. Census data from 1990 indicated a population of 9,546; annual per capita income was estimated at \$9,073. Wrightstown Borough, which abuts McGuire AFB to the northwest, had a population of approximately 3,843 in 1990, with an estimated per capita income of \$8,571 (USAF, 1995e). The population for McGuire AFB has been estimated at 7,580 persons, including personnel and dependents (USAF, 1994b).

3.2.1.2 Employment. As of 1995, McGuire AFB employed more than 11,500 people, including approximately 1,500 civilians. The composition of the remaining employees includes over 5,700 military personnel, 3,000 Air Force Reserve members, and nearly 1,500 Air National Guard personnel. The base's 1995 annual payroll was nearly \$203 million. Additionally, approximately 12,000 retirees live within a 40-mile radius of the base and utilize McGuire AFB facilities and services (USAF, 1997c).

3.2.1.3 Expenditures of McGuire AFB. Construction spending in Burlington County exceeded \$300 million in 1988, but was less than \$170 million in 1991, a 44 percent drop even without adjusting for inflation. The drop in construction spending reflects a decline in the regional economy between 1989 and 1991. Nearly \$19 million was spent on construction projects at McGuire AFB in 1990, representing nearly 10 percent of the total construction in Burlington County that year. In 1992, construction expenditures were back up to approximately \$244 million in Burlington County. Most of the expenditures were related to residential construction (USAF, 1994).

3.2.1.4 Housing. There are 1,753 family housing units plus 176 mobile home lots on McGuire AFB to house base personnel plus dependents (USAF, 1994b). Dormitories on base provide housing for 3,467 unaccompanied personnel, including visitor quarters. The base also has 164 temporary lodging facilities.

3.2.1.5 Environmental Justice. Federal agencies must observe 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. Federal agencies must identify and address disproportionately high and adverse human health and environmental effects of a proposed project.

Sites CE-1, CE-3, and 5 are located on McGuire AFB away from any population groups.

3.2.2 Future Baseline Without the Project

It is not expected that there would be any substantial change in socioeconomic trends in the future without the project. Presently there is no indication of any changes planned on base that would substantially affect population, housing, or employment.

3.3 UTILITIES AND TRANSPORTATION

3.3.1 Existing Conditions

The utilities supplied to McGuire AFB, including the area of the alternative ASR-11 sites and the existing GPN-20 radar, are discussed in this section. The utilities include water supply, wastewater treatment, solid waste, electricity, telephone, and natural gas. Transportation, mainly roadway management and usage, is described in 3.3.1.7.

3.3.1.1 Water Supply. McGuire AFB supplies potable water for industrial, commercial and housing needs from the Potomac-Raritan-Magothy (PRM) aquifer, at an approximate depth of 1,000 to 2,000 feet below the existing ground surface (USAF, 1995e). There are four existing deep wells used to pump the water. They are located on and off the base as shown on Figure 3.3-1. The Water Resources Division of the NJDEP has issued a water allocation diversion permit to McGuire AFB that limits the total flow of water to four million gallons per day, although the wells are only producing on a daily average 1.8 million gallons (USAF, 1995e).

The PRM water resources have been drawn down and the NJDEP has requested all users of the aquifer, including the communities of Wrightstown and Cookstown, to reduce their water uses. NJDEP has asked federal facilities and communities that utilize the PRM system for a public water source to decrease the amount of water drawn from the aquifer. McGuire AFB was asked to reduce its pumping by 35 percent (USAF, 1997c). McGuire AFB has begun negotiations with Fort Dix to obtain some of Fort Dix's permit water credits to pump water from the PRM in order to meet future water demands on McGuire AFB. Fort Dix has decreased the number of forces on base and may not need to pump its permitted amount of water to meet demands. The recent development of Fort Dix as a Kosovo refugee housing facility could temporarily increase water use on Fort Dix.

The treatment process for the water drawn from the wells is aeration, filtration, chlorination, fluoridation and lime addition for pH control. The water is tested quarterly and semi-annually from the well heads and random locations to comply with the Safe Drinking Water Act and NJDEP regulations (USAF, 1995e).

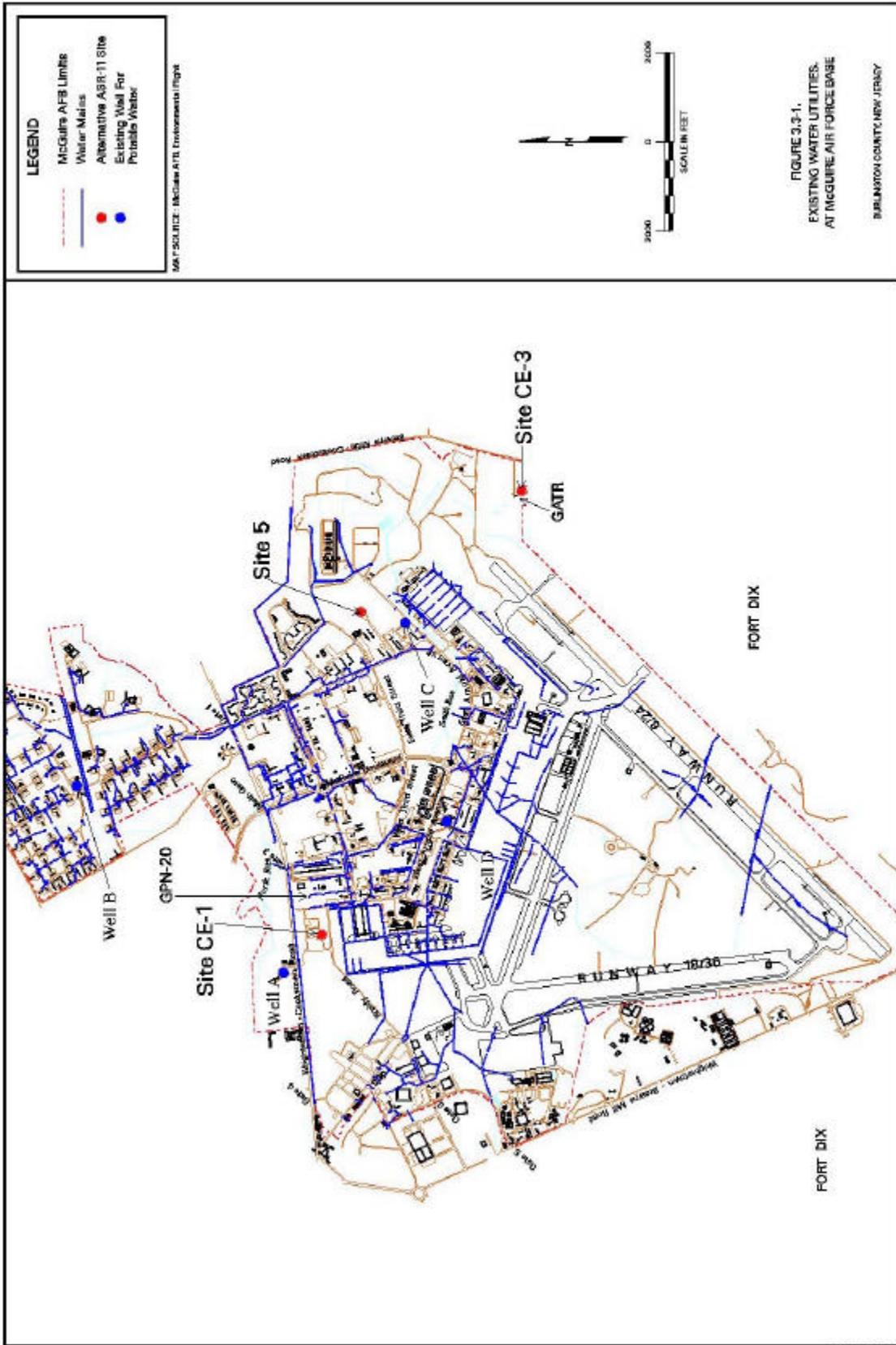
There are two elevated water storage tanks on base that can hold a maximum of 1,000,000 gallons of water (USAF, 1995e). There are no water lines in the immediate vicinity of the alternative DASR sites (Figure 3.3-1).

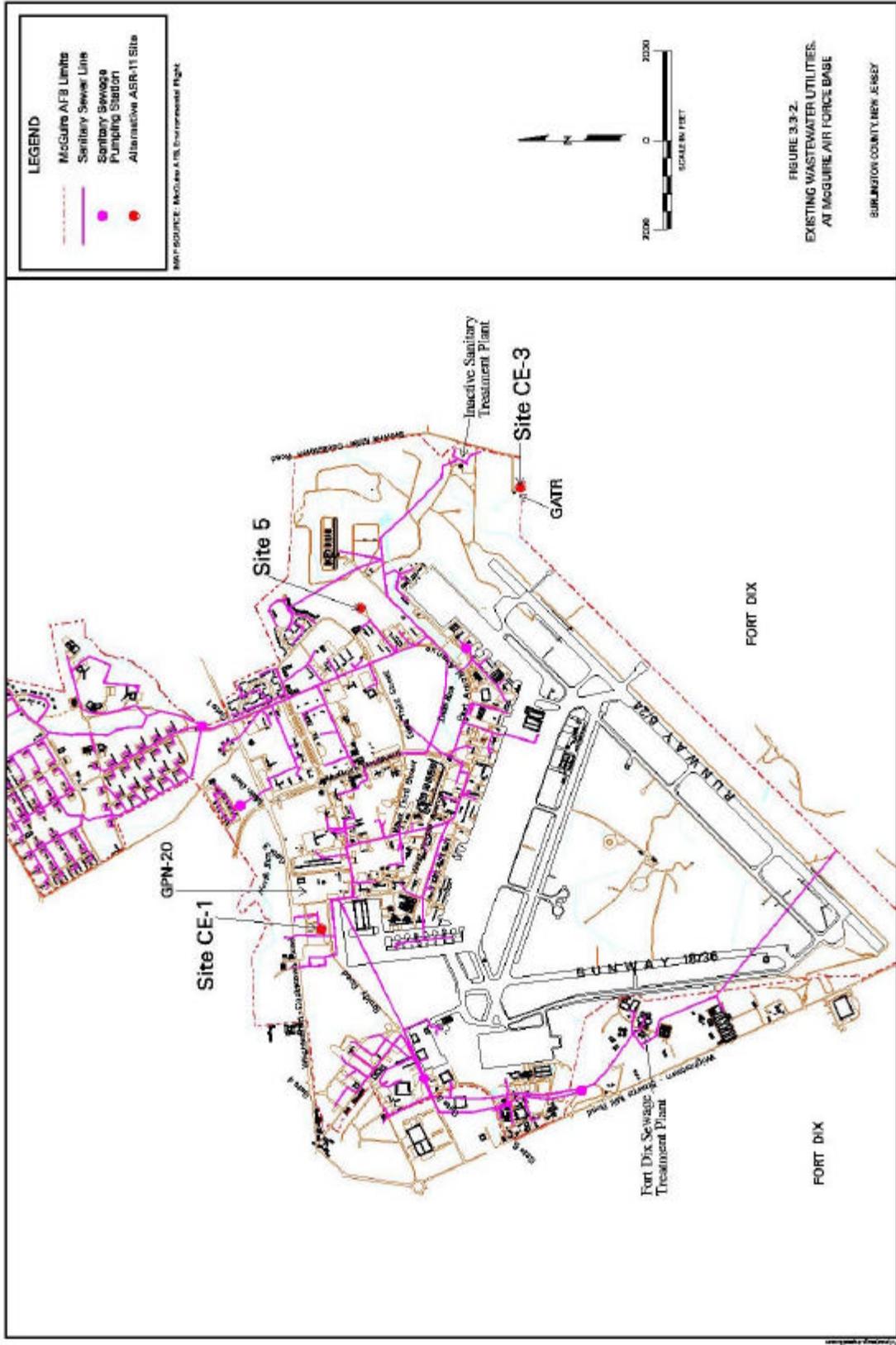
3.3.1.2 Wastewater Treatment. All industrial and sanitary wastewater is discharged from McGuire AFB to a tertiary wastewater treatment plant on Fort Dix. The wastewater flows through a system of gravity and force mains and five lift stations (Figure 3.3-2). The wastewater treatment plant on McGuire AFB has been decommissioned since the plant on Fort Dix began operation (USAF, 1995e). Now a lift station at the old plant on McGuire AFB pumps the wastewater to Fort Dix through a force main along Runway 06/24. The wastewater treatment plant on Fort Dix began operation in 1994 and has the capacity of treating 4.5 million gallons per day (mgd). Currently the plant treats 2.5 mgd, 76,000 gallons per day are from McGuire AFB and the remaining from Fort Dix. The treated effluent is discharged into percolation lagoons on Fort Dix and the South Run (USAF, 1997c).

Sewer lines exist in the vicinity of Site CE-1 and Site 5, as shown on Figure 3.3-2. There are no sewer lines in the immediate vicinity of Site CE-3 or the GPN-20. Northeast of Site CE-3 is the decommissioned wastewater treatment plant, which now houses a lift pump station to convey the wastewater to the tertiary treatment plant on Fort Dix.

3.3.1.3 Solid Waste. All solid waste is removed from McGuire AFB through a contract agreement. The waste is transported to the Burlington County Landfill. The landfill opened in 1989 and there is no scheduled closing date for the landfill (USAF, 1995e). Paper is separated from the solid waste and transported to the Fort Dix incinerator to provide power and heat to Fort Dix and McGuire AFB. There are six inactive landfills on McGuire AFB that were used to dispose of miscellaneous industrial chemicals, drums of unknown wastes, coal ash, general base refuse and explosive ordnance waste materials. These sites have been investigated and found to contaminate the soils and groundwater in the area. Therefore, mitigation of the sites has been initiated through the Installation Restoration Program (IRP) (USAF, 1995e). One of these inactive landfills is located approximately 1,000 feet northwest of the alternative Site CE-1. This landfill is discussed in greater detail in Section 3.11, the discussion on pollution prevention and hazardous waste.

The base operates a recycling program requiring the separation of paper, cardboard, aluminum and steel cans, and plastic and glass bottles. The Burlington County Occupational Training Center provides





curbside pickups for the family housing areas. Programs have been implemented to recycle the following various wastes: uncontaminated jet fuel that has been defueled is returned to bulk storage; waste oil and contaminated fuel is sent to a recycling facility off base; washing solvents are removed from base by a solvent recovery operation; lead-acid batteries are sent off base to be recycled; and household batteries are treated as hazardous waste (USAF, 1995e).

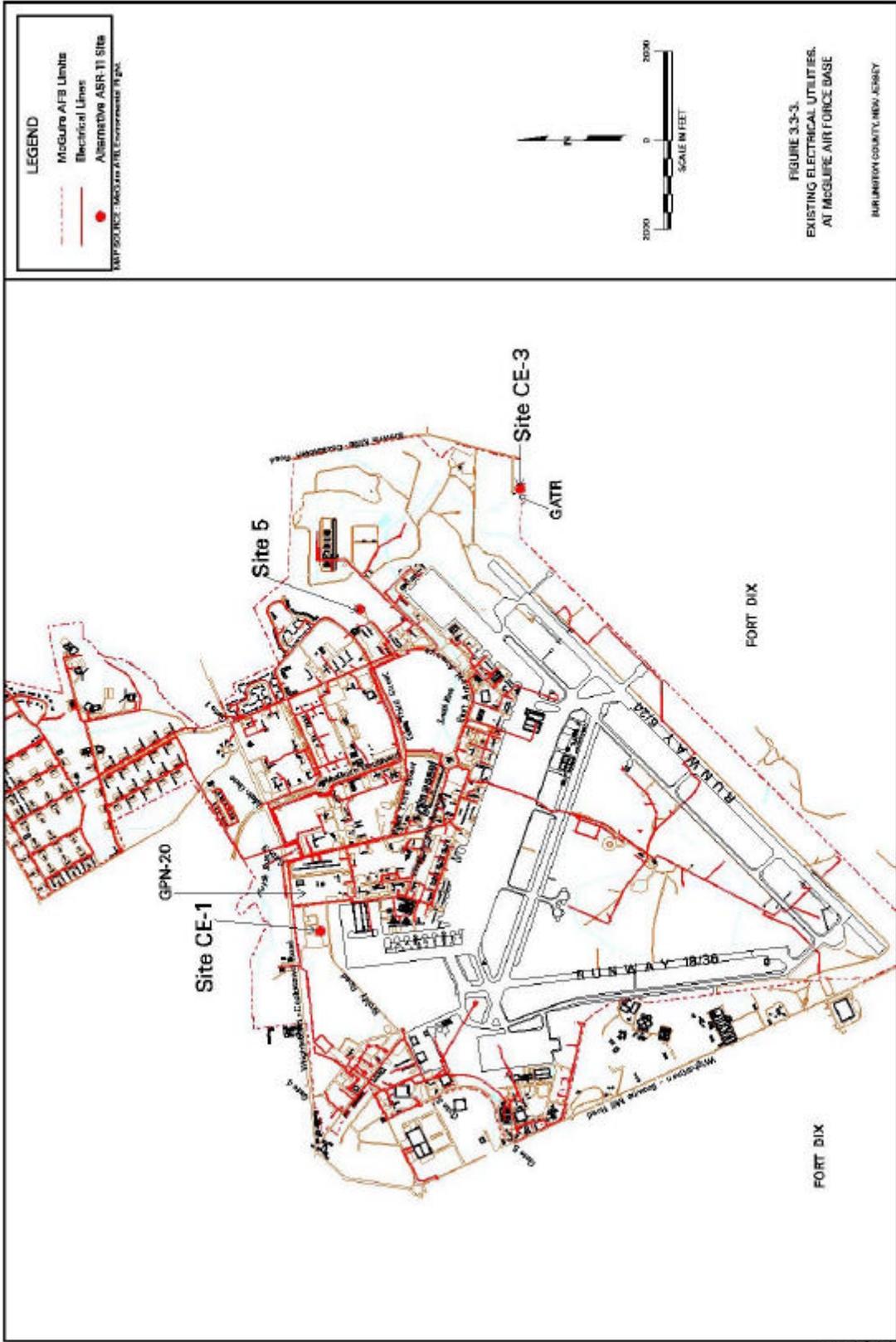
Any garbage generated from international flights is incinerated to avoid the introduction of foreign pests.

3.3.1.4 Electricity. Power is supplied to McGuire AFB by New Jersey Central Power & Light via seven feeder circuits. Two sub-stations bring the voltage down from 7,200/12,470 volts to 2,400/4,160 volts (USAF, 1995e). One of the sub-stations is located near the Broidy Road trailer park, to the west of alternative Site CE-1; the other is located near the flight line.

All electrical transmission and distribution lines on McGuire AFB are above ground with the exception of a cable connecting the cantonment area with the industrial and Air National Guard areas west of the runway triangle (Figure 3.3-3). The cable runs under the Runway 18/36 approach zone (USAF, 1995e). Another underground cable runs under the main parking apron to provide power to the airport infield. In the case of electrical failure, there are 46 emergency backup generators to power buildings housing airfield control and instrumentation, emergency organizations and utility services.

Electrical power currently exists in the vicinity of each of the alternative ASR-11 sites. There is a substation located to the west of Site CE-1 and another substation located to the west of Site CE-3 near Runway 6/24. Electrical lines currently run along East Fourth Street, 350 feet southwest of Site 5. Electrical power is also at the existing GPN-20, approximately 1,000 feet east of Site CE-1.

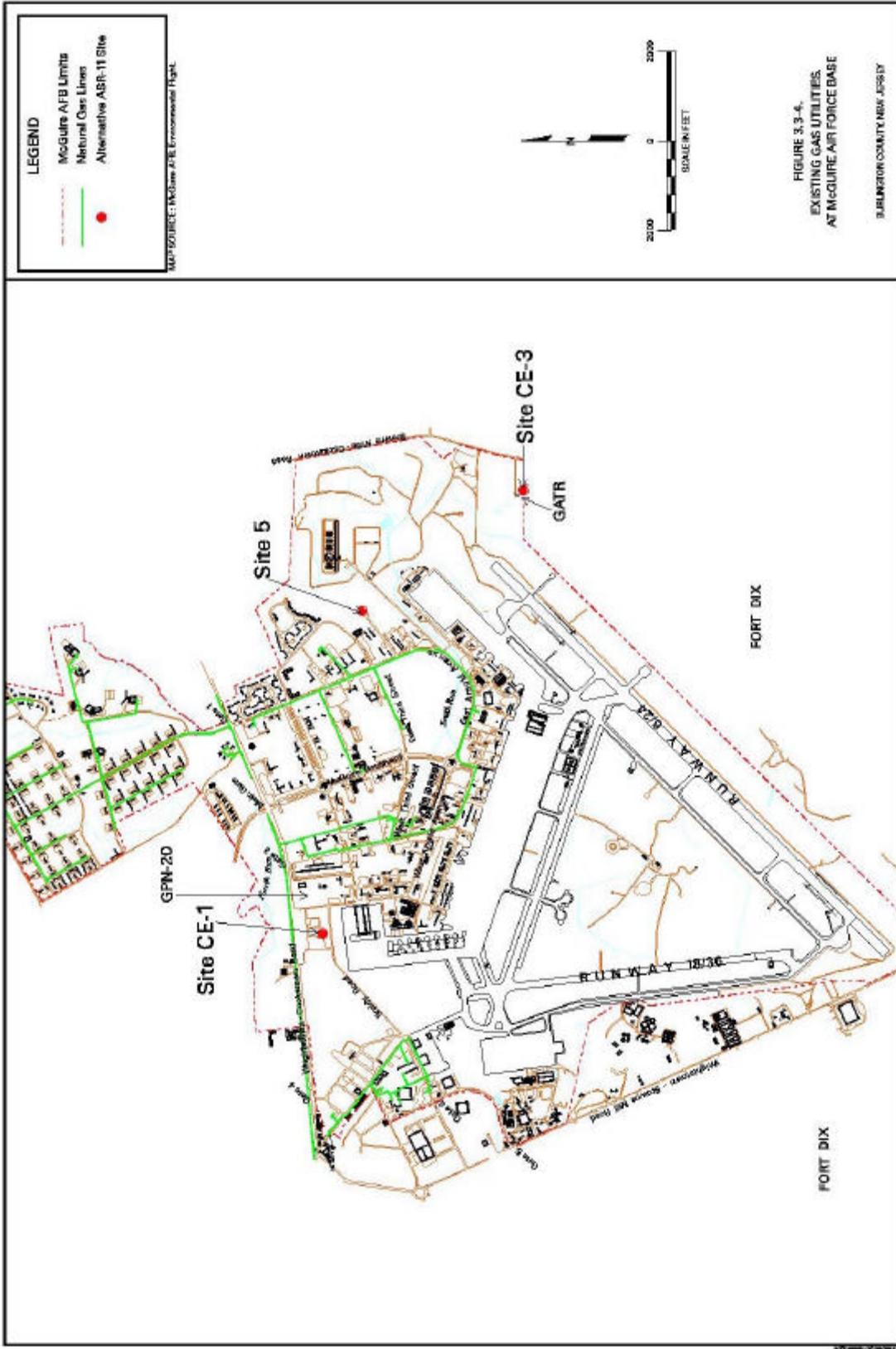
3.3.1.5 Telephone. Telephone lines exist in the areas of the alternative sites so that lines could be run to the ASR-11 for a minimal cost. Telephone lines are currently available at the GPN-20 and could be extended to alternative Site CE-1 (Raytheon, 1998). The building supporting the GATR facility (Building 1506) has telephone lines coming into it, which could be extended to alternative Site CE-3. Telephone lines are currently available at buildings within 500 feet of alternative Site 5 and could be extended to the alternative site.



3.3.1.6 Natural Gas. Natural gas is provided to McGuire AFB by Public Service Electric and Gas Company (PSEG). Gas replaced oil on the base in 1972 when a metering station was installed near the Gate 3 service entrance on Wrightstown-Cookstown Road (USAF, 1995e). The gas line from PSEG follows Wrightstown-Cookstown Road, which is approximately 500 feet north of alternative Site CE-1 and 250 feet north of the existing GPN-20 (Figure 3.3-4). Gas lines were also installed to housing and dormitories as well as other selected buildings on the main cantonment area. The central heating plant (Building 2101) on McGuire AFB is supplied with natural gas through a 14-inch diameter main at an approximate pressure of 60 pounds per square inch (psi). An eight-inch diameter main delivers natural gas to the Falcon Courts North family housing area for heating and hot water (USAF, 1995e). Alternative Site 5 is located approximately 270 feet east of a gas line into Building 1908. There are no gas lines located near Site CE-3.

3.3.1.7 Transportation. McGuire AFB is located approximately 10 miles southeast of the New Jersey Turnpike, which allows access to New York City, Baltimore, and Washington, D.C. Interstate 295 runs parallel to the New Jersey Turnpike and leads to Philadelphia. West of the base is U.S. 206, oriented north-south to Trenton. Just south of the base is State Route 70, which runs east/west across New Jersey.

Four of five operating gates at McGuire AFB provide access on a regular basis during peak hours (Figure 3.3-4). These gates are 1, 2 (Main Gate), and 3, providing access from Wrightstown-Cookstown Road on the northern edge of the base, and Gate 8 on Broidy Road, located along the western edge of the base. Gate 5 is located off of Wrightstown-Browns Mills Road providing access into the base and to Wonnacott Avenue. Gates 4, 6, and 7 are permanently closed. The traffic volumes are greatest at Gates 1, 2, and 8 (USAF, 1994b). Gate 2 is the main entrance providing access to McGuire Boulevard, the primary north-south road on base. During the weekends and evening weekday hours Gate 1, east of Gate 2, is the primary base entrance and connects the Falcon Courts North family housing area with the main base. Freight traffic primarily uses Gate 3, west of Gate 2, on an as needed basis. Gate 8 is often used to access the NJ National Guard cantonment, the civil engineering and industrial area, and the mobile home storage area next to Beverly Park on Broidy Road (USAF, 1994b).



Site CE-1. Alternative Site CE-1 is bordered by Belmarsh, Fritche, West Arnold, and Drivas Avenues. It can be accessed through Gate 8, along Broidy Road traveling northeast.

Site CE-3. Alternative Site CE-3 is located on the eastern boundary of the base. Site CE-3 can be accessed, without entering any of the gates at McGuire AFB proper, from a short access road off Browns Mills-Cookstown Road, which intersects Wrightstown-Cookstown Road northeast of the base.

Site 5. Alternative Site 5 is located at the end of East Fourth Street, which can be accessed from the main gate, along McGuire Boulevard to East Arnold Avenue.

GPN-20. The existing GPN-20 can be accessed via a similar route as described to Site CE-1.

There have been no traffic analyses performed on McGuire AFB recently. However, the *Burlington County Highway Master Plan, 1989* states that there is a higher volume of traffic surrounding the base than a few miles away. Average daily traffic on Route 616 in the vicinity of the McGuire AFB gates is estimated at 9,500, while two miles east of the base the average daily traffic on Route 616 is estimated to decrease to 6,300 cars per day (USAF, 1994b). A similar situation is reported to occur on Route 545 where average daily traffic counts are 20,300 cars per day near Gate 8 on Broidy Road and 12,900 cars per day near Browns Mills (USAF, 1994b).

3.3.2 Future Baseline Without the Project

No substantial change in wastewater, solid waste, electricity, telephone, and natural gas conditions would occur if the project were not completed. The state's request to decrease the amount of water pumped from the PRM aquifer could put a strain on the base's water supply. There are plans to widen East Arnold Avenue, north of the recreational facilities, and Broidy Road, from Gate 8 to Texas Avenue, in order to facilitate the flow of traffic in and out of the base (USAF, 1995e). There are also plans to increase parking and access to frequently used facilities.

3.4 NOISE

Existing noise environments at the three alternative ASR-11 sites and existing GPN-20 are discussed in this section. Environmental noise levels from aircraft are described in terms of the day-night average

sound level (L_{dn}), in units of A-weighted decibels (dBA). The L_{dn} value is used by many federal agencies to describe noise exposure and to predict the community effects of long-term exposure to environmental noise. The L_{dn} value is also used by federal agencies to determine the appropriateness of a given use of specific land (land use compatibility) relative to the average level of environmental noise experienced at that location. Air Force land use compatibility guidelines are documented in the *Air Installation Compatible Use Zone (AICUZ) Program Handbook* (USAF, 1991). Noise levels below 65 dB are considered to be compatible with residential land use. Residential land use is discouraged for areas with noise levels in the range of 65-70 dB, strongly discouraged for areas in the range of 70-75 dB, and considered generally unacceptable for areas that exceed 75 dB.

3.4.1 Existing Conditions

Aircraft are the only significant noise source at McGuire AFB. An AICUZ study was updated for McGuire AFB in 1995. The study addressed safety issues and identified hazard potential due to aircraft accidents and obstructions to navigation and compatible land uses based on exposure levels to aircraft noise in the surrounding area (USAF, 1997c). Overall, the base's noise and accident potential zones (APZs) extend approximately 2 miles to the north, 4 miles to the northeast, and 2 miles to the south and southwest from the base.

To analyze current noise levels resulting from McGuire AFB aircraft operations, contours of constant value (isopleths) for L_{dn} values of 65, 70, 75, 80, and 85 dB in the vicinity of the base were generated with the NOISEMAP 6.3 computer program (USAF, 1994b). The L_{dn} values were computed with data on average busy-day frequency of operations for the 1993 calendar year, operational data describing flight tracks, and altitude profiles, including power settings and airspeed. These factors were combined with data on standard aircraft operational noise-emission characteristics corrected to local conditions (USAF, 1994b). Noise from surface vehicles (cars and trucks) was not included in the contours; the contribution of such sources to the total noise level is assumed to be small except in the immediate vicinity of roads. The analysis indicated that aircraft-related noise contours extend beyond the boundary of McGuire AFB on both ends of Runway 06/24, into the communities on both sides of the air base.

Prevailing winds dictate the selection of the primary operating runway and, thus, the patterns of aircraft operations and noise emissions in the vicinity of McGuire AFB. Runway 06/24 is used approximately 98 percent of the time for takeoffs and landings at McGuire AFB. Of that 98 percent, Runway 24 is used

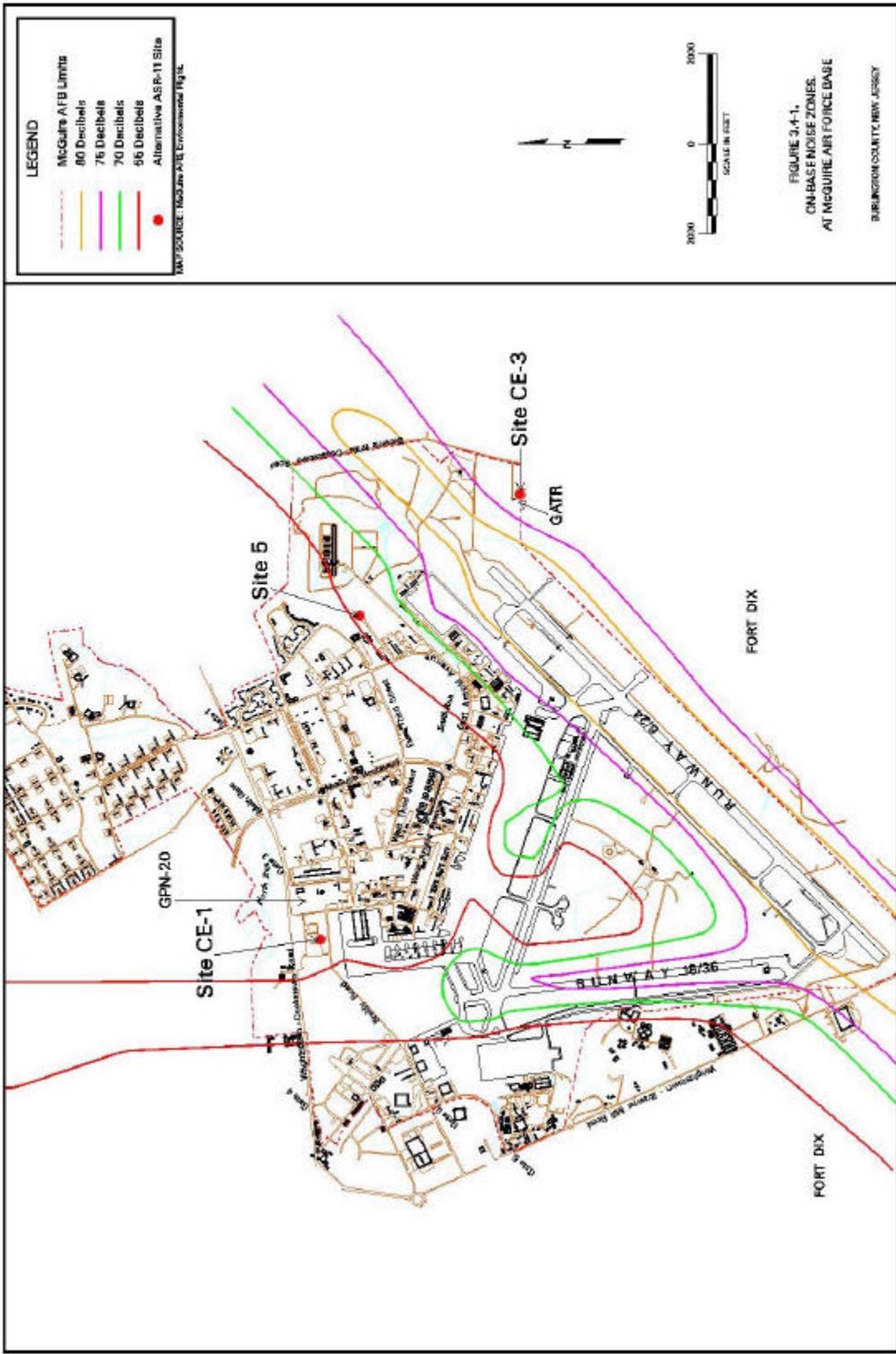
60 percent of the time, and Runway 06 is used 40 percent of the time. Runway 18/36 is used for the remaining 2 percent of operations, primarily for training activities and only infrequently for arrivals and departures (USAF, 1994b).

Current operations at McGuire AFB consist primarily of training and mission operations by the C-141 and KC-135 aircraft assigned to the base. However, transient (visiting) aircraft that land at the base and aircraft that fly closed patterns at the base (C-5A, A-10A, A-4C, C-130E, F-16A, and KC-135R) but do not land, also contribute to the noise levels and extend the noise contours. Another potential source of noise from fixed-wing aircraft is the performance of engine run-up maintenance on the ground at designated locations along hangar aprons for the C-141 and KC-135 aircraft (USAF, 1994b). Records maintained by the 438th Air Wing Public Affairs Office indicate that each year McGuire AFB typically receives 50-60 complaints about aircraft noise. The frequency of complaints ranges from 2 to 5 per month from October through May, and from 5 to 12 per month from April through September (when windows are more commonly open) (USAF, 1994b). Complaints typically come from areas within 2-3 miles of McGuire AFB, but some are from areas outside the immediate airspace of the base, such as Leisuretown (a retirement village approximately 10 miles southeast of the base) and Ocean County (coastal area, 30 miles east-southeast).

Site CE-1. Site CE-1 is outside the 65 dBA aircraft noise contours, and thus, is the least affected by aircraft-generated noise of the three proposed sites (Figure 3.4-1). However, Site CE-1 is located approximately 500 feet south of Wrightstown-Cookstown Road, and is somewhat more affected by non-aircraft generated noise than the other alternative sites.

Site CE-3. Site CE-3 is located approximately 2,500 feet east of the end of Runway 06/24 inside the gated GATR complex. This site is located between the 70 and 75 dBA aircraft noise contours (Figure 3.4-1). The ambient noise level, as observed during the field survey, is fairly quiet, with the exception of significantly elevated noise levels when jet aircraft take off and land on the adjacent runway. Site CE-3 is significantly screened from non-aircraft generated noise along Cookstown-Browns Mills Road by forest vegetation.

Site 5. Site 5 is between the 65 and 70 dBA aircraft noise contours (Figure 3.4-1). No significant



proximate sources of non-aircraft generated noise were observed during the field study.

GPN-20. The existing GPN-20 is located approximately 1,000 feet east of Site CE-1, and is characterized by similar ambient noise levels. The existing radar site is located outside the 65 dBA aircraft noise contour (Figure 3.4-1). The only noise source related to the GPN-20 is the emergency generator, which is periodically tested. The generator has a muffler and is located in a small building adjacent to the tower. Some vehicular traffic-generated noise is discernable from Wrightstown-Cookstown Road, which lies to the north of the radar site.

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 the sites in the future without the project, although moderate increases in ambient noise levels may be associated with expanded or relocated base activities. No changes in land use activities are expected to occur at Site 5, and thus there would be no significant changes in noise levels at this location. Aircraft operations and maintenance are proposed to occur at Site CE-1, and thus noise levels in the vicinity of the site may be elevated on a periodic basis. The proposed removal of the mobile home storage area near alternative Site CE-1 is not anticipated to alter the ambient noise levels in this vicinity. In the vicinity of Site CE-3, the base intends to extend Runway 06/24 approximately 2000 feet to the east of its existing terminus (with an additional 1000-foot overrun area). The runway extension this would bring the eastern terminus of the runway closer to Site CE-3, which may experience increased noise levels as a result of the proposed runway expansion.

3.5 AIR QUALITY

3.5.1 Existing Conditions

Existing air quality characteristics in the vicinity of the three alternative ASR-11 sites and existing GPN-20 are discussed in this section. Regional data expected to characterize the specific sites are described.

The 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 (CAA) and the 1977 and 1990 Clean Air Act Amendments (CAAA), EPA has promulgated 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 (Table 3.5-1). To date, EPA has issued NAAQS for six criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO₂), ozone (O₃), nitrogen dioxide (NO₂), lead (Pb), and particles with a diameter less than or equal to a nominal 10 micrometers (PM₁₀). National primary standards are set to protect human health with an adequate margin of safety for even the most sensitive portion of the human population. Secondary standards are set for some pollutants to protect against damage to plants, animals, and materials. New Jersey Ambient Air Quality Standards are the same as the NAAQS with the exception of secondary standards for O₃, SO₂, and total suspended particulates (TSP) (New Jersey Administrative Code, Title 7, Chapter 27).

Ambient concentrations in excess of these standards are a violation of the law and can lead to a designation of nonattainment. Standards are not to be exceeded more than once per year, except for O₃ and PM₁₀, which are not to be exceeded more than an average of one day per year. As of 1994, the area around McGuire AFB had been designated as nonattainment only for O₃. The predominant winds in the area of McGuire AFB during the months of September and May are from the north and west, and from the south during June, July, and August (USAF, 1996a). The winds tend to be calm from June to November. The ventilation and dilution factor for an area is determined by the stability of air layers and wind speed. McGuire AFB generally has adequate ventilation to disperse most pollutants. Primary and secondary ozone standards can be exceeded in the area when ozone builds up from poor ventilation during warm summer months, which aids in the development of photochemical ozone (USAF, 1996a). Since the use of motor vehicles contributes to ozone nonattainment, the state of New Jersey imposes trip reduction requirements. McGuire AFB participates in the trip reduction program between 6:00 AM and 10:00 AM, with the goal of obtaining an average vehicle ridership of 1.38 persons per vehicle. In 1995, estimated ridership was 1.09 persons per vehicle.

McGuire AFB (including all three potential ASR-11 sites), located in Burlington County, is in the extreme eastern portion of the Metropolitan Philadelphia Interstate Air Quality Control Region (AQCR). Areas within the AQCR are further defined according to the attainment status of criteria pollutants. Burlington County is included in the ozone nonattainment area referred to as Philadelphia/Wilmington/Trenton (P/W/T). The P/W/T area is classified as severe nonattainment for ozone and is in an ozone transport zone that encompasses the State of New Jersey and much of the northeast United States. The transport region establishes that ground-level ozone formation in the northeastern United States is a regional atmospheric problem.

Table 3.5-1. National Ambient Air Quality Standards (continued)

Table 3.5-1. National and New Jersey Ambient Air Quality Standards

POLLUTANT	FEDERAL STANDARDS		NEW JERSEY STANDARDS*
	Primary Standard	Secondary Standard	Secondary Standard
Sulfur dioxide (SO ₂)			
annual arithmetic mean ⁴	80 µg/m ³ (0.03 ppm) ²	No secondary standard	60 µg/m ³ (0.02 ppm)
maximum 24-hour average ⁵	365 µg/m ³ (0.14 ppm) ²	No secondary standard	260 µg/m ³ (0.1 ppm)
maximum 3-hour average ⁵	None	1300 µg/m ³ (0.50 ppm) ²	1300 µg/m ³ (0.50 ppm)
Particulate Matter (PM-10 ^a)			
24-hour average ⁵	150 µg/m ³	Same as primary standard	Same as federal primary standard
annual arithmetic mean ⁴	50 µg/m ³	Same as primary standard	Same as federal primary standard
Carbon Monoxide (CO)			
8 hour average ⁵	9 ppm (10 mg/m ³)	No secondary standard	Same as federal primary standard
1 hour average ⁵	35 ppm (40 mg/m ³)	No secondary standard	Same as federal primary standard
Ozone (O ₃)			
1 hour average ⁶	0.12 ppm (235 µg/m ³)	Same as primary standard	0.08 ppm (160 µg/m ³)
Nitrogen Dioxide (NO ₂)			
annual arithmetic mean ⁴	0.053 ppm (100 µg/m ³)	Same as primary standard	Same as federal primary standard
Lead (Pb)			
Calendar quarter max. arithmetic mean ⁴	1.5 µg/m ³	Same as primary standard	Same as federal primary standard

Table 3.5-1. National Ambient Air Quality Standards (continued)

POLLUTANT	FEDERAL STANDARDS		NEW JERSEY STANDARDS*
	Primary Standard	Secondary Standard	Secondary Standard
Total Suspended Particulates (TSP)			
annual arithmetic mean ⁴	No primary standard	No secondary standard	75 µg/m ³ (primary); 60 µg/m ³
maximum 24-hour average ⁵	No primary standard	No secondary standard	260 µg/m ³ (primary); 150 µg/m ³

* New Jersey Ambient Air Quality Primary Standards are the same as the NAAQS

^a"particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers" (40 CFR 50)

¹ppm= parts per million

²approximate equivalent value in either µg/m³, mg/m³ or ppm

⁴not to be exceeded

⁵not to be exceeded more than once a year

⁶not to be exceeded more than one day per year

Source: EPA, 1993 and USAF, 1995b

New Jersey Department of Environmental Protection (DEP), Division of Environmental Quality performs air monitoring throughout New Jersey. McGuire AFB lies within the Central Delaware Valley reporting region. The nearest monitoring stations are in Burlington, Camden, Colliers Mills, Rider College, and Trenton. Pollutants monitored at the Burlington site include CO, SO₂, and TSP, while nitrogen oxides (NO_x) are monitored at Camden. The Colliers Mills site monitors O₃, primarily originating from pollutants generated in Philadelphia and Camden metropolitan areas. Although the Colliers Mills monitoring station is not within the P/W/T area, the dominant wind direction from McGuire AFB is towards this station. The Colliers Mills site, about 7 miles east-northeast of McGuire AFB and 4.5 miles east of New Egypt began operation when the McGuire AFB monitoring site was discontinued on March 1992. In addition to air monitoring sites, an acid precipitation monitor operates in the Lebanon State Forest in Burlington County, along the southern boundary of Fort Dix (USAF, 1995e).

In 1992, no violations of air quality standards for CO, sulfur oxides (SO_x), or PM₁₀ were recorded in the City of Burlington, and the Camden monitoring station reported no violations of the NO_x standards. The McGuire AFB monitoring site recorded four days in 1989, four days in 1990, and ten days in 1991 when O₃ concentration averages violated the primary NAAQS. The secondary NJAAQS for O₃ was exceeded on 149 days in 1990 (USAF, 1994b).

In August 1994, McGuire AFB completed a Clean Air Act (CAA) General Conformity Determination for the realignment of aircraft and personnel based on the 1993 Base Realignment and Closure recommendations and Air Force force-structure changes. Results of the conformity determination demonstrated no adverse impact to regional air quality for ozone, allowing the realignment actions to occur (USAF, 1995e).

Regulated air emission stationary sources at the base which require permits include paint spray booths, oil and gas-fired boilers, generators, storage tanks, engine test cells, and fueling operations. As of 1995, permits to operate were issued for 123 point sources located throughout the base. These permitted sources are being consolidated under the base's Title V permit application (USAF, 1997c). The Emissions Survey Report (ESP), comprising an air pollution emission inventory of stationary and mobile sources, summarized the total 1994 emissions from sources at McGuire AFB (Table 3.5-2).

Activities at McGuire AFB that could potentially affect the air quality in the vicinity of the three

alternative ASR-11 sites and existing GPN-20 include managed and inadvertent fires on the base (including the infield triangle), which may emit PM-10 and carbon monoxide, vehicular traffic, and activities associated with aircraft and runway operations, such as aircraft and equipment maintenance and jet engine testing and operation.

3.5.2 Future Baseline Without the Project

Without the project, the air quality in the vicinity of the three DASR sites is expected to improve as a result of ongoing efforts to reduce emissions at McGuire AFB. Air emissions at the base should decrease in the future due to the implementation of new technologies which reduce emissions and improved maintenance of motor vehicles, aircraft, and equipment; and replacement of outdated aircraft and machinery with more efficient models that have lower emissions. There are no future realignments or closures proposed that would change base operations and air quality conditions.

3.6 GEOLOGY AND SOILS

Physiography, geology, and soils at the three alternative ASR-11 sites and the site of the GPN-20 are discussed in this section. There are no existing data specific to the sites. Therefore, the data for the surrounding area generally characterize the alternative ASR-11 sites and the area of the GPN-20.

3.6.1 Existing Conditions

The topology of McGuire AFB is characterized by nearly level plains, rolling uplands, mature streams, and swampy areas. These characteristics are typical of the Atlantic Coastal Plain Physiographic Province in which McGuire AFB lies (USAF, 1997c). The physiographic province is located along the Delaware Valley across New Jersey to Raritan Bay and is approximately 10 to 20 miles wide. The base elevations vary from 80 feet above mean sea level (msl) along the eastern edge to 144 feet above msl in the southwest area (USAF, 1997c). Both Sites CE-1 and 5 are approximately 120 feet above msl. Site CE-3 is approximately 100 feet above msl.

3.6.1.2 Geology. McGuire AFB is situated over interbedded continental and near shore marine sands and clays. The formations in a descending order are as follows: Cohansey Sand, Kirkwood Formation, Manasquan Formation, Vincentown Formation, Hornerstown Sand, Mount Laurel-Wenonah

Table 3.5-2. Stationary and Mobile Source Emissions.

	Stationary Sources (tons/year)	Mobile Sources (tons/year)
Particulate Matter (PM ₁₀)	9.72	39.15
Nitrogen Oxides (NO _x)	141.19	710.53
Carbon Monoxide (CO)	56.03	1874.93
Volatile Organic Compounds (VOCs)	73.93	489.93
Sulfur Dioxide (SO ₂)	13.98	73.57

Source: USAF, 1995a

Formation, and the Potomac-Raritan-Magothy Formation (USAF, 1997a).

The interbedded formations are primarily the Cohansey (Pliocene and Miocene), Kirkwood (Miocene), and Vincenttown (Paleocene). The Cohansey Sand formation, found under the majority of the base, is a light gray/yellow-brown, well sorted, cross-bedded, fine- to coarse-grained, partly arkosic quartz sand (USAF, 1997a). The Kirkwood Formation has local beds of clay and silt within a moderately well sorted, fine-grained, micaceous quartz sand matrix. The Vincenttown Formation is primarily comprised of a clayey, glauconitic quartz sand (USAF, 1997a).

According to the 1994 Uniform Building Code database, McGuire AFB and vicinity is located in Seismic Zone 1, which exhibits low potential for seismic events (USAF, 1998b).

3.6.1.1 Soil Resources. The Burlington County Soil Survey has classified all the soils in the area of the alternative sites and the GPN-20 as >urban land.= Most of McGuire AFB is urban land with the exception of the soils in the northern and eastern areas that have not been disturbed (USAF, 1997c). Urban land consists of soils that have been highly disturbed. They are not considered prime farmland or hydric soil. The permeability of these soils ranges from rapid to slow, depending on the compaction. This soil type is conducive to development (Raytheon, 1998).

Small areas of the base are undisturbed soils that were formed on Tertiary or redeposited sand. The soils that generally exist in these areas are Westphalia loam fine sand and fine sandy loam, Klej sand and fine

sand, and Pemberton sand.

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, although it is possible that areas that have not previously been disturbed could be affected by expansion of any base activity. It is expected that the above stated existing conditions will continue to represent the area of the alternative ASR-11 sites and existing GPN-20.

3.7 SURFACE WATER AND GROUNDWATER

The surface water and groundwater at the three alternative ASR-11 sites and the site of the GPN-20 are discussed in this section. Site specific data are not available at this stage of analysis. The data for the surrounding area are expected to generally characterize and describe the alternative ASR-11 sites and the area of the GPN-20.

3.7.1 Existing Conditions

3.7.1.1 Surface Water. McGuire AFB is within two watersheds, Crosswicks Creek and Rancocas Creek. Surface water runoff in the northern area of the base drains to the North Run, and central base surface water drains to the South Run (see Figure 3.3-1 in Section 3.3). Both the North and South Runs flow to Crosswicks Creek. The southern area of the base drains to Jacks Run and Larkins Run which lead to the North Branch of Rancocas Creek. A diversion pond and sluice gate have been installed by the base on South Run to protect the water from spills that may occur (USAF, 1997c). Site CE-1 and the GPN-20 are located approximately 1,000 feet south of the North Run, across Wrightstown-Cookstown Road. Site CE-3 is approximately 2,000 feet south of the South Run and Site 5 is 1,000 north of the South Run. Site CE-3 is located in an area that is seasonally inundated. Section 3.8, Biological Resources, describes the wetlands conditions at Site CE-3.

The only point source discharge on base is the effluent from the Central Heat Plant (Building 2101), which discharges non-contact cooling water into surface waters (USAF, 1997c). Non-point pollution sources are more of a concern on McGuire AFB than point sources. The chemicals used to de-ice aircraft (propylene glycol) and runways (urea) are potential storm water contaminants. McGuire AFB

is researching new de-icing chemicals for the runways that would be less harmful to the environment. Each year McGuire AFB uses approximately 100 tons of urea to de-ice runways. Pesticides that are used on and around the airfield to control the population of Japanese beetles and >crack grass and weeds= contribute to non-point source pollution potential of surface waters (USAF, 1997c).

Development on McGuire AFB that resulted in increased impervious surfaces has been mitigated by removing existing pavement that is no longer in use. However, it has not always been possible to provide this type of mitigation. One possible stormwater control measure that has been considered for implementation is a retention impoundment. The Pinelands Commission prefers this method, however, retention impoundments do not always work as planned. Due to the high water table the retention impoundments often result in retention ponds (USAF, 1997c).

In July of 1995 New Jersey Department of Environmental Protection issued McGuire AFB an interim three year storm water discharge permit (Permit No. NJ0106747). The permit requires the following: a Storm Water Pollution Prevention Plan (SPPP) be developed and implemented for areas on base where storm water would avoid contact with industrial activity; the identification of areas on base that storm water cannot avoid contact with industrial activity and the development of Best Management Practices (BMPs) for each area; and a monitoring program (USAF, 1997c). The SPPP for McGuire AFB was developed in August 1995 to identify potential storm water contamination sources and prevent pollution by implementing BMPs (USAF, 1997c).

3.7.1.2 Groundwater. There are four major hydrogeologic units underlying McGuire AFB, three shallow units, the Cohansey Sand, the Kirkwood Formation, and the Vincentown Formation, and one deep unit, the Potomac-Raritan-Magothy (PRM) System separated by confining clays of the Merchantville and Woodbury Formations (USAF, 1997c).

Cohansey and Kirkwood Formations are extremely permeable and are at or near the existing ground level. They are approximately 50 feet thick near the surface. These formations are not significant aquifers in the vicinity of McGuire AFB and are not used as a water source for the area of McGuire AFB. However, east of the base, down gradient, the formations become thicker and are used for potable water (USAF, 1997c).

In the area of McGuire AFB the water table is found to range from being at the surface to 20 feet below ground level. The depth is dependent on the amount of precipitation during seasonal fluctuations and the topography. Most often the groundwater is found to be six feet below ground level or less (USAF, 1996a). The Cohansey/Kirkwood aquifer is recharged through precipitation in the area where the Cohansey and Kirkwood formations outcrop. McGuire AFB is in the recharge zone for the Cohansey/Kirkwood aquifer (USAF, 1997c).

The Vincentown Formation may supply a small amount of water to existing wells on McGuire AFB from localized water bearing beds (USAF, 1997c).

The regional potable water source is the deep PRM aquifer system, which occurs at a depth of 450 feet below mean sea level and is approximately 550 feet in thickness. It supplies water to Burlington County, including McGuire AFB and Fort Dix (USAF, 1997c). The system is recharged through precipitation in the location of where it outcrops, northeast of Trenton.

McGuire AFB pumps its water from four deep wells in the PRM system ranging from 1,010 to 1,100 feet in depth (see Figure 3.3-1 for well locations). Artesian (confined) water conditions are typical of the PRM system. The New Jersey Department of Environmental Protection (NJDEP) has permitted McGuire AFB to pump four million gallons per day, although, the wells are only producing on a daily average 1.8 million gallons (USAF, 1997c).

The PRM water resources have been decreased over years of use as a potable water source. The NJDEP has requested all users of the aquifer to reduce their water use. Section 3.3, Utilities and Transportation discusses this issue in more detail.

3.7.2 Future Baseline Without the Project

Surface water conditions are expected to improve in the future with the implementation of the SPPP and BMPs. The decrease or change in chemicals used to de-ice planes and the runway would also contribute to an improvement in surface water quality. Groundwater conditions are expected to improve as a result of the decrease in pumping from the region. The decrease in pumping will allow the PRM aquifer to recharge. The federal facilities and municipalities that presently draw water from the PRM aquifer are to continue pumping water, however, at a decreased rate indicated by the state and specific to each

permit holder.

3.8 BIOLOGICAL RESOURCES

3.8.1 Existing Conditions

3.8.1.1 Vegetation. McGuire AFB lies along the northwestern edge of the Pinelands National Reserve, a forest expanse encompassing nearly one million acres in the Pine Barrens area of New Jersey. The Pinelands, a unique area of great biological diversity, contain pine forests, cedar- and maple-lined streams, open grasslands with scrub oak, oak woodlands, and marshes and bogs (New Jersey Pinelands Commission 1980, cited in USAF 1994). McGuire AFB and Fort Dix are considered to be in the oak-pine fringe of the Pinelands. Fort Dix and Lebanon State Forest immediately south of McGuire AFB contain a wide variety of representative Pinelands communities. Remnant natural communities remaining on McGuire AFB are generally not contiguous with similar communities off base, and the base is not part of any current or planned regional greenway.

Most of McGuire AFB is developed, with extensive areas of maintained grasslands, lawns, and other landscaped areas (golf course and housing). The general vegetation type on the base is consistent with the typical vegetation found along the inner coastal plain of New Jersey. Common plant species that occur on the airfield are indicated in Table 3.8-1. Lawn areas typically consist of fescue (*Festuca* spp.), bluegrass (*Poa praetensis*), and perennial ryegrass (*Lolium preenne*). Greens are maintained in creeping bentgrass (*Agrostis palustris*).

Trees commonly throughout the base in developed areas are indicated in Table 3.8-2. The base has no urban forestry plan or landscape plan. There are also no established landscaping guidelines for new construction sites to ensure horticultural compatibility with the rest of the base or to ensure that native, low-maintenance trees and shrubs are used to the maximum extent possible (USAF, 1997c). Changing missions and improper selection of trees have created problems in areas adjacent to the flight line. Over 100 trees were removed from the Beverly Park area because they were penetrating the glidescope in the clear zone for Runway 18/36. White pines planted a number of years ago along Broidy Road are also now encroaching into airfield airspace as well as providing potential roosting sites for flocks of blackbirds and grackles (USAF, 1997c).

Table 3.8-1. Common Plant Species at McGuire AFB

Common Name	Latin Name
broomsedge	<i>Andropogon virginicus</i>
little bluestem	<i>Schizachyrium scoparium</i>
barnyard grass	<i>Echinochloa</i> sp.
foxtail	<i>Setaria</i> spp.
bushclover	<i>Lespedeza</i> spp.
orchard grass	<i>Dactylis glomerata</i>
Canada thistle	<i>Cirsium arvense</i>
milkweed	<i>Asclepias</i> sp.
early goldenrod	<i>Solidago juncea</i>
fescue	<i>Festuca</i> spp.
bluegrass	<i>Poa praetensis</i>
perennial ryegrass	<i>Lolium prene</i>
common reed	<i>Phragmites australis</i>

Source: USAF, 1997c

Table 3.8-2. Common Tree Species at McGuire AFB

Common Name	Latin Name
silver maple	<i>Acer saccharinum</i>
red maple	<i>Acer rubrum</i>
black cherry	<i>Prunus serotina</i>
white pine	<i>Pinus strobus</i>
sweet gum	<i>Liquidambar styraciflua</i>
black gum	<i>Nyssa sylvatica</i>
white oak	<i>Quercus alba</i>
willow oak	<i>Quercus phellos</i>
scarlet oak	<i>Quercus coccinea</i>
sassafras	<i>Sassafras albidium</i>

Source: USAF, 1994b

Much of McGuire AFB land has been heavily disturbed by agricultural development and by military activities. However, small remnants of natural communities can still be found on base. The drainages within the Falcon Courts North area contain oak-dogwood-magnolia-viburnum and oak-beech woodlands with many large specimen trees. There is also a remnant pitch pine-oak-heath woodland near the old base sewage treatment plant site adjacent to Fort Dix (near Site CE-3). Even the infield area contains grasslands important to several small ground-dwelling birds listed as threatened or endangered by the

State of New Jersey. The runway infield areas support a tall, grassy old-field vegetative cover. The habitat type totals approximately 921 acres on McGuire AFB. These grassy areas are mowed only twice per year, after July 15, to a height of 4 inches. Common plants in these areas include English plantain (*Plantago lanceolata*), Canadian thistle, early goldenrod, foxtail, milkweed, orchard grass, and common reed (USAF, 1997c). Early successional meadow and grassland communities exist along the southeast portion of the base as a consequence of periodic mowing. Plant diversity is quite variable, though dominant species usually include some of the following: brome grass (*Bromus* sp.), panic grass (*Panicum* sp.), broomsedge, little bluestem, and spotted knapweed (*Centaurea maculosa*).

The area of Fort Dix west of McGuire AFB consists of a large amount of developed land with some hardwood swamp. This forest type is typically dominated by red maple or sweet gum, with black gum and sweetbay magnolia (*Magnolia reginiana*) also present (USAF, 1994b). Small amounts of pitch pine (*Pinus rigida*) lowland forest and oak-pine forest (typically dominated by black oak (*Quercus velutina*) with pitch pine and chestnut (*Quercus prinus*), white, scarlet, and post (*Quercus stellata*) oaks) also occur. The eastern portion of Fort Dix contains hardwood swamp and oak-pine forest, with a small amount of pitch pine lowland forest and pine-oak forest (typically dominated by pitch pine with blackjack (*Quercus marilandica*), black, chestnut, white, scarlet, and post oaks). The areas of Fort Dix south of McGuire AFB support oak-pine forest, with lesser amounts of hardwood swamp and a small amount of pine-oak forest.

In summary, the majority of land at McGuire AFB is somewhat or highly disturbed. Vegetation communities in such areas include grasslands in the airfield region, a golf course, and lawns or landscaped areas adjacent to buildings and other structures. Remnants of native upland forests and forested wetlands occur largely around the periphery of the base. Forested areas on base amount to approximately 160 acres, of which about 72 acres represent forested wetlands (USAF, 1997c).

The three proposed ASR-11 sites have all been cleared in the past.

Site CE-1. Site CE-1 consists primarily of an old blacktop parking area, and is generally devoid of vegetation.

Site CE-3. The vegetation at Site CE-3 (within the GATR facility) consists primarily of mixed grasses and plantains, which are routinely mown. Site CE-3 is bordered by a red oak, white birch, and pitch

pine forest, with occasional highbush blueberry (*Vaccinium corymbosum*), red osier dogwood (*Cornus stolonifera*), and aspen (*Populus* sp.) in the understory.

Site 5. The vegetation at Site 5 (adjacent to the base golf course) consists primarily of mixed grasses and plantains, which are routinely mown.

GPN-20. The site of the existing GPN-20, which lies approximately 1,000 feet east of Site CE-1, also is characterized by limited vegetation.

3.8.1.2 Wetlands. Precipitation falling on McGuire AFB drains by overland flow to diversion structures and then into surface streams that drain into the two local watersheds, Crosswicks Creek and Rancocas Creek. These two creeks in turn drain into the Delaware River. The northern portion of the base drains to North Run and South Run creeks, which are tributaries of Crosswicks Creek. The southwestern portion of the base drains through Fort Dix to three small tributaries of Rancocas Creek; Bowkers Run, Jacks Run, and Larkins Run (USAF, 1994).

Wetlands occupy some of the infield triangle and portions of the strip southeast of Runway 06/24, as well as the drainages in the northern area of the base. The US Fish and Wildlife Service and the US Department of Agriculture Soil Conservation Service have identified 500 acres of wetlands within the runway triangle, at the southeast corner of the base, and along North Run stream (USAF, 1995e). The wetlands in the triangle have been delineated as jurisdictional by the US Army Corps of Engineers. None of the three proposed DASR sites, nor the existing radar site, was identified as wetlands as part of the survey conducted by the USFWS/USDA.

A wetland evaluation and habitat management plan for McGuire AFB, prepared by the Greeley-Polhemus Group for the ACOE (1997), New York District identified 88 wetlands on-base, totaling 367.43 acres.

The plan identified five areas of wetland habitat important for preservation, based on their relatively high probabilities for performing important wetlands functions and values or because they provide habitat for rare or endangered species. These areas include the South Run forested corridor, the North Run forested corridor, the grasslands in the triangle, the forested uplands in the residential portions of the base, and the pinelands habitat in the southeastern portion of the base. The Greeley-Polhemus plan identifies Site CE-3 as occupying approximately 50 percent wetlands; no wetland resources were

identified as present at either Site CE-1 or Site 5; nor were wetlands identified in the vicinity of the existing GPN-20. Figure 3.8-1 shows the comparison between the delineation completed by the USFWS and by Greeley-Polhemus at Site CE-3.

A wetlands delineation and assessment of Site CE-3 was conducted to determine the boundary and extent of wetlands present. An on-site survey of wetland resource areas in the vicinity of the proposed ASR-11 site was conducted on November 12 and 13, 1998 to determine the boundaries of federal and state jurisdictional wetland resources areas within the project boundaries and within approximately 300 feet of the proposed facility footprint. Approximate boundaries of wetland resource areas onsite were first located based upon review of resource mapping and an initial site walk-over, and then identified in accordance with the *Corps of Engineers Wetlands Delineation Manual* (USACOE, 1987), which employs a three-parameter (hydrophytic vegetation, hydric soils, and hydrology) approach for identifying and delineating wetlands. Site CE-3 is located within the southeastern corner of a fenced area, which is frequently mown to a height of 1.5 to 2.0 inches. The site is highly disturbed and vegetative indicators were not always discernable. The site is also seasonally inundated, making it difficult to observe hydrologic indicators during dry seasons. Consultation with a representative of the NJ Pinelands Commission indicated that in a situation such as this, the Commission would generally avoid vegetative analysis and use a Aone parameter approach, with the one parameter being soils (NJ Pinelands, 1998).

At Site CE-3, wetland scientists evaluated vegetation, soil, and hydrologic components at representative points (both inside and outside the security fence). Approximately 20 representative locations were assessed, focusing on the footprint of the facility, but also addressing areas within 300 feet of the proposed facility. No clear wetland boundary was evident; much of the site was characterized as either wetland or transitional wetland/upland. Dominant vegetation within the facility footprint consisted primarily of various species of fescues (*Festuca* sp.), although English plantain (*Plantago lanceolata*), bushy beardgrass (*Andropogon glomeratus*), sphagnum moss (*Sphagnum* sp.), common dandelion (*Taraxacum officinale*), cat's ear (*Hypochoeris radicata*), and crabgrass (*Digitaria sanguinalis*) were also present within the site.

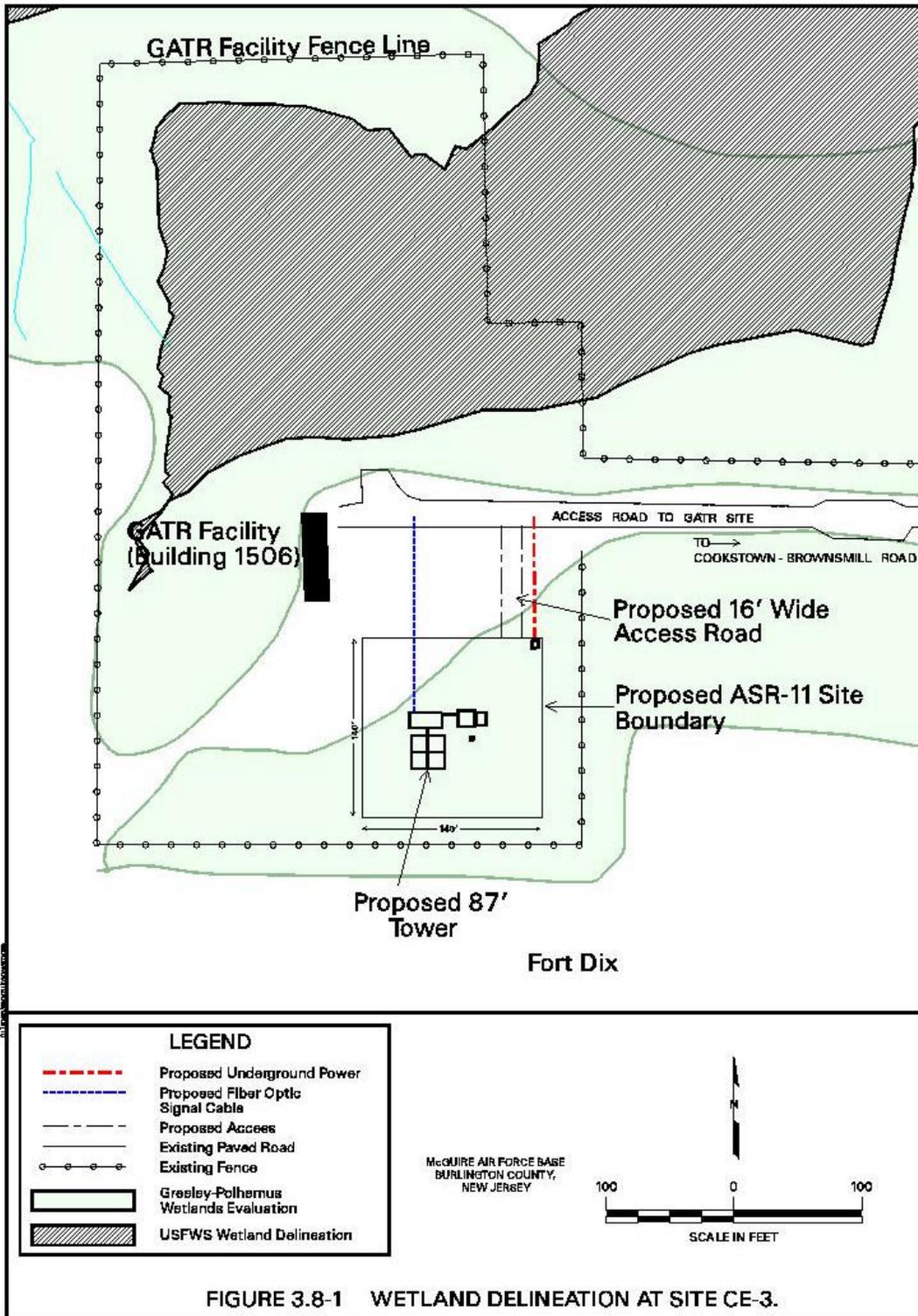


FIGURE 3.8-1 WETLAND DELINEATION AT SITE CE-3.

Within the site, there was little evidence of wetland hydrology at the time of the investigation; however, observations by others have indicated that, at times during the year, the ground is saturated to the surface. Although no saturated soils were observed during the site investigation, the observations of others previously, coupled with the significant ruts and torn turf (likely resulting from a mower losing traction on spongy soils), resulted in the conclusion that the majority of the site exhibits wetland hydrology during some portion of the growing season. Numerous soil samples were taken to depths between 18-24 inches; all of the soil samples from within the proposed DASR-site contained mottles, low chroma colors, and/or vertical streaking, all of which are characteristic of hydric soils. Therefore, the conclusion based on the data gathered is that Site CE-3 is located on a wetland.

The forested area adjacent to Site CE-3 was determined to be primarily upland, due to the absence of hydric soil indicators and the general lack of hydrophytes among the dominant vegetation. A small, isolated depression outside the eastern fence of the GATR facility, dominated by Sphagnum moss, is within 100 feet of the proposed facility, and meets the ACOE three parameter wetland definition. It should be noted that both the NWI wetland maps and two basewide wetland surveys conducted by either the USFWS/USDA and the Greeley-Polhemus Group indicate a significant portion of the forest outside the GATR fence to be wetland.

The only floodplain associated with McGuire AFB is a narrow area (100 feet on both sides; approximately 60 acres) of North Run and its tributaries. The North Run is approximately 1,000 feet north of Site CE-1 and the existing GPN-20.

3.8.1.3 Wildlife. Wildlife abundance and species diversity are relatively low at McGuire AFB, principally due to extensively developed areas and/or degraded natural habitats. Because of considerable area of open habitats, bird species are the most diverse group of vertebrate animals represented.

Various songbird species, and some game bird species, such as the ruffed grouse (*Bonasa umbellus*), woodcock (*Philohela minor*), and quail (*Callipepla* sp.), are found in the local area. Birds potentially nesting in the Pinelands area near McGuire AFB are indicated in Table 3.8-3.

Table 3.8-3. Birds Potentially Nesting in the Pinelands near McGuire AFB, by Habitat

OAK-PINE FOREST

rufous-sided towhee	<i>Pipilo erythrophthalmus</i>
screech owl	<i>Otus asio</i>
downy woodpecker	<i>Picoides pubescens</i>
blue jay	<i>Cyanocitta cristata</i>
tufted titmouse	<i>Parus bicolor</i>
red-eyed vireo	<i>Vireo olivaceus</i>
ovenbird	<i>Seiurus aurocapillus</i>
black-and-white warbler	<i>Mniotilta varia</i>

PINE-OAK FOREST

pine warbler	<i>Dendroica pinus</i>
prairie warbler	<i>Dendroica discolor</i>
brown thrasher	<i>Toxostoma rufum</i>
rufous-sided towhee	<i>Pipilo erythrophthalmus</i>
chipping sparrow	<i>Spizella passerina</i>

UPLAND HABITAT

turkey vulture	<i>Cathartes aura</i>
American kestrel	<i>Falco sparverius</i>
ruffed grouse	<i>Bonasa umbellus</i>
bobwhite	<i>Colinus virginianus</i>
Carolina chickadee	<i>Parus carolinensis</i>
Carolina wren	<i>Thryothorus ludovicianus</i>
northern mockingbird	<i>Mimus polyglottos</i>

PITCH PINE LOWLAND

gray catbird	<i>Dumetella carolinensis</i>
common yellowthroat	<i>Geothlypis trichas</i>
white-eyed vireo	<i>Vireo griseus</i>

HARDWOOD SWAMPS/DEEP WATER MARSHES

red-shouldered hawk	<i>Buteo platypterus</i>
barred owl	<i>Strix varia</i>
hooded warbler	<i>Wilsonia citrina</i>
eastern bluebird	<i>Sialia sialis</i>
great blue heron	<i>Ardea herodias</i>
ruby-throated hummingbird	<i>Archilochus colubris</i>
northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
willow flycatcher	<i>Empidonax traillii</i>

eastern kingbird	<i>Tyrannus tyrannus</i>
cedar waxwing	<i>Bombycilla cedorum</i>
common yellowthroat	<i>Geothlypis trichas</i>
red-winged blackbird	<i>Agelaius phoeniceus</i>

FOREST/OLD FIELD BOUNDARIES

yellow warbler	<i>Dendroica petechia</i>
northern cardinal	<i>Cardinalis cardinalis</i>
indigo bunting	<i>Passerina cyanea</i>
rufous-sided towhee	<i>Pipilo erythrophthalmus</i>
field sparrow	<i>Spizella pusilla</i>
song sparrow	<i>Melospiza melodia</i>
brown-headed cowbird	<i>Molothrus ater</i>
upland sandpiper	<i>Bartramia longicauda</i>
grasshopper sparrow	<i>Ammodramus savannarum</i>
savannah sparrow	<i>Passerculus sandwichensis</i>
American goldfinch	<i>Carduelis tristis</i>

Source: USAF, 1994b

McGuire AFB is located in the Atlantic flyway. Thus, a large number of bird species occur in the area during migrations in addition to those listed in Table 3.8-3, including Canada goose (*Branta canadensis*), snow goose (*Chen caerulescens*), swan, mallard (*Anas platyrhynchos*), lesser and greater scaup (*Aythya* spp.), ring-necked duck (*Aythya collaris*), bald eagle (*Haliaeetus leucocephalus*), red-tailed hawk (*Buteo jamaicensis*), broad-winged hawk (*Buteo platypterus*), American kestrel, yellow-rumped warbler (*Dendroica coronata*), Cape May warbler (*Dendroica tigrina*), and white-eyed vireo.

The wooded/old field areas of McGuire AFB provide habitat for numerous mammals, including whitetail deer (*Odocoileus virginianus*), cottontail rabbit (*Sylvilagus floridanus*), gray squirrel (*Sciurus carolinensis*), woodchuck (*Marmota monax*), red fox (*Vulpes vulpes*), eastern chipmunk (*Tamias striatus*) and opossum. Airfield grassland areas may provide suitable habitat for herpetiles such as American toad (*Bufo americanus*) and eastern garter snake (*Thamnophis sirtalis*). Various species of mice, and rabbits are known in such habitats. Common reptiles and amphibians in upland areas include the fence lizard (*Sceloporous* sp.), box turtle (*Terrapene* sp.), and pine snake (*Pituophis* sp.). Beaver (*Castor canadensis*) are known to inhabit marshy and stream areas on base, especially along South Run Creek. In these areas, as well as deep water marshes and ponds, herpetiles such as bullfrog (*Rana catesbeiana*) and queen snake (*Regina septemvittata*), mammals such as common muskrat (*Ondatra zibethicus*) may locally breed. Forested wetlands may support habitat for various frogs and salamanders, common raccoon (*Procyon lotor*), and long-tailed weasel (*Mustela frenata*) (USAF, 1997c).

3.8.1.4 Threatened and Endangered Species. Habitat in the vicinity of McGuire AFB may support species that are listed by the state of New Jersey or the US Fish and Wildlife Service as threatened or endangered. Two federally-listed threatened plant species, swamp pink (*Helonias bullata*) and Knieskern=s beaked-rush (*Rhynchospora knieskernii*), and one federally-listed endangered species, American chaffseed (*Schwalbea americana*), are known to occur in the vicinity of McGuire AFB; however, these plants are not known to occur on the base. The bald eagle, a federally-listed threatened species, and the peregrine falcon (*Falco peregrinus*), a federally-listed endangered species, are both occasional transients in the area around McGuire AFB.

Surveys for endangered and threatened vertebrate animals were conducted in 1994 by the New Jersey Division of Fish, Game, and Wildlife (USAF, 1994a). Of the 12 animal species having the potential to occur at McGuire AFB, three species of rare breeding birds were observed. Prior to this study, only the grasshopper sparrow (*Ammodramus savannarum*, state-listed threatened) was known to breed at the base. One New Jersey listed endangered species, the upland sandpiper (*Bartramia longicauda*), was found to be nesting at McGuire AFB in the runway infield area. This area is one of only five known sites in the state that supports breeding populations. The upland sandpiper, of which 3 pairs were observed at McGuire AFB, is a scarce and declining species throughout the northeastern US. Vegetation height is an important variable in nest site selection. Low vegetation typically from 0 to 4 inches in height is required for feeding and brood rearing. Areas that are mowed frequently in spring and summer provide such short grass habitat, while disturbed soils having sparse vegetation also provide brood rearing habitat.

Additionally, two New Jersey listed threatened species, the grasshopper sparrow and the savannah sparrow (*Passerculus sandwichensis*) were sighted on the base near the runway areas. The grasshopper sparrow was estimated to be represented by a minimum of 75 breeding pairs, largely within or adjacent to the airfield. This species prefers grassland habitat having clump-forming vegetation and significant areas of bare ground. They are, therefore, adaptable to disturbed grasslands that are common at places such as airports. The number of savannah sparrows present at McGuire AFB could not be quantified during the survey. This sparrow *Aprefers areas with dense ground vegetation, especially grasses, and moist microhabitats.*≡ This species also has experienced a decline in populations in the northeast, though it is more adaptable to disturbed and artificial habitats, such as reclaimed strip mines. Breeding areas for these birds include any grassy, relatively undisturbed site, such as fields and roadsides (USAF,

1997c).

In summary, the 1994 bird survey by the NJ Division of Fish and Game revealed breeding populations of upland sandpiper, savannah sparrow, and grasshopper sparrow. All sightings were within the maintained grassland community bounded by and adjacent to the runways and taxiways, which is not in close proximity to the alternative ASR-11 sites or existing GPN-20. No federal or state-listed species have been observed at any of the proposed DASR sites.

Surveys for endangered and threatened species of plants were conducted in 1994 by David Snyder of the New Jersey Natural Heritage Program (USAF, 1997c). An inventory of all federal and state listed species possible at McGuire AFB, by known available habitats, resulted in the discovery or rediscovery of two state-listed plants, Greene=s rush (*Juncus greenei*) and clustered bluets (*Hedyotis uniflora*). Greene=s rush was located at two sites, one in a *Afield adjacent to an unnamed tributary to South Run, between the archery range and sewage treatment plant*≡ and the other site is within the *Acenter of the infield triangle near the wrecked plane used for fire fighting practice*.≡ The former site included hundreds of clumps of the sedge in grassy and herbaceous habitat, while the latter site provided only a single clump of the species. The former site is located approximately 1,000 feet northwest of Site CE-3. Neither site is close to the alternative ASR-11 sites or the existing GPN-20. Greene=s rush is a perennial, northern plant that ranges south to central New Jersey. The species is considered *Aimperiled*≡ within the state and is ranked AS2", indicating that 6-20 extant occurrences are known. This grows in *Amoist to mostly dry sandy or clay soils in clearings or edges of pine-oak or oak-pine woodlands, thickets, successional fields, railroads or power line right-of-ways*≡ (USAF, 1997c).

Clustered bluets was historically known from two localities at McGuire AFB. In 1984, this member of the madder family was noted in woods adjacent to the archery range (in the southeastern portion of the base). In the 1994 survey, scattered patches amounting to approximately 170 plants were observed in the same vicinity. This location is not in the immediate vicinity of any of the three alternative ASR-11 sites or the existing GPN-20. Clustered bluets is an annual plant that flowers from July to the first frost. Its range extends north to central New Jersey and Long Island. The species is considered *Arare*≡ in the state and is ranked AS3", indicating that 20-30 extant occurrences are known. This wetland plant *Agrows in ...wet spots on unpaved roads and trails through low woods and muddy bottoms of Coastal Plain intermittent ponds*≡ (USAF, 1997c).

In summary, no federal or state-listed plant species were identified in the vicinity of either Sites CE-1 or 5. However, the NJDEP Natural Heritage Program has a record of an occurrence of Greene=s juncus in the immediate vicinity of Site CE-3. A field review conducted on 21 September 1998 as part of the site survey concluded that Site CE-3 does not presently function as habitat for the Greene=s juncus (Raytheon, 1998). Subsequent field investigations conducted in November 1998 also identified no individuals of Greene=s juncus at Site CE-3.

3.8.2 Future Baseline Without the Project

Without the project, the status of vegetation, wetlands, wildlife, and threatened and endangered species in the vicinity of the three proposed ASR-11 sites and GPN-20 is expected to be the same as present.

There is no planned change in land use for the locations of the sites which would alter the current characteristics of biological resources in this area.

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 construction and operation of the DASR at the alternative sites.

3.9.1 Existing Conditions

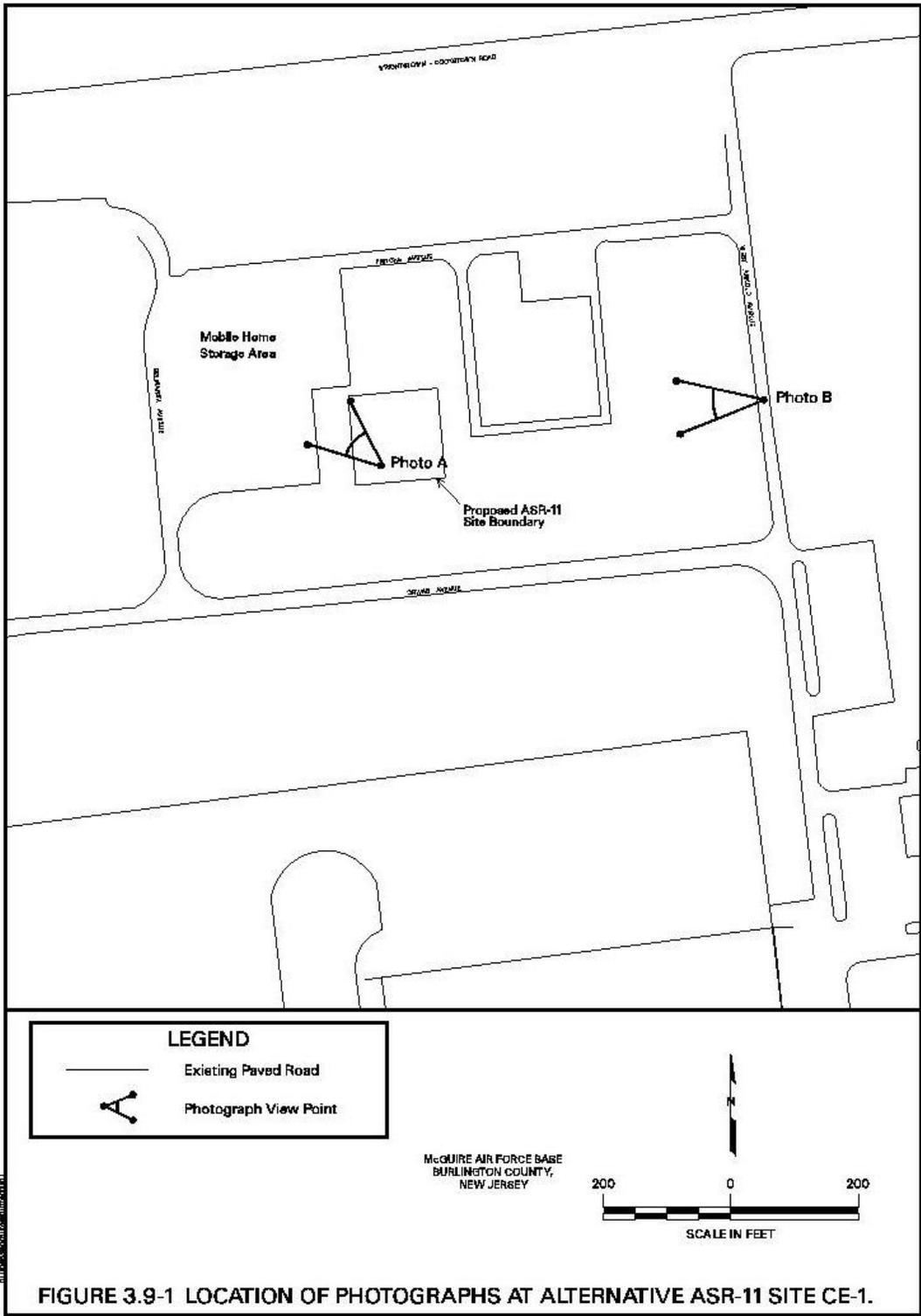
McGuire AFB is located between the southern edge of New Jersey=s Inner Coastal Plain and the northern edge of its Outer Coastal Plain. The area is relatively flat, with gently rolling topography west of the base and lower relief to the east and south. Most of McGuire AFB is situated between elevations of 100 and 150 feet within the northern reaches of the Pinelands National Reserve, an area of unique visual diversity. The landscape of the base is dominated by the flight line and its attendant buildings, including the control tower, which is 108 feet tall. Most of the buildings located on or near the flight line exceed 30 feet in height. Two water towers (the tallest is 171 feet) and several communications towers on McGuire AFB are visible from the surrounding areas.

Site CE-1. Site CE-1 is located on the northwest side of McGuire AFB (approximately 500 feet south of Wrightstown-Cookstown Road), approximately 1,000 feet west of the existing GPN-20 radar site, in

the southwest corner of a semi-vacant lot used by contractors as a storage lot. The site is bordered by Bellmarsh Avenue to the west, Fritche Avenue to the north, West Arnold Avenue to the east, and Drivas Avenue to the south. Figure 3.9-1 shows locations from which photographs were taken during a site survey in October of 1998. A partial view of the paved Site CE-1 and a view west of the site are shown on Photograph A, Figure 3.9-2. Little vegetation exists in the vicinity of Site CE-1, with the exception of a grassy area and small pine trees north of the site (buffering the views to and from Wrightstown-Cookstown Road) and a grassy field to the west of the site. Photograph B, Figure 3.9-2, shows the view from West Arnold Avenue into the subcontractors storage area. Site CE-1, obscured by the trees in the foreground, is located in the back of the storage area when looking at this picture.

Site CE-3. Site CE-3 is located near the southeastern corner of McGuire AFB, approximately 2,500 feet east of the end of Runway 06/24, inside the gated GATR complex containing Building 1506. The site, located near the eastern Fort Dix/McGuire AFB property line, is proximate to the McGuire AFB airfield to the west and undeveloped areas used for training to north, east, and south. Figure 3.9-3 shows locations from which photographs were taken during a site survey in October of 1998. The aesthetics of the site are dominated by the large wooden poles that support the GATR antennas and Building 1506, shown in Photographs A and B on Figure 3.9-4. The site is bordered on nearly all sides by forested areas, which partially buffer visibility of the site from its surroundings.

Site 5. Site 5 is located on the eastern side of McGuire AFB, at the end of the East Fourth Street cul-de-sac. Figure 3.9-5 shows locations from which photographs were taken during a site survey in October of 1998. Views from the site are principally of the well-maintained grassy area, with a few small pine trees, near the base golf course (Photographs A and B, Figure 3.9-6). The Trunked LMR





Photograph A. View looking west from alternative Site CE-1 toward the mobile home storage area.



Photograph B. View towards alternative Site CE-1 located behind the trees in the foreground. View is looking west from West Arnold Avenue.



Photograph C. View of the area south of alternative Site CE-1. Taken from West Arnold Avenue facing southwest.

Figure 3.9-2. Photographs in the area of Alternative DASR Site CE-1

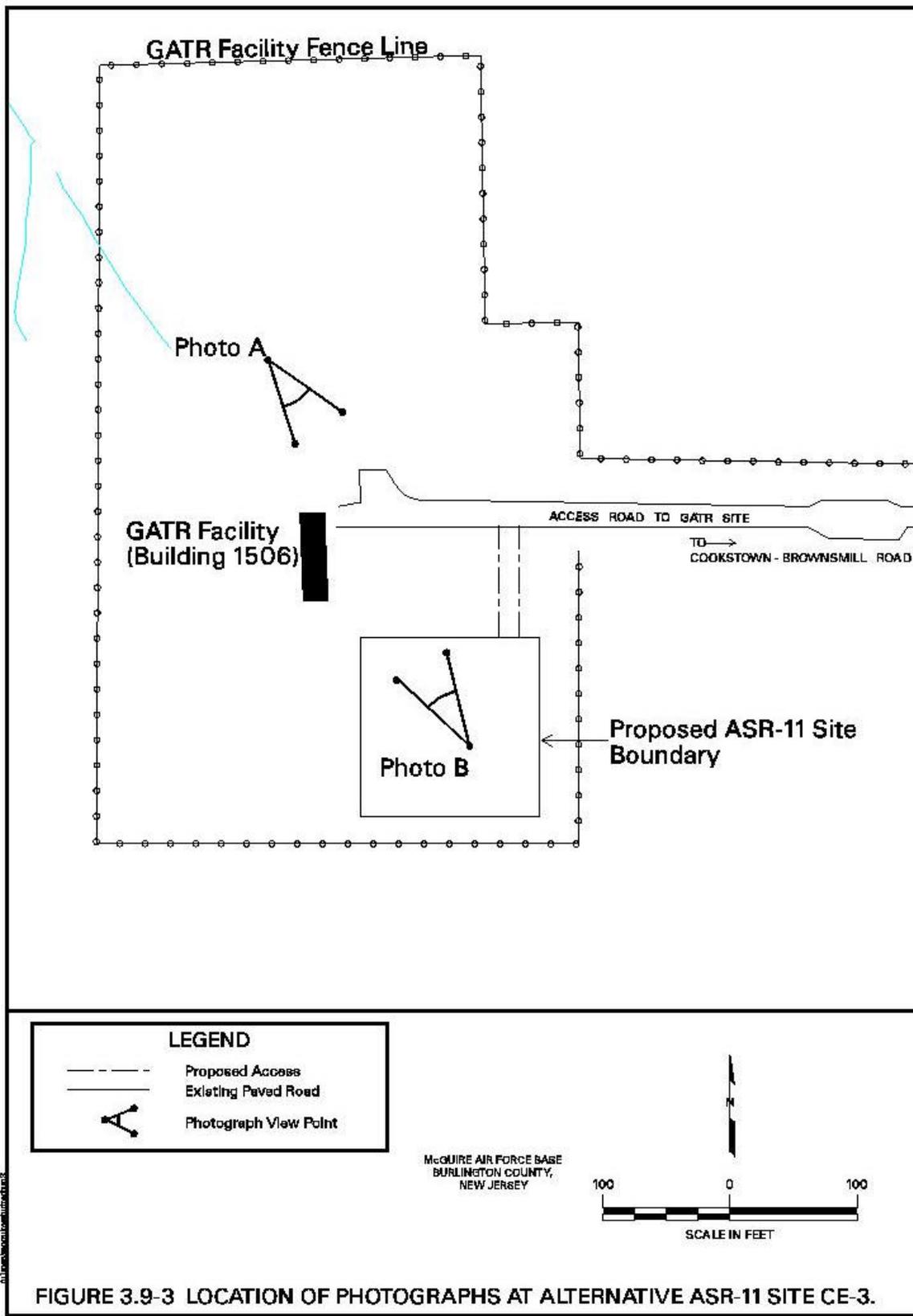


FIGURE 3.9-3 LOCATION OF PHOTOGRAPHS AT ALTERNATIVE ASR-11 SITE CE-3.



Photograph A. View of alternative Site CE-3 (behind basketball hoop) looking southeast.



Photograph B. View of alternative Site CE-3 and the GATR facility (Building 1506) looking northwest.

Figure 3.9-4. Photographs at Alternative DASR Site CE-3.

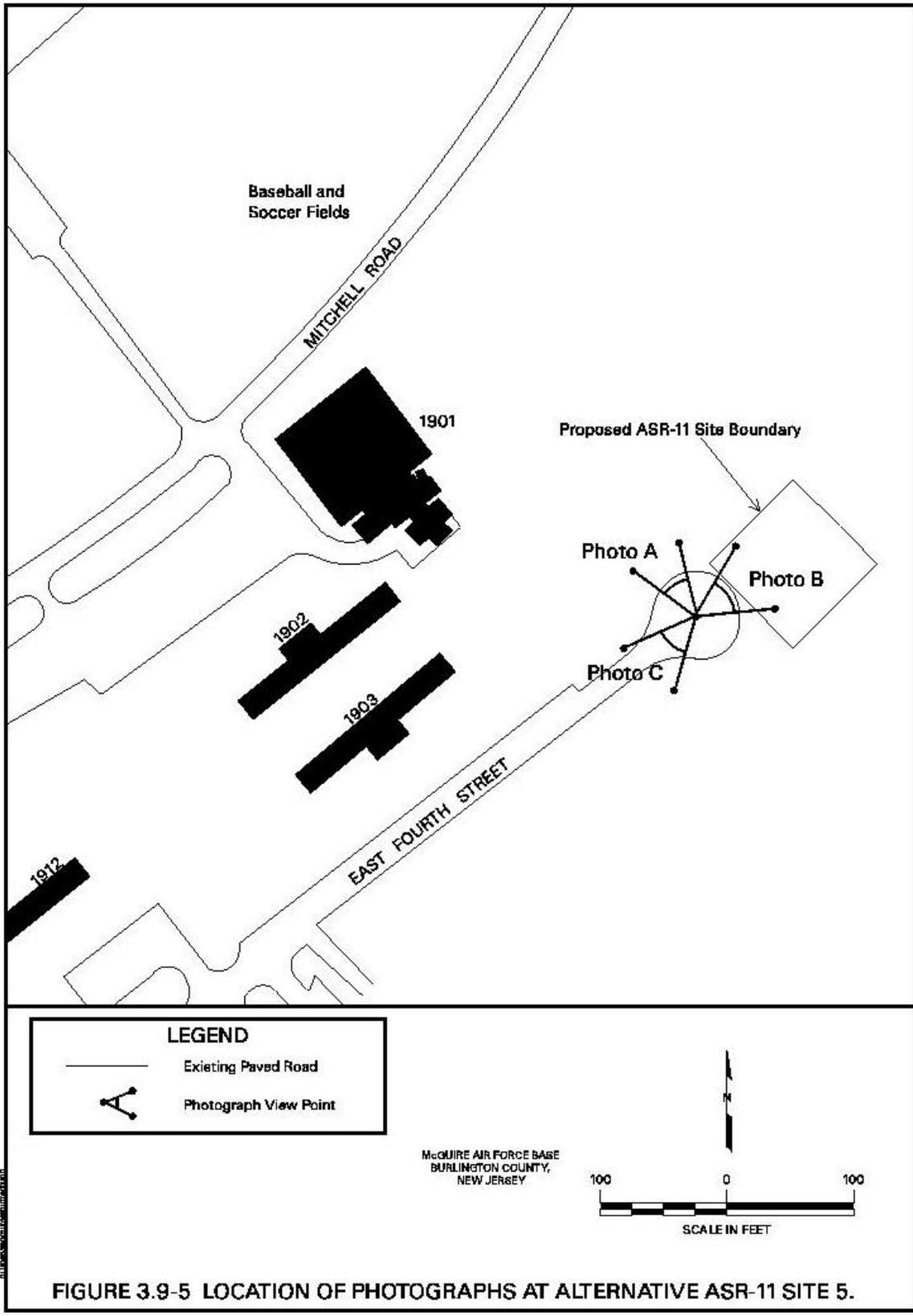


FIGURE 3.9-5 LOCATION OF PHOTOGRAPHS AT ALTERNATIVE ASR-11 SITE 5.



Photograph A. View looking northwest from alternative Site 5 towards Building 1901 and the sports fields (the LMR antenna visible at left).



Photograph B. View looking northeast at alternative Site 5 towards the base golf course.



Photograph C. View from alternative Site 5, looking west toward SAGE Building.

Figure 3.9-6. Photographs at Alternative DASR Site 5.

antenna dominates the northern skyline, partially shown in Photograph A, and the SAGE building is prominent to the west in Photograph C.

The existing GPN-20 is located between West Arnold Avenue and Warehouse Road, south of Wrightstown-Cookstown Road. The aesthetic surroundings of the existing radar site are similar to that of Site CE-1, which lies approximately 1,000 feet west of the GPN-20.

3.9.2 Future Baseline Without Project

The aesthetic values for the areas of all the alternative ASR-11 sites and GPN-20 are not expected to substantially change in the future without the project. There are no proposed projects that would significantly alter the aesthetic resources that currently exist at the sites. McGuire AFB personnel have indicated that the wooden poles which support the antennas at the GATR site may be replaced with longer poles, to improve reception.

3.10 CULTURAL RESOURCES

3.10.1 Existing Conditions

The following section identifies the prehistoric and historic resources that are present on McGuire AFB. The Cultural Resource Manager (CRM), 305 SPTG/CEV, is responsible for managing cultural resources on McGuire AFB and following the Cultural Resources Management Plan (CRMP) for McGuire AFB. The CRMP presents data obtained from surveys performed on base as well as standard operating procedures for new development on or near an existing cultural resource. The New Jersey State Historic Preservation Office (NJSHPO) and the New Jersey Pinelands Commission have the authority to approve all development on or near existing cultural resources within their respective jurisdictional boundaries.

3.10.1.1 Prehistoric Sites

The New Jersey Pinelands Commission has two prehistoric sites on McGuire AFB in their files. The two sites are located on the main portion of McGuire AFB along the original course of South Run east of the base golf course (USAF, 1996c). Their location is east of Site 5, on the opposite side of the golf course. It was recorded in the files that the prehistoric sites contained points and ceramic shards classifying them as Late Woodland sites. However, the National Park Service (NPS) performed a reconnaissance-level surface survey in 1991 and did not find evidence of either site due to their

destruction during the construction of the base (USAF, 1996c).

3.10.1.2 Historic Sites and Structures

Argonne National Laboratory conducted a base-wide survey in 1994 to establish an inventory of World War II and Cold War buildings that may be eligible for the National Register of Historic Places (NRHP) (USAF, 1996c). Structures less than 50 years of age can be considered for the NRHP if the building is exceptionally significant to the era. The survey resulted in two structures being recommended as potentially eligible for inclusion on the NRHP: the Semi-Automatic Ground Environment (SAGE) building (Building 1907) and the BOMARC facility, consisting of 110 buildings and structures (USAF, 1996c). The SAGE building was used during the Cold War as the computer controlling center for launching ground-to-air missiles from the BOMARC facility, located on Fort Dix. The location of the SAGE building is approximately 1,000 feet southwest of alternative Site 5, on East Fourth Street.

A second survey in 1995, conducted by Argonne National Laboratory, resulted in the discovery of 11 historical archaeological sites on the base, containing historical artifacts (USAF, 1996c). The survey report recommended eight of the sites as potentially eligible for listing on the NRHP. The NJSHPO agreed with the findings and recommendation in June of 1995 (USAF, 1996c). The eight potentially eligible sites are not in the areas of the alternative ASR-11 sites or the GPN-20.

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. One of the future goals for the Cultural Resources Management Program through the year 2001 is to contact the appropriate Native American groups in order to determine if there are locations on the base to which the American Indian Religious Freedom Act would apply (USAF, 1996c).

Other goals are to continue to research the known archeological sites that are potentially eligible for the National Register and to maintain the cultural resource data base.

3.11 POLLUTION PREVENTION AND HAZARDOUS WASTE

3.11.1 Existing Conditions

3.11.1.1 Pollution Prevention. No specific pollution prevention measures have been identified at the three alternative ASR-11 sites or the GPN-20; however, base-wide pollution prevention programs are applicable to each of the alternative sites. The environmental programs at McGuire AFB include hazardous materials and waste management and minimization of the following: asbestos, polychlorinated biphenyls (PCBs), lead based paint, solid waste, petroleum, oils, and lubricants (USAF, 1996a). All pollution prevention efforts are conducted in accordance with applicable federal, state, local, DoD, and Air Force regulations, laws, and standards.

McGuire AFB has implemented several policies and programs for recovery and reclamation of various waste streams. These programs are documented in the McGuire AFB Pollution Prevention Program (USAF, 1997c). Uncontaminated jet fuel resulting from aircraft defueling operations may be returned to bulk storage areas; waste oil and contaminated fuels are sent off base to a recycling center; solvents used in parts washers and paint gun washers are reclaimed by solvent recovery operations; and, lead acid batteries are collected and sent off-site for recycling. Household batteries are collected and disposed of as hazardous waste.

Hazardous materials are used on the base in association with aircraft maintenance and other aspects of the base mission. Remediation of past contamination is the focus of the Installation Restoration Program (USAF, 1997c). To minimize additional, avoidable releases of hazardous materials into the environment, the base has implemented a number of safeguards in the storage, use and disposal of hazardous materials.

Hazardous materials management programs include inventory control, storage area inspections, and material resale programs. Bulk storage systems at the base include fuel and petroleum aboveground and underground tanks, drum storage areas for oils and maintenance materials, hazardous waste storage and accumulation areas, and pesticide mixing and storage sheds. All hazardous materials used or stored at the base are approved by Bioenvironmental Engineering (BEE). BEE compiles an annual inventory of all chemicals used at the base. Annual inspections of material storage areas are conducted by the CE Environmental Flight and BEE to ensure that all hazards are properly identified and managed. All materials proposed for use at McGuire AFB are reviewed by Supply and BEE to determine if appropriate

alternatives exist to reduce potential hazards (USAF, 1997c).

Discharge and emergency response equipment is maintained in accessible areas throughout McGuire AFB. Spill response kits and fire extinguishers are available in all 90-day hazardous material storage areas. The McGuire Fire Department maintains adequate fire response and discharge control containment equipment. Equipment stores are maintained at the HazMat Trailer (Building 1708), HazMat Storage Shed (Building 2502) and on five crash-fire rescue vehicles located near the flight line (USAF, 1995e).

3.11.1.2 Hazardous Waste. Hazardous wastes are generated at McGuire AFB during daily activities such as aircraft operation and maintenance, including refueling, building and grounds maintenance, and provision of medical services. Hazardous wastes generated include petroleum products, paints, solvents, pesticides and herbicides, and other chemicals and materials used in routine operations at the base. The largest volumes of waste generated in 1993 were waste paint thinners (38,920 pounds) and base-wide petroleum spill materials (30,000 pounds). The Hazardous Waste Management Plan (HWMP) for McGuire AFB was revised in October 1995 (ENSR, 1995). The HWMP summarizes waste handling, storage, and disposal requirements applicable to the base, pursuant to the Resource Conservation and Recovery Act (RCRA), Solid Waste Disposal Amendments, New Jersey Waste Management Regulations, Air Force Instruction 32-7042 (solid and hazardous waste compliance), and the US Air Force Hazardous Waste Management Guidance Document.

On-base hazardous waste generation includes four types of sites: generation points, accumulation points (90 day), satellite accumulation points, and spill cleanup equipment/materials storage. As of 1995, there were 14 generation points, 17 accumulation points, and 22 satellite accumulation points. Waste is stored at these points in several types of storage containers, ranging from 55-gallon drums to a 3400-gallon tank; however, most is stored in 55-gallon drums. The majority of this waste is transported to a permitted hazardous waste storage facility in Building 2310. The total containment capacity at Building 2310 is 11,000 gallons (200 55-gallon drums). Additionally, two aboveground storage tanks (10,000-gallon and 2,200-gallon capacity) located at Building 2310 are used for 90-day accumulation of contaminated jet fuel and waste oil (USAF, 1997c).

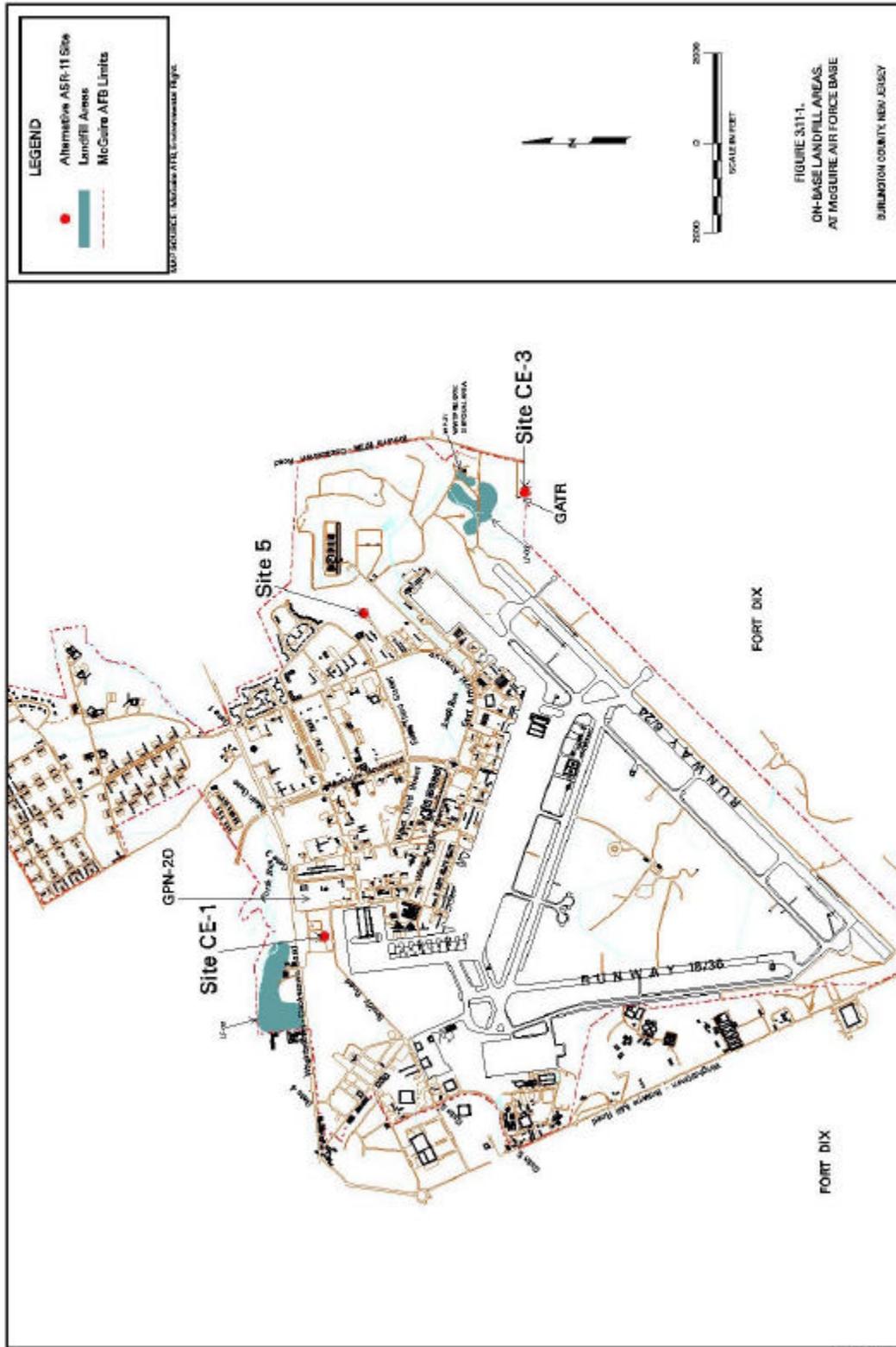
The McGuire AFB Installation Restoration Program (IRP) was initiated in 1982 when a Phase I Records

Search identified potential hazardous waste or hazardous substance sites. Additional sites were added to the list in September 1990. As of 1995, there were 17 IRP sites on McGuire AFB, including the following classifications: waste disposal sites, drum storage site, bulk fuel storage site, sludge disposal site, spill sites, fire protection training areas, and a pesticide wash area. The goal of the IRP is to remediate all accident, disposal, or spill sites which may pose a threat to public health, welfare, or the environment. The IRP is administered by the compliance and planning sections of the Base Civil Engineering Environmental Flight.

To date, McGuire AFB has not been placed on the National Priorities List (NPL) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). However, all IRP sites follow prescribed CERCLA procedures, including drilling or test wells for soil and groundwater sampling. No further remedial action is planned at 8 of the 17 sites on base. All restoration activities are programmed to be in place by the end of 2002 (USAF, 1997c).

Six inactive solid waste disposal sites on McGuire AFB are currently listed IRP sites. These former landfills, comprising approximately 75.9 acres, were used for disposal of miscellaneous industrial chemicals, drums of unknown wastes, coal ash, general base refuse and explosive ordnance waste materials. Investigations at these sites have identified contamination in the soils and ground water, and mitigation efforts are being implemented under the IRP. Landfills LF-03 and LF-04, as well as the Defense Reutilization and Marketing Office drum storage yard (ST-07), are located adjacent to the North Run floodplain, and the landfills penetrate the shallow water table in this area (USAF 1995e).

Site CE-1. Landfill LF-03 is located north of Wrightstown-Cookstown Road, approximately 800 feet north of Site CE-1 (Figure 3.11-1). The Site Inspection (SI) report for McGuire AFB addressed eleven areas of concern, as well as basewide groundwater and surface water/sediment conditions. Groundwater near two of the former Entomology Shops (Buildings 3207, 3205, and 3208) north of Drivas Avenue (near Site CE-1) has been impacted by pesticides (USAF, 1997a). Dieldrin was detected in groundwater at a concentration above the practical quantitation limit (PQL) and risk based concentration (RBC) near the former location of Building 3207. Pesticides were detected above PQLs and RBCs in groundwater, and several metals (eight metals exceeding RBCs) were detected in unfiltered groundwater at concentrations above maximum contaminant levels or tap water RBCs near



the former location of Building 3205. Elevated concentrations of metals in the unfiltered groundwater were presumed to be a result of high turbidity of the groundwater sample; the nature and extent of the impacted groundwater was not fully delineated. Groundwater sampling has not been conducted at Site CE-1, therefore, the presence of any contaminants at the site has not been confirmed.

Site CE-3. LF-02 is located approximately 500 feet north of proposed ASR-11 Site CE-3 (Figure 3.11-1). LF-02 is known to have volatile organic compounds, semi-volatile organic compounds, and metals contaminating the groundwater, soil, and surface water/sediment in the immediately vicinity.

Site 5. No known sources of hazardous contamination are present in the immediate vicinity of Site 5.

GPN-20. The existing radar is located 1200 feet east of the former entomology shops in the area of alternative Site CE-1. Contaminated groundwater has not been identified in the area of the GPN-20. The radar tower is galvanized steel and not painted.

3.11.2 Future Baseline Without the Project

It is expected that management and remediation of hazardous materials and wastes, respectively, will continue. Continuing pollution prevention measures on the base may reduce the potential for new sources of contamination to arise at any of the sites. Near Site CE-1, potential groundwater contamination may be remediated in the future, although no definitive plan has been established. The area of concern is presently undergoing internal review. Further investigations are expected to occur before the year 2006 (USAF, 1999b).

3.12 RADIO FREQUENCY RADIATION

3.12.1 Existing Conditions

As explained in the Programmatic EA for the NAS program (USAF, 1995b), radio frequency radiation (RFR), also referred to as radio waves, is electromagnetic waves at frequencies between approximately 3 kilohertz (kHz) and 300 gigahertz (Ghz). Exposure to electromagnetic fields (EMFs) is often misunderstood, because presentations do not distinguish between RFR and ionizing radiation. This sometimes raises concerns, with no scientific basis, that RFR can give rise to the hazardous effects known to be caused by ionizing radiation. Ionizing radiation, such as ultraviolet light, x-rays and gamma rays, and emissions from radioactive materials, has frequencies millions and trillions of times higher than

those of RFR.

In contrast to ionizing radiation, quanta of nonionizing radiation or electromagnetic radiation (such as RFR) have intrinsic energies far too small to ionize molecules within a body because their frequencies are vastly lower. Rather than producing changes in molecules (as in ionizing radiation), nonionizing/electromagnetic radiation simply agitates molecules making them vibrate and rotate faster, the equivalent of adding heat to the body. RFR is emitted by common household devices such as hair driers, electric shavers, TV/computers, radio broadcasting stations, citizen-band radios, ham radio transmitters, and cellular telephones. The additional molecular agitation produced by the RFR ceases when exposure to RFR ends. The heat induced in a warm-blooded animal by exposure to RFR at relatively low incident power densities can normally be compensated for through the body's temperature regulating capabilities. However, depending on the species, the heat produced at relatively high intensities may exceed the temperature regulating mechanisms of the animal; consequently, compensation for such effects may be inadequate. Thus, exposure at high intensities could cause gross heating and subsequent thermal distress or irreversible thermal damage. Some researchers have reported bioeffects at RFR levels below those giving rise to gross heating; however, such reports are not universally accepted by the large majority of the research community (USAF, 1995b).

Background levels of RFR are likely to exist at all three alternative ASR-11 sites due to the ubiquitous presence of RFR in the human environment. In addition, Site CE-3 is located in the GATR complex, and Site 5 is located near the LMR Facility, both of which may generate RFR. The existing GPN-20 contributes RFR to background levels. On McGuire AFB there are no established RFR hazard zones in the area of the existing radar. Persons are permitted to walk in the immediate area of radar without risk of radiation (USAF, 1999c). As of 1995, more than 64 fixed unit electromagnetic radiation (EMR) sources had been inventoried annually at McGuire AFB. Aircraft in motion are difficult to track and, therefore, have not been monitored. The base Radiation Safety Officer (Bioenvironmental Engineer) is responsible for the overall maintenance of the Electromagnetic Radiation (EMR) program. The program involves identifying, categorizing, and surveying all radio frequency emitters and occupationally-used microwave ovens on the base to ensure that personnel are adequately protected against unnecessary exposure to EMR.

3.12.2 Future Baseline Without the Project

The future RFR conditions in the vicinity of the three alternative ASR-11 sites and the existing GPN-20 are expected to remain similar to those currently present. There are no planned changes in land use at the site locations which would substantially alter the RFR characteristics in the area.

4.0 ENVIRONMENTAL CONSEQUENCES - NO ACTION ALTERNATIVE

The alternative of no action would leave the existing GPN-20 and air traffic control equipment in place. No new construction, renovation, or operations would be required. Since the no action alternative would involve no alteration to any of the three alternative ASR-11 sites at McGuire 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 GPN-20, would require relying on existing radar equipment that is not capable of meeting future user requirements for 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.

5.0 ENVIRONMENTAL CONSEQUENCES - DASR ALTERNATIVE

Potential impacts resulting from construction (short-term) and operation (long-term) of the DASR facility are described in this section. Impacts are presented by environmental parameter. Mitigation measures that may be required to reduce impacts are described in Section 7.0.

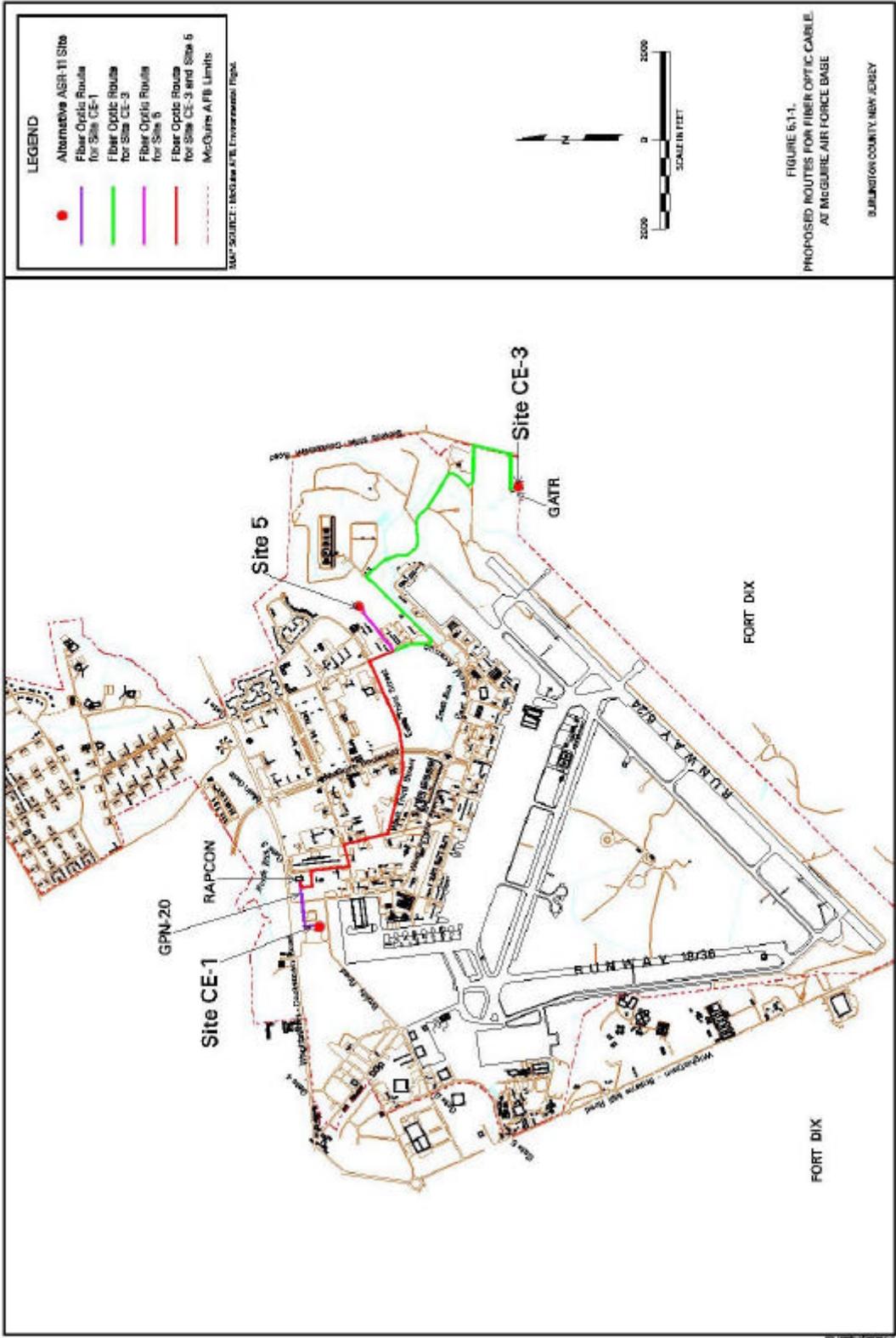
5.1 LAND USE

5.1.1 Short-Term Impacts

Short-term impacts associated with construction of the ASR-11 and demolition and removal of the GPN-20 would include temporary disruption of land uses due to elevated noise levels, increased dust, interference with roadway access, and visual effects. 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 will not be defined until final design, it is anticipated that land uses along the alignments would be affected by elevated noise levels and increased dust associated with open trench excavation.

Site CE-1 is located in an area that is designated for industrial activity, and military operations and aircraft maintenance are proposed for the site. Radar installation and operation are allowed in areas designated for industrial activity, thus the construction of the proposed DASR and supporting facilities would be compatible with land use plans for this area. While electricity and telephone are expected to be connected from nearby sources, fiber optic cable must be laid between the site and the new RAPCON, which has been proposed to be built at the location of the existing GPN-20 located 1,000 feet from Site CE-1 (Figure 5.1-1). A final alignment for the cable has not been selected, however, minor disruptions to land uses along the route could occur during construction.

Site CE-3. Construction of the ASR-11 at alternative Site CE-3 would not substantially affect surrounding land uses. The site is located within the GATR complex, and care would have to be taken to insure that movement and operation of construction equipment did not interfere with GATR operations. The route for the fiber optic cable between Site CE-3 and the new RAPCON is the longest of the three proposed sites. The route is proposed to be approximately 18,500 feet and would run from the GATR facility, along the service roads to East Arnold Avenue, along East Third Street and West



Third Street to Vandenberg Avenue, briefly on West Tuskegee and north on Warehouse Road to the RAPCON (Figure 5.1-1).

Site 5 is located in an area classified as outdoor recreation, although it is not currently supporting recreational use. The site is adjacent to the base golf course and construction of the DASR would result in short-term elevation of noise levels and increased dust that could affect users of the golf course. Construction activity would be visible from the golf course and also from the administration and housing structures 500 feet to the west and the baseball and soccer fields 700 feet to the north. Mitigation measures to reduce noise levels and to provide visual screening during construction could be implemented to reduce potential adverse effects. Installation of fiber optic cable between the site and the new RAPCON would be approximately 8,800 feet in length (Figure 5.1-1). The route is proposed to be along East Fourth Street to East Arnold Avenue, along East Third Street and West Third Street to Vandenberg Avenue, briefly on West Tuskegee, and north on Warehouse Road to the new RAPCON. Disruptions in traffic and site access to land uses along these roadways would be expected during construction, although traffic mitigation measures would be implemented to reduce impacts.

GPN-20. Impacts to surrounding land uses related to demolition and removal of the GPN-20 would be minor. The area surrounding the existing GPN-20 is industrial in nature and the temporary construction activity would be compatible with ongoing activities. The impact associated with construction of the new RAPCON are being addressed in a separate environmental evaluation.

5.1.2 Long-Term Impacts

Site CE-1. Land use would not be substantially affected by the operation of the DASR at Site CE-1. The site would consist of the radar tower and supporting facilities, and would be consistent with military and aircraft operations planned for the site and with other industrial activities in the area.

Site CE-3. The Air Force conducted an electromagnetic compatibility (EMC) study to determine the effects of a proposed ASR-11 on the ground-to-air transmit/receive (GATR) radios at Site CE-3 (USAF, 1999a). Although the study concluded that the ASR-11 radar would have a low probability of causing interference to the GATR receivers if co-located on the same compound, the minimum separation distance between the ASR-11 tower and the GATR antennas as set forth in TO 31Z3-10-9 (Guidelines for siting VHF and UHF ground radio sites) cannot be met at Site CE-3 due to the physical size of the

GATR site compound (USAF, 1999a). TO 31Z3-10-9 states *AMetallic towers used to support communications equipment may not be erected closer than 500 feet to a ground/air radio antenna and should be located in a secondary area of interest* (USAF, 1999a). The primary reason for this required separation is to reduce antenna pattern distortion and blind spot problems for the radio site antennas. A secondary concern is that the ASR-11 may cause electromagnetic interference (EMI) to the receivers at the GATR site due to the close proximity of the radar and GATR site antennas. The study determined that while there is significant frequency separation between the radar and radio equipment, the high radiated peak field strength close to the radar may be sufficient to cause interference or desensitization to the GATR site receivers.

Based on the results of the recent study, it is evident that the operation of a ASR-11 at alternative Site CE-3 has the potential to interfere with and/or preclude operation of the existing GATR Facility. Therefore, siting the DASR at CE-3 would have adverse impacts to the existing land use at that site.

Site 5. Site 5 is classified as outdoor recreation, and thus the use of the site for the ASR-11 would preclude actual development of a recreational resource at this location. The acreage required to develop the DASR is less than one-half acre, and while it represents a loss, the acreage is relatively small compared to the area of open space and recreation abutting the site. Site 5 is located on the western side of the large open area, close to existing military operations buildings. Thus the loss of the acreage would not fragment the larger outdoor recreation area. The ASR-11 would be visible from the existing golf course near Site 5, but once operational, should have minimal impact on users of the golf course because the facility would not generate adverse noise, air quality, or traffic impacts. The ASR-11 at Site 5 would also be visible from the administration and housing structures 500 feet to the west and the baseball and soccer fields 700 feet to the north, however, the facility is not expected to affect the continued use of these areas.

A recent study addressed the potential interference to the McGuire AFB central office and trunked radio system from a proposed DASR at Site 5 (USAF, 1999a). Measurements performed on the ASR-11 radar at a distance equal to the distance between proposed Site 5 and Building 1901 (location of the telephone switching system and trunked land mobile radio (LMR) repeater) revealed a low probability of the ASR-11 causing interference to the telephone switching system or the trunked LMR repeater. Thus, construction of the ASR-11 at Site 5 does not appear to conflict with the existing adjacent land uses at

Site 5.

GPN-20. Dismantling and removal of the GPN-20 would provide an opportunity for redevelopment of that site as the new RAPCON. Thus no adverse land use effects are anticipated as a result of this activity.

5.2 SOCIOECONOMIC

5.2.1 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 on the base. Construction at alternative Sites CE-1, CE-3 or 5 would not adversely impact the socioeconomic conditions at McGuire AFB. There would be a slight short-term increase in 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 GPN-20 radar would be dismantled. No effects on socioeconomic conditions are anticipated as a result of this activity.

5.2.2 Long-Term Impacts

In the absence of other independent activities at McGuire AFB, socioeconomic conditions would return to the existing conditions once the DASR construction was completed. The new radar facility would be unmanned, away from residential developments, and would, therefore, have no long-term effect on socioeconomic conditions.

5.3 UTILITIES AND TRANSPORTATION

5.3.1 Short-Term Impacts

As described below, it is not anticipated that construction of the ASR-11 at any of the alternative sites and removal of the existing GPN-20 would result in adverse impacts to existing utilities or transportation.

5.3.1.1 Water Supply. A temporary increase in water demand would occur during construction. A

water source would be supplied on site by mobile water tanks. Although the base has been asked by the state to reduce its water consumption, it is not anticipated that the water demand for the construction of the ASR-11 would adversely impact the water supply at McGuire AFB due to the small number of construction workers and short construction period.

5.3.1.2 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 the septage would be transported to the nearby treatment facility.

5.3.1.3 Solid Waste. Removal of abandoned tar and gravel at Site CE-1 will be required during construction. In addition, during the dismantling of the existing GPN-20 radar, 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 produced would be disposed of following McGuire AFB policies and protocols and relevant state regulations (see also Section 5.11 on hazardous materials).

5.3.1.4 Electricity. Conduits for fiber optic cable would be installed via open trench excavation in order to provide a communication connection from the ASR-11 site to the proposed new RAPCON to be located at the existing GPN-20 site. Surface disruption resulting from the connections could be up to approximately three miles (18,500 feet) for Site CE-3, 1.5 miles (8,800 feet) for Site 5, and 1,000 feet for Site CE-1 (Figure 5.1-1). This could result in temporary impacts to the immediate land use during the open trench excavation, however, the installation of the fiber optic cable would not impact electrical power in the area of the alternative ASR-11 sites.

Sufficient electrical power is available to each of the alternative ASR-11 sites. Specific routes will be determined when a site is selected and final design plans are completed. Power lines could be routed from the substation west of Site CE-1 via an underground conduit from the closest manhole to the site. Site CE-3 would receive electricity from a substation west of the site, via underground lines also from the closest manhole to the site. Site 5 would be supplied with electricity from surrounding distribution lines on East Fourth Street through an underground conduit from the closest manhole. The construction of the conduits could impact the immediate land use of the open trench excavation, however, electrical power in the area of the alternative ASR-11 sites would not be impacted.

5.3.1.5 Telephone. Telephone lines would be extended from the existing locations stated above in existing conditions. Specific routes and distances will be determined when final design plans are completed.

5.3.1.6 Natural Gas. Natural gas is not required for the installation of the proposed DASR, therefore there would be no impact to existing natural gas conditions on McGuire AFB.

5.3.1.7 Transportation. Impacts on transportation within McGuire 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 cement 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 (USAF, 1999d). Construction related activities would not adversely impact existing traffic conditions.

5.3.2 Long-Term Impacts

It is not anticipated that future utility and transportation conditions would be affected as a result of operation of the DASR. The addition of electrical power, telephone lines, and fiber optic cable at any of the alternative ASR-11 sites would not have an effect on the utilities in the area. The operation of the proposed DASR would not require water resources, wastewater treatment, collection of solid waste, or natural gas resources, therefore, no impacts to those utilities would occur. No long-term impacts on traffic are anticipated.

5.4 NOISE

5.4.1 Short-Term Impacts

Noise impacts during construction are expected to be similar at all three sites. 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. Detailed construction requirements are not available at this stage of project planning, however, it is expected that construction of the DASR at Site CE-3 may require pilings. Pile driving would result in increased noise levels in the vicinity of the site.

Typical construction equipment noise levels may be reduced by using well-maintained equipment and by installing mufflers and engine jackets (Table 5.4-1). 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. As indicated in the baseline conditions section of this EA, none of the proposed three sites is located in an area populated by sensitive receptors, although, Site 5 is located proximate to the base golf course. Increased noise levels would be mitigated and of such a short-term nature that substantial impacts on golf course users are not anticipated. Of the three sites, Site CE-3 is closest to an operating building on the base. Building 1506 is associated with the GATR facility, and intermittent noise disruptions could occur at this facility during construction at Site CE-3.

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

5.4.2 Long-Term Impacts

It is not anticipated that there would be any long-term noise impacts as a result of operation of the DASR radar. Noise levels generated by the DASR system would be maintained at a level consistent with current OSHA regulations as specified in CFR Title 29, Part 1910. Noise from DASR equipment located in operational areas would be designated not to exceed 55 dBA at any time. Noise from DASR system equipment located in general work areas should not exceed 65 dBA, including periods when

Table 5.4-1. 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 (87 L ₁₀)*	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 (90 L ₁₀)*	83	76
Truck Alarms	94	89	75

Sources: Bolt, Beranek, and Newman, 1974, and CH₂M Hill, 1989

(*Regulation of Construction Activity Noise*. BBN Report No. 2887. November 1974)

* Field measurements by CH₂M Hill (1989) for the MWRA CSO construction project indicate that the L₁₀ noise level associated with construction activities averages 2 dB greater than the measured L_{eq} of same equipment.

the cabinet doors are open. The antenna pedestal with its drives, mounted on its tower, will be designed not to produce noise levels in excess of 55 dBA outdoors on the ground at a distance of 100 feet from the tower.

5.5 AIR QUALITY

5.5.1 Short-Term Impacts

The short-term air quality impacts of constructing a ASR-11 would be similar at all of the three alternative sites. DADR site clearing and construction vehicle traffic would generate fugitive dust during the construction period. Construction of a ASR-11 at any of the sites would require disturbing approximately 0.45 acres. Since the area that would be disturbed at each of the sites is similar, the amount of dust generated during construction is not expected to vary substantially among the sites. No new roads would be needed with the exception of a gravel access driveway.

Distances for electrical connections between the alternatives sites and existing utility manholes in the vicinity of the sites will be determined when the site design is completed. Installation of fiber optic signal cable connections would require the placement/construction of approximately 1,100 feet of conduit from Site CE-1 to the proposed RAPCON; 18,500 feet of conduit from Site CE-3; and 8,800 feet of conduit from Site 5. It should be noted that the length of the new utility lines proposed at McGuire AFB as part of DADR development on Site CE-3 and 5 would significantly exceed the maximum length of the new utility lines estimated in the Programmatic EA, i.e. 2,640 feet. 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.

As described in the Programmatic EA for the NAS program (USAF, 1995b), construction vehicles and equipment would produce emissions that could temporarily affect air quality. However, because the number of vehicles required is relatively few and the construction duration is limited, emissions are not anticipated to cause an exceedance of National Ambient Air Quality Standards (NAAQS) in the vicinity of the NAS sites. Similarly, these emissions are not anticipated to cause an exceedance in New Jersey Ambient Air Quality Standards.

Similar to the installation of the new ASR-11, dismantling of the existing GPN-20 radar would generate

some fugitive dust and some vehicle and equipment emissions. The nominal emissions and dust generated during the GPN-20 dismantling are not anticipated to cause an exceedance of either the state or federal AAQS.

5.5.2 Long-Term Impacts

Operation of the new radar 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 DASR site 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 on the ASR-11 site. As described in the Programmatic EA for the NAS program (USAF, 1995b), the emergency generator is anticipated to be operated approximately once per 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 triggers review under the Prevention of Significant Deterioration regulations, and are therefore, expected to have no adverse impact on air quality (USAF, 1995b). The evaporative loss from the AST is also expected to be minimal, and to have no adverse impact on air quality. The Programmatic EA also stated that maintenance traffic on unpaved access roads would generate fugitive dust during operation of the DASR facility. However, all of the potential ASR-11 sites at McGuire AFB would be accessed by either a new paved road for Site CE-3 or gravel roads for Sites CE-1 and 5. Consequently, minimal fugitive dust should be generated during operation of the DASR facility at McGuire AFB.

5.6 GEOLOGY AND SOILS

5.6.1 Short-Term Impacts

The construction of the ASR-11 would have similar effects on the soil at each of the alternative ASR-11 sites. Urban land exists at all three alternative ASR-11 sites and along the proposed utility routes. Excavations for the footings of the radar tower typically do not exceed seven feet in depth. If soil conditions prove to be poor, as may be the case at Site CE-3, the excavation depth could increase in order to replace the poor soil with fill that is more stable than the existing soil. Excavation for a utility trench is typically four feet deep, and may be 10 feet wide. Problems associated with caving may occur during deeper excavations. If the banks of the excavated areas are unstable, they could be stabilized with sheeting or other supports as appropriate. The installation of the access road at Site CE-1 would require the removal of an abandoned concrete foundation. This would require temporary ground disruption, but

would not result in an adverse impact to soils or geology.

The dismantling of the GPN-20 would not require any ground disturbance. The existing radar system would be dismantled to ground level, leaving the foundations in place. All hazardous material encountered would be properly disposed of. Therefore, there would be no impact to the soils or geology.

5.6.2 Long-Term Impacts

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

5.7 SURFACE WATER AND GROUNDWATER

5.7.1 Short-Term Impacts

It is not anticipated that construction of the new radar at any of the alternative sites would have adverse impacts on surface water. However, there is the potential for stormwater runoff conditions to change at the selected site. During the construction period, vegetation, mostly grass at Sites CE-3 and 5, would be removed and excavations for foundations would be placed. The removal of vegetation could temporarily increase the stormwater runoff. Vegetation aids in controlling storm water runoff. The selected site would be graded to the perimeter fence, lined with filter fabric, and covered with six inches of crushed stone to provide adequate storm water runoff. The addition of the crushed stone at Site CE-1 and its access road could improve surface water conditions in the area because the site is presently paved.

The amount of impervious surface removed at Site CE-1 would exceed the impervious area required for the tower footings and supporting operation structures. Specific impervious areas will be determined once final design plans are completed.

The installation of the fiber optic conduit along base roads for each alternative ASR-11 site could temporarily alter stormwater conditions. McGuire AFB has a Stormwater Pollution Prevention Plan that will be used for guidance during construction of the ASR-11 in order to prevent impacts to future surface water conditions.

The excavations for the tower footings, approximately seven feet deep, are not expected to penetrate the water table at Site CE-1 and Site 5. As stated above, the water table at McGuire AFB ranges from 0

to 20 feet below the existing ground surface. Sites CE-1 and Site 5, both at 120 feet msl, are expected to be in areas where the water table is greater than seven feet below the existing ground surface. Therefore, impacts to groundwater are not anticipated at Site CE-1 and Site 5. Site CE-3, at 100 feet above msl, is known to be seasonally inundated, meaning the groundwater is at or above the existing ground surface. Wetland investigations at Site CE-3, described in Section 3.8.1.2, indicated that hydric soils exist in the area of the alternative ASR-11 site. As stated earlier, observations have been reported by persons on base that Site CE-3 is seasonally inundated. These observations and the presence of hydric soils indicate that there is the potential that construction of the proposed project would temporarily disrupt the groundwater in the vicinity of Site CE-3. Measures would need to be taken during construction to handle and discharge groundwater appropriately.

The dismantling of the GPN-20 would not require ground disturbance and any hazardous materials (e.g. paint chips) that are encountered or produced would be removed from the area and disposed of in accordance with base regulations.

5.7.2 Long-Term Impacts

The fenced-in area for all alternative ASR-11 sites is anticipated to be approximately one-half acre or less and would be constructed of crushed stone over filter fabric. The radar tower footings and foundations for related facilities would be constructed of concrete. The specific dimensions of impervious area will be determined when the final site design is completed. Alternative Sites CE-1 and 5 would require the construction of an access road to the site. The access road would be constructed of six inches of crushed stone over filter fabric, and would not be expected to have an impact on surface water or groundwater. Site CE-3 would require the construction of a paved access road, due to potential unstable soils, adding an impervious surface to the area of an approximately 3,200 square feet (200 feet long by 16 feet wide). The Pinelands Commission requires all new construction disturbing more than 5,000 square feet to implement a storm water management plan (NJ Pinelands, 1999). Storm water runoff rate calculations for a 2, 10, and 100 year storm, before and after construction, must be presented to the Pinelands Commission along with final design plans for the project.

Removal of the GPN-20 is not expected to have an impact on storm water runoff conditions.

5.8 BIOLOGICAL RESOURCES

5.8.1 Short-Term Impacts

5.8.1.1 Vegetation.

Site CE-1. There is no existing vegetation in the area of Site CE-1. Therefore, no short-term impacts to vegetation would result.

Site CE-3. The site is completely entirely mowed grass, and some wetland plant species may be present. Short-term impacts to vegetation would result from the clearing of the entire site during construction. Impacts to wetlands resources are discussed in greater detail in Section 5.8.1.2, below.

Site 5. The site is completely entirely mowed grass. Short-term impacts to vegetation would result from the clearing of the entire site during construction.

5.8.1.2 Wetlands. No wetland impacts are anticipated at Site CE-1, Site 5, or the GPN-20, since all locations are upland and not proximate to any wetlands or watercourses. Preliminary fiber optic routes for Sites CE-1 and 5 would not impact wetlands delineated by the USFWS or Greeley-Polhemus. However, as mentioned previously, Site CE-3 contains and/or is proximate to wetland resources under the jurisdiction of the New Jersey Pinelands Commission. The preliminary fiber optic route from Site CE-3 to the RAPCON would also be within wetlands delineated by the USFWS and Greeley-Polhemus. The Pinelands Commission generally does not permit activities within wetlands (Pinelands, 1998). Work within a wetland would require obtaining a Waiver from Strict Compliance from the Pinelands standards. Obtaining a waiver requires completion of a feasibility alternatives analysis and a demonstration that no other site on base is as acceptable. Although the Pinelands Comprehensive Management Plan does indicate an exemption from the regulatory standards for those activities necessary for national security, this exemption has never been used before and is not favored by or advocated by the Commission (Pinelands, 1998). An exemption would require a letter from the Commander of the base.

Based on consultation with the Pinelands Commission, it is likely that the Commission would determine that Site CE-3 is a wetland. Even if the site is determined to not be a wetland, if wetlands are determined to be present within 300 feet of the proposed activity, the project would be difficult to permit.

It is possible to petition the Pinelands Commission to reduce the areal extent of the wetland buffer zone, utilizing a Pinelands Commission approved buffer model. For an undisturbed area, the buffer has typically been reduced to 110 to 175 feet (Pinelands, 1998). The smallest buffer (50 feet) has been used with isolated, small pocket wetlands. Once again, no work is permitted within the buffer zone (thus, the reduction is on the size of the buffer zone, not the performance standards within the (smaller) buffer zone. Work in the buffer zone would still require a Waiver from Strict Compliance.

5.8.1.3 Wildlife. No significant short-term wildlife impacts are anticipated at any of the proposed DASR locations or the GPN-20. Construction of the ASR-11 would require disturbing approximately 0.45 acre of disturbed upland/pavement at Site CE-1 or 0.45 acre of mowed grass at Sites CE-3 and 5.

Thus, construction is anticipated to have minimal adverse impact on wildlife habitat. In addition, the noise generated during construction of the DASR and dismantling of the GPN-20 is expected to have minimal impact on wildlife in the area, since the general vicinity of all the sites provides minimal valuable habitat for wildlife and any wildlife in the area are already acclimated to aircraft noise.

5.8.1.4 Threatened and Endangered Species. No impacts to threatened or endangered species are anticipated at Sites CE-1 and 5, or the GPN-20. However, the NJDEP Natural Heritage Program may require an intensive field review to document the presence/absence of *Greene=s juncus* at Site CE-3. It is anticipated that the results of such a field review would be consistent with the previous investigations which have not revealed any individuals of *Greene=s juncus* at Site CE-3.

5.8.2 Long-Term Impacts

5.8.2.1 Vegetation. As mentioned previously, each of the proposed sites and the GPN-20 are located within previously disturbed areas. The proposed ASR-11 would replace a 0.45 acre parcel of grassy or paved surface with approximately 0.45 acre of crushed stone/gravel; a portion will be an impervious surface for the tower footings and related structure foundations. The area of new impervious surface will be determined when the final design is complete. Due to the disturbed nature of the three proposed sites, the loss of this quantity of vegetation is not considered to be a significant adverse impact. Additionally, the crushed stone/gravel surface will allow for storm water permeability, thereby maintaining or enhancing the groundwater recharge at the proposed sites.

The dismantling of the GPN-20 would have no long-term impacts to vegetation.

5.8.2.2 Wetlands. Locating a radar at either Site CE-1 or Site 5 and dismantling the GPN-20 are not anticipated to pose any adverse long-term impact to wetland resources. However, as mentioned previously, the placement of a ASR-11 facility at Site CE-3 may result in the loss of wetland resource area, which would probably require mitigation to provide offsetting wetland functions and values that may ultimately be lost.

5.8.2.3 Wildlife. No significant adverse long-term impacts to wildlife are anticipated from the presence and operation of an ASR-11 at any of the proposed sites or the dismantled GPN-20. The radar 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, 1995b), the relatively low height of the ASR-11 antennas is not anticipated to pose a substantial threat to birds flying through the area. Additionally, the selected ASR-11 site would be surrounded with a chainlink fence, which would act as a barrier to larger mammals, precluding them from the site.

5.8.2.4 Threatened and Endangered Species. Operation of the DASR at one of the alternative ASR-11 sites or the dismantling of the GPN-20 is not anticipated to adversely impact threatened or endangered species since none are known to occur at the sites.

5.9 AESTHETIC RESOURCES

5.9.1 Short-Term Impacts

The construction of the DASR at alternative Site CE-1 or CE-3 would not adversely impact aesthetic resources at McGuire AFB. While construction of the ASR-11 at Site 5 would be visible from the golf course, the impact is likely to be minor, because recreational users on the base are accustomed to aircraft related sites and activities. Construction activity associated with the removal of the GPN-20 would not change the existing aesthetic resources at the sites.

5.9.2 Long-Term Impacts

All three alternative sites and the existing GPN-20 are located on McGuire AFB in areas that the general public cannot easily access. There would generally be no long-term impacts to aesthetic resources at either Site CE-1 or Site CE-3, because the aesthetic value of the ASR-11 is comparable to that of the existing aesthetic resources in the area, which include maintenance buildings, stored equipment, and antenna towers. The tower for the ASR-11 at Site CE-1 would be visible from Wrightstown-Cookstown Road and other locations off-base, much like the GPN-20 currently is. However, the Pinelands Commission does impose a limitation on tower height (35 feet) for aesthetic reasons. The limitation would conflict with a proposed DASR facility at Site CE-3, since it already triggers a permit from the Pinelands Commission for construction within 300 feet of a wetland. The installation of a DASR facility at Site 5 would likely have some aesthetic impact on the adjacent golf course and recreational facilities. Users of the golf course and recreational facilities in the vicinity of Site 5 would be able to see the tower for the ASR-11. However, as noted previously, antenna towers and supporting facilities are commonplace on Air Force bases, thus, the impact is anticipated to be minor. Dismantling and removal of the GPN-20 would enhance aesthetic conditions in that area of the base.

5.10 CULTURAL RESOURCES

5.10.1 Short-Term Impacts

Consultation with McGuire AFB has indicated that no significant archaeological or historical sites are recorded or likely to be present on the alternative ASR-11 sites. The areas have been mapped as having low probability for the presence of cultural resources because the land has previously been disturbed. The Semi-Automatic Ground Environment (SAGE) building (Building 1907) has been recommended as

potentially eligible for inclusion on the National Register of Historic Places. The SAGE building is located approximately 1,000 feet southwest of alternative Site 5, on East Fourth Street. Construction at Site 5 would be visible from the SAGE building, however, there would be no direct impact on the building. Consequently, construction at any of the alternative sites is not expected to have an impact on cultural resources.

The GPN-20 is not located near recorded cultural resources and is in an area of previously disturbed land. Therefore, the dismantling of the GPN-20 would not impact cultural or historic resources.

The NJ State Historic Preservation Office (SHPO) was contacted in September, 1998 for an opinion or for information on existing resources in the vicinity of the alternative ASR-11 sites and will be contacted upon final site selection.

5.10.2 Long-Term Impacts

There would be no cultural or historic resource impacts related to the operation of the ASR-11 at any of the alternative sites or the removal of the GPN-20. Operation of the DASR is not expected to substantially alter the setting of the SAGE building, and would not affect the building itself in any manner.

5.11 POLLUTION PREVENTION AND HAZARDOUS WASTE

5.11.1 Short-Term Impacts

5.11.1.1 Pollution Prevention. The construction phase of the DASR project would comply with all applicable McGuire 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 chemical and toxic substances. Consequently, hazardous waste generation is anticipated to be reduced to the maximum extent possible during construction of the ASR-11 facility and the dismantling of the existing GPN-20. Similar pollution prevention measures would be implemented during DASR construction regardless of the alternative site at which the facility is constructed.

5.11.1.2 Hazardous Waste. At each of the three alternative ASR-11 sites, some hazardous materials

and waste would likely be used and generated during 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 construction would be used, stored, transported, and disposed in accordance with base, military, state, and federal regulations.

It is anticipated that no contaminated soils would be encountered at Sites CE-1, Site CE-3, or Site 5. The construction of the DASR facility would require excavating to an approximate depth of seven feet to facilitate the antenna foundation installation. Due to the relatively shallow depth of installation, groundwater is not expected to be encountered at Site CE-1 or Site 5 as discussed in Section 5.7, Surface Water and Groundwater. However, there is the potential to penetrate the water table at Site CE-3 due to its presence at or near the existing ground surface, but there has been no confirmation of contaminated groundwater at Site CE-3. Consequently, it is not anticipated that contaminated groundwater would be encountered at any of the alternative ASR-11 sites. The utility trenches would be relatively shallow (four feet) and would therefore not encounter groundwater.

The 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 GPN-20 and facilities equipment. As part of the dismantling, the area will be surveyed prior to final site decommissioning, and any potentially hazardous material will be collected and disposed of in accordance with applicable McGuire AFB policies and procedures. Any USTs or ASTs on the site would not be removed during the dismantling of the GPN-20.

5.11.2 Long-Term Impacts

5.11.2.1 Pollution Prevention. As indicated above, a pollution prevention plan has been developed for the NAS program. The 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. In addition, operation of the DASR facility would comply with all applicable McGuire 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.

5.11.2.2 Hazardous Waste. Operation of the radar facility at any of the three alternative ASR-11 sites

would include the storage of fuel in an AST. In addition, hazardous materials and waste would likely be used and generated during DASR 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 the ASR-11 operation.

The removal of the GPN-20 would reduce the potential for generation of any hazardous waste at this site.

5.12 RADIO FREQUENCY RADIATION

5.12.1 Short-Term Impacts

Construction at any of the DASR alternative sites on McGuire AFB would not 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 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 GPN-20 would occur only after operation of the radar has ceased. Consequently, there should be no RFR hazard to workers involved in the GPN-20 dismantling. Similar to the DASR construction, dismantling activities at the GPN-20 site could generate low levels of RFR from commonly used devices, which are not anticipated to be harmful to human health.

5.12.2 Long-Term Impacts

Terms such as Δ safety standards \cong and Δ exposure standards \cong 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 permissible exposure limits (PELs), threshold limit values (TLVs), or 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 standards. 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 3000,000 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 mW/cm² averaged over a 30-minute period. The guideline level for controlled environments is 9-10 mW/cm² averaged over a 6-minute period.

In 1988, the International Radiation Protection Association (IRPA) published guidelines for occupational and public exposure to RFR in the frequency range 0.001 MHz to 300,000 MHz (IRPA, 1988). At the ASR-11 frequency, the MPE for occupational exposure is 5 mW/cm² averaged over a 6-minute period. The MPE for non-occupational exposure is 1 mW/cm² 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/cm² 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/cm², averaged over 6 minutes. The corresponding MPE for exposure of the general population is 1 mW/cm², 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 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 m (75 feet) from the ASR-11 antenna, the peak power density of the ASR-11 signal will be 945 mW/cm², less than the 1,000 mW/cm² 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 m (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 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/cm², 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/cm² at a distance of 10m (33 feet) from the radar antenna. Since the ASR-11 will be mounted on a tower greater than 10 m in height, persons at ground level would not be exposed to RFR levels exceeding the ANSI/IEEE MPE. At distances of more than 13 m (43 feet) from the ASR-11 antenna, the ASR-11 signal will comply with the MPE levels for the general population, 1.0 mW/cm², 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 m (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 m (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 m (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.

6.0 COMPARISON OF ENVIRONMENTAL CONSEQUENCES AND SELECTION OF ENVIRONMENTALLY PREFERRED ALTERNATIVE

Of the three alternative ASR-11 sites, one site does not emerge as an environmentally preferred site. As described below, both Site CE-1 and Site 5 feature characteristics that would generally make either of these locations an acceptable location for the ASR-11 facility from an environmental perspective. However, Site CE-3, which is characterized by substantial wetland resources and may be unacceptable from an operations standpoint, is not an environmentally preferred site.

Site CE-1 is located in an area zoned for aircraft operations/maintenance, and would generally be compatible with the construction and operation of the ASR-11 facility. No significant adverse impacts associated with land use, socioeconomics, utilities, transportation, noise, air quality, geology, surface water, groundwater, biological resources, aesthetic resources, or cultural resources would be anticipated if Site CE-1 were selected as the preferred alternative. Site CE-1 has the advantage of being located closest to the existing GPN-20, the site of the new RAPCON, and therefore, requires the shortest fiber optic cable link. There is potentially contaminated groundwater in the vicinity of Site CE-1, but as stated in Section 5.7, groundwater is not expected to be encountered at Site CE-1 or Site 5.

Site 5 is located in an area classified as outdoor recreation, and would also generally be compatible with the construction of the DASR facility, although there would be a loss of open space and there may be impacts to users of the adjacent golf course. No significant adverse impacts associated with socioeconomics, utilities, transportation, noise, air quality, geology, surface water, groundwater, biological resources, or hazardous waste would be anticipated if Site 5 were selected as the preferred alternative. Site 5 is located in close proximity to the National Register-eligible SAGE building, as well as the base golf course; however, construction of the ASR-11 at this location would not significantly alter the aesthetics of the site. Measurements recently conducted by the Air Force revealed a low probability of the ASR-11 causing interference to the telephone switching system or the trunked LMR repeater; thus, the site was not precluded from an operational perspective. One disadvantage for Site 5 is its distance from the proposed RAPCON; Site 5 would require approximately 8,800 feet of fiber optic cable to connect to this communications facility.

As indicated above, several conditions at Site CE-3 make it less acceptable for ASR-11 installation and operation. The recently completed electromagnetic compatibility study indicated that the minimum

separation distance between the ASR-11 tower and the GATR antennas, as set forth in the guidelines for siting VHF and UHF ground radio sites, cannot be met at Site CE-3 due to the physical size of the GATR site compound (USAF, 1999). Based on the wetland investigation conducted and conversations with the New Jersey Pinelands Commission, it appears that Site CE-3 would be regulated as a wetland. Assuming that the Pinelands Commission concurs that wetlands are located within Site CE-3, and the Air Force wishes to pursue this location as the preferred alternative, a lengthy and difficult permitting process would ensue. The Pinelands Commission would require the Air Force to apply for a Waiver from Strict Compliance with the Pinelands standards, which includes a detailed feasibility/ alternatives analysis. The Air Force would need to demonstrate to the Commission's satisfaction that no other location on the base is acceptable for the installation of the proposed ASR-11. Due to the substantial environmental and operational disadvantages at Site CE-3, it is recommended that Site CE-3 not be selected as the location for the proposed ASR-11 facility.

7.0 MITIGATION

Issues that must be addressed during construction 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 can be reduced using standard mitigation measures.

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 will be monitored and maintained as necessary. 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. Noise barriers may also be used to reduce noise levels. These barriers would have the benefit of providing a visual buffer. Dust will be controlled onsite by using water to wet down disturbed areas. All areas disturbed for the DASR 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 would be handled and disposed of in accordance with McGuire AFB policies and protocols and all applicable state and federal regulations. Traffic management measures will be developed to ensure traffic flow and pedestrian access is maintained.

During operation of the DASR, fuel would be stored in an above-ground storage tank (AST), and some hazardous materials, such as 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 McGuire 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 during operation, warning signs, indicating the safe distance from the operating radar, will be installed at the facility perimeter.

8.0 LIST OF ACRONYMS

ACC	Air Combat Command
ACOE	Army Corps of Engineers
AFDTC	Air Force Development Test Center
AICUZ	Air Installation Compatible Use Zone
AOC	Areas of Concern
APZ	Accident Potential Zone
ASR	Airport Surveillance Radar
AST	Above-ground Storage Tank
BEE	Bioenvironmental Engineering
BMP	Best Management Practice
CRM	Cultural Resource Manager
CRMP	Cultural Resource Management Plan
DAAS	DoD Advanced Automation System
DASR	Digital Airport Surveillance Radar
dB	Decibel
dBa	Decibel A-weighted
dBW	Decibel Watt
DoD	Department of Defense
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMR	Electromagnetic Radiation
FAA	Federal Aviation Administration
FONSI	Finding of No Significant Impact
GATR	Ground-to-Air Transmit/Receive
Hz	Hertz
IEEE	Institute of Electrical Electronics Engineers
IRP	Installation Restoration Program
IRPA	International Radiation Protection Association
KVA	Kilovolt Ampere
LCF	Local Control Facilities
LMR	Land Mobile Radio
MCL	Maximum Concentration Limit
MCT	Military Control Towers
mgd	million gallons per day
mg/L	Miligrams per liter
MPE	Maximum Permissible Exposure
MPO	Metropolitan Planning Organizations
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NAS	National Airspace System
NEPA	National Environmental Policy Act
NJDEP	New Jersey Department of Environmental Protection
NJSHPO	New Jersey State Historical Preservation Office
NRCP	National Council on Radiological Protection
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
PEL	Permissible Exposure Limit
ppm	parts per million
PQL	Practical Quantitation Limit
PRM	Potomac-Raritan-Magothy formation
RAPCON	Radar Approach Control
RBC	Risk Based Concentration

LIST OF ACRONYMS (continued)

RFR	Radio Frequency Radiation
SAGE	Semi-Automatic Ground Environment
SPL	Sound Pressure Level
SPPP	Stormwater Pollution Prevention Plan
SVOC	Semi-Volatile Organic Compound
TLV	Threshold Limit Value
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UST	Underground Storage Tank
VCSS	Voice Communications Switching System
VOC	Volatile Organic Compound
WWTP	Wastewater Treatment Plant

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APPENDIX A: LISTING OF AGENCIES AND INDIVIDUALS CONTACTED

LISTING OF AGENCIES AND INDIVIDUALS CONTACTED

McGuire AFB Environmental Flight, King Mac

McGuire AFB Radar Maintenance, Sergeant Nicholas

McGuire AFB Horizontal, Sergeant Regelman

McGuire AFB Communication Squadron, Mr. Michael Karle

McGuire AFB Environmental Flight, Ms. Raye Griffin

McGuire AFB Environmental Flight, Mr. Wightman

McGuire AFB Environmental Flight, Mr. Chris Archer

McGuire AFB Environmental Flight, Ms. Mary Ellen Pinkstaff

McGuire AFB Site Development, Mr. Richard Dean

McGuire AFB Site Development, Mr. Robert Kline

APPENDIX B: AGENCY CORRESPONDENCE