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ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.

May 22, 1987
ESE No. 86-843-0100-2136

Mr. John Edwards
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Los Angeles, CA 90009

Dear Mr. Edwards:

Enclosed for your review are 20 copies of the Draft Environmental Assessment (EA) for installation and operation of the American Satellite Terminal at New Boston Air Force Station (NBAFS).

Should you have any questions regarding this report, please contact Mr. John Wiese in our ESE Gainesville office.

Sincerely,

Roy S. DeLotelle
Project Manager

RSD/das

Enclosures

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NEW BOSTON AIR FORCE STATION
ENVIRONMENTAL ASSESSMENT

Prepared for:

DEPARTMENT OF THE AIR FORCE
Headquarters Space Division
Los Angeles, California

Prepared by:

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
Gainesville, Florida

ESE No. 86-386-0100-2130

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EXECUTIVE SUMMARY

The new Boston Air Force Station (NBAFS) is located approximately 12 miles west of Manchester, New Hampshire, in Hillsborough County. The developed portion of the installation is 125 acres, whereas NBAFS occupies 2,826 acres. The NBAFS population consist of approximately 270 people; however, total military personnel can increase to over 500 during military training. In order to provide additional interfaces with the Air Force Satellite Control Facility (AFSCF), two antennas (one 7 meter and one 10 meter)) will be installed at NBAFS. To accomplish this task, modification of habitats and existing structures will occur near building 100 on the northeastern side of the installation. Habitats in this area consist of disturbed grassy areas in a courtyard. Soils are of fine sandy loam and overlay bedrock. No unique or unusual hydrological or geological features occur in this area. The area is located on the upper slope of an 800-foot (ft) hill with exposed bedrock near the surface. Drainage is to the southwest of NBAFS.

No substantial impacts to ecological or other area resources are anticipated. Planting grass on the exposed surface, use of salutation traps, and other appropriate measures will stabilize soils and surface drainage. Endangered and threatened wildlife species may occur on NBAFS but should not frequent the area of concern. Thus, no impacts on these resources are anticipated. Upon completion of the project, all disturbed habitats will be stirred to their former characteristic.

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1.0 INTRODUCTION

The New Boston Air force Station (NBAFS) is located approximately 12 miles west of New Hampshire, in Hillsborough County in the southeast part of the state (see Figure 1-1). The installation occupies 2,836 acres and has easements of 49.43 acres. There are five operational areas (Areas A and through E). The main entrance, guard house, fire department, and main power station occupy Area A. Area B is the main operational area, containing the antenna systems, the satellite communications (SATCOM) terminal, the technical and administration building, base support shops, civil engineering, supply, motor pool/maintenance, the sewage treatment plant, and the multipurpose recreation building. Area C contains a skeet range, and Area D contains a 400-foot (ft) boresight tower and an access road. Area E contains temporary storage buildings, wells, reservoirs, and a pumping system. The developed pertion of NBAFS, which includes Areas A and B and other facilities located in Areas C through E, consists of approximately 125 acres (NBAFS, 1983a).

The NBAFS population consists of approximately 270 people (NBAFS, 1983a). As a training facility, NBAFS handles many additional military personnel. A total of 11,807 military personnel used the training facilities from October 1981 through September 1984 (NBAFS, 1983a). Building 100, which is in the area of proposed construction, is located near the main gate and is the technical and administration building housing the operations, control, telemetry, computer/data processing, communication, telephone switchboards, precision measurement equipment laboratory (PMEL), and administration offices.

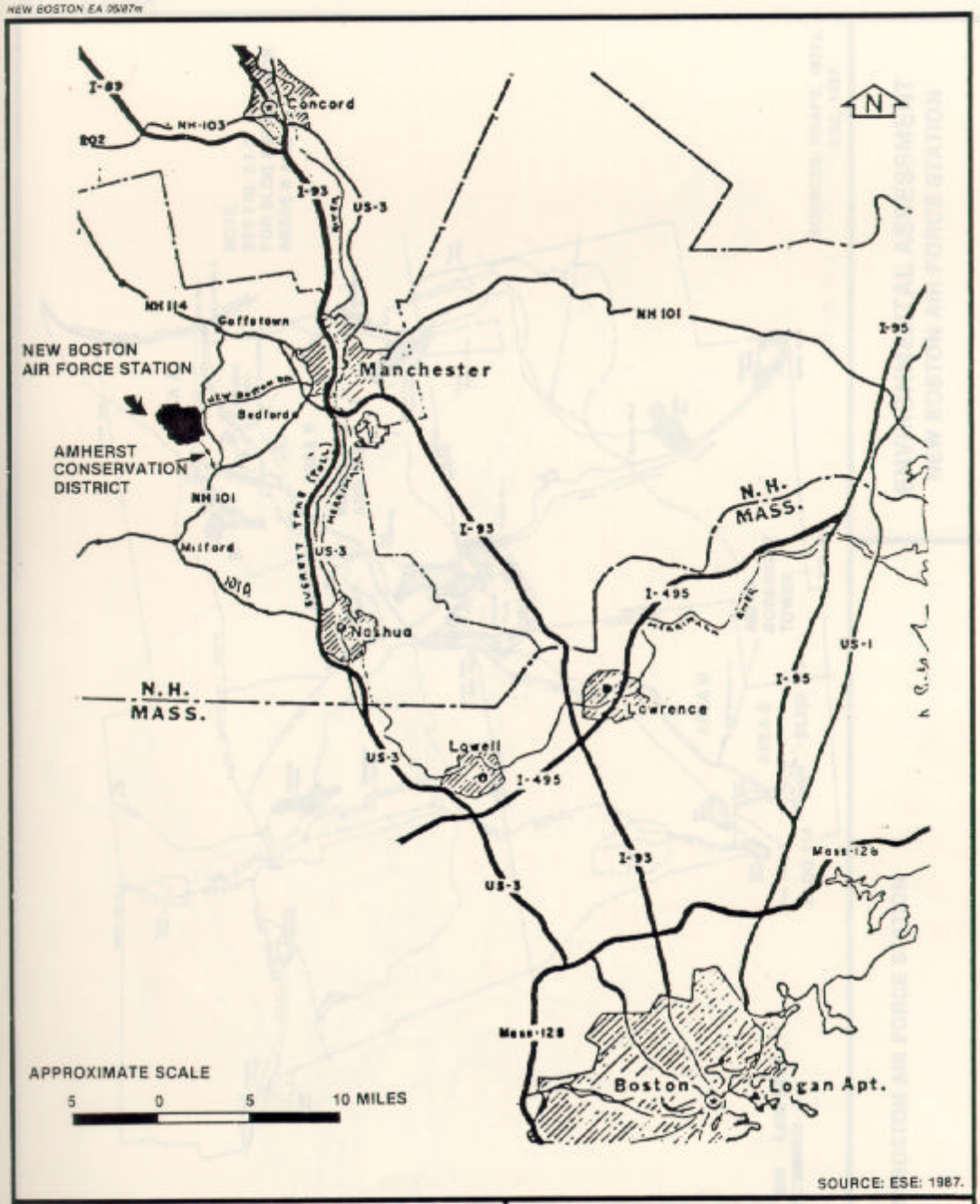

Figure 1-1
LOCATION OF NEW BOSTON AIR FORCE STATION

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NEW BOSTON AIR FORCE STATION

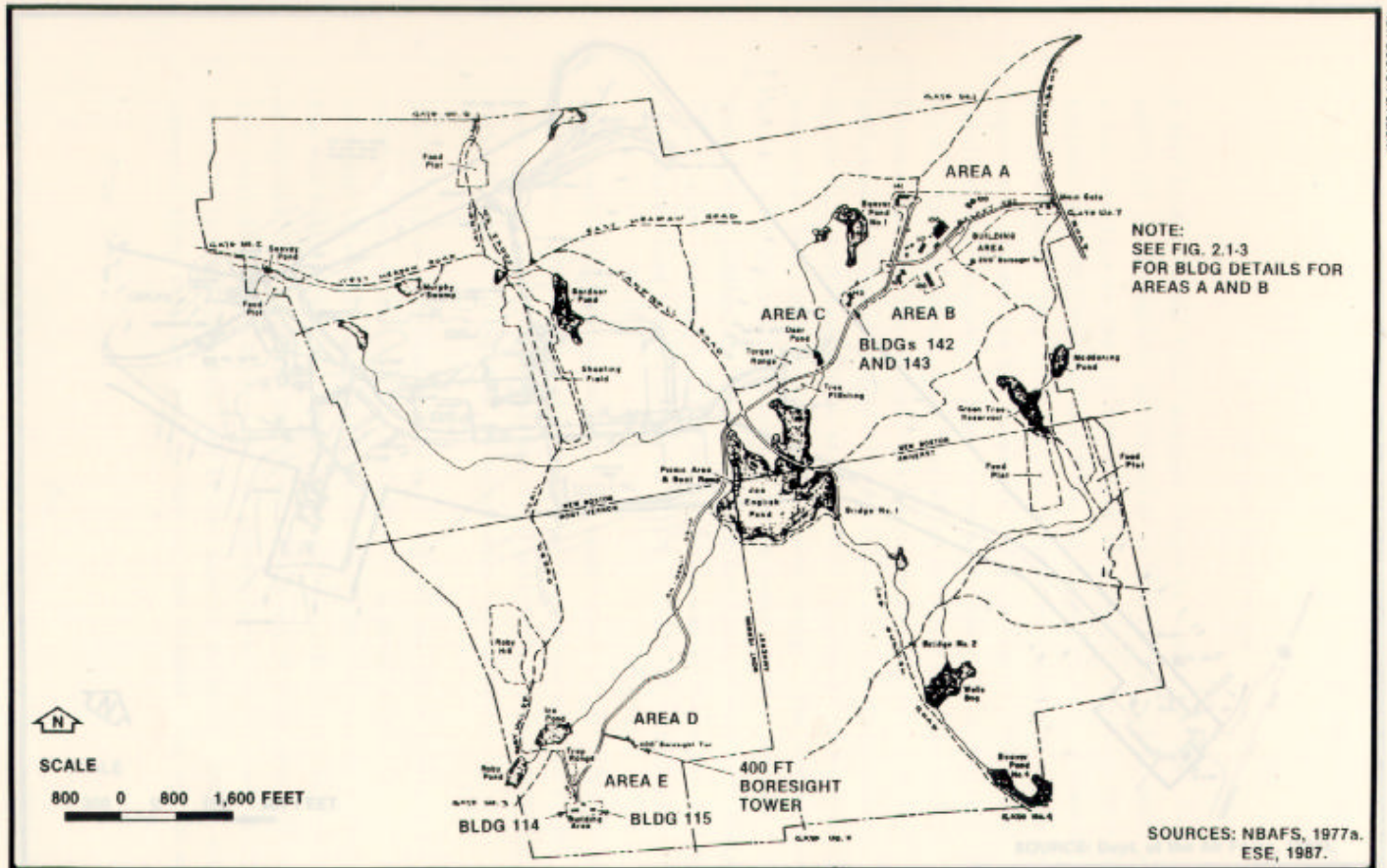

Figure 1-2
MAP OF NEW BOSTON AIR FORCE STATION

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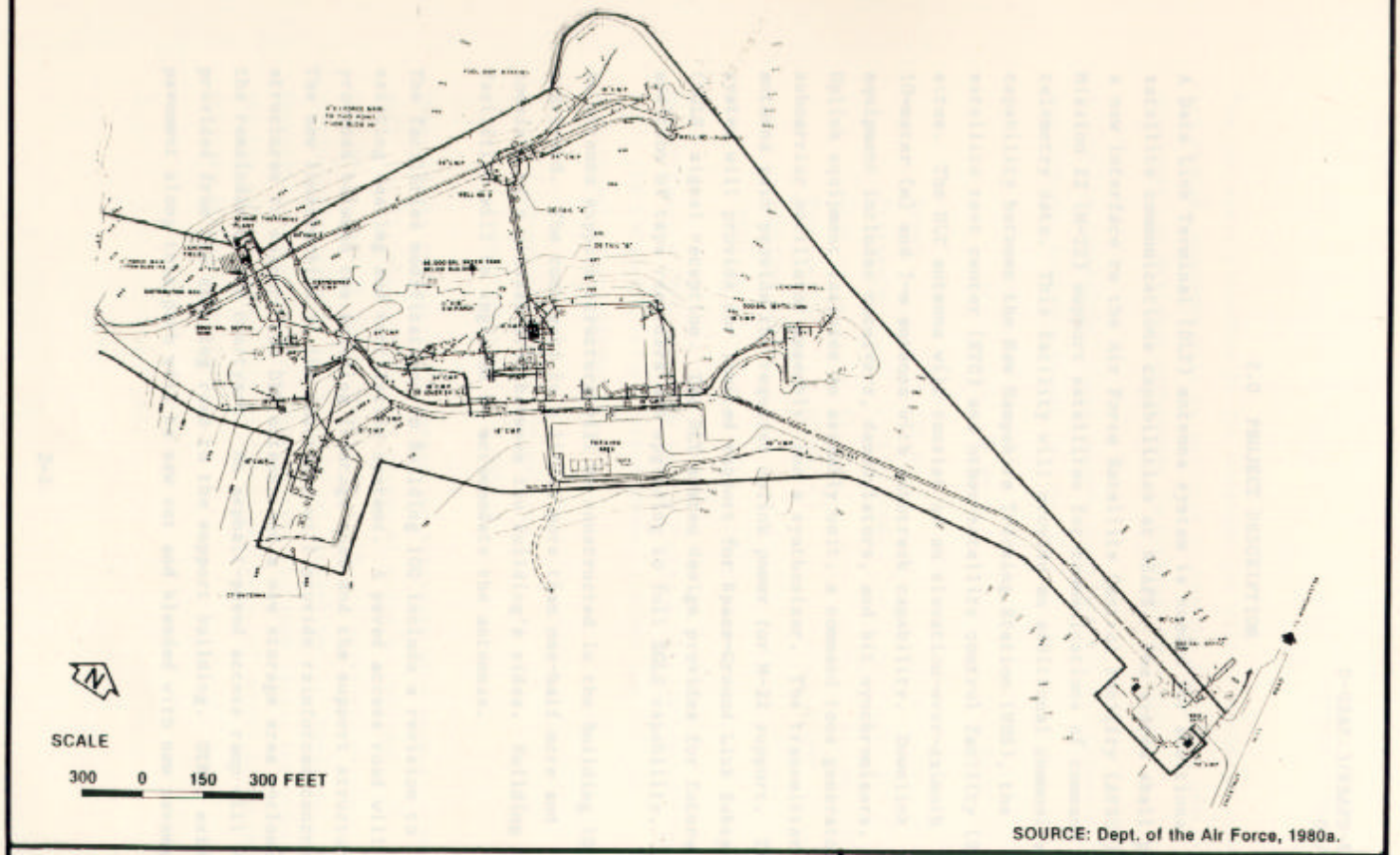
NEW BOSTON AIR FORCE STATION

NEW BOSTON EA 0587m



SOURCE: Dept. of the Air Force, 1980a.

Figure 1-3
MAP OF NBAFS AREAS A AND B

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2.0 PROJECT DESCRIPTION

A Data Link Terminal (DLT) antenna system is needed for additional satellite communications capabilities at NBAFS. The system shall provide a new interface to the Air Force Satellite Control Facility (AFSCF) Mission 22 (M-222) support satellites for communications and command and telemetry data. This facility will provide an additional communications capability between the New Hampshire Tracking Station (NHS), then satellite test center (STC) and other satellite control facility (SCF) sites. The DLT antenna will consist of an elevation-over-azimuth 10-meter (m) a 7-m antenna with autotrack capability. Downlink equipment includes receivers, demodulators, and bit synchronizers. Uplink equipment includes an assembly unit, a command tone generator/subcarrier oscillator assembly, and a synthesizer. The transmitter and antenna gain provide the required uplink power for M-22 support. This system will provide for limited support for space-Ground Link Subsystem (SGLS) signal reception. The DLT system design provides for future addition of tape recorders and upgrading to full SGLS capability.

An antenna support structure will be constructed in the building 100 courtyard. The courtyard is a little more than one-half acre and consists of a grassed area between the building’s sides. Building 100 facilities will be upgraded to accommodate the antennas.

The facilities modifications to building 100 include a revision to existing heating and ventilation systems. A paved access road will be provided between the existing frontage road and the support structure. The new construction in the courtyard will provide reinforced-concrete structures to support the DLT antenna and a new storage area enclosing the remainder of the courtyard. An asphalt-paved access ramp will be provided from the existing road to the support building. Other existing pavement along this path will be saw cut and blended with new pavement.

The sod areas disturbed by the construction will be reshaped, topsoil, and seeded. Measures will be employed to control siltation problems in waterways and drainage structures in surrounding areas.

During the operational phase, parameter values for the proposed 7-meter and 10-meter antennas are as follows:

	10 Meter	7 Meter
Power	130 W	75 W
Frequency	1.76-2.3/GH2	3.7-4.2, 5.9-6.4 GH2
Gain	41 dB	44.1 dB, 46.3 dB
Permissible Exposure Limit (PEL)	10 mW/cm square	10 mW/cm square

Radifrequency (RF) radiation hazard distance calculations performed using the parameter values listed above, yielded the following theoretical hazard distances:

10-meter antenna: 36 meters
7-meter antenna: 50 meters

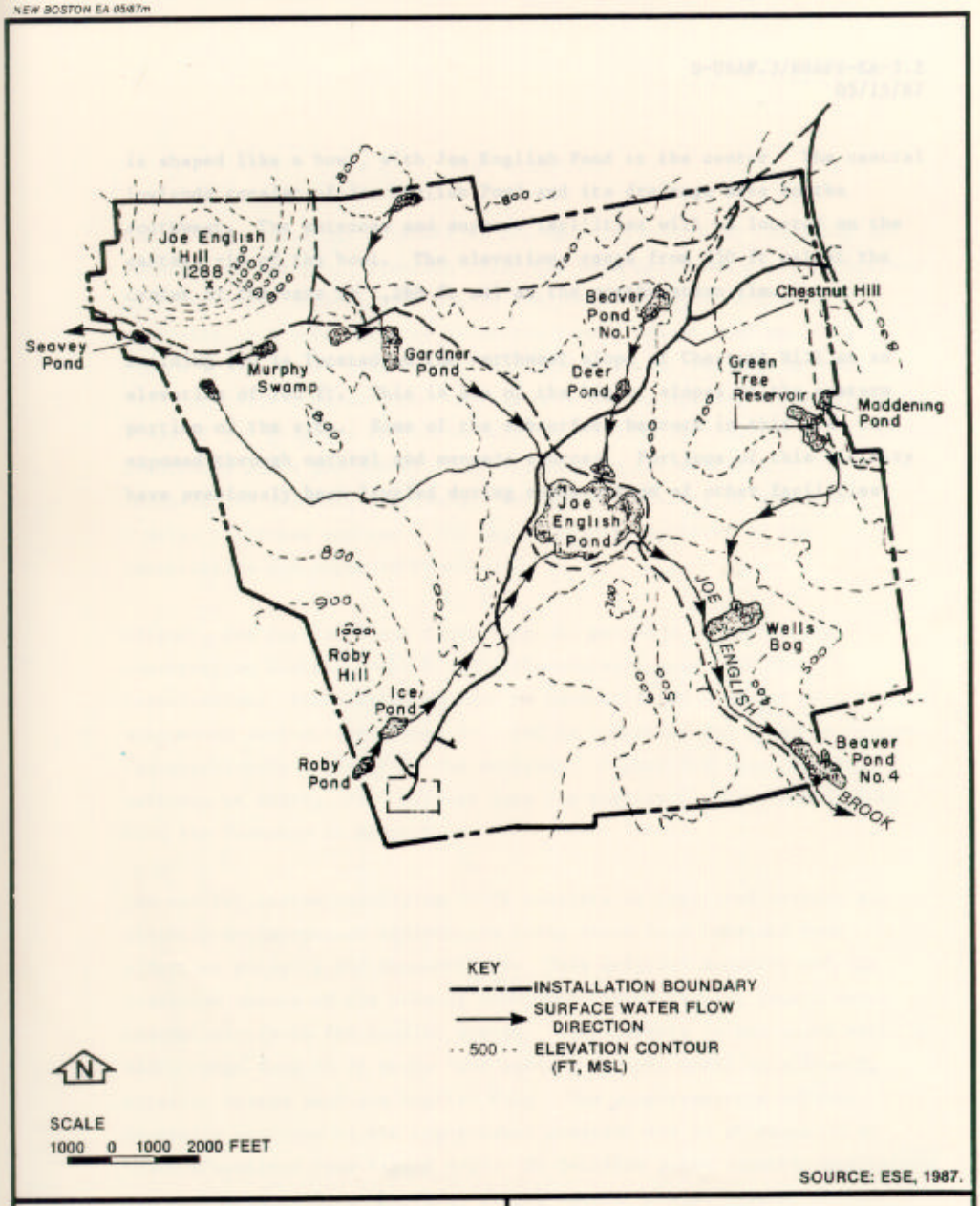
These values represent the respective distances from each antenna which the RF radiation PEL for personnel would be exceeded. The PEL is defined as that RF power density to which an individual may be continuously exposed, in the light of present medical knowledge, without detectable bodily injury. These hazard distance values are theoretical, and the actual values will be determined by a RF survey after the antennas become operational.

3.0 GEOLOGY

NBAFS is located on highly folded metasedimentary rocks, which are structurally related to the Meerimack Syncline. This syncline complex trends northeast and exhibits highly folded sections due to east-west oriented compressive forces. The installation is situated on the Lower Devonian Littleton Formation [U.S. Fish and Wildlife Service (FWS), 1980], which consist of slightly to moderately metamorphosed rock. A gray, micaceous quartzite is the predominant rock type, with lesser amounts of gray, coarse mica schist. The Littleton Formation extends more than 5,000 ft below mean sea level (msl) in the vicinity of NBAFS (FWS, 1980). The formation is bounded by Upper Devonian gray gneiss to the northeast. Bedrock underlying NBAFS is highly fractured in the upper sections due to structural compression and folding.

A thin veneer of Pleistocene and recent glacial alluvium consisting of boulders, gravel, sand, and silt covers most areas on the installation. Alluvium is generally thickest in the low-lying areas and valley bottoms. Soil borings taken for building construction (Dept. of the Air Force, 1980b) indicated a maximum thickness of about 8 ft of alluvium in Areas A and B. In some poorly drained areas, several feet of fibrous mucks and peat’s have accumulated on top of the alluvial deposits. In many cases, these bog areas represent former small lakes in which decomposing organic material has accumulated.

Terrain at NBAFS is hilly and mountainous. Many peaks within the vicinity of NBAFS exceed 1,200-ft msl (see ig. 3-1). Three main physiographic structures dominate the installation: Chestnut Hill (700 ft msl) on the northeastern section of the base, Roby Hill (1,000 ft msl) in the southwestern section and Joe English Hill (1,288 ft msl) in the northwestern part of the installation. The NBAFS



SOURCE: ESE, 1987.

Figure 3-1
MAJOR TOPOGRAPHIC AND SURFACE WATER DRAINAGE FEATURES

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is shaped like a bowl, with Joe English Pond at the center. The central lowlands consist of Joe English Pond and its drainage area to the southwest. The antennas and support facilities will be located on the eastern rim of the bowl. The elevations range from 350-ft msl at the center of the base to 1,288-ft msl at the northwestern rim.

Building 100 is located on the northwest slope of Chestnut Hill at the elevation of 700 ft. This one of the higher slopes on the eastern portion of the site. Some of the subsurface bedrock in this area is exposed through natural and manmade sources. Portions of this vicinity have previously been leveled during construction of other facilities.

4.0 HYDROLOGY

The surface hydrology of NBAFS is strongly influenced by the hilly and mountainous terrain. Chestnut Hill, the main developed area, is drained by a series of intermittent creeks and lowlands. This drainage is generally in a northwesterly direction toward Beaver Pond No. 1 (see Figure 3-1). Water from Beaver Pond drains toward Joe English Pond. This centrally located pond receives most of the drainage from upland areas of the property and ultimately drains into Joe English Brook, which eventually exits the installation boundary to the southeast. The installation contains many swamps and ponds (totaling 98 acres) and 7 miles of stern courses. The major drainage features of the installation are shown in figure 3-1.

Offpost, Joe English Brook flows into the wetlands of the Amherst Conservation District, which abuts the southern border of the installation. Storm water on base is controlled by a series of stormwater drains (see Figure 4-1) and is collected and diverted toward topographically lower areas and wetlands. Figure 3-1 shows drainage patterns on NBAFS. Flow offpost into Joe English Creek is coordinated with the Township of Amherst.

The aquifer system underlying NBAFS consist of fractured bedrock and slightly metamorphosed sedimentary rocks, which have retained some effective porosity and permeability. This original porosity and the fractured nature of the bedrock provide a high degree of ground water transmissivity in the aquifer system. Water levels in the cased wells at NBAFS range from 73 ft below land surface (NBAFS, 1985) to a flowing artesian system near Joe English Pond. The potentiometric surface generally conforms to the topographic gradient and is artesian in at lower elevations (see figure 4-2). No detailed potentiometric map exists for the installation. Recharge to the aquifer occurs through direct infiltration of perception through fractures and joints in the

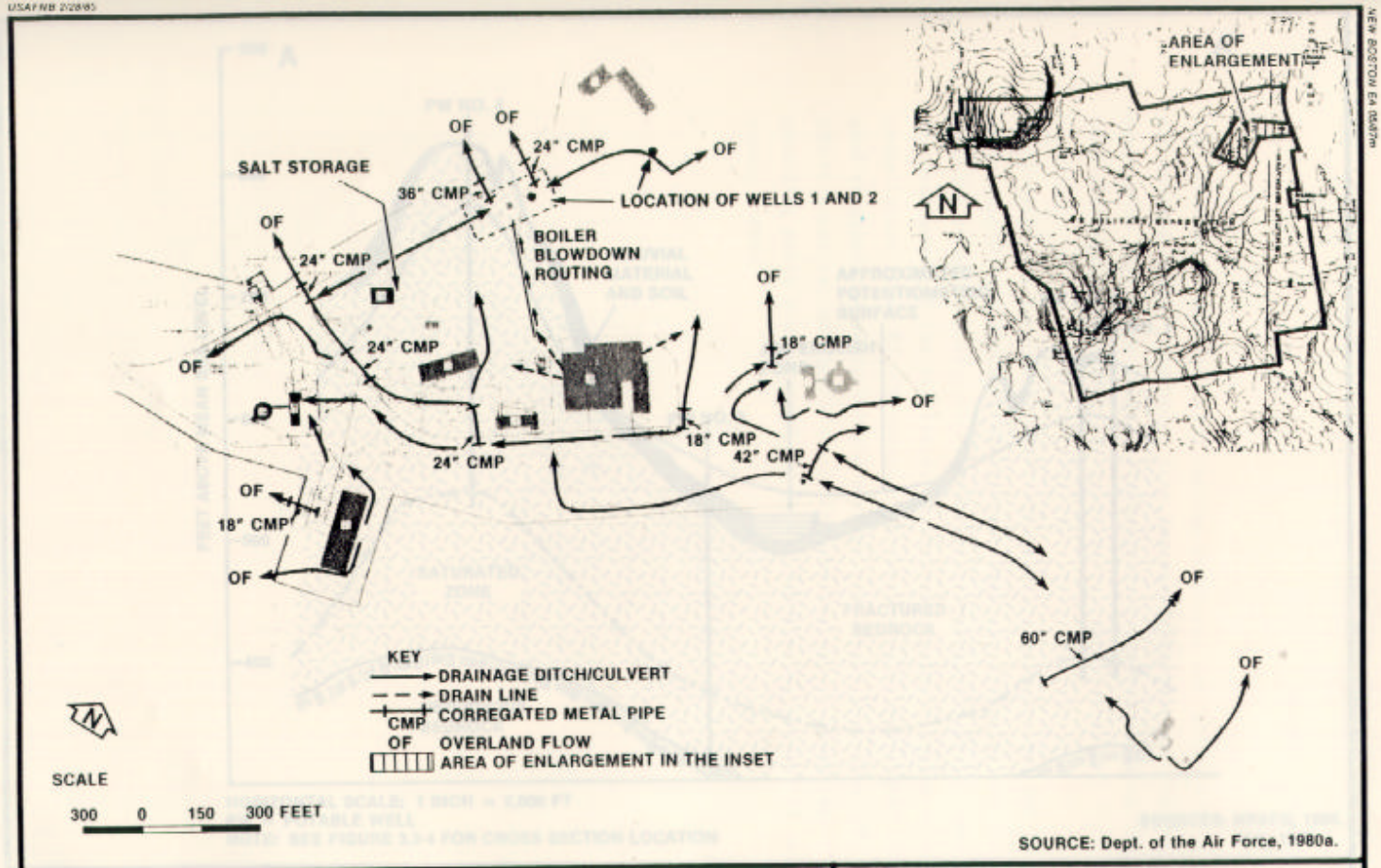

Figure 4-1
STORMWATER DRAINAGE ON THE MAIN CANTONMENT AREA OF NBAFS

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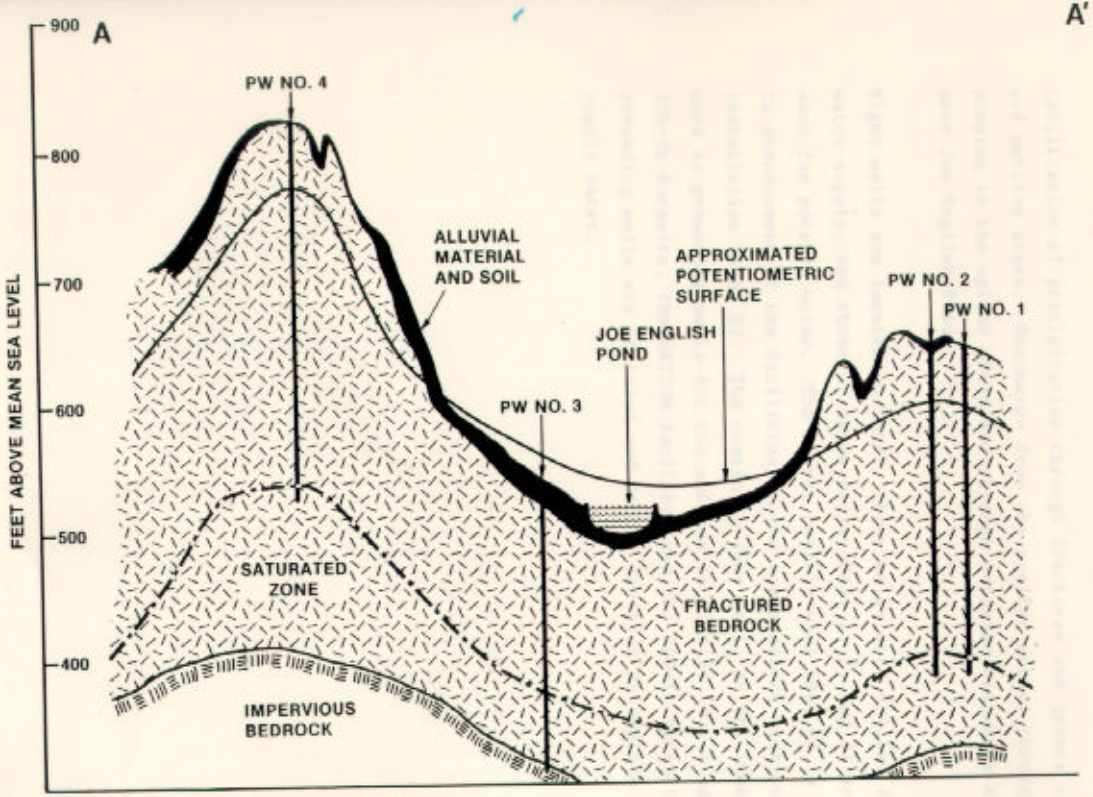

HORIZONTAL SCALE: 1 INCH = 2,000 FT
PW = POTABLE WELL
NOTE: SEE FIGURE 3.3-4 FOR CROSS SECTION LOCATION

SOURCES: NBAFS, 1985.
ESE, 1987.

Figure 4-2
GENERALIZED HYDROGEOLOGIC CROSS SECTION

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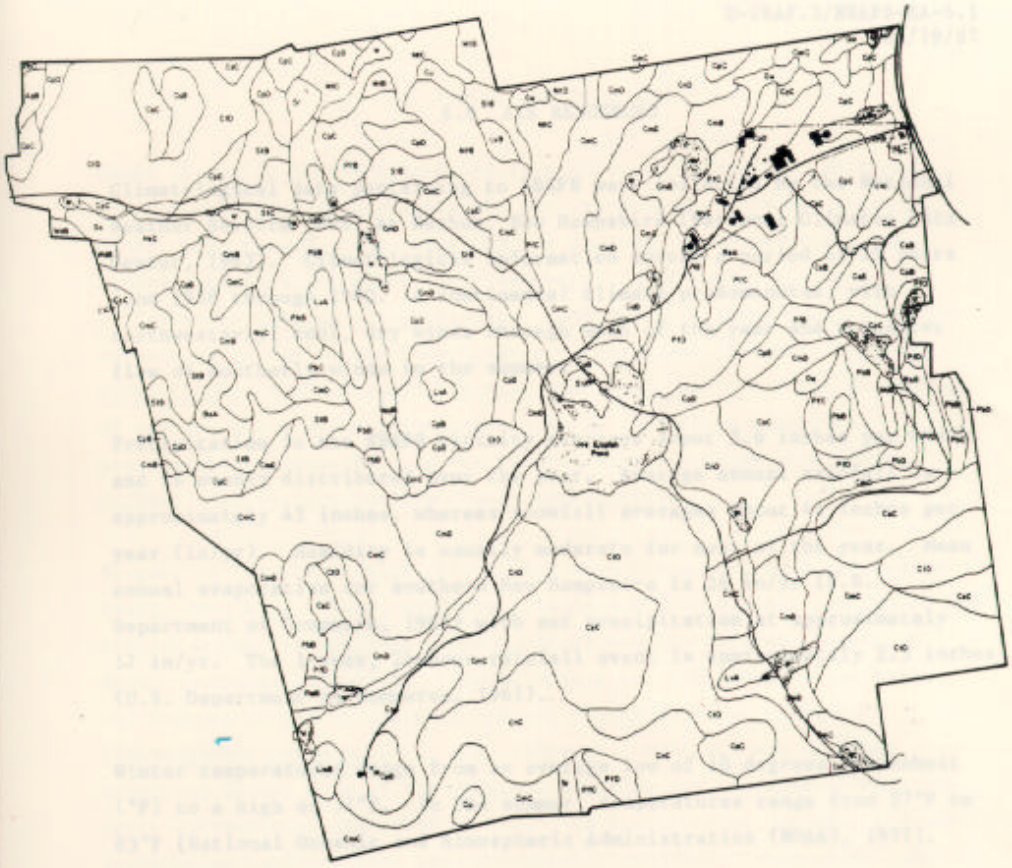
upland and outcrop areas. Discharge from the aquifer occurs through well pumping in the upland areas and through artesian discharge at Well No.3 near Joe English Pond.

Eight wells are located on NBAFS. Four Wells are drilled for potable water supply, and three of these wells (Nos. 1,2, and 3) are currently used for potable water. The fourth potable well (N0. 40 is inactive due to abandonment of the facilities in the southwestern section of the installation (Area E). The remaining four wells on the installation are used as grounding wells for the antenna facilities (Building 100, the 200-ft boresite, the SATCOM facility, and the 400-ft boresite). The grounding wells are enclosed and do not function as sources of potable or supply water.

5.0 SOIL

Figure 5-1 shows the U.S Soil Conservation Service (SCS) soil types which occur on NBAFS (SCS, 1984). Four soil types which are found near Building 100 include the Chatfield-Holli-Canton complex, the Chatfield-hollis-Rock outcrop complex, Poxton stony fine sandy loam, and Redgebury stony loam (NBAFS, 1984a). The soil profile overlying bedrock on NBAFS consists of loam matrix is approximately 8 ft at maximum thickness. Slopes of soil range from 0 to 25 percent. Slopes of soils in the proposed construction area are nearly level with about 1 to 2 ft of unconsolidated sediments over bedrock. Soils in the construction area are well drained.



MAP SYMBOL	SOIL NAME
Bo	Borohemists, nearly level
Ca	Canton fine sandy loan
Cm	Canton stony fine sandy loan
Cn	Canton very stony fine sandy loam
Cp	Chatfield-Hollis-Canton complex
Cs	Chatfield-Hollis complex
Ct	Chatfield-Hollis-Rock outcrop complex
Cu	Chocorua mucky peat
Cw	Greenwood mucky peat
Hs	Hinckley loamy sand
Lv	Leicester-Walpole complex stony
Mt	Montauk stony fine sandy loam
Pb	Paxton fine sandy loam
Pf	Paxton stony fine sandy loam
Pl	Pipestone loamy sand
Re	Ridgebury stony loan
So	Scarboro mucky loamy sand
Sr	Scarboro stony mucky loamy sand
St	Scituate stony fine sandy loam
Wo	Woodbridge loam
Wv	Woodbridge stony loam

N

SCALE
1000 0 1000 2000 FEET

NOTE: Third letter in Map Symbol denotes percentage of slope.

A - 0 to 3 percent slopes
B - 3 to 8 percent slopes
C - 8 to 15 percent slopes
D - 15 to 25 percent slopes
E - 25 to 35 percent slopes

SOURCES: NBAFS, 1984a; ESE, 1987.

Figure 5-1
SURFICIAL SOIL TYPES

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6.0 AIR RESOURCES

The National Weather Service (NWS) collected climatological data pertaining to NBAFS at Nashua, New Hampshire (National climatic Data Center, 1983). Climatological information covers a period of 29 years from 1958-1980. A continental climate predominates, with northwesterly, cool, dry winds through much of the year and a greater flow of southerly winds in the summer.

Precipitation in the NBAFS vicinity averages about 3.6 inches per month and is evenly disturbed over the year. Average annual rainfall is approximately 43 inches, whereas snowfall averages about 41 inches per year (in/yr.). Humidity is usually moderate for most of the year. Mean annual evaporation for southern New Hampshire is 26 in/yr. (U.S. Department of Commerce, 1968) with net precipitation at approximately 17 in/yr. The 1-year, 24-hour rainfall event is approximately 2.5 inches (U.S. Department of Commerce, 1961).

Winter temperatures range from an average low of 10 degrees Fahrenheit (F) to a high of 31-degree F. In the summer, temperatures range from 57 degree F to 83 degree F [National Oceanic and Atmospheric Administration (NOAA), 1977].

7.0 BIOLOGICAL COMMUNITIES

NBAFS is set in Northern Hardwood-Spruce Forest Ecoregion. Hardwood forests which occupy approximately one-third of the forested area on NBAFS. Red oak (Quercus rubra) is the dominant broadleaf tree, but others include sugar maple (Acer saccharm), red maple (A. rubrum), yellow birch (Betula alleghaniensis), and others. These forested lands support white-tailed deer (Odocoileus virginianus), bobwhite (Colinus virginianus), ruffled grouse (Bonasa umbellus), and a diverse assemblage of migratory and permanent nongame species. Coniferous forests predominate the remainder of the area and include white pine (Pinus strobus) and eastern hemlock (Tsuga canadensis).

Because of greatly sloping relief, drainage basins are well defined on NBAFS. For this reason, wetlands account for only a small portion of the station. The few wetlands present are seasonally flowing streams, swamps, marshes, and ponds. Wooded swamps are dominated by red maple, (Cephalanthus occidentalis), and cranberry. Habitats and wildlife occurring in the area of the proposed activity are representative of an early successsional disturbed system. The courtyard of building 100 and surrounding habitats have been extensively modified. Vegetation consists of native grass, weeds, and other species, which typically invade disturbed habitats. Wildlife occurring in such habitats also is species, which normally inhabit disturbed habitats.

Several ponds and one stream on NBAFS are managed for recreational fishing. Management is based on a comprehensive plan developed in a cooperative effort by the U.S. Air Force (USAF), FWS, and New Hampshire Fish and game Department. Game fish found to be present in NBAFS waters include the following species (FWS, 1980):

Brook trout	Salvelinus fontinalis
Rainbow trout	Salmo gairdneri
Largemouth bass	Micropterus salmoides
White Sucker	Catostum commersoni
Yellow perch	Perca flavescens
Chainpickerel	Esox niger
Browm bullhead	Ictalurus nebulosus
Pumpkinseed	Lepomis gibbosus
Creek chubsucker	Erimyzon oblongus
Golden shiner	Notemigonus crysoleucas
Stonecat	Noturus insignis
American eel	Anguilla rostrata

Several state-protected and federally protected species are expected or known to occur within the NBAFS boundaries. These include:

Bald eagle	Haliaeetus leucocephalus	Observed No nesting
Indiana bat	Myotis sodalis	Observed
Common loon	Gavis immer	Observed
Cooper’s hawk	Accipiter cooperii	Observed
Marsh hawk	Circus cyaneus hudsonius	Observed
Red-shouldered hawk	Buteo lineatus	Observed
Osprey	Pandion haliaetus caroliensis	Observed
Upland plover	Bartramia longicauda	Observed
Whippoorwill	Camprimulugus vociferus	Observed
Purple Martin	Pronge subis subis	Observed
Eastern bluebird	Sialia sialis	Observed
Pine marten	Martes americana	Observed
New England cottontail rabbit	Sylvilagus transitionalis	Observed

The extent to which these species occur on NBAFS is not known; however, none of these species would be expected to utilize areas proposed for the antenna installation.

8.0 ENVIRONMENTAL IMPACTS

Because of the nature and the small size of the proposed modifications, the environmental consequences of the proposed action are considered minimal. Land surface area to be modified is approximately 0.55 acres and consists entirely of disturbed habitats. Surface w3ater runoff and erosion will be controlled by appropriate preventive measures. Existing facilities in Building 100 will be used for operation and use of the antenna. Certain modifications, including increased heating and air conditioning, will be made to building 100; however, the environmental consequences of these actions are negligible. Once the operational phase is initiated, the area should return to its former characteristics. Disturbed areas will be contoured and grassed for soil stabilization. Effects on native wildlife and endangered and threatened species occurring in the area will be minimal and will be restricted to moderate disturbance to ubiquitous species types such as sparrows and pigeons. Endangered and threatened species will not be impacted. Affects on aquatic resources also will be minimal.

As a result of the geohydrological environment and soil characteristic, conditions on NBAFS are conductive to migration of contaminants if introduced in the environment. Use of such contaminants during construction phase of the antenna installation will be minimal; however, those materials that are hazardous will be controlled and disposed in an appropriate manner.

A number of productive biological communities, including aquatic and terrestrial systems, are present on the installation but not in the vicinity of Building 100. These communities should not be affected by the proposed action because of the small size of the habitat modification and the location of the disturbance in the developed portion of the installation.

During the operational phase, determining hazard distance will control potential impacts to human populations from RF radiation. Impacts to wildlife will not occur because of the non-use of these areas by native wildlife species.

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