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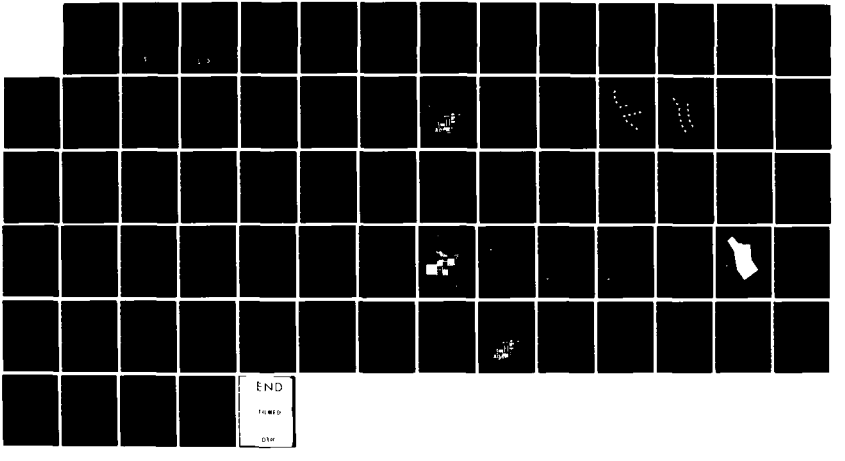

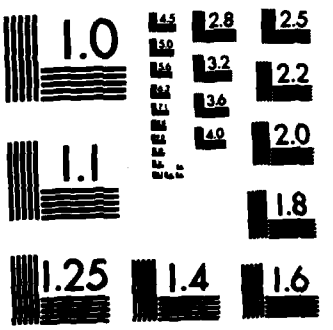

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Final
Report No. 1
June 1984

An Archeological Overview and Management Plan for the U.S. Army Natick Research and Development Laboratories

Under Contract CX4000-3-0018
with the

National Park Service
U.S. Department of the Interior
Philadelphia, Pennsylvania 19106

for the
U.S. Army Material Development and
Readiness Command

by

Envirosphere Company
2 World Trade Center
New York, New York 10048

Prepared under the Supervision of

Joel I. Klein, Principal Investigator

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16. Abstract (Limit: 200 words)

This archeological overview and management plan provides a tool which can be used by DARCOM and decision-makers at the U.S. Army Natick Research and Development Laboratories (NLABS) to assist in complying with existing regulations and procedures relating to historic preservation (Technical Manual 5-801-1, Technical Note No. 78-17, Resources Management; 32 CFR 650.18-650.193; Army Regulation 420-XX; Army Regulation 200-1; Army Regulation 200-2; 36 CFR 800). This document summarizes data relating to the area's environmental history; cultural chronology; historic and modern ground disturbances; previous archeological surveys; presently identified archeological resources; known artifact, ecofact, and documentary collections relating to archeological resources; potentially identifiable but not presently recorded archeological resources; significant archeological resources; ongoing and planned activities that could effect archeological resources; locational data of known archeological resources; and locational data of potential archeological resources. No significant archeological remains are known to exist on NLABS property. However, portions of previously undisturbed areas at the main installation and at the Sudbury Housing Area may contain such remains. Prioritized archeological surveys of these areas have been recommended.

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MANAGEMENT SUMMARY

This archeological overview and management plan provides a tool which can be used by DARCOM and decision-makers at the U.S. Army Natick Research and Development Laboratories (NLABS) to assist in complying with existing regulations and procedures relating to historic preservation (Technical Manual 5-801-1, Technical Note No. 78-17, Resources Management; 32 CFR 650.18-650.193; Army Regulation 420-40; Army Regulation 200-1; Army Regulation 200-2; 36 CFR 800). This document summarizes data relating to the area's environmental history; cultural chronology; historic and modern ground disturbances; previous archeological surveys; presently identified archeological resources; known artifact, ecofact, and/or documentary collections relating to archeological resources; potentially identifiable but not presently recorded archeological resources; significant archeological resources; ongoing and planned activities that could effect archeological resources; locational data of known archeological resources; and locational data of potential archeological resources. No significant archeological remains are known to exist on NLABS property. However, portions of previously undisturbed areas at the main installation and at the Sudbury Housing Area may contain such remains. The following prioritized archeological resource management tasks have been recommended: conduct an archeological survey of recreation areas; consider alternatives to stockpiling snow in lakefront areas; advise employees of DARCOM's historic preservation responsibilities; conduct an archeological survey of other undisturbed portions of NLABS and conduct an archeological survey of selected portions of the Sudbury Housing Area.

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PREPARERS AND QUALIFICATIONS

Joel I. Klein is Project Manager for the DARCOM project and is the principal author of this Archeological Overview and Management Plan. He holds a B.S. in Anthropology and Physics and M.A. and Ph.D. degrees in Anthropology, and is certified by the Society of Professional Archeologists in field research and cultural resource management. His 15 years of professional experience have been in anthropological and archeological research and cultural resource management. He has participated in archeological investigations across the United States. He is presently a Principal Engineer with Envirosphere Company.

Elise M. Brenner is a contributing author. For the DARCOM project Dr. Brenner was directly responsible for the collection of all baseline data and the preparation of the regional culture history for the U.S. Army Natick Research and Development Laboratories. Dr. Brenner received her M.S. and Ph.D. degrees in Anthropology from the University of Massachusetts - Amherst. Her doctoral dissertation was based on the archeology and ethnohistory of the Natick, Massachusetts area. She has served as a supervisor on other archeological projects in Massachusetts including one on Nantucket Island and one in Deerfield. Both of these involved preparation of archeological overviews.

Sydne B. Marshall is a contributing author. For the DARCOM project she functioned as Assistant Technical Manager, responsible for the day-to-day operation of the project. She holds B.A., M.A., M. Phil. and Ph.D. degrees in Anthropology. Over the past 12 years, Dr. Marshall has participated in the excavation, analysis, management, and reporting of many large and small archeological projects in northeastern North America. She is currently a Senior Engineer with Envirosphere Company.

ACKNOWLEDGEMENTS

This archeological overview and management plan could not have been written without the cooperation of Henry Weisgold, Director of Services and Facilities, and Diane McGrath, NLABS Real Property Officer. Both gave generously of their time during several visits to NLABS and provided essential data relating to the history of the installation's development.

Brona Simon, Preservation Planner, Massachusetts Historical Commission, was very helpful during the data-gathering phases of this project.

Stephanie Rodeffer, Yvonne Stewart, and Lea Baker, National Park Service, provided appreciated guidance throughout the course of this project.

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1.1 PURPOSE AND NEED

This archeological overview and management plan will assist the U.S. Army Materiel Development and Readiness Command (DARCOM) in its efforts to comply with laws and regulations concerning the management of archeological resources at the U.S. Army Natick Research and Development Laboratories.

The National Historic Preservation Act of 1966 as amended (94 Stat. 2988) affirmed the policy of the federal government (Sec. 2(3)) to "administer federally owned, administered or controlled prehistoric and historic resources in a spirit of stewardship for the inspiration and benefit of present and future generations." Section 110(a)(1) of that code specifies that each federal agency is responsible for the preservation of such resources on agency-owned or controlled lands. DARCOM is committed to the implementation of that policy, following the guidelines for historic resource management set forth in the 1966 Act and related laws, regulations, and technical guidance.

DARCOM has contracted with the U.S. Department of the Interior's National Park Service to provide technical guidance for the development of DARCOM installation cultural resource overviews and management plans. The program is entitled the DARCOM Historical/Archeological Survey (DHAS). The National Park Service has in turn separated this review and planning program into two major elements, architectural and archeological. The architectural review and planning function is being directed by the Service's Historic American Buildings Survey (HABS), while the archeological resource assessment and planning function is being handled through the Service's Interagency Resources Management Division (IRMD). The archeological function includes both prehistoric and historical archeology.

Under the requirements of the National Historic Preservation Act (NHPA) of 1966 as amended (80 Stat. 915, 94 Stat. 2987; 16 USC 470), DARCOM must:

- inventory, evaluate, and where appropriate nominate to the National Register of Historic Places all archeological properties under agency ownership or control (Sec. 110(a)(2))

- prior to the approval of any ground-disturbing undertaking, take into account the project's effect on any National Register - listed or eligible property; afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the proposed project (Sec. 106)

- complete an appropriate data recovery program on an eligible or listed National Register archeological site prior to its being heavily damaged or destroyed (Sec. 110(b), as reported by the House Committee on Interior and Insular Affairs [96th Congress, 2d Session, House Report No. 96-1457, p. 36-37])

Since the passage of the National Historic Preservation Act Amendments of 1980, DARCOM has begun a more active commmandwide program in historic resource management. DARCOM's management program involves several steps. The first step is a literature review and preliminary evaluation of known cultural resources on DARCOM facilities. This provides a basis for prediction of the overall resource base requiring management. The second step involves applying the understood parameters of the resource base in a plan which takes into consideration both short- and long-term command activities and goals.

Other compliance regulations taken into consideration by this archeological overview and management plan include:

o The Archeological and Historic Preservation Act of 1974 (88 Stat. 174, 16 USC 469), which requires that notice of an agency project that will destroy a significant archeological site be provided to the Secretary of the Interior; either the Secretary or the notifying agency may support survey or data recovery programs to preserve the resource's information values.

o The Archeological Resources Protection Act of 1979 (93 Stat. 721, 16 USC 470aa; this supersedes the Antiquities Act of 1906 [93 Stat. 225, 16 USC 431-43]), with provisions that effectively mean that

  - The Secretary of the Army may issue excavation permits for archeological resources on DARCOM lands (Sec. 4)

  - Anyone damaging an archeological resource on DARCOM lands may incur criminal (Sec. 6) or civil penalties (Sec. 7)

o 36 CFR 800, "Protection of Historic and Cultural Properties" (44 FR 6068, as amended in May 1982); these regulations from the Advisory Council on Historic Preservation set forth procedures for compliance with Section 106 of the National Historic Preservation Act

o Regulations from the Department of the Interior setting forth procedures for determining site eligibility for the National Register of Historic Places (36 CFR 60, 36 CFR 63), standards for data recovery (proposed 36 CFR 66), procedures implementing

the Archeological Resources Protection Act (43 CFR 7) and the Secretary of the Interior's Standards for Archeology and Historic Preservation.

- o Guidance from the U.S. Department of the Army as to procedures and standards for the preservation of historic properties (32 CFR 650.181-650.193; Technical Manual 5-801-1; Technical Note 78-17; Army Regulation 420-40; Army Regulation 200-1; Army Regulation 200-2).

The formulation of archeological plans for DARCOM installations is part of a developing national acceptance of the historic Resource Protection Planning Process (RP3) (HCRS 1980). RP3 presents an outline for the development of preservation plans, which, in turn, provide an analytical structure for preservation decision-making. This archeological overview and management plan has been prepared with those guidelines in mind.

This report is based upon data made available by installation representatives as of June 1983.

1.2 THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES

The U.S. Army Natick Research and Development Laboratories (NLABS) are situated on the shore of Lake Cochituate, within the town of Natick, Massachusetts (Figure 1-1a). In addition to the main installation, four housing areas are under the jurisdiction of NLABS. These are located in Natick (immediately adjacent to the main installation), Hudson (Sudbury Housing (Figure 1-1b), Wayland (Figure 1-1c) and Needham (Figure 1-1d) Townships. The main installation including the adjacent housing area covers a total of 78 a. The Sudbury Housing area covers 86 a.; Wayland Housing covers 6 a.; Needham Housing encompasses 4 a.

On 28 October 1949 the 81st Congress by Public Law 425 authorized the construction of a Quartermaster Research Laboratory at Natick. On 1 October 1953, the Quartermaster Research and Development Center was established as a Class II installation under the jurisdiction of the Quartermaster General. Effective 1 September 1980, by DARCOM Permanent Order No. 64-1 (dated 20 August 1980) NARADCOM became the U.S. Army Natick Research and Development Laboratories.

NLABS now includes the following operating laboratories: Aero-Mechanical Engineering, Individual Protection, Food Engineering, and Science and Advanced Technology. In addition, the NLABS has had responsibility for planning and executing the Department of Defense (DOD) Food Research, Development, Testing and Engineering Program; executing a Pollution Abatement Project, and undertaking specific projects, since July 1971.

NLABS and the Natick Housing Area contain a total of 60 structures, all constructed since 1952 (Figure 1-2a). Fifty-one of these are permanent buildings which include research and development, storage, utility substations, and housing structures. Three structures are

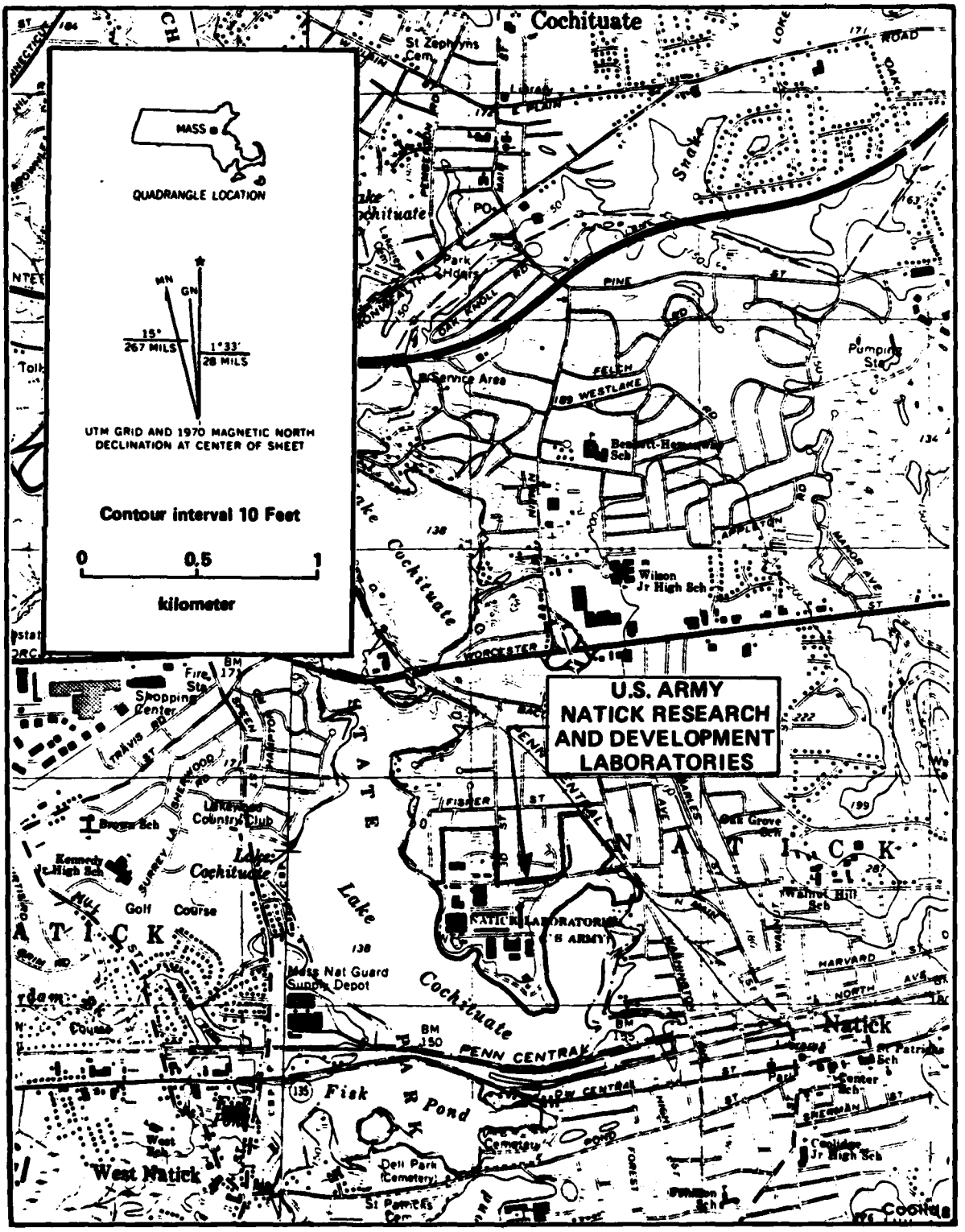

Figure 1-1a. MAP OF THE GENERAL VICINITY OF THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES

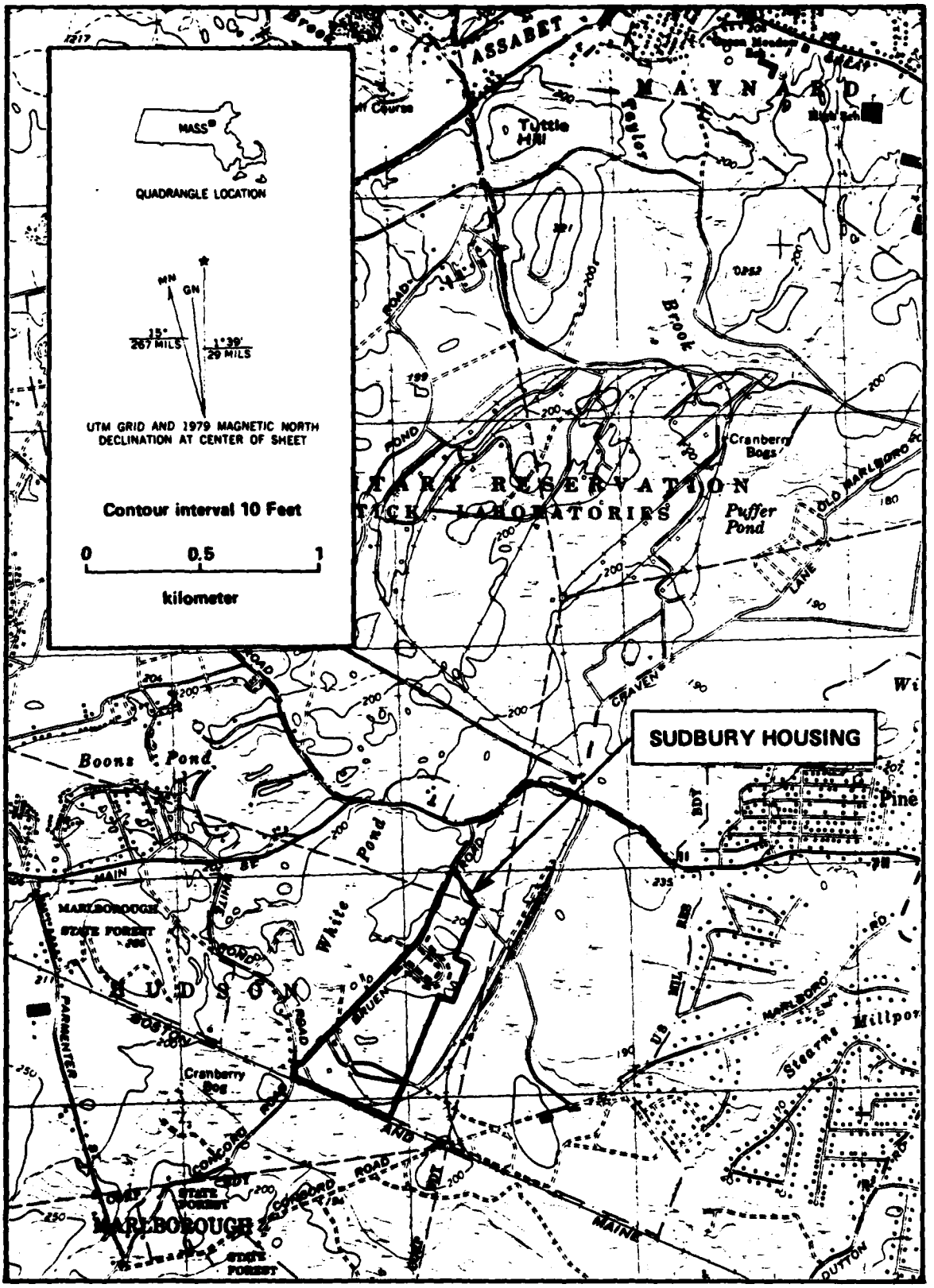

Figure 1-1b. MAP OF THE GENERAL VICINITY OF THE SUDBURY HOUSING AREA (U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES)

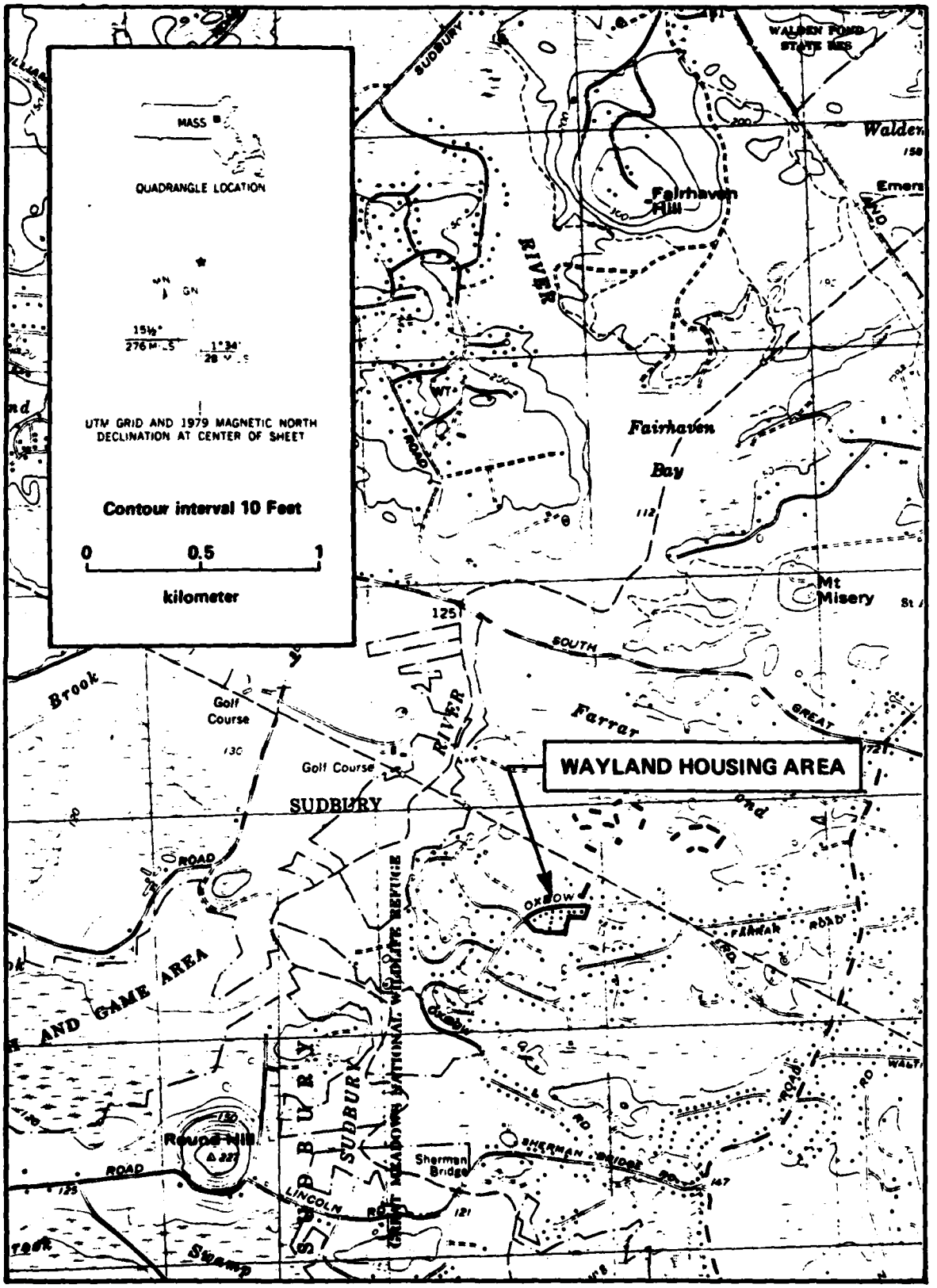

Figure 1-1c. MAP OF THE GENERAL VICINITY OF THE WAYLAND HOUSING AREA (U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES)

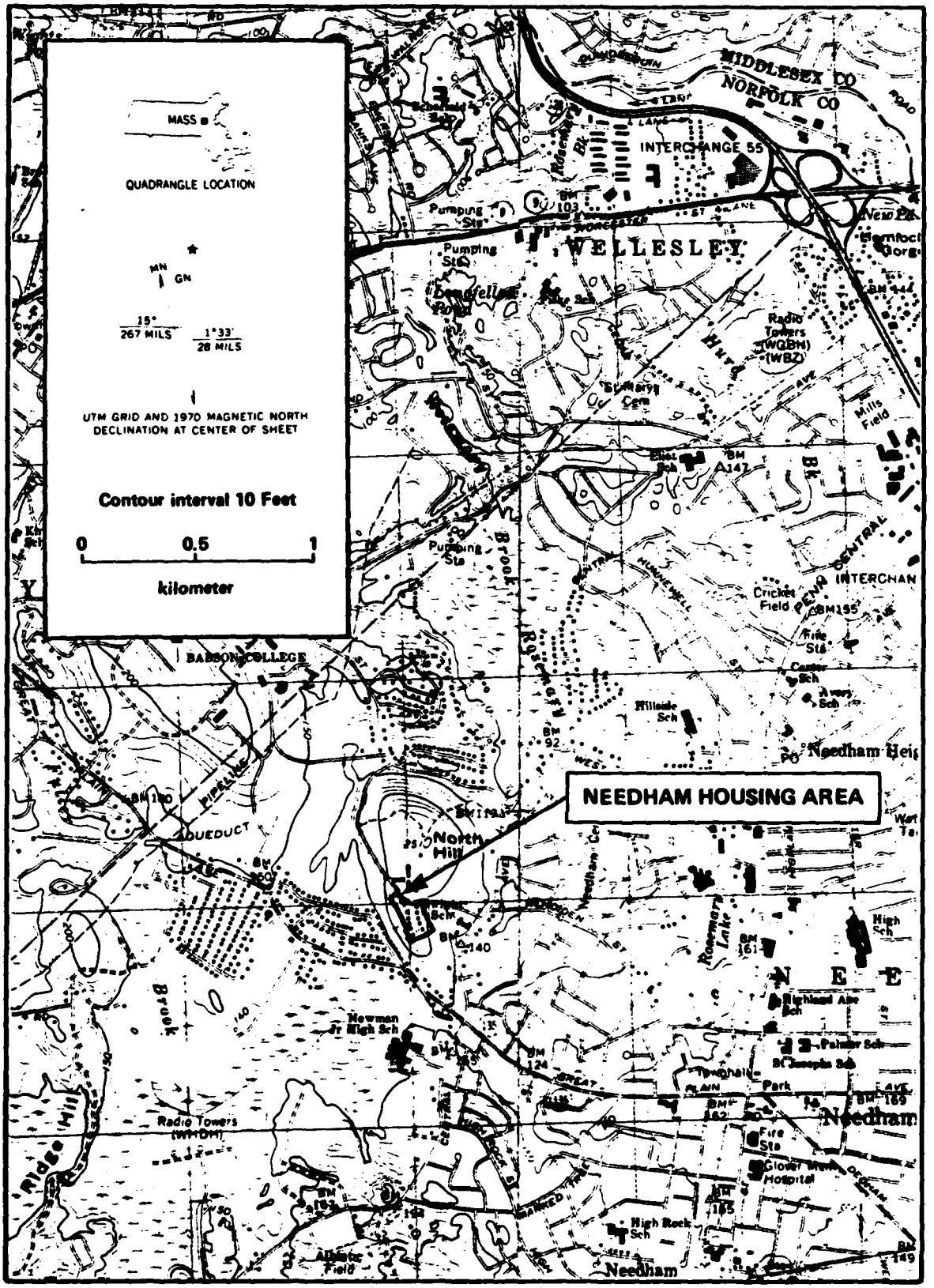

Figure 1-1d. MAP OF THE GENERAL VICINITY OF THE NEEDHAM HOUSING AREA (U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES)

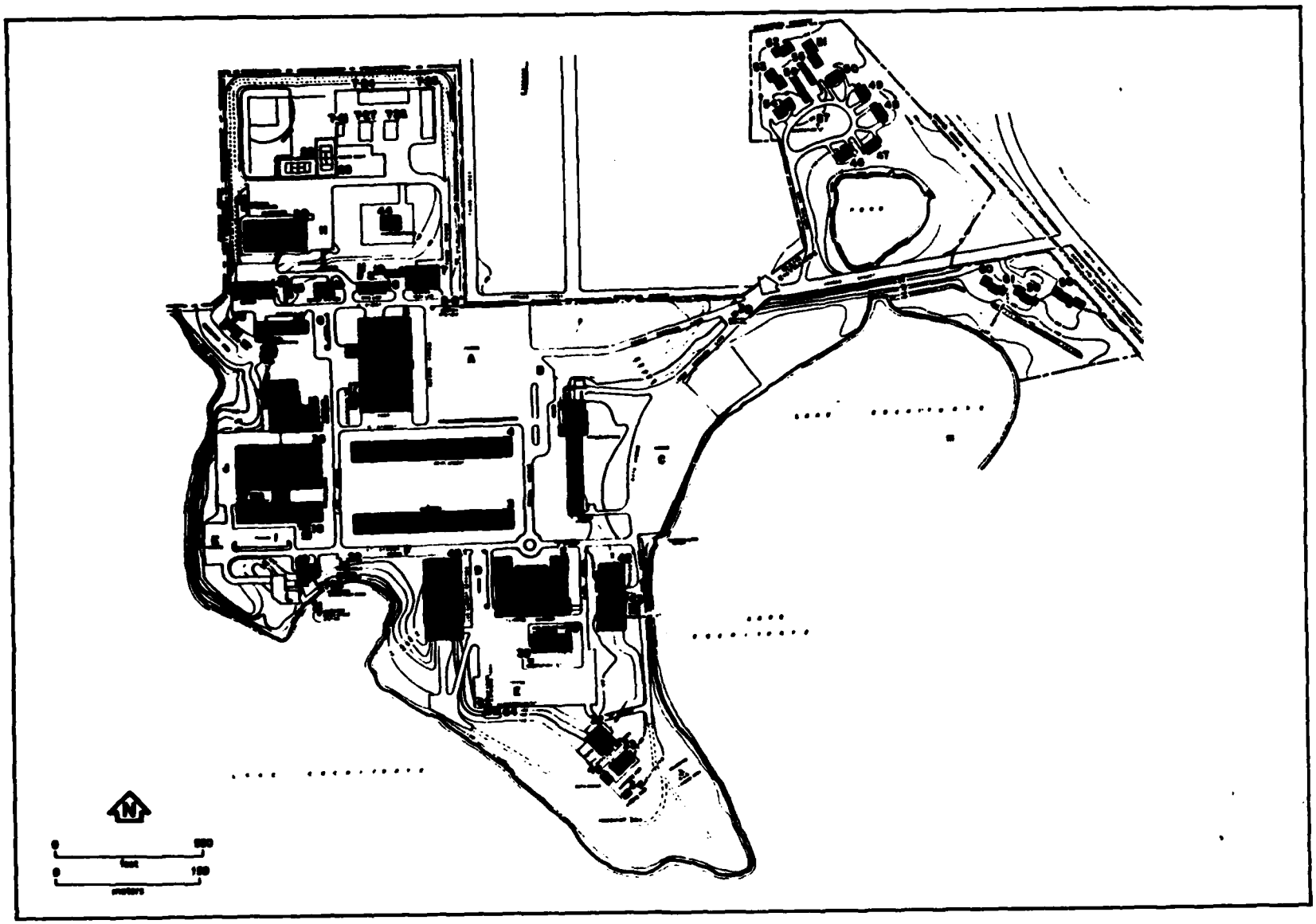

Figure 1-2a. MASTER BASE MAP OF THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES

semi-permanent and six are temporary. Much of the area surrounding these buildings has been paved for roadways and parking lots or landscaped. The facility is considered fully developed.

The Sudbury Housing Area is composed of 22 buildings: 19 permanent, 1 semi-permanent, and 2 temporary. These buildings include 17 residences for enlisted personnel, a research and development building and utility substations (Figure 1-2b). The Wayland Housing Area contains 12 residences for enlisted personnel (Figure 1-2c). The Needham Housing Area contains 12 residences for commissioned personnel (Figure 1-2d).

1.3 SUMMARY OF PREVIOUS ARCHEOLOGICAL WORK CONDUCTED ON THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES

For the purposes of this study, the region in which the NLABS and the housing areas under its jurisdiction are located is defined as that section of the Sudbury River Valley which passes through the towns of Natick, Framingham, Wayland, Sudbury, and southern Concord, Massachusetts. There are no known sites, and no previous archeological work has been conducted, on NLABS property. However the surrounding region does contain numerous archeological sites. This section of the report discusses previous archeological work conducted in the vicinity of NLABS, especially around Lake Cochituate.

Lake Cochituate has been the focus of a great deal of collecting by local residents. Artifact collecting by avocational archeologists has occurred at the following spots (Barbara Robinson, 1983, personal communication): 1) the Lake Cochituate Brook area at the outlet of Lake Cochituate; 2) the vicinity of Lake and Lakeview Roads in Framingham; 3) 7 a. directly across from the Lake and Lakeview Roads locale, on the Wayland side of Lake Cochituate; and at 4) the vicinity of the outlet of Lake Cochituate when the Massachusetts Turnpike was constructed. Prehistoric artifacts from these spots are in the Ben Smith Collection at the Concord Antiquarian Society, and in the possession of individual area residents, most notably Mr. Thomas Batey of Weston, Mrs. Longworth, and Mrs. Mansfield of Wayland.

Salvage excavation was conducted at the Mansion Inn Late Archaic burial site by members of the Massachusetts Archaeological Society in 1959 when construction activities exposed calcined bone, ash, and artifacts which had been broken and burnt (Dincauze 1968:12; Mansfield 1961). Thereafter, Frederick Johnson of the Peabody Foundation conducted salvage excavations at the disturbed cemetery (Dincauze 1968:12). The area is now a housing development and the Mansion Inn site is totally destroyed. Dincauze (1968) has done an analysis of the Mansion Inn data, employing archeological collections and field notes and inventory records of the excavators.

In 1959, Massachusetts Archaeological Society members conducted controlled excavations at the Washakamaug site (19MD383) (Carlson 1964). A stratified Early Archaic through Late Woodland occupation was discovered (Carlson 1964; Fowler 1968). Prehistoric activity most likely extended beyond the limits of the tested area, especially in an easterly

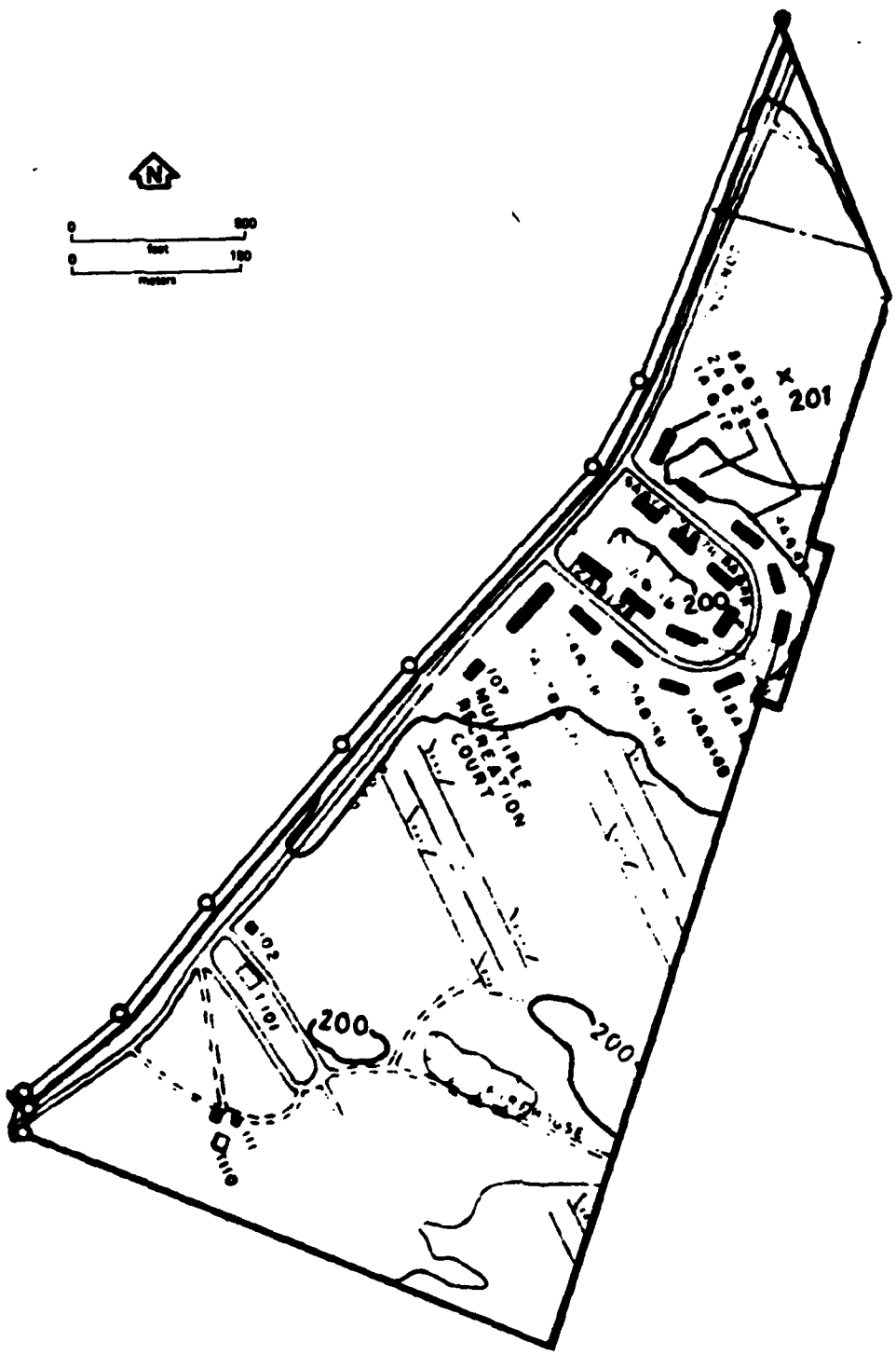

Figure 1-2b. MASTER BASE MAP OF THE SUDBURY HOUSING AREA (U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES)

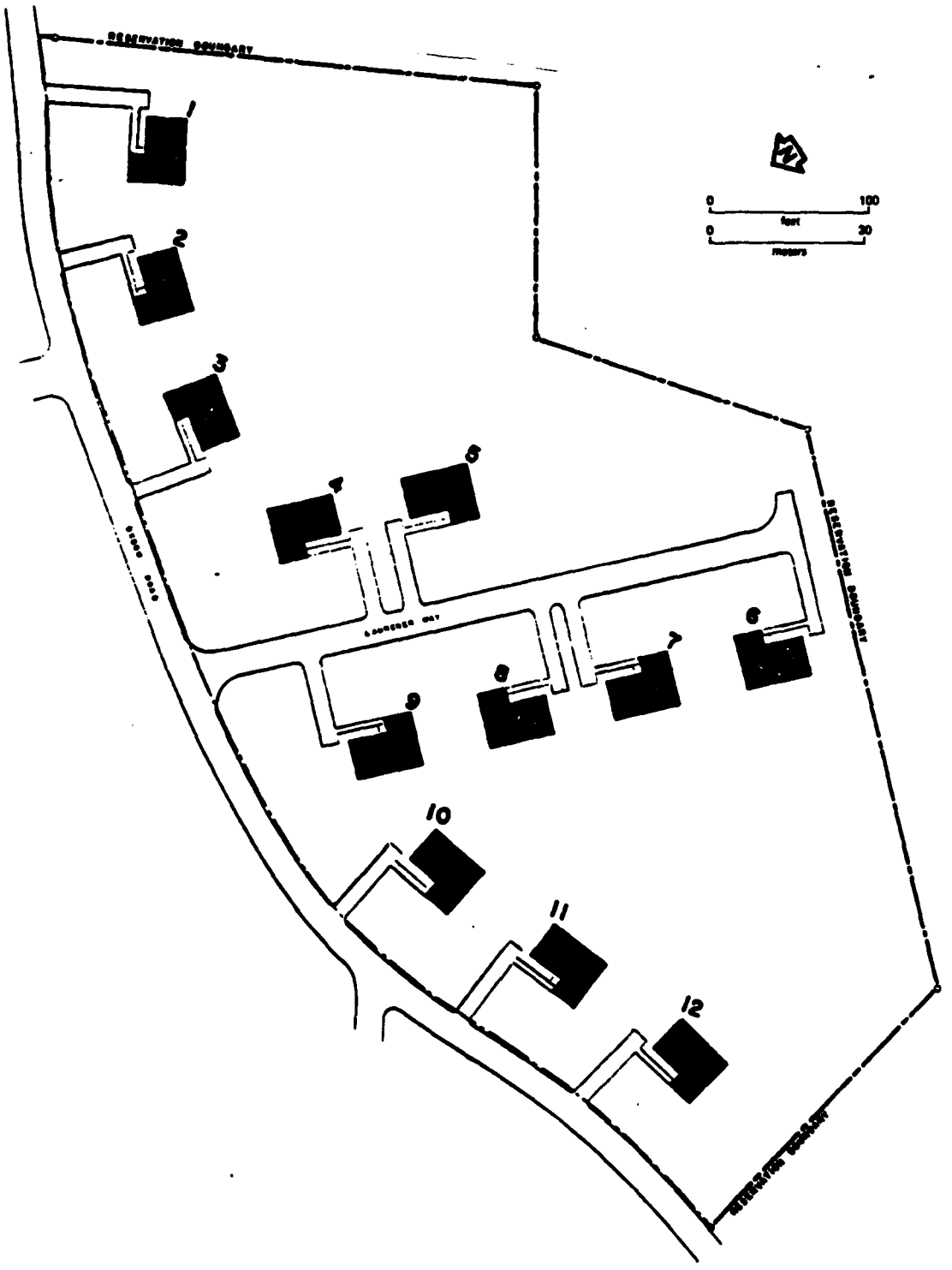

Figure 1-2c. MASTER BASE MAP OF THE WAYLAND HOUSING AREA (U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES)

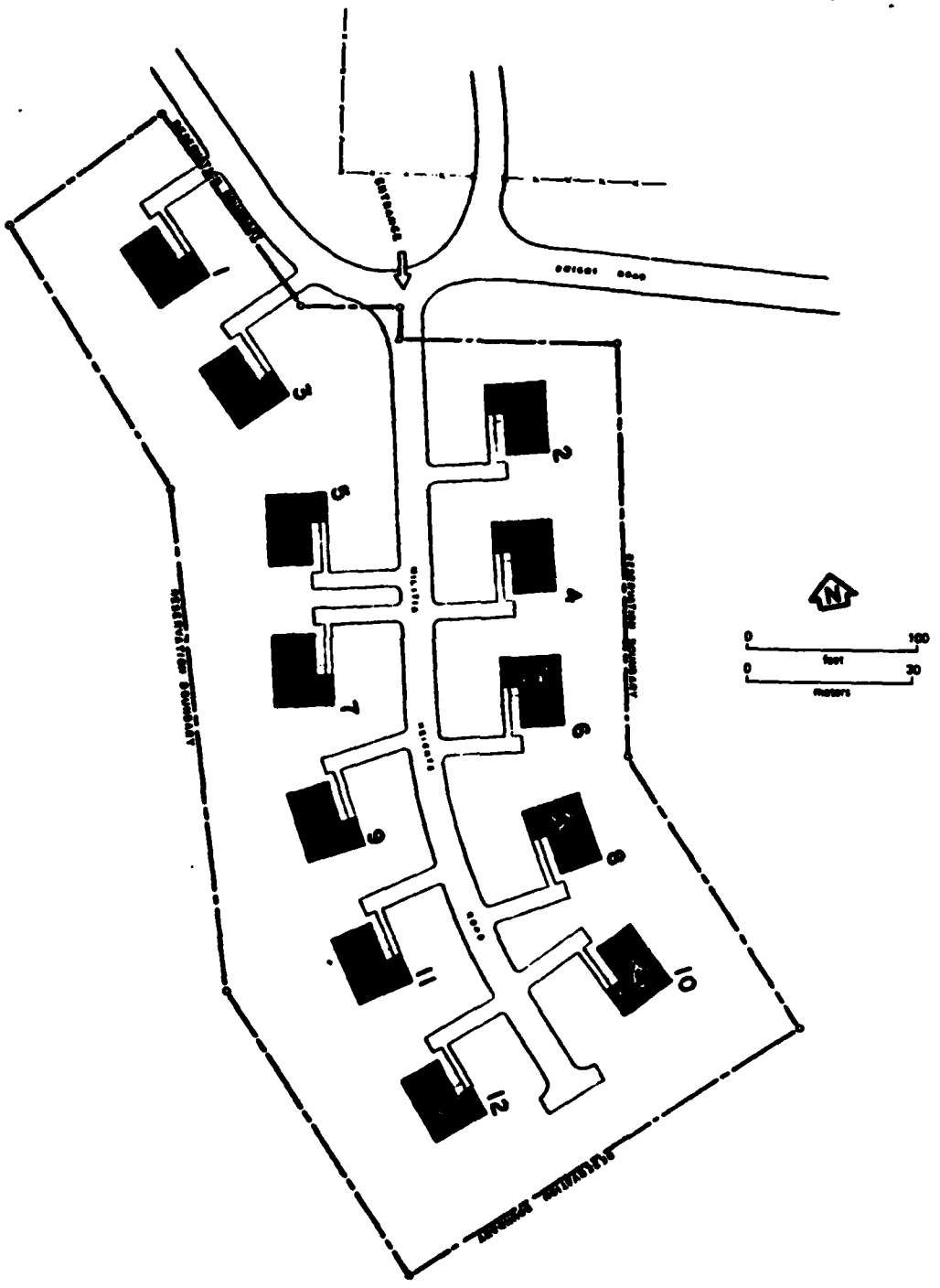

Figure 1-2d. MASTER BASE MAP OF THE NEEDHAM HOUSING AREA (U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES)

direction above Farm Pond, but this area was disturbed (Carlson 1964). In 1977, an archeological survey was conducted in the Farm Pond area in connection with proposed construction activities (Turchon 1977). A small campsite was discovered on and around the knoll. The artifacts recovered during the survey are in the possession of the Framingham Historical Society. The site is currently disturbed by development, although one small edge near Farm Pond may be relatively intact.

1.4 THE SOCIOCULTURAL CONTEXT OF THE ARCHEOLOGICAL RESOURCES ON THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES

The area surrounding the NLABS may be characterized as a rapidly developing suburb which has undergone rapid residential growth due to an abundance of developable land and its proximity to Boston. Between 1940 and 1950 Natick had the fastest growth rate of all Massachusetts towns with a population over 15,000. This rate of expansion continued through 1960. From 1950-1960, the population increased 82.6 percent from 15,789 to 28,831. This rapid growth created social tensions between those born and reared in Natick and newcomers (Crawford 1976:77). Those born and bred in Natick began to refer to the newcomers as "carpetbaggers," and the newcomers referred to the long-time residents of Natick as "Indians."

Immigrants arrived in Natick from Ireland, Canada, Britain, Germany, and southern and eastern Europe around the turn of the century, creating the first religious, ethnic, socio-cultural heterogeneity the town had seen. At the beginning of the twentieth century, immigration was from Italy, Greece, Turkey, Russia, Australia, Poland, Syria, Finland, Armenia, and Lithuania. Today, only 7 percent of the population is foreign-born, and 30 percent are of foreign parentage (Crawford 1976:72).

The majority of dwellings today are single-family units (78.6 percent). Eighty percent of the families own their homes. Ninety-four percent of the housing is in standard condition, and only one percent is substandard (Crawford 1976:78). Although by 1950 commercial growth in Natick center had ceased, expansion and development occurred in other parts of the town. Route 9, for example, became a huge commercial area with shopping centers and warehouses. The Massachusetts Turnpike and a turnpike interchange were put in.

2.0
AN OVERVIEW OF THE CULTURAL AND RELEVANT NATURAL HISTORY OF THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES

2.1 THE PHYSICAL ENVIRONMENT

2.1.1 Earth Resources

NLABS is situated on an outwash plain within the drainage system of the Sudbury River, a tributary of the Merrimack. The installation lies on a flat area, with moderate slopes, bounded on three sides by Lake Cochituate. Small wooded areas occupy portions of the southern and western boundaries. The facility lies in an area classified as Udorthents by the USDA Soil Conservation Service (1982). Udorthents consist of areas from which soil has been excavated and/or deposited by construction activities. Generally, no intact archeological remains are expected within areas classified as Udorthents. However, there are some small areas at NLABS which visual inspection and examination of construction documents indicate may not lie on Udorthents.

The region in which NLABS and its outlying housing areas are located is referred to as the Sudbury Basin physiographic zone. This was the locus of glacial Lake Sudbury--a temporary ice-dammed lake which was created when the Wisconsin glacier retreated (Goldthwait 1905, cited in Dincauze 1968:12). Lake Cochituate, which forms the western, southern and eastern boundaries of NLABS, is situated in a Pleistocene ice-blocked basin (Goldthwait 1905, cited in Dincauze 1968:12). The region, as defined in this report, is composed, to a great extent, of outwash plains and terraces. The elevations of these outwash plains and terraces range from 100-200 ft. above sea level. Most of Natick lies below 200 ft. above sea level. Several small hills, many of which are glacial drumlins, with elevations of 350 ft. or more above sea level, dot this generally level topography.

The area's bedrock, primarily granites and slates, lies underneath deposits of glacial tills. No quarry finishing stone suitable for historic-period building purposes is available. Clay suitable for brick was found in the western part of Natick Township and was used for some time and then abandoned. Limestone in the central part of Natick was also utilized for a period of time (Bacon 1856:98). A great variety of feldspar and quartz are found locally.

The surficial deposits in the region of NLABS are poorly sorted and mostly unstratified loose to compact deposits of till (Nelson 1974a, 1974b). Most of the stratified surficial materials overlie the till. The surficial deposits are water-laid ice-contact, deltaic, and associated deposits that were laid down in and/or graded to various levels of glacial Lake Sudbury and glacial Lake Charles (Nelson 1974a, 1974b). The deposits are composed of mixtures of gravel, sand, and silt in ice-channel fillings, kame terraces, kame deltas, kames, and some outwash (Nelson 194a, 1174b). Glacial striae, grooves on bedrock outcrops, and the alignment of drumlins indicate that glacial ice moved across the region in a south to southeasterly direction (Nelson 1974a, 1974b).

In this region the soils of the lowlands are generally Merrimac loamy sands. It is here in the lowlands that stratified archeological sites are expected to be located (Dincauze 1968). The present day topography at NLABS represents an artificial landscape built up over the natural lowland glacial outwash plain and terrace topography. The adjacent uplands are characterized by Hinckley gravelly sandy loam formed on stratified drift (USDA Soil Conservation Service 1982). The soils are less than 15,000 years old, therefore they contain limited organic matter and have limited fertility (Crawford 1976:2). The soil can, however, yield a suitable harvest (Vance and Murphy 1951:12-22, cited in Crawford 1976:2). Muck and peat soils characterize the wetland areas (Casjens and Lamberg-Karlovsky 1979). These wetland areas (marshes, swamps, meadows, etc.) were created by glaciers which disrupted the earlier drainage patterns (Crawford 1976:2).

2.1.2 Water Resources

Water covers 688 a., or 6.8 percent of the total land surface in Natick (Crawford 1976:1). Lake Cochituate drains a surface of 11,400 a. of land (Crawford 1976:1) and is 7 mi. in length (Bacon 1856:100). In some places the opposite shores of the lake are as close together as tens of meters. The depth of the lake varies from being comparatively shallow to nearly 70 ft. (Hurd 1890:513). Lake Cochituate is a glacial kettle-hole, as are Morse Pond and Pickerel Pond (Crawford 1976:2). Dug Pond, lying to the south of Lake Cochituate covers nearly 50 a. (Hurd 1890:513). In the nineteenth century the water supply of the town of Natick was taken from this spring-fed lake. A narrow strip of land separates Dug Pond from Lake Cochituate (Hurd 1890:513). The operation of the Boston Metropolitan Water System at Lake Cochituate in 1848 caused Fisk Meadow to flood, forming Fisk Pond between Lake Cochituate and Dug Pond (Crawford 1976:2). Prior to the damming of the Concord River, anadromous fish reached Lake Cochituate. Natick records show that officers were chosen to supervise the fisheries of the parish to ensure that no unauthorized persons took fish from the lake (Hurd 1890:513). Pegan Brook empties into the southeastern corner of Lake Cochituate.

During retreat of the ice from the Natick region, melt waters were dammed by hills located to the west, south, and east, and by the ice front itself to the north, and glacial Lakes Charles and Sudbury were formed (Nelson 1974a, 1974b). As the ice withdrew further north, lower

spillways were uncovered and the lakes were successively lowered to the levels of the new spillways (Nelson 1974a, 1974b). Each successive level represents a lake stage, and gravel and sand were deposited in or graded to each level (Nelson 1974a, 1974b).

Frequently sands and gravels were deposited in contact with the ice front or around and over isolated stagnant ice blocks. Near the ice front sand and gravel were deposited rapidly and directly into the lakes, and deltas were formed (Nelson 1974a, 1974b). The present Lake Cochituate is located in the ancient ice-block basin (Goldthwait 1905, cited in Dincauze 1968:12).

Swamp deposits are widely dispersed in the vicinity of the NLABS. These were probably formed during late glacial and postglacial periods in poorly drained areas. They consist of peat and muck together with some silt and sand (Nelson 1974a, 1974b).

The Sudbury River is bordered by extensive wetlands, marshes, swamps, and meadowland, created by the generally poor drainage conditions in the region. These wetlands absorb water which may flood from the river. The uplands, by contrast, are moderately well-drained. Casjens (1979) has argued that since there is minimal heavy flooding in the region, archeological sites are not deeply buried. Further away from the river, inland streams are fed by the many marshes and wet meadowlands. Ponds and lakes, streams and brooks occur across the entire landscape of the study region.

2.1.3 Modern Climate

In the region in general there is a humid continental climate. The average annual temperature is 50°F, with the summer average of 67°-70°F and a winter average of 30°F. Annual precipitation averages 40-45 in. Prevailing winds are from the northwest in the winter and from the southwest in the summer (Casjens 1979:5). In the immediate vicinity of the laboratories, the temperature averages range from 27.5°F in January to 73.2°F in July. Annual precipitation at the facility averages 45.17 in. The lowest recorded temperature in Natick was -28°F, and the highest was 105°F. Natick has an average of 180 frost-free days. The relative humidity is 75 percent in the morning and 65 percent at noon. Yearly snowfall averages 40 in. (Crawford 1976:2).

2.1.4 Plant Resources

The study region is presently covered by woodlands and by inland wetland vegetation. In the uplands which are moderately well-drained, the dominant tree species are white pine, sugar maple, hickory, gray birch, poplar, and oak; in the poorly-drained lowland, dominated by swamps and wet meadows and marshes, the dominant species is the red maple (Casjens 1979).

In the nineteenth century the forest was characterized by walnut, chestnut, elm, maple, birch, pine, oak, and lesser quantities of hemlock and spruce (Bacon 1856:98).

2.1.5 Animal Resources

The river and adjacent wetlands were characterized by the following animal resources: anadromous fish, such as salmon, shad, alewife, herring, lamprey, striped bass, sturgeon, smelt, eel, brook trout, perch, turbot, and other non-migratory fish; mink, otter, muskrat, beaver, ducks, brant, geese, turtles, frogs, snakes (Bacon 1856; Hurd 1890; Casjens 1979; Crawford 1976). The upland woodlands included the following mammal species: white-tailed deer, moose, bear, chipmunk, squirrel, raccoon, porcupine, woodchuck, gopher, skunk, hare, cotton-tail rabbit, mole, wild turkey, quail, partridge, passenger pigeon, ruffed grouse, ptarmigan (Bacon 1856; Casjens 1979; Hurd 1890).

2.1.6 Paleoenvironment

The Pleistocene glaciation throughout the region lasted until approximately 9000-8000 BC. Glacial ice disappeared from the uplands sooner than in the major river valleys. A general warming trend followed the last glaciation. By 8000 BC lakes were formed in low-lying areas, marshes, swamps and wet meadows were created, and deltas created by glacial runoff formed at the mouth of river drainages. Few fish species appear to have been available from these water sources. The environment at this time may be characterized as a tundra, with sedge vegetation. This environment would have supported cold-adapted fauna, such as mammoth, mastodon, giant beaver; all presently extinct. Biomass was low in the tundra so there were no large herds of these mammals.

As the tundra advanced to the north, forest species from the south replaced it. An open forest, characterized by such species as spruce, poplar, and birch, began to establish itself after 8000 BC. This open forest was succeeded by an open park woodland environment with spruce, ash, hornbeam and oak as the dominant tree species. Palynological data indicate that pine reached a maximum between 8000-7000 BC. The forest at this time had a dense tree cover, the climate was warmer and drier than it is today.

By 7000 BC a mixed forest characterized the region. Between 7000-3000 BC the warming and drying climatic trend continued. The postglacial thermal maximum reached its peak around 4000 BC. Sea level rose at this time and salt water transgressed into fresh water rivers, creating estuarine zones. Pollen analysis indicates an increase in ragweed and a decrease in trees. Deciduous species increase in frequency, resulting in a temperate oak forest. There is an increasing diversity in plants and animals available for human consumption such as anadromous fish, sea-mammals, birds, terrestrial mammals, vegetable foods, and shellfish. Forest communities are maturing at this time with the temperate-deciduous forest establishing itself. By AD 1 hickory and chestnut appeared from the south. The Lake Cochituate vicinity at that time consisted of an abundance of meadows and marshes which provided plentiful fish and fowl for the prehistoric inhabitants of the area. The wooded uplands provided a variety of large and small mammals, most notably the white-tailed deer.

A cooling trend appears to have occurred worldwide from AD 1300 to 1800 followed by a warming trend. A summary of the region's environmental history is presented in Table 2-1.

2.2 THE CULTURAL ENVIRONMENT

2.2.1 Prehistory

A summary of the cultural chronology of the U.S. Army Natick Research and Development Laboratories is presented in Table 2-2.

Paleo-Indian. The Paleo-Indian period represents the earliest human occupation of North America. Diagnostic remains associated with Paleo-Indian are fluted (Clovis and Folsom type) projectile points and extinct fauna. Sites from this cultural period in the Northeast are usually highly disturbed and/or have poor or no preservation of faunal materials. The fluted point assemblages tend to be stereotyped, standardized, and occur over wide areas, suggesting either a built-in conservatism or a far ranging communication network. Other artifacts which typify the Paleo-Indian tool assemblage are spurred flake scrapers, twist drills, large bifaces, pieces esquillees, and side scrapers.

The Paleo-Indian hunters inhabited an environment characterized by a spruce-lichen woodland. The landscape in eastern Massachusetts was a hilly, marshy coastal plain in which some former lake beds possibly contained shallow bodies of water (Dincauze 1974:43). Mammal diversity was low, but some species may have aggregated at certain times. In general an environment with seasonal availability of resources, low stability of resources, and low predictability of resources predominated. A patchy, unpredictable environment is best utilized by small numbers of people who travel from place to place seasonally. Thus, a low population density was undoubtedly the case for Paleo-Indian people. Artifacts made from non-local materials occur at many sites in New England. This may be interpreted as migration, exchange, or transport behavior. Although some large Paleo-Indian sites are known in the Eastern Woodlands, most are quite small, indicating small groups of people and seasonal mobility.

Paleo-Indian habitation sites would be expected to be located on high, dry ground, such as knolls. Temporary, special-purpose sites, on the other hand, may be located with reference to other variables, such as access to stone for quarrying.

A fluted Paleo-Indian point was recovered from the multi-component Heard Pond site (19MD207, 208, 209, 205), approximately 4 mi. north of NLABS. The site has an elevation of 120-130 ft. above sea level, is situated 400 ft. from Heard Pond and 200 ft. from a tight meander in the Sudbury River. The vicinity is presently marshy and swampy.

Early Archaic (7500-6000 BC). The evidence for Early Archaic occupation is essentially the distribution of projectile point types (bifurcate-base points, Kirk points, Plano points). During this time period temperate species were expanding their ranges northward and eastward. Early Archaic sites are clustered in lowlands, along major rivers, on the

Table 2-1. A SUMMARY OF THE ENVIRONMENTAL HISTORY OF THE AREA OF THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES

Dincauze 1974 (based on Davis 1969)
Rogers Lake Pollen

Date	Inferred Climate
2500 BP - present	Gradual warming trend to present climate
3000 - 2500 BP	Climatic cooling; stabilization of shorelines; density of hickory declines; chestnut and other northern species increase
8000 - 5000 BP	Increase in ragweed pollen; decrease in tree pollen; deciduous tree species increase; temperate oak forest; mast-producing trees; temperatures above modern range
9000 BP	Mixed forest in which pitch and white pines are predominant
10,000 - 9000 BP	Warm, dry climate; lakes and ponds established; pine pollen maximum; dense tree cover
10,000 BP	Open park woodland; dominant tree species include spruce, ash, oak, hornbeam; warming and drying trend continues
11,000 - 10,000 BP	Warming trend begins; sea level rises; sedge vegetation; deltas form at the mouths of river drainages created by glacial run-off; lakes form in low-lying areas; tundra environment predominates; temperatures range from arctic to subarctic
11,000 BP	Pleistocene glacial mass present

Table 2-2. A SUMMARY OF THE CULTURAL CHRONOLOGY OF THE AREA OF THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES

Cultural Unit					
Tradition	Period or Phase	Date	General Settlement Patterns	General Subsistence Systems	Kinds of Archeological Remains Representative of Period
American	Urbanization	AD 1850 to Present	Urban; suburban; some rural farm areas	Commercial and manufacturing industries; service industries; orientation towards commuting to non-local employment	Dominance of American and imported manufactured goods; metal, glass and brick building materials; post-1920, automobile associated artifacts; post-1950, high technology-related items
	Industrialization	AD 1700 to 1850	Plantation-agricultural settlements give way to expanding residential and commercial and industrial communities	Intensive agriculture, livestock raising and cottage-industry giving way to manufacturing and industry	Metal, glass, and brick building materials; roads, underground pipe; ceramics, metal and glass goods; textiles, etc.
	European-Native American Contact	AD 1550 to 1700	Coastal communities lose thousands of their population to epidemics; shift in settlement locations due to disease, dislocation, fragmentation, white settlement. Communities are still semi-mobile	Early contact: continuation of hunting, fishing, gathering, and horticulture with modifications due to new trade relations, fur trade, trading posts. White settlement incursions, missionary activity, warfare. Later contact: Native Americans populations become diminished and part of the institutionalized poor	Traditional native *artifact forms made* with imported raw materials; wampum beads; European trade goods such as glass beads, copper kettles, clothing, glass bottles, rings, spoons, thimbles, iron tools
Native American	Late Woodland	AD 1000 to 1550	Spring and fall base camps in estuary and riverine zones; annual round within restricted territories around river-basins; coastal zone intensively occupied; increased sedentism; higher population density	Introduction of cultigens; hunting; fishing; gathering; horticulture	Levanna points; shell-tempered pottery; shell middens; hoes
	Early-Middle Woodland	1000 BC to AD 1000	Annual round base camps	Increased use of coastal resources; hunting; fishing; gathering	Shell middens; platform pipes; blocked end tubular pipes; lanceolate points; side-notched points; Meadowood points; grit tempered, rocker-and-dentate stamped pottery

Table 2-2. A SUMMARY OF THE CULTURAL CHRONOLOGY OF THE AREA OF THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES (Concluded)

Cultural Unit					
Tradition	Period or Phase	Date	General Settlement Patterns	General Subsistence Patterns	Kinds of Archeological Remains Representative of Period
	Late Archaic	1000 to 3000 BC	River basin territoriality; decreased mobility; higher population density; central-based foraging pattern; base camps. Burial ceremonialism; alternating dispersal and aggregation	Hunting of small game; collection of shellfish, anadromous fish, seeds, nuts	Squibnocket, Brewerton, small-stemmed points; ground stone axes; adzes; gouges; mortars; pestles; steatite bowls; shell middens on coast; burial cremations; local raw materials
	Middle Archaic	3000 to 6000 BC	Restricted foraging pattern; hunting, gathering and fishing on seasonal basis; larger sites with more varied locations; more numerous sites; long-distance exchange or transport	Hunting of small- and medium-sized mammal collection of shellfish, anadromous fish, and vegetable foods	Merrimac, Neville, Stark projectile points; scrapers; perforators; semi-lunar knives, fishhooks
	Early Archaic	6500 to 7000 BC	Small, mobile bands seasonal base camps; sites located preferentially in lowlands	Foraging for large and small game; collecting of wild vegetable foods	Bifurcate-base points; Kirk points
	Paleo-Indian	7000 to 9000 BC	Small, highly mobile bands of hunters and gatherers. Sites on high, well-drained land, especially knolls, drumlins, terraces	Hunting of large and small game; some wild vegetable foods are gathered	Fluted projectile points; utilized flakes; gravers; bifacial knives; drills; small end-scrapers

coast, or along marsh and swamp lands (Dincauze and Meyer 1977). Sea level has risen since this time, many of the sites from this period may be inundated. Early Archaic communities most likely exploited more vegetable foods and fish resources than did their Paleo-Indian predecessors (Dincauze and Meyer 1977). The Heard Pond site (10 MD207, 208, 209, 205) includes an Early Archaic component, as does the Irwin Farm site (19MD190, 377) located 4 mi. due north of NLABS, between the Sudbury River and Heard Pond. This latter is a multi-component site with an elevation of 120-130 ft. above sea level.

Middle Archaic (6000-3500 BC). The Middle Archaic period coincides with the postglacial thermal maximum, which occurred from about 6000-2000 BC, peaking around 4000 BC. The climate became warmer long before the warm forest association was established. Sea level rose. The Middle Archaic is characterized by the development of regional adaptations. There appears to have been seasonal specialization as part of a larger pattern of an annual-round subsistence system. There may have been an increase in population, or simply a higher visibility of archeological materials. The environment was typified by a diversity of plants and animals and a generally increased density of resources. Human communities utilized seasonally specific resources as well as generally available ones. Spring sites were generally aggregation sites and dispersal occurred in the fall, resulting in a pattern of alternating seasonal aggregation and dispersal throughout the year. There is a tendency toward increased use of local raw materials; social territories were constricting perhaps due to an increase in population density. Both the Irwin Farm (19MD190, 337) and Heard Pond (19MD207, 208, 209, 205) sites include Middle Archaic components.

Middle Archaic sites are more numerous, larger, and occur in more diverse locations than Early Archaic and Palio-Indian sites. Most notable among preferred site locations were sites along rivers, adjacent to lakes, and along side bogs (Dincauze 1974:45). The favored utilization of these spots may indicate that Middle Archaic foragers exploited such seasonally available resources as spawning runs of anadromous fish and migrating birds (Dincauze 1974:45). The Stark complex, dating from 7000-6000 years ago, occurs at more sites and in higher numbers than the preceding Neville complex. Diagnostic artifacts recovered from Middle Archaic sites include projectile points, unstandardized flake scrapers, perforators, heavy tools, semi-lunar knives (Dincauze 1974:45).

Late Archaic (3500-1000 BC). Three different traditions have been delineated for the Late Archaic in the Northeast. The Laurentian Tradition, characterized by Brewerton type projectile points, often occurs on the same sites as do the other traditions. The Narrow-Point or Small-Stemmed Tradition is the earliest and occurs most frequently along the coast and in inland river valleys. The Susquehanna or Broad Point Tradition may have been intrusive from the Middle Atlantic coast. It occurred alongside the Narrow Point Tradition for about 1000 years and is divided into the Atlantic, Watertown, and Coburn phases. The latter traditions merged into the Orient phase at the end of the Late Archaic period. During the Orient phase, the number of inland sites decreased while coastal sites may have been occupied year round (Dincauze 1974:50).

A large number of artifacts occur in the Late Archaic, especially in the Small-Stemmed Tradition. There is heavy use of local raw materials. Little evidence exists for widespread trade networks; instead there seems to be regional intensification and specialization. A tendency toward small territories is marked. There are sites of many different kinds in a limited area. The closely packed nature of Late Archaic sites suggests the limited areal extent of the seasonal round. The settlement-subsistence system suggests a wide range of plant and animal species was being utilized, with specialized techniques for getting each type of resource. Based on the large number of artifacts and the frequency of sites, a higher population density than earlier periods is inferred, and widely dispersed communities of small groups living in restricted territories was probably the case for Late Archaic populations. Each community would have developed a specialization for exploiting the range of food in their own territory. Tool assemblages would therefore differ markedly and quickly with location and season. Given restricted territories, there was probably an increase in sedentism.

Material evidence of the Small-Stemmed Point Tradition is indicative of river-basin territoriality (Dincauze 1974:48). Sites of this tradition are located in all the niches selected by all prehistoric communities and display the highest degree of diversity including: coastal sites, estuarine sites, lake and pond shore sites, sites adjacent to springs and brooks; riverbank sites, quarries, and small upland habitat sites (Dincauze 1974:48).

The Little Laurentian evidence there is in Massachusetts suggests a more interior orientation (Dincauze 1974:49). Susquehanna Tradition evidence indicates a strong coastal lowlands orientation (Dincauze 1974:49).

The Late Archaic is also characterized by an increase in burial ceremonialism. There are isolated burials as well as cemeteries; cremations as well as inhumations. Susquehanna burials in southern New England seem to have only cremations. The Mansion Inn site (19MD210), located 200 yd. from both Lake Cochituate and Dudley Pond in Wayland Township is a Late Archaic cremation complex. It is situated on a high flat knoll about 20 ft. higher than the narrow ridge which separates Dudley Pond from Lake Cochituate (Mansfield 1961:1). The Vincent's Site (19MD199), bordering small ponds, at the base of a knoll, at an elevation of 130-140 ft. above sea level, is a second Late Archaic cremation complex in the region. The Washakamaug site (19MD383), situated in the land lying between Washakamaug Pond and Farm Pond, includes habitation debris as well as burials from the Late Archaic period. The Jeffrey Road site (19MD189), at an elevation of 140 ft. above sea level, at the bottom of a small knoll, includes a Late Archaic component, as do the Sherman Bridge site (19MD130), the Irwin Farm site (19MD190, 377), and the Heard Pond site (19MD107, 208, 209, 205).

Early and Middle Woodland: (800 BC - AD 800). The change in focus of settlement which began during the Orient Phase of the Lake Archaic - from the uplands of the inland to the coastal lowlands where estuarine resources were being more intensively exploited - characterizes the Early-Middle Woodland periods. Little is known of upland, interior site

locations. Indeed, very few Early Woodland sites are known at all from eastern Massachusetts.

During the Early and Middle Woodland Period settlement appears to focus on the coast, estuaries, and at lower elevation areas (Dincauze 1974:50). Sites seem to be less numerous than in the Late Archaic Period. Little is understood of Early and Middle Woodland use of upland interior areas (Massachusetts Historical Commission 1979:32). Favored site locations in the Early and Middle Woodland include: coastal shellfish exploration sites associated with nearby habitation sites; settlements at estuary heads; small inland camps, rockshelters and quarries (Massachusetts Historical Commission 1982:21).

Ceramics became part of the material culture inventory in the Early Woodland period, in some areas replacing steatite bowls. The earliest pottery is known as Vinette I. The paste is grit-tempered, the vessels are conoidal in shape and the surfaces are textured. A second type of ceramics is smooth-bodied or incised, fiber-or-steatite tempered, manufactured by modeling, has flat bottoms and shows impressions of mats and textiles.

During the Middle Woodland population density began to increase again, as evidenced by larger numbers of sites and more widely distributed sites. Evidence for contact between southern New England and the western interior continues to be found in ceramic design, platform pipes, and projectile point forms. There may have been year-round settlement along the coast. Large sites also occur inland near rivers on high flood plains, and smaller Middle Woodland sites occur along streams. In general little is known of upland, interior Middle Woodland site locations.

The Heard Pond (19MD107, 208, 209, 205), Staiano (19MD455), Jeffrey Road (19MD189), and Sherman Bridge (19MD130) sites include Early and/or Middle Woodland components.

Late Woodland: (AD 800 - European Contact). During the beginning of the Late Woodland period an increase in population density is evidenced by larger numbers of artifacts and more and larger sites (Dincauze 1974:53). Lowland areas became favored for settlement. Larger villages either at estuary heads in coastal areas, or at spawning sites in the interior lowlands were the foci of seasonal rounds (Dincauze 1974:53). During the summer, families were dispersed in horticultural fields and during the winter in temporary inland encampments. Diagnostic artifacts such as shell-tempered pottery, and small, triangular Levanna-like projectile points occur at this time.

Cultigens in the form of corn, squash and the common bean were introduced into the Northeast from more semi-tropical zones during this period. At approximately 1000 AD the three species occurred together in New England. Late Woodland houses were square or rectangular. Triangular projectile points suggest the use of the bow-and-arrow. Globular pottery, often shell tempered, appeared at this time. Despite the introduction of horticulture in the Late Woodland, villages were still only semi-permanent. Because of the variable length of summer,

groups ran the risk of an early frost destroying the crops, so there was still a commitment to hunting, gathering, and fishing. In addition, New England's thin and acidic soil made farming less productive than in other regions. In general, there is still an increase in sedentism along with a probable population increase. The Heard Pond site (19MD107, 208, 209, 205) contains a Late Woodland component, as do the Staiano, Goddard (19MD 204), Irwin Farm (19MD190, 377), Jeffrey Road (19MD189), and Washakamaug (19MD383) sites.

2.2.2 Ethnohistory

By the time the first accounts of explorers, missionaries, settlers, and so forth were written, changes in native lifeways in New England had already begun. Epidemics in the early seventeenth century decimated coastal communities in Massachusetts and caused severe dislocation, fragmentation, and sociopolitical upheaval. Prior to 1630 selected trade goods were incorporated into the native system, especially sheet brass which was worked into traditional native forms of utilitarian tools and ornaments.

Throughout the rest of the seventeenth century, settlement and subsistence practices began to reflect the new economic and political relations entered into by native communities. Trading posts made European goods available to the native communities in an institutionalized manner. Clothing, glass bottles, kettles, spoons, beads, etc. became available, as well as firearms and liquor. Some very richly furnished graves occur at this time; these burials contain a predominance of European trade goods.

In Natick Township, South Natick was the location of the first of 14 mission towns ("praying towns") of the missionary John Eliot. The town was established in 1651. The praying town was an attempt to "Europeanize" and Christianize the native community through a policy of enforced sedentism, the practice of full-time agriculture and cottage-industries, religious observance and worship, English-style political organization, and nuclear family organization. The mission attempt was essentially a failure.

There were several seventeenth century aboriginal sites in the vicinity of NLABS. Temple (1887:47-48) reports a seventeenth century native American village at Saxonville. In addition, a bluff located directly east of where Cochituate Brook enters the Sudbury River was the locus of an historic period native fort. A cluster of wigwams reportedly stood on Nobscot Hill's eastern slope, and planting fields were situated at the foot of the hill, below the settlement (Temple 1887:25, 27). A fish weir, built and used by the native population, is reported from Sherman's Bridge, at a point in the river where it can be forded at low water. The site is referred to as Weir Hill (Hudson 1889:10-11).

2.2.3 History

During the early part of the eighteenth century Natick was still an Indian settlement. The land was owned by aboriginal inhabitants and public offices were held by Indians. The first white settler was Thomas Sawin, who built a grist mill and saw mill on a creek near the Sherborn

border in South Natick at the end of the seventeenth century (Bacon 1856:40; Crawford 1976:25).

Between the late seventeenth century and 1720, a half dozen European families had settled in the area known as Needham Leg, or Hog Leg, an area of about 1700 a. in the heart of the Natick plantation (Crawford 1976:25). Needham Leg extended eastward from Lake Cochituate, and northward from Natick Center (Crawford 1976:29). This piece of land was surrendered to Needham in 1761, and later in 1797 was returned to Natick. The Livermore Map of 1749 shows 15 English homesteads in Needham Leg; the homesteads of the Drury, Bacon, and Fisk families were located on the western edge of Needham Leg, or to the east of Lake Cochituate in the vicinity of the NLABS.

Historic settlement began along the coast and expanded island along tidal rivers (Massachusetts Historical Commission 1982:39). Important factors which influenced site location were: access to fertile agricultural land and grazing land, water power for especially along small streams and rivers, and proximity to land and waste transportation routes as afforded by established Indian trails and places (Massachusetts Historical Commission 1982:40). From 1675 and 1775 growing population filled in the upland regions.

Beginning in the second quarter of the eighteenth century municipal offices began to be held by Europeans. In 1745 Natick was established as a precinct, or a parish (Bacon 1856; Hurd 1890). From this time forward only Europeans held public offices. In 1781 the town of Natick was incorporated.

A dispute between the central and southern parts of Natick began in 1743 over the location of the meetinghouse. One party of the dispute consisted of the European residents of southeastern Natick who, living near the Indian meetinghouse, were happy with its location along the Charles River. The other party consisted of the growing European population in the western and northern sections of Natick. This latter party believed that the reasonable path of action would be to relocate the meetinghouse to Natick Center where it would be conveniently accessible to all residents. The issue went before the General Court several times over the course of 40 years. In 1800 the meetinghouse was built in Natick Center; in 1828 the residents of South Natick built their own meetinghouse on the original meetinghouse site (Crawford 1976:28-29).

Until approximately 1830 the majority of Natick's population were farmers. In 1830 farms were occupied in a five mile radius from the First Church in South Natick (Crawford 1976:42). An 1829 map of Natick shows only three homesteads in the area of NLABS. In 1830 the population of Natick was approximately 890. Around this time Natick began a process of change from a homogenous agricultural community into a heterogeneous manufacturing center (Crawford 1976:43). By 1835 the putting-out system was utilized in Natick, introducing the division of labor and the separation of capital and labor. When the Boston and Albany Railroad opened through Natick Center in 1835, the shoe industry was given a boost by lowered transportation costs and by direct communication to

customers. Machinery was introduced into manufacturing in the 1860s. The successful shoe industry attracted population to Natick from 1830-1840, at which time Natick's population increased by 45 percent. From 1840-1850 the population more than doubled; by 1860 it nearly doubled again, reaching 5516 individuals - an increase of 600 percent within 30 years (Crawford 1976:43-44, 56). By the middle nineteenth century Natick Center was the focus of residential and industrial growth. In 1856 Natick Center consisted of 275 dwellings, while South Natick contained only 65 dwellings (Crawford 1976:48).

In the early decades of the twentieth century the shoe industry collapsed, and Natick became a residential suburb of Boston. Following World War II, local commerce, development, and industry increased in Natick, especially along Route 9 (Crawford 1976:3). NLABS, located on Lake Cochituate, began its operations in 1953.

2.3 ARCHEOLOGICAL RESEARCH DIRECTIONS

2.3.1 Regional Concerns

Regional research concerns for the Paleo-Indian time period, some of which are addressed in Cultural Resources in Massachusetts: A Model for Management (Massachusetts State Plan), include the relationship between environmental change and cultural change. In order to elucidate this relationship, first reconstructions of the late glacial and postglacial landscape must be refined, and second, a representative sample of Paleo-Indian sites in both upland and lowland areas (habitation sites, special-purpose sites, temporary encampments) must be examined (Massachusetts Historical Commission 1979:12) in order to infer exploitative strategies, aggregation and dispersal patterns, population sizes and structures, exchange and interaction strategies, habitat changes, and scheduling of subsistence activities.

A major problem relating to the Early Archaic is whether the presently under-represented time period actually means that the Early Archaic was a period of population decline or whether remains from this period are under-represented due to presently poor archeological visibility/recovery. Some Early Archaic sites may be submerged by the postglacial rise in sea levels (Massachusetts Historical Commission 1979:12, 32).

The major research concerns centering around the Late Archaic period include questions regarding the succession of peoples and lifestyles in the state (Massachusetts Historical Commission 1979:30). Does the presence of Susquehanna forms indicate population replacement, diffusion or migration. Another question concerns the relationship between increasing indications of sedentism and population increase. Further considerations include the social, economic, or technological significance of different artifact style spheres, and the social or political functions of burial ceremonialism. Open for examination also is the reason why the upland habitats were ostensibly abandoned by 2500 years ago (Dincauze 1980; Moore 1980; Massachusetts Historical Commission 1979).

Important research questions pertaining to the Early-Middle Woodland period include: the role of coastal habitats in supporting foraging communities with high population densities; and the nature of the contacts between southern New England communities and Middle Woodland phenomena to the west.

Research concerns focusing on the Late Woodland period include: the process of incorporation of cultigens into the foraging lifestyle (Dincauze 1980:33); the relationship between horticulture, sedentism, and increasing population density; the effect of horticulture on social organization; the mechanisms by which horticulture was introduced into southern New England; and the question of scheduling of subsistence activities.

Research questions relevant to the historic period include study of: the growth, development and maintenance of the relationship between Natick and Boston, the regional commercial core of the area; the changing historic period landscape features such as town and private grant boundaries, field division lines, roads, cemeteries and town plans; and the range of vernacular architecture in the Natick area as represented in the archeological record.

The management model for Massachusetts' cultural resources places Natick within the Eastern Massachusetts coastal lowlands study unit, one of eight study units delineated within the state. Archeological data from the vicinity of NLABS can contribute to the solution of a number of research domains relating to the prehistory and history of Massachusetts. There is a sufficient degree of variability in the types of habitats and types of sites encountered in the vicinity of NLABS to test hypotheses concerning adaptations to small-scale environmental heterogeneity (Massachusetts Historical Commission 1979:14). Further, since the known sites or components of sites span the duration of time from Paleo-Indian through the historic periods, there is the potential to investigate all four contexts into which the cultural resources of the state are to be placed (Massachusetts Historical Commission 1979:67):

- the succession of people who have lived in Massachusetts;
- the changing lifestyles practiced and resource exploitation techniques utilized by different groups in local environments;
- the changing structures of spatial organization -- transportation and communication networks, trade flows, hierarchies of urban centers -- that have linked activities at different periods of time;
- the historic patterns of diffusion, from centers of innovation, of material artifacts and ideas as indicators of changes in lifestyles.

The NLABS area with natural environmental heterogeneity lends itself to an investigation of regional land use patterns and resource exploitation techniques through time and space, including dispersal and aggregation patterns, site selection, habitat changes through time, seasonal scheduling of subsistence activities, population sizes and structures.

Problems associated with addressing the above issues include the fact that the intensity of research which has been carried out in the eastern Massachusetts study unit varies (Massachusetts Historical Commission

1979:74). Collector bias may be responsible for the selective neglect and under-representation of small, upland sites in favor of larger, highly visible sites located along rivers and streams (Massachusetts Historical Commission 1979:75). Therefore, a fundamental problem is the representativeness of the current data base and the need to develop strategies for the evaluation and recovery of low visibility sites and resources (Massachusetts Historical Commission 1969).

A further important consideration is the role of the eastern Massachusetts study unit within the state as an "intermediate area between the core of the Boston basin and the central uplands" (Massachusetts Historical Commission 1979:90). The Massachusetts State Plan outlines the need for understanding core-fringe relationships through time in the state. Natick lies in the study unit considered intermediate between a core and a fringe. In order to gain an understanding of core-fringe relationships, the cultural sequence of settlement in the eastern Massachusetts study unit must be clarified. For this to happen it is necessary to confront the incomplete nature of the archeological record and survey strategies that tend to concentrate research activities in those areas already known to contain evidence of habitation. It is necessary to investigate habitats that have been assumed to be devoid of prehistoric habitation or that have low archeological visibility of cultural remains (Massachusetts Historical Commission 1979:27-28).

The Massachusetts State Plan and Dincauze (1980) also point to research questions concerning human sociocultural interactions. The region around NLABS includes two known sites of Late Archaic burial ceremonialism (Mansion Inn and Vincent). Such ceremonialism has been explained variously as a mechanism for boundary-maintenance, as a social control mechanism, and as stress-alleviation. As discussed, population density and diversity increased in the Late Archaic, as did intensification of foraging strategies. Populations living in restricted territories must establish and maintain exchange and interaction networks in order to obtain items unavailable locally or goods that became locally scarce as a result of short-term environmental perturbations. Burial cults most likely served social functions regarding interaction and exchange between and among social groups in the Late Archaic.

In order to operationalize the above research domain, priority must be given to investigations of the social environment (we must not limit ourselves to investigations of the physical environment), and to the social and symbolic uses to which material culture is put. Formal variation in material culture is nearly infinite, therefore, researchers must develop models and strategies for the definition and recovery of data whose formal properties may carry significant social and cultural meanings (Dincauze 1980).

2.3.2 Installation-Specific Archeological Research Directions

There has been no archeological work carried out at NLABS or its associated housing areas. There are, however, known sites in the vicinity. Any prehistoric archeological sites which may be located in the future at NLABS or the Sudbury Housing Area could provide data useful in addressing the research questions discussed in Section 2.3.1.

3.0
AN ASSESSMENT OF ARCHEOLOGICAL RESOURCE PRESERVATION AND SURVEY ADEQUACY

3.1 ENVIRONMENTAL CONSTRAINTS TO SITE PRESERVATION

Archeological sites in the region, as defined in this report, are relatively dense, despite the fact that no sites are known to exist on NLABS property. Prehistoric activity spans the time from Paleo-Indian through Late Woodland. The protohistoric period is well represented in the region as well. Natural environmental constriants to site preservation in Natick are few. They include factors such as wind and weather erosion which especially take a toll on unmaintained, abandoned cultural resources. Development in Natick associated with urban sprawl has been far more destructive to cultural resources.

All of the known prehistoric sites are strongly clustered according to soil type, topography, and water sources. Such a clustering supplies patterning which can be used to predict site locations and can aid in the implementation of site protection plans.

The distribution of known archeological sites clearly favors the level outwash plains of the region. Sandy terraces, formed by old lake shores in the hills, were also attractive areas for prehistoric settlement. Eighty-five percent of the known sites with reliable locational data associated are located at elevations of 110-150 ft. above sea level. The remaining 15 percent of the known sites are situated at elevations of 155-200 ft. above sea level. In other words, the vast majority of sites occur on glacial outwash plains. Fifty percent of the known sites are situated on what is currently marshy and/or swampy land.
In the near vicinity of the NLABS, the percentage is even higher. All of the known sites in the region were located with reference to surface water. Fifty percent of the sites are located within 1000 ft. of what is currently a large pond or lake (e.g., Heard Pond, Farm Pond, Dudley Pond, Lake Cochituate). Any site not located within 1000 ft. of a large pond or lake is located within 1000 ft. of a stream or brook. In 25 percent of the cases, a site was situated within 1000 ft. of both a stream/brook and a pond/lake. All sites not located within 1000 ft. of a stream/brook or a pond/lake were situated within 1000 ft. of the Sudbury River. Again, in many cases one site was located adjacent to both the river and a brook/stream. Since portions of the NLABS main facility, and the Needham, Sudbury and Wayland Housing Areas occur at 110 - 150 ft. above sea level, are near ponds, brooks and rivers, and are near currently marshy, swampy land, they are, in general, in locations favored by prehistoric people.

3.2 HISTORIC AND RECENT LAND USE PATTERNS

In historic times there are two clear correlations between prehistoric sites and historic land use. First, it is expected that areas preferred for native horticulture will be choice farmland in historic and modern times. Second, sites at river falls, where abundant fish could be caught, are more often than not the locations of early industries which tapped the hydraulic energy of the falls. In recent times housing development, commercial and industrial expansion have caused a great deal of destruction to archeological remains in the region; sites chosen for prehistoric habitation are frequently chosen by historic period settlers for the same reasons. The suburban towns along the Sudbury River in the region have expanded and grown at a very rapid pace since World War II at the expense of the area's archeological resources.

The U.S. Army Natick Research and Development Laboratories, which began operating in 1953, lie on soils classified as Udorthents (disturbed by construction and fill sequences). However, the southeastern tip and part of the southwestern edge of the main installation occur on soils classified as Hinckley loamy sand, and to a lesser extent, on soils classified as Deerfield sandy loam (USDA Soil Conservation Service 1982). It is impossible to determine, without some testing, the status and integrity of these two locations. These two areas would have been prime locations for prehistoric activity. They occur on a glacial outwash plain, are adjacent to surface water, and occur on moderately well-drained soils.

The northeastern corner of NLABS (GDA-1, Table 3-1 and Figure 3-1a), including Parking Lot H and buildings T-24, T-25, T-26, T-27, T-41, 28, 29, 62, 20, and 44, was originally a sand and gravel pit for the town of Natick (Henry Weisgold, personal communication). The area has been excavated to a minimum depth of 20 ft. below original grade and is considered 100 percent disturbed.

The Natick Housing Area was built in 1974. The entire area included in the housing unit property is landscaped; and a great deal of the acreage is comprised of buildings, paved roads, and parking lots. It appears that the entire area is disturbed.

The Sudbury Housing Area originally included 2426 a. At the present time only 86 a. remain under the jurisdiction of NLABS. The remaining acreage has been transferred to Fort Devens. Housing in Sudbury was built in 1962, although utilities and roadways were constructed 20 years earlier. There is a significant amount of undisturbed woodland surrounding the housing units (Figure 3-1b).

The Wayland Housing Area, comprising 5.6 a., was constructed in 1957, with additional construction through 1979. There is one paved road off of which the houses are built. The remainder of the property is wooded. A ravine, which may have been a kettle hole at one time is located to the east of the houses. Disturbance on the front and back lawns of the houses may be quite shallow (Figure 3-1c).

Table 3-1. A SUMMARY OF HISTORIC AND MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE ON THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES

CDA No	Type of Disturbance	Date Conducted (yr)	Reference[d]	Area Disturbed (acres)	Estimated Depth Below Surface (ft.)	Ratio of Disturbed to Total Area	Location of Disturbed Area					USGS Quad Sheet[e]	Coincidental Sites
							UTM		Legal Reference				
							Northing	Easting	Township	Range	Section		
CDA-1	Excavation of gravel pit prior to construction of NLABS	pre-1952	Personal Communication, H. Weisgold (NLABS); Dwg. No. 16-06-02, Sheet 2	13	20	10:10	4684770 4684766 4684540 4684548	304880 305123 305110 304898	Natick			N770	-
CDA-2	Construction of family housing; underground utility lines	1974	NPBIMc Dwg. No. 18-02-02, Sheets 5, 6, 7, and 8	13	N/A	6:10	4684781 4684785 4684456 4684440 4684533	305365 305440 305666 305567 305346	Natick			N770	-
CDA-3	Construction of *Buildings* 15, 16, 31 and 38; underground utility lines	1953	NPBIM Dwg. No. 18-02-02, Sheets 5, 6, 7, 8 and 9; Dwg. No. 16-06-02	2	1-76f	8:10	4684483	304968	Natick			N770	-
CDA-4	Construction of Buildings 5 and 17; utility lines underground	1954	NPBIM Dwg. No. 18-02-02, Sheets 5, 6, 7, 8 and 9; Dwg. No. 16-06-02	3	1-76f	8:10	4684483	305039	Natick			N770	-
CDA-5	Construction of Parking Areas A and B; underground utility lines	1954	NPBIM Dwg. No. 18-02-02, Sheets 5, 6, 7 and 8; see note a, below	4	1-2a	10:10[b]	4684476	305126	Natick			N770	-

Table 3-1. A SUMMARY OF HISTORIC AND MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE ON THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES (Continued)

CDA No	Type of Disturbance	Date Conducted (yr)	Reference[d]	Area Disturbed (acres)	Estimated Depth Below Surface (ft.)	Ratio of Disturbed to Total Area	Location of Disturbed Area					USGS Quad Sheet[a]	Coincidental Sites
							UTM		Legal Reference				
							Northing	Easting	Township	Range	Section		
CDA-6	Construction of Headquarters Building (Bldg No. 1); utility lines	1954	MPBIM Dwg. No. 18-02-02, Sheets 5, 6, 7, 8 and 9; Dwg. No. 16-06-02	1	1-76f	7:10	4684402	305197	Natick			M770	-
CDA-7	Construction of Parking Area C	1954	See note a	3	1-2a	10:10b	4684393	305275	Natick			M770	-
CDA-8	Construction of Buildings 18, 36 and 37; Parking Areas I, J, and K; underground lines	1964	MPBIM, Dwg. No. 18-02-02, Sheets 5, 6, 7, 8 and 9; Dwg. No. 35-06-02, Sheets 2; see note a, below.	4	1-5	9:10	4684368	304940	Natick			M770	-
CDA-9	Construction of Buildings 3 and 4; *Air Conditioning* Plant; underground utility lines	1954	MPBIM Dwg. No. 18-02-02, *Sheets 5, 6,* 7, 8 and 9; Dwg. No. 16-06-02	5	1-76f	7:10	4684368	305067	Natick			M770	-
CDA-10	Construction of Boiler House (Bldg. No. 19) Bldg. No. 22; Parking Area L; underground utility lines	1953	MPBIM Dwg. No. 18-02-02, Sheets 5, 6, 8 and 9; Dwg. No. 16-06-02; see note a, below	1	1-76f	6:10	4684290	304954	Natick			M770	-
CDA-11	Construction of Bldg. No. 45; underground utility lines	1970	MPBIM Dwg No. 18-02-02, Sheets 5, 6, 7, 8 and 9; Dwg. No. 35-06-20, Sheets 2 and 4	2	1-16	9:10	4684237	305082	Natick			M770	-

Table 3-1. A SUMMARY OF HISTORIC AND MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE ON THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES (Continued)

GDA No	Type of Disturbance	Date Conducted (yr)	Reference[d]	Area Disturbed (acres)	Estimated Depth Below Surface (ft.)	Ratio of Disturbed to Total Area	Location of Disturbed Area					USGS Quad Sheet[e]	Coincidental Sites
							UTM		Legal Reference				
							Northing	Easting	Township	Range	Section		
GDA-12	Construction of Buildings 2, 30, and 35; Parking Areas D and E; underground utility lines	1954	MPBIM Dwg. No. 18-02-02, Sheets 5, 6, 7, 8 and 9; Dwg. No. 16-06-02; see note a, below	4	1-76f	10:10	4684237	305147	Natick			M770	-
GDA-13	Construction of Buildings 42 and 43; underground utility lines	1962	MPBIM Dwg. No. 18-02-02, Sheets 5, 6, 7, 8 and 9; Dwg. No. 16-06-02	1	1-76f	6:10	4684268	305228	Natick			M770	-
GDA-14	Construction of Helicopter Pad	1982	N/A; see note a, below	1	1-2	10:10	4684129	305259	Natick			M770	-
GDA-15	Construction of Buildings 32, 33, 34 and 40; underground utility lines	1962	MPBIM Dwg. No. 18-02-02, Sheets 5, 6, 7 and 8; Dwg No. 16-06-02	1	1-76f	6:10	4684100	305213	Natick			M770	-
GDA-16	Construction of family housing; underground utility lines; septic and seepage pits	1962	Dwg. No. 18-04-04, Sheets 5, 6, and 7	14	N/A	9:10	4695540 4695400 4695520 4695720	295900 296180 296260 296090	Hudson			M765R	-
GDA-17	Construction of warehousing, pumphouses, and water storage tank; underground utilities; unpaved roads	1942	Dwg. No. 18-04-04, Sheets 5, 6, and 7	7	N/A	5:10	4695260	295710	Hudson			M765R	-

Table 3-1. A SUMMARY OF HISTORIC AND MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE ON THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES (Concluded)

GDA No	Type of Disturbance	Date Conducted (yr)	Reference[d]	Area Disturbed (acres)	Estimated Depth Below Surface (ft.)	Ratio of Disturbed to Total Area	Location of Disturbed Area					USGS Quad Sheet[e]	Coincidental Sites
							UTM		Legal Reference				
							Northing	Easting	Township	Range	Section		
GDA-18	Construction of family housing; underground utilities	1958	MPBIM Dwg. No. 1802-05, Sheets 4, 5, and 6	4	N/A	9:10	4697480	305760	Wayland			C770R	-
GDA-19	Construction of family housing; underground utilities	1958	MPBIM Dwg. No. 1802-05, Sheets 4, 5, and 6	4	N/A	10:10	4683920	314020	Needham			M770	-

Notes:

a. Based upon typical vehicular paving section shown on Dwg. No. 35-06-20, Sheet 4, on file with facility engineer.

b. The relatively shallow nature of soils with the potential for containing prehistoric cultural materials in the Natick area suggests that disturbance in excess of one foot would disturb most potential prehistoric archeological remains.

c. Master Plan Basic Information Maps.

d. Unless otherwise indicated, all referenced drawings are on file with the facility engineer, NLABS.

e. M770 = Natick 7.5', 1970 edition; M765R = Maynard 7.5', 1965 edition, photorevised 1979; C770R = Concord 7.5', 1970 edition, photorevised 1979

f. Because of the hilly nature of the NLABS site excavation depths varied greatly for any single structure.

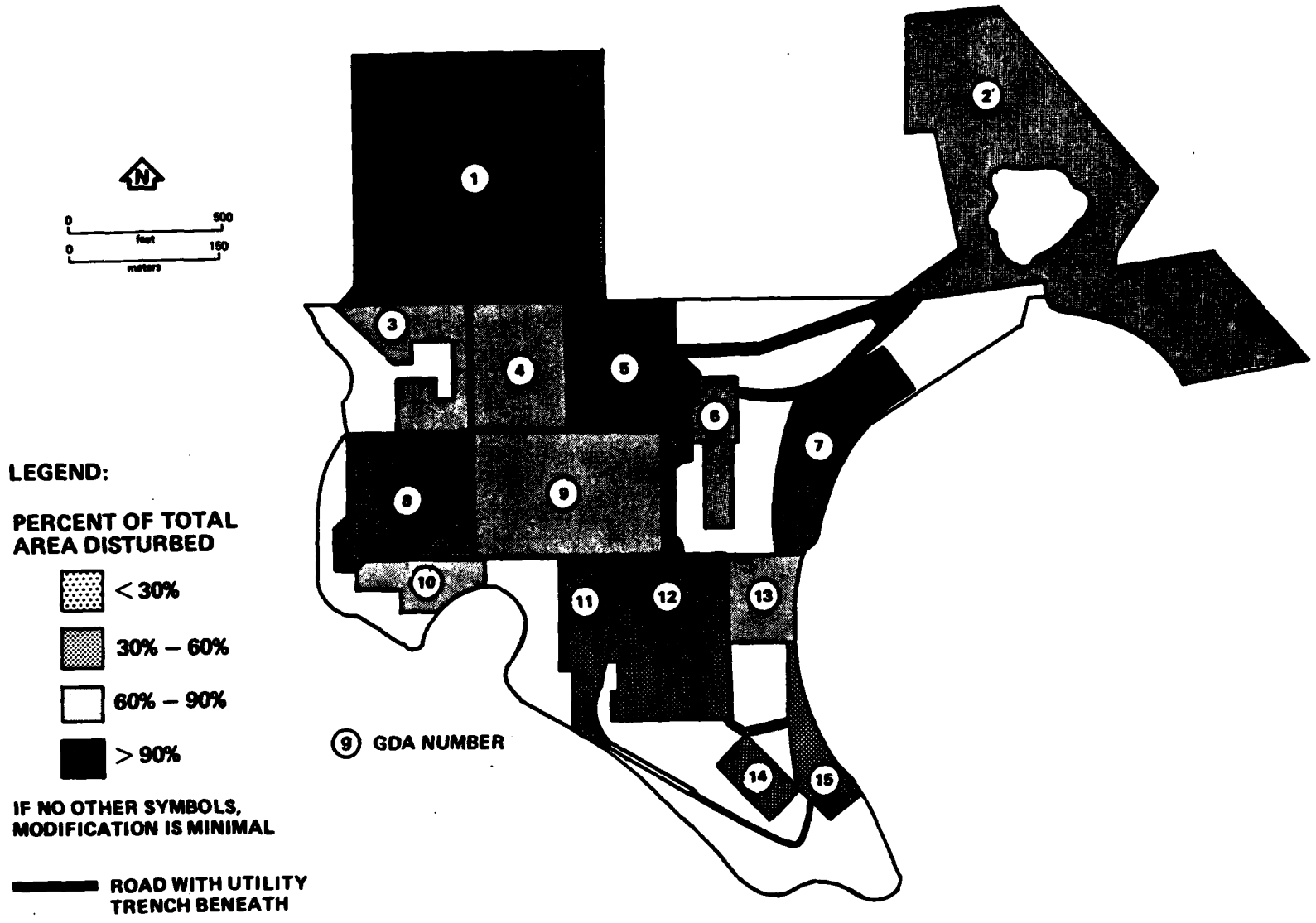

Figure 3-1a. A MAP OF AREAS OF HISTORIC AND/OR MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE AT THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES

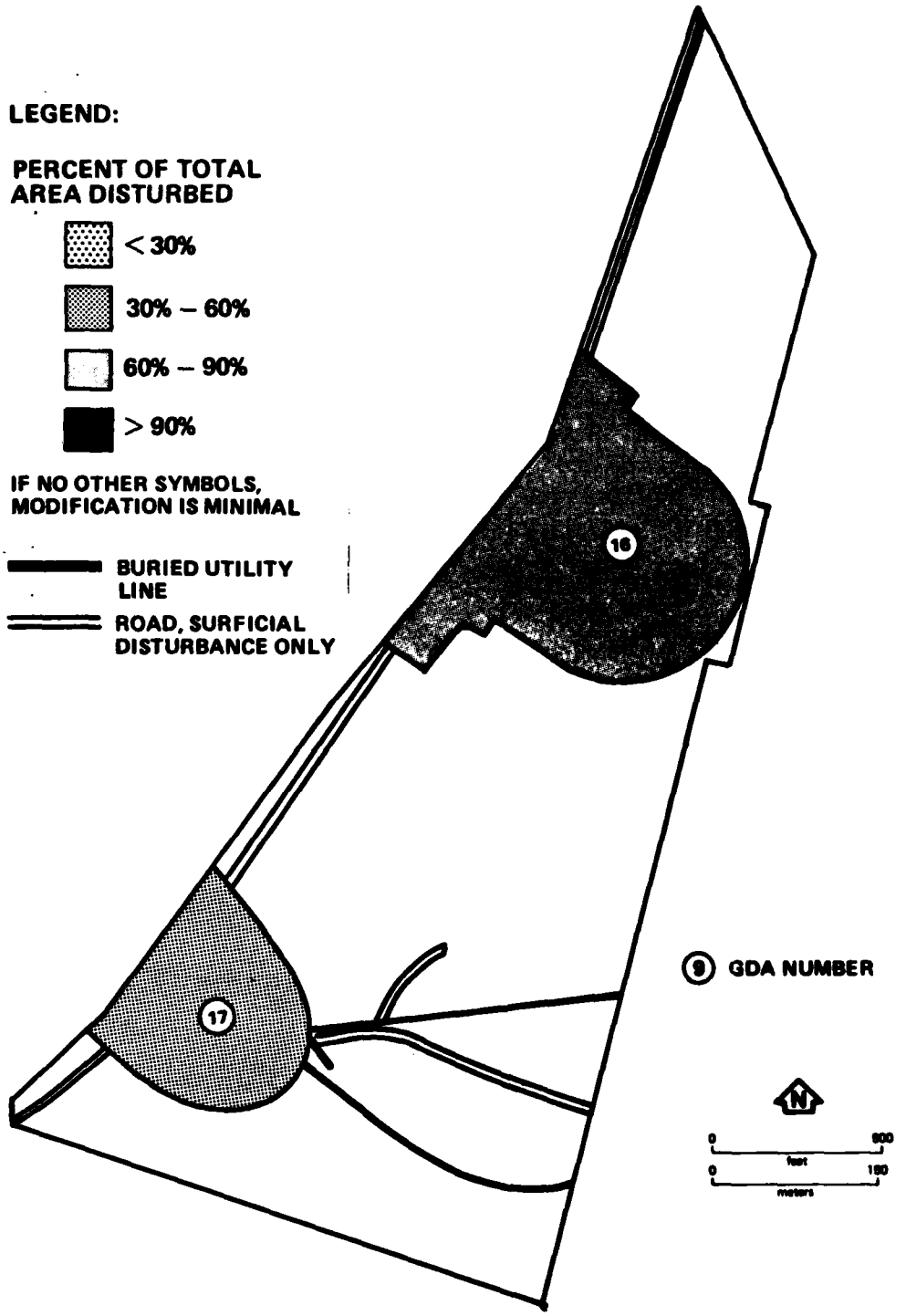

Figure 3-1b. MAP OF HISTORIC AND/OR MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE AT THE SUDBURY HOUSING AREA (U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES)

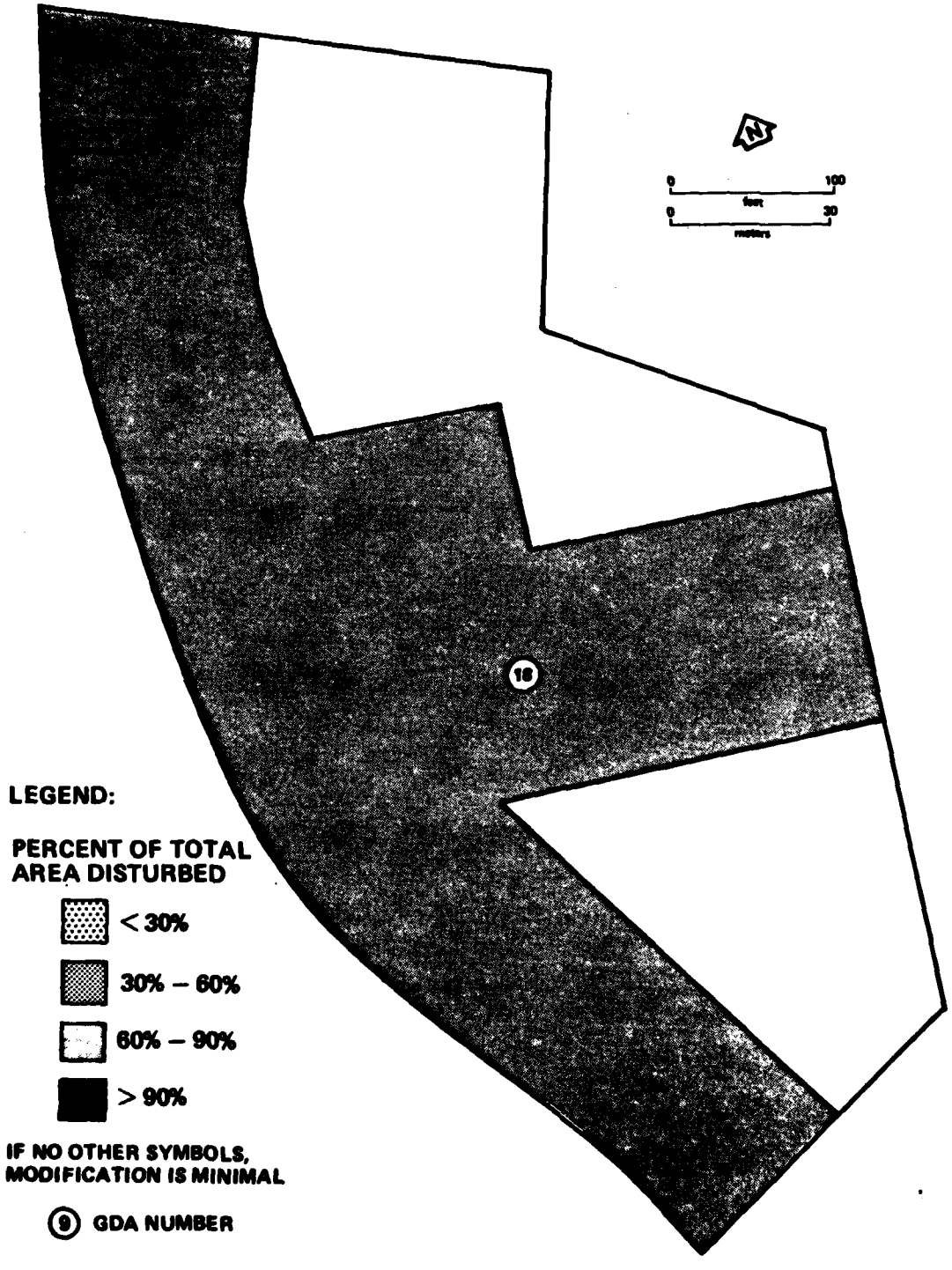

Figure 3-1c. MAP OF HISTORIC AND/OR MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE AT THE WAYLAND HOUSING AREA (U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES)

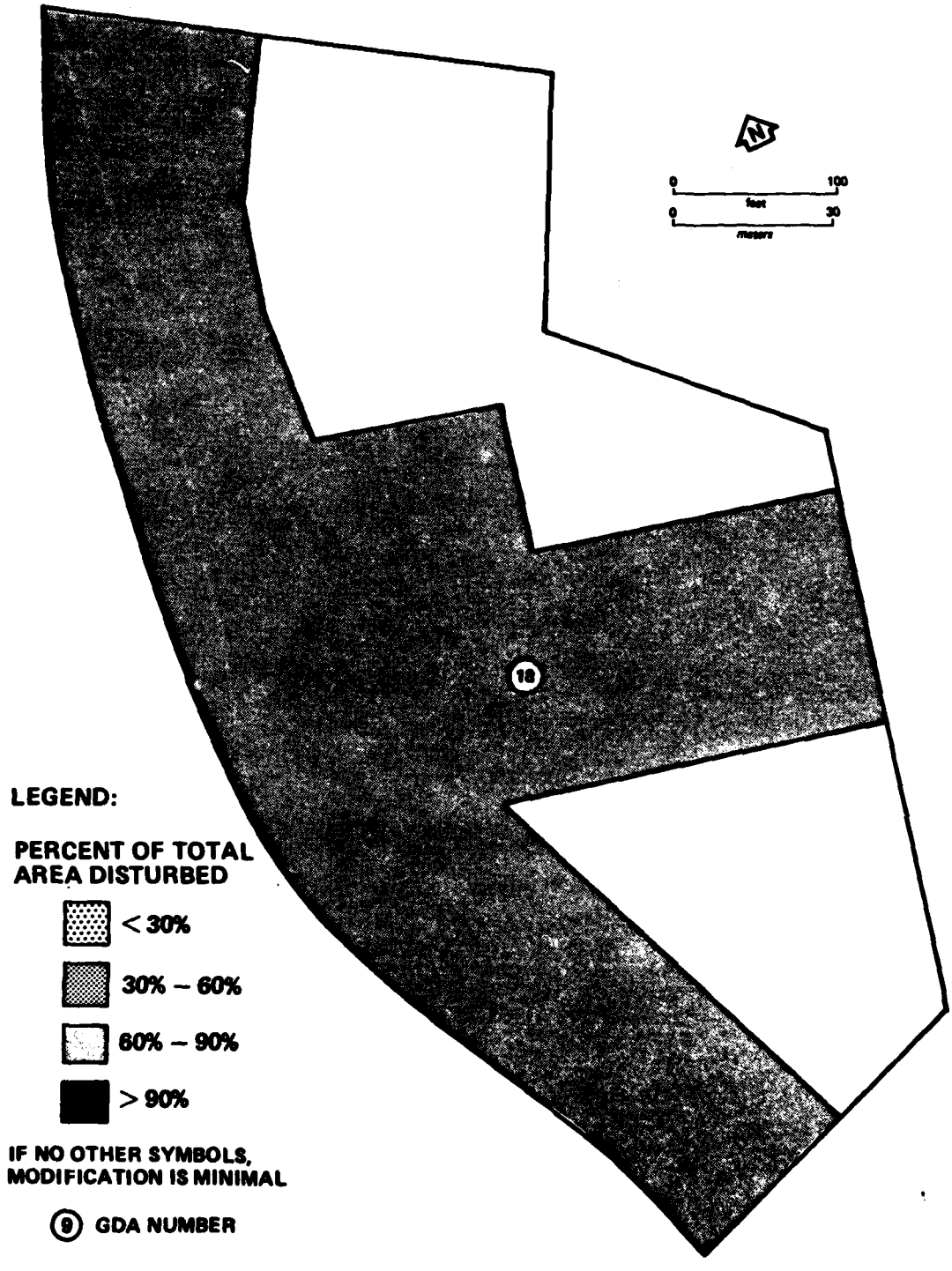

Figure 3-1c. MAP OF HISTORIC AND/OR MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE AT THE WAYLAND HOUSING AREA (U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES)

The Needham Housing Annex includes 3.5 a. of land. This annex was built in 1958, with additional construction occurring through 1973. The General Site Map for the area (Dwg. No. 18-02-05, Sheet 2; on file with the NLABS facility engineer) clearly indicates extensive grading associated with individual structures (Figure 3-1d).

3.3 PREVIOUS CULTURAL RESOURCE INVESTIGATIONS: COVERAGE AND INTENSITY

There have been no cultural resource investigations conducted at NLABS or the housing areas under its jurisdiction.

3.4 SUMMARY ASSESSMENT OF DATA ADEQUACY, GAPS

Although no archeological investigations have been carried out at NLABS, there are several locations which possess the characteristics at which archeological remains have been found. One is located at the southeastern tip of the installation and the second is located at the western edge of the facility. The elevation (less than 150 ft. above sea level), the soils (loamy sand and sandy loam), and the proximity to water make these two spots potentially suitable for prehistoric habitation. Further, these spots have remained undisturbed throughout the construction of the NLABS. There is, therefore, a possibility that archeological materials could be recovered from these two locales on the installation.

The Sudbury Annex housing unit includes an area of undisturbed land which would have been suitable for prehistoric settlement. White Pond and Boons Pond are close to the facility, and small streams, ponds, and wetlands surround the housing unit in the wooded area. The topography is relatively level; the potential area of prehistoric occupation lies at an elevation of approximately 200 ft. above sea level.

The Wayland housing unit is situated nearly equidistant from both the Sudbury River and Farrar Pond. Several sites are known from along the river near the Wayland facility. The sub-installation at Wayland lies on irregular terrain; a ravine, perhaps originally a kettle-hole, lies behind the housing complex. This land appears to be undisturbed, and the flat area above the ravine would have been favorable for prehistoric habitation.

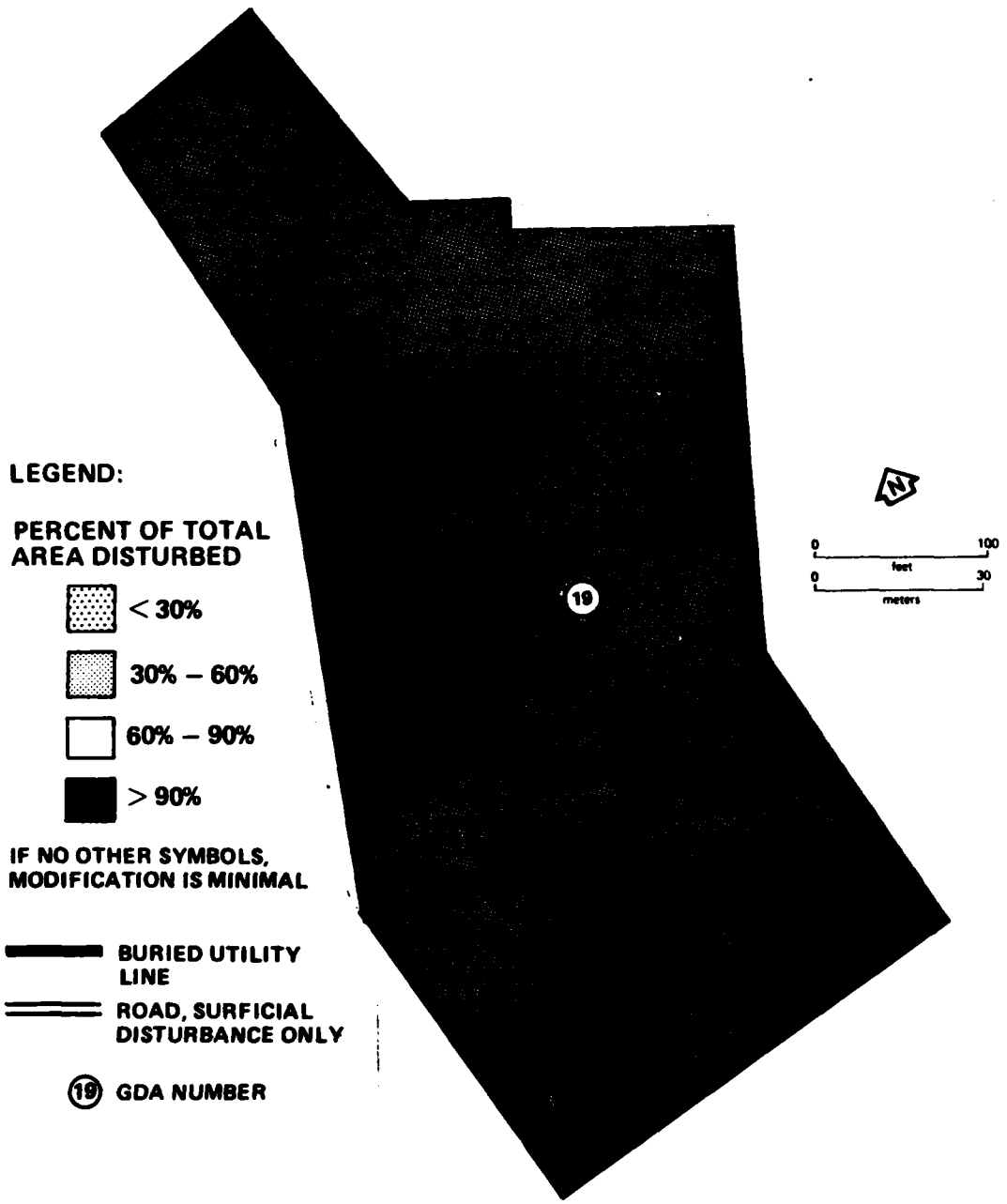

Figure 3-1d. A MAP OF HISTORIC AND/OR MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE AT THE NEEDHAM HOUSING AREA (U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES)

4.0
KNOWN ARCHEOLOGICAL RESOURCES ON THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES

At present, there are no known historic or prehistoric archeological resources located on property under the jurisdiction of the U.S. Army Natick Research and Development Laboratories (NLABS and associated housing areas) (Tables 4-1, 4-2, 4-3).

The large number of known prehistoric occupation sites in lacustrine settings in the Natick vicinity suggests that such locations were preferred by aboriginal populations. As noted in Chapter 3.0, prehistoric sites have been reported adjacent to Farm Pond in Framingham, west of Natick; along the northern and eastern margins of Lake Cochituate; and along Heard Pond in Wayland. The location of NLABS on a small peninsula jutting into the southern portion of Lake Cochituate, may also have been a preferred site. It is therefore possible that unrecorded aboriginal archeological sites may exist in undisturbed areas of NLABS.

The only identified potential archeological sites of the historic period which may remain on NLABS property consist of below grade remains of several houses which once existed along the south side of Kansas Street (Table 4-4). The exact number of these houses is not known, but at least two are shown in photographs 4512-10 and 4512-17 on file with the NLABS facility engineer. Both appear to date on stylistic grounds to the first half of the twentieth century, and both had at least partial basements.

(Presumably more data on these houses and others, if any, along Kansas Street which were demolished can be obtained through a study of Township property and tax records.)

Table 4-1. PRESENTLY IDENTIFIED ARCHEOLOGICAL RESOURCES ON THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES: ADMINISTRATIVE DATA

Site Number	Site Recorder	Date of Site Record	SHPO Survey Number	Site Record Repository	Survey Collection Policy	Current Status of Investigation	NRHP Status	State, Local Status	Architectural Association	Bibliographic Reference

NONE

Table 4-2. PRESENTLY IDENTIFIED ARCHEOLOGICAL COMPONENTS ON THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES: DESCRIPTION AND EVALUATION

Site Number	Unit Age				Unit Description							Evaluation			
	Date		Temporal Unit						Dimension						
	BP	Years BC/AD	Tradition	Phase (Period)	Artifacts	Features	Depositional Context	Landform	Area (m^2)	Depth (m)	Ascribed Function	Percent Intack	Value Integrity	RV	CR
NONE															

Table 4-3. PRESENTLY KNOWN ARTIFACT, ECOFACT, OR DOCUMENTARY COLLECTIONS FROM ARCHEOLOGICAL RESOURCES ON THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES

Site Number, Name	Collection Location		Collection Characteristics					
			Artifact		Ecofact		Documentary	
	Curatorial Repository	Accession Number(s)	Brief Description	Size/No.	Brief Description	Size/No.	Brief Description	Size/No.

NONE

Table 4-4. POTENTIALLY IDENTIFIABLE BUT NOT PRESENTLY RECORDED ARCHEOLOGICAL RESOURCES ON THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES

Site Number, Name[a]	Reference	Description	Research Value CR[b]
NLABS-A	Photo 4512-17; on file with NLABS facility engineer	Subsurface remains of early twentieth century structure	1
NLABS-B	Photos 4372-7 and 4512-10; on file with NLABS facility engineer	Subsurface remains of early twentieth century structure	1

Notes: a. Designations assigned for this study

b. Confidence Rating (CR): 1 = resource has little research value

5.0
AN ASSESSMENT OF THE SIGNIFICANCE OF THE ARCHEOLOGICAL RESOURCE BASE ON THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES

5.1 THE SIGNIFICANT RESOURCE BASE

There are no known archeological resources at NLABS or its affiliated housing areas. The only potential archeological resources (resources known to have existed but whose exact location and current status cannot be established) believed to be on NLABS property consist of the remains of several twentieth century homes located on the south side of Kansas Street.

These structures may or may not have been architecturally significant. However, it is highly unlikely that archeological excavation could provide significant data pertaining to the construction of these buildings which cannot be obtained through examination of extant photographs. Given the fact these structures were almost certainly emptied of their contents prior to their demolition or removal, it is highly unlikely that non-structural artifactual material relating to the dwellings' occupants exists. The relatively late construction dates also argues against the presence of such features as wells or privies which might yield archeological data. Given the above facts, possible archeological remains which might be associated with the former structure locations south of Kansas Street cannot be considered significant. Data on these sites is included in Table 5-1 for informational purposes only.

Prehistoric aboriginal remains may exist within undisturbed portions of NLABS property. While given the current state of New England prehistory, it is likely that any such site would be significant, no determinations can be made in the total absence of site-specific data.

5.2 IDEAL GOALS AND OBJECTIVES

Given the total absence of known, significant archeological resources at NLABS, a discussion of how to best study and manage resources which might be identified in the future would be premature. At the present time, the ideal first objective of any archeological planning program at NLABS should be the completion of archeological surveys of undisturbed areas and the evaluation, in terms of National Register of Historic Places eligibility criteria, of any resources discovered by such surveys. The need for, and scope of further goals and objectives is dependent upon the results of those studies.

Table 5-1. SUMMARY OF SIGNIFICANT ARCHEOLOGICAL RESOURCES ON THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES

Temporal Unit	Thematic Unit	Resource Type	Type Occurrence: Known Occurrences (no.)	Type Occurrence: Potential Occurrences (no.)	Type Occurrence: Other Likely Occurrences	Sociocultural Assn.	Landform Assn.	Physical Integrity	Research Value[a]	RV CR[b]	Sociocultural Value[c]	SCV CR[b]
20th C.	Domestic	House	0	2	+	American		?	0	3	0	3

a. This is a subjective summary assessment of the overall research value (RV) of the resource class. It is an evaluation of the class' quality of preservation, representation of activity diversity or uniqueness, and temporal distinctiveness or reflection of diachronic relationships. It incorporates the need to avoid triviality, but to acquire what may be redundant data so as to discern patterns among those data. Based on these research values, the resource class under discussion is ranked from 0 (no value) to 5 (highest value), including "NA" if such an evaluation is believed to be impossible given the available information.

b. The Confidence Rating (CR) is a further evaluation of the perceived reliability of the research (RV) or sociocultural (SCV) values of the resource class. The following code records a judgement of that reliability, based on the available information: (1) the judgement is more guess than science, and likely not to be reliable; (2) the judgement is moderately reliable; (3) the judgement is most likely reliable.

c. This is a subjective summary assessment of the overall sociocultural value (SCV) of the resource class. It is an evaluation of the social, religious, or political importance of the resource to a contemporary community, from 0 (no value) to 5 (highest value).

6.0
A RECOMMENDED ARCHEOLOGICAL MANAGEMENT PLAN FOR THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES

6.1 FACILITY MASTER PLANS AND PROPOSED IMPACTS

6.1.1 Proposed Construction

NLABS is considered to be a fully developed installation (H. Weisgold, 1983, Personal communication). However, the Master Plan (Dwg. No. 18-04-01, sheet 3, revised 9 February 1983; on file with the NLABS facility engineer) does indicate some proposed development that will involve ground disturbance (Table 6-1). This development includes construction of:

a) a 45 ft. by 10 ft. addition to the west side of the NCO Club (Bldg. No. 38);

b) a 200 ft. by 100 ft. warehouse immediately east of and adjacent to an existing warehouse (Bldg. No. 20);

c) a 50 ft. by 30 ft. addition to the northeast corner of the Special Test Lab (Bldg. No. 7);

d) a 100 ft. by 100 ft. gymnasium east of the existing tennis courts;

e) a 110 ft. by 75 ft. library in the open area between buildings 3 and 4, and partially over the existing air conditioning central plant; and

f) a 50 ft. by 50 ft. addition to the southeast corner of Headquarters (Bldg. No. 1).

Three of the proposed projects (warehouse, gymnasium and addition to Bldg. No. 7) are located within GDA-1, a former gravel pit which was excavated to a minimum depth of 20 ft. below original grade. None of these projects will have any impact on archeological remains.

The addition to the NCO Club (Figure 6-1, Area A) because of its size and proximity to the existing structure will probably effect already disturbed areas. However, no photos or detailed grading plans relating to the construction of the original building have been located, and it is

Table 6-1. A SUMMARY OF ON-GOING AND PLANNED ACTIVITIES ON THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES THAT COULD AFFECT ARCHEOLOGICAL RESOURCES

Activities						Associated Resources				Impacts		
Description	Date	Area[a]	Size (a.)	Estimated Depth Below Surface (ft.)	Ratio of Disturbed to Total Area	Resource Class	Resources Known or Predicted[b]	NRHP Status	Other Value	Direct	Indirect	Mitigation Options
On-going												
Use of recreation areas	-	B,C	4	?	10:10	Prehistoric	L+				Artifact Collecting	
Stockpiling snow	-	C	3	1	8:10	Prehistoric	L+			Disturb unknown sites		Alternate means of snow removal
Planned												
Expansion of Bldg. No. 36	N/A	A	-	N/A	?	Prehistoric	+			Disturb unknown sites		
Expansion of Bldg. No. 1	N/A	D	-	N/A	?	Prehistoric	+			Disturb unknown sites		
Construction of library	N/A	E	-	N/A	?	Prehistoric	+			Disturb unknown sites		

NOTES: a. Refer to Figure 6-1 for location.
b. L = Likely, + = positive chance.

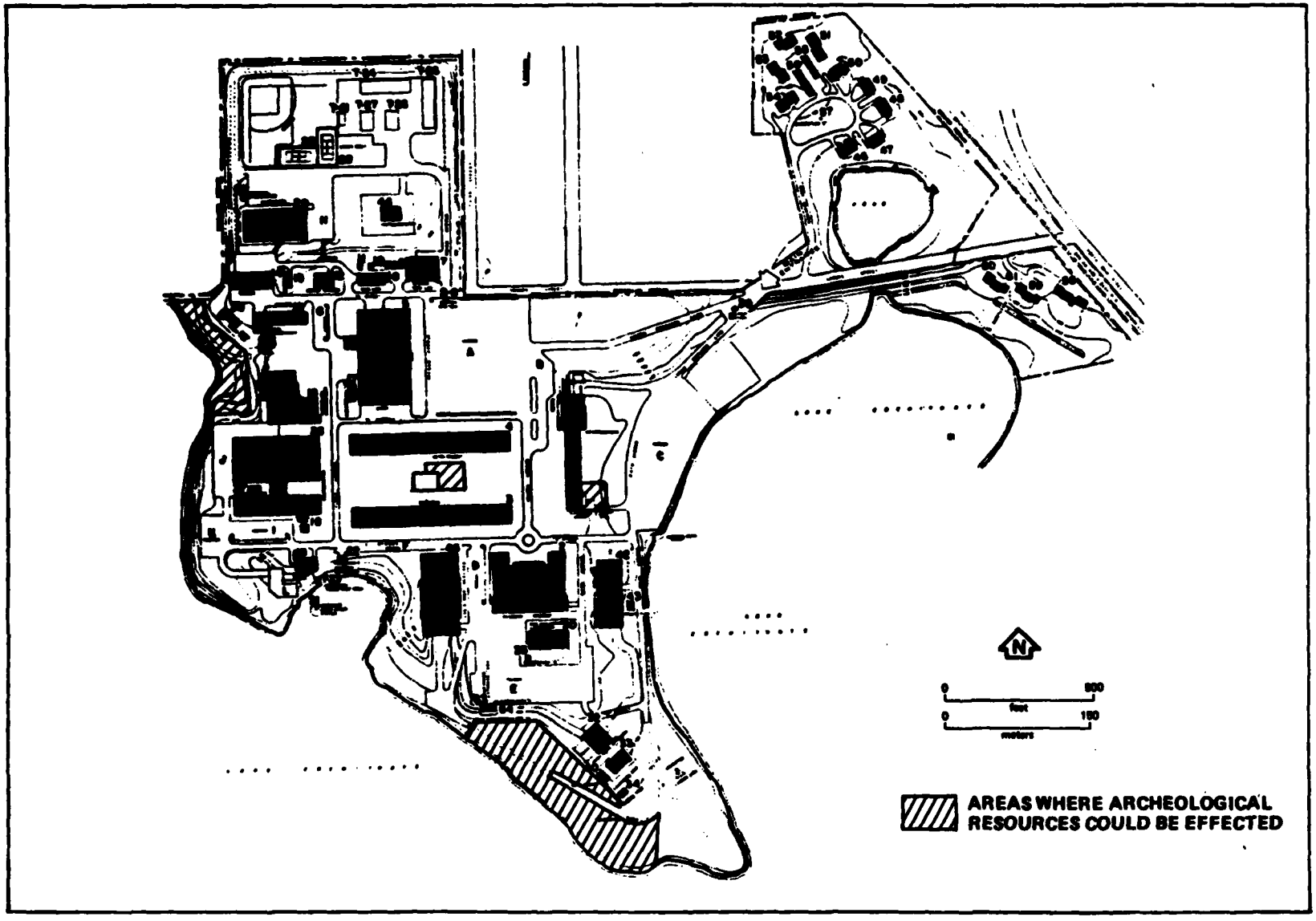

Figure 6-1. MAP OF AREAS OF ONGOING OR PLANNED ACTIVITIES AT THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES THAT COULD AFFECT ARCHEOLOGICAL RESOURCES

possible that some small previously undisturbed areas might be impacted. The site's position on a high point overlooking a cove and beach on Lake Cochituate would have been a choice location for aboriginal settlement.

The proposed library (Figure 6-1, Area E) is located partially within the area disturbed by construction of the underground air conditioning central plant. The majority of the new structure will be located in an area which does not have any underground utilities. However, this area may have been extensively disturbed during the original construction of Building Nos. 3 and 4. An unnumbered photograph on file with the facility engineer suggests that much of GDA-9 was extensively graded during site preparation prior to the first phase of construction at NLABS. Thus, while it is possible that only minimally disturbed sections of the area in which the library will be constructed exist, this is highly unlikely.

Construction of the proposed addition to the Headquarters Building (Figure 6-1, Area D) will take place in an area which has not been disturbed by underground utilities. No photos or detailed grading plans relating to the original construction of the Headquarters Building have been located. However, a general site preparation plan (Dwg. No. 16-06-02, Sheet 1, on file with NLABS facility engineer) suggests that some contouring of this area (a small knoll) has taken place. The site is located only 300 ft. from the shore of Lake Cochituate, and while it is possible that undisturbed archeological remains are located in the area, it is highly unlikely.

6.1.2 Ongoing Nonconstruction Activities

Outdoor Recreation. Two areas (Figure 6-1, Area C) are presently being used for outdoor recreation at NLABS. One is a small wooded cove with a natural beach on the shore of Lake Cochituate west of Building No. 16. Several small boats are beached here and the area is used for picnicking. The second area consists of the lakefront land at the southern end of the peninsula on which NLABS is located. This area is grassed and contains large shade trees. It is used as both a children's play area and for picnicking.

Both of the areas noted above are at an elevation of between 140 and 145 ft. above sea level. As noted in Section 3.1, 85 percent of the known sites in the study area are located at elevations between 110 and 150 ft. above sea level, and all are located with reference to surface water. This suggests that these recreation areas are the areas most likely to contain prehistoric archeological remains. Disturbance to date of both these areas (except as noted below) appears to have been only surficial.

Snow Removal. The densely developed nature of the NLABS site, its numerous parking areas, and its location within a heavy snowfall area, means that snow removal is a major winter-time occupation (see photo 4793, on file with facility engineer). Because of the region's long cold winters, snow must be removed from roads and parking areas. Much of this snow is stockpiled during the winter (to await warmer spring weather when it melts) at the south end of the NLABS peninsula within and adjacent to

the recreation area (Figure 6-1, Area C). Heavy equipment is used during this operation resulting in both disturbance of the surface to an unknown depth (probably generally less than 6 in., but possibly greater in some areas, particularly when wet) and compaction of the soil. This operation would have an adverse effect upon archeological remains which might be located in the area.

6.2 APPROPRIATE ARCHEOLOGICAL MANAGEMENT GOALS WITHIN THE U.S. ARMY NATICK RESEARCH AND DEVELOPMENT LABORATORIES MASTER PLAN

6.2.1 General Facility Planning

Although the majority of NLABS land has been disturbed, there are several small undisturbed areas which, because of their physiographic setting, may contain prehistoric archeological remains. In addition, at least one minimally disturbed area may contain remains of historic structures. A primary planning goal for NLABS, in accordance with Sec. 110(a)(2) of the National Historic Preservation Act, is to determine if any of these areas contain archeological resources requiring further management. In general, it appears that any future development within areas identified as disturbed on Figure 3-1a will be unlikely to affect significant archeological resources.

The Sudbury Housing Area includes the largest single area of undisturbed land under NLABS jurisdiction (approximately 65 a.). However, while several elevated areas (generally areas above the 200 ft. contour line) would have been suitable for prehistoric occupation, the majority of the undisturbed area is wetland and is unlikely to contain archeological remains. At the present time there are no plans for further development at the Sudbury Housing Area, and there are no ongoing activities which might affect unknown archeological resources. An archeological survey should be conducted on the elevated portions of the property prior to any future development or removal of federal control over the area (e.g., excessing).

Approximately 65 percent of the Wayland Housing Area was disturbed by house construction and the placement of associated utilities. The undisturbed portions generally have slopes averaging 20 percent. In the absence of some other special characteristics, such areas would have been totally unsuitable for occupation by prehistoric or historic populations. The Needham Housing Area was totally disturbed during its construction. No further archeological management consideration need be given to either the Wayland or Needham areas.

6.2.2 Project-Specific Resource Protection or Treatment Options

At the present time the only planned or ongoing activity at NLABS which may be actively affecting archeological resources is the stockpiling of snow at the southern end of the installation. Given the density of development at NLABS, it is unlikely that an alternative location for this activity is feasible. Consideration should be given to the disposal of snow into Lake Cochituate until such time as the presence or absence of archeological remains in the area is determined.

It is possible that the use of the several recreation areas at NLABS may result in the fortuitous discovery of archeological remains by NLABS employees. All new NLABS employees should be advised during their initial orientation of DARCOM's historic preservation responsibilities and told to report any archeological finds on NLABS property to the facility engineer (who in turn should notify DARCOM and the State Historic Preservation Officer). The present "Standards of Conduct for NLABS Employees" should be revised to note that the removal or disturbance of archeological remains from NLABS property (including housing areas) is prohibited. Residents of housing areas should be advised to inform their families of this prohibition and the need to inform the facilities engineer of any chance finds of archeological remains.

6.2.3 A Summary of Recommended Management Directions and Priorities for Effective Compliance and Program Development

The following prioritized archeological resource management tasks should be undertaken at NLABS and its associated housing areas:

- o archeological survey of recreation areas,
- o consideration of alternatives to stockpiling snow in lakefront areas,
- o advising employees of DARCOM's historic preservation responsibilities during new personnel orientations and by modification of the NLABS Code of Conduct,
- o archeological survey of other undisturbed portions of NLABS,
- o archeological survey of selected portions of the Sudbury Housing Area.

Subsequent recommendations for the management of archeological resources at NLABS is contingent upon future discoveries of such resources.

6.3 ESTIMATED SCOPES OF WORK AND COST LEVELS FOR PRESENTLY IDENTIFIABLE MANAGEMENT NEEDS

6.3.1 Archeological Survey of NLABS Recreation Areas

The two lakeside areas at NLABS where ongoing or planned activities could effect archeological resources cover approximately 1 a. and 3 a., respectively. Testing for archeological resources should be accomplished through a series of sub-surface shovel tests placed at approximately 50 ft. intervals to insure the discovery of small sites. These tests should extend to sterile Pleistocene deposits. All excavated material should be screened through 1/4 in. hardware cloth. Use of shovels in combination with soil augers will allow tests to be excavated to the bottom of any deposits which might contain cultural material. Survey standards should be consistent with those described the Secretary of the Interior's Standards for Archeology and Historic Preservation. Field

investigations should require four person-days while analysis and reporting will require an additional two person-days. The estimated cost will be $1100-$1300.

6.3.2 Archeological Survey of Undisturbed Areas Which May Contain Archeological Resources

NLABS. Not all areas shown as undisturbed on Figure 3-1a are equally likely to contain archeological remains. Certain areas because of their relatively steep slopes would not have been suitable for human occupation. In addition to the two recreation areas recommended for survey in Section 6.3.1, two additional areas not presently scheduled to be impacted by NLABS activities have archeological potential. These are the grassy area south of Kansas Street and east of parking Area A (where coincidentally the remains of sites NLABS-A and NLABS-B are believed to be located), and the grassy area northeast of Parking Area C, bordering Lake Cochituate. Together, these areas cover approximately 3 a. Excavation methodology and reporting standards should be the same as those described in Section 6.3.1. Three person-days will be required to complete field operations. An additional two person-days will be required for analysis and report preparation. Total estimated cost is $900-$1100.

Sudbury Housing Area. Undisturbed non-wetland portions of the Sudbury Housing Area (generally areas above the 200 ft. contour line) cover approximately 10 to 15 a. Excavation methodology and reporting standards should conform to those described in Section 6.3.1. Archeological subsurface testing will require 12 person-days and laboratory analysis and report preparation will require four days. Estimated costs are $2400-$2800.

6.3.3 Archeological Survey of Areas of Proposed Future Construction

As noted in Section 6.1.1 proposed construction of a library and additions to Building Nos. 1 and 36 may affect as yet unrecorded archeological remains. However, because of the small areas involved and because these areas are likely to have been previously disturbed to an unknown extent, separate examination of these areas would not be cost effective. These areas can best be examined in conjunction with one of the other surveys recommended in Sections 6.3.1 and 6.3.2 at an additional estimated cost of $100. A separate field survey is not warranted.

7.0
SUMMARY

A complete inspection of all information sources likely to have data relating to the archeology of the site occupied by the U.S. Army Natick Research and Development Laboratories was conducted for this study. That inspection revealed that although numerous prehistoric sites have been reported in the Lake Cochituate vicinity and the Sudbury River drainage, none is known to exist on NLABS property (including its affiliated housing areas). In addition, though the area is rich in history, no known historic archeological sites of potential significance could be identified.

Among the institutions consulted as part of the basic data gathering were the Peabody Museum (Harvard University), the Bronson Museum (Massachusetts Archaeological Society), the Framingham Historical Society, the Concord Public Library, the Goodnow Library, the Natick Historical Society, the American Museum of Natural History, the Museum of the American Indian-Heye Foundation, and the Massachusetts Historical Commission (State Historic Preservation Officer). The "America: History and Life" database of Lockheed's Dialog Information Retrieval Service, which contains abstracts from more than 2000 history journals, was consulted.

Two separate site visits to NLABS by the authors and an examination of original construction plans, photographs, and the installation Basic Information Maps has indicated that most of the NLABS site has been disturbed to varying degrees precluding the existence of extant archeological sites in these areas. However, relatively undisturbed areas currently being used for recreational purposes and the stockpiling of snow during winter months are likely to contain previously unrecorded prehistoric archeological sites. Archeological surveys of these areas are recommended. Future NLABS activities described in the installation's Master Plan are unlikely to effect archeological resources.

The Sudbury Housing Area contains approximately 10-15 a. of land which might contain prehistoric archeological sites. An archeological survey of this area should be conducted prior to any future ground disturbing activities (none are presently planned) or removal of the property from federal control. The Wayland and Needham housing areas are not believed to have any potential for the presence of archeological sites because of prior ground disturbance and/or the physiographic characteristics of undisturbed areas.

8.1 PRIMARY SOURCES AND REFERENCES CITED

Bacon, Oliver. 1856. A History of Natick, From its First Settlement in 1651 to the Present Time. Boston: Damrell & Moore.

Beers, J. B. 1874. Atlas of Middlesex County, Massachusetts. New York: J. B. Beers and Company.

Carlson, Robert W. 1964. The Washakamaug Site. Bulletin of the Massachusetts Archaeological Society 25(2):29-34.

Casjens, Laurel. 1979. Archaeological Site Catchments and Settlement Patterns in the Concord River Watershed, Northeastern Massachusetts. Ms. on file, Institute of Conservation Archaeology, Peabody Museum, Harvard University.

Crawford, Michael. 1976. History of Natick, Massachusstts 1650 - 1976. Natick, Massachusetts: Natick Historical Commission.

Dincauze, Dena. 1968. Cremation Cemeteries in Eastern Massachusetts. Papers of the Peabody Museum of American Archaeology and Ethnology 59(1).

----------. 1971. An Archaic Sequence for Southern New England. American Antiquity 36(2):194-198.

----------. 1972. The Atlantic Phase: A Late Archaic Culture in Massachusetts. Man in the Northeast 4:40-61.

----------. 1974. An Introduction to Archaeology in the Greater Boston Area. Archaeology of Eastern North America 2(1):39-67.

----------. 1978. Cremation Cemeteries in Eastern Massachusetts. Papers of the Peabody Museum of American Archaeology and Ethnology 59(1).

----------. 1978. The Case for Conservation Archaeology: Uniqueness and Universality, the Massachusetts Example. In Conservation Archaeology in the Northeast: Toward a Research Orientation, edited by A. E. Speiss. Peabody Museum Bulletins 3:4-8.

----------. 1980. Research Priorities in Northeastern Prehistory. In Proceedings of the Conference on Northeastern Archaeology, edited by J. A. Moore. Department of Anthropology, University of Massachusetts, Amherst, Research Reports 19.

Dincauze, Dena and Judith Meyer. 1977. Prehistoric Resources of East-Central New England: a Preliminary Predictive Study. Cultural Resource Management Studies. National Park Service, U.S. Department of the Interior, Washington, D.C.

Fowler, William. 1978. A Case for an Early Archaic in New England. Bulletin of the Massachusetts Archaeological Society 29(3-4):53-58.

Funk, Robert E. 1978. Post-Pleistocene Adaptations. In Handbook of North American Indians, edited by B. Trigger, pp. 16-27. Washington, D.C.: United States Government Printing Office.

Goldthwait, J. W. 1905. The Sand Plains of Glacial Lake Sudbury. Bulletin of the Museum of Comparative Zoology, Vol. 42, Geological Series 6(6):263-301.

Hudson, A. S. 1889. The History of Sudbury, Massachusetts:1638-1889. Sudbury.

Hurd, Hamilton. 1890. History of Middlesex County, Volume 1. J. W. Philadelphia: Lewis and Co.

Mansfield, J. A. 1961. The Mansion Inn Site - Wayland. Bulletin of the Massachusetts Archaeological Society 23(1):1-5.

Massachusetts Historical Commission. 1979 (revised 1980). Cultural Resources in Massachusetts: A Model for Management. HCRS Publication No. 37.

Moore, James A. 1980. Introduction. In Proceedings of the Conference on Northeastern Archaeology, edited by James A. Moore, pp. 1-7. Department of Anthropology, University of Massachusetts, Amherst. Research Reports No. 19.

Mulholland, Mitchell. 1978. Forest Succession and Human Population Change in a Temperate Forest Environment. Paper Presented at the Northeastern Anthropological Association Annual Meeting, Quebec.

Temple, J. H. 1897. History of Framingham, Massachusetts, Early Known as Danforth's Farms, 1640-1880. Framingham.

Turchon, Frederick. 1978. Archaeological Assessment for the Proposed Park and Playground Facilities, Farm Pond Park, Framingham, Mass. Ms. on file, Storch Associates Engineers, Boston.

United States Department of Agriculture Soil Conservation Service. 1982. Northeastern Massachusetts Interim Soil Survey Report. Cooperatively published by Essex, Middlesex, Norfolk, Suffolk, Worcester Northeast, Worcester Northwest and Worcester South Conservation Districts; and

the State Committee for Conservation and Soils, Water and Related Resources.

8.2 OTHER PERTINENT LITERATURE

Bawden, Garth. 1979. Archaeological Reconnaissance Survey: Downtown Common, Framingham. Ms. on file, Massachusetts Historical Commission, Boston.

Biglow, William. 1839. History of the Town of Natick, Massachusetts. Boston.

Blancke, Shirley. 1980. An Assessment of the Archaeological and Historical Impact of the Concord, Massachusetts Facilities Plan. Ms. on file, Massachusetts Historical Commission, Boston.

Bolian, Charles, R. Scott Dillon and Eugene Winter. 1981. A Cultural Resource Survey of the Great Meadows National Wildlife Refuge, Massachusetts. Ms. on file, Massachusett, Historical Commission, Boston.

Brenner, Elise. 1982. Sociopolitical Change in 17th Century Massachusetts: Archaeology and Ethnohistory. Ms. on file, National Science Foundation, Washington, D.C.

Byers, Douglas. 1960. The Rape of Wayland. American Antiquity 25(3):420.

Carlson, Robert W. 1964. The Washakamaug Site. Bulletin of the Massachusetts Archaeological Society 25(2):29-34.

----------. 1968. A Preliminary Report on the Charles River Archaeological Survey. Ms. on file, National Park Service, Washington, D.C.

----------. 1973. Archaeological Reconnaissance in the Greater Boston Area: 1969-1972. Ms. on file, National Science Foundation, Washington, D.C.

----------. 1973. Prehistoric Occupation of the Charles River Estuary: a Paleogeographic Study. Bulletin of the Archaeological Society of Connecticut 38:25-39.

Davis, M. B. 1969. Palynology and Environmental History During the Quaternary Period. American Scientist 57 (3):317-332.

Elia, Ricardo. 1980. Report on the Phase I Archaeological Investigation of the Proposed Wastewater Facilities, Natick, Massachusetts. Ms. on file, Massachusetts Historical Commission, Boston.

Horner, George and C. L. Cittadino, Jr. 1977. Cultural Impact Study/Phase I, North High School Practice Field and Running Track, Framingham, Massachusetts. Ms. on file, Massachusetts Historical Commission, Boston.

Hudson, Alfred Sereno. 1891. Annals of Sudbury, Wayland, and Maynard, Middlesex County, Massachusetts. Published privately.

----------. 1904. The History of Concord, Massachusetts. The Erudite Press, Concord.

LaForge, Laurence. 1932. Geology of the Boston Area, Massachusetts. United States Geological Bulletin 839.

Latimer, W. J. and M. D. Lanphear. 1924. Soil Survey of Middlesex County, Massachusetts. U.S. Department of Agriculture, Bureau of Chemistry and Soils Series 1924 (26).

Moeller, Roger. 1977. Cultural Resource Reconnaissance of the Saxonville Local Protection Project: Framingham, Massachusetts. Ms. on file, Massachusetts Historical Commission, Boston.

Nelson, Arthur E. 1974a. Surficial Geologic Map of the Framingham Quadrangle, Middlesex and Worcester Counties, Massachusetts. Reston, Virginia: U.S.G.S.

----------. 1974b. Surficial Geologic Map of the Natick Quadrangle, Middlesex and Norfolk Counties, Massachusetts. Reston, Virginia: U.S.G.S.

Ritchie, Duncan. 1980. Cultural Resource Survey: Great Meadows National Wildlife Refuge, Massachusetts. Ms. on file, Massachusetts Historical Commission, Boston.

Sabloff, Jeremy and Steven Cox. 1976. Route 2: Acton, Concord, Lincoln, Lexington, Massachusetts. Ms. on file, Massachusetts Historical Society.

Vance, J. E. and R. E. Murphy. 1951. A Geographic Survey of Natick. Ms. on file, Morse Institute, Natick, Mass.

Walcott, Charles. 1884. Concord in the Colonial Period. Boston: Estes and Lauriat.

Willoughby, Charles C. 1935. Antiquities of the New England Indians. Cambridge, Massachusetts: Peabody Museum of American Archaeology and Ethnology.

Wilson, John. 1975. Archaeological Survey Report, Constance M. Fiske site (Phase I), Baiting Brook Watershed, Framingham, Massachusetts. Ms. on file, Massachusetts Historical Society, Boston.

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