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USATHAMA

U.S. Army Toxic and Hazardous Materials Agency

Enhanced Preliminary Assessment Report:

East Windsor Army Housing Units East Windsor, Connecticut



October 1989

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prepared for

Commander
U.S. Army Toxic and Hazardous Materials Agency
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<p>Argonne National Laboratory has conducted an enhanced preliminary assessment of the Army housing property located in East Windsor, CT. The objectives of this assessment include identifying and characterizing all environmentally significant operations, identifying areas of environmental contamination that may require immediate remedial actions, identifying other actions which may be necessary to resolve all identified environmental problems, and identifying other environmental concerns that may present impediments to the expeditious sale of this property.</p>			
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SUMMARY

The East Windsor military housing facility located in East Windsor, Conn., presents no imminent or substantial threat to human health or the environment. There is no evidence to suggest that hazardous or toxic constituents have ever been released from this property. No immediate remedial actions, therefore, are warranted for the site.

Although these housing units were originally developed in conjunction with a Nike missile battery, available documentation and circumstantial evidence indicate that the housing property was wholly independent of the battery's operational activities. No Nike-related wastes were delivered to this property for management or disposal. Furthermore, since this property was independent of the Nike missile operations with respect to all necessary utilities, there is no possibility of migration of Nike-related wastes along buried utility lines. Nevertheless, two potential environmental impacts from this property have been identified, and these might ultimately warrant remedial action.

Potential environmental impact involves the above-ground fuel-oil storage tanks. The exteriors of the above-ground tanks appear not to have an adequate protective coating, and areas of rust were observed on some of them. An adverse environmental impact can be anticipated should these tanks remain in service in their present condition. Adding to this concern is the possibility that the effectiveness of the concrete containment box beneath each tank would be compromised if the drainage tap on the box were to remain in the open position for an extended period of time.

The following actions are recommended prior to the release of this property:

- Assure the integrity of the above-ground fuel-oil storage tanks, treat for rust, and apply a proper protective coating.
- Develop and implement a solution to the possibility of containment-box drainage taps being inadvertently left in the open position.

The above recommendations are based on the assumption that this property will continue to be used for residential housing.

1 INTRODUCTION

In October 1988, Congress passed the Defense Authorization Amendments and Base Closure and Realignment Act, Public Law 100-526. This legislation provided the framework for making decisions about military base closures and realignments. The overall objective of the legislation is to close and realign bases so as to maximize savings without impairing the Army's overall military mission. In December 1988, the Defense Secretary's ad hoc Commission on Base Realignment and Closure issued its final report nominating candidate installations. The Commission's recommendations, subsequently approved by Congress, affect 111 Army installations, of which 81 are to be closed. Among the affected installations are 53 military housing areas, including the East Windsor housing area addressed in this preliminary assessment.¹

Legislative directives require that all base closures and realignments be performed in accordance with applicable provisions of the National Environmental Policy Act (NEPA). As a result, NEPA documentation is being prepared for all properties scheduled to be closed or realigned. The newly formed Base Closure Division of the U.S. Army Toxic and Hazardous Materials Agency is responsible for supervising the preliminary assessment effort for all affected properties. These USATHAMA assessments will subsequently be incorporated into the NEPA documentation being prepared for the properties.

This document is a report of the enhanced preliminary assessment (PA) conducted by Argonne National Laboratory (ANL) at the Army stand-alone housing area in East Windsor, Conn.

1.1 AUTHORITY FOR THE PA

The USATHAMA has engaged ANL to support the Base Closure Program by assessing the environmental quality of the installations proposed for closure or realignment. Preliminary assessments are being conducted under the authority of the Defense Department's Installation Restoration Program (IRP); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 91-510, also known as Superfund; the Superfund Amendments and Reauthorization Act of 1986, Public Law 99-499; and the Defense Authorization Amendments and Base Closure and Realignment Act of 1988, Public Law 100-526.

In conducting preliminary assessments, ANL has followed the methodologies and procedures outlined in Phase I of the IRP. Consequently, this PA addresses all documented or suspected incidents of actual or potential release of hazardous or toxic constituents to the environment.

In addition, this PA is "enhanced" to cover topics not normally addressed in a Phase I preliminary assessment. Specifically, this assessment considers and evaluates the following topical areas and issues:

- Status with respect to regulatory compliance,
- Asbestos,
- Polychlorinated biphenyls (PCBs),
- Radon hazards (to be assessed and reported on independently),
- Underground storage tanks,
- Current or potential restraints on facility utilization,
- Environmental issues requiring resolution,
- Health-risk perspectives associated with residential land use, and
- Other environmental concerns that might present impediments to the expeditious "excessing," or transfer and/or release, of federally owned property.

1.2 OBJECTIVES

This enhanced PA is based on existing information from Army housing records of initial property acquisition, initial construction, and major renovations and remodeling performed by local contractors or by the Army Corps of Engineers. The PA effort does not include the generation of new data. The objectives of the PA include:

- Identifying and characterizing all environmentally significant operations (ESOs),
- Identifying property areas or ESOs that may require a site investigation,
- Identifying ESOs or areas of environmental contamination that may require immediate remedial action,
- Identifying other actions that may be necessary to address and resolve all identified environmental problems, and
- Identifying other environmental concerns that may present impediments to the expeditious transfer of this property.

1.3 PROCEDURES

Connecticut military housing records located at Fort Devens, Mass., were reviewed during the week of May 15-19, 1989. Additional information was obtained on July 17, 1989, from the Family Housing Office located at the Navy and Marine Corps Reserve Center, New Haven, Conn., and from an interview on July 20, 1989, with the Area Facilities Engineer at his office in Windsor Locks, Conn. A site visit was conducted at East Windsor, Conn., on July 20, 1989, at which time additional information was obtained through personal observations of ANL investigators and discussions with a site occupant. Photographs were taken of the housing units and surrounding properties as a means of documenting the condition of the housing units and immediate land uses. Site photographs are appended.

All available information was evaluated with respect to actual or potential releases to air, soil, and surface and ground waters.

Attempts to gain access to the housing units through involvement of the senior occupant were unsuccessful. Therefore, internal inspection of the units was not possible during the site visit. However, ANL investigators revisited the site on September 10, 1989, at which time the interiors of all but five of the units (units #2, 5, 8, 12, and 13; South Road) were inspected.

2 PROPERTY CHARACTERIZATION

2.1 GENERAL PROPERTY INFORMATION

The East Windsor housing property, located in the town of East Windsor in Hartford County in north-central Connecticut, contains 4.0 acres of land and has a license from the State of Connecticut for sewer lines.² Figures 1 and 2 show the general location of the facility.

The housing units were developed in 1958 and were recently renovated.³ No additional major construction has taken place on the property since it was developed.

2.2 DESCRIPTION OF FACILITY

Figure 3 shows the site plan of the housing property.

Housing Units

The East Windsor military housing facility comprises 16 wood-frame, one-story, single-family houses built on concrete slabs. Capehart is the model name assigned to these houses by the builder, National Homes. Nine of the housing units have three bedrooms and seven have two bedrooms. Twelve of the 16 housing units have attached garages, equally divided among the two- and three-bedroom units.

Utilities

The housing units are connected to the town water department's distribution system, and no drinking water wells exist on the property. Likewise, the electrical distribution system for the property is connected to the local power company's distribution system. However, according to the Area Facilities Engineer, all water and electrical lines, utility poles, and electrical transformers on the property are owned by the U.S. government, which is responsible for maintaining them. Therefore, the cost of repairs made to the property's utility distribution systems by public utility personnel is borne by the government. There is no record of sampling of the electrical transformers for the presence of PCBs. However, no evidence of spills or leaks from the transformers could be found. Solid wastes are removed from the property by a private contractor.

Sewage

The government-owned sewage distribution system for the housing facility and the sewage system for the nearby Middleton U.S. Army Reserve Center were both connected to the public sanitary sewer system upon completion of the Phelps Road sewer line in about 1983.⁴ A contractor for the Water Pollution Control Authority of the Town of East Windsor constructed the sewer line. Real-property records indicate that the

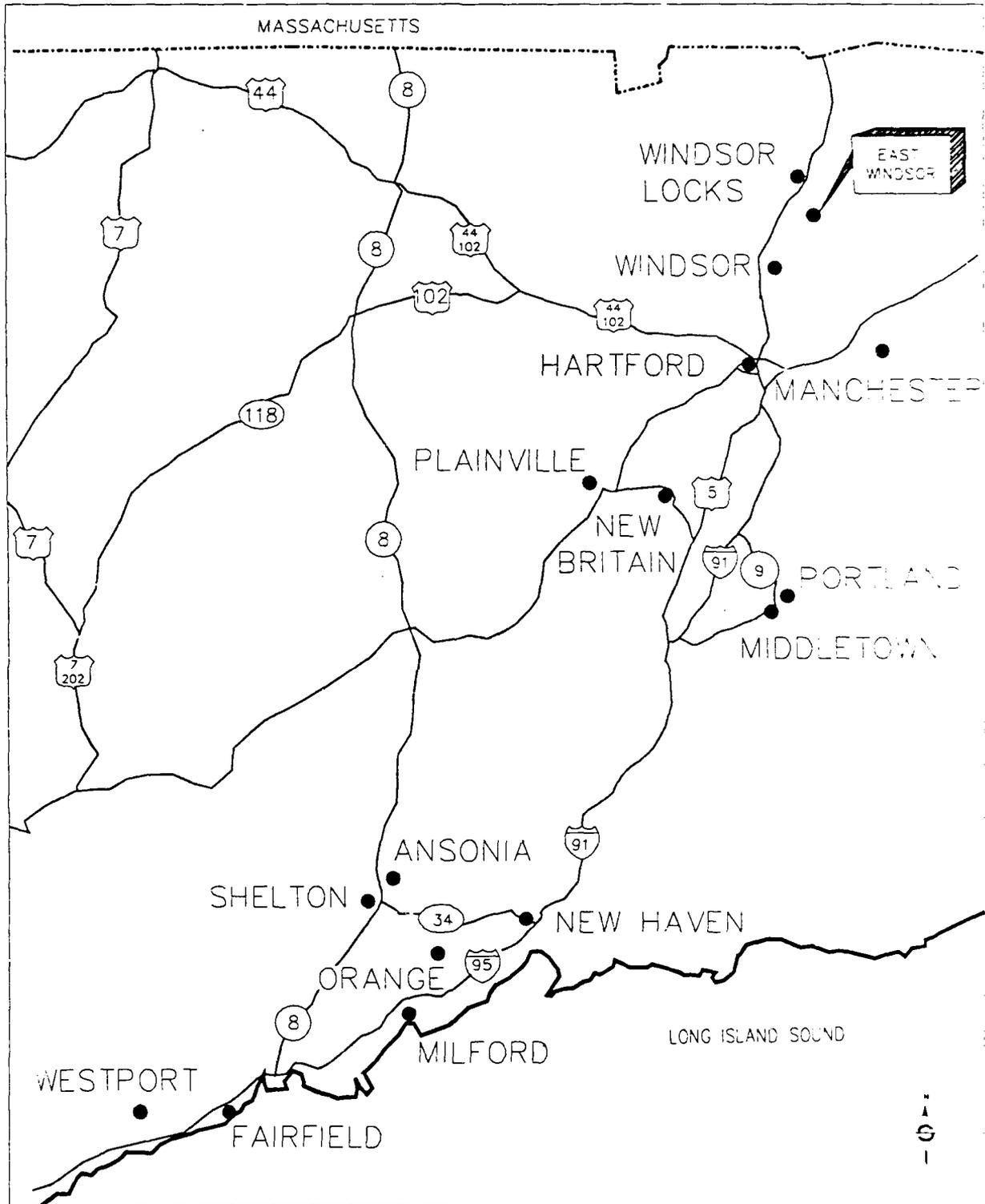


FIGURE 1 Location Map of Connecticut Army Housing Facilities

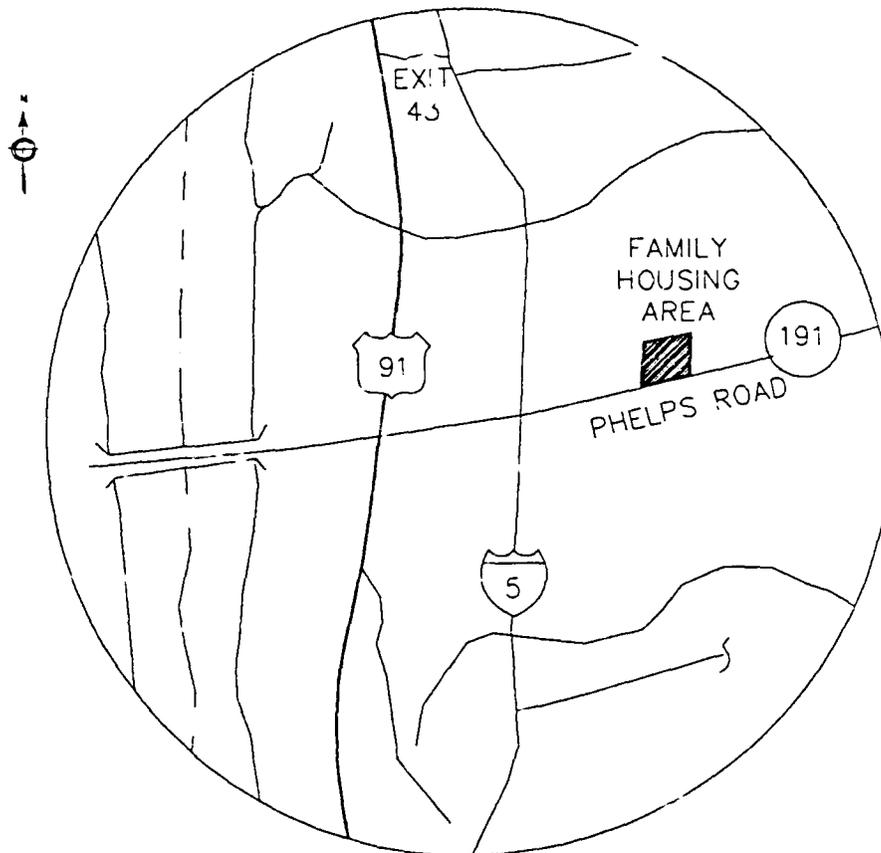


FIGURE 2 Vicinity Map of East Windsor Army Housing Units

housing units originally were serviced by individual subsurface waste-disposal systems that consisted of a 750-gallon septic tank and a leaching trench, with the exception that 27 Phelps Road and 2 South Road shared a 1,500-gallon septic tank and an unspecified number of leaching trenches.³ However, the Area Facilities Engineer at Windsor Locks stated that the housing units were serviced by a government-owned waste-treatment center until about four years ago, and that there were never any septic tanks on site. The Area Facilities Engineer also stated that there was a government-owned sanitary sewer line extending westward on Phelps Road from the housing area to Rt. 5.

Fuel Storage

Each housing unit has a new above-ground, 275-gallon, fuel-oil storage tank located in the rear of the unit. Concrete containment boxes are in place beneath the recently-installed tanks. The containment boxes are at ground level above the former locations of the original underground storage tanks which were drained of oil, filled with sand or fine gravel, and left in place. This tank replacement was contracted approximately two years ago through the Army Corps of Engineers, New York District. No spills or releases of petroleum products from the underground tanks are known or suspected. Rather, the changeover to above-ground tanks is the result of good engineering practice, dictated by the advancing ages of the tanks.

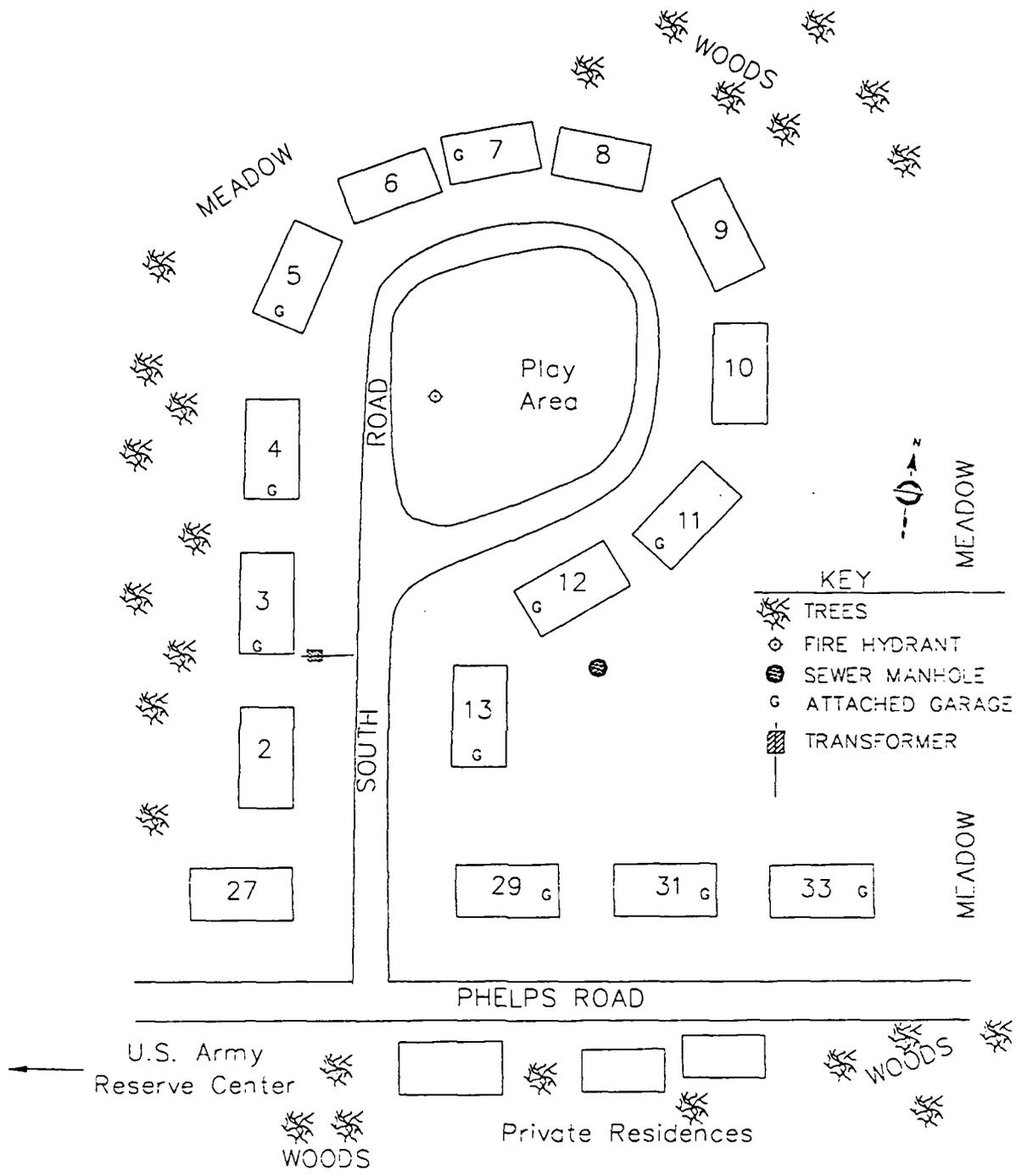


FIGURE 3 Site Plan Map of East Windsor Army Housing Units

Storm Drainage Systems

The terrain of the property and its surroundings is flat, and no catch basin or other sign of a storm drainage system in the vicinity of the property was evident. Drainage is by natural seepage into the ground subsurface.

Other Permanent Structures or Property Improvements

Other than recent renovations to the housing units, there are no other permanent structures or property improvements.

2.3 PROPERTY HISTORY

2.3.1 Nike Defense Program and Typical Battery-Level Practices

Generic information on the national Nike anti-aircraft defense program has been compiled in two studies, one commissioned by the Army Corps of Engineers⁵ and the other by the U.S. Army Toxic and Hazardous Materials Agency.⁶ In both studies, independent contractors relied on information contained in unclassified documents related to the Nike surface-to-air missile program, including engineering drawings and specifications (for the facilities and the missiles themselves), interviews with Army personnel participating in the Nike program, and operations manuals and directives relating to the operations and maintenance of Nike facilities. Taken together, these two reports represent the most complete assemblage of generic information on the Nike missile program from an environmental perspective. Salient points from both reports are condensed below.

At its zenith in the early 1960s, the Nike program included 291 batteries located throughout the continental United States. The program was completely phased out by 1976, with many of the properties sold to private concerns or expropriated to state or local governments for nominal fees.

Nike Ajax missiles were first deployed in 1954 at installations throughout the continental United States, replacing, or in some cases augmenting, conventional artillery batteries and providing protection from aerial attack for strategic resources and population centers. Typically, Nike batteries were located in rural areas encircling the protected area. The Ajax was a two-stage missile using a solid-fuel booster rocket and a liquid-fuel sustainer motor to deliver a warhead to airborne targets.

The Ajax missile was gradually replaced by the Nike Hercules missile, introduced in 1958. Like the Ajax, the Hercules was a two-stage missile, but it differed from the Ajax in that its second stage was a solid-fuel rather than liquid-fuel power source and its payload often was a nuclear rather than conventional warhead. Ajax-to-Hercules conversions occurred between 1958 and 1961 and required little change in existing Nike battery facilities. A third-generation missile, the Zeus, was phased out during development and consequently was never deployed.

A typical Nike missile battery consisted of two distinct and separate operating units, the launch operations and the integrated fire control (IFC) operations. The two operating areas were separated by distances of less than two miles, with lines of sight between them for communications purposes. A third separate area was also sometimes part of the battery. This area was typically equidistant from the two battery operating sites and contained housing for married personnel assigned to the battery. Occasionally, these housing areas also contained battalion headquarters, which were responsible for a number of Nike batteries.

Depending on area characteristics and convenience, the housing areas were often reliant on the launch or IFC sites for utilities such as potable water, electrical power, and sewage treatment. In those instances, buried utility lines connected the housing area to one or both of the other battery properties. It is also possible, however, that housing areas were completely independent of the missile launcher and tracking operations. In those instances, the necessary utilities were either maintained on the housing site or purchased from the local community. In many localities, as the character of the land area around the housing units changed from rural to suburban or urban, communities extended utility services to the housing unit locations, in which case conversions from independent systems to community systems were made.

A large variety of wastes was associated with the operation and maintenance of Nike missile batteries. Normally encountered wastes included benzene, carbon tetrachloride, chromium and lead (contained in paints and protective coatings), petroleum hydrocarbons, perchloroethylene, toluene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and trichloroethylene. Because of the rural locations of these batteries, and also because very few regulatory controls existed at that time, most of these wastes were managed "on-site." (Unused rocket propellants and explosives, however, would always have been returned to central supply depots and not disposed of on-site.) It is further conceivable that wastes generated at one of the Nike properties may have been transferred to its companion property for management or disposal.

Wastes related to missile operation and maintenance would not have been purposely transferred from a battery operating area to a housing area with no facilities for waste management or disposal. In some instances, however, the sewage treatment facilities for all Nike battery properties were located at the housing area; that possibility cannot be automatically ignored. Finally, where housing areas received various utilities from either of the operating areas, it is also possible that wastes disposed of on those other properties may have migrated to the housing area via the buried utility lines. And since decommissioning of the Nike batteries did not normally involve removal of buried utility or communication lines, any such contaminant migration is likely to have gone unnoticed.

2.3.2 East Windsor Housing Units

The East Windsor housing area was developed in 1958 as a stand-alone housing facility for military personnel assigned to the Nike missile battery located in East Windsor, Conn. Sixteen single-family houses were erected on the housing-facility property. Since the initial property development in 1958, no other permanent structures

have been added and none of the original structures has been razed. However, renovations have been made, including the installation of smoke and heat detectors in each unit in 1979. More recently, new vinyl siding was installed over the original cedar shakes, in addition to new roofs, gutters, and downspouts, new above-ground fuel-storage tanks to replace the original underground tanks, new heating systems, new windows, and new kitchens and bathrooms.

A 1963 U.S. Geodetic Survey map (1984 photorevision) shows a U.S. military reservation directly across Phelps Road from the housing facility. The Middleton U.S. Army Reserve Center now occupies at least part of the old military reservation property. During construction of a new Reserve Center building and maintenance garage in 1982, an abandoned sanitary sewer line, and abandoned water and electric conduits were uncovered.⁷ The abandoned sewer line extended south from Phelps Road to a septic tank located northwest of the maintenance garage, which lies to the rear of the main Reserve Center building. The abandoned water and electrical conduits lay under the parking lot behind the maintenance garage and extend west to the former Nike launcher operations area, which is located at the rear of the Reserve Center property, south of the main building.

Because the housing area and the former launcher area are situated on opposite sides of Phelps Road, it seems reasonable to conclude that the housing site and the Nike operational areas would have been independently serviced by public utility lines and by the government-owned sewer line on Phelps Road. It was not ascertained whether there originally was any connection between the housing facility's waste disposal system and the septic tank on the Reserve Center property.

2.4 ENVIRONMENTAL SETTING AND SURROUNDING LAND USE

The housing facility, containing 4.0 acres, is located in an area that appears to be, or to have recently been, used for agriculture. The property is bordered by woodland along its western boundary, by a meadowland along the western portion of its northern boundary, by woodland along the eastern portion of its northern boundary, by meadowland along its eastern boundary, and by Phelps Road along its southern boundary. Across Phelps Road from the housing facility are three private residences and a narrow wooded area separating these residences from the nearby Army Reserve Center located a short distance west on Phelps Road. East of the private residences is a wooded area. There is an old tobacco barn in the meadow to the northwest of the housing facility. The town of East Windsor is northeast of the city of Hartford and has an estimated 1986 population of 9,000.⁸

2.5 GEOLOGIC AND HYDROLOGIC SETTINGS

Windsor is located in the Upper Connecticut River Basin of the New England Upland Section of the New England Physiographic Province. The 508 square miles of the upper Connecticut River Basin in north-central Connecticut include the basins of four major tributaries: the Scantic, Park, and Hockanum rivers, and the Farmington River downstream from Tariffville. Precipitation over this area averaged 44 inches per year

during 1931-60. In this period, an additional 3,800 billion gallons of water per year entered the basin in the main stem of the Connecticut River at the Massachusetts state line; about 230 billion gallons per year in the Farmington River at Tariffville; and about 10 billion gallons per year in the Scantic River at the Massachusetts state line. Some water was also imported from outside the basin by water-supply systems. About half of the precipitation, 22.2 inches, is lost from the basin by evapotranspiration; the remainder flows out of the study area in the Connecticut River at Portland. There are 30 principal lakes, ponds, and reservoirs, in the Upper Connecticut River Basin. Two of them have usable storage capacities of more than 1 billion gallons. Floods have occurred within each month of the year but in different years. The greatest known flood on the Connecticut River was in March 1936; it had a peak flow of 130,000 cubic feet per second at Hartford. Since then, major floods have been reduced by flood-control measures.⁹

The major aquifers underlying the basin are composed of unconsolidated materials (stratified drift and till) and bedrock. Stratified drift overlies till and bedrock in valleys and lowlands in the eastern and western parts, and in most of the broad central valley. The stratified drift generally ranges in thickness from 10 feet in small valleys to more than 200 feet in the Connecticut River Valley. Bedrock underlies the entire basin and is composed of (1) interbedded sedimentary and igneous rocks and (2) crystalline rocks.

Groundwater sources yield from several million gallons per day from large well fields to 1 gallon per minute (gal/min) from single wells. Yields of 100 gal/min or more are most commonly obtained from screened wells tapping stratified-drift aquifers. Small to moderate water supplies can generally be obtained from any of the aquifers. Wells in bedrock yield at least a few gallons per minute at most sites. The probability of obtaining an adequate yield for domestic supply is greater in sedimentary than in crystalline bedrock and is also greater in stratified-drift overburden than in till.

Where unaffected by man's activities, the water which is of the calcium magnesium bicarbonate type, is generally low to moderate in dissolved-solids concentration, and ranges from soft to hard. In general, stream flow is less mineralized than groundwater, particularly when it consists largely of direct runoff. However, streams become more highly mineralized during low-flow conditions, when most flow consists of more highly mineralized water discharged from aquifers. The median dissolved-solids concentration in water from 25 stream sites was 113 milligrams per liter (mg/L) during high flow, and 148 mg/L during low flow. Iron and manganese occur naturally in objectionable concentrations in some streams draining swamps and in some waters draining from sedimentary bedrock which contains iron- and manganese-bearing minerals.

Man's activities have affected the water quality of streams in much of the area, particularly in the Hockanum and Park River basins. The degradation of quality in these streams is shown by wide and erratic changes in dissolved-solids concentration, excessive amounts of trace elements, a low dissolved-oxygen content, and abnormally high temperatures. Groundwater within this area is degraded principally by induced infiltration of surface water that contains chemical wastes, by leachate from wastes stored or disposed of on the ground, and by effluents discharged from septic tanks.⁹

The quantity and quality of water are satisfactory for a wide variety of uses, and, with suitable treatment, the water may be used for most purposes. The total amount of water used in 1968 was more than 100 billion gallons. About 80% of this was used for industrial purposes, and 90% of the industrial water was obtained from surface-water sources. About 85% of the population was supplied with water for domestic use by 15 major public and municipal systems, and 25 private associations. Analyses of water from the 13 largest systems show generally good quality.

3 ENVIRONMENTALLY SIGNIFICANT OPERATIONS

3.1 FUEL-OIL STORAGE TANKS

A canopy affixed to the house a few feet above the new above-ground 275-gallon fuel-storage tank located in the rear of each unit provides marginal protection from the elements. The tanks appear to have been coated with primer only and not to have been coated with an adequate protective finish. Frequently observed small areas of rust on the tanks reinforce this perception. Moreover, a rupture and leakage of oil from a similar above-ground storage tank at another Connecticut military housing facility has been reported.¹⁰ Therefore, continued use of these tanks in their present condition may entail a significant environmental risk.

Potential risk to health might also attach to the collection of rainwater in the containment box beneath each storage tank if the water is allowed to stagnate. On the other hand, if the occupant of a housing unit opens the containment-box drainage tap to release rainwater but forgets to close it, the effectiveness of the box in containing an oil leak would be compromised should a tank rupture occur.

3.2 ASBESTOS-CONTAINING MATERIALS

Vinyl asbestos floor tiles were used in the original construction of the housing units. The area facilities engineer stated that insulation present on water pipes in the utility rooms of the units also contains asbestos but gave no indication that any of this insulation was deteriorated. The floor tiles were found to be in good condition.

4 KNOWN AND SUSPECTED RELEASES

There have been no known major releases or impacts to the environment from the East Windsor housing facility. No hazardous wastes or hazardous materials are stored on site. No releases of oil from the above-ground or the decommissioned underground tanks have been documented or were observed during the site visit.

5 PRELIMINARY ASSESSMENT CONCLUSIONS

Although these housing units were originally developed in support of a Nike missile battery located in East Windsor, there is no evidence that wastes associated with the operation or maintenance of the battery were delivered to or managed at this property. Furthermore, the housing facility would appear to have been independent of the battery's launch and fire-control operations with respect to water, sewer, and electrical utilities. No documentary evidence was found of utility connections between the housing site and the other battery properties.

Despite independence from Nike battery operations, this property could adversely affect the environment if the above-ground fuel-oil storage tanks that service the housing units were to remain in service in their present potentially unsafe condition. It should be recognized also that the concrete containment box beneath each storage tank would be rendered ineffective if the drainage tap of the box were to remain open for an extended period of time.

There is no documentation of airborne asbestos in the housing units, but asbestos is known to be present in floor tiles and water pipe insulation. Floor tiles are in good condition. No deterioration of water-pipe insulation was reported by the area facilities engineer.

6 RECOMMENDATIONS

The East Windsor housing facility presents no imminent or substantial threat to human health or the environment. There is no evidence to suggest that hazardous or toxic constituents have ever been released from this property. No immediate remedial actions, therefore, are warranted for the site. Nevertheless, the potential for environmental impacts has been identified.

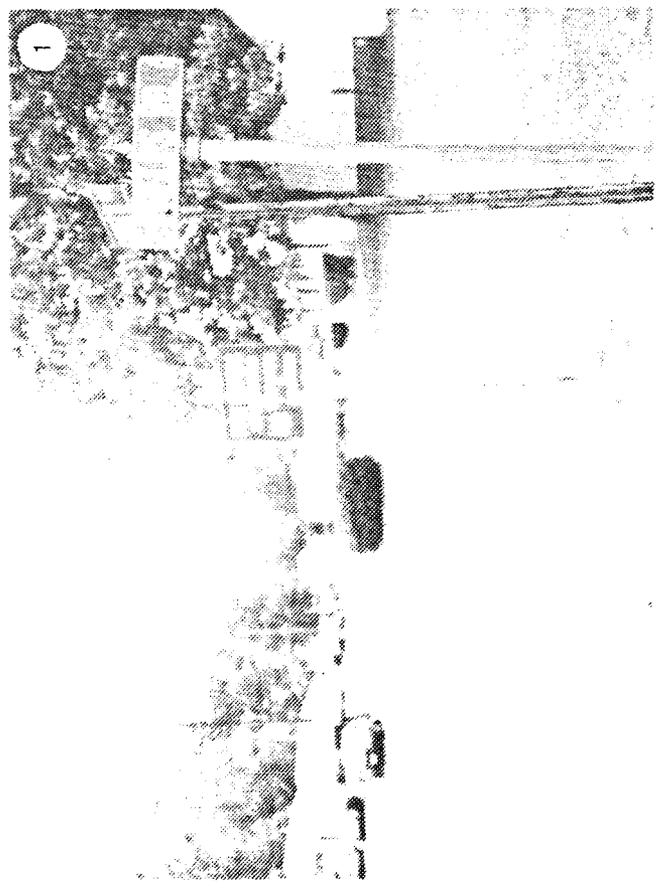
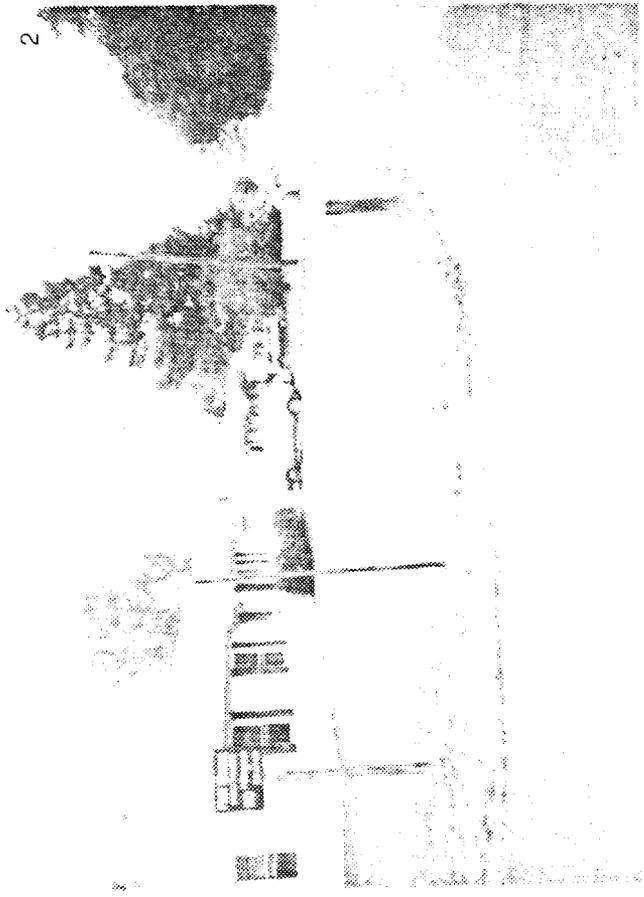
Potential environmental impact derives from the continued use of the inadequately protected above-ground fuel-oil storage tanks and their associated concrete containment boxes. The integrity of these relatively new storage tanks should be confirmed, and following treatment for existing rust, protective coatings should be applied to the exteriors of the tanks. With respect to containment-box drainage taps, some method should be devised to ensure that they do not remain in the open position for extended periods of time.

These recommendations are based on the assumption that the property will continue to be used for residential housing.

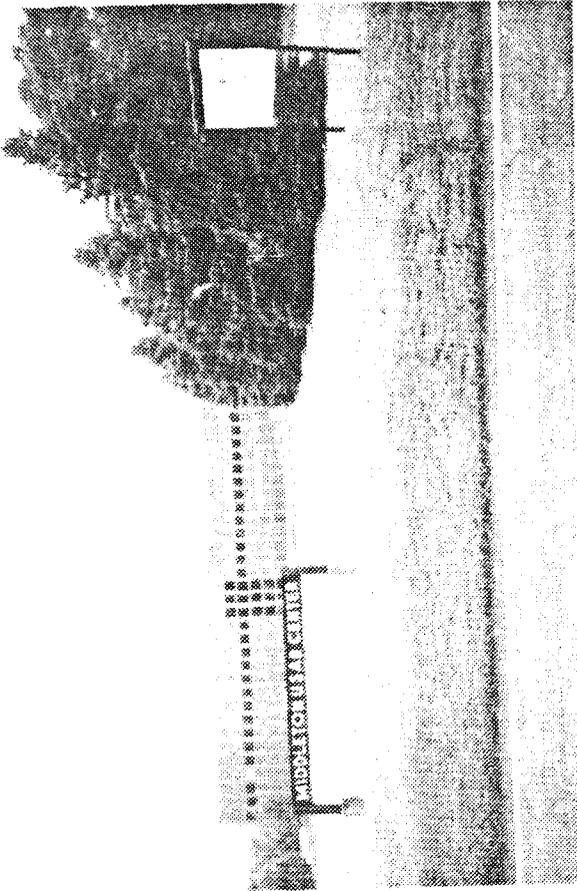
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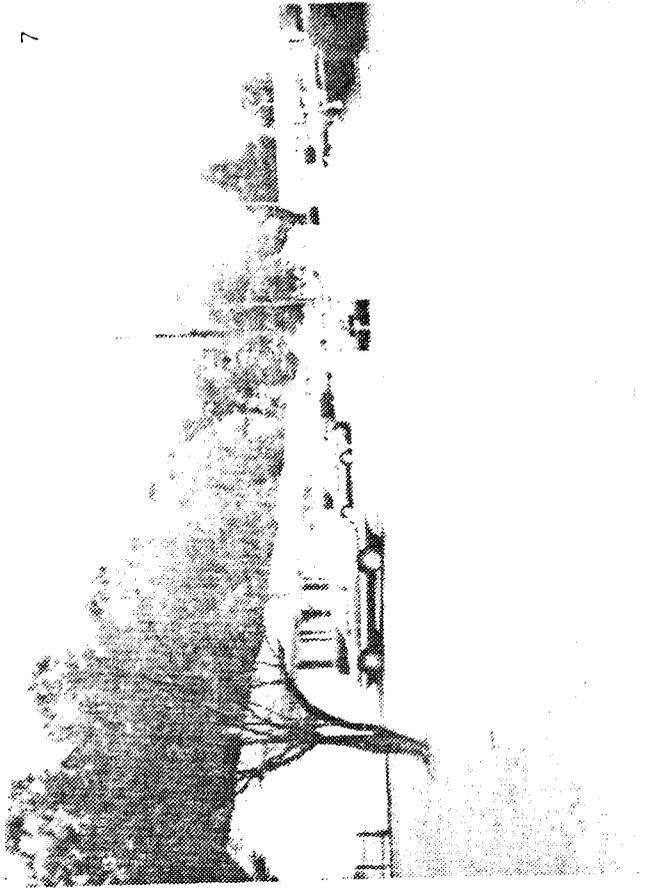
APPENDIX:
**PHOTOGRAPHS OF EAST WINDSOR HOUSING FACILITY
AND SURROUNDING LAND**



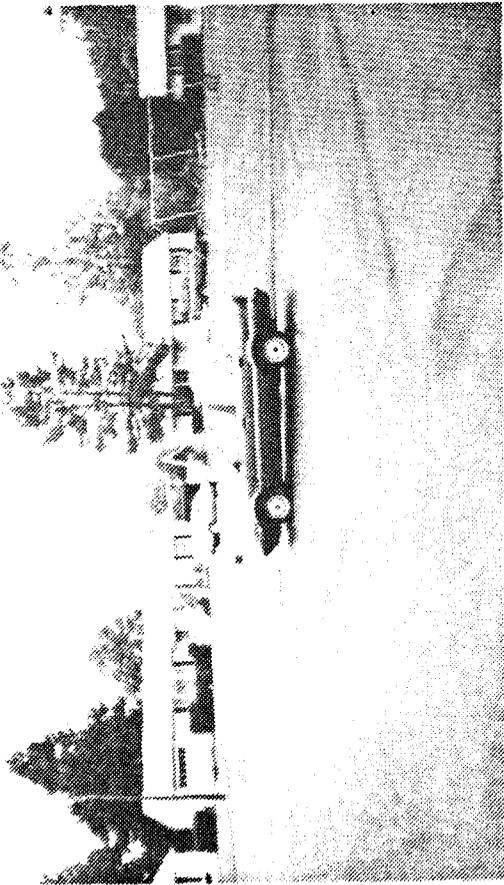
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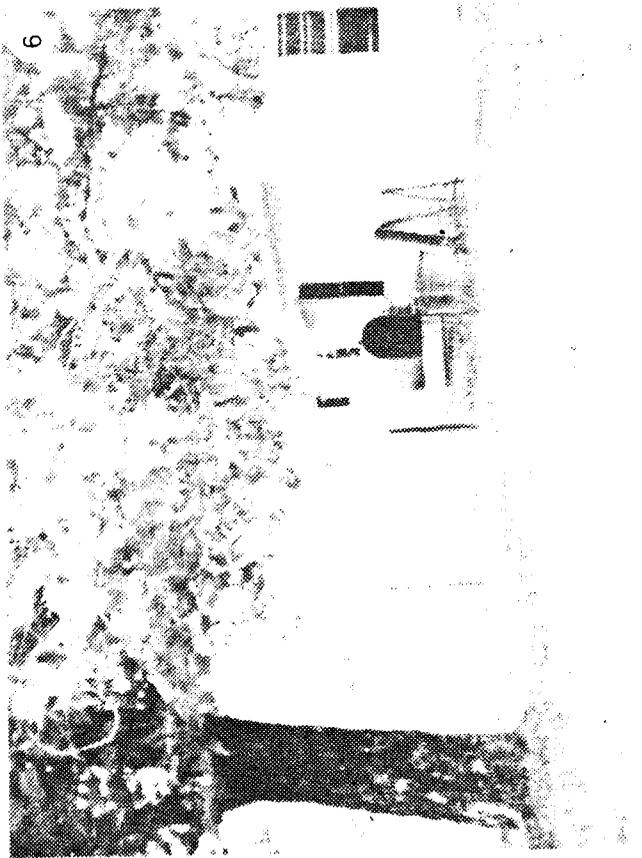
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IDENTIFICATIONS OF PHOTOGRAPHS

1. A view of the housing area from the intersection of Phelps and South roads.
2. Looking east on Phelps Road; units #29, 31, and 33, at left in photograph, are on the north side of Phelps Road.
3. A view to the east on South Road, showing units #10, 11, and 12 (foreground).
4. Area's playground is located on the northern section of South Road; housing unit #7 (background) is typical of 10 units that have attached garages (6 have no garages).
5. The Middleton U.S. Army Reserve Center, located on the south side of Phelps Road and just west of the housing area.
6. The rear of one of the housing units, showing the above-ground fuel storage tank, concrete containment box, and the canopy above the tank.
7. An electrical transformer atop a utility pole in front of unit #3; transformers on this property are maintained by the federal government.