THE CONNECTICUT VALLEY ELECTRIC TRANSMISSION RELIABILITY PROJECTS

APPLICATION TO THE

CONNECTICUT SITING COUNCIL

FOR CERTIFICATES OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR

THE CONNECTICUT PORTION

OF THE GREATER SPRINGFIELD RELIABILITY PROJECT

AND FOR

THE MANCHESTER TO MEEKVILLE JUNCTION CIRCUIT SEPARATION PROJECT

BY

THE CONNECTICUT LIGHT & POWER COMPANY

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VOLUME 3: ENVIRONMENTAL – CULTURAL RESOURCES

EX. 1: **Historical and Archaeological Assessment of Connecticut Sections of the Connecticut Light & Power Company Greater Springfield Reliability Project**

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EX. 1: Historical and Archaeological Assessment of Connecticut Sections of the Connecticut Light & Power Company Greater Springfield Reliability Project

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HISTORICAL AND ARCHAEOLOGICAL ASSESSMENT

OF CONNECTICUT SECTIONS OF THE CONNECTICUT LIGHT & POWER COMPANY

GREATER SPRINGFIELD RELIABILITY PROJECT

TOWNS OF BLOOMFIELD, EAST GRANBY, SUFFIELD & ENFIELD, CONNECTICUT

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ABSTRACT

Two Northeast Utilities Subsidiaries, The Connecticut Light and Power Company (CL&P) in Connecticut and Western Massachusetts Electric Company (WMECO) in Massachusetts, propose to enhance electric service and reliability by the construction and operation of the Greater Springfield Reliability Project. Connecticut sections of the project require approval of the Connecticut Siting Council. The location, size, and nature of associated new structures remain undetermined, pending Siting Council approval of a route and completion of a CL&P Development and Management Plan (D&M Plan). Project components within Connecticut would include new 345-kV transmission lines to complete a 345-kV loop through north-central Connecticut and western Massachusetts. These lines would be built between WMECO's Ludlow substation in Ludlow, Massachusetts and its South Agawam substation in Agawam, Massachusetts, and between the South Agawam substation and CL&P's North Bloomfield substation in Connecticut.

The preferred "Northern Route" for the Connecticut portion of the GSRP project would consist of an approximately 12-mile overhead 345-kV line, built within the boundaries of an existing CL&P overhead transmission line rights-of-way, from the North Bloomfield through Bloomfield, East Granby and Suffield to the Connecticut/ Massachusetts border. The preferred "Northern Route" for the WMECO Ludlow to South Agawam line would be along existing rights-of-way entirely within Massachusetts. However, an alternative overhead "Southern Route" route along other rights-of-way would cross into Connecticut for a short distance. A total of three alternative underground routes are also under consideration, two along parts of the Northern Route and one along part of the Southern Route. An assessment of cultural resources was made on behalf of CL&P to identify known or potential archaeological sites within possible project areas, and to evaluate the potential for adverse visual effects on significant historic properties. Depending on an approved D&M Plan, additional assessment or reconnaissance investigations will be made in consultation with the Connecticut State Historic Preservation Office.

No documented archaeological sites exist within proposed project areas. Background research and field inspection indicated areas sensitive for potential Native American sites along discontinuous areas totaling approximately 9.7 miles of preferred and alternative overhead routes. Native American sites are not expected in most alternative underground routes, although sites are possible alongside roadways where off-road facilities are required. No Euroamerican archaeological sites listed on, or eligible for listing on, the National Register of Historic Places or the State Register of Historic Places, are reported or likely near proposed and alternative overhead routes. Two entirely subsurface Euroamerican archaeological sites listed on, or eligible for listing on, the National Register of Historic Places are reported adjacent to alternative underground routes in East Granby, both of which have been impacted by recent road construction.

Three significant aboveground historic resources were identified within approximately 0.25 mile of the Northern Route primary overhead route, all cemeteries subject to Ancient Burying Ground protection under Connecticut law. The 0.25 mile distance was selected to evaluate possible visual effects of new transmission structures. Based on digital topographic profiles and photographs taken to simulate views of the new transmission structures, terrain and forest cover will preclude any visibility of new structures at two properties, and no adverse visual effects are expected at the third property. In most cases, adverse visual effects on historic structures are unlikely at distances over 500 feet.

A total of five significant aboveground and belowground historic resources were identified within approximately 500 feet of the alternative underground routes in East Granby. The 500 foot distance was chosen to plan for any necessary protective measures against blasting effects. Significant resources included three structures and districts listed on the National Register of Historic Places and two cemeteries subject to Ancient Burying Ground protection under Connecticut law. One of the National Register properties, Old New-Gate Prison and Copper Mine, is also a National Historic Landmark.

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I. INTRODUCTION

A. Purpose of Study

Two Northeast Utilities Subsidiaries, The Connecticut Light and Power Company (CL&P) in Connecticut and Western Massachusetts Electric Company (WMECO) in Massachusetts, propose to enhance electric service and reliability by the construction and operation of the Greater Springfield Reliability Project (GSRP, or Project). These improvements are needed to provide safe, reliable, and economic transmission service throughout the Greater Springfield geographic area, and in north-central Connecticut, and to assure that these portions of the regional transmission system comply with mandatory federal and regional reliability standards. At the same time, the GSRP improvements will advance a comprehensive regional plan for improving electric transmission in New England, through extensive coordinated improvements in Connecticut, Massachusetts, and Rhode Island. This comprehensive plan is known as the New England East – West Solution (NEEWS). GSRP components within Connecticut would include new 345-kV transmission lines to complete a 345-kV loop through north-central Connecticut and western Massachusetts. These lines would be built between WMECO's Ludlow substation in Ludlow, Massachusetts and its South Agawam substation in Agawam, Massachusetts, and between the South Agawam substation and CL&P's North Bloomfield substation in Connecticut. The preferred "Northern Route" for the WMECO Ludlow to South Agawam line would be along existing rights-of-way entirely within Massachusetts. However, an alternative "Southern Route" along other rights-of-way would cross into Connecticut for a short distance.

CL&P is commencing the process of submitting an application to the Connecticut Siting Council ("Siting Council", "Council") for a Certificate of Environmental Compatibility and Public Need (Certificate) for the construction and operation of the GSRP Connecticut components. In addition to the Council, CL&P will seek approvals and/or certifications from the Connecticut Department of Environmental Protection (DEP), the Connecticut State Historic Preservation Office (SHPO), municipal commissions (for locations where substations are planned), and other agencies as may be required depending upon the final project design. Based on consultations with project area municipalities and state agencies, the final application to the Siting Council may include alternative routes. The location, size, and nature of associated new transmission structures and facilities remain undetermined, pending completion of a CL&P Development and Management Plan (D&M Plan) approved by the Siting Council.

Among the issues to be addressed for approval of the project's environmental compatibility, potential project effects on cultural resources must be reviewed by the Connecticut Historical Commission (CHC) under the Connecticut Environmental Policy Act and Connecticut General Statutes Section 221-90 (1)(J), and under Section 16-50p(a)(2) of the Public Utilities Environmental Standards Act (PUESA). Cultural resources subject to review under these acts include historic architectural properties, historic industrial or engineering resources, and prehistoric or historic archaeological sites.

Northeast Utilities subsidiary Northeast Utilities Service Company (NUSCO) provides services to CL&P and WMECO including oversight or implementation of transmission planning, design, and permitting work required for GSRP. CL&P and WMECO retained Burns & McDonnell Engineering Company, Inc. (B&M) to manage GSRP engineering and construction, in coordination with NUSCO. As agent for the utility companies, B&M retained Raber Associates to identify known or possible cultural resources subject to potential effects of project construction, and to recommend future actions needed to avoid adverse effects on cultural resources eligible for the State or National registers of historic places.

Based on consultations among NUSCO, Raber Associates, SHPO, and B&M, Raber Associates prepared a cultural resources assessment of current GSRP alternatives. Assessment methods, summarized in Section II, are iterations and enhancements of methods worked out by Raber Associates, NUSCO, and SHPO on similar recent projects (Raber and Wiegand 2002, 2003).

B. Summary Project Description

1. Routes and Facilities

Appendix 1 shows all routes as currently proposed in Connecticut. The preferred "Northern Route" for the Connecticut portion of the GSRP project would consist of an approximately 12-mile overhead 345-kV line beginning at CL&P's North Bloomfield substation in Bloomfield and continuing north through Bloomfield, East Granby and Suffield to the Connecticut/ Massachusetts border. The Northern Route would be built within the boundaries of an existing CL&P overhead transmission line rights-of-way (R/W), next to existing transmission lines. In addition, there is a possibility that CL&P might need to seek approval for a portion of a new overhead 345-kV line to be constructed between WMECO's Ludlow and South Agawam substations. Although WMECO expects to propose to build the GSRP along existing rights-of-way that are entirely within Massachusetts, CL&P has also identified a "noticed alternative" overhead "Southern Route," which would use other existing rights-of-way including a 5.9-mile-long section in the the towns of Suffield and Enfield.

Overhead facilities would generally include steel or laminated-wood H-frame structures 75-80 feet high, built 75 feet east/south of existing structures in CL&P rights-of-way. Similar structures approximately 95 feet high might be used to cross the Farmington River. For a short distance near the Massachusetts border, existing structures would be replaced by 130-foot-high steel monopoles. Required substation improvements associated with the Northern Route would consist of installing a second 345-kV to 115-kV autotransformer in the North Bloomfield substation.

As alternatives to building new overhead facilities near residential areas, two underground 345-kV variations are under consideration for part of the Northern Route in East Granby and Suffield. The Route 168 Underground Variation would run approximately 7.5 miles, largely along state routes 20, 187, and 168. The Newgate Road Underground Variation would run approximately 5.1 miles along State Route 20, Newgate Road, and Phelps Road. To meet similar objectives along the Southern Route, a Southern Route Underground Variation would run approximately 4.9 miles along local roads in Enfield.

Underground sections would be installed largely within existing streets in trenches 4-5 feet wide and approximately 4-7 feet deep. Size limits of the spools carrying underground cable will limit continuous lengths of installed cable to 1800-2000 linear feet, and require installation of concrete splice vaults approximately 8 feet square in section and 28 feet long. Excavations for the splice boxes will exceed 8 feet in depth below present surfaces. Most stream crossings would be accomplished with horizontal directional borings, work areas required for which remain undefined. Transition stations of 5-10 acres are required where underground and overhead transmission lines meet. Three such station sites have been identified in East Granby and Suffield for the underground alternatives associated with the Northern Route, and two transition station sites have been identified in Enfield for the Southern Route Underground Variation

2. Construction Methods for Overhead Facilities

Construction and vegetation clearance methods will be developed to minimize site disturbance and to protect residual forests, wetlands, watercourses, soils, and cultural resources including stone walls, old cemeteries and old foundations that are commonly found in wooded areas in Connecticut. Impacts to stone walls will be limited to equipment bar-ways generally not exceeding 15 feet in width, and other aboveground cultural resources will be avoided.

a. Access Roads and Construction Pads

Construction vehicles including large cranes will require access to each structure location, and secure pads or work areas. Existing access roads will form the backbone of the construction road network and will be used as much as possible to limit ground disturbance. However, additional spur roads will have to be constructed to provide access to the new structure locations and pad sites.

Existing access roads are in various conditions, and in many places will require improvements to achieve appropriate grades (10% or less), sufficient surface widths (at least 15 feet), and stable bases. Existing access road improvements will range from light to extensive grading. New spur roads may only require minor grading to level the ground surface before applying stone and gravel, but in some cases extensive cuts and fills may be necessary to prepare a stable road base. The amount of work necessary will depend on topography, soil conditions, and type of vehicles that will need access through the area.

A range of construction pad preparation methods will include light surface grading, extensive cuts and fills, and/or use of wooden mats in wetlands. Pad sizes will vary with activity requirements, but may reach 100-foot-square areas at sites of new overhead structures. Smaller pads could be utilized if site conditions allow. Construction sites may frequently require 20-foot-square dewatering pits outside pad limits. At sites where existing structures would be dismantled, pad size would depend on the type of structure to be removed, existing topography, and other natural features. A cleared area typically at least 25 feet from all structure surfaces, including all poles of a multiple pole structure and all guy wires, would be needed but different sizes and configurations are likely. If necessary, stone or wooden mats would be used to level and stabilize the area necessary for deconstruction activities. Typically these sites would not exceed the size of the cleared area.

Equipment storage and/or staging areas, along with pole stockpile sites and wire stringing locations (for pulling and tensioning), will be necessary to support the construction of the 345-kV overhead transmission line and the reconstruction of certain of the existing transmission facilities. The locations of such areas will not be determined until a final route for the Project is certified.

b. Vegetation Clearance

Northern Route construction would require work in approximately 160 acres if only overhead facilities are built, including some 95 acres of forest or brush clearance. Southern Route construction would require work in approximately 73 acres if the entire alternative is overhead, of which some 31 acres would require forest or brush clearance. Only 6 acres of forest clearance would be required if the Southern Route Underground Variation were used with a shorter overhead Southern Route.

Mechanical equipment to remove herbaceous vegetation, shrubs, small diameter trees and other low growing vegetation could include many types of brush mowers, most of which have rubber or steel tracks and a cutting head mounted directly on the front or on a boom. The cutting head is typically a steel drum spinning at a very high speed.

Larger-diameter trees would be removed by directionally-controlled hand-held chainsaw felling, or by mechanical felling with a “feller buncher.” This type of machine has a cutting head mounted directly on the front or on a boom, and will have rubber tires or steel tracks. A feller buncher is designed to work as part of a “cut-to-length” system, in which the feller buncher severs the tree with the saw head, and the operator holds the tree for a short time to direct the tree to a desired place on the ground. The operator can then cut off tree limbs and cut the main stem of the tree into shorter logs. All the cut material is grouped into piles so that the next phase of the work can begin.

Regardless of the method used to fell the trees, all the material will need to be brought to a central location (loading or landing area) for further processing and removal from the site. There are two types of machines commonly used during this phase of the work. The most likely equipment would be a skidder, a large, articulated tractor with a grapple and/or winch on the rear of the machine which the operator uses to drag material to a loading area. The second type of machine is a forwarder, an articulated tractor with a loading boom that can pick up the material and place it in a bunk on the rear. The material can then be transported to the loading area without being dragged over the ground surface. This type of machine is less common than a skidder, particularly in land clearing operations.

C. Study Issues and Definitions

1. Overhead Route Sections

a. Visual Effects

Any project effects on historic architectural or engineering resources in overhead project sections will be limited to the visual intrusion of taller and/or closer transmission line structures, heights of which will vary depending on project alternatives. Available guidelines for SHPO assessment of visual effects on cultural resources appear in Section 16-50p(a)(4)(C) of PUESA, and in regulations of the federal Advisory Council on Historic Preservation (36CFR 800.5). Both sets of guidelines apply to properties listed, or eligible for listing, on the National Register of Historic Places. Based on Federal Power Commission guidelines to which it refers, PUESA mandates avoidance of National Register properties where possible, or, if avoidance is not possible, minimization of transmission structure visibility or effects on the character of National Register property environ. Advisory Council on Historic Preservation (ACHP) regulations, while not required in SHPO review of projects subject to Connecticut Siting Council approval, provide *de facto* guidelines commonly used by SHPO. Criteria for findings of adverse effects on historic properties include change of the physical features within a property's setting which contribute to property significance, and introduction of visual elements which diminish the integrity of a property's significant features.

These guidelines provide no established or objective criteria for determining when a visual effect is adverse, leaving identification of adverse effects to the judgement of the reviewer (personal communications, David A. Poirier). In general, visual effects will be diminished if new structures are as low as possible relative to existing structure heights, and/or if new structures are located further from historic properties. Based on results of similar, recent studies (Raber and Wiegand 2002, 2003) and discussions with SHPO, this assessment attempts to distinguish among three categories of visibility:

> Visibility with No Effect: the structure is too far from a historic property, and/or too masked by forest cover or built environments, to be perceived as a distinct landscape feature
>
> Visibility with Non-Adverse Effect: the structure can be perceived as a distinct landscape feature, but because of distance, forest cover, or built environments there is no significant change to the visual environment of a historic property
>
> Visibility with Adverse Effect: by virtue of proximity, size, or appearance, the structure degrades the existing visual environment of a historic property.

For historic architectural and engineering resources in the overhead route section, assessment objectives included:

> identifying all historic properties listed on, or previously determined as eligible for listing on, the state or national registers of historic places within 0.25 mile of proposed new structures
>
> providing graphic evidence of the extent of potential visual effects for each such historic property.

The universe of inventoried historic properties, and the choice of an 0.25-mile distance as a viewshed corridor from proposed new structures, is also based on results of the similar recent studies for upgraded transmission facilities, and on discussions with SHPO Staff Archaeologist David A. Poirier and Historical Architect Susan R. Chandler. Previous studies indicated that adverse visual effects from proposed new transmission structures were highly unlikely at distances exceeding 0.25 mile. As discussed in Section V.C below, previous surveys of aboveground historic resources in Project areas did not usually identify resources eligible for National or State registers of historic places, which may require additional studies to locate and evaluate significant properties and any related project effects. Data developed to meet these objectives can be used by CL&P, the Connecticut Siting Council, and interested local parties to determine which potential visual effects are adverse, and to identify possible means of mitigating or avoiding adverse effects.

b. Archaeological and Other Resources

In most proposed overhead project areas, the potential for prehistoric or historic archaeological resources has not been previously evaluated. In the absence of prior assessment of known or possible resources based on review of background data and field inspection, and D&M Plan completion after consideration of all project alternatives, it was impractical to plan for reconnaissance-level field testing for archaeological sites. The present study included an archaeological assessment, from which recommendations for future reconnaissance investigations have been developed for implementation when the final project configuration is determined. The assessment was conducted to meet all standards of the SHPO *Environmental Primer for Connecticut's Archaeological Resources*, with the following objectives:

identification of any known or possible archaeological resources in project areas, based on available background material and surface inspection;

assessment of the known or potential eligibility of such resources to the national or state registers of historic places;

development of recommendations on the need for any additional investigations to confirm or identify such resources, or to determine their eligibility to the national or state registers.

To be eligible for the national or state registers, cultural resources must possess physical integrity and meet at least one of the following criteria:

A. Association with important historic events or activities;
B. Association with important persons;
C. Distinctive design or physical characteristics, including representation of a significant entity whose individual components may lack distinction;
D. Potential to provide important information about prehistory or history.

Stone walls have recently been recognized by SHPO as a resource class requiring attention. Despite recent attempts to classify and discuss the history of these widespread regional landscape features (Thorson 2002, 2005), there is currently no framework to determine their eligibility for the state or national registers (personal communication, David A. Poirier). SHPO has concurred with an approach developed for the current Middletown-Norwalk Project, under construction by CL&P and The United Illuminating Company, under which stone walls are described, mapped, and photographed during field investigations to provide a record of historical site conditions and an example of rural landscape development for use in future historic context or local historical studies.

Resource identification also included cemeteries used in whole or in part more than 100 years ago. Cemetery areas 100 years or older are protected as Ancient Burying Grounds under Connecticut General Statutes 19a-315.

2. Belowground Route Sections

Possible effects on cultural resources from underground transmission facility construction include:

direct effects on belowground prehistoric or historic archaeological resources, the potential for which has not previously been evaluated in most project areas

direct or indirect effects on nearby significant historic structures, including foundation damage from blasting during construction

It is expected that horizontal directional borings at crossings of watercourses will avoid any effect on historic bridges.

Except for areas with deeply-buried soils or other prehistoric surfaces, it was assumed that roadbed construction or other paving episodes have removed all soils sensitive for Native American resources, or severely limited the integrity of such resources by removing most sensitive strata. The same disturbance, and the relative antiquity of the roads in the proposed underground route, also suggested that no Euroamerican resources other than perhaps older utilities would be found in or below existing roadbeds. Although most areas immediately adjacent to paved roadways may be disturbed, pockets of intact soil with archaeological material may survive in such areas. Conversely, undocumented disturbance associated with generations of road and utility construction, maintenance, and improvement may have removed all archaeologically-sensitive soils within surrounding level, well-drained areas. Archaeological assessment objectives for possible off-road underground alignments were similar to those summarized above for overhead route sections. Reconnaissance archaeological testing will be necessary to locate sites once any underground routes are defined in areas not within developed roadbeds.

To address any possible effects on significant historic structures, assessment objectives included identifying all historic properties within 500 feet of the underground route section which are listed on or eligible for the state or national registers of historic places. A 500 foot-distance from underground route sections was chosen to plan for any necessary protective measures against blasting effects. Underground facilities installed within roads, and not visible after construction, would have no potential for effects on historic resources outside of those in the immediate vicinity.

II. ASSESSMENT STUDY METHODS

A. Background Research

Background research focused on two objectives:

identifying known or potential archaeological sites, and collecting information on environmental, prehistoric, historic, and technological contexts of such sites as appropriate;

identifying all significant historic architectural and engineering properties within 0.25 miles of the overhead route section, and within 500 feet of the underground route section

Background sources included:

listings on the state and national registers of historic places;

listings of sites eligible for the National Register maintained by SHPO including historic bridges identified in surveys made for the Connecticut Department of Transportation;

lists of other potentially significant properties in townwide architectural surveys completed for SHPO or in local historic districts;

prehistoric and historic archaeological site files maintained by the Connecticut State Archaeologist;

unpublished cultural resource management studies and other pertinent reports filed with NUSCO, SHPO, the Connecticut State Archaeologist, or University of Connecticut Special Collections at the Dodd Center, including documentations of historic resources conducted to standards of SHPO or the National Park Service;

published and unpublished studies of project vicinity geology, hydrology, soils, prehistoric or historic archaeological sites, and local or regional history and geography;

historic maps and aerial photographs;

maps, plans, drawings, and other pertinent documents held by CL&P and/or NUSCO;

interviews with SHPO personnel and the Connecticut State Archaeologist.

B. Analysis and Field Inspections

1. Historic Architectural and Engineering Properties

a. Overhead Route Sections

For significant historic properties within 0.25 mile of the possible overhead corridors, we developed digital topographic profiles to eliminate those properties visually shielded from the corridor by hills, forest cover, or large structures. Profile contours were based on U.S. Geological Survey quadrangle base maps as reproduced in TOPO! CD-ROM format, from which preliminary profiles were generated between specific transmission line structures and historic properties. Profile data were re-plotted for graphic clarity, with the addition of a typical forest cover paralleling ground contours where such cover exists. Recent aerial photographs were used as needed to identify the horizontal extent of forest cover. Although tree heights in forested project area vicinities average 60-80 feet, plotted profiles assumed only a 50-foot-high average cover.

Photographic documentation for identification of potential visual effects was conducted for all historic architectural properties, or clusters of properties, within 0.25 miles of the transmission line corridor, except where digital topographic profile analysis indicated no proposed transmission structures would be visible, or where field inspection indicated a lack of visibility. For preliminary simulation purposes, photographs of existing structures were digitally altered to show prospective new structures at the same locations. If final Project approval leads to different overhead routes or taller structures than currently anticipated, similar procedures will be followed. If necessary, balloons or bucket truck can be raised to heights of proposed alternative structures, at actual locations where proposed structures might be visible from historic properties now wholly or substantially shielded by tree cover.

b. Underground Route Sections

Field inspections were conducted to confirm the presence, absence, and/or location of other significant historic properties for which there was inadequate information.

2. Historic and Prehistoric Archaeological Sites

Based on background information, we distinguished project areas which appeared adequately surveyed or classified for cultural resources from those requiring field inspection. For potential Native American sites, we eliminated from further consideration areas which appear too steep, poorly drained, or disturbed using recent aerial photographs, published soils atlases, topographic maps, or other pertinent information. There is generally little likelihood of encountering Native American sites on slopes exceeding 20% or in poorly drained soils, other than possible rockshelters. For possible Euroamerican sites, we used recent aerial photographs as needed to assess the potential for site survival. Such sites with known or probable survival were located approximately on NUSCO base maps for field inspection.

Walkover or surface inspections from automobiles were conducted to accomplish the following tasks:

identify undisturbed areas with potential for Native American sites;

locate previously unmapped historic sites identified in background data;

assess the integrity of some reported historic sites with inadequate descriptions of present conditions.

All areas within existing transmission corridors sensitive for Native American sites were noted on Project base maps. Historic sites were located approximately on Project base maps, and documented as appropriate with written notes, photographs, and sketch plans.

Site assessments were framed in terms of National Register criteria. For Native American sites, we used background and field data to create a bi-modal classification of all project areas: sensitive for known or possible resources with at least potential National Register eligibility, or not sensitive. Designation of non-sensitive areas incorporated negative findings made in previous archaeological surveys. Any planned project actions in sensitive areas would require reconnaissance studies, regardless of whether the potential for sites was "low", "moderate", or "high." Areas with potential for few sites could include important information in the form of small, undisturbed satellite or special-purpose sites within larger Native American settlement systems.

We prepared brief contextual frameworks for historic sites, identifying important site types and discussing how examples of such types may be eligible for the National Register. In particular, we assessed site types in the framework of National Register significance criteria C (important example of typical site) and D (having potential for important new historical information). For unreported or previously reported Euroamerican sites, we classified data from background and field investigations as follows:

listed on the national or state registers of historic places

eligible for national or state register listing, based on SHPO findings and/or finding in previous surveys;

potentially eligible for national or state register listing, pending additional research, based on previous studies and/or assessment research;

known or possible site with undetermined potential for national or state register listing.

known site with no potential eligibility, based on based on previous studies and/or assessment research.

All archaeological site analysis results were summarized graphically on Project base maps.

III. PROJECT AREA ENVIRONMENTS

All Project areas lie within Connecticut's Central Valley or Central Lowlands physiographic province. The valley, known to geologists as the Hartford Basin, is predominantly a lowland with "red-bed" Triassic sedimentary sandstone and arkose bedrock which slopes down to the east. Near the west side of the lowland in the Project vicinity, a series of eroded lower Jurassic volcanic intrusions known collectively as the Metacomet Ridge are interbedded with the sedimentary rock in a generally north-south alignment, which effectively bisects the valley (Rodgers, ed. 1985; Lee 1985; Bell 1985). Paraphrasing from Banks' summary (2000: 64), the volcanic flows covered and, in some instances, intruded between layers of earlier sedimentary rock. Lava from these flows formed thick layers of basalt or traprock. Sediments eroded from exposed rock were deposited after each of the lava flows, resulting in additional sedimentary layers that covered the volcanic layers. These sedimentary sequences include the Shuttle Meadow Formation (reddish-brown to gray-black silty shale and sandstone), the East Berlin Formation (reddish-brown silty shale), and Portland Arkose (brownstone). Movement of the continental plates, subsequent volcanic activity, and sediment deposition resulted in the sinking of the land in the eastern portion of the valley, leaving the Metacomet Ridge with an easterly tilt. Faulting which occurred during the Jurassic Period thrust large blocks of rock upward, and subsequent erosion created the abrupt cliffs along the western side of the Metacomet Ridge. The eastern slopes descend much more gradually. While most of the Project areas are at elevations of 50-300 feet above mean sea level, the discontinuous mountains comprising the Metacomet Ridge — which is crossed or traversed by the Northern Route — rise to approximately 650 feet in East Granby and Suffield.

Bedrock geology created the framework for modern glaciated environments, as is the case throughout most of northern North America. In part of the Project area, bedrock formations also included copper mineral deposits along Newgate Road which attracted entrepreneurs for some 150 years beginning in the early 18th century. The oldest volcanic intrusion, the Talcott basalt, is a locally-discontinuous belt of rock found at or slightly above the elevation of Newgate Road in East Granby. The Central Lowlands have widespread copper mineral deposits found in several distinct types of mineralization, with the strata-bound variety including the Newgate deposits typically found in sedimentary rock at the approximate stratigraphic level of the Talcott basalt. The Newgate copper consists of copper sulfide minerals disseminated within Shuttle Meadow formation sandstones, which were deposited subsequent to the Talcott basalt intrusion in the form of stratigraphically-distinct bands of channel sand eroded into the earlier red-beds and basalt by the floodwaters of a large river basin. The mineralized zone, which extends along the general line of Newgate Road for over a mile, follows an unconformity or fault which truncated the Talcott formation, leaving the basalt largely absent from the Newgate copper mineral area. The absence of basalt greatly eased later human access to the mineralized sandstone. Mineralization occurred as precipitation from the surface into still-unconsolidated gray sandstone strata, following several episodes in which deeper, hot, saline, mineral-laden water was flushed to the surface through faults opened during the erosional unconformity in the Talcott basalt, as well as at least one later faulting episode. Copper minerals dissolved and replaced cementitious material in the gray sandstone, but did not become fixed within the older, consolidated red-beds, which are distinctly devoid of copper minerals (Perrin 1976; Gray 1982, 1987).

Pleistocene glaciation and Holocene land-formation processes created most of the Project area environments used over the last approximately 10,000 years by Native American and Euroamerican peoples, within several drainages all tributary to the Connecticut River. West of the Metacomet Ridge highlands, Project area landscapes are defined primarily by glacial till and stratified drift on which well-drained soils have developed, with extensive wetlands along small streams and within depressions created by glacial and early post-glacial processes. North of Hatchett Hill Road in East Granby, streams and wetlands west of the highlands flow into Salmon Brook, a tributary of the Farmington River whose basin encompasses the Northern Route south of this road. A glaciolacustrine dam at present Plainville, Connecticut diverted the course of the Farmington River in late glacial times, and the river turned north at its confluence with the Pequabuck River in present Farmington, following an earlier channel along the western edge of the Metacomet Ridge until it reached the Tariffville Gorge and created a water gap along a bedrock fault. Downstream of the water gap, the Farmington flows southeast through the Northern Route corridor towards the Connecticut River (Flint 1930; Colton 1960; U.S. Department of Agriculture 1962; Randall 1970; Stone *et al*. 1998; Banks 2000).

The Metacomet Ridge highlands, with much exposed or shallow bedrock, divide the Farmington and Connecticut river drainage basins. In most Project areas and vicinity, land west of the ridge drops rapidly in a series of steep shelves into the bottom of the Salmon Brook drainage, falling approximately 130 feet in elevation from the approximately 465-foot-elevation of Newgate Road to the upper edge of wetlands and ponds along Salmon Brook tributaries. The steep drops below Newgate Road are sometimes known as Copper Hill. Most of the Newgate Road Underground Variation runs through this environment (Colton 1960; Schnabel and Eric 1964; Perrin 1976; Rodgers, comp.,1985; Bell 1985).

Between the Metacomet Ridge and the Connecticut River, higher elevations including most of the Route 168 Underground Variation route are characterized by till and ice-contact stratified drift. Most of the landscape on both sides of the river east of the ridge, including the north end of the Northern Route and all of the Southern Route and its underground variation, is dominated by level deposits associated with late-glacial Lake Hitchcock and subsequent river and stream formation processes. The lake drowned the lowland along 150 miles of present river some 12,500-16,000 years ago. Lake deposits included fine silts and clays later exploited for brick manufacture, and broad, sandy deltaic fans around tributary streams. The north end of the Northern Route in Suffield is drained by headwaters of Connecticut River tributary Stony Brook and the Muddy Brook tributary of Stony Brook, crossing deltaic deposits with well-drained sandy soils and post-glacial wetlands. In northeast Suffield and northern Enfield, most of the Southern Alternative routes pass through terrace deposits of sand, silt, and clay created by late glacial and Holocene river and stream formation, and delta or outwash plain deposits associated with Lake Hitchcock at the east end of these routes. There are also less extensive areas of till in Suffield, bedrock-controlled Connecticut River banks, and, in Enfield, glacial ice-contact drift and early Holocene aeolian deposits of sand. Soils along the Southern Route and its underground variation are predominantly sandy loam, fine sand, or silt loam, all draining directly into the Connecticut River or into its tributary Worthington (Suffield) and Freshwater (Enfield) brooks (Colton 1960; U.S. Department of Agriculture 1962; Colton and Hartshorn 1970; Bell 1985; Stone *et al*. 1998).

The Project area environments offered a wide range of natural resources for human use beginning some 10,000 years ago. Freshwater fish were available in many of the rivers and streams, as were anadromous fish and eels until the obstructions created by historic dams. As discussed in Section IV, the water gap at Tariffville was a fall line which slowed the passage of anadromous fish and created an important locus of seasonal fish capture. Wetlands and alluvial stream or river margins attracted birds and mammals which could be hunted. The igneous materials exposed along the Metacomet Ridge were important sources for stone tool manufacture by Native Americans. Relatively stone-free, level soils in the areas once covered by Lake Hitchcock attracted Native American and Euroamerican farmers. Euroamericans made a variety of products from pine forests in sandy soils along the larger rivers, and tried to extract riches from the copper deposits along Newgate Road.

IV. NATIVE AMERICAN ARCHAEOLOGICAL SENSITIVITY

A. Known Resources and Research Context

Within approximately 1 mile of the Northern Route and/or its underground variations, there are nine reported Native American sites in files of the Connecticut State Archaeologist, and two such sites within the same distance from the Southern Route and its underground variation (Tables 1-4). As there is widespread if uneven evidence of Native American occupation in the Central Lowlands, this Project-specific dearth of information probably reflects a relative lack of detailed archaeological survey and excavations in the Project area vicinities. Several of the reported sites, plus a badly-looted Terminal Archaic cemetery (c3,900-2,700 years before present [B.P.]) on the Enfield/Longmeadow, MA border which the Connecticut site files show as located in Longmeadow, suggest the general sensitivity of Project areas for potentially-significant Native American resources (Walwer 1996). The most important reported site in Connecticut data for Project vicinities, and the only one subject to extensive professional archaeological excavation (Banks 2000), is the Indian Hill Site in Bloomfield (Site 11-2), occupied seasonally below Tariffville Gorge as a major fish capture point primarily during Middle and Late Archaic periods (c7,500-3,000 B.P.). Avocational collecting or sampling activities have located largely-undocumented possible campsites, dated to Late Archaic-Woodland periods (c5,000-450 B.P.) based on stone tools or fragments of stone tool manufacture/repair (lithic debitage), at the Radtke Site near the Farmington River in Windsor (Site 164-5) and the Roncari Site near wetlands and small brooks south of East Granby center (Site 40-1). The Griffin Site in East Granby (Site 40-4), located northeast of East Granby center adjacent to wetlands and Creamery Brook, had surface finds suggesting continual Native American occupation from Early Archaic times (c10,000-7,500 B.P.) into the Late Woodland period. Limited professional testing at the Griffin North #2 Site (Site 40-15) adjacent to Beaver Dam Marsh in the Copper Hill section of East Granby did not yield enough information to suggest site age or function (Banks 2002). In Enfield, unnamed Site 49-3 along Freshwater Brook had a variety of Late Archaic projectile points (c5,000-3,000 B.P.) recovered by avocational archaeologists, but no information confirming site age or function.

These sites reflect many of the limitations in present knowledge of Native American settlement systems or lifeways in this section of the Connecticut River Valley, and elsewhere in the Northeastern United States. Although some were tested or excavated with scientific controls and methods, only the Indian Hill Site yielded sufficient information to define site functions or ages very precisely. The settlement systems generating these sites remain largely unexplained, although a variety of models have been generated with variants of shifting seasonal occupations and more limited permanent campsites, including work suggesting that the Farmington River Valley was a relatively self-contained region for Native American social geography beginning in Late Archaic times (e.g., Feder 1981; McBride 1984; Banks 2000; Forrest *et al*. 2006). Problems common to researchers working elsewhere in the region characterize this work: lack of enough time, money, or property access to conduct very extensive research, poorly defined stratigraphic relationships of site components, lack of well-defined components from datable periods, and limited preservation of organic materials. A large percentage of reported finds are based on very limited, casual information. Almost three decades of increased archaeological research made under the aegis of cultural resource preservation mandates have expanded our knowledge of Amerindian prehistory and history somewhat, but broad questions remain for all documented periods of occupation. In this context, comparison of the project area with regional research results is essential to define Project area potential for significant Amerindian resources.

Table 1. REPORTED NATIVE AMERICAN ARCHAEOLOGICAL SITES WITHIN ONE MILE OF NORTHERN ROUTE

TOWN	NO.	NAME	DATE	DESCRIPTION	NR STATUS	SOURCES
BLOOMFIELD	11-2	INDIAN HILL	MA/LA/LW	seasonal fishing site with Stark, Neville, Vosburg, Otter Creek & Levanna projectile points; scrapers, ulu fragment, atlatl weight, calcined bone	probably NRE	OSA; Banks 2000
WINDSOR	164-5	RADTKE SITE	LA/WOOD	possible camp; Small-Stemmed projectile points & limited lithic debitage	UNK	OSA
EAST GRANBY	40-1	RONCARI SITE	LA/TA/WOOD	possible camp; Small-Stemmed & lanceolate projectile points; grooved ax	UNK	OSA
EAST GRANBY	40-14	GRIFFIN NORTH #1 SITE	UNK	limited lithic debitage	NOT NRE	OSA; Banks 2002
EAST GRANBY	40-15	GRIFFIN NORTH #2 SITE	UNK	possible camp; quartz, quartzite, basalt, hornfels, slate lithic debitage; chert projectile point fragment	UNK	OSA; Banks 2002

Table 2. REPORTED NATIVE AMERICAN ARCHAEOLOGICAL SITES WITHIN ONE MILE OF ROUTE 168 UNDERGROUND VARIATION

TOWN	NO.	NAME	DATE	DESCRIPTION	NR STATUS	SOURCES
EAST GRANBY	40-1	RONCARI SITE	LA/TA/WOOD	possible camp; Small-Stemmed & lanceolate projectile points; grooved ax	UNK	OSA
EAST GRANBY	40-4	GRIFFIN SITE	EA/MA/LA/TA/ WOOD	multi-component surface collection: Kirk, Neville, Otter Creek, Vosburg, Brewerton, Squibnocket, Snook Kill, Susquehanna Broad, Orient projectile points; other tools; lithic debitage	UNK	OSA
EAST GRANBY	40-7	UNNAMED	UNK	NO INFORMATION	UNK	OSA
EAST GRANBY	40-8	UNNAMED	UNK	NO INFORMATION	UNK	OSA
EAST GRANBY	40-20	UNNAMED	UNK	NO INFORMATION	UNK	OSA

Table 3. REPORTED NATIVE AMERICAN ARCHAEOLOGICAL SITES WITHIN ONE MILE OF NEWGATE ROAD UNDERGROUND VARIATION

TOWN	NO.	NAME	DATE	DESCRIPTION	NR STATUS	SOURCES
EAST GRANBY	40-14	GRIFFIN NORTH #1 SITE	UNK	limited lithic debitage	NOT NRE	OSA; Banks 2002
EAST GRANBY	40-15	GRIFFIN NORTH #2 SITE	UNK	possible camp; quartz, quartzite, basalt, hornfels, slate lithic debitage; chert projectile point fragment	UNK	OSA; Banks 2002

Table 4. REPORTED NATIVE AMERICAN ARCHAEOLOGICAL SITES WITHIN ONE MILE OF SOUTHERN ROUTE & SOUTHERN ROUTE UNDERGROUND VARIATION

TOWN	NO.	NAME	DATE	DESCRIPTION	NR STATUS	SOURCES
ENFIELD	49-3	UNNAMED	LA	possible camp; Brewerton; Poplar Island, Bare Island, Otter Creek, Lamoka projectile points	UNK	OSA
ENFIELD	49-9	FRESHWATER BROOK KNOLL	UNK	1 atlatl weight, surface collection	UNK	OSA

ABBREVIATIONS

DATE:	UNK	Unknown	NR STATUS:	NRE	Eligible for National Register listing
	MA	Middle Archaic		UNK	National Register eligibility not determined
	LA	Late Archaic		NOT NRE	Not eligible for National Register listing
	TA	Terminal Archaic			
	WOOD	Unidentified Woodland	SOURCES:	OSA	Office of Connecticut State Archaeology
	EW	Early Woodland			
	MW	Middle Woodland			
	LW	Late Woodland			

1. Prehistoric and Contact Period Background

Published reports and artifact collections indicate continuous human occupation in Connecticut over at least the past 10,000 years. Archaeological researchers divide this span of time into several periods, beginning with the Paleo-Indian and continuing through Archaic and Woodland times to the period of European contact (e.g., Ritchie 1980).

a. Paleo-Indian Period (c15,000-10,000 B.P.)

In the Northeast, the Paleo-Indian Period dates from 15,000 to 10,000 B.P., although the earliest archaeological evidence for human occupation in the New England region dates to approximately 12,500 B.P. (Snow 1980) and in Connecticut to around 10,000 B.P. (Moeller 1980). The period began as the final retreat of the Wisconsin III glacier from southern New England was nearly complete. Spruce and fir, with smaller proportions of deciduous species such as oak, characterized the forest cover at this time (Snow 1980). Sea level was over 200 feet below present shorelines, with much of earth's water still trapped in glacial ice. Many fauna which are now extinct or no longer native to the area lived in Connecticut, including mammoth, mastodon, elk, peccary, giant beaver and caribou (Ritchie 1980).

There are a number of archaeological sites from this period reported in the Northeast, although their ability to provide data for reconstruction of ancient lifeways is limited by site rarity, lack of integrity, and lack of preserved organic remains (Richie 1980, Funk 1972, Eisenberg 1978). Site type include apparent base camps, quarry-workshops, rockshelter occupations, hunting camps, temporary camps, and kill sites, based on intersite variability of artifact assemblages and environmental settings (Funk 1972; Gramly 1982; Moeller 1980). Reconstruction of settlement and subsistence patterns suggests that Paleoindians were a sparse population, perhaps operating from central base camps to pursue herds of large game animals, and probably to exploit a wider range of seasonally-available food resources including wild plant foods and marine resources (e.g., Newman 1967; Brennan 1974; Kaufman and Dent 1982). Sites from this period are characterized by distinctive fluted points and flaked stone assemblages, and are most frequently found near major river channels.

The amount of data Paleo-Indian Period land use patterns and subsistence activities in the Northeast is relatively limited. Few intact cultural deposits from the Paleo-Indian Period have been found in Connecticut; most of the known sites consist of surface finds in plowed fields. It is possible that Amerindians arrived in central Connecticut early enough to live along the shores of glacial Lake Hitchcock, but scattered finds from this period within the lake's limits suggest that continuous habitation in this area did not begin until after the lake drained (Curran and Dincauze 1977). A very small number of intact Paleo-Indian sites are reported for Connecticut, in Groton, Washington, and Ledyard (Moeller 1980; McBride 1984; Jones 1997). The paucity of Paleoindian evidence would make any such site in the project area very valuable.

b. Archaic Period (c10,000-2,700 B.P.)

The Archaic Period dates from 10,000 to 2,700 B.P. in the Northeast and is characterized by more generalized hunter-gatherer cultures than in the Paleo-Indian Period. The period is subdivided into the Early, Middle and Late Archaic Periods on the basis of associated changes in environment, projectile point styles and inferred adaptations (Snow 1980; McBride 1984). Each subperiod is discussed below.

The Early Archaic Period (c10,000-7,500 B.P.). Pollen evidence indicates a gradual trend toward a warmer, drier climate beginning around 10,000 B.P., with the region largely forested in pines with an increase in oak and other deciduous species by about 9,000 B.P. (Eisenberg 1978). Sea level rose to within perhaps 80 feet of present levels, turning the late glacial lake occupying much of what is now Long Island Sound into a marine environment toward the end of Early Archaic times (Gordon 1983). The large Pleistocene fauna were by now extinct or living north of southern New England, leaving smaller species such as moose, deer and beaver. In addition, seasonally available resources became more predictable and abundant, permitting Early Archaic populations to exploit a wider range of resources.

Populations probably increased during this period, although Early Archaic sites are not well-represented in the regional archaeological record. This low representation could be due in part to changing environmental conditions which may have deeply buried or destroyed many early sites by erosion and rising seas, or to the difficulty of recognizing Early Archaic assemblages (cf. Funk 1977 and Dincauze and Mulholland 1977). Early Archaic stone tool assemblages have been recovered from several sites in Connecticut, and suggest this period is characterized by a quartz cobble lithic industry and bifurcate-based projectile points (e..g, McBride 1984). The Dill Farm Site (Site 41-50) in East Haddam represents one of the best-documented Early Archaic sites in eastern Connecticut. Archaeological investigations identified cooking/refuse features, quartz debitage, retouched tools, and bifurcate-based projectile points. Further excavations at the site have produced additional bifurcate-based points, hearth areas, refuse pits, stone tool workshops, and subsistence remains (charred nuts, mammal bone) as well as radiocarbon date of 8,560 +/- 270 B.P. In the lower Connecticut River Valley, Early Archaic occupations are more widely distributed than Paleo-Indian sites across both riverine and upland zones (McBride 1984). The presence of occupations in a wider variety of environmental settings is assumed to reflect the exploitation of a wide range of seasonally available resource by hunter-gatherer populations. Recent investigations suggest that large wetland basins presented a wide variety of resources during the Early Archaic Period and likely attracted long-term Native American settlements. The Sandy Hill Site in Ledyard has produced scores of steep-edged quartz scrapers, hundreds of quartz micro-cores and several groundstone tools, and many wetland pant species. Several pithouse features at the site have yielded dates between 9,300 and 8,500 B.P. (Forrest 1999, Forrest *et al*. 2006). The presence of one or more Kirk projectile points at the Griffin Site in East Granby suggests the possibility of Early Archaic occupations near streams and wetlands in Project areas.

The Middle Archaic Period (c7,500-5,000 B.P.). Pollen evidence indicates a trend toward a moister, warmer climate in this period culminating in the establishment of essentially modern deciduous forest by the end of the Middle Archaic (Salwen 1975). The greater number of archaeological sites known for this period may relate to an increase in the diversity and richness of the natural resource base of human settlement. The seasonal use of resources noted above appears well established by this time, although detailed reconstruction will require more research. Site types include spring fishing camps along major streams, open fall hunting camps, rockshelter occupations, and shellfishing stations (Dincauze 1976; Barber 1980; Brennan 1974; Banks 2000). Middle Archaic data indicate a trend toward more special-purpose camps, reflecting more specialized seasonal activity in different resource zones. New tool classes during this period include grooved axes, implying woodworking tasks, and the presence of netsinkers and plummets indicates the growing importance of marine resources such as fish (Snow 1980).

Few sites in Connecticut have yielded information on Middle Archaic subsistence and land use patterns. The archaeological assemblages are characterized by a local quartz cobble industry, Stark and Neville projectile points, and a settlement pattern oriented toward large upland interior wetlands (McBride 1984). The Dill Farm Site yielded Neville points, basin-shaped hearths, post molds, pit features, preserved nuts and mammal bone, caches of quarry blocks, and stone tool manufacturing debris. The pattern suggests seasonal re-use of this locale over a long period of time. The Indian Hill Site in Bloomfield, close to the Northern Route, is among the best-documented seasonal fishing sites in the state, with Stark and Neville points, many hearths, scrapers and fishing weights of local basalt, quartz, and hornfels, and specialized ulus or semi-lunar knives most likely used for fish processing and made of slate probably brought from the Hudson River Valley (Banks 2000).

Middle Archaic Period occupations in the Connecticut Valley are distributed across a variety of ecozones, with an orientation toward upland microenvironments. As in the rest of the Northeast, Middle Archaic settlement patterns in eastern Connecticut are assumed to reflect movement to seasonally abundant resources, but with an emphasis toward interior upland zones. Data from the northeastern highlands indicate that Middle Archaic sites were temporary in nature and tend to be located adjacent to larger interior rivers and wetlands. The nature of the sites suggests small, mobile groups of hunter-gatherers, exploiting a fairly limited range of upland resources. It appears that small bands of hunters operated out of larger riverine or interior wetland camps in the Connecticut Valley, using the eastern highlands and the upper Farmington River Valley for hunting and other seasonal tasks (McBride *et al.* 1980, Feder 1981; McBride and Soulsby 1989; Banks 2000).

Late Archaic Period (c5,000-3,000 B.P.). The Late Archaic Period in the Northeast is characterized by an essentially modern distribution of plant and animal populations, with an increase in human populations, the development of more complex settlement and subsistence systems, and the establishment of long-distance exchange networks (Snow 1980). Late Archaic Period settlement in central and eastern Connecticut has been documented at numerous coastal and interior upland locations. This period is often considered a time of cultural fluorescence, as reflected by evidence for burial ritual, population increases, and long-distance exchange networks (Ritchie 1969b; Snow 1980). The Late Archaic Period is one of the best-known temporal sequences in southern New England, and is characterized by three major technological or cultural traditions: the Laurentian (c6,000-4,200 B.P.), the Narrow-stemmed (c4,300-3,500 B.P.), and the Susquehanna (c3,800-2,700 B.P.) (Ritchie 1969b; Snow 1980). Distinctions among these traditions are not always easy to draw, however, and as noted below artifacts from more than one tradition appear at several sites near Project areas.

The Laurentian Tradition. The Laurentian Tradition is considered the earliest manifestation of the Late Archaic Period in southern New England. Most data concerning the Laurentian Tradition in the Northeast come from work done in New York State and on Martha's Vineyard by Ritchie (1969a, 1969b). Sites assigned to the Laurentian Tradition are characterized by Vosburg, Brewerton and Otter Creek projectile points, bannerstones, gouges, adzes, plummets and ulus, and a settlement pattern in which large camps are located in riverine areas. Smaller, more temporary and special-purpose sites are situated in the interior (Ritchie 1969a and b).

Laurentian sites in eastern Connecticut have been identified with Brewerton projectile points, ground stone tools including ulus or semi-lunar slate knives, and a preference for a stone other than quartz. McBride summarized relatively limited data on a number of such sites dated between 4,600 and 4,300 B.P., indicating that eastern Connecticut occupations are distributed across a wide range of microenvironments and most likely represent small groups of hunter-gatherers utilizing a variety of upland resources on a seasonal basis. These sites tend to be small, usually not more than 500 square meters in size, and are believed to reflect the movement of small, mobile groups of hunters and gatherers (10-20 people per group) moving about the landscape pursuing seasonally abundant resources. One of the earliest of these Laurentian finds in Connecticut, Site 12-4 in Bolton, has been radiocarbon-dated to 4,890 +/- 100 B.P. Large seasonal camps suggest larger aggregations of people for at least part of the year. The Indian Hill Site in Bloomfield included Vosburg and Otter Creek points, ulus, and several features dated to 4870 +/-80 and 5010 +/-80 B.P. No large residential camps have been located anywhere in the highlands of eastern Connecticut or the upper Farmington River Valley, suggesting that seasonal aggregations of small bands may not have taken place in the uplands, but along the larger rivers and streams or interior lakes instead. Along Freshwater Brook in Enfield about one mile from the Southern Route, Site 49-3 had a number of Laurentian points, and may represent a series of seasonal aggregations; the Griffin Site in East Granby has similar components, though neither of these sites has been excavated very extensively (McBride 1984; Banks 2000).

Narrow-stemmed Tradition. Late Archaic Narrow-stemmed Tradition sites date between 4,300 and 3,500 B.P. in southern New England. This tradition is characterized by small- or narrow-stemmed projectile points, regional variants of which include Squibnocket, Sylvan Lake, Lamoka, Bare Island, Wading River, and Poplar Island projectile point forms (Snow 1980). Narrow-stemmed settlement patterns are characterized by seasonal camps along rivers, interior wetlands, lakes and uplands. Numerous temporary and task-specific sites are distributed across a wide variety of ecozones. Larger base camps have also been discovered along major rivers, indicating long-term seasonal reuse of some locales over long periods of time as well as a degree of stability and territoriality not previously documented in the region.

McBride identified two different phases or components of Narrow-stemmed occupations in the Connecticut River Valley. His Vibert Phase (c4,400-4,200 B.P.), perhaps transitional between the Laurentian and Narrow-stemmed Traditions, is characterized by triangular projectile point types, a quartz cobble lithic industry, and a dispersed settlement pattern consisting of small, temporary occupations, somewhat analogous to the Golet Phase. Vibert Phase occupations are distributed across a variety of environmental zones, with an emphasis upon non-riverine areas such as upland streams and interior wetlands. In the lower Connecticut River Valley, his Tinkham Phase (c4,200-3,500 B.P.) is characterized by stemmed point forms, the presence of an almost exclusively quartz cobble lithic industry, and a settlement pattern characterized by a high frequency of large camps and task-specific sites, with few temporary camps, suggesting a larger, less mobile population. Tinkham Phase occupations are distributed over a wide range of ecozones and environmental locales, including riverine areas, lakes, upland streams and interior wetlands, reflecting the use of a variety of resources. The largest camps (base camps) tend to be situated near the Connecticut River, although seasonal camps have been located throughout the lower valley. Smaller, more specialized occupations tend to be located in terrace and upland zones, perhaps reflecting frequent movement out of seasonal camps on a daily or temporary basis to procure resources. The nature and distribution of sites suggest aggregation during summer months, with seasonal dispersal into smaller groups during the cold weather (McBride and Dewar 1981; McBride 1984; Dewar and McBride n.d.).

Tinkham Phase population aggregations are indicated near the Connecticut River, in the eastern highlands, and at some sites in the upper Farmington River Valley. No large base camps have been found in the upland areas, although certain sites may represent larger aggregations of people during certain seasons of the year. Seasonal movement from the river to the uplands is still poorly understood, but the high frequency of seasonal camps throughout the Connecticut River Valley and adjacent highlands suggests movement of groups to the highlands on a seasonal basis. The other possibility is that upland settlement data represent year-round occupations. Near Project areas, the Radtke Site in Windsor and the Roncari and Griffin sites in East Granby included Narrow-stemmed projectile points which may indicate additional Late Archaic components, though this artifact type is also associated with later Woodland sites.

Susquehanna or Terminal Archaic Tradition. Sites assigned to the Susquehanna Tradition date between 3,900 and 2,700 B.P. in southern New England, and are often characterized by the appearance of broad-bladed projectiles -- probably from the south and west -- which differ radically from the earlier, narrow-stemmed lithic products of the Sylvan Lake phase. It remains entirely unclear as to whether the later points reflect actual migrations of people or simply technological diffusion (Ritchie 1980; T.G. Cook 1976; Turnbaugh 1975; Dincauze 1975). In central Connecticut, Susquehanna sites have been defined by 1) Snook Kill, Susquehanna Broad and Orient Fishtail points; 2) steatite (soapstone) bowls; 3) cord-marked and grit-tempered ceramics; 4) lithic assemblages consisting of flint, chert, argillite, felsite, rhyolite, and quartzite (local quartz was used infrequently); 5) a riverine/lacustrine settlement pattern; and 6) human cremation burials (McBride 1984). Burial ritual in this period has received a great deal of attention in the Connecticut Valley, with cremations located at the Schwartz, Carrier and Griffin sites; the latter is located in East Lyme, and is not the site of the same name in East Granby (Pfeiffer 1980, 1983, 1984; Pagoulatos 1986). Numerous habitation sites assigned to the Susquehanna Tradition have also been identified in the Connecticut Valley, eastern highlands, and surrounding areas. Susquehanna finds near the Project area include some projectile points from the Griffin Site in East Granby, and grave goods taken from the Native American cemetery on the Longmeadow/Enfield border.

The Timothy Stevens Site, situated on the terrace edge overlooking the Connecticut River flood plain in Glastonbury, represents what might be typical of the larger occupations interpreted as seasonal camps. This site dates to between 2,740 +/- 60 B.P. and 2,460 +/- 60 B.P. (Pagoulatos 1986). Larger Susquehanna camps in the Connecticut River Valley have typically appeared on river terraces, not in the flood plain or in the highlands (Dewar and McBride n.d.). This shift may have provided residence closer to the river earlier in the year, either before or during the annual spring floods. In the eastern highlands, settlement patterns related to this tradition resemble those identified for Laurentian sites, with mostly temporary camps and more specialized use of the uplands than seen in the Narrow-stemmed Tinkham Phase. It is possible that small groups from riverine camps established these temporary sites to procure seasonally-available resources. Populations may have dispersed into smaller domestic units or specialized task groups and moved into the eastern highlands in the late fall and winter (Pagoulatos 1986; McBride and Soulsby 1989).

Despite the large amount of data available for the Late Archaic Period, the relationship among its various traditions is by no means fully documented.

c. Woodland Period (c3,000-450 B.P.).

The Woodland Period is characterized by the increased use of clay pottery, the introduction of tropical cultigens (i.e., maize, beans, squash and sunflowers), and an increase in site size and complexity, suggesting a trend toward increased sedentism and social complexity (Dragoo 1976). The Woodland Period has been traditionally subdivided into Early, Middle, and Late periods on the basis of ceramic styles, settlement and subsistence patterns, and political and social developments (Ritchie 1969a and b; Snow 1980). In this summary, the break between Middle and Late Woodland periods is based on an apparent shift to more or less permanent camps, possibly associated with increased use of tropical cultigens (Cassedy 1997).

The Early Woodland Period (c3,000-1,600 B.P.). Various Early Woodland regional complexes have been recognized in southern New England and are generally characterized by: 1) Lagoon, Meadowwood, and Rossville point forms; 2) thick, grit-tempered, cord-marked ceramics; 3) a settlement pattern oriented toward riverine and coastal locales; 4) burial ritual; and 5) long-distance trade/exchange networks. In the Connecticut River Valley, Early Woodland finds vary somewhat from this pattern, and are characterized by a quartz cobble lithic industry, narrow-stemmed points, an occasional Meadowwood projectile point, thick, cord-marked ceramics, and perhaps human cremations. There is little data available regarding on settlement and subsistence patterns. Sites in the Connecticut Valley are distributed across a variety of ecozones, with some orientation toward flood plain wetlands and upland lakes, and large sites appear primarily in the flood plain and terraces. Approximately contemporary sites from eastern Connecticut include only seasonal camps only, ranging from 600 to 1,500 square meters in size. Temporary and task-specific camps were probably used, but are not always easy to identify because the artifact assemblage is identical to Late Archaic Tinkham phase occupations, with the exception of ceramics. The limited available data suggest that Early Woodland populations were mobile bands of hunter-gatherers, exploiting a wide range of microenvironments in cycles of seasonal group movements throughout the lowlands and highlands, with population aggregations along major rivers, interior lakes and wetlands. Probable seasonal camps appear along the river as well as near interior wetlands and lakes extending into the eastern Connecticut highlands (McBride 1984).

McBride (1984) has noted important potential ambiguities in Terminal Archaic/Early Woodland chronology and settlement patterns, as the few well-dated Early Woodland sites tend to overlap in time and space with sites of the Susquehanna Tradition. The extremely different natures of the sites from these two periods (i.e., the Early Woodland sites may be seasonal while the Susquehanna sites appear to be more temporary and specialized) and the marked differences in the lithic assemblages would argue for two overlapping settlement systems: a Susquehanna tradition network centered along the Connecticut River with seasonal and specialized use of the uplands, and an Early Woodland network staying year-round in the uplands. The Early Woodland Period is generally poorly documented, with pertinent components often hard to distinguish in multi-component sites, and the possibility that coastal sites from this period have been submerged and destroyed by rising seas. Some researchers have associated the paucity of sites and radiocarbon dates attributable to this period as evidence of a population decline (Cassedy 1997).

The Middle Woodland Period (c1,600-1,200 B.P.). The Middle Woodland Period has been characterized by increased ceramic diversity in both style and form, the use of tropical cultigens, and long-distance exchange networks (Dragoo 1976; Snow 1980). Much of our current knowledge of the Middle Woodland Period in southern New England is extrapolated from work done by Ritchie (1969b) in New York State. Ritchie noted an increased use of plant foods such as goosefoot (*Chenopodium sp.*) in the Canoe Phase in New York, which he suggests had a substantial impact upon social and settlement patterns. Ritchie further noted an increased frequency and size of storage facilities during the Middle Woodland Period, which may reflect an increased trend toward sedentism (Ritchie 1969b; Snow 1980). Speculation on the possible role of horticulture in such changes remains unsubstantiated, and the earliest dates for maize (*Zea Mays*) in the region — in eastern New York State— are c1100 B.P., in what may more accurately be attributed to the Late Woodland Period (Ritchie and Funk 1973; Snow 1980; Cassedy 1997). An acorn storage pit in a Middle Woodland layer of the Spruce Swamp site in Norwalk provides a unique example of food storage in coastal Connecticut (Claypool 1976).

In the Connecticut River Valley, Middle Woodland sites are identified by 1) straight-walled, pointed-bottomed, dentate-stamped ceramics; 2) a quartz cobble lithic industry, but with an increased amount of flint from New York, ranging from 5 to 15%; 3) narrow-stemmed and occasionally Jack's Reef projectile point varieties; and 4) a settlement pattern characterized by population aggregations along major rivers and the coast. Sites are distributed across riverine and upland zones, including tidal marshes, coves, upland streams and interior wetlands. Large seasonal camps are mostly found near the Connecticut River, situated in riverine wetland and tidal marsh locales; smaller, temporary camps tend to be distributed away from the river in the uplands. This pattern suggests the aggregation of populations near the Connecticut River for much of the year, with possible organized task groups using temporary camps near upland wetlands to exploit specific resources. The pattern reflects a collecting strategy in which collectors made fewer residential moves; task groups would collect resources in upland zones and transport them to the riverine base camps (McBride 1984). Increased sedentism near tidal marshes probably reflects the establishment of essentially modern sea levels by c2500-2000 B.P., and the wide variety of animal, plant and aquatic resources available in the emerging marshes on present shorelines. Many earlier examples of coastal sedentism have probably been obscured or destroyed by wave action as the sea rose.

Late Woodland Period (c1,200-450 B.P.). This period is characterized regionally by the intensive use of maize, beans, and squash; changes in ceramic technology, form, style, and function; population aggregations in villages along coastal and riverine locales; increased sedentism; and the use of upland zones by smaller, domestic units or organized task groups. Not all of these regional developments have been identified in southern New England. Late Woodland Period artifact assemblages include, primarily, Levanna point forms and finely made, brushed, stamped, incised and cord-marked ceramics (Ritchie 1969b; Snow 1980). This settlement pattern suggest a trend toward fewer and larger villages near the coast and rivers, reflecting a continued reduction in residential mobility and increased sedentism. It has been hypothesized that these changes can be attributed to the introduction of maize, beans, and squash, but as noted below it is unclear how important cultigens were in the aboriginal diet of southern New England groups (Ritchie 1969b; Ceci 1980; McBride 1984).

In the Connecticut River Valley, Late Woodland sites are characterized by 1) brushed, cord-marked, stamped, fabric-marked and incised Windsor, Sebonac and Hollister ceramics; 2) an increase in non-local lithic utilization, ranging from 60 to 80% of assemblage context; 3) the presence of Levanna and Madison point varieties; and 4) a settlement pattern which reflects the establishment of semi-sedentary villages near the rivers and temporary encampments in the uplands (McBride 1984). Patterns noted for the Middle Woodland appear to have intensified, with populations apparently aggregated in large villages during much of the year, at perhaps a smaller number of larger sites near the Connecticut River. Temporary encampments were established on a seasonal basis by smaller, domestic units or organized task groups in upland zones, including the upper Farmington River Valley. The settlement pattern reflects that of a collecting strategy (Binford 1980; McBride 1984; Banks 2000).

Near the lowermost Connecticut River or along the coast, Late Woodland sites such as Selden Island, Hamburg Cove and Mago Point Sites represent large occupations and provide information regarding subsistence activities. These occupations date from c1,100 to 1,010 B.P. and may represent villages. The sites include habitation, refuse and burial areas, which yielded mammal, plant, nut, and bird resources indicative of spring, summer and fall occupation. By contrast, more recent sites (c950-500 B.P.) close to the river between Rocky Hill and East Windsor show evidence for similar organic remains such as nut, plant and mammal resources, with the addition of maize. These sites include the Morgan Site in Rocky Hill, the Kasheta and Burnham-Shepard sites in South Windsor, 6HT116 (Site 47-2) in extreme southwestern East Windsor at the mouth of the Scantic River, and the Fox Run 2 Site north of an intermittent tributary of Quarry Brook in East Windsor (Lavin 1988a; Bendremer and Dewar 1993; Raber 1997). Although these sites clearly demonstrate the Late Woodland use of tropical cultigens in the Connecticut River Valley, wild plant, fish, and animal resources were still, in all likelihood, a primary component of the aboriginal diet. The data suggest the aggregation of populations in semipermanent villages near tidal marshes and flood plain wetlands, at least in the spring, summer and fall. A mixed economy of hunting, gathering, fishing, shellfish collecting and horticulture was practiced.

The degree of dependence upon cultigens (as opposed to the storage of wild plants) is unclear, however. In Connecticut, there are less than fifteen sites with maize — including one or two unreported examples — of which only eight have associated radiocarbon dates. All these sites are on coastal or riverine floodplains or nearby glacial terraces. While likely or possible maize storage features at several sites suggest considerable cultivation, the abundance of shellfish and other marine resources also suggests why signs of maize cultivation appear stronger at riverine than at coastal sites. Current data do not support large-scale agriculture practices until the sixteenth century in the Connecticut Valley (McBride 1984; Lavin 1988b; McBride and Soulsby 1989; Bendremer and Dewar 1993; Cassedy 1997).

A brief Final Woodland era has been identified in parts of the Northeast. In the Connecticut River Valley, the Final Woodland dates from c450 to 350 B.P., and is characterized by Levanna point forms, Niantic and Windsor ceramics, and a further increase in the use of non-locally derived flints. Sites are distributed across a variety of riverine, cove, lake, tidal marsh, stream and interior wetland microenvironments. Large villages (5,000-15,000 square meters) are found near the Connecticut River, while smaller seasonal camps and "homesteads" are situated across a variety of resource zones, with a primary focus upon upland streams and interior wetlands. In contrast to the preceding centuries, riverside villages appear to have been occupied throughout much of the year in a wide range of resource zones, but upland land use appears to have involved small seasonal camps occupied by nuclear families. The smaller sites represent dispersal of individual families from riverine areas into a wide variety of upland environments. These family units may have been highly mobile when procuring seasonally available resources in the uplands, away from their sedentary villages near the Connecticut River (McBride 1984). Whether this pattern reflects structural changes in economic and social activities, possibly due to the use of tropical cultigens, remains to be demonstrated.

One Levanna point at the Indian Hill Site in Bloomfield suggests possible use of this fishing site into Woodland times. While no other sites near Project areas appear to have distinct Late Woodland components, the larger sites found near the Connecticut River as well as the seasonal sites found in the Farmington River Valley strongly suggest that seasonal Late Woodland sites could be found in some Project areas.

d. Contact - Early Historic Period

By the 1630s, when direct European contact was felt throughout Connecticut's coasts and larger rivers, Indians were organized in groups of small households which banded together along ethnic and territorial lines in larger villages during the spring and summer and dispersed during other seasons. These small groups engaged in hunting, fishing, and gathering of wild plant foods, and in the later prehistoric period were engaged in maize horticulture. During the Contact period, trapping of beaver and other fur-bearing animals was an important economic activity. In the late prehistoric and contact periods, settlement was focused on or adjacent to the flood plains of the major tributaries, reflecting the importance of agricultural activities, fishing, and access to transportation and communication routes. Planting in the spring and capture of anadromous fish at waterfalls and choke points brought together households. Upland areas were used for hunting, trapping, and gathering from the late summer through the winter by the component household groups of the larger ethnic divisions.

For reasons which remain unclear, there appears to be a strong correlation between the territorial boundaries of Indian ethnic groups and drainage boundaries by the 1630s. Social boundaries among the Algonquian-speaking Indians of southern New England were not rigid, and political organization for most purposes was loose, with male and occasionally female sachems recognized in limited spheres of authority. With fur trade, however, political and territorial boundaries hardened and the fortified villages observed by the Europeans may date to this era of inter-tribal conflicts. Competition for trapping grounds and access to fur markets became intense in the early seventeenth century, and some English adjudication of such matters in Connecticut during later decades used drainage boundaries as political boundaries. There is evidence from other parts of New England for at least a historic period pattern of territoriality based on drainages, and to some extent this pattern probably predates European contact. We can only surmise at this point that stream locations and water resources were always important in determining the movement of game animals and their human predators, while at the same time watercourses were often effective avenues of travel in upland areas. With competition for fur animals, both initial demands for trapping grounds and expansion of these grounds as downstream areas were depleted of furs may have resulted in attempts to control headwater areas for the first time.

In the early 17th century, there was a substantial population of Native Americans in the Connecticut River Valley. The Algonquian-speaking peoples who lived there had practiced agriculture for 500-700 years, but they also continued to hunt, gather, and fish to supplement the crops from their fields. River meadows were the primary areas of maize cultivation (Stiles 1891). The Enfield Rapids would have been an obvious location for seasonal fishing camps, and there were probably villages with cultivated fields in the nearby area as well. Smaller bands hunted in this area in the fall and winter. The earliest white explorer, Adriaen Block, saw an Indian fort along the river above Hartford in 1614. European explorers and colonists, confused about the organization of and identification of various tribes and bands, have left us with many conflicting accounts of tribal names and leadership. Historians, responding to this confusion, have often referred to the many groups on the Connecticut River as the River Tribes. From early sources we see references to the Tunxis who lived to the west on the Farmington River, the Poquonocks at present Windsor, the Massacos above the Poquonocks near Simsbury, and the Sicaogs in present West Hartford. The territory of the Agawam, centered at present Springfield, extended as far south as Stony Brook in present Suffield and about the present border of Enfield and East Windsor. One authority has estimated the pre-epidemic population of these five "sachemdoms" at 3200 (Cook 1976: 57, 61-65). There were also Mattabesecs, Wongunks, and Hammonassets south of Hartford. Some or all of present Enfield may also have been territory of the Podunks, who occupied lands on the east side of the Connecticut river south of the Agawam to about Keeney Cove in present Glastonbury, and from whom some sources say English settlers purchased land rights in Enfield (Spiess and Bidwell 1924; Ingersoll, ed., 1934; Miller 1998). To the south and east, larger tribes such as the Niantics, Pequots, and Mohegans lived along the coast and in interior areas (Cook 1976; DeForest 1851).

The Podunk population c1630 has been estimated at about 1600 people, who lived in six or seven villages and perhaps an unknown number of smaller winter encampments. Most of their principal villages were located on the Scantic, Podunk, and Hockanum rivers in present East Hartford, South Windsor, and Manchester, although some sources place two smaller villages in East Windsor, on the Scantic in the vicinity of present Broad Brook village and near the mouth of Namerick Brook. Given the models of settlement discussed above for prehistoric periods, small temporary camps or task-specific resource-procurement sites were probably dispersed within short distances of the villages. Known Podunk burial grounds were in South Windsor, on the Podunk River and opposite the mouth of the Farmington River. Burials found elsewhere, such as some at Warehouse Point uncovered before the early 19th century, have been attributed to the Podunk but could be from earlier groups. The Agawam, considered in some sources as part of a group of allied tribes or clans known as the Pocomtuc Confederacy, are less well-documented but appear to have been centered around present Springfield, Massaschusetts (McClure 1806; Stiles 1891; Spiess and Bidwell 1924; Ingersoll, ed., 1934; Cook 1976).

The Dutch West India Company began a small trading post at later Hartford in 1623, stimulating a trade in furs which led to conflicts among Amerindian tribes. The Podunks and other River Tribes soon found themselves at odds with the larger Pequot and Mohegan groups of the Thames River drainage. The advent of English settlement around Hartford in the 1630s was in part a response to an invitation from a River Tribe sachem who may have been a Podunk. The Podunk sold land rights to English settlers of early Windsor in 1636, although there was no English settlement east of the river until the 1660s (Stiles 1891). The Mohegans, subservient to the Pequots until the Pequot War of 1637, claimed large areas of the Connecticut Valley and eastern highlands following the defeat of the Pequots. The Mohegans, under their leader Uncas, became the most important Indian political force in eastern Connecticut, using alliances with the English to subjugate or outmaneuver Indian opponents in the region. Uncas was involved in wars or serious quarrels with nearly every Indian group in the region between the Pequot War and King Philip's War of 1676. Many of these disputes originated over control of fur trade resources and markets. During this period of conflict, the English settled affairs between the Mohegan and the Podunk by defining a boundary between them running through Bolton Notch in 1666. This line corresponds approximately to the drainage divide between the Connecticut and Thames River basins. The Mohegan may have retained a later claim to Podunk lands near the Connecticut River through Uncas' son Joshua, whose wife was willed these areas c1672 by her father, a Podunk or Sicaog sachem (Stiles 1891).

The Podunk evidently survived a 1633-34 smallpox epidemic which devastated native populations on the west side of the river around Hartford, and retained a viable military presence until about the time of King Philip's War. By the 1670s, the hunting and trapping grounds of southern New England were probably depleted as sources of Indian income, and those groups which had survived the disease and warfare of the early Contact period had begun trading land rights or money, goods, or political security. Although they resisted being drawn into tributary relations with the Pequot or Mohegan, the Podunk suffered occasional attacks from the Iroquoian Mohawks from New York, who also tried to control trade networks. The decline of the Podunk in the late 17th century is not well documented, but has been associated with Mohawk attacks and the choice by many Podunk to side with the unsuccessful Indian alliance against the English during King Philip's War. It is possible, though not documented, that the large Indian site in Enfield near Indian Run Road may in part represent a Podunk fort from this period. In 1678 and 1680, English settlers based primarily in Springfield purchased some land rights from the Podunk in present Enfield, but there is little published information on Contact-era Native American groups in this town. Small numbers of Podunk lived in East Windsor into the third quarter of the 18th century, and some were present in Manchester into the early 19th century (Stiles 1891; Speiss and Bidwell 1924; Bridge, ed. 1977: 5-7; Miller 1998).

B. Project Area Sensitivity and Future Actions

While relatively few Native American sites are reported near Project areas, nearly all proposed overhead routes remain relatively undeveloped. The approximately 24 miles of proposed overhead and underground route cross-cuts a wide range of topographic and environmental settings. Undisturbed areas matching certain environmental characteristics are sensitive for possible Native American archaeological sites, which could contribute to our knowledge of local and regional prehistory.

Environmental characteristics of known Native American sites in the vicinities of the alternative project routes allowed for identification of areas sensitive for undiscovered sites, based on both surface inspection and information about slope and drainage conditions. Slope, drainage and proximity to streams and wetlands are generally the indicators of Native American site sensitivity. The vast majority of sites are located in areas of less than 15-20% slopes, in well-drained soils. While some fairly large sites that may have been used as permanent, semi-permanent or seasonal sites may be located along major streams and wetlands, previous experience has shown that uplands settings with small level areas adjacent to smaller streams and wetlands do contain Native Amercan sites. The smaller sites encountered in such settings would probably have been used as temporary camps, hunting camps and stations, resource acquisition sites for the obtaining of workable stone or food items, or temporary refuges. It is possible that rock overhangs in areas with steeper, rocky topography would have also been used as short-term shelters.

While proximity to available water in the form of streams, wetlands and ponds with their associated floral and faunal resources would usually be a good indication of potential Native American sites, the absence of nearby water should not be considered great enough to exclude some site locations, particularly in the steeper portions of the project area. As many sites in such locations are small temporary camps or hunting sites, they may have been occupied during the late fall through early spring, when the presence of snow may have eliminated the need for a stream or wetlands. Conversely, it is important to understand if areas now poorly drained have been either created or enlarged due to modern land use. It is possible that some sites may now lie within wet areas that were formerly well-drained, although we are presently not aware of any such areas among those identified as non-sensitive.

Other factors that may have been important in prehistoric times include the presence of rocks and minerals used for tools. Outcrops of basalt, chert, quartz and steatite may exist in surficial exposures of bedrock that were once used as quarry-workshops by prehistoric Native Americans. The presence of steep, narrow gorges and stream valleys and natural rock enclosures may have also been used as natural ambush and game drive sites for hunters.

Based on these considerations, areas with Native American resource sensitivity were identified for the overhead and underground route sections. Identification procedures included:

> assessment of slope, drainage, ledge and disturbances characteristics from topographic and soil maps, recent aerial photographs, and detailed plan and profile data for existing overhead sections (U.S. Department of Agriculture 1962; Connecticut Light & Power Company 1924; Connecticut Power Company 1960; Northeast Utilities Service Company 1969-2002, 1997)
>
> visual inspection of selected portions of the proposed Northern Route and underground alternative transition stations, from truck or on foot, to note slope and drainage characteristics, and to define areas which did not appear archaeologically sensitive because of ground disturbance, landfill, or visible ledge conditions in areas without possible rockshelters

Along overhead route sections, approximately 6.7 miles of the Northern Route and 3 miles of the Southern Route appear sensitive for possible Native American sites (Appendix 1). Precise locations of future transmission structures remain undetermined, but will generally be offset 75 feet from existing ones. Reconnaissance archaeological testing will be necessary to confirm the presence or absence of Native American sites in the following types of Project areas in the sensitive areas shown in Appendix 1:

at future structure foundations and work areas

along new or upgraded access roads requiring ground disturbance

in vegetated areas where forest or brush clearance might result in ground disturbance due to clearance methods and/or work seasons involving softened ground conditions.

Because of disturbance associated with generations of road construction, Native American sites are not expected in most underground alternative routes. Appendix 1 shows underground route sections in which there may be undisturbed soils alongside roadways in which off-road facilities including splice vaults or stream crossings might encounter Native American sites. Undocumented disturbance may have removed all archaeologically-sensitive soils within these areas. Reconnaissance archaeological testing will be necessary to locate sites once any off-road underground routes are defined.

Most potential transition station areas appear sensitive for Native American sites. Parts of the southern transition station for the Northern Route underground variations appear non-sensitive due to poorly-drained soils and/or relatively-recent ground disturbance.

At the locations of future structures including off-road underground facilities, and in areas requiring vegetation clearing or access road construction, additional assessment of Native American archaeological sensitivity may be required to make a final determination of locations where reconnaissance testing will be necessary to locate sites.

V. EUROAMERICAN RESOURCE SENSITIVITY AND POTENTIAL VISUAL EFFECTS

A. Summary of Background Information

The Connecticut River was always an important travel corridor for early European settlers. Dutch explorer Adrien Block sailed upriver to the bottom of Enfield Rapids in 1614, the first serious obstacle for small sailing vessels, but no serious attempts at European settlement began on the river for almost another twenty years. The Dutch West India Company began a small trading post at later Hartford in 1623, completing a small fort a decade later on the eve of English settlement from the Plymouth and Massachusetts Bay colonies, which soon pushed out the Dutch. From subsequent English colonization along the Connecticut River, Project areas were settled from several directions: Bloomfield and East Granby emerged from the growth of Windsor, while Suffield and Enfield began as part of Springfield's expansion in Massachusetts.

1. Bloomfield and East Granby

Families from Dorchester, Massachusetts began the permanent English settlement of Windsor in 1635-36, making it one of Connecticut's first three towns along with Hartford (1635) and Wethersfield (1634) within a large area of easily-worked Connecticut River Valley soils. The Dorchester settlers edged out a group of fur traders from Plymouth Colony who had arrived in 1633, as well as small group arriving in 1635 with a patent from an English nobleman. Like many of the early river towns, Windsor began as a small fortified settlement near riparian meadows, in this instance at the mouth of the Farmington River, a major east-flowing Connecticut River tributary.

As 17th-century Connecticut farmers depleted the soil nutrients in their fields, they cleared more land and converted worn-out fields to pastures. Large families and continuing immigration so accelerated the expansion of cultivated land that the second generation of colonists settled most of the tillable land in the coastal plain, the Connecticut River Valley, and the tidal reaches of the Housatonic and Thames rivers, and the lower Farmington River Valley by the 1670s. The earliest English use of lands in present Bloomfield began in the 1640s, when some settlers from Windsor moved into parts of Bloomfield, and John Griffin and Michael Humphrey established what may have been the first pitch works in Connecticut near the south bank of the Farmington River in the vicinity of the Northern Route. Secondary descriptions differ as to whether the pitch works, probably located on Griffin Brook and based on the collection and processing of pine knots, was south of Tariffville Road close to the Northern Route or closer to the Farmington River and further from this route (The Wintonbury Historical Society 1983: 219; Springman and Guinan 1983: 11-12). By the mid-1660s, Griffin was perhaps the first English settler in present East Granby, while others from Windsor moved further up the Farmington River to begin the settlement of Simsbury, which when incorporated as a town in 1670 included the later towns of Granby and East Granby, and a small part of later Bloomfield.

Continued but dispersed population growth in the early 18th century, accentuated by geographic barriers like the Metacomet Ridge and the poor condition of most roads, led to the beginnings of present municipal boundaries as scattered villages demanded separate centers of Congregational worship. Bloomfield originated as three separate ecclesiastical societies or parishes established within Windsor, Simsbury, and Farmington in the 1730s. The Town of Bloomfield incorporated in 1835, and annexed Simsbury's Scotland Parish in 1843. Aside from small-scale bell-making, carding, and carriage-making operations, Bloomfield remained an agricultural town focused on tobacco growing and packing from c1860 to the mid 20th century (The Wintonbury Historical Society 1983).

Development in present East Granby remained limited until the early 18th century, when two very different patterns emerged on opposite sides of the Metacomet Ridge. West of the ridge, the proprietors (generally, landowners) of Simsbury became interested in mining at the Copper Hill area immediately west of the ridge, which remained common, undivided land at the beginning of the 18th century. The shallowness of the mineral-bearing gray sandstone in some places allowed for relatively easy investigations. By the time that copper minerals were first noted here in 1705, the Connecticut General Assembly had passed an act encouraging mining and smelting activity. The town quickly reserved all mining and mineral rights, and in 1707 most of Simsbury's proprietors formed a company to exploit the proposed mines. Little if anything was accomplished for about five years, under a kind of management arrangement with the family of the local minister, although in 1709 the General Assembly appointed commissioners to guard the town and colony interests in the venture. In 1712, the proprietors began anew with a 30-year lease of some 315 acres along present Newgate Road to Simsbury minister Timothy Woodbridge, Jr., and Boston merchants William Partridge and his son-in-law Jonathan Belcher. None of these men, or their successors in interest, were able to extract or process the ore profitably, and in 1742 no investors chose to renew the 30-year lease. Mining and shipping expenses, and lack of knowledge about how best to process these relatively unusual deposits, were important factors in this lack of success. The deposits varied widely in their copper mineral content, and proved difficult to separate effectively from the gray sandstone gangue. There were no further attempts to mine these deposits until the 19th century. The 18th-century mining attempts were concentrated at the relatively large mine beneath later New-gate Prison, but these efforts also included a large number of exploratory shafts along much of the line of Newgate deposits. Several of these shafts are visible immediately south of the prison enclosure. The economic effects of the mining also extended beyond the large mine. A population of at least several dozen miners lived in the immediate vicinity, stimulating local trade and sometimes marrying into Simsbury families. The lessees bought or leased large tracts around the mine lease area for gardens, timber, and waterpower for stamp mills and/or smelters. The somewhat bustling community emerging along the road to the mine included John Viets, who established a trading post in 1738 at a house near the site of his later tavern, built in 1763. Viets' business flourished, and by 1770 he had purchased nearly all the interests of the Simsbury proprietors in the mine lands. James Holmes took over the lease briefly in the early 1770s, but evidently did nothing before selling his interest to the Colony of Connecticut in 1773. The 18th-century mines and shafts are below, immediately adjacent to, or very near the Newgate Road Underground Variation, as summarized in Section V.C.2.c below (Richardson 1928; Raber *et al*. 1999).

The land on the east side of the ridge around present East Granby center was the last large arable area laid out by English settlers in the Farmington River Valley. Although surveyed by Simsbury proprietors in 1688, settlement did not begin until 1707, and gradually developed along present North and South Main streets adjacent to part of Route 168 Underground Variation. Beginning in 1729, the residents of what was by then known as Turkey Hills petitioned the Connecticut General Court for independent parish status, and succeeded in establishing the Turkey Hills Ecclesiastical Society in 1736. The parishes in Wintonbury to the south and Salmon Brook to the west were established in the same year. Turkey Hills parish included almost all of present East Granby, but the small population remained concentrated east of the mountain. Away from the Farmington River at the parish's south border, and the copper deposits mined along Newgate Road in the early 18th and early 19th centuries, there was little industrial development in Turkey Hills other than small saw and grist mills, most located outside Project corridors. One grist mill was established in 1766 on what is now Creamery Brook, west of the North Main Street section of the Route 168 Underground Variation, but does not appear to have operated more than a few decades. The Salmon Brook and Turkey Hills parishes were incorporated as the Town of Granby in 1786, and in 1858 East Granby became a separate town including small portions of Windsor Locks, Windsor and Granby. East Granby's agricultural economy, based primarily on livestock, grain, and vegetable production for sale to urban and West Indian markets into the early 19th century, became somewhat more specialized in tobacco after c1830. Tobacco, and related growth in dairy farming which supplied manure as well as milk, was a major component of the local economy c1850-1925, and dairy production continued on a smaller scale into the late 20th century. In the late 19th century, a now-demolished creamery operated at the approximate location of the 1766 grist mill noted above. West of North Main Street on Creamery Brook, there was a cider distillery c1850-1879 (Blodget 1792; Warren and Gillet 1812; Woodford 1855; Gray 1869; Springman and Guinan 1983; Cunningham and Ransom 1988).

East Granby's most prominent landmark, discussed in more detail in Section V.C.2.c below, is Old New-Gate Prison, operated 1773-1782 and 1790-1827 above the largest mine opened in the early 18th century. Located immediately west of Newgate Road along the Newgate Road Underground Variation, the prison complex is nationally significant as the first prison in what is now the United States operated by a state-level government, and as perhaps the first American example of long-term incarceration for serious non-capital crimes as an alternative to the practice of severe physical punishment followed by release. Following closure of the prison and transfer of prisoners to a new state facility in Wethersfield, the Newgate mines were again operated commercially -- and unsuccessfully -- c1831-1857. The 1829 completion of the Farmington Canal through Connecticut, running a short distance west of Project corridors, was probably a major stimulus to new investors, offering potential for cheaper transport of material including processed ore if smelting could not be accomplished near the mine. The Phoenix [sometimes Phenix] Mining Company secured ownership of the 5-acre prison parcel from the state and extracted some ore in 1831-32, and again in 1845-46, with the labor of several dozen Welsh, Irish, Cornish, English, and German miners under the management of Richard Bacon. Bacon bought out remaining Phoenix interests in 1853-54, and created the new partnership of Richard Bacon & Co. with Ezra Clark, Jr., in 1854. This firm did little if any new mining, but built an ore mill at a site about a mile northwest of the mine, along an extension of the Canal Railroad which replaced the failed Farmington Canal in 1855-56. The Bacon firm transferred its assets in 1855 to the Connecticut Copper Company, which ceased operations in 1857. Bacon had evidently never learned how to separate the copper mineral from the gray sandstone gangue profitably. After about 1857, owners of the mine and prison site operated it as tourist attraction until 1968, when the Connecticut Historical Commission acquired the property and added the existing parking lot, visitors center, and stair entrance to the mine (Raber *et al.* 1999).

Until the end of the 19th century, none of the waterpower development on the Farmington River occurred in or very near the Northern Route. Upriver of the Project, the falls at Tariffville in Simsbury were first used for saw and grist mill purposes c1750, and beginning in 1824 provided power for the woolen and carpet mill of the Tariff Manufacturing Company. The village, linked to a Canal Railroad spur, remained focused on carpet manufacture until a large fire in 1867, and was later the site of a number or short-lived industries. At the Spoonville section of East Granby about a half mile downstream of the Project corridor, two mills — one on the north side of the river and the other a short distance north on a tributary stream — made wire and German silver flatware c1829-1860. In 1899, The Hartford Electric Light Company (HELCO), which began operations in 1883, completed its Tariffville hydroelectric station on the Farmington River, under or immediately adjacent to the Northern Route. Built to transmit power about ten miles to Hartford, the Tariffville project was notable for being the first commercial American example of a long-distance line using aluminum as an electrical conductor. The Tariffville power plant was also part of the first generation of high-voltage electric transmission across rural Connecticut. Service reached the more populated sections of East Granby soon after the plant opened, and the existing corridor of the Northern Route was first completed by c1924. The hydroelectric project included a 250-foot-long concrete dam, creating a 29-foot head of water which powered two pairs of 1300-hp turbines, each connected to a 750-kilowatt generator in a brick powerhouse. The plant's headrace and tailrace, on the north side of the river, created a new island which was largely washed away in the flood of 1955, which tore off the upper 8 feet of the dam, threw part of the dam downriver, and damaged the powerhouse severely. HELCO demolished the powerhouse down to its concrete floor, still visible today (Springman and Guinan 1983; Haviland 1998; Connecticut Light and Power Company 1924, 2007).

Rail transportation lines crossed the Northern Route in two places, but had limited effects on local economies in the immediate vicinity of the Project. The Connecticut Western Railroad, opened from Hartford to Millerton, NY in 1871, cut through rock just east of the later North Bloomfield Substation, and in this area is now part of a CL&P access road. After much inter-railroad competition and corporate struggles, the Connecticut Western re-incorporated as the Central New England Railway in 1898, and built a 15-mile extension from Tariffville to Agawam and West Springfield, MA by 1902. The branch line, fought by the New York, New Haven & Hartford Railroad with a brazen re-purchase of part of the route, crossed the later electric transmission line just north of Holcomb Road as a rock-lined cut largely eradicated by construction and maintenance of the HELCO right-of-way. The Central New England was absorbed by the New York, New Haven, and Hartford in 1927, and after 1938 the Tariffville Extension was abandoned and dismantled (Springman and Guinan 1983; Turner and Jacobus 1986)

2. Suffield and Enfield

While the three first Connecticut river towns (Wethersfield, Hartford, and Windsor) were establishing a new government in 1636, William Pynchon established a settlement upriver at Agawam, later Springfield, with a party from Roxbury, Massachusetts. This was the first European settlement on the river above Enfield Rapids, and the basis for the later founding of Suffield and Enfield. Pynchon had to use canoes or wagons for any movement of goods beyond the rapids, and soon set up transhipment facilities at Warehouse Point, on the east side of the river below the rapids in present East Windsor. Massachusetts Bay authorized his monopoly on fur trade with the upper river basin's Native Americans in 1638, and, in 1648, gave Springfield rights on the east side of the river to a point just below Pynchon's warehouse (Winch 1886: 139). Windsor's prior claim to some of this land was one of many boundary issues requiring over a century of argument and adjustment, the most notable of which was Massachusett's 1642 Woodward and Saffery survey which overextended the colonial border to the south by several miles.

William Pynchon's son John took over the family's extensive business and political responsibilities in 1652, and sought new outposts between Springfield, Warehouse Point, and the Connecticut river towns within the disputed area. Following land purchases from local Native Americans, he spearheaded the settlement of Suffield in 1670. Suffield was abandoned during King Philip's War, but quickly resettled in 1677. Soon after the war, Pynchon led efforts to establish permanent English settlement in Enfield through 1678 and 1680 land purchases from local Native Americans, and was involved in initial moves of proprietors into the present town c1680-81. The Massachusetts General Court recognized Enfield as a separate town in 1683, with a territory including present Somers. Soon thereafter, Windsor families moved east of the river, establishing a separate parish in 1694 which included an area claimed by Enfield. Resolution of the boundary issues c1713-49 put Enfield and Suffield in Connecticut, and confirmed the limits between Enfield and East Windsor; the latter community became a town in 1768 (Winch 1886; Stiles 1892; Lewis 1978).

Enfield and Suffield developed agricultural economies and relatively dispersed settlement patterns typical of 18th-century Connecticut river towns, exporting produce and livestock to metropolitan and West Indian markets. The first generation of settlement in Enfield was concentrated along King Street on the top of the ridge which rises about 100 feet above the Connecticut River. There is some fertile land along the ridge. To the east, the sandy aeolian deposits between the ridge and the Scantic River, dotted with marshes, was used as pasture and as a source of pine tree products such as potash, turpentine, tar, and lumber. More extensive tracts of arable land were found east of the Scantic and around the headwaters of Freshwater Brook, separated from the rest of the town by a range of hills near the present Somers town line. Although four roads between King Street and the eastern parts of the town were established c1680, there was no significant settlement to the east until the c1713 beginnings of the Scitico and Wallop sections of town, respectively located along the Scantic at the hills noted above, and immediately southeast of the project area. Somers became a precinct of Enfield in 1721, and a separate town in 1734. Until the late 18th century, there was little settlement in Enfield east of the Scantic River. During the final florescence of the West Indies trade c1793-1807, Enfield farms produced more livestock for export and more rye for gin made at local distilleries. Farms operated on

this basis shifted into tobacco and dairy production when markets changed in response to trade disruptions associated with the Jefferson Embargo and the War of 1812. Although cultivated in Enfield as early as 1737, and an important part of other local economies from the early 19th century, tobacco was evidently not a major crop in this town until the early 20th-century introduction of Cuban shade tobacco led to significant increases in Enfield tobacco acreage c1900-1921 (Winch 1886; Pease 1900; Fletcher 1934; Bridge, ed. 1977; Raber and Malone 1991; Miller 1998).

Enfield's waterpower potential on the Scantic River and lower Freshwater Brook contributed to significant 19th-century industrial growth not shared by neighboring towns. Industrial villages emerged c1828-35 at Thompsonville (carpet production) on Freshwater Brook south of Project areas, and at Hazardville (gunpowder) around the Scantic several miles southeast of Project areas. By 1840, Enfield's population was increasing much faster than that of its neighbors in the Enfield Rapids vicinity, and by 1880 was more than twice the size of populations in Suffield, East Windsor, or Windsor Locks. Completion of the Hartford and Springfield Railroad in 1844 along the Connecticut River stimulated both industrial villages. Community growth included the arrival and gradual integration of Irish, Polish, and Italian immigrants. Gunpowder production ceased in Hazardville in 1913, while carpet production continued at Thompsonville into the 1960s. After World War II, expanded road and airport facilities, and the Hartford region's growth in defense industry and commercial-insurance services, spurred population and housing increases which persisted despite the diminished place of traditional industries. Enfield has replaced some of these industries with large retail outlets, but is now largely a bedroom community (Clark 1886; Bridge ed. 1977).

Suffield's pre-Revolution economy was somewhat diversified by the exploitation of local bog iron resources for several water-powered bloomeries. The town had a long history of small paper, cider, gin, and textile mills, a few of which persisted into the early 20th century, and none of which appear to have been in or near Project areas. Tobacco cultivation remained the major local enterprise for at least 140 years, beginning c1810 after at least a half century of increasing importance. Family farms apparently remained relatively stable in number, size, and occupation for much of this period. Over 90% of Suffield farms grew at least some tobacco c1850-70, and probably for some decades thereafter. Late in the 19th century, Polish immigrants arrived and eventually established a significant Polish community which joined the tobacco-raising culture; many Poles achieved farm ownership. Suffield's largely agrarian cast, reflected in a landscape dominated by tobacco barns and farmer and merchant homes, contributed to a frequently conservative approach to obtrusive new developments. The initial rejection of a railroad line through the town, and opposition to interstate highway routing over a century later, are more obvious affirmations of self-conscious agrarian stability. Expanding suburban settlement, following on the heels of the decline of tobacco, has attenuated but not removed the town's rural character (Winch 1886; Sheldon 1879, 1886; Stiles 1892; Alcorn 1970; Raber and Malone 1991).

B. Known or Potential Archaeological Resources

Identification of known or potential archaeological resources included review of historical maps, and files held by SHPO and the Connecticut State Archaeologist, and field inspection.

1. Northern Route

State site files reported no EuroAmerican archaeological sites within approximately one mile of the Northern Route, other than the c1773-1827 Newgate Prisoners Cemetery recently discovered during investigations led by the State Archaeologist. At present, no action has been taken which would secure the protections available under state law, but this site numbered 40-17 in state files should be eligible for protection as a historic cemetery under CGS 19a-315, and it is treated below as a significant historic resource evaluated for visual effects (personal communication, Nicholas F. Bellantoni).

Several unreported sites have visible remains within the Northern Route corridor (Appendix 1). As noted above, two railroad cuts associated with the Central New England Railway cross the Northern Route in Bloomfield and East Granby, but inspection of these areas indicated little or no remains of engineering structures. No structures are visible within Project areas in Bloomfield. In East Granby north of Holcomb Street, there are fragmentary remains on the east side of the currently-used transmission corridor of an unmortared arkose masonry retaining structure which lined part of the north side of a shallow earthen cut. The cut is much larger east of the Project limit, and has been largely if not entirely eradicated within the existing CL&P transmission corridor. On the north side of the Farmington River, the dam from the 1899 HELCO plant is partly intact, but most other signs of this hydrolectric development have been demolished or severely eroded; the powerhouse survives only as foundation and concrete floor. The railroad and hydroelectric sites do not appear eligible for the National Register of Historic Places.

Historical maps do not suggest other EuroAmerican sites within the Northern Route, but in the vicinity of Newgate Road in East Granby there are undocumented or under-documented roads, causeways, and small exploratory shafts associated with the 18th- and 19th-century mining episodes summarized above.

Near the south end of the Northern Route in Bloomfield, one source suggested the possibility that the 1640s pitch works noted above was in the vicinity of the crossing of Griffin Brook and Tariffville Road. The primary processing of pine knots into tar probably involved use of a raised rock hearth with a depressed center paved with clay or loam, on which the knots were piled and covered with clay or loam for controlled firing similar to that seen in charcoal manufacture. A gutter from the hearth center allowed liquid tar to run into containers. Secondary processing of tar into pitch involved boiling or firing the tar and adding powdered charcoal, perhaps in low rock or masonry hearths fired from below. While archaeological signatures of these or related processes are not well documented, inspection of the Griffin Brook vicinity of the Northern Route did not suggest any of this area was likely to contain remains of the pitch works, which presumably required relatively level ground. South of Tariffville Road, the brook runs through steep, irregular terrain defined by much exposed bedrock and wetlands. North of the road and away from the brook, the Project corridor is a long east-facing slope of 15-20 degrees. East of the corridor, the brook runs north of the road across a more level property in which small-scale industrial activity appears more feasible, but the Project corridor does not appear sensitive for remains of this 17th-century enterprise (The Wintonbury Historical Society 1983: 219; Springman and Guinan 1983: 11-12).

2. Route 168 Underground Variation

Two EuroAmerican archaeological sites have been reported adjacent to the underground route along Route 20 west of the center of East Granby, a tenant farmhouse and a cigar shop with related house. Both were determined eligible for, and one was listed on, the National Register of Historic Places. Because of on-going road reconstruction, the tenant farmhouse site was protected with fill, and the cigar shop/house was destroyed after archaeological mitigation. The only other reported Euroamerican archaeological sites within about 1 mile of Route 168 Underground Variation are subsurface components of the Viets Tavern and Newgate Prison and Mine sites, each located about 4800 feet from this route and listed on the National Register of Historic Places (Table 5).

Historical maps and secondary sources indicate that virtually all of the underground route as presently defined consists of roadways built on previously undeveloped land, or on fill. Generations of road and utility construction have probably removed, or severely damaged, remains of original unpaved roads. Assuming the use of horizontal directional borings at all stream crossings, the only parts of this underground route with potentially significant archaeological sites would therefore be off-road facilities such as splice vaults in areas which are not fill or wetlands (Appendix 1). While no other specific archaeological sites in possible off-road alignments seem likely based on assessment research, it is possible that undisturbed soils near existing or demolished historic structures could contain artifact deposits associated with residential, commercial, or small industrial sites along the principle avenues of Euroamerican settlement in East Granby— much of which is

part of the East Granby National Register District. Given the long history of road development and nearby historic occupation in most proposed underground project areas, it is difficult to anticipate the nature or extent of possible historic artifacts. The significance of any recovered historic artifacts will depend primarily on the integrity of apparent depositional episodes, and the age and rarity of the materials. In general, widely-distributed household or commercial materials post-dating the mid 19th century will be too well documented to yield significant new information.

3. The Newgate Road Underground Variation

Two EuroAmerican archaeological sites have been reported adjacent to the underground route along Newgate Road: the subsurface components of the Viets Tavern and Newgate Prison and Mine sites. The only other reported non-mortuary Euroamerican archaeological sites within about one mile of The Newgate Road Underground Variation are the tenant farmhouse and cigar shop with related house noted above along Route 20, at least 1200 feet from this route (Table 6). As noted for Route 168 Underground Variation, additional sites are not expected within existing roadways other than the Newgate mine some distance below grade, as discussed in Section V.C.2.c, but it is possible that undisturbed soils in possible off-road facilities could contain artifact deposits associated with residential, commercial, or small industrial sites including existing or demolished historic structures, and mine shafts and related roads or causeways (Appendix 1). The significance of any such resources will depend on the integrity and rarity of landscape features, the integrity of apparent depositional episodes in trash deposits, and the age and rarity of recovered artifacts. In general, widely-distributed household or commercial materials post-dating the mid 19th century will be too well documented to yield significant new information.

4. Southern Route & Southern Route Underground Variation

State site files reported three Euroamerican archaeological sites within approximately one mile of these routes, the closest of which is 4000 feet away. Two have no determined eligibility for the National Register of Historic Places, and one has been determined not eligible (Table 7). Historical maps do not suggest other EuroAmerican sites within the Southern Route corridor. For the Southern Route Underground Variation, archaeological issues are similar to those outlined for Route 168 Underground Variation, except that historical settlement along Southern Route roadways was much less dense than in the East Granby Historic District vicinity. Virtually all of the underground route as presently defined consists of roadways built on previously undeveloped land, and previous road and utility construction have probably removed, or severely damaged, remains of original unpaved roads. Assuming the use of horizontal directional borings at all stream crossings, the only parts of this underground route with potentially significant archaeological sites would therefore be off-road facilities such as splice vaults in non-wetland areas (Appendix 1). While no other specific archaeological sites in possible off-road alignments seem likely based on assessment research, it is possible that undisturbed soils near existing or demolished historic structures could contain artifact deposits associated with scattered residential sites. It is difficult to anticipate the nature or extent of possible historic artifacts. The significance of any recovered historic artifacts will depend primarily on the integrity of apparent depositional episodes, and the age and rarity of the materials. In general, widely-distributed household or commercial materials post-dating the mid 19th century will be too well documented to yield significant new information.

Table 5. REPORTED EUROAMERICAN ARCHAEOLOGICAL SITES WITHIN ONE MILE OF ROUTE 168 UNDERGROUND VARIATION

TOWN	NO.	NAME	DATE	DESCRIPTION	DISTANCE	NR STATUS	SOURCES
EAST GRANBY	40-11	CLARK FARM TENANT HOUSE SITE	c1860-1940	residential archaeological site	adjacent	LISTED; filled over for recent road construction	Harper & Clouette 2001; OSA; SHPO
EAST GRANBY	40-12	PETER GROHMAN HOUSE & CIGAR SHOP ARCHAEOLOGICAL SITE	c1860-?	2 foundations	adjacent	NRE; destroyed after mitigation	Harper & Clouette 1996; Harper *et al.* 2004; OSA
EAST GRANBY	40-16	VIETS TAVERN	1763-20th c.	tavern building	4800 ft.	LISTED	Darbee 1971; Gradie 1987
EAST GRANBY	40-13	OLD NEW-GATE PRISON & COPPER MINE	c1705-1857	prison walls, buildings, & ruins; copper mine; associated landscape features on 5.2-acre area	4800 ft.	LISTED	Darbee 1969; Snell 1972; Raber *et al.* 1999

Table 6. REPORTED EUROAMERICAN ARCHAEOLOGICAL SITES WITHIN ONE MILE OF NEWGATE ROAD UNDERGROUND VARIATION

TOWN	NO.	NAME	DATE	DESCRIPTION	DISTANCE	NR STATUS	SOURCES
EAST GRANBY	40-11	CLARK FARM TENANT HOUSE SITE	c1860-1940	residential archaeological site	3800 ft.	LISTED	Harper & Clouette 2001; OSA
EAST GRANBY	40-12	PETER GROHMAN HOUSE & CIGAR SHOP ARCHAEOLOGICAL SITE	c1860-?	2 foundations	1200 ft.	NRE; destroyed after mitigation	Harper & Clouette 1996; Harper *et al.* 2004; OSA; SHPO
EAST GRANBY	40-16	VIETS TAVERN	1763-20th c.	tavern building	adjacent	LISTED	Darbee 1971; Gradie 1987
EAST GRANBY	40-13	OLD NEW-GATE PRISON & COPPER MINE	c1705-1857	prison walls, buildings, & ruins; copper mine; associated landscape features on 5.2-acre area	adjacent	LISTED	Darbee 1969; Snell 1972; Raber *et al.* 1999

Table 7. REPORTED EUROAMERICAN ARCHAEOLOGICAL SITES WITHIN ONE MILE OF SOUTHERN ROUTE & SOUTHERN ROUTE UNDERGROUND VARIATION

TOWN	NO.	NAME	DATE	DESCRIPTION	DISTANCE	NR STATUS	SOURCES
ENFIELD	49-11	E. CROWNINGSHIELD SITE	late 19th - early 20th century	artifacts in disturbed context	4500 ft.	NOT NRE	McBride 1991
ENFIELD	49-13	ICE POND DAM	late 19th c. - c1940	masonry & concrete dam, possibly built for sawmill	5000-5800 ft.	UNK	Binzen 2001
ENFIELD	49-15	TERRY HOUSE	UNK	NO INFORMATION	5100 ft. from Underground	UNK	OSA

ABBREVIATIONS

NR STATUS:	LISTED	Listed on the National Register of Historic Places
	UNK	National Register eligibility not determined
	NOT NRE	Not eligible for National Register listing
SOURCES:	OSA	Office of Connecticut State Archaeology
	SHPO	personal communication, Dr. David Poirier, State Historic Preservation Office

C. Historic Properties and Project Effects

1. Resource Identification

Identification of significant historic properties within 0.25 mile of the overhead route sections and 500 feet of the underground route sections was based primarily on:

maps available with National Register of Historic Places nomination forms, State Register of Historic Places nominations or other materials, and townwide surveys of historic architectural or industrial resources

lists with addresses of properties considered eligible for the National Register in townwide surveys of historic architectural or industrial resources

a statewide inventory of many historic bridges (Historic Resource Consultants 1990, 1991)

visual inspection as needed to confirm resource location or obtain photographic images

aerial photographs (Fairchild Aerial Survey 1934; Center for Land Use Education and Research 2004)

maps of the Northern Route prepared at different times by CL&P or associated electric utility companies (Connecticut Light and Power Company 1924, Connecticut Power Company 1956-1960; Northeast Utilities Service Company 1969-2002, 1997).

No historic resource survey has been completed for Bloomfield. Outside of National Register properties or districts, surveys of East Granby and Suffield had maps showing surveyed properties, but no recommendations for National-Register-eligible properties (Capital Region Council of Governments 1979, 1980). In Enfield, historic resource survey outside National Register properties or districts has been limited to the Thompsonville section (Andrews and Ransom 1989), and to scattered Federal-period homes (Raber and Thompson 2005), in areas over 0.25 mile from any Project alternatives. Most properties listed, or eligible for listing, on the State Register of Historic Places have not been mapped, and those with known locations are over 0.25 mile from any Project alternatives (personal communication, David A. Poirier).

a. Northern Route

With these caveats, and applying criteria for resource inclusion discussed above in Section I.C.a, a total of three significant historic properties were identified within 0.25 mile of the Northern Route, all cemeteries established over 100 years ago and subject to protection under C.G.S. 19a-315 (Table 8, Appendix 1). The two cemeteries in East Granby have not been mapped precisely. No properties listed on the National Register of Historic Places are reported within 0.25 mile of the Northern Route.

As noted above in Section I.C.1.b, undocumented stone walls may have value as a record of historical site conditions and an example of rural landscape development for use in future historic context or local historical studies. No attempt was made to locate all such features, but electric utility maps and visual survey indicated that a number of walls lie within Northern Route boundaries, in a variety of conditions. Some have been partially removed for construction and maintenance of existing facilities.

Table 8. SIGNIFICANT HISTORIC RESOURCES WITHIN APPROXIMATELY ¼ MILE OF NORTHERN ROUTE

TOWN	NAME	SUMMARY DESCRIPTION	STATUS	PROFILE/ RESULT	PHOTO	SOURCES	REMARKS
BLOOMFIELD	ST. ANDREWS CEMETERY	Episcopal cemetery begun c1740	CGS 19a-315	NON-ADVERSE EFFECT	Appendix 3	Hale 1932; Wintonbury Historical Society 1983	450-1200' from Route
EAST GRANBY	SMALLPOX CEMETERY	cemetery used c1784-1793	CGS 19a-315	1: BLOCKED		Hale 1932; Springman & Guinan 1983; East Granby Historical Society 2007	approximately 1300' from Route
EAST GRANBY	NEWGATE PRISONERS CEMETERY (Site 40-17)	possibly 20-25 graves in area 60' square, c1773-1827	eligible for CGS 19a-315 status	2: BLOCKED		OSA; personal communication, Nicholas Bellantoni	500' from Route

Table 9. SIGNIFICANT HISTORIC RESOURCES WITHIN 500 FEET OF ROUTE 168 UNDERGROUND VARIATION

TOWN	NAME	SIGNIFICANT RESOURCES	STATUS	NO. ADJACENT RESOURCES	SOURCES	REMARKS
EAST GRANBY	EAST GRANBY CENTER CEMETERY	cemetery operated beginning 1722	LISTED; CGS 19a-315	0	Hale 1932; Cunningham & Ransom 1988	component of East Granby Historic District
EAST GRANBY	EAST GRANBY HISTORIC DISTRICT	133 residential, farm, or public institution properties c1722-1936	LISTED	approximately 63 properties within 500 feet	Cunningham & Ransom 1988	

Table 10. SIGNIFICANT HISTORIC RESOURCES WITHIN 500 FEET OF NEWGATE ROAD UNDERGROUND VARIATION

TOWN	NAME	SIGNIFICANT RESOURCES	STATUS	NO. ADJACENT RESOURCES	SOURCES	REMARKS
EAST GRANBY	OLD NEW-GATE PRISON & COPPER MINE (Site 40-17)	prison walls, buildings, & ruins; copper mine; associated landscape features on 5.2-acre area c1705-1857	LISTED	1	Darbee 1969; Snell 1972; Raber *et al.* 1999	prison walls, ruins, & mine susceptible to possible blasting damage
EAST GRANBY	VIETS TAVERN (Site 40-16)	tavern structure built 1763	LISTED	1	Darbee 1971; Gradie 1987	
EAST GRANBY	VIETS CEMETERY	2 burials 1777 & 1810	CGS 19a-315	1	Hale 1932; East Granby Historical Society 2007	

ABBREVIATIONS

STATUS: LISTED Listed on the National Register of Historic Places
CGS 19a-315 Wholly or Partially Protected under Connecticut Statute as Ancient Burying Ground

PROFILE RESULT: BLOCKED No Likely Visibility assuming 50'-high forest

SOURCES OSA Office of State Archaeology

b. Route 168 Underground Variation

Applying criteria for resource inclusion discussed above in Section I.C.a, two significant historic properties were identified within 500 feet of Route 168 Underground Variation. The resources include the large East Granby Historic District listed on the National Register of Historic Places, and the East Granby Center Cemetery which is part of the district and also subject to protection under C.G.S. 19a-315 as an ancient burying ground (Table 9, Appendix 1). Within the historic district, which includes 133 properties, approximately sixty-three properties are within 500 feet of the underground route. No significant historic resources were identified within 0.25 mile of proposed transition stations associated with this alternative.

c. Newgate Road Underground Variation

Applying criteria for resource inclusion discussed above in Section I.C.a, there are three significant and closely-associated Euroamerican resources, with above- and belowground components within 500 feet of the Newgate Road Underground Variation (Table 10, Appendix 1):

> Old New-Gate Prison and Copper Mine, listed on the National Register of Historic Places and also a National Historic Landmark. National Historic Landmarks are nationally-significant historic places, designated by the Secretary of the Interior based on their exceptional value or quality in illustrating or interpreting the heritage of the United States.
>
> Viets Tavern, listed on the National Register of Historic Places
>
> Viets Cemetery, subject to protection under C.G.S. 19a-315 as an ancient burying ground.

No significant historic resources were identified within 0.25 mile of proposed transition stations associated with this alternative.

d. Southern Route & Southern Route Underground Variation

For these routes, no significant historic resources are reported within 0.25 mile of the overhead, or 500 feet of the underground, alternatives. Aerial photographs suggest there may be several stone walls in the overhead corridor.

2. Preliminary Identification of Resources Subject to Project Effects

a. Northern Route

For the three significant historic properties within 0.25 mile of the Northern Route, two transects between the Smallpox and Newgate Prisoners cemeteries were identified on U.S. Geological Survey maps and digitally profiled to assess visibility. As shown in Appendix 2, these profiles assumed new 75-foot-high transmission structures and 50-foot-high average tree heights in forested areas shown on recent aerial photographs. The profiles indicate that new transmission structures would not be visible because of forest cover obstructions (Burns & McDonnell Engineering Company, Inc. 2007).

At the remaining significant historic property, St. Andrews Cemetery, visual inspection indicated likely or possible transmission structure visibility. Photographs were taken of existing transmission structures at distances of approximately 750 and 1070 feet. As shown in Appendix 3, simulations of worst-case project visual conditions suggest that conditions can be classified as Visibility with Non-Adverse Effect. Simulations were made with hypothetical 95-foot-high new structures approximately 75 feet east of south of existing transmission structures. Existing tree cover, dense arrays of existing local electric distribution facilities, and distances of 450-1200 feet appear to make simulated new facilities very minimal components of views taken

from the cemetery. Since these simulations were completed, further Project planning resulted in projected new structure heights of 75-80 feet, at which heights the new structures would barely be visible from the cemetery (Burns & McDonnell Engineering Company, Inc. 2007).

No other direct project effects are presently anticipated on significant historic properties along the Northern Route.

b. Route 168 Underground Variation

This alternative will pass through the East Granby Historic District in existing roadways. No direct effects on district properties are currently anticipated, although as noted above the construction of off-road splice vaults or related facilities could affect undocumented subsurface resources associated with district properties, or with demolished sites which could contribute to district significance. Any potential effects of blasting on documented district properties will be evaluated during D&M planning, and protective measures developed as needed.

c. The Newgate Road Underground Variation

This alternative will pass close, or adjacent to, the three significant properties noted above. Except at New-Gate Prison and Mine as discussed below, no direct effects on these properties are currently anticipated, although as noted above the construction of off-road splice vaults or related facilities could affect undocumented subsurface resources associated with the significant properties or with other 18th-to-19th-century residential or industrial properties.

i. Potential Effects at Old New-Gate Prison and Copper Mine

The following description of property significance, components, and structural issues is based primarily on findings in Raber *et al.* 1999, and on the present author's participation in a recent, incomplete study of property stabilization options. This property immediately west of Newgate Road is owned by the State of Connecticut and operated by the Historic Preservation and Museum Division of the Commission on Culture and Tourism. The site includes brick and masonry prison walls, buildings, and ruins; copper mine features beneath the prison enclosure and part of Newgate Road; and associated landscape features on an area of approximately 5.2-acres (Appendices 1 and 4). Old New-Gate Prison, operated 1773-1782 and 1790-1827, was the first prison in what is now the United States operated by a state-level government, and was also probably the first American example of long-term incarceration for serious non-capital crimes as an alternative to the practice of severe physical punishment followed by release. The Newgate mines, operated commercially c1714-1742 and c1831-1857, represented the earliest and perhaps the largest efforts made to mine copper in England's American colonies.

A series of 19th and 20th century mapping episodes indicate the mine consists of 0.4 acre of workings, retained tailings, and bedrock support columns sloping downwards from west to east, excavated in gray-black sandstone deposits with copper sulfide minerals. Most of the mine lies directly under the prison enclosure. The mine openings begin between about 11 and 85 feet below the surface, and are generally less than 8 feet in internal height. Four shafts including a well penetrate the mine, which also includes a 280-foot-long drainage adit or tunnel (Appendix 4).

The prison enclosure and its interior features are the dominant aboveground features at the property. Two-foot-thick mortared walls of Triassic red arkose or sandstone define a 185-by-154-foot rectangle. These walls slope steeply in the west half of the enclosure, following the terrain. The enclosure interior has an extremely uneven surface of bedrock and stony fill, with some grassy patches and two trees. Undocumented volumes of boulder-sized mine tailings underlie the surface, providing often unstable footings for building foundations. One standing structure, the 30-by-60-foot guardhouse built in 1790 with and 1819 addition, remains near the

center of the enclosure. The west wall of the guardhouse basement leans west and away from the north and south wall at an increasingly angle, reflecting the unstable nature of fill in the west half of the prison enclosure. Rubble walls retain several small terraces north, northeast, and immediately south of the guardhouse. The lower area in the northeast corner includes a well, and a 37-foot-long, one-and-a-half-story freestanding sandstone block wall which is the only visible remnant of a prison workshop built in 1803. Northwest of the workshop wall near the prison enclosure wall, there is a sandstone block structure tentatively identified as an assay furnace. The southern third of the prison enclosure includes the second mine shaft, within a 7-foot-square 20th-century brick shed, and freestanding wall ruins from three prison buildings. Two of these ruins are from 25-foot-wide, two-story buildings built c1805 and 1814 along the south and east prison enclosure walls to provide space including hospital and chapel facilities. The easterly of these two structures is 48.3 feet long, and evidently built directly on the rocky surface or on shallow footings. The structure to the west, in the middle of the south enclosure wall, is about 40 feet long and has a cellar story of coursed sandstone block following the steep slope. The third ruined structure is the remains of a four-story 26.5-by-64.4-foot building erected in 1824 with cell blocks, kitchens, office and hospital space, and a grist mill powered by prisoners on a treadmill. This last structure was built over and across the south enclosure wall, beyond which the building ruins extend about 16 feet. Extending south from the southeast corner of the prison enclosure, there is a 7.8-by-6.5-foot brick sentry box atop a 23.9-foot-long, 7.8-foot-wide sandstone block platform. Other historic structures within the enclosure include an 86-foot-long, 2.5-foot-thick sandstone wall built 10-13 feet from the west enclosure wall, with remains of a 7.5-by-12-foot stone enclosure or platform at the 86-foot-long wall's center. The function of this wall is unknown, but it may represent an additional retaining structure built to control mine tailings (Appendix 4)

The guardhouse and the remnants of other structures are historically significant resources that are critical components of the property. The structural integrity of the guardhouse, which remains open to visitors, has been seriously compromised by the effects of settling, and the state monitors basement sections against the possibility of sudden collapse. The four-story prison block ruins at the southwest corner of Old New-Gate Prison have been closed to public access for approximately seven years, due to concerns about the stability of the high free-standing walls built on a steep slope of mine tailings (Appendix 4). In 2005-2006, the Historic Preservation and Museum Division initiated architectural and engineering studies to stabilize the prison block ruins, but the study was not completed.

Beginning approximately 400 feet south of the prison enclosure, bedrock is very near the surface of Newgate Road for a distance of about 0.75 miles, running north past the prison. Construction of the Newgate Road Underground Variation would require blasting or drilling very close to prison structures, and trenches reaching elevations approximately 50-75 feet above the closest mine ceilings used by visitors to the historic site. Any destabilization of prison walls or mine components would most likely have adverse effects on a significant set of historic resources. Assessing the nature and potential for such effects will require further engineering study, and avoiding any potential effects will require close coordination with the Historic Preservation and Museum Division as well as possible development of detailed stabilization plans as appropriate.

3. Possible Future Needed Actions

CL&P will continue to coordinate with SHPO regarding cultural resources and will perform further archaeological, engineering, and visual effect studies as necessary. For overhead project areas in which no previous historic resource surveys have been conducted to identify significant historic properties, additional studies may be needed to locate and evaluate such properties and any related project effects. To define further the universe of historic properties subject to visual or other effects, the right-of-way and transmission line will have to be designed and the D&M Plan drafted.

REFERENCES

Alcorn, Robert H.
1970 *The Biography of a Town: Suffield, Connecticut 1670-1970*. Hartford: Connecticut Printers, Inc.

Allen, Francis O.
1900 *The History of Enfield, Connecticut*. 3 vols. Lancaster, PA: The Wickersham Printing Co.

Andrews, Gregory F., and David F. Ransom
1989 Historical and Architectural Resources of Thompsonville, Town of Enfield, Connecticut. Prepared for Town of Enfield. On file, Connecticut Historic Preservation Collection, Dodd Center, University of Connecticut, Storrs.

Baker and Tilden, publishers
1869 *Atlas of Hartford City and County*. Hartford.

Banks, Marc L.
2000 Anadromous Fish and Prehistoric Site Selection in the Farmington Valley of Connecticut. Ph.D. dissertation, University of Connecticut.

2002 Final Report, Archaeological Reconnaissance Survey: Griffin North Subdivision, Copper Hill Road, East Granby, Connecticut. Prepared for R&J Development, LLC. Report on file as CHPC #1086, Connecticut Historic Preservation Collection, Dodd Center, University of Connecticut, Storrs.

Barber, Russell J.
1980 Post-Pleistocene Anadromous Fish Exploitation at the Boswell Site, Northeastern Massachusetts, in Early and Middle Archaic Cultures in the Northeast. *Man in the Northeast Occasional Publications in Northeastern Anthropology* 7: 97-113.

Bell, Michael
1985 *The Face of Connecticut: People, Geology, and the Land.* Connecticut State Geological and Natural History Survey Bulletin 110. Hartford.

Bendremer, Jeffrey C.M., and Robert E. Dewar
1993 The Advent of Prehistoric Maize in New England. In S. Johannsen and C. Hastorf, eds., *Corn and Culture in the New World*. Minneapolis: University of Minnesota Press.

Binford, L.R.
1980 Willow Smoke and Dogtails: Hunter Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45 (1): 4-20.

Binzen, Timothy L
2001 Archaeological Assessment Survey of the Grassland Bird Mitigation Area, Complex One, Department of Corrections, Enfield and Somers, Connecticut. Prepared for Connecticut Department of Corrections. Baystate Environmental Consultants Inc. Report on file as CHPC #985, Connecticut Historic Preservation Collection, Dodd Center, University of Connecticut, Storrs.

Blodget, William
1792 New and Correct Map of Connecticut...Middletown.

Brennan, Louis A.
1974 The Lower Hudson: a decade of shell middens. *Archaeology of Eastern North America* 2:81-93.

Bridge, Ruth, ed.
1977 *The Challenge of Change: Three centuries of Enfield, Connecticut History*. Canaan, NH: Phoenix Publishing.

Burns & McDonnell Engineering Company, Inc.

2007 Greater Springfield Reliability Project/ N. Bloomfield to Agawam Plan & Profiles. Draft drawings dated October 30, 2007.

Capital Region Council of Governments
1979 Historical and Architectural Resource Survey, Town of East Granby, Connecticut. On file, Connecticut Historic Preservation Collection, Dodd Center, University of Connecticut, Storrs.

1980 Town of Suffield, Survey of Historical and Architectural Resources. On file, Connecticut Historic Preservation Collection, Dodd Center, University of Connecticut, Storrs.

Cassedy, Daniel F.
1997 From the Erie Canal to Long Island Sound: Technical Synthesis of the Iroquois Pipeline Project, 1989-1993. Report submitted to Iroquois Gas Transmission System. Garrow & Associates, Inc., Atlanta.

Ceci, Lynn
1977 The Effect of European Contact and Trade on the Settlement Pattern and Trade of Indians in Coastal New York, 1524-1664. Ph.D. dissertation, City University of New York.

1980 Maize Cultivation in Coastal New York: The Archaeological, Agronomical and Documentary Evidence. *North American Archaeologist* 1 (1): 45-74.

Center for Land Use Education and Research, University of Connecticut, Storrs
2004 Connecticut Digital Orthophotos Beta Version. Available from World Wide Web: http://clear.uconn.edu/data.html

Clark, Charles H.
1886 The Growth of the County, in J. Hammond Trumbull, ed., *The Memorial History of Hartford County, Connecticut 1633-1884*, Vol. I, pp. 207-14. Boston: Edward L. Osgood.

Claypool, Earl
1976 A Prehistoric Storage Pit from Coastal Connecticut. Paper presented to the Archaeological Society of Connecticut, Oct. 9, 1976.

Colton, Roger B.
1960 Surficial Geology of the Windsor Locks Quadrangle, Connecticut. *U.S. Geological Survey Map GQ-137*. Washington.

1965 Surficial Geology of the Broad Brook Quadrangle, Hartford and Tolland Counties, Connecticut. *U.S. Geological Survey Map GQ-434*. Washington.

Colton, Roger B., and Joseph H. Hartshorn

1966 Bedrock Geologic Map of the West Springfield Quadrangle, Massachusetts and Connecticut. *U.S. Geological Survey Map GQ-537*.

1970 Surficial Geologic Map of the West Springfield Quadrangle, Massachusetts and Connecticut. *U.S. Geological Survey Map GQ-982*.

Connecticut Light and Power Company

1924 Hartford-Agawam Transmssion Line/Plan & Plan & Profile. NUSCO Dwg. No. 01180-10001.

2007 The Hartford Electric Light Company. Available on World Wide Web at http://www.cl-p.com/ companyinfo/helcohistory.asp

Connecticut Power Company

1956-
1960 North Bloomfield-Southwick 115 K.V. Line/Plan and Profile Structures. NUSCO Dwg. No. 01155-10001.

Cook, S.F.

1976 The Indian Population of New England in the Seventeenth Century. *University of California Publications in Anthropology* 12.

Cook, T.G.

1976 Broadpoint: culture, phase, horizon, tradition, or knife? *Journal of Anthropological Research* 32: 337-57.

Curran, M. and D. Dincauze

1977 Paleo-Indians and Paleo-Lakes: New Data from the Connecticut Drainage. In W.S. Newman and B. Salwen, eds., Amerinds and Their Paleoenvironments in Northeastern North America, pp. 333-48. *Annals of the New York Academy of Sciences* Vol. 288.

Cunningham, Janice and David Ransom

1988 East Granby Historic District. National Register of Historic Places Inventory - Nomination Form. On file, Connecticut State Historic Preservation Office.

Darbee, Herbert C.

1969 Old Newgate Prison and Copper Mine. National Register of Historic Places Inventory - Nomination Form. On file, Connecticut State Historic Preservation Office.

1971 Viets Tavern. National Register of Historic Places Inventory - Nomination Form. On file, Connecticut State Historic Preservation Office.

DeForest, John W.

1851 *History of the Indians of Connecticut from the Earliest Known Period to 1850*. Hartford: Wm. J. Hamersley.

Dincauze, Dena F.

1975 The Late Archaic Period in Southern New England. *Arctic Anthropology* 12:23-23.

1976 The Neville Site: 8,000 Years at Amoskeag. *Peabody Museum Monographs* 4. Harvard University.

Dincauze, Dena F. and Mitchell T. Mulholland
1977 Early and Middle Archaic Site Distribution and Habitats in Southern New England, in W.S. Newman and B. Salwen, eds., Amerinds and their paleoenvironments in northeastern North America, pp. 439-56. *New York Academy of Sciences Annals* 288.

Dragoo, Don
1976 Some Aspects of Eastern North American Prehistory. A Review of 1975. *American Antiquity*. 41 (1).

East Granby Historical Society
2007 Cemeteries of East Granby. Available on World Wide Web at http://eastgranby.com/HistoricalSociety/cemeteries.htm#Small%20Pox%20Cemetery

Eisenberg, Leonard
1978 Paleoindian settlement patterns in the Hudson and Delaware River drainages. *Man in the Northeast Occasional Papers in Northeastern Anthropology*.

Fairchild Aerial Survey
1934 Aerial survey of the State of Connecticut. Record Group 89, Records of the Department of Transportation. Connecticut State Archives.

Feder, Kenneth L.
1981 The Farmington River Archaeological Project: Focus on a Small River Valley. *Man in the Northeast* 22: 131-146

Fletcher, Henry F.
1934 *Studies in the History of Enfield, Connecticut.* Litchfield: Enquirer Press.

Flint, Richard Foster
1930 The Glacial Geology of Connecticut. *State Geological and Natural History Survey of Connecticut Bulletin* No. 47.

Forrest, Daniel
1999 Beyond Presence and Absence: Establishing Diversity in Connecticut's Early Holocene Archaeological Record. *Bulletin of the Archaeological Society of Connecticut* 62: 79-99.

Forrest, Daniel T., Michael S. Raber, Brian D. Jones, and Robert M. Thorson
2006 Report/Archaeological and Historical Resource Study/Adraien's Land Project, Hartford, Connecticut. Prepared for the Connecticut Office of Policy and Management. Storrs, CT: Archaeological and Historical Services Inc. Report on file as CHPC #1489, Connecticut Historic Preservation Collection, Dodd Center, University of Connecticut, Storrs.

Funk, Robert E.
1972 Early Man in the Northeast and the Late Glacial Environment. *Man in the Northeast* 4:7-39

1976 Recent Contributions to Hudson Valley Prehistory. *New York State Museum and Science Service Memoir* 22. Albany.

1977 Early Cultures in the Hudson Drainage Basin, in W.S. Newman and B. Salwen, eds., Amerinds and their paleoenvironments in northeastern North America, pp. 316-32. *New York Academy of Sciences Annals* 288.

Gradie, Robert R.
1987 Archaeology at Viets Tavern: A Report on the 1986 Field Season. Prepared for the Connecticut Historical Commission. Report on file as CHPC #402, Connecticut Historic Preservation Collection, Dodd Center, University of Connecticut, Storrs.

Gray, Norman H.
1982 Copper Occurrences in the Hartford Basin of Northern Connecticut. *State Geological and Natural History Survey of Connecticut, Guidebook* No. 5.

1987 The Origin of Copper Occurrences in the Hartford Basin. *U.S. Geological Survey Bulletin* 1776: 341-49.

Hale, Charles R.
1932 Cemeteries and Burial Plots in Connecticut, under auspices of the Connecticut State Library. Mss., Connecticut State Library, Hartford.

Handman, Elinor
1973 Depth to Bedrock, Windsor Locks Quadrangle, Connecticut. *U.S. Geological Survey Miscellaneous Field Studies Map MF-450 B.* Connecticut Valley Urban Area Project, Contribution 40.

Harper, Mary and Bruce Clouette
1996 Report: Phase I Archaeological Reconnaissance Survey, Reconstruction of Intersection of Route 20, Holcomb Street, and Newgate Road, State Project No. 39-88, East Granby, Connecticut. Prepared for Connecticut Department of Transportation. Storrs: Public Archaeology Survey Team, Inc. Report on file as CHPC #693, Connecticut Historic Preservation Collection, Dodd Center, University of Connecticut, Storrs.

2001 Clark Farm Tenant House Site. National Register of Historic Places Registration Form. On file, Connecticut State Historic Preservation Office.

Harper, Ross, Eric Pomo, and Bruce Clouette
2004 Phase III Archaeological Data Recovery Program, Peter Grohman House and Cigar-Making Shop (Site 40-12), Route 20, Holcomb Street, and Newgate Road, East Granby, Connecticut, State Project No. 39-88. Prepared for Connecticut Department of Transportation. Storrs: Public Archaeology Survey Team, Inc. Report on file as CHPC #1309, Connecticut Historic Preservation Collection, Dodd Center, University of Connecticut, Storrs.

Hartshorn, Joseph H., and Carl Koteff
1967 Geologic Map of the Springfield South Quadrangle...*U.S. Geological Survey Map GQ-678*.

Haviland, Frank
1998 The Mill Village of Tariffville. Available on World Wide Web at http://www.tariffville.org/history/TVA_mill_village_of_tariffville.htm

Hildreth, Carol T., and Roger B. Colton
1982 Surficial Geologic Map of the Hampden Quadrangle, Massachusetts and Connecticut. *U.S. Geological Survey Map GQ-1544*.

Historic Resource Consultants
1990 Connecticut Historic Bridge Survey/Inventory-Phase Final Report: Project Narrative, Inventory and Recommendations. Report prepared for Connecticut Department of Transportation. Hartford.

1991 Connecticut Historic Bridge Inventory/Final Report: Preservation Plan. Report prepared for Connecticut Department of Transportation. Hartford.

Hyde, Richard C., and Roger B. Colton
1973 Depth to Bedrock, Broad Brook Quadrangle, Connecticut. *U.S. Geological Survey Miscellaneous Field Studies, Map MF-451G*. Washington.

Ingersoll, Elinor H.B.
1934 *Connecticut circa 1625: its Indian trails, villages and sachemdoms*. [from data collected by Mathias Spiess]. The Connecticut Society of the Colonial Dames of America, Inc.

Jones, Brian D.
1997 The Late Paleoindian Hidden Creek Site in Southeastern Connecticut. *Archaeology of Eastern North America* 25: 45-80.

Jones, Brian D. and Daniel T. Forrest
2003 Life in a Postglacial Landscape: Settlement-Subsistence Change During the Pleistocene-Holocene Transition in Southern New England. In *Geoarchaeology of Landscapes in the Glaciated Northeast* edited by David L. Cremeens and John P. Hart. New York State Museum Bulletin 497. University of the State of New York, The State Education Department, Albany, New York.

Kaufman, B., and R. Dent
1982 Preliminary Floral and Faunal Recovery and Analysis at the Shawnee- Minisink Site (36MR43). *American Indian Archaeological Institute Occasional Paper* 3: 7-11.

Lavin, Lucianne
1988a The Morgan Site, Rocky Hill, Connecticut: A Late Woodland Farming Community in the Lower Connecticut River Valley. *Bulletin of the Archaeological Society of Connecticut* 51: 7-21.

1988b Coastal Adaptation in Southern New England and Southern New York. *Archaeology of Eastern North America* 16: 101-20.

Lee, Cara
1985 *West Rock to the Barndoor Hills: The Traprock Ridges of Connecticut.* State Geological and Natural History Survey of Connecticut, Department of Environmental Protection.

Lewis, Thomas R.
1978 From Suffield to Saybrook: An Historical Geography of the Connecticut River Valley in Connecticut before 1800. Ph.D. dissertation, Rutgers University.

McBride, Kevin A.
1991 Report, Phase I Archaeological Reconnaissance Survey Route 220 (Shaker Road), State Project No. 048-155. Prepared for Connecticut Department of Transportation. Storrs: Public Archaeology Survey Team, Inc. Report on file as CHPC #470, Connecticut Historic Preservation Collection, Dodd Center, University of Connecticut, Storrs.

1984 The Prehistory of the Lower Connecticut Valley. Ph.D. dissertation, Department of Anthropology, University of Connecticut, Storrs.

McBride, Kevin A., and Robert E. Dewar
1981 Prehistoric settlement in the Lower Connecticut River Valley. *Man in the Northeast* 22: 37-66.

McBride, Kevin A. and Mary Soulsby
1989 Prehistory of Eastern Connecticut: Phase I, II, and III Archaeological Surveys for the Relocation of Route 6/I-84 Project. Prepared for Connecticut Department of Transportation. Storrs: PAST, Inc.

McBride, Kevin A., William Wadleigh, Robert E. Dewar, and Mary G. Soulsby
1980 Prehistoric Settlement in Eastern Connecticut: the North-Central Lowlands and Northeastern Highlands Surveys: 1979. Archaeology Research Monographs, No. 15. Storrs: PAST, Inc. Prepared for the Connecticut Historical Commission.

Miller, Michael
1998 *Images of America: Enfield, Connecticut*. Charleston, SC: Arcadia Press.

Moeller, Roger
1980 6-LF-21. A Paleo-Indian Site in Western Connecticut. *American Indian Archaeological Institute Occasional Paper* No. 2.

Newman, Walter S.
1967 Late Pleistocene History of the Lower Hudson Estuary. *New York State Archaelogical Association Bulletin* 40: 1-2.

Northeast Utilities Service Company
1969-
2002 North Bloomfield-Agawam-Franconia 115 KV Line/1781 & 1782/Plan and Profile. Dwg. No. 08001-10002

1997 North Bloomfield Sub. to Agawam Sub. 115 KV Transmission Powerline Plan and Profile Sheet. Dwg. No. 01180-10002.

Pagoulatos, Peter
1986 Terminal Archaic Settlement and Subsistence in the Connecticut River Valley. Unpublished Ph.D. dissertation. University of Connecticut, Storrs.

Pease, John C.
1900 Introduction, in Francis O. Allen, *The History of Enfield, Connecticut*, Vol. I, pp. 11-19. Lancaster, PA: The Wickersham Printing Co.

Peper, John D.
1977 Bedrock Geologic Map of the Hampden Quadrangle, Massachusetts and Connecticut. *U.S. Geological Survey Map GQ-1368*.

Perrin, John
1976 Geology of the Newgate Prison-Mine of East Granby, Connecticut. M.S. thesis, University of Connecticut.

Pfeiffer, John
1980 The Griffin Site. *Man in the Northeast* 19: 129-133.

1983 Late Archaic and Terminal Archaic Cultural Applications and the Broadspear Complex. Occasional Papers in Northeastern Anthropology.

1984 The Late and Terminal Archaic Periods of Connecticut Prehistory. *Bulletin of the Archaeological Society of Connecticut* 47: 73-88.

Randall, Allan D.
1970 Surficial Geologic Map of the Tariffville Quadrangle, Connecticut-Massachusetts. *U.S. Geological Survey Map GQ-798*.

Raber, Michael S.
1997 Reconnaissance and Intensive Survey Archaeological Investigations for Proposed Parking Lot Expansion at Southern Auto Sales, Inc., East Windsor, Connecticut. Report prepared for Southern Auto Sales, Inc. South Glastonbury, CT: Raber Associates.

Raber, Michael S., Robert B. Gordon, and Mary G. Harper
1999 Report: Archaeological and Historical Investigations and Site Management Plan for Old New-Gate Prison and Copper Mine, East Granby, Connecticut. Prepared for Connecticut Historical Commission. Public Archaeology Survey Team, Inc., and Raber Associates. Report on file as CHPC #824, Connecticut Historic Preservation Collection, Dodd Center, University of Connecticut, Storrs.

Raber, Michael S., and Patrick M. Malone
1991 Final Report/Historical Documentation/River Canal Center Feasibility Study and Master Plan/Windsor Locks Canal Heritage State Park. Report prepared for Bureau of Parks and Forests, Connecticut Department of Environmental Protection. South Glastonbury, CT: Raber Associates.

Raber, Michael S., and Roger Thompson
2005 Final Report. Archaeological Reconnaissance and Historical Investigations For Proposed Reconstruction of Post Office/town Farm Roads, Enfield, Connecticut. Prepared for Maguire Group, Inc. Report on file as CHPC #1413, Connecticut Historic Preservation Collection, Dodd Center, University of Connecticut, Storrs.

Raber, Michael S., and Ernest A. Wiegand
2002 Cultural Resources Assessment in Support of Proposed Electric Transmission Line Facilities Between Plumtree and Norwalk Substations Bethel, Redding, Weston, Wilton, and Norwalk, Connecticut. Report prepared for Northeast Utilities Service Company. South Glastonbury, CT: Raber Associates. Report on file as CHPC #1070, Connecticut Historic Preservation Collection, Dodd Center, University of Connecticut, Storrs.

2003 Cultural Resources Assessment of Proposed Middletown-Norwalk 345 Kv Transmission Project: Proposed Route with Supported Changes and Alternative Routes. Report prepared for Northeast Utilities Service Company. South Glastonbury, CT: Raber Associates. Report on file as CHPC #1283, Connecticut Historic Preservation Collection, Dodd Center, University of Connecticut, Storrs.

Richardson, Creel
1928 A History of the Simsbury Mines. M.A. thesis, Trinity College.

Ritchie, William A.
1969a *The Archaeology of Martha's Vineyard*. New York: Natural History Press.

1969b *The Archaeology of New York State*. Garden City, NY: Natural History Press.

Ritchie, William A., and Robert E. Funk
1973 Aboriginal Settlement Patterns in the Northeast. *New York State Museum and Science Service Memoir* 20.

Rodgers, John, comp.
1985 Bedrock Geological Map of Connecticut. Hartford: Connecticut Department of Environmental Protection.

Schnabel, Robert W.
1971 Surficial Geologic Map of the Southwick Quadrangle, Massachusetts and Connecticut. *U.S. Geological Survey Map GQ-891*.

1974 Bedrock Geologic Map of the Southwick Quadrangle, Massachusetts and Connecticut. *U.S. Geological Survey Map GQ-1170*.

Schnabel, Robert W., and John H. Eric
1964 Bedrock Geology Map of the Windsor Locks Quadrangle, Connecticut. *U.S. Geological Survey Map GQ-137*. Washington.

Sheldon, Hezekiah Spencer
1879 *Documentary History of Suffield...1660-1749.* Springfield: Clark W. Bryan.

1886 Suffield, in J. Hammond Trumbull, ed., *The Memorial History of Hartford County, Connecticut 1633-1884, Vol. II,* pp. 383-214. Boston: Edward L. Osgood.

Snow, Dean
1980 *The Archaeology of New England*. New York: Academic Press.

Snell, Charles W.
1972 Old Newgate Prison and Copper Mine. National Register of Historic Places Inventory - Nomination Form (used for National Historic Landmark designation). On file, Connecticut State Historic Preservation Office.

Spiess, Mathias, and Percy W. Bidwell
1924 *History of Manchester, Connecticut*. Centennial Commitee of the Town of Manchester.

Springman, Mary, and Betty Guinan
1983 *East Granby: The Evolution of a Connecticut Town.* Canaan, NH: Phoenix Publishing.

Stiles, Henry R.
1892 *The History and Genealogies of Ancient Windsor, Connecticut, including East Windsor, South Windsor, Bloomfield, Windsor Locks and Ellington. 1635-1891*. 2 vols. Hartford: Case, Lockwood & Brainard Co. [1976 facsimile, Somersworth, NH: New Hampshire Publishing Co.]

Stone, J.R., *et al.*
1998 Quaternary geologic map of Connecticut and Long Island Sound basin. U.S. Geological Survey Open-File Report 98-371.

Thorson, Robert M.
2002 *Stone by Stone: The Magnificent History in New England's Stone Walls*, New York: Walker& Company.

2005 *Exploring Stone Walls: A Field Guide to New England's Stone Walls*, New York: Walker& Company.

Turner, Gregg, and Melancthon W. Jacobus
1986 *Connecticut's Railroads...An Illustrated History*. Hartford: Connecticut Historical Society.

Winch, Rev. George W.
1886 Enfield, in J. Hammond Trumbull, ed., *The Memorial History of Hartford County, Connecticut 1633-1884*, Vol. II, pp. 129-62. Boston: Edward L. Osgood.

Wintonbury Historical Society
1983 *From Wintonbury to Bloomfield.* Bloomfield.

U.S. Department of Agriculture, Soil Conservation Service
1962 *Soil Survey of Hartford County, Connecticut*. Washington: Government Printing Office.

U.S. Geological Survey
1893 *Topographical Atlas of the State of Connecticut*.

1944,
1953,
1964,
1984 Broad Brook, Conn. 7.5-minute quadrangle sheet.

1947,
1972 Southwick, Mass.-Conn. 7.5-minute quadrangle sheet.

1946,
1958,
1979 Springfield South, Mass.-Conn. 7.5-minute quadrangle sheet.

1951,
1956,
1984 Tariffville, Conn. 7.5-minute quadrangle sheet.

1938,
1945,
1958,
1979 West Springfield, Mass.-Conn. 7.5-minute quadrangle sheet.

1946,
1953,
1964,
1984 Windsor Locks, Conn. 7.5-minute quadrangle sheet.

Walwer, Gregory F.
1996 Survey of Native American Burials and Cemeteries East of the Connecticut River. Volume 1. Prepared for the Connecticut Historical Commission. Guilford, CT: Archaeological Consulting Services. On file, Connecticut State Historic Preservation Office.

Warren, Moses, and George Gillet
1812 Connecticut, from Actual Survey, Made in 1811... East Windsor: Abner Reed.

Woodford, E.M.
1855 Smith's Map of Hartford County. Philadelphia: H. & C.T. Smith.

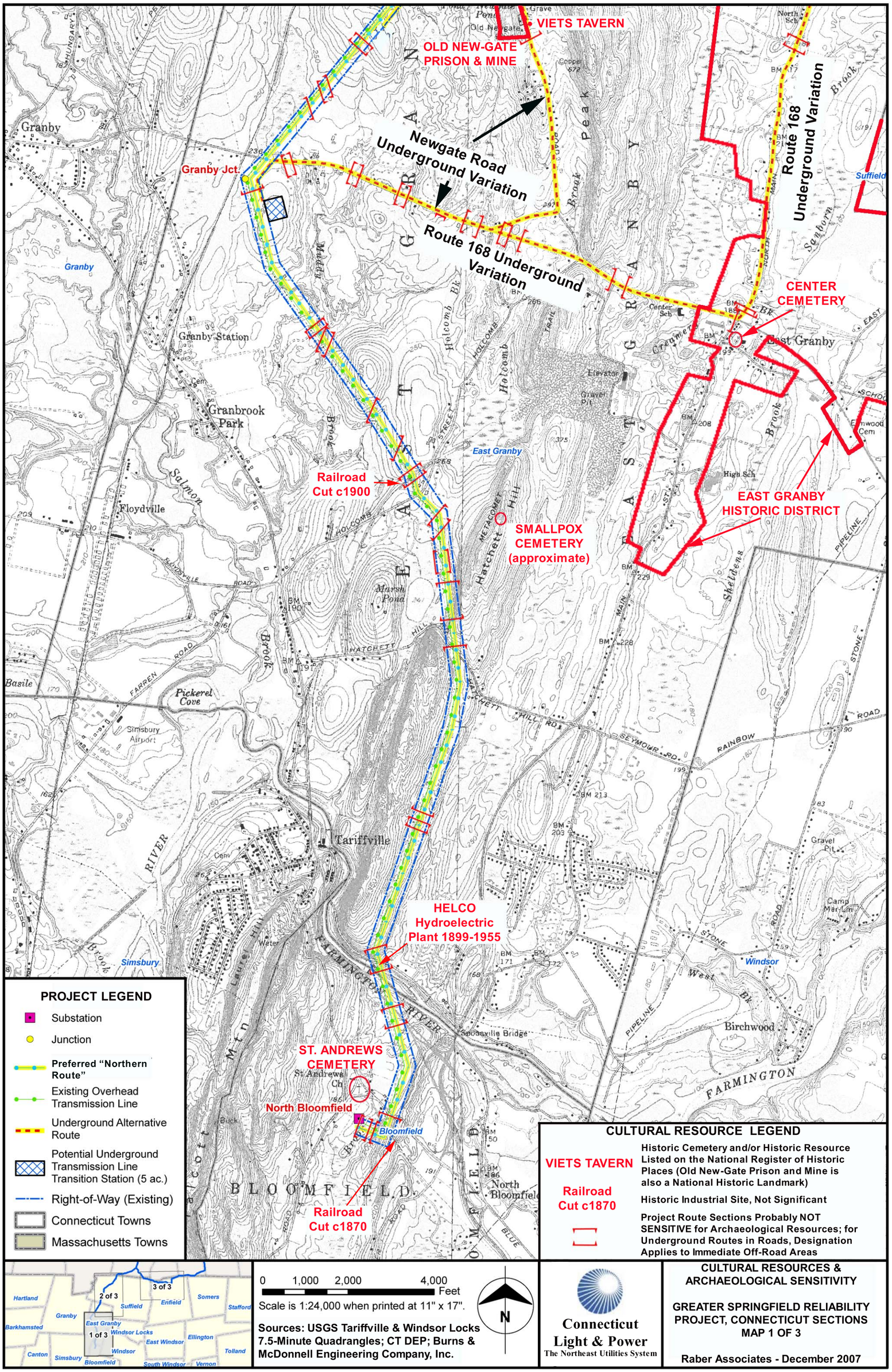
PERSONAL COMMUNICATIONS

Nicholas Bellantoni, Connecticut State Archaeologist

David A. Poirier, Staff Archaeologist, Connecticut State Historic Preservation Office

APPENDIX 1

PROPOSED AND ALTERNATIVE PROJECT ROUTES, CULTURAL RESOURCES, AND ARCHAEOLOGICAL SENSITIVITY



PROJECT LEGEND

- Substation
- Junction
- Preferred "Northern Route"
- Existing Overhead Transmission Line
- Underground Alternative Route
- Potential Underground Transmission Line Transition Station (5 ac.)
- Right-of-Way (Existing)
- Connecticut Towns
- Massachusetts Towns

CULTURAL RESOURCE LEGEND

VIETS TAVERN — Historic Cemetery and/or Historic Resource Listed on the National Register of Historic Places (Old New-Gate Prison and Mine is also a National Historic Landmark)

Railroad Cut c1870 — Historic Industrial Site, Not Significant

Project Route Sections Probably NOT SENSITIVE for Archaeological Resources; for Underground Routes in Roads, Designation Applies to Immediate Off-Road Areas

0 1,000 2,000 4,000 Feet

Scale is 1:24,000 when printed at 11" x 17".

Sources: USGS Tariffville & Windsor Locks 7.5-Minute Quadrangles; CT DEP; Burns & McDonnell Engineering Company, Inc.

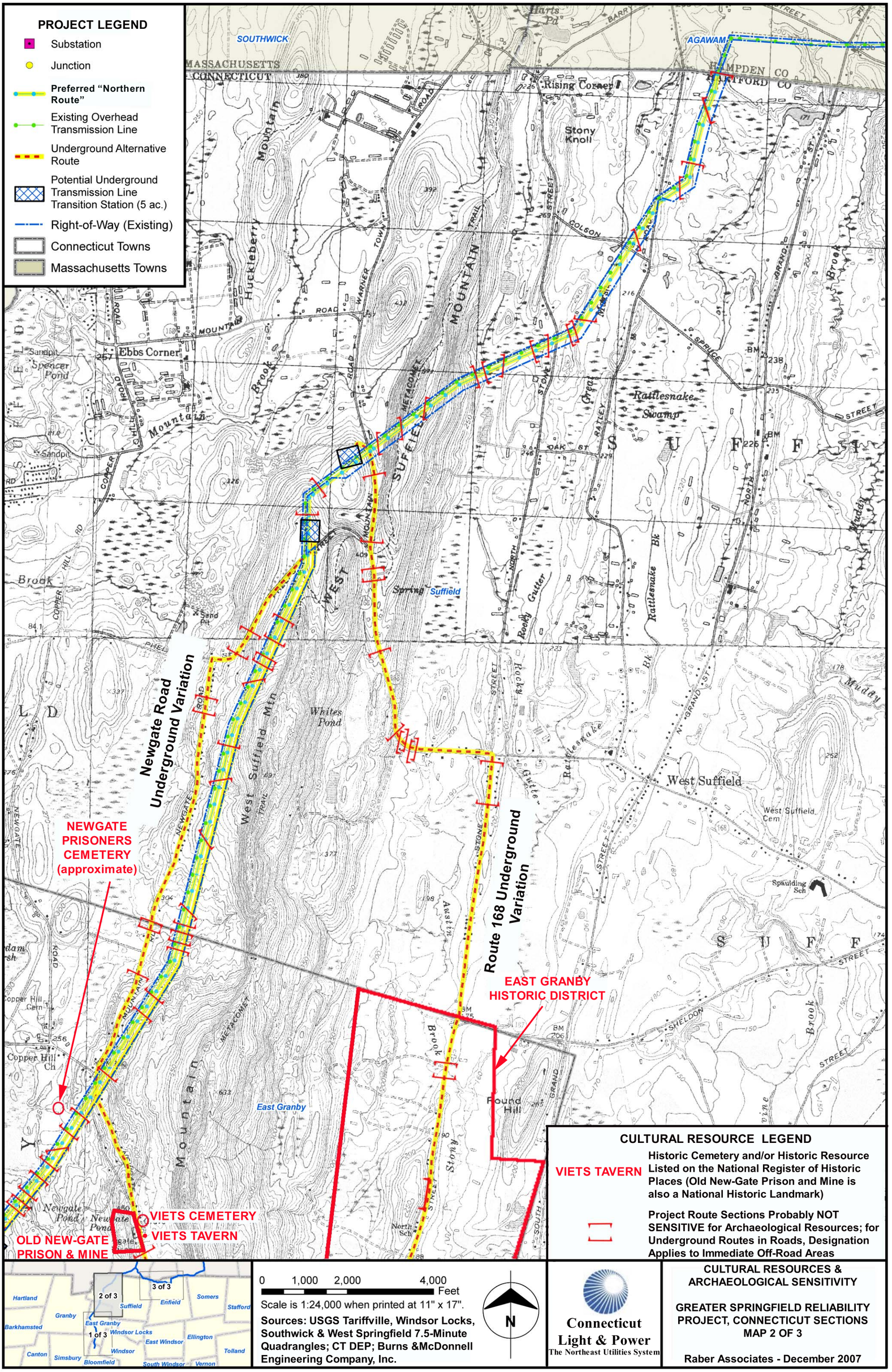
N

Connecticut Light & Power
The Northeast Utilities System

CULTURAL RESOURCES & ARCHAEOLOGICAL SENSITIVITY

GREATER SPRINGFIELD RELIABILITY PROJECT, CONNECTICUT SECTIONS MAP 1 OF 3

Raber Associates - December 2007


PROJECT LEGEND
Substation
Junction
Preferred "Northern Route"
Existing Overhead Transmission Line
Underground Alternative Route
Potential Underground Transmission Line Transition Station (5 ac.)
Right-of-Way (Existing)
Connecticut Towns
Massachusetts Towns
SOUTHWICK
AGAWAM
MASSACHUSETTS
CONNECTICUT
HAMPDEN CO
HARTFORD CO
Rising Corner
Stony Knoll
Ebbs Corner
Spencer Pond
Rattlesnake Swamp
Suffield
West Suffield
East Granby
Round Hill
Whites Pond
Newgate Pond
Copper Hill Cem
West Suffield Cem
Spaulding Sch
North Sch
Newgate Road Underground Variation
Route 168 Underground Variation
NEWGATE PRISONERS CEMETERY (approximate)
EAST GRANBY HISTORIC DISTRICT
VIETS CEMETERY
VIETS TAVERN
OLD NEW-GATE PRISON & MINE
CULTURAL RESOURCE LEGEND
VIETS TAVERN
Historic Cemetery and/or Historic Resource Listed on the National Register of Historic Places (Old New-Gate Prison and Mine is also a National Historic Landmark)
Project Route Sections Probably NOT SENSITIVE for Archaeological Resources; for Underground Routes in Roads, Designation Applies to Immediate Off-Road Areas
Hartland
Somers
Stafford
Granby
Suffield
Enfield
East Granby
Windsor Locks
Barkhamsted
East Windsor
Ellington
Canton
Simsbury
Bloomfield
Windsor
South Windsor
Vernon
Tolland
2 of 3
3 of 3
1 of 3
0 1,000 2,000 4,000 Feet
Scale is 1:24,000 when printed at 11" x 17".
Sources: USGS Tariffville, Windsor Locks, Southwick & West Springfield 7.5-Minute Quadrangles; CT DEP; Burns &McDonnell Engineering Company, Inc.
N
Connecticut Light & Power
The Northeast Utilities System
CULTURAL RESOURCES & ARCHAEOLOGICAL SENSITIVITY
GREATER SPRINGFIELD RELIABILITY PROJECT, CONNECTICUT SECTIONS
MAP 2 OF 3
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Franconia Jct.

Southern Route
Underground Variation

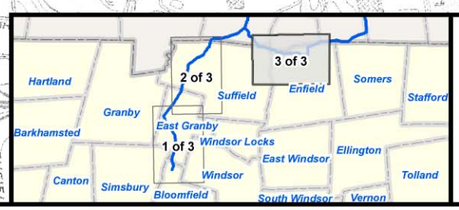
AGAWAM
LONGMEADOW
EAST LONGMEADOW
SUFFIELD
THOMPSONVILLE
ENFIELD

North Thompsonville
Thompsonville

MASSACHUSETTS
CONNECTICUT

PROJECT LEGEND

- Substation
- Junction
- "Southern Route"
- Existing Overhead Transmission Line
- Underground Alternative Route
- Potential Underground Transmission Line Transition Station (5 ac.)
- Right-of-Way (Existing)
- Connecticut Towns
- Massachusetts Towns



CULTURAL RESOURCE LEGEND

Project Route Sections Probably NOT SENSITIVE for Archaeological Resources; for Underground Routes in Roads, Designation Applies to Immediate Off-Road Areas

0 1,000 2,000 4,000 Feet

Scale is 1:24,000 when printed at 11" x 17".

Sources: USGS West Springfield, Springfield South, Windsor Locks, & Broad Brook 7.5-Minute Quadrangles; CT DEP;
Burns &McDonnell Engineering Company, Inc.

N

Connecticut Light & Power
The Northeast Utilities System

CULTURAL RESOURCES & ARCHAEOLOGICAL SENSITIVITY

GREATER SPRINGFIELD RELIABILITY PROJECT, CONNECTICUT SECTIONS
MAP 3 OF 3

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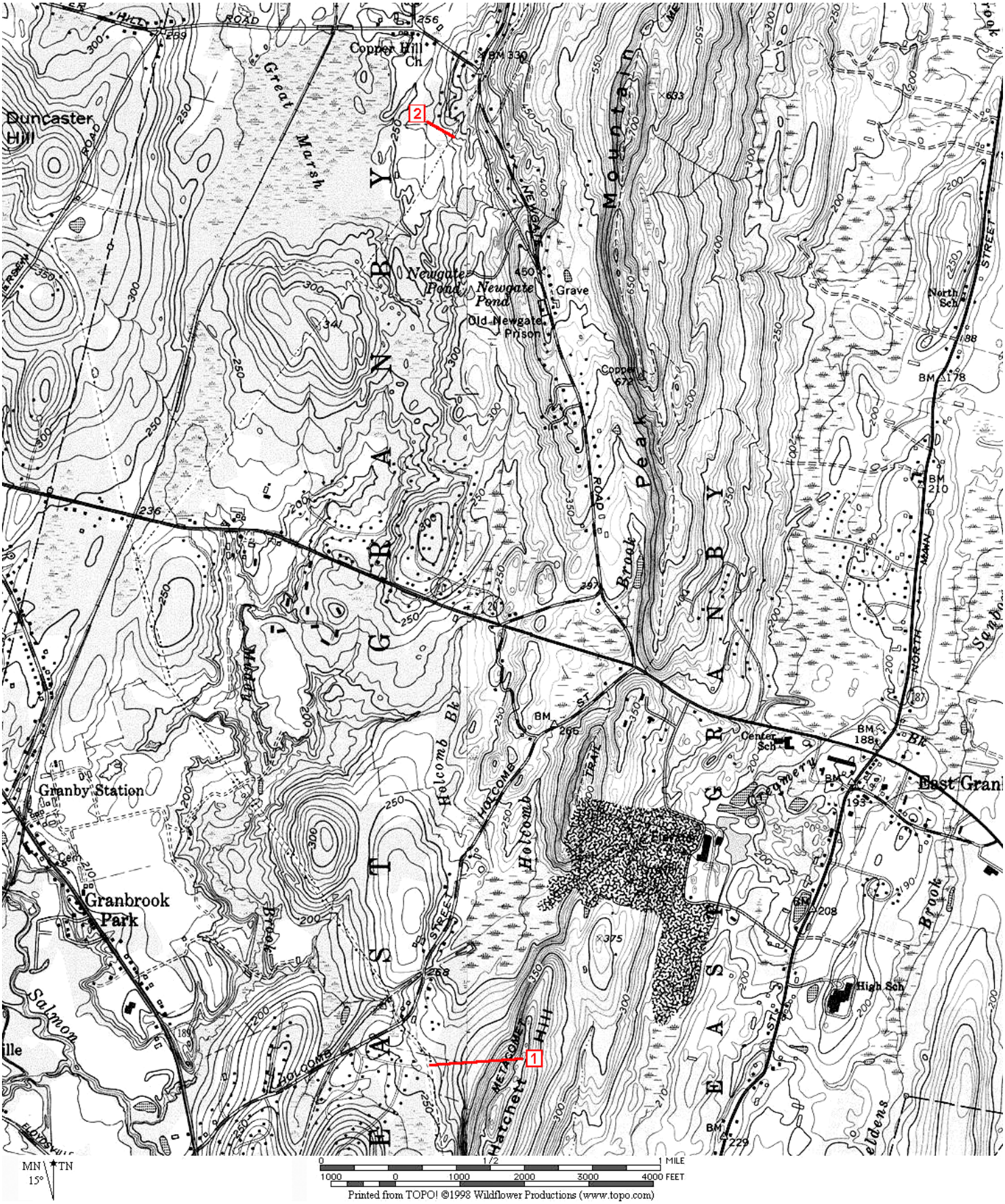
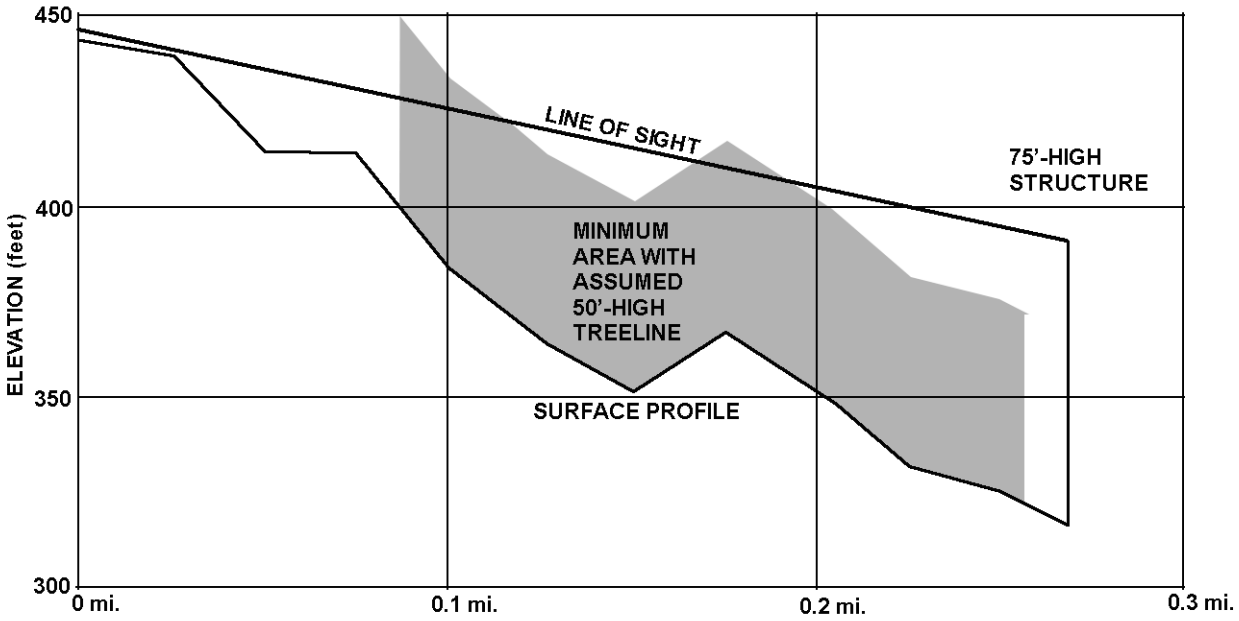
APPENDIX 2

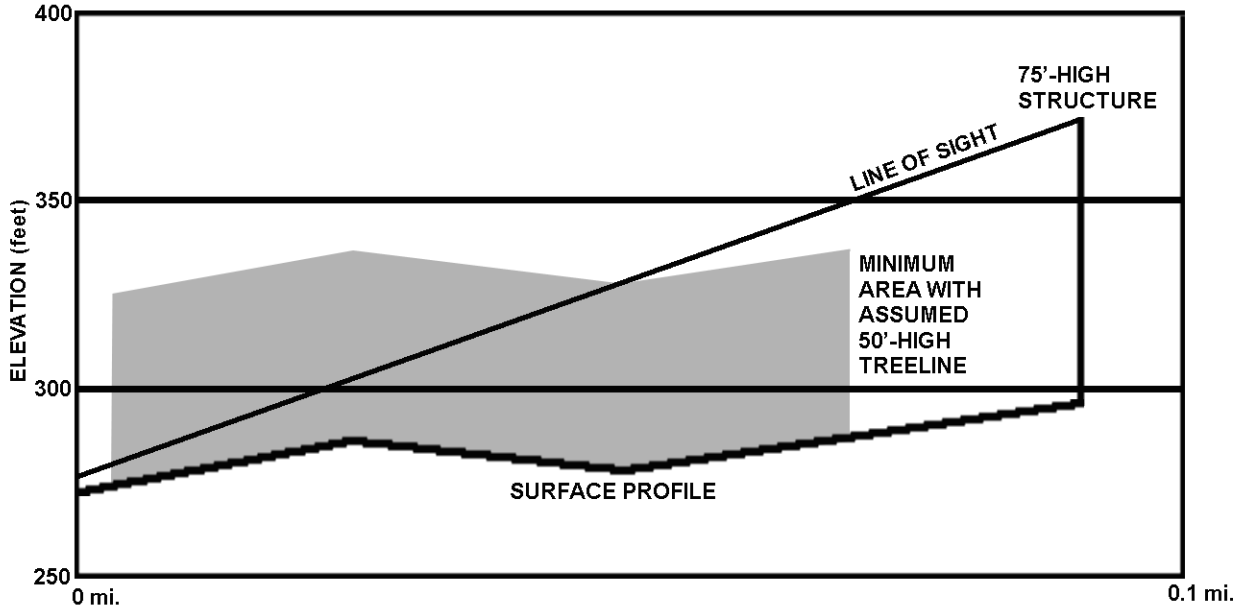
DIGITALLY-GENERATED TOPOGRAPHIC PROFILES SAMPLING POSSIBLE LINES OF SIGHT FROM SIGNIFICANT HISTORIC PROPERTIES TO POSSIBLE TRANSMISSION STRUCTURES ON THE PRIMARY ROUTE UNDER CONSIDERATION



KEY TO PROFILES 1 AND 2 ON TARIFFVILLE AND WINDSOR LOCKS QUADRANGLES



PROFILE 1. FACING SOUTHEAST, FROM SMALLPOX CEMETERY TO VICINITY OF EXISTING STRUCTURE 3160



PROFILE 2. FACING NORTHWEST, FROM NEWGATE PRISONERS CEMETERY TO VICINITY OF EXISTING STRUCTURE 3194

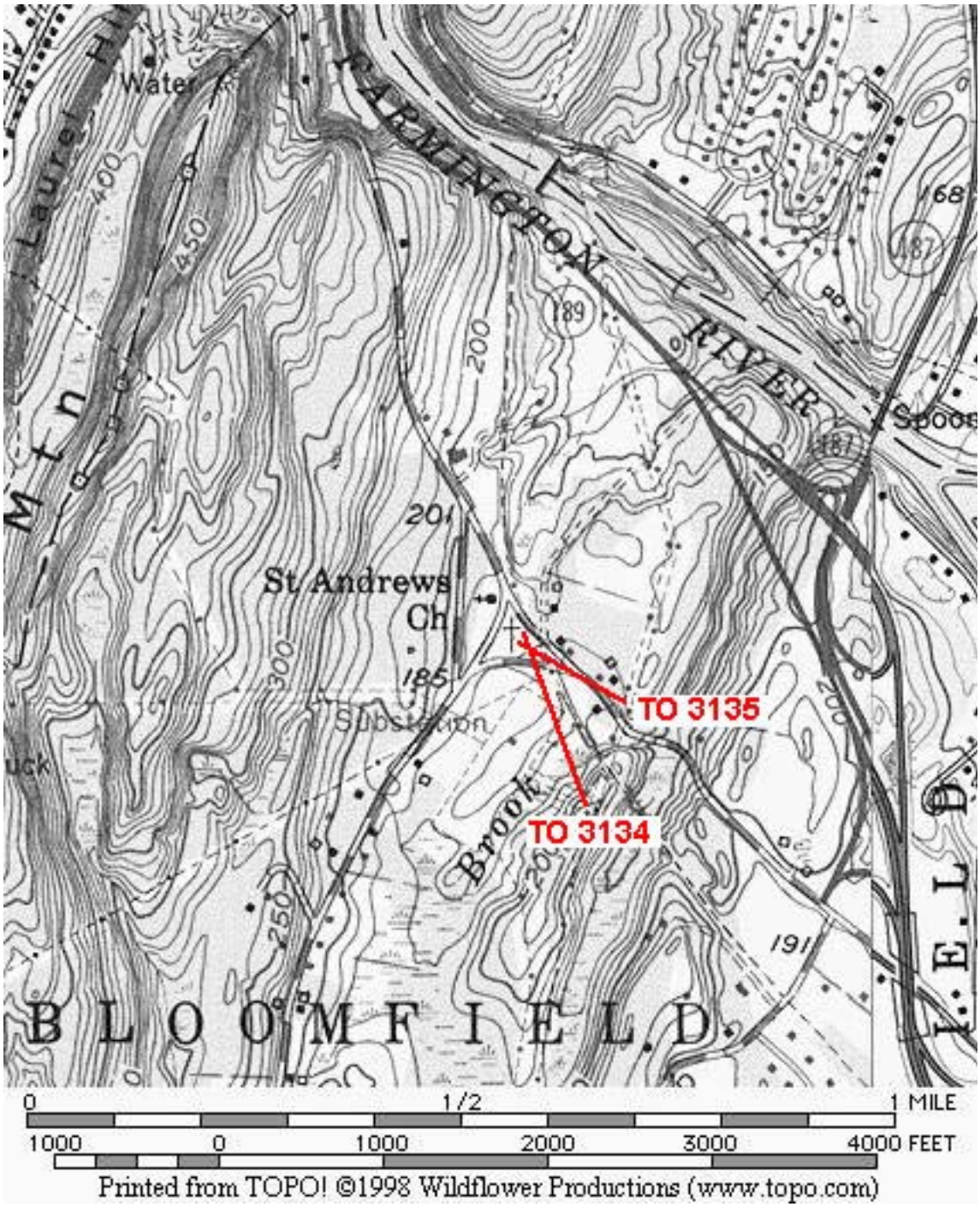
1" = 50' (VERTICAL)

BASE PROFILES ADAPTED FROM TOPO!©1998 WILDFLOWER PRODUCTIONS
STRUCTURE HEIGHTS BASED ON BURNS & McDONNELL ENGINEERING COMPANY, INC. 2007

APPENDIX 3

PHOTOGRAPHS OF ST. ANDREWS CEMETERY, WITH SIMULATIONS OF NEW TRANSMISSION STRUCTURES FOR PRIMARY ROUTE UNDER CONSIDERATION

Simulations are of structures at least 95 feet high, based on earlier Project planning. Current Project planning anticipates new structures 75-80 feet high (Burns & McDonnell Engineering Company, Inc. 2007).



KEY TO VIEWS ON TARIFFVILLE QUADRANGLE

EXISTING VIEW SOUTHEAST TO STRUCTURE 3134

SIMULATED VIEW SOUTHEAST TO EXISTING STRUCTURE 3134

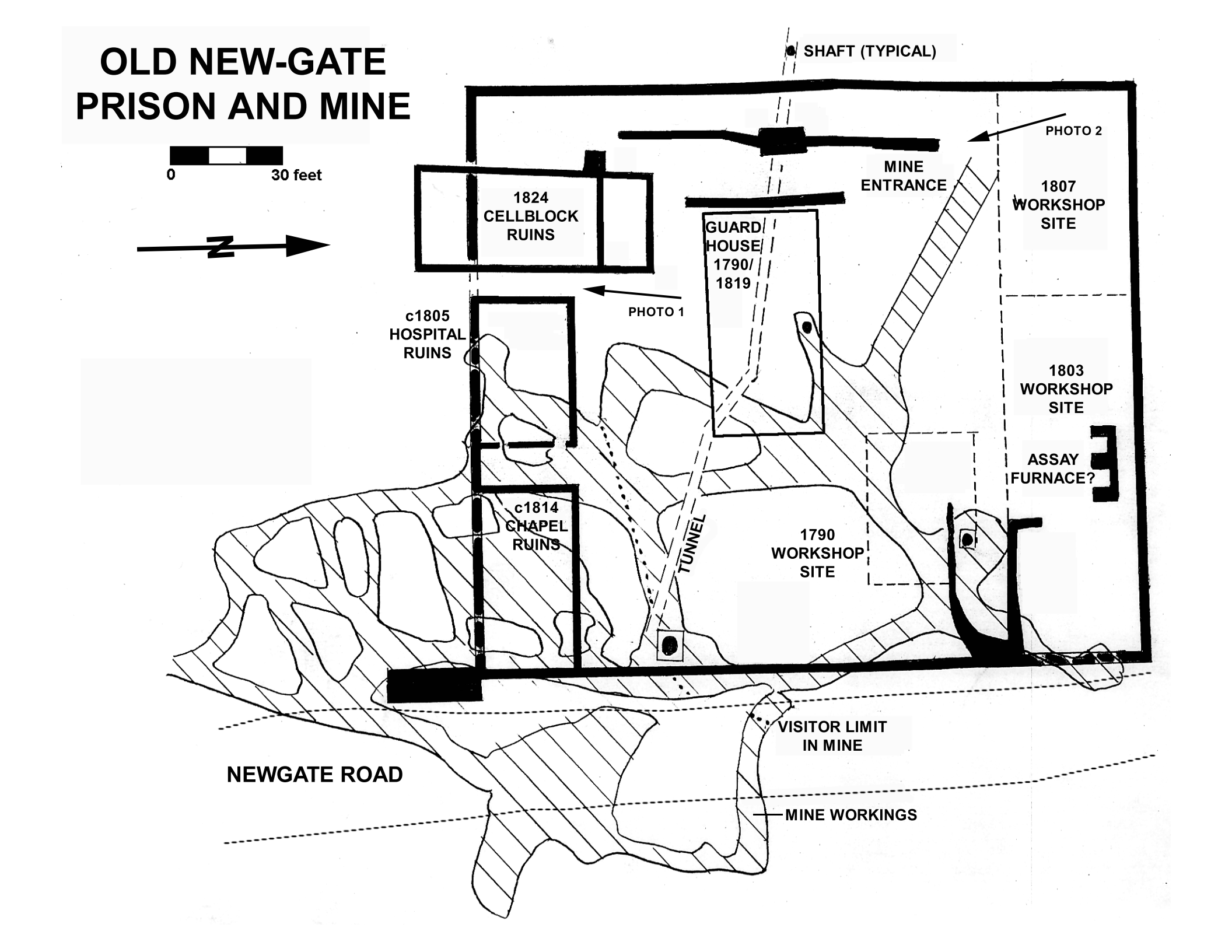
EXISTING VIEW SOUTHEAST TO STRUCTURE 3135

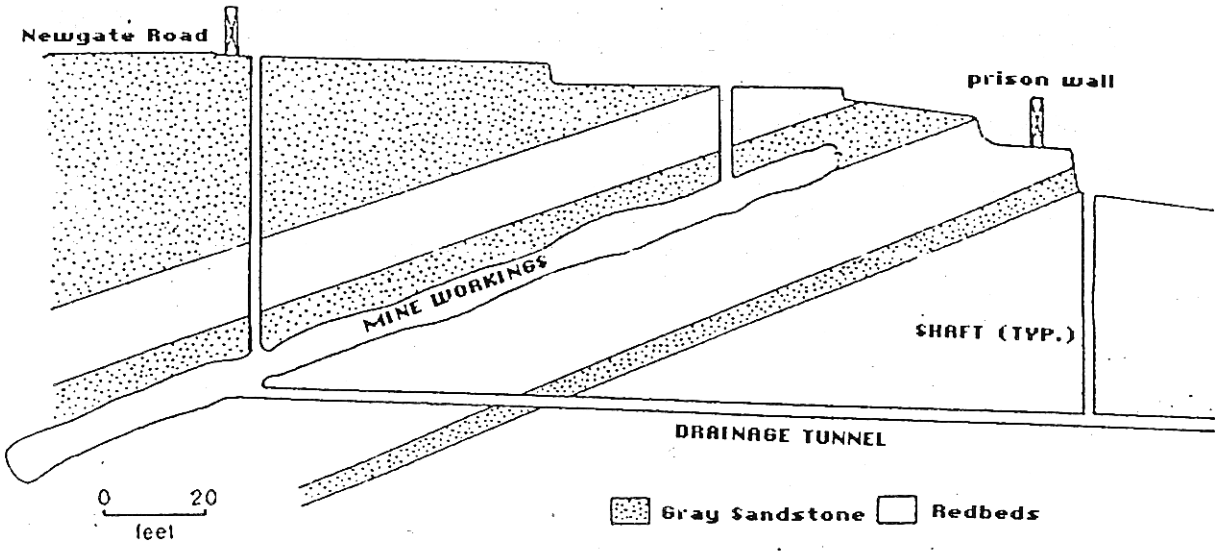
SIMULATED VIEW SOUTHEAST TO EXISTING STRUCTURE 3135

APPENDIX 4

OLD NEW-GATE PRISON SITE MAP, GEOLOGICAL CROSS-SECTION, AND PHOTOGRAPHS

OLD NEW-GATE PRISON AND MINE





SOUTH-FACING SECTION OF NEWGATE MINE ALONG DRAINAGE TUNNEL
source: Gray 1982

NEWGATE PHOTOGRAPH 1

NEWGATE PHOTOGRAPH 2

EX. 2: Historical and Archaeological Assessment Addendum for Connecticut Sections of the Connecticut Light & Power Company Greater Springfield Reliability Project: Manchester Substation to Meekville Junction Circuit Separation

RABER ASSOCIATES
CONSULTANTS IN THE HISTORICAL AND SOCIAL SCIENCES

Final Report

HISTORICAL AND ARCHAEOLOGICAL ASSESSMENT ADDENDUM FOR CONNECTICUT SECTIONS OF THE CONNECTICUT LIGHT & POWER COMPANY GREATER SPRINGFIELD RELIABILITY PROJECT: MANCHESTER SUBSTATION TO MEEKVILLE JUNCTION CIRCUIT SEPARATION, MANCHESTER, CONNECTICUT

Michael S. Raber

prepared for:

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July 2008

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ABSTRACT

Two Northeast Utilities Subsidiaries, The Connecticut Light and Power Company (CL&P) in Connecticut and Western Massachusetts Electric Company (WMECO) in Massachusetts, propose to enhance electric service and reliability by the construction and operation of the Greater Springfield Reliability Project (GSRP). GSRP components within Connecticut would include new 345-kV transmission lines to complete a 345-kV loop through north-central Connecticut and western Massachusetts, and separation of existing 345-kV and 115-kV circuits between Manchester Substation and Meekville Junction in Manchester, Connecticut. As part of the process of submitting an application to the Connecticut Siting Council ("Siting Council", "Council") for a Certificate of Environmental Compatibility and Public Need (Certificate) for the construction and operation of the GSRP Connecticut components, Raber Associates prepared a cultural resources assessment of alternatives for the new 345-kV lines in 2007. The circuit separation project in Manchester (Manchester-Meekville Route) was added to GSRP after completion of the 2007 assessment. This addendum addresses similar objectives for the Manchester-Meekville Route, using the same methods and some of the same background data presented in the 2007 assessment. An assessment of cultural resources was made on behalf of CL&P to identify known or potential archaeological sites within possible project areas, and to evaluate the potential for adverse visual effects on significant historic properties. Depending on an approved D&M Plan, additional assessment or reconnaissance investigations will be made in consultation with the Connecticut State Historic Preservation Office.

Within an existing CL&P right-of-way (ROW) extending approximately 2.7 miles between Manchester Substation and Meekville Junction and averaging 350 feet in width, existing facilities include a 345-kV circuit, three 115-kV circuits, and two distribution lines. The steel lattice structures supporting the 345-kV circuit also support one of the 115-kV circuits. As part of GSRP, the 115-kV circuit in question would be removed and placed on a separate line of new steel-monopole structures, which will also require relocation of a double-circuit distribution line. All work will occur within the existing CL&P ROW.

No documented archaeological sites exist within the proposed Manchester-Meekville Route. Background research and field inspection indicated areas sensitive for potential Native American sites along discontinuous areas totaling approximately 0.3 miles of the project corridor. No Euroamerican archaeological sites listed on, or eligible for listing on, the National Register of Historic Places or the State Register of Historic Places, are reported or likely near proposed and alternative overhead routes.

One significant aboveground historic resource, eligible for National Register inclusion, was identified within approximately 0.25 mile of the project corridor, southwest of the Manchester Substation. The 0.25 mile distance was selected to evaluate possible visual effects of new transmission structures. Based on visual inspection and analysis of present-condition photographs, adverse visual effects on the resource appear unlikely because of distance, existing buildings, and trees around the substation perimeter.

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I. INTRODUCTION

A. Purpose of Study

Two Northeast Utilities Subsidiaries, The Connecticut Light and Power Company (CL&P) in Connecticut and Western Massachusetts Electric Company (WMECO) in Massachusetts, propose to enhance electric service and reliability by the construction and operation of the Greater Springfield Reliability Project (GSRP). GSRP components within Connecticut would include new 345-kV transmission lines to complete a 345-kV loop through north-central Connecticut and western Massachusetts, and separation of existing 345-kV and 115-kV circuits between Manchester Substation and Meekville Junction in Manchester, Connecticut. As part of the process of submitting an application to the Connecticut Siting Council ("Siting Council", "Council") for a Certificate of Environmental Compatibility and Public Need (Certificate) for the construction and operation of the GSRP Connecticut components, Raber Associates prepared a cultural resources assessment of alternatives for the new 345-kV lines (Raber 2007). The circuit separation project in Manchester (Manchester-Meekville Route) was added to GSRP after completion of the 2007 assessment. This addendum addresses similar objectives for the Manchester-Meekville Route, using the same methods and some of the same background data presented in the 2007 assessment (see Raber 2007: Sections I.A, I.C and II for objectives and methods).

B. Summary Project Description

Within an existing CL&P right-of-way (ROW) extending approximately 2.7 miles between Manchester Substation and Meekville Junction and averaging 350 feet in width, existing facilities include a 345-kV circuit, three 115-kV circuits, and two distribution lines. The steel lattice structures supporting the 345-kV circuit also support one of the 115-kV circuits. As part of GSRP, the 115-kV circuit in question would be removed and placed on a separate line of new steel-monopole structures, which will also require relocation of a double-circuit distribution line. All work will occur within the existing CL&P ROW (Figure 1).

The existing steel lattice structures supporting the circuits to be separated average 110 feet in height. The other two existing 115-kV circuits are supported by a single line of steel lattice structures averaging 90 feet in height. Existing wood distribution poles are approximately 40 feet in height. The preferred plan under consideration to support the circuit separation includes steel monopoles averaging 100 to 150 feet in height with a vertical configuration, located between the existing lattice structures to minimize additional clearing and other environmental impacts.

None of the existing transmission line structures would be removed, but the existing wood distribution poles would be relocated to accommodate the new 115-kV overhead line for the preferred configuration. New structure placements will be close to existing structure locations.

New structures will have concrete foundations, requiring access for large cranes and secure pads or work areas. Existing access roads will form the backbone of the construction road network and will be used as much as possible to limit ground disturbance. Access roads will in places require improvements to achieve appropriate grades (10% or less), sufficient surface widths (at least 15 feet), and stable bases. The amount of work necessary will depend on topography, soil conditions, and type of vehicles that will need access through the area.

A range of construction pad preparation methods will include light surface grading, extensive cuts and fills, gravel surfaces, and/or use of wooden mats in wetlands. Pad sizes will vary with activity requirements, but may reach 100-foot-square areas at sites of new overhead structures. Smaller pads could be utilized if site conditions allow. Construction sites may frequently require 20-foot-square dewatering pits outside pad limits. At sites where existing structures would be dismantled, pad size would depend on the type of structure to be removed, existing topography, and other natural features. A cleared area typically at least 25 feet from all structure surfaces, including all poles of a multiple pole structure and all guy wires, would be needed but different sizes and configurations are likely. If necessary, stone or wooden mats would be used to level and stabilize the area necessary for deconstruction activities. Typically these sites would not exceed the size of the cleared area. Equipment storage and/or staging areas will not be determined until a design is certified.

Little if any forest clearance is anticipated. Mechanical equipment to remove herbaceous vegetation, shrubs, small diameter trees and other low growing vegetation could include many types of brush mowers, most of which have rubber or steel tracks and a cutting head mounted directly on the front or on a boom. The cutting head is typically a steel drum spinning at a very high speed. These activities are not expected to involve much ground disturbance.

II. MANCHESTER-MEEKVILLE ROUTE ENVIRONMENTS

All project areas lie within Connecticut's Central Valley or Central Lowlands physiographic province. The valley, known to geologists as the Hartford Basin, is predominantly a lowland with "red-bed" Triassic sedimentary sandstone and arkose bedrock which slopes down to the east. (Rodgers, ed. 1985). Bedrock geology created the framework for modern glaciated environments, as is the case throughout most of northern North America. Pleistocene glaciation and Holocene land-formation processes created most of the Manchester-Meekville Route environments used over the last approximately 10,000 years by Native American and Euroamerican peoples. From the Manchester Substation, the project corridor is traversed by Olcott Street, Middle Turnpike, the Hockanum River, I-84, the tracks of the former New York, New Haven & Hartford Railroad, and Tolland Turnpike. From a short distance south of the tracks, most of the corridor lies within the basin of the Hockanum River, and its tributary South Fork (formerly known as Hop Brook) which flows immediately east of the Manchester Substation. The northern end of the corridor is drained by the Podunk River via its tributary Whaples or Quarry Brook. The Podunk River and the Hockanum River Basin are tributary to the Connecticut River (Figure 1).

Except for steep, glacial-till-based elevations between I-84 and the railroad tracks, the project corridor is relatively level or gently sloped in most places, with elevations approximately 80-140 feet above mean sea level. Including areas disturbed by 20th-century development, most corridor landscapes are dominated by level deposits associated with late-glacial Lake Hitchcock and subsequent river and stream formation processes. The lake drowned the lowland along 150 miles of present river some 12,500-16,000 years ago. Lake deposits included fine silts and clays later exploited for brick manufacture, and broad, sandy deltaic fans around tributary streams. Post-glacial, poorly-drained stream terrace and alluvial deposits characterize the project corridor sections in the Hockanum River Basin. Portions of these areas have also been filled or otherwise disturbed by historical development, notably the construction episodes associated with I-84 which included deposition of spoils along the steep project corridor elevations just north of the highway. In the Podunk River drainage, the project corridor consists primarily of till and deltaic deposits. Although commercial and industrial development along both sides of the corridor north of Tolland Turnpike has involved wetland filling and other disturbance, much of the corridor within the Podunk River drainage appears to have well-drained sandy loams with varying amounts of fine or gravelly material. Little detailed information is available on current soil conditions in this section (Figure 1; U.S. Geological Survey 1893, 1944, 1952, 1963/1994; Fairchild Aerial Survey 1934; U.S. Department of Agriculture 1962; Stone *et al*. 1998).

The environments in the project corridor and vicinity offered a wide range of natural resources for human use beginning some 10,000 years ago. Freshwater and anadromous fish were available in the Hockanum and Podunk rivers. Wetlands and alluvial stream or river margins attracted birds and mammals which could be hunted. Relatively stone-free, level soils in the areas once covered by Lake Hitchcock attracted Native American and Euroamerican farmers. Euroamericans also used the rivers near Project areas for waterpowered industrial operations.

III. NATIVE AMERICAN RESOURCE SENSITIVITY

A. Known Resources and Research Context

The general sensitivity of the Project area and vicinity for possible Native American resources is well established by the reported presence in files of the Connecticut State Archaeologist of at least eight prehistoric sites within approximately 1 mile of the Manchester-Meekville Route (Table 1). These finds, although generally not fully excavated, indicate thousands of years of Native American occupation. None have been determined eligible for the National Register of Historic Places. Although most have not been excavated extensively, the sites with temporally diagnostic artifacts date from the Late Archaic to Contact periods (c5000-350 B.P.), and include at least two villages and one burial site from the Contact period located approximately 1100-1500 feet from the Project corridor. No sites have been found within the project corridor, but reported sites are within 600 feet.

Research on the region around Hartford suggests that Native American activity in the Project vicinity spanned a period of at least 8000 years. The limited information on earlier millennia, and on the reported sites, is in large part a reflection of the degree of historical development that over the past 200 years has buried and destroyed countless Native American sites. Prior to the replacement or removal of Native American people in this vicinity during the 17th and 18th centuries, the project corridor would have likely been part of a riverine-focused settlement area including access to a variety of resources from the Connecticut River and its tributaries, terrestrial hardwood forest and wetlands, and upland hunting and nut-gathering locations. Native American use of this area probably included short periods of food collecting and hunting, overnight logistical hunting and transitory camps, longer-term seasonal occupations, and agriculture-based hamlets or villages.

Table 1. REPORTED NATIVE AMERICAN ARCHAEOLOGICAL SITES WITHIN ONE MILE OF PROJECT CORRIDOR

TOWN	NO.	NAME	DATE	DESCRIPTION	NR STATUS	SOURCES
EAST HARTFORD	43-3	TOWN LINE SITE	UNK	quartz debitage found on surface	UNK	OSA
EAST HARTFORD	43-10	VILLAGE SITE	CON	90 hearths; cache of hoes	UNK	OSA; Spiess & Bidwell 1924; Spiess 1937
MANCHESTER	77-7	[NONE]	LA/LW/CON	2 axes; Squibnocket & Levanna projectile points; possible Podunk village	UNK	Spiess & Bidwell 1924; Spiess 1937
MANCHESTER	77-8	OLCOTT FARM	CON	stone mortar; circular earth ridge; Podunk village	UNK	OSA; Spiess & Bidwell 1924; Spiess 1937
MANCHESTER	77-10	WEST CEMETERY	CON	2 burials	UNK	OSA; Spiess 1937
MANCHESTER	77-11	BURNHAM	LA	1 Brewerton projectile point found on surface	UNK	OSA
MANCHESTER	77-14	[NONE]	CON?	possible Podunk village	UNK	OSA; Spiess 1937
MANCHESTER	77-16	MCTC	UNK	2 loci; quartz & rhyolite debitage & point tip	UNK	OSA: Clouette & Harper 1997

ABBREVIATIONS

DATE:	UNK	Unknown	NR STATUS:	UNK	National Register eligibility not determined
	LA	Late Archaic		NOT NRE	Not eligible for National Register listing
	LW	Late Woodland			
	CON	Contact		SOURCES: OSA	Office of Connecticut State Archaeology

A general context for regional Native American settlement patterns was summarized in Section IV.A of the initial GSRP cultural resource assessment (Raber 2007), most of which is not repeated here. As suggested by the nearest reported archaeological sites, the project corridor vicinity is perhaps most notable within this context as an important center within the former territory of the Podunks, who occupied lands on the east side of the Connecticut river during the Contact period from the approximate area of present Enfield to about Keeney Cove in present Glastonbury. The Podunk population c1630 has been estimated at about 1600 people, who lived in six or seven villages and perhaps an unknown number of smaller winter encampments. Most of their principal villages were located on the Scantic, Podunk, and Hockanum rivers in present East Hartford, South Windsor, and Manchester, although some sources place two smaller villages in East Windsor, on the Scantic in the vicinity of present Broad Brook village and near the mouth of Namerick Brook. Small temporary camps or task-specific resource-procurement sites were probably dispersed within short distances of the villages. One of their principal permanent villages was along the north bank of the Hockanum River in East Hartford. Seasonal camps have been reported close to the project corridor, near Love Lane close to Hop Brook (Site 77-8) and near Hilliard Street (Site 77-14) in Manchester, and near Spencer Street in East

Hartford close to the Manchester boundary (Site 43-10). Spencer-West Center Street south of the project corridor originated as part of an important Podunk trail, as did parts of Tolland Turnpike. Known Podunk burial grounds were in South Windsor, on the Podunk River and opposite the mouth of the Farmington River. Two Podunk burials were reported at West Cemetery (Site 77-10) in Manchester (DeForest 1851; Stiles 1891; Spiess and Bidwell 1924; Spiess 1937; Buckley 1973; Cook 1976).

The Dutch West India Company began a small trading post at later Hartford in 1623, stimulating a trade in furs which led to conflicts among Native American tribes. The Podunks and other River Tribes soon found themselves at odds with the larger Pequot and Mohegan groups of the Thames River drainage. The advent of English settlement around Hartford in the 1630s was in part a response to an invitation from a River Tribe sachem who may have been a Podunk. The Podunk sold land rights to English settlers of early Windsor in 1636, and to Hartford settlers c1640 in present East Hartford, although there was no English settlement east of the river until the 1660s (Stiles 1891). The Mohegans, subservient to the Pequots until the Pequot War of 1637, claimed large areas of the Connecticut Valley and eastern highlands following the defeat of the Pequots. The Mohegans, under their leader Uncas, became the most important Indian political force in eastern Connecticut, using alliances with the English to subjugate or outmaneuver Indian opponents in the region. Uncas was involved in wars or serious quarrels with nearly every Indian group in the region between the Pequot War and King Philip's War of 1676. Many of these disputes originated over control of fur trade resources and markets. During this period of conflict, the English settled affairs between the Mohegan and the Podunk by defining a boundary between them running through Bolton Notch in 1666. This line corresponds approximately to the drainage divide between the Connecticut and Thames River basins. The Mohegan may have retained a later claim to Podunk lands near the Connecticut River through Uncas' son Joshua, whose wife was willed these areas c1672 by her father, a Podunk or Sicaog sachem (Stiles 1891). The Podunk evidently survived a 1633-34 smallpox epidemic which devastated native populations on the west side of the river around Hartford, and retained a viable military presence until about the time of King Philip's War. By the 1670s, the hunting and trapping grounds of southern New England were probably depleted as sources of Indian income, and those groups which had survived the disease and warfare of the early Contact period had begun trading land rights for money, goods, or political security. Although they resisted being drawn into tributary relations with the Pequot or Mohegan, the Podunk suffered occasional attacks from the Iroquoian Mohawks from New York, who also tried to control trade networks. The decline of the Podunk in the late 17th century is not well documented, but has been associated with Mohawk attacks and the choice by many Podunk to side with the unsuccessful Indian alliance against the English during King Philip's War. Small numbers of Podunk lived in East Windsor and East Hartford into the third quarter of the 18th century, and some were present in Manchester into the early 19th century (Stiles 1891; Speiss and Bidwell 1924; Buckley 1973).

B. Project Corridor Sensitivity

In Connecticut and elsewhere in Northeastern North America, Native American sites are almost invariably located on at least moderately well-drained soils, and on slopes of less than about 20 percent except at rockshelters. Background research and field inspection indicated that discontinuous areas meeting these basic criteria totaled approximately 0.3 mile at the north end of the project corridor. Within these areas, additional assessment of soil conditions Native American archaeological sensitivity may be required at some construction pad or access road locations. Given the presence of numerous nearby under-documented sites, and proximity to nearby rivers, streams, and wetlands, the northern project corridor appeared highly sensitive for a wide variety of sites including permanent and semi-permanent Late Woodland and Contact villages, and smaller types of sites during most or all periods of Native American settlement such as satellite seasonal habitations and special-purpose sites for procurement of plant or animal resources. Many of the settlement pattern ambiguities result from lack of information on such smaller sites, whose distribution, functions and seasonality should reflect distinct variations in social and economic organization. The extent of these ambiguities is such that well-preserved data on small sites from any of the periods outlined above could provide significant new information, and be eligible for the National Register under Criterion D. Reconnaissance archaeological investigations would be necessary to locate potentially eligible sites in project areas with archaeologically-sensitive soils.

IV. EUROAMERICAN RESOURCE SENSITIVITY

A. Summary of Background Information

The Connecticut River was always an important travel corridor for early European settlers. Dutch explorer Adrien Block sailed upriver to the bottom of Enfield Rapids in 1614, the first serious obstacle for small sailing vessels, but no serious attempts at European settlement began on the river for almost another twenty years. The Dutch West India Company began a small trading post at later Hartford in 1623, completing a small fort a decade later on the eve of English settlement along the river from the Plymouth and Massachusetts Bay colonies. English settlers established a town at present Hartford in 1635, making it one of Connecticut's first three towns along with Wethersfield (1634) and Windsor (1635-36) within a large area of easily-worked Connecticut River Valley soils. Dutch settlers in Hartford were pushed out by the English c1654.

By the third quarter of the 17th century, Hartford encompassed some 86 square miles, including the present towns of West Hartford, East Hartford, and Manchester. Territory including East Hartford was acquired from Podunk leaders by c1640, and the Hockanum River quickly became a waterpower resource with the first sawmill and gristmill established on the stream c1639. Hartford obtained the Five Mile Tract, corresponding approximately to present Manchester, c1672-1682 from Uncas' son Joshua and his estate. Until the mid-18th century, English settlement in Hartford's eastern territories was limited primarily to the Main Street and Prospect Street sections of present East Hartford some distance west of the Project area, with some farmsteads established closer to the Project area near Willow Brook and along Burnside Avenue. Access to the Connecticut River allowed local farmers and merchants to participate in trade with the West Indies. Population grew to a point that Hartford's lands east of the Connecticut River became a separate parish or ecclesiastical society in 1694. The Five Mile Tract was quickly used for additional waterpower sites, with a sawmill established on Hop Brook in 1673, but the area remained common land until the first of three land divisions among proprietors in 1731 and there was little settlement in present Manchester until c1740. Some of the earliest development in the Five Mile Tract, which became Hartford's Orford Parish in 1772, occurred near the present Manchester Substation including a school built east of Olcott Street in 1751 (Goodwin 1886: Buckley 1973; Paquette 1976).

By the Revolution, the Hockanum River in present northeastern East Hartford had a number of mills making, processing, or finishing grains, lumber, paper, flaxseed oil, iron, and wool, with a powder mill built along the later border with Manchester c1775. Soon after American independence, Hartford east of the Connecticut River became the Town of East Hartford in 1783. Silk manufacture began within several years, and local manufacturers were able to take advantage of the loss of imports created by the Non-intercourse Act and the Embargo of 1806-1809. Further from good water transportation than the western section of East Hartford, industrial development in Orford Parish grew slowly c1775-1800, but included waterpowered paper and cotton mills on the Hockanum River and its tributaries, as well as the Pitkin glass works which operated under a state monopoly from 1783-1808. A paper mill opened by Charles Bunce in 1800 operated on Hop Brook upstream of the present Manchester Substation, probably south of West Center Street. Middle Turnpike was developed as part of the Boston Turnpike Company c1797, and the trail corresponding to Tolland Turnpike became part of the Hartford and Tolland Turnpike in 1801. The War of 1812 and a subsequent depression restrained growth in the original Town of East Hartford, but manufacturing began to expand again after c1820. With a population of approximately 1400, Orford Parish became the Town of Manchester in 1823 (Blodget 1792; Warren and Gillet 1812; Robbins 1886; Wood 1919; Buckley 1973; Paquette 1976).

Tobacco production was an important component of Manchester's economy from c1840-1850 until the 1930s, including fields at the north end of the project corridor. Initial completion of the Hartford, Providence, & Fishkill Road in 1849 from Hartford to Willimantic just north of the Hockanum enhanced the growth of the river's mills in East Hartford and Manchester; the railroad reached Providence and Waterbury by 1855, and after financial difficulties and absorption by the New York & New England Railroad, the line became part of the New York, New Haven & Hartford system in 1898. By the Civil War, several industrial villages had emerged in Manchester on the Hockanum River and Hop Brook, built around factories making paper, woolens, and, most notably, silk at the Cheney Brothers complex on Hop Brook. Population almost doubled

between 1840 and 1860. Residential and commercial development expanded considerably after 1880, with the town more than doubling to approximately 13,600 between 1880 and 1910. Paper mills near the present Manchester Substation on Hop Brook expanded until the third quarter of the 19th century, when two plants operated by the Bunce family succumbed to flooding and a third mill just north of West Center Street closed. The Great Depression shuttered many of the larger mills and factories, but suburban growth and highway construction after World War II led to an approximately 60% increase in population between c1945 and 1970, when the town had approximately 48,000 residents. The post-war landscape was heavily altered by highway construction beginning in the late 1940s (the beginnings of present I-84) and continuing through completion of I-384 in the early 1970s. The highways encouraged new commercial and industrial development, including businesses along and north of Tolland Turnpike near the project corridor (Woodford 1855; Baker and Tilden 1869; Robbins 1886; U.S. Geological Survey 1893, 1944-1994; Fairchild Aerial Survey 1934; Buckley 1973; Turner and Jacobus 1986).

Apart from a sewage disposal facility dating to the early 20th century, approximately 800 feet west of the Manchester Substation, most areas near the project corridor remained undeveloped and relatively undisturbed until after World War II. Residential or commercial construction on the roads traversing the corridor, and nearby on Hartford Road and Spencer/West Center streets was very limited c1850-1950, other than the construction of a schoolhouse in 1863 west of Olcott Street which replaced the 1751 school. The extant but now-closed Bunce School replaced the 1863 structure in the 1920s, and stands immediately south of the existing overhead electric transmission line (Woodford 1855; Baker and Tilden 1869; U.S. Geological Survey 1893, 1944; Fairchild Aerial Survey 1934; Buckley 1973; Rossano 1998).

B. Known or Potential Archaeological Resources

State site files reported one poorly-documented Euroamerican archaeological site within approximately 1 mile of the Manchester-Meekville Route, the Love Lane Site (Site 77-1) with 19th-century wells and irrigation pipes. Historical maps and other information suggest the undocumented site of Manchester's first schoolhouse, built in 1751 east of Olcott Road, might survive west of the Manchester Substation, although there has been no prior investigation of this area and soil conditions are unknown. Re-alignment of Olcott Road after 1952 may also have disturbed the site of the school. The Manchester-Meekville Route would begin on the east side of Manchester Substation, and is not expected to impact the possible school site area. No other Euroamerican archaeological resources are expected in or immediately adjacent to the project corridor (Buckley 1973; Woodford 1855; U.S. Geological Survey 1952, 1963/1994).

C. Historic Properties and Project Effects

1. Resource Identification

To evaluate possible visual effects as discussed in Section I.C.1 of the initial GSRP assessment (Raber 2007), historic properties listed on, or eligible for listing on, the National or State registers of historic places within 0.25 mile of the Meekville-Manchester Route were identified, based on:

- maps available with National Register of Historic Places nomination forms, State Register of Historic Places nominations or other materials, and townwide surveys of historic architectural or industrial resources
- lists with addresses of properties considered eligible for the National Register in townwide surveys of historic architectural or industrial resources
- a statewide inventory of many historic bridges (Historic Resource Consultants 1990, 1991)
- visual inspection as needed to confirm resource location or obtain photographic images
- aerial photographs (Fairchild Aerial Survey 1934; Center for Land Use Education and Research 2004)

There are no properties listed on the National or State registers within 0.25 mile of the project corridor. Based on a survey of historic resources in Manchester, one property eligible for National Register inclusion was identified slightly over 0.25 mile southwest of Manchester Substation: the c1835 Charles Bunce House (Figures 1 and 2; Rossano 1998).

2. Preliminary Identification of Resources Subject to Project Effects

Visual inspection and photographs indicate that views of Manchester Substation from the Charles Bunce House or the immediate vicinity are largely blocked by a commercial structure on the east side of Hartford Road, and by trees planted on the substation perimeter. Existing transmission structures near the substation, some over 100 feet high, are visible from the historic resource at distances of approximately 750-1500 feet. Visibility of these structures at 1400 feet appears very limited (Figures 2-4). The nearest proposed structure on the Manchester-Meekville Route would be approximately 1360 feet from the house, on a line intercepted by the commercial structure. Given the visual obstructions involved, no photographic simulations of proposed structures were attempted for this assessment. Existing conditions suggest that if new structures could be seen from the Charles Bunce House or its vicinity, conditions after proposed construction can be classified as Visibility with Non-Adverse Effect as discussed in Section I.C.1.a of the initial GSRP assessment (Raber 2007).

No other direct project effects are presently anticipated on significant historic properties along the Manchester-Meekville Route.

3. Possible Future Needed Actions

CL&P will continue to coordinate with SHPO regarding cultural resources and will perform further archaeological, engineering, and visual effect studies as necessary based on approved project design.

DOCUMENTARY SOURCES

Baker and Tilden

1869 *Atlas of Hartford City and County*. Hartford.

Blodget, William

1792 New and Correct Map of Connecticut...Middletown.

Buckley, William E.

1973 *A New England Pattern: The History of Manchester, Connecticut.* Chester, CT: Pequot Press.

Center for Land Use Education and Research, University of Connecticut, Storrs

2004 Connecticut Digital Orthophotos Beta Version. Available from World Wide Web: http://clear.uconn.edu/data.html

Clouette, Bruce, and Mary G. Harper

1997 Phase I Archaeological Reconnaissance Survey, Manchester Community-Technical College Master Plan, DPW Project No. BI-CTC-353-1. Report prepared for Connecticut Department of Public Works. Storrs: Public Archaeology Survey Team, Inc. Report on file as CHPC #714, Connecticut Historic Preservation Collection, Dodd Center, University of Connecticut, Storrs.

Cook, S.F.

1976 The Indian Population of New England in the Seventeenth Century. *University of California Publications in Anthropology* 12.

DeForest, John W.

1851 *History of the Indians of Connecticut from the Earliest Known Period to 1850*. Hartford: Wm. J. Hamersley.

Fairchild Aerial Survey

1934 Aerial survey of the State of Connecticut. Record Group 89, Records of the Department of Transportation. Connecticut State Archives.

Historic Resource Consultants

1990 Connecticut Historic Bridge Survey/Inventory-Phase Final Report: Project Narrative, Inventory and Recommendations. Report prepared for Connecticut Department of Transportation. Hartford.

1991 Connecticut Historic Bridge Inventory/Final Report: Preservation Plan. Report prepared for Connecticut Department of Transportation. Hartford.

Raber, Michael S.

2007 Historical and Archaeological Assessment of Connecticut Sections of the Connecticut Light & Power Company Greater Springfield Reliability Project. Report prepared for Burns & McDonnell Engineering Company, Inc. South Glastonbury, CT: Raber Associates. Report on file as CHPC #1628, Connecticut Historic Preservation Collection, Dodd Center, University of Connecticut, Storrs.

Robbins, Rev. S.W.
1886 Manchester, in J. Hammond Trumbull, ed., *The Memorial History of Hartford County, Connecticut 1633-1884*, Vol. II, pp. 243-66. Boston: Edward L. Osgood.

Rodgers, John, comp.
1985 Bedrock Geological Map of Connecticut. Hartford: Connecticut Department of Environmental Protection.

Rossano, Geoffrey
1998 Historic and Architectural Resource Survey of Manchester, Connecticut. Connecticut Historical Commission. Report on file, Connecticut Historic Preservation Collection, Dodd Center, University of Connecticut, Storrs.

Spiess, Mathias
1937 Podunk Indian Sites. *Bulletin of the Archaeological Society of Connecticut* 5: 9-11.

Spiess, Mathias, and Percy W. Bidwell
1924 *History of Manchester, Connecticut*. Centennial Commitee of the Town of Manchester.

Stiles, Henry R.
1891 *The History and Genealogies of Ancient Windsor, Connecticut, including East Windsor, South Windsor, Bloomfield, Windsor Locks and Ellington. 1635-1891*. 2 vols. Hartford: Case, Lockwood & Brainard Co. [1976 facsimile, Somersworth, NH: New Hampshire Publishing Co.]

Stone, J.R., *et al.*
1998 Quaternary geologic map of Connecticut and Long Island Sound basin. U.S. Geological Survey Open-File Report 98-371.

Turner, Gregg, and Melancthon W. Jacobus
1986 *Connecticut's Railroads...An Illustrated History*. Hartford: Connecticut Historical Society.

U.S. Department of Agriculture, Soil Conservation Service
1958 *Soil Survey, Hartford County, Connecticut*. Washington: Government Printing Office.

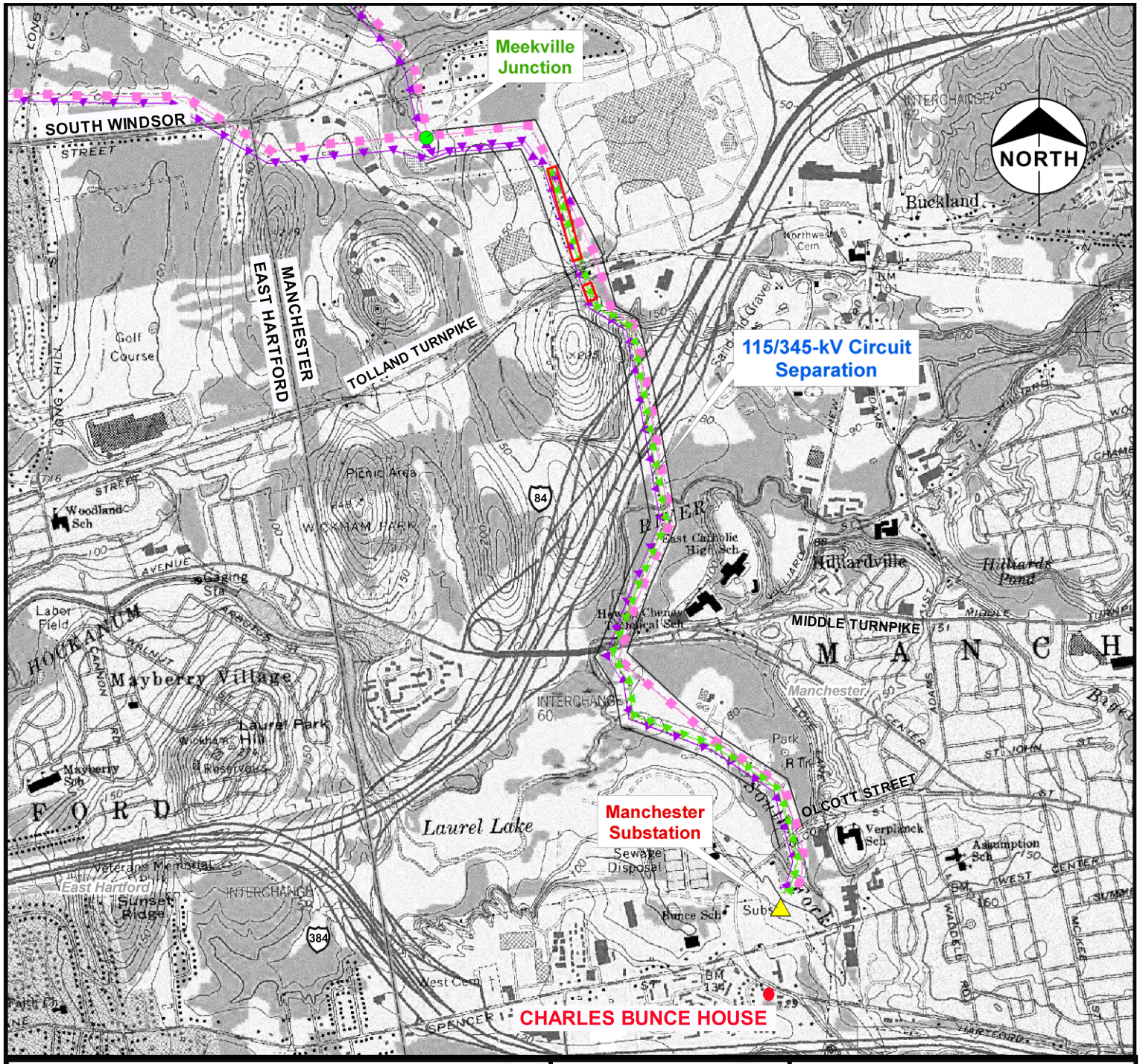
U.S. Geological Survey
1893 Hartford Sheet, in Topographical Atlas of the State of Connecticut.

1944,
1952,
1963/
1994 Manchester, Connecticut 7.5-Minute Quadrangle Sheet.

Warren, Moses, and George Gillet
1812 Connecticut, from Actual Survey, Made in 1811... East Windsor: Abner Reed.

Wood, Frederic J.
1919 *The Turnpikes of New England*. Boston: Jones.

Woodford, E.M.
1855 Smith's Map of Hartford County, Connecticut. Philadelphia: H. & C.T. Smith.



Legend

- Substation
- Junction
- 115-kV Improvements
- Existing 115-kV to Remain
- Existing 345-kV to Remain
- Route Sections Sensitive for Archaeological Resources
- CHARLES BUNCE HOUSE — Historic Resource Eligible for the National Register of Historic Places

Connecticut Light & Power

The Northeast Utilities System

Figure 1.
PROJECT LOCATION, CULTURAL RESOURCES & ARCHAEOLOGICAL SENSITIVITY

Base Map: USGS 7.5-Minute Manchester Quadrangle, Burs & McDonnell Engineering Co., Inc.

0 1,000 2,000 4,000 Feet

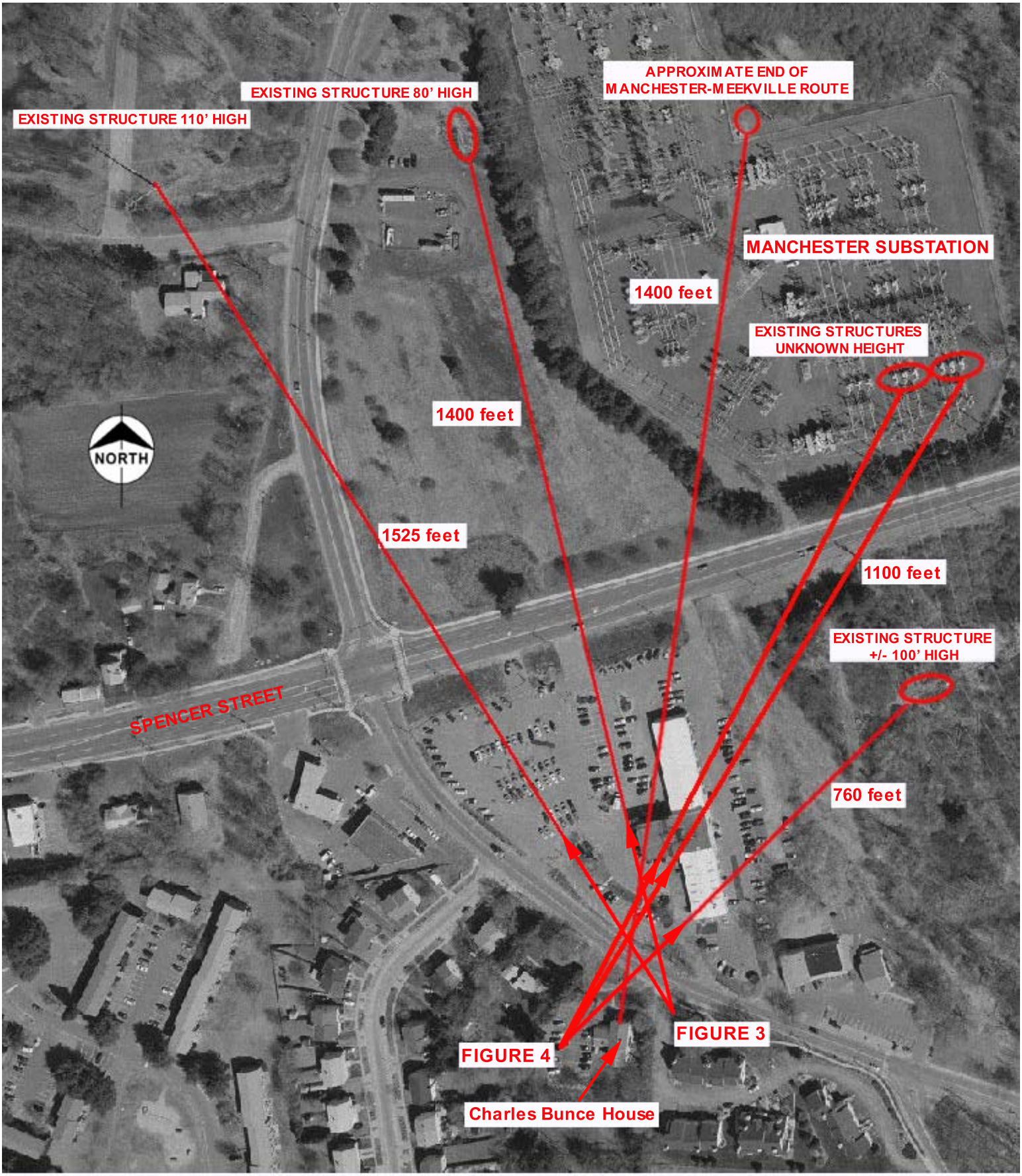


Figure 2. INDEX TO FIGURES 3-4
base image: Center for Land Use Education and Research 2004

0 200 ft.

Figure 3. MARCH 2008 VIEW NORTHWEST FROM CHARLES BUNCE HOUSE

Figure 4. JANUARY 2008 VIEW NORTHEAST FROM CHARLES BUNCE HOUSE