

**DRAFT ENVIRONMENTAL ASSESSMENT,  
FINDING OF NO SIGNIFICANT IMPACT, AND RECORD OF NON-  
APPLICABILITY**

**for the**

**INTERSTATE RELIABILITY PROJECT**

**PROPOSED TRANSMISSION LINE RIGHT-OF-WAY EXPANSION  
ACROSS MANSFIELD HOLLOW STATE PARK AND WILDLIFE  
MANAGEMENT AREA**

**Towns of Chaplin and Mansfield,  
Connecticut**

**November 2012**

**United States Army Corps of Engineers  
New England District  
696 Virginia Road  
Concord MA, 011742-2751**

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**DRAFT FINDING OF NO SIGNIFICANT IMPACT (FONSI)**

**FOR THE**

**GRANTING OF AN EASEMENT TO THE CONNECTICUT LIGHT AND POWER COMPANY  
FOR THE CONSTRUCTION, OPERATION, AND MAINTENANCE OF AN OVERHEAD  
ELECTRIC TRANSMISSION LINE ACROSS FEDERAL PROPERTIES IN THE MANSFIELD  
HOLLOW FLOOD CONTROL FACILITY**

**MANSFIELD AND CHAPLIN, CONNECTICUT**

The U.S. Army Corps of Engineers (USACE) proposes to grant to The Connecticut Light and Power Company (CL&P) additional easement rights, amounting to approximately 5 acres, to expand CL&P's existing right-of-way (ROW) on federal property to allow the construction, operation, and maintenance of a new 345-kilovolt (kV) overhead transmission line, parallel to CL&P's existing overhead 345-kV transmission line, across two segments of Federal property consisting of 0.9 mile in the Town of Mansfield (Tolland County, Connecticut) and 0.5 mile in the Town of Chaplin (Windham County, Connecticut).

CL&P's existing ROW and the additional 5-acre easement conveyance area are within 2,472 acres of Federal land surrounding Mansfield Hollow Dam and Mansfield Hollow Lake, which the USACE constructed in the 1950s to control flooding in the Thames River Basin. The two Federally-owned segments traversed by CL&P's ROW are among 2,300 acres leased by the USACE to the Connecticut Department of Energy and Environmental Protection (CT DEEP), which manages the property as Mansfield Hollow State Park, Mansfield Hollow Lake, and Mansfield Hollow Wildlife Management Area (WMA). The property is collectively referred to as "the Mansfield Hollow area".

Across the Mansfield Hollow area, CL&P's existing transmission line easement, which was granted by the USACE in the early 1970s, is only 150 feet wide. CL&P's existing overhead 345-kV transmission line is aligned within the center of this easement. The easement expansion will consist of an additional ROW width of 25 feet abutting (to the north) the existing 150-foot-wide ROW through the 0.9-mile segment in the Town of Mansfield (amounting to approximately 2.6 acres) and an additional 35-foot-wide ROW abutting (to the north) the existing 150-foot-wide ROW across the WMA in the Town of Chaplin (amounting to approximately 2.2 acres). This incremental expansion of the existing ROW easement will allow the new 345-kV transmission line to be installed parallel to the existing line, while maintaining mandatory clearances between conductors and vegetation and improving the critically needed reliability of the regional electric transmission system. The conveyance of the expanded easement rights and the

construction, operation, and maintenance of the new 345-kV line across the Federal properties are referred to herein as the “Proposed Action” or the “5-Acre Minimal ROW Expansion”

The new 345-kV transmission line, which will be constructed, operated, and maintained along or adjacent to the 5-acre expanded easement area, is part of the Interstate Reliability Project, which consists of new 345-kV transmission lines in northeast Connecticut, northwestern Rhode Island, and south-central Massachusetts, as well as related modifications and improvements to other transmission lines and electric substations and switching stations. The Interstate Reliability Project is needed to improve the bulk power transmission system in Southern New England and to achieve compliance with applicable national and regional electric reliability standards and criteria. CL&P is responsible for the Connecticut portion of the Interstate Reliability Project.

The USACE has completed a draft Environmental Assessment (EA) regarding the Proposed Action. The EA identifies and evaluates alternatives to the Proposed Action, supports the Proposed Action as the preferred alternative, and describes the potential impacts and the mitigation measures that will be implemented to protect, conserve, and enhance environmental and cultural resources on the affected Federal properties.

The draft EA was prepared pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 C.F.R. § 1500-1517). I find that based on the evaluation of environmental effects discussed in this EA, this Project is not a major Federal action significantly affecting the quality of the human environment. Under the CEQ NEPA regulations, “NEPA significance” is a concept dependent upon context and intensity (40 C.F.R. § 1508.27). When considering a site-specific action like the Proposed Action, significance is measured by the impacts felt at a local scale, as opposed to a regional or nationwide context.

The CEQ regulations identify a number of factors to measure the intensity of impact. These factors are discussed below and none are implicated here to warrant a finding of NEPA significance. A review of these NEPA “intensity” factors, as follows, reveals that the Proposed Action would not result in any significant impact, either beneficial or detrimental, to the human environment:

**Impacts on public health or safety:** The 5-Acre Minimal ROW Expansion will not have an adverse effect on public health or safety. During the construction of the proposed transmission line, heavy construction equipment, materials, and vehicles will be required to access and operate on the ROW through Mansfield Hollow State Park and WMA, across which several public hiking trails extend. In

addition, traffic on nearby state and local roads will increase, not only as a result of construction equipment movements, but also as construction workers drive to and from construction sites each work day. These increases will be highly localized, and will occur only during the time required to complete the installation of the new transmission line facilities within the Mansfield Hollow area.

CL&P will coordinate with the USACE, CT DEEP, the Connecticut Forest and Parks Association, and the towns of Mansfield and Chaplin to develop appropriate mitigation measures (e.g., signs, web site postings of construction schedule) for use during the construction period within the Mansfield Hollow area. These measures will be designed to provide for the safety of the public in general and of hikers using the trails during the construction period and to minimize potential effects on the recreational users, including children, of these resources.

**Unique characteristics:** The 5-Acre Minimal ROW Expansion will not affect wild and scenic rivers, the coastal zone, or historic resources; will have negligible effects on prime farmlands and farmlands of statewide importance; and minimal impacts to water resources and cultural resources. Avoidance and minimization measures will be implemented, as detailed in the EA, to mitigate impacts. Any construction work in water resources on the Federal lands will be performed in accordance with the conditions of the regulatory approvals that will be required from the USACE and the CT DEEP for the Interstate Reliability Project as a whole. The mitigation of direct impacts to wetlands as a result of the construction and operation of the new 345-kV transmission line on the Federally-owned lands in the Mansfield Hollow area will be incorporated into CL&P's Compensatory Mitigation Plan for the Connecticut portion of the Interstate Reliability Project. Further, construction activities in the Mansfield Hollow area will not commence until the Section 404 permit is issued by the USACE for the Interstate Reliability Project. To mitigate for temporary impacts from construction activities along the ROW in the Mansfield Hollow area, site-specific wetland enhancement activities, such as wetland invasive species control, will be undertaken along the ROW within the Mansfield Hollow area. These enhancement measures will be included as a Special Condition to the USACE Section 404 permit for the Interstate Reliability Project.

**Controversy:** The Proposed Action is not controversial and involves only an incremental (5 acre) expansion of CL&P's existing easement through the Mansfield Hollow area.

**Uncertain impacts:** The impacts of the Proposed Action are not uncertain, but rather are well-defined and readily understood, based on the use of the existing CL&P easement for overhead

transmission line operation over the past 40 years and on the specified procedures, as defined in the EA, for using the 5-acre easement expansion area to construct, safely operate, and maintain the new 345-kV overhead transmission line.

**Precedent for future actions:** The proposed 5-acre real estate easement expansion is in response to a specific request from CL&P and has been carefully evaluated. This 5-Acre Minimal ROW Expansion will not establish a precedent for future actions.

**Cumulative significance:** The 5-Acre Minimal ROW Expansion is needed to safely accommodate the construction of an additional row of 345-kV utility structures and is located adjacent to the existing CL&P transmission line ROW through federal property. The impacts that will occur from the construction and operation of the Project on ecosystems, cultural resources, and communities have been minimized. No additional cumulative impacts are anticipated as a result of the expanded lease.

**Historic resources:** Both research and field investigations were conducted to identify and assess archaeological and historic resources in the Project area. These investigations were performed after consultation and agreement with the USACE and the Connecticut State Historic Preservation Officer (SHPO) regarding Project-specific survey protocol. In addition, field reconnaissance of the Project area was performed with representatives of the involved Native American Tribes. The Project will not have an adverse effect on any standing historic resources. Additional studies will be conducted of three archaeological sites to determine potential eligibility for the National Register of Historic Places (NRHP). The archaeological sites, if found to be NRHP-eligible, and areas of concern or interest to Native American Tribal representatives will be avoided or protected during Project construction. Specific avoidance and protective measures, as well as data recovery protocols if required for the archaeological sites, will be incorporated into a Historic Resources Management Plan that will be developed by CL&P as part of the Section 106 consultation for the Project that will be completed under the Section 404 permitting process for the Interstate Reliability Project. The USACE will review this mitigation program for conformance to the National Historic Preservation Act as part of the Section 404 process.

**Endangered species:** The Proposed Action will have no negative impacts on any Federal-listed threatened or endangered species.

**Potential violation of federal law:** The Proposed Action is located on Federal property and will not violate Federal law.

Based on my review and evaluation of the environmental effects as presented in the Environmental Assessment, I have determined that the real estate grant of conveyance of approximately 5 additional acres to CL&P for the expansion of an existing utility easement in the Mansfield Hollow area is not a major federal action significantly affecting the quality of the human environment. Therefore, I have determined that this Proposed Action is exempt from requirements to prepare and Environmental Impact Statement.

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Date

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CHARLES P. SAMARIS  
Colonel, Corps of Engineers  
District Engineer

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## 1.0 INTRODUCTION

### 1.1 PROJECT PURPOSE AND NEED

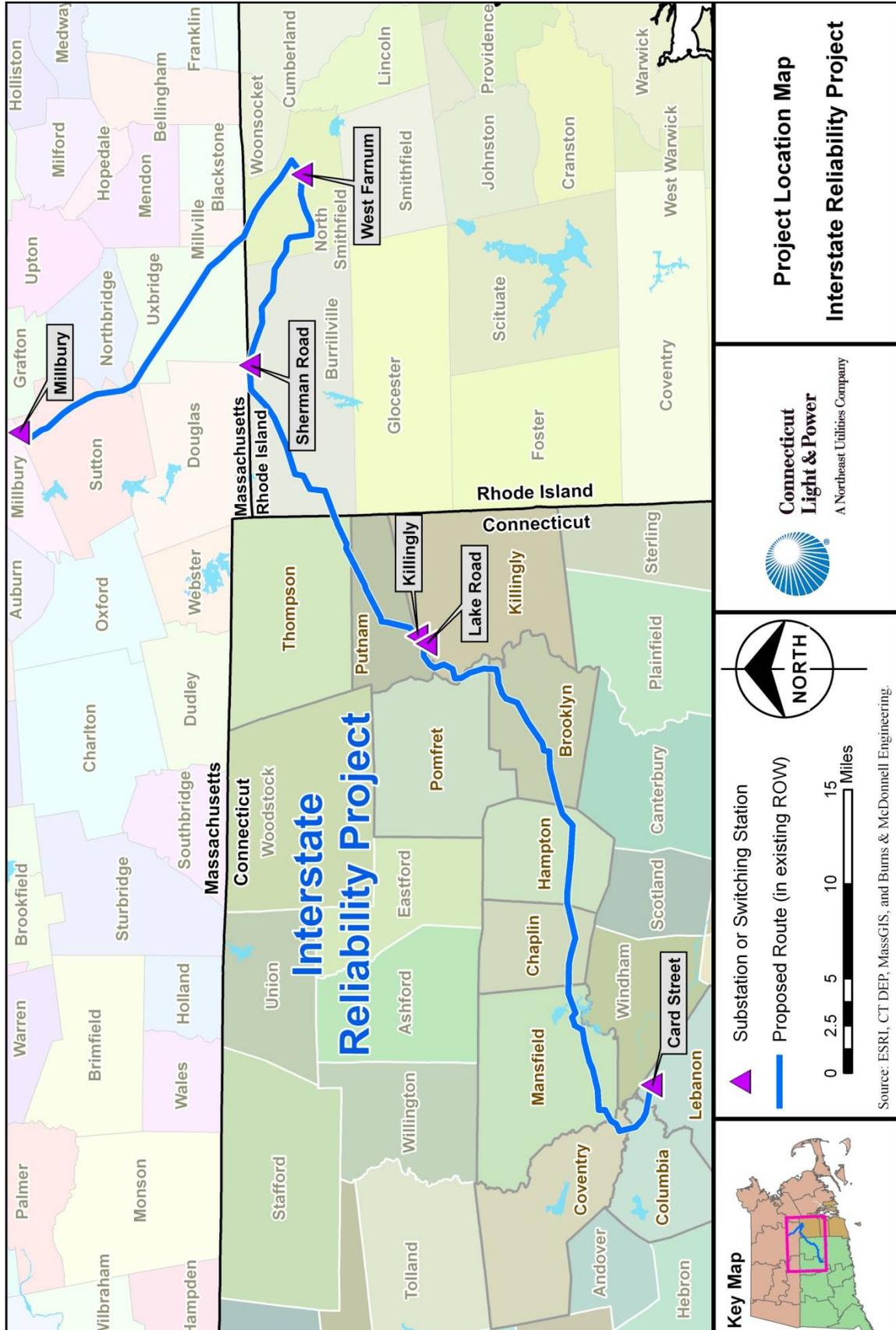
The Connecticut Light and Power Company (CL&P), a wholly-owned subsidiary of Northeast Utilities (NU), along with The Narragansett Electric Company and New England Power Company, both of which are wholly-owned subsidiaries of National Grid USA (National Grid), propose to construct, operate, and maintain new 345-kilovolt (kV) electric transmission lines and to make related modifications and improvements to existing 345-kV and 115-kV transmission lines, switching station, and substation facilities in northeastern Connecticut, northwestern Rhode Island, and south-central Massachusetts. These proposed electric transmission system improvements are referred to as the Interstate Reliability Project (the Project).

The Project will improve the bulk power electric transmission system in Southern New England and achieve compliance with applicable national and regional reliability standards and criteria. It also will increase the capability of the regional transmission system to move power into Connecticut from the rest of New England, to move power from resources in eastern New England to load in western New England, and to move power from resources in western New England to load in eastern New England. When the electric system is under stress, such transfers are needed to maintain continuity of service. The Independent System Operator – New England (ISO-NE), which is responsible for planning the New England region's electric transmission system, has determined that such upgrades are needed.

Overall, the Project will entail the development of approximately 75 miles of new 345-kV overhead transmission lines, as well as modifications to two existing substations (Card Street Substation in Connecticut and West Farnum Substation in Rhode Island) and two existing switching stations (Lake Road Switching Station in Connecticut and Millbury No. 3 Switching Station in Massachusetts). In addition, National Grid will develop a new switching station in Rhode Island and the new 345-kV line will pass through, but will not electrically connect, the Killingly Substation in Connecticut. CL&P will construct, own, and operate the Project facilities in Connecticut, whereas National Grid will construct, own, and operate the Project facilities in Rhode Island and Massachusetts.

Figure 1-1 illustrates the location of the Project.

Figure 1-1: Interstate Reliability Project: Proposed 345-kV Transmission Line Location



## 1.2 PROJECT LOCATION

### 1.2.1 Summary of the Proposed Project in Connecticut

The Project facilities that CL&P proposes to construct, operate, and maintain in Connecticut will consist of approximately 36.8 miles of 345-kV overhead electric transmission lines, as well as related modifications to associated facilities, including improvements to the Card Street Substation and the Lake Road Switching Station. One new 345-kV transmission line (referred to as the 3271 Line) will extend from CL&P's existing Card Street Substation in the Town of Lebanon (Tolland County) to CL&P's existing Lake Road Switching Station in the Town of Killingly (Windham County). A second new 345-kV transmission line (referred to as the 341 Line) will extend from Lake Road Switching Station, past Killingly Substation (also in the Town of Killingly), to the Connecticut/Rhode Island state border (in the Town of Thompson), where the CL&P transmission line will connect with a new 345-kV line section to be constructed and operated by National Grid.

Pursuant to federal guidelines<sup>1</sup>, CL&P proposes to locate each new 345-kV transmission line within or adjacent to existing linear transmission line rights-of-way (ROWs). Such collocation typically minimizes adverse environmental effects, compared to the creation of an entirely new linear transmission corridor. Between Card Street Substation, Lake Road Switching Station, Killingly Substation, and Connecticut/Rhode Island state border, CL&P already operates 345-kV overhead transmission lines (presently designated as the 330, 3348, and 347 Lines). These existing 345-kV lines were constructed in the early 1970s and, at that time, connected Card Street Substation directly to National Grid's Sherman Road Switching Station in Rhode Island. The existing 345-kV lines, which along certain ROW segments also are collocated with other overhead transmission lines (e.g., 69 kV and 115 kV) and distribution lines (23 kV), occupy a CL&P utility easement<sup>2</sup> that typically varies in width from 300 to 400 feet.

To allow the safe operation of the existing overhead 345-kV and 115-kV transmission lines, CL&P manages portions of the easement in non-woody vegetation, in conformance with mandatory federal and industry standards for clearances between the transmission line conductors and vegetation. The width of the vegetatively managed portion of the easement varies depending on the locations of the existing transmission lines within the ROW, but generally averages 140 feet.

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<sup>1</sup> The Federal Energy Regulatory Commission (FERC) *Guidelines for the Protection of Natural, Historic, Scenic, and Recreational Values in the Design and Location of Rights-of-Way and Transmission Facilities*, Order 414, November 27, 1970.

<sup>2</sup> As used in this document, "easement" typically refers to the linear corridor within which CL&P has rights to install and maintain transmission lines. The terms "ROW" and "easement" are generally used interchangeably.

Although various transmission system and routing options were identified and evaluated, new 345-kV transmission lines were determined to be the optimal solution for addressing the electric system reliability needs in Southern New England. The Project is the preferred solution and represents the culmination of these alternatives analyses. In Connecticut, CL&P proposes to locate the new 345-kV transmission lines along the existing 330, 3348 and 347 Line ROWs (this is referred to as the “Proposed Route”). The environmental and engineering studies that CL&P conducted indicate that a new 345-kV line can be located parallel to these existing 345-kV lines, within the unutilized portion of the 300- to 400-foot-wide existing utility easement.

The only areas in Connecticut where the proposed 345-kV transmission lines cannot be effectively located within this existing easement are along two segments, totaling approximately 1.4 miles, in the towns of Mansfield (0.9 mile) and Chaplin (0.5 mile) in Tolland and Windham counties, respectively. Through these segments, which consist of property owned by the federal government under the auspices of the U.S. Army Corps of Engineers (USACE), CL&P’s existing transmission line easement is only 150 feet wide. CL&P’s existing overhead 345-kV transmission line (i.e., the 330 Line) is aligned within the center of this easement. The USACE leases the property to the Connecticut Department of Energy and Environmental Protection (CT DEEP), which manages the property as Mansfield Hollow State Park, Mansfield Hollow Lake, and Mansfield Hollow Wildlife Management Area (WMA). These two federally-owned segments, which are separated by a 0.8-mile section of privately-owned, 300-foot-wide ROW, are collectively referred to in this document as “the Mansfield Hollow area”.

To accommodate a new 345-kV transmission line adjacent to the existing 330 Line across the Mansfield Hollow area segments (while maintaining clearances from conductors and vegetation and avoiding the need for electrical outages), CL&P requests that the federal government grant a conveyance of expanded easement rights. This conveyance will allow the construction, operation, and maintenance of the new 345-kV transmission line, within a slightly expanded ROW, parallel to and north of the existing 330 Line, across the approximately 1.4 miles of federally-owned lands in the Mansfield Hollow area. This incremental expansion of the existing ROW will provide a cost-effective approach for achieving the Project’s objective of providing the best solution for improving the critically needed reliability of the regional electric transmission system. CL&P requests a total of approximately 5 acres of additional easement from the USACE for this purpose.<sup>3</sup>

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<sup>3</sup> The approximately 5 acres of proposed ROW expansion is estimated based on currently available data. Detailed field surveys will be completed to verify the specific acreage of the easement expansion area..

### 1.2.2 History of the Existing Utility ROW on Federal Property in Mansfield Hollow

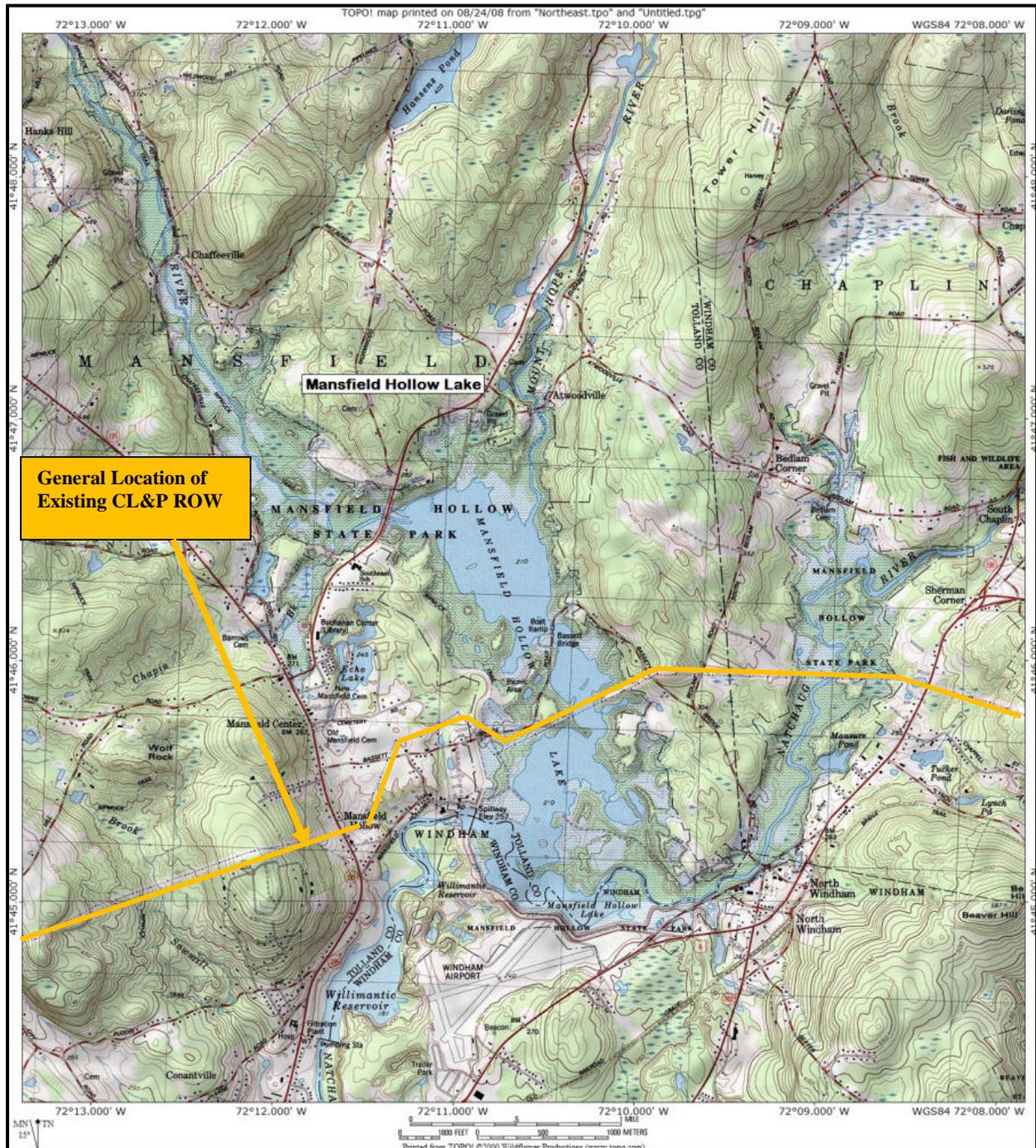
In the Mansfield Hollow area, the federal government owns approximately 2,472 acres of property. The property was acquired approximately 60 years ago to allow the construction of the Mansfield Hollow Dam at the confluence of the Natchaug, Fenton, and Mount Hope rivers. The purpose of the dam, which was completed in 1952, is to control and reduce flooding in communities within the Thames River Basin by controlling water flows on upstream tributaries in Massachusetts and Connecticut. The 460-acre Mansfield Hollow Lake was created as a result of the dam. The federally-owned properties surround the dam and lake, extending south into the Town of Windham, as well as north and east along both sides of the Natchaug, Fenton, and Mount Hope rivers. Figure 1-2 generally illustrates the extent of the lake and associated federally-owned properties, as well as the surrounding topography.

Although the federal lands in Mansfield Hollow are administered by the USACE, approximately 2,300 acres are leased to and managed by the CT DEEP for a variety of outdoor recreational purposes. These leased areas, which encompass Mansfield Hollow Lake (450 acres) and consist of Mansfield Hollow State Park (251 acres) and Mansfield Hollow WMA (2,012 acres), are used year-round for various recreational activities, such as fishing, hunting, biking, boating, hiking, camping, cross-country skiing, dog training, and nature viewing. CL&P's existing 345-kV transmission line ROW traverses the south-central portion of the Mansfield Hollow property, crossing federal lands leased to the CT DEEP in two locations (referred to in this document as follows, and illustrated on Figure 1-3):

- Segment 1: An approximately 0.9-mile segment of CL&P's existing transmission line ROW traverses Mansfield Hollow State Park, including an approximately 600-foot span of Mansfield Hollow Lake, as well as portions of the WMA (Town of Mansfield, Tolland County); and
- Segment 2: CL&P's existing transmission line ROW traverses a second portion of the WMA for approximately 0.5 mile across and in the vicinity of the Natchaug River (Town of Chaplin, Windham County).

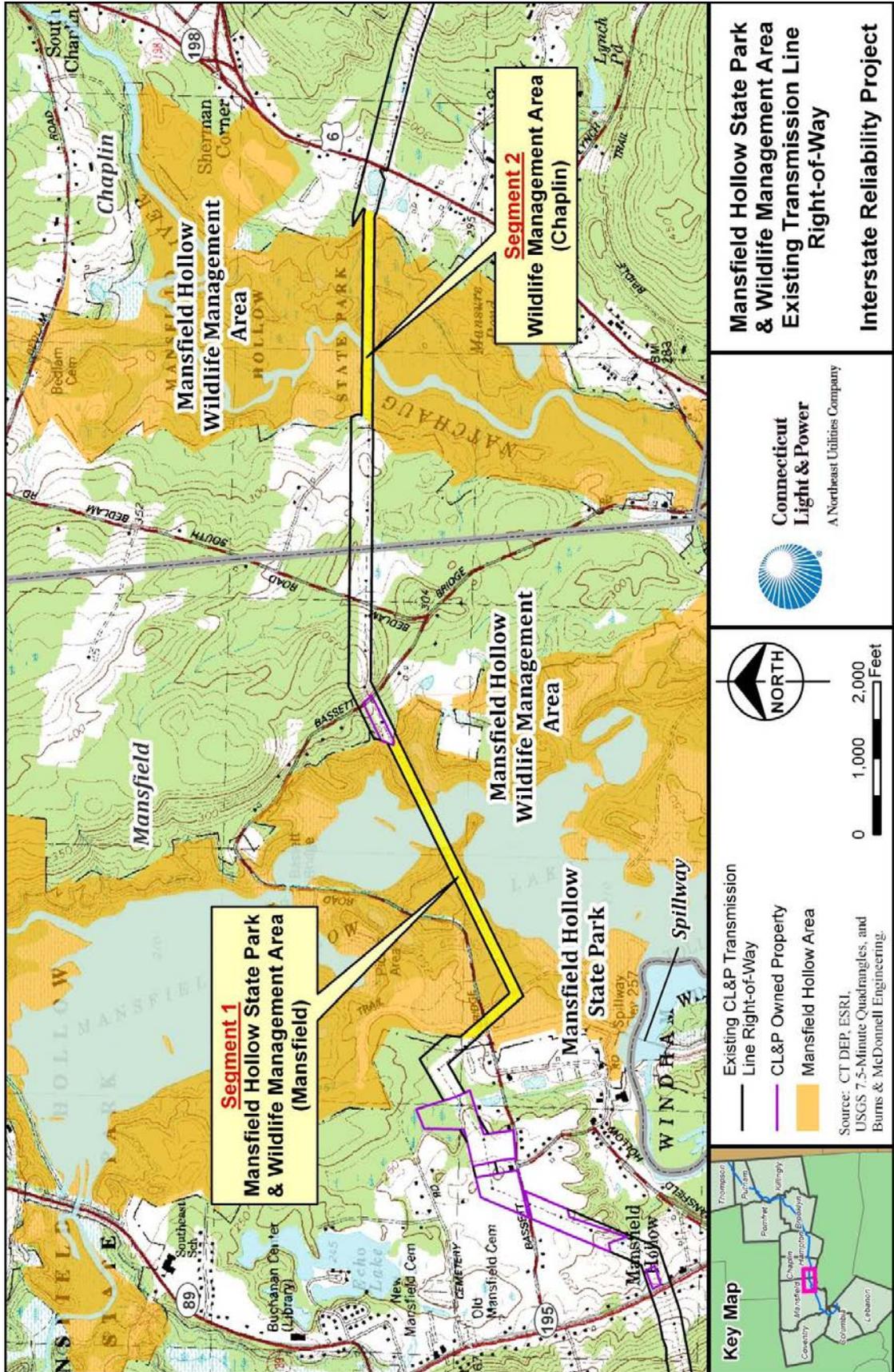
These two segments are separated by an approximately 0.8-mile section of ROW across privately-owned property (including parcels owned by CL&P) in the towns of Mansfield and Chaplin. Along this section of ROW, which extends generally from Bassetts Bridge Road in Mansfield to near Shuba Lane in Chaplin, the existing 300-foot-wide ROW will not require expansion to accommodate the proposed 345-kV transmission line. In addition, along this 0.8-mile privately-owned section, CL&P owns in fee an approximately 600-foot-long portion of the ROW between the eastern boundary of the WMA in Mansfield and Bassetts Bridge Road.

**Figure 1-2: General Location of CL&P ROW and Mansfield Hollow Area USACE-Owned and CT DEEP-Leased Recreational Lands: Tolland and Windham Counties**



Note: Although this USGS map identifies lands in the vicinity of the Natchaug River as part of Mansfield Hollow State Park, this area is actually part of the Mansfield Hollow WMA (refer to Figure 1-3).

Figure 1-3: Location of Existing CL&P ROWs across the Mansfield Hollow Area Federally-Owned Properties: Segments 1 and 2



Appendix A.1 includes aerial photography-based segment mapsheets, at a scale of 1"=400'<sup>4</sup> that illustrate the location of the proposed 345-kV transmission line through the Mansfield Hollow area, including the approximately 1.4 miles of federally-owned properties and the 0.8-mile section of privately-owned land in between. These mapsheets depict the boundaries of federally-owned properties (Segments 1 and 2), and generally identify the proposed location of the 345-kV transmission line in relation to CL&P's existing 330 Line and to environmental resources.

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<sup>4</sup> Aerial mapsheets have been prepared for the entire 36.8-mile Connecticut portion of the Project, as well as the Rhode Island and Massachusetts portions of the Project. The mapsheets included in Appendix A pertain to the Mansfield Hollow area only.

## 2.0 PROPOSED ACTION (PROJECT DESCRIPTION)

### 2.1 EXISTING AND PROPOSED FACILITIES

As part of the 36.8-mile Connecticut portion of the Project, CL&P proposes to own, construct, operate, and maintain approximately 1.4 miles of new overhead 345-kV transmission line facilities (consisting of structures, circuits, and conductors) within the federally-owned Mansfield Hollow properties (i.e., Segments 1 and 2). These new facilities will be aligned north of and parallel to CL&P's existing overhead 345-kV transmission line (the 330 Line), which was installed on the existing 150-foot-wide easement through the Mansfield Hollow area in the early 1970s and has operated continuously since then. The approximately 1.4 miles of ROW across the federally-owned property, representing the only locations where the new 345-kV transmission lines cannot be accommodated within CL&P's existing easement, account for approximately 4% of the total Connecticut portion of Project.

CL&P's existing 345-kV line across the Mansfield Hollow State Park and WMA in Mansfield (i.e., Segment 1) is supported on steel "Delta" configuration monopole structures with an average height of 115 feet above ground, whereas the existing 345-kV line through the WMA in Chaplin (i.e., Segment 2) is configured on wood-pole H-frame structures with an average height of 75 feet above ground. Cross-sections (XS) illustrating the existing 345-kV transmission line structure types and placement within the ROW along Segments 1 and 2 are included in Appendix A.2 (refer to XS-3 and XS-5<sup>5</sup>). Table 2-1 summarizes the characteristics of CL&P's existing ROW across the Mansfield Hollow area. Within the 0.8-mile section of 300-foot-wide ROW across privately held property between Segments 1 and 2, the existing 330 Line is supported on wood-pole H-frames that typically average 85 feet in height.

CL&P requests from the USACE a total of approximately 5 acres of additional easement and proposes to support the new 345-kV overhead transmission line on steel-monopole structures with vertically-configured conductors. This configuration is referred to as the "5-Acre Minimal ROW Expansion" or the "Proposed Action". The design and appearance of the proposed structures, as well as the additional easement width that CL&P requests from the USACE (refer to the discussion in Section 2.2), are depicted on XS-3 and XS-5 in Appendix A.2. Within both Segment 1 and Segment 2, the new 3271 Line will be aligned near the northern edge of the expanded ROW. As summarized in Table 2-2, the new steel-monopole structures along Segment 1 will range from 130 to 155 feet in height, while through Segment 2, the 3271 Line's steel-pole structures will be 115 to 135 feet tall.

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<sup>5</sup> The CL&P portion of the Project includes 15 ROW segments; of these, XS-3 and XS-5 depict Segments 1 and 2, respectively, in the Mansfield Hollow area.

**Table 2-1: Summary of Existing Characteristics: 1.4 Miles of 150-Foot-Wide ROW along Segments 1 and 2**

Characteristic	150-Foot-Wide ROW Segments across Federally-Owned Property	
	Segment 1	Segment 2
Town	Mansfield	Chaplin
Length across Federal Lands	0.9 mile	0.5 mile
Principal Land Uses Traversed	<ul style="list-style-type: none"> <li>• Mansfield Hollow State Park, including Red Trail hiking path and trail on top of levee system associated with Mansfield Hollow Dam</li> <li>• Mansfield Hollow Lake (600-foot span)</li> <li>• Mansfield WMA, including the Nipmuck Trail (East Branch), a Connecticut Forest &amp; Park Association Blue-Dot Trail</li> </ul>	<ul style="list-style-type: none"> <li>• Mansfield Hollow WMA</li> <li>• Natchaug River (No public access to this area except via river)</li> </ul>
Existing Line Structure Appearance	Steel-Pole Delta Structure height range = 106 - 137 feet	Wood-Pole H-Frame Structure height range = 73 – 81 feet
Existing Structure Locations within ROW	Center	Center
Number of Existing 330 Line Structures along Segment / (Structure No. <sup>a</sup> )	6 (9081 to 9086)	5 (9095 to 9099)
Existing Width (Typical) of CL&P-Managed Portions of ROW (Scrub-shrub Vegetation)	100 feet	140 feet
Existing Location / Approx. Width of Vegetation Not Managed within ROW	25 feet (south) 25 feet (north)	5 feet (south) 5 feet (north)
Public Road Access near ROW Segments across Federal Lands	Bassetts Bridge Road (two locations; west and east of Mansfield Hollow Lake).  Note: East of Mansfield Hollow Lake and outside of the federal lands, CL&P-owned property abuts Bassetts Bridge Road on the west. The transmission line ROW extends across this CL&P-owned property to the WMA.	South Bedlam Road (west)  U.S. Route 6 (Willimantic Road) (east)

Note:

(a.) Structure numbers are identified on the aerial mapsheets in Appendix A.

**Table 2-2: Comparison of Structure Types and Heights: Existing 330 Line and Proposed New 3271 Line (5-Acre Minimal ROW Expansion)**

Existing 330 Line				New 3271 Line			
Structure No.	Height (feet)	Base Elevation (feet)	Structure Type	Structure No.	Height (feet)	Base Elevation (feet)	Structure Type
<b>Segment 1</b>				<b>Segment 1</b>			
9081	117	252.5	Delta Tangent	82	150	253.5	Vertical Strain
9082	137	258.2	Vertical Deadend	83	130	258.0	Vertical Deadend
9083	117	235.1	Delta Tangent	84	150	233.9	Vertical Tangent
9084	106	262.2	Delta Tangent	85	130	262.1	Vertical Tangent
9085	111	256.0	Delta Tangent	86	150	261.0	Vertical Tangent
9086	116	255.0	Delta Tangent	87	155	256.2	Vertical Tangent
<b>0.8-mile Privately-Owned ROW Segment</b>				<b>0.8-mile Privately-Owned ROW Segment</b>			
9087	103	267.9	H-Frame Tangent	88	160	268.2	Vertical Tangent
9088	81	354.1	3-Pole Deadend	89	95	364.6	3-Pole Running Angle
9089	83	339.8	H-Frame Tangent	90	80	346.3	H-Frame Tangent
9090	86	297.7	H-Frame Tangent	91	85	299.1	H-Frame Tangent
9091	86	283.4	H-Frame Tangent	92	85	295.0	H-Frame Tangent
9092	86	283.2	H-Frame Tangent	93	80	291.3	H-Frame Tangent
9093	75	297.2	H-Frame Tangent	94	65	299.5	H-Frame Strain
9094	68	275.4	H-Frame Tangent	95	110	272.8	Vertical Tangent
<b>Segment 2</b>				<b>Segment 2</b>			
9095	81	247.1	H-Frame Tangent	96	115	247.4	Vertical Tangent
9096	77	281.7	H-Frame Tangent	97	115	281.1	Vertical Tangent
9097	73	255.1	H-Frame Tangent	98	120	251.8	Vertical Tangent
9098	80	250.3	H-Frame Tangent	99	120	248.6	Vertical Tangent
9099	75	260.0	3-Pole Running Angle	100	135	259.1	Vertical Strain

## Notes:

- For illustrations of typical H-frame and steel-pole (i.e., delta, vertical) structures, refer to Appendix A.2.
- Along Segment 1, six new steel- monopole structures will be installed generally parallel to the six existing 330 Line monopole structures. Similarly, along Segment 2, five new steel-monopole structures will be installed generally parallel to the existing 330 Line's H-frames structures.

## **2.2 LAND REQUIREMENTS**

### **2.2.1 Proposed ROW Expansion**

To construct, operate, and maintain the new 345-kV line adjacent to the existing 330 Line across the federally-owned Mansfield Hollow properties, CL&P will require from the USACE a grant of approximately 5 acres of additional easement. This represents the minimal additional easement (ROW) required to allow the development of the new transmission line adjacent to the existing 330 Line, and assumes that the new structures will be steel monopoles with vertically-configured conductors.

The proposed easement expansion (i.e., the 5-Acre Minimal ROW Expansion) will consist of an additional ROW width of 25 feet adjacent to the existing 150-foot-wide ROW through the 0.9-mile Segment 1 (across the state park, lake, and WMA lands in the Town of Mansfield), and an additional 35-foot-wide ROW adjacent to the existing 150-foot-wide ROW across the WMA in the Town of Chaplin (Segment 2). The reason for the difference in the proposed ROW expansion widths along the two segments is that the new steel monopoles along Segment 1, placed parallel to the existing 330 Line's steel Delta monopoles, will have a narrower "footprint" than the new steel monopoles placed parallel to the existing (wider) existing H-frame structures along Segment 2. The taller monopole structures of the existing 330 Line through Segment 1 were designed and painted (sky blue), pursuant to input from the State of Connecticut during that line's approval process.

For the Project, the proposed structure configuration and ROW expansion in the Mansfield Hollow area were determined based on engineering design analyses, constructability reviews, and input from agency and public consultations. The proposed 5-acre ROW expansion takes into consideration the limits of the existing 150-foot-wide ROW, the location of the existing 330 Line within that ROW, and the additional width that will be required to construct, maintain, and safely operate the new 345-kV line, using the proposed vertically-configured steel-monopole structures, while conforming to national and state safety code requirements.

### **2.2.2 Temporary Staging Areas, Conductor Pulling Sites, and Access Roads**

To construct the Project within the Mansfield Hollow area, temporary access roads, work pads, guard-structure pads and conductor pulling sites will be required along the ROW. A total of 14 temporary work pads and one temporary work pad for a temporary guard structure will be located within or partially within federal property. (A guard structure is a pole or a bucket-truck vehicle that is positioned temporarily adjacent to road or other crossings to assist in holding the conductors above the crossing

during conductor (wire) stringing. Such guard structures are only required temporarily during conductor stringing operations.)

Existing access roads along the ROW also will need to be improved and, in some locations, new temporary access roads will be required. CL&P proposes to confine all temporary work sites, access roads, conductor pulling sites, and other activities associated with the construction of the new 345-kV transmission line to the existing 150-foot-wide easement and the additional 5-acre easement expansion area, except for the following:

- At the Bassetts Bridge Road crossing in Mansfield Hollow State Park, the road grade is higher than the ROW. As a result, significant temporary fill (e.g., gravel) would be required to develop a safe temporary access road along the ROW in this area. Therefore, to allow construction equipment to more easily access the ROW from Bassetts Bridge Road, CL&P requests from the USACE a temporary easement for the development and use of temporary access roads on either side of Bassetts Bridge Road. The proposed temporary access roads, which will be removed after the completion of construction, are illustrated on mapsheet 2 in Appendix A.3.
- During construction, any trees located outside the existing and expanded easement that pose a danger to the integrity of the new transmission line will have to be removed in accordance with mandatory safety standards for overhead transmission line operation. Such “danger trees” typically cannot be identified until the construction or operational phases of the Project. “Danger tree” removal will be coordinated with the USACE’s Mansfield Hollow Project Manager.
- Three temporary conductor pulling sites, which will be used to stage the installation of the overhead line conductors and shield wires on the transmission structures, will be required within the Mansfield Hollow area. Such pulling sites are needed to accommodate the specialized equipment that must be used to install the wires on the structures and to pull the wires into place under tension to avoid contacting the ground or other objects. Conductor pulling site locations are typically 50 to 75 feet wide and 100 to 200 feet long, and are determined based on accessibility, terrain, and transmission line structure characteristics (e.g., angles, dead end structures).

The temporary on- and off-ROW access roads, work pads, guard-structure pads, and pulling site pads will be removed during the final phase of construction. Areas impacted by these temporary facilities will be restored.

### **2.3 CONSTRUCTION PROCEDURES**

CL&P will construct the proposed 345-kV transmission line through the federally-owned Mansfield Hollow properties using the same basic procedures as detailed for the rest of the overhead transmission line. Descriptions of such construction procedures are presented in CL&P’s Project Application to the Connecticut Siting Council (Council or CSC) for a Certificate of Environmental Compatibility and Public

Need (CSC Docket 424; submitted December 23, 2011; refer to Volume 1, Section 4, Construction Procedures). The CSC Application is incorporated by reference in this document and can be viewed on the CSC's website at <http://www.ct.gov/csc/site/default.asp> or on CL&P's (NU's) website at <http://www.transmission-nu.com/residential/projects/IRP/default.asp>.

CL&P will construct the new 345-kV transmission line along the ROW on the 1.4 miles of federal properties using standard overhead transmission line installation procedures, involving several stages, some overlapping in time. Construction activities will be managed and staged from temporary field offices and equipment / material storage yards, which will be established in the Project vicinity, but outside of the federally-owned properties in the Mansfield Hollow area. Because the new 345-kV transmission line will be installed adjacent to the live (in-service) 345-kV line, safety considerations are of primary importance during all phases of construction.

The following summarizes the primary activities, materials, and equipment generally expected to be involved in the construction of the new overhead 345-kV transmission line through the Mansfield Hollow area:

- Survey and stake the ROW boundaries, vegetation removal limits, and proposed structure locations.
- Mark the boundaries of previously-delineated wetland and watercourses along the ROW.
- Identify and mark areas to be avoided, including sensitive cultural or environmental resource areas, such as wetlands and watercourses. (Note: Through the Mansfield Hollow area, the only water resources that will be affected by construction activities are located along the 0.5-mile Segment 2 ROW in Chaplin. Both Mansfield Hollow Lake and the Natchaug River will be spanned; no in-water activities will occur within these waterbodies, although some trees will be trimmed or removed adjacent to these waterbodies.)
- Install erosion and sedimentation controls in accordance with best management practices (BMPs). Controls will be deployed using pickups, other small trucks, or small tracked vehicles. Erosion and sedimentation controls will typically be installed in conjunction with vegetation removal, depending on site-specific characteristics. Specifically, soil erosion and sedimentation controls typically are installed around work limits (e.g., access roads, work pads) in or near wetlands and streams.
- Remove vegetation. To construct the new transmission line along the ROW in Segments 1 and 2, vegetation will be removed along the northern portions of the ROW / expanded ROW as illustrated on the 1"=100' maps in Appendix A.3 and summarized as follows:

- Along Segment 1, woody vegetation will be removed along a 50-foot-wide area (encompassing both the 25-foot-wide portion of the existing 150-foot-wide ROW that is not presently managed and the 25-foot-wide expanded easement area).
- Along Segment 2, woody vegetation will be removed along a 40-foot-wide area (including the 5-foot-wide portion of the existing ROW that is not presently managed and the 35-foot-wide expanded easement area).

(Notes: (1.) Scrub-shrub vegetation along the ROW on the slopes adjacent to Mansfield Hollow Lake and abutting the Natchaug River will not have to be removed because no new structures will be installed in these areas. Instead, in these areas, tree removal or trimming will be performed as required to conform to conductor separation specifications in overhead transmission line standards. (2.) Existing woody vegetation within the southern portion of the existing ROW (i.e., the un-managed portions of the existing ROW adjacent to and south of the existing 330 Line), will not be cleared as part of the Project.

Within the ROW, vegetation also will be removed from areas that contain incompatible, tall-growing, woody species that could grow to interfere with the operation of the proposed transmission line should they not be removed. In general, vegetation will be removed to the designated limits of vegetation removal, including at work pads, as well as along existing or new access roads. Vegetation also will be removed, as necessary, along existing or new access roads located within the ROW (but outside the designated limits of clearing). Grassland vegetation also will be affected along the two short off-ROW access roads adjacent to Bassetts Bridge Road (refer to mapsheet 2 in Appendix A.3). In addition, danger trees outside the limits of clearing (on or off the ROW) will be removed as necessary to protect the integrity of the proposed or existing transmission lines. Where danger trees are identified outside the CL&P easement area on federal property, CL&P will coordinate with the USACE's Mansfield Hollow Project Manager prior to such tree removal.

Vegetation removal activities typically require flatbed trucks, brush hogs or other types of mowing equipment, skidders, forwarders, bucket trucks for canopy trimming, tree shears for larger trees, wood chippers, log trucks, and chip vans. Effects on wetlands, watercourses, or other environmentally sensitive areas will be minimized to the extent practicable. Vehicles with tracks may be used to remove vegetation in wetlands. In addition, depending on soil saturation, vegetation removal activities in wetlands may involve the use of temporary timber mats or timber riprap (corduroy) to provide a stable base for clearing equipment.

- Construct new on-ROW access roads or improve existing on-ROW roads, and construct the two short temporary off-ROW access roads near Bassetts Bridge Road in Segment 1, to provide a minimum 20-foot-wide travel-way (this equates to a 25-foot-wide total road width, including road shoulders). As illustrated on the maps in Appendix A.3, existing (permanent) on-ROW access roads are located within Segment 1, east of Mansfield Hollow Lake, as well as within Segment 2, east of the Natchaug River. These existing access roads, which are typically approximately 12 feet wide, will be improved for use during Project construction. Along the portions of the ROW in the Mansfield Hollow area where there are no existing access roads, new temporary access roads will be installed to facilitate construction. Two temporary culverts also will be installed along access roads in Segment 2. (Note: All of the access roads developed for the Project in the Mansfield Hollow area will be temporary; no new permanent access roads will be maintained along the ROW after the completion of construction.)

In select locations, access roads will be wider to accommodate the turning radii of the large equipment used in the construction of the transmission line facilities. In addition, where access roads must extend down slopes, additional grading will be required to create a safe travel surface for construction equipment. In such instances, the travel-way width of the access roads will be approximately 30 feet wide (refer to the Appendix A.3 maps).

Access road development or improvement (including temporary culvert installation) typically requires bulldozers or front loaders, excavators, dump trucks for crushed stone or gravel, pickups or stake-body trucks for culverts, and/or mat installers for wetland mats. Temporary roads may be constructed of wood mats or gravel, whereas permanent access roads are generally constructed of gravel only. Roads must have sufficient width and capacity for heavy construction equipment for both over-the-road and off-road vehicles, including oversized tractor trailers. The need for access by flat-bed trailers and concrete trucks often determines the scope of access road improvements. Road grades must be negotiable for over-the-road trucks; grades are typically 10% maximum, less if wet weather or surface conditions result in traction problems.

- Prepare material staging sites (e.g., storage, staging, and laydown areas) to support the construction effort. To support the construction effort in Mansfield Hollow, such staging sites would be located, as needed, in upland areas along the ROW, within the limits of clearing.
- Prepare level work pads as necessary at new structure sites. Work pad installation typically may involve grading and requires the use of gravel, timber mats, or equivalent to create a stable base for the construction equipment needed to drill the structure foundations, install the structures, and attach the conductors. Proposed work pad locations are illustrated on the 1"=100' maps in Appendix A.3.
- Construct structure foundations. The steel monopole structures will require excavations for embedding the structures, as well as concrete for the structure foundations. Excavation for the structure foundations is expected to be accomplished using mechanical excavators (drilling) and pneumatic hammers; controlled blasting is not expected to be required. Any surface water or groundwater encountered in excavations will be pumped from the excavated areas, temporarily contained (if necessary), and discharged in accordance with applicable local and state permit requirements. During the foundation excavation process, some structure locations may have to be shifted slightly from the sites shown on Project plans to facilitate foundation installation (e.g., to avoid rock or if required because of a drilling hole collapse). However, any such shifts would typically be minor and would be within the footprint of the work pad. Structure foundation installation work will involve the same types of equipment used for access road preparation, with the addition of flat-bed trucks for hauling structure components, hardware, and augers; other trucks for hauling reinforcing rods; drill rigs; concrete trucks; dump trucks for structures that require crushed rock backfill; and bucket trucks. Dump trucks are also needed for foundation work if excess excavated material has to be removed from the ROW. In wet conditions or if groundwater is encountered during excavation, pumping (vacuum) trucks, tanks, or other suitable equipment will be used to pump and contain water from the excavated areas.
- Install structures. The steel monopoles for the new 345-kV transmission line will be delivered in sections to the foundation sites (work pads), where they will be assembled and then installed using a large crane. Insulators and connecting hardware will also be installed.

- Install shield wires and conductors. Special equipment is required to install conductor and shield wires. This equipment will include conductor reels, conductor pulling and tensioner rigs, and bucket trucks. Helicopters also may be used to install the initial pulling lines for the conductors or shield wires. The conductors and shield wires must be installed in sections, under tension to avoid contact with the ground or other objects. Therefore, equipment and materials will be staged at work sites (referred to as “pulling sites”) at intervals along the ROW. In the Mansfield Hollow area, three conductor pulling sites will be required; two within the ROW in Segment 1 and one within the ROW in Segment 2. To assure that the new conductors and shield wires are installed safely across Bassetts Bridge Road in Mansfield Hollow State Park, a temporary guard structure will be placed along the ROW at the road crossing. After the wires are installed, the remaining insulators and hardware will be connected. Conductors and shield wires will be sagged to design tensions and connected to hardware, pursuant to industry standards and design specifications.
- Install counterpoise and guy wires / anchors, where needed. Depending on site-specific soil conductivity, supplemental subsurface grounding (counterpoise) will be installed. A ditchwitch is typically used for this activity. Guy wires and guy anchors also will be installed, if needed, to provide structure stability.
- Restore the ROW<sup>6</sup>. Temporary access roads, work pads, pulling sites, and all other construction materials will be removed. Along Segment 2, the two temporary culverts installed along access roads across wetlands will be removed. Disturbed upland areas will be re-graded to approximate pre-construction elevations and then re-seeded and stabilized as necessary with mulch. Wetland areas will be re-seeded and stabilized with a native seed mix and then allowed to revegetate naturally (mulch will not be used). Construction debris will be hauled off the ROW for disposal. Vegetative materials cut along the ROW and not otherwise provided to the USACE or CT DEEP for productive use may be piled, scattered, or chipped on the ROW, depending on site-specific environmental features. However, no piles of debris will be left on the ROW, and no wood piles for wildlife habitat will be created without the prior approval of the USACE Mansfield Hollow Project Manager. To restore portions of the open field affected by construction along the ROW near Bassetts Bridge Road in Mansfield (refer to Mapsheet 2 of 8 in Appendix A.3), the soil may be decompacted by discing, if warranted.
- Maintain temporary erosion and sedimentation controls until vegetation is re-established or disturbed areas are otherwise stabilized. Areas of exposed soils on steep slopes may be stabilized with jute netting or pre-made erosion control fabric containing seed, mulch, and fertilizer. No plastic erosion-control netting will be used on federal property. After site stabilization is achieved, all temporary erosion and sedimentation controls that are not biodegradable (e.g., geotextile material, twine, stakes) will be removed from the ROW and disposed of properly.
- Perform ROW monitoring to verify restoration effectiveness as required by the easement agreement with the USACE or Project permit and certificate conditions. CL&P will conduct post-construction ROW restoration monitoring, as specified in Project regulatory requirements. CL&P’s established ROW vegetation management procedures will be implemented for the long-term maintenance of the ROW. These procedures will include monitoring and control of invasive species in wetlands, pursuant to CL&P’s agreement with CT DEEP, as well as other mitigation designed to enhance wetlands on the ROW across federal properties (refer to Section 7).

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<sup>6</sup> Restoration of the ROW on the federal properties in the Mansfield Hollow area will be in accordance with the easement agreement between CL&P and the USACE.

## 2.4 OPERATION AND MAINTENANCE PROCEDURES

After the installation of the new 3271 Line, 150 feet of the total new 175-foot-wide ROW along Segment 1 will be managed to promote low-maturing vegetative species (e.g., dogwood, blueberry, viburnum, mountain laurel, juniper, spicebush, winterberry). The existing forested vegetation along the southern boundary of the ROW (south of the existing 330 Line) will not be affected. Similarly, along Segment 2, 180 feet of the total 185-foot-wide expanded ROW will be managed in low-maturing vegetation. The approximately 5-foot-wide strip of existing forested vegetation located along the southern boundary of the ROW will not be affected.

CL&P's long-term vegetation management program includes the selective removal of targeted species (e.g., tall growing trees such as ash, maple, oak, pine, sycamore and selected state-listed invasive woody shrubs, such as autumn olive, buckthorn, Japanese barberry) within the portions of the ROWs occupied by transmission lines. In addition to tree removal within the ROW, danger trees adjacent to the managed ROW that could fall onto a conductor will be trimmed or removed. Prior to the removal of danger trees located on federal property outside the boundaries of the CL&P easement area, CL&P will coordinate with the USACE's Mansfield Hollow Project Manager.

Brush control within CL&P's ROWs is performed every four years, and side trimming (i.e., removal of trees or tree limbs that encroach along the edge of the managed ROW) is performed every 10 years. All work is performed in accordance with NU's *Specification for Rights-of-Way Vegetation Management (2011)*, which is consistent with the North American Electric Reliability Corporation's (NERC's) mandatory requirements. (The NERC requirements were instituted in 2006, following the August 13, 2003 blackout in the Northeast U.S., which was determined to have been triggered by line outages caused by overgrown vegetation.) CL&P will operate and maintain the new transmission line in accordance with all applicable codes and standards, including those of the National Electrical Safety Code (NESC), the Institute of Electrical and Electronic Engineers (IEEE), the American National Standards Institute (ANSI), CT DEEP Public Utilities Regulatory Authority (PURA) regulations, company standards, and good utility practice.

## 2.5 PERMITS, APPROVALS, AND REGULATORY REQUIREMENTS

In addition to the grant of easement for the additional ROW width through the Mansfield Hollow federal properties, the entire Project will require regulatory approvals from the USACE (pursuant to Section 404 of the Clean Water Act). Approvals also will be required from the Connecticut, Massachusetts, and Rhode Island agencies responsible for siting and permitting energy facilities.

Neither the Mansfield Hollow area segments nor the Project as a whole will adversely affect any federally-listed threatened or endangered species. As a result, the Project is consistent with the federal Endangered Species Act. (Refer to Section 4.4, Listed Species, for additional information.) Similarly, none of the Project is located within the designated coastal zone boundary and thus does not require a coastal consistency review pursuant to the federal Coastal Zone Management Act.

For the Connecticut portion of the Project, CL&P has coordinated with and solicited input from state regulatory agencies, including the CSC (which has primary siting authority over the Connecticut portion of the Project facilities) and the CT DEEP, which has provided input to the CSC process and has the responsibility for issuing a water quality certification for the Project, pursuant to Section 401 of the Clean Water Act, and for administering the stormwater and dewatering wastewater permitting for construction activities pursuant to the Section 402 of the Clean Water Act [regulatory authority delegated to the CT DEEP]. The CT DEEP also is responsible for the protection of state-listed species of concern, and the issuance of other state permits applicable to the Project.

In addition, the Project also will require a finding of “no significant effect” on cultural resources from the State Historic Preservation Office (SHPO), which is part of the Connecticut Department of Economic and Community Development, Offices of Culture and Tourism, Historic Preservation and Museum Division. The CSC’s approval of the Project will require the preparation of and compliance with a detailed construction and maintenance plan, which incorporates detailed Project specifications, including the measures to be taken to minimize both the short- and long-term adverse environmental effects of the transmission line facilities. The requirements for this plan, which is referred to as a “Development and Management (D&M) Plan,” are published on the CSC’s website at <http://www.ct.gov/csc/cwp/view.asp?a=960&q=248928#60>.

## **2.6 COST**

The estimated cost for the construction of the Proposed Action is \$14.3 million. This cost excludes expenditures for the additional 5 acres of easement (real estate costs), which will be negotiated with the USACE.

## 2.7 SCHEDULE

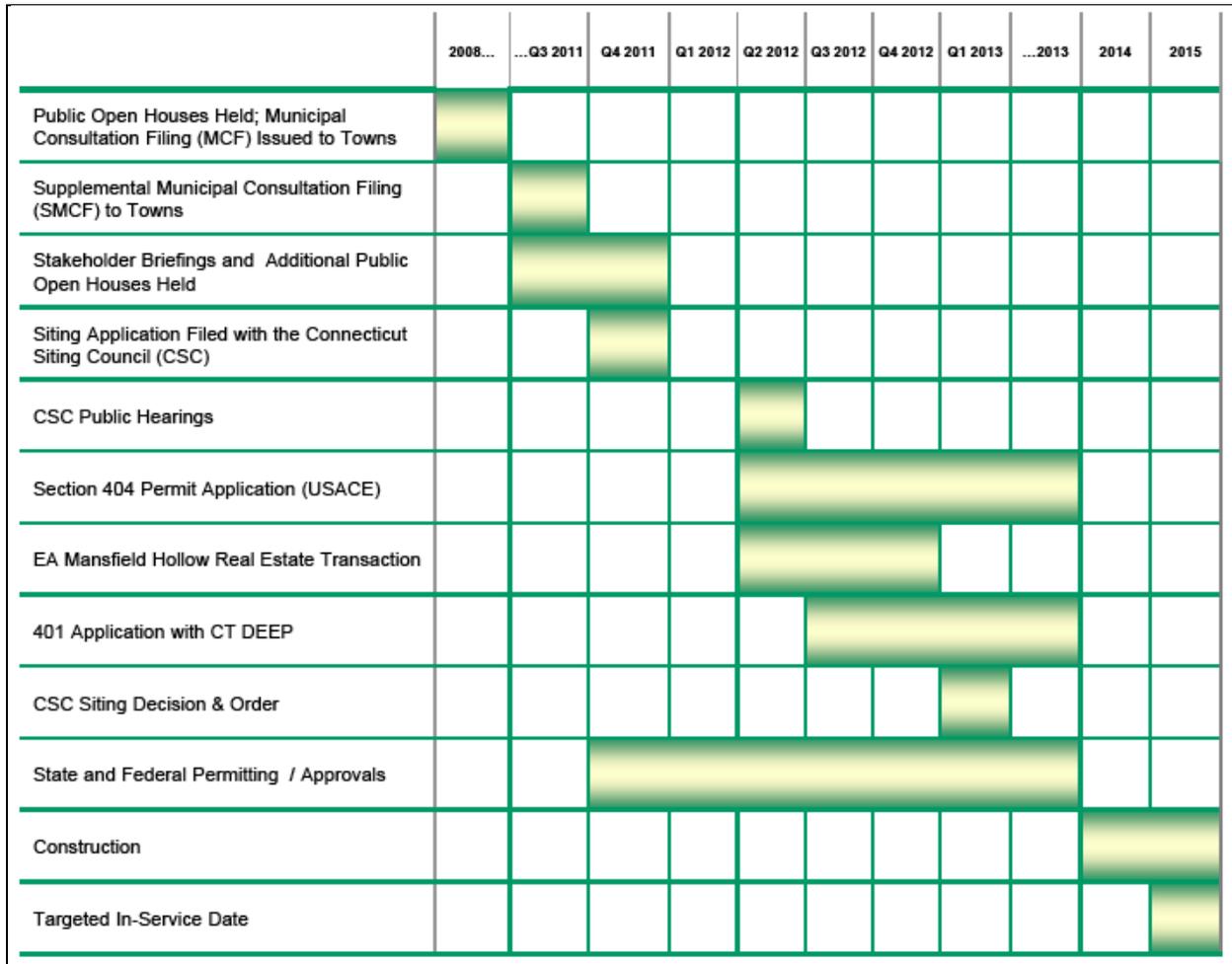
The target in-service date for the Project is December 2015. Figure 2-1 illustrates the key activities in CL&P's proposed schedule for developing the Connecticut portion of the Project. Although not depicted on this schedule, initial Project planning began in 2004.

As noted previously, CL&P's application to the CSC for the Connecticut portion of the Project was filed on December 23, 2011. To inform the public about the Project and solicit input regarding the Project prior to the submission of the CSC application, CL&P conducted two major public outreach efforts, referred to as Municipal Consultation Filings (MCFs). The MCF process is a pre-requisite of the submittal of an application to the CSC. For the Connecticut portion of the Project, CL&P prepared and distributed to potentially involved municipalities and stakeholders an initial MCF in 2008, as well as a Supplemental MCF in July 2011.

In addition to the CSC application, in conjunction with National Grid, on May 25, 2012, CL&P filed a Clean Water Act Section 404 Permit application with the USACE New England District. On July 23, 2012, CL&P filed an application with CT DEEP for a Section 401 Water Quality Certification / Stream Channel Encroachment Permit for the Connecticut portion of the Project.

The primary construction activities within the Mansfield Hollow area are expected to require approximately two months. Such activities will include vegetation removal through structure installation and conductor and shield wire stringing. Additional time will be required for ROW restoration and revegetation. To the extent practicable based on the timing of the receipt of regulatory approvals, during construction of the Project, CL&P will endeavor to remove forested vegetation along the ROW on federal properties between August 1 and April 1, outside the typical bird nesting season.

**Figure 2-1: Connecticut Portion of the Interstate Reliability Project – Historical and Estimated Timeline**



Notes:

1. Construction in-service date assumes timely receipt of approvals from the CSC and federal / state regulatory agencies.
2. The construction timeline is for the Project as a whole and refers to the installation of the new 345-kV transmission lines and station modifications. This does not necessarily include the completion of all ROW restoration and post-construction monitoring activities. ROW restoration timelines will depend on the season in which the temporary construction work pads and access roads are removed and on when the ROW can be effectively reseeded and stabilized with vegetation. Restoration typically may occur the season following the in-service date.

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### 3.0 ALTERNATIVES

Prior to identifying the Project as the preferred option for improving the reliability of the electric system in Connecticut, Rhode Island, and Massachusetts, CL&P and National Grid, working with ISO-NE, evaluated a variety of alternatives, including no action; non-transmission energy alternatives (e.g., generation, energy conservation); transmission system alternatives; transmission design options; and routing alternatives<sup>7</sup>. These alternatives were evaluated by ISO-NE and are described in detail in CL&P's application to the CSC (refer to the CSC Application, Volume 1A).

As a result of these extensive alternatives analyses, the proposed Project was selected, involving the alignment of the new 345-kV transmission lines along existing CL&P and National Grid ROWs in order to best connect the various substations and switching stations in Connecticut, Rhode Island, and Massachusetts. In Connecticut, the Proposed Route for the Project includes the alignment of the new 345-kV transmission line along the 330 Line ROW across the federally-owned lands in the Mansfield Hollow area.

After this Proposed Route was generally identified, CL&P identified and evaluated various options for either developing the new 345-kV transmission line along the existing ROW in the Mansfield Hollow area or avoiding the Mansfield Hollow area entirely. As the only locations along the 75-mile, three-state Project route where the existing utility ROW is not sufficiently wide to accommodate the new 345-kV transmission line using the base proposed matching structure configuration, the Mansfield Hollow area Segments 1 and 2 were extensively studied as part of CL&P's Project planning process.

The Mansfield Hollow alternatives evaluation process involved studies conducted between 2008 and 2012. Alternatives evaluated included the expansion of the ROW across the federally-owned properties to match the width of CL&P's easement across privately-owned properties (i.e., a total of approximately 300 feet); route variations that would avoid the Mansfield Hollow area but would require the establishment of a new transmission line corridor in other locations; underground cable system options in lieu of an overhead line design; and various options for configuring the new 345-kV line structures within the Mansfield Hollow area so as to require limited or no additional ROW.

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<sup>7</sup> The Project need, non-transmission alternatives, and major transmission system alternatives, including options in Connecticut, Rhode Island, and Massachusetts that would avoid the development of the proposed 345-kV transmission line through the Mansfield Hollow area, were considered and evaluated in depth by ISO-NE, CL&P, and National Grid (refer to ISO-NE's *Solution Report for the Interstate Reliability Project*, August 2008 and the *Updated Solution Report*, January 2011; and to CL&P's CSC Application, which summarizes these studies). The proposed Project was determined to be superior to these options based on electric transmission system reliability criteria, cost, and/or environmental factors.

Table 3-1 summarizes the chronology of CL&P's evaluation of alternatives for the Mansfield Hollow area, and identifies how CL&P sought public and agency comments on the alternatives during the CSC's MCF process and other public outreach programs for the Project.

The routing and design alternatives identified and reviewed for the proposed 345-kV line through or around the Mansfield Hollow area are described in the following subsections and include:

- No Action (Section 3.1)
- Major Off-ROW Alternatives: Willimantic South Variations (Section 3.2)
  - Avoidance of the federal properties by following a new “greenfield” overhead transmission line ROW across private properties (i.e., creating a new utility corridor, not adjacent to any existing linear ROWs, by purchasing easements from private landowners and public agencies).
  - Avoidance of the federal properties by installing the Mansfield Hollow segment of the Project underground, using a 345-kV cable system of buried duct banks and splice vaults, within or adjacent to roadways.
- Uniform Easement Expansion Alternative: Expansion of the existing utility easement across USACE properties by 150 feet in width to conform to CL&P's typical 300-foot-wide ROW that is common along other portions of the Proposed Route (Section 3.3).
- Underground Route Alternatives in the Mansfield Hollow Area (Section 3.4).
  - Installation of the new transmission line underground, adjacent to the existing overhead 345-kV line and within the existing 150-foot-wide easement through the federal properties.
  - Installation of the new transmission line underground, within or adjacent to existing roadways in the Mansfield and Chaplin areas.
- Overhead Line Design Options along the Existing ROW:
  - No ROW Expansion Option (Section 3.5): Removal and reconstruction of the existing 345-kV line (i.e., the 330 Line) and installation of the new transmission line overhead, all within the existing 150-foot-wide easement through the federal lands, but involving line outages and more difficult, time-consuming construction techniques.
  - 11-Acre ROW Expansion Option (Section 3.6): Alignment of the new 345-kV line to the north of the existing 330 Line, using structures that generally match the existing transmission line in appearance (type) and height. This option would require expansion of the ROW by 55 feet to the north along Segment 1 and 85 feet along Segment 2.

As the following analyses demonstrate, the Proposed Action (i.e., the 5-Acre Minimal ROW Expansion, involving the expansion of the ROW by 25 feet and 35 feet through Segments 1 and 2, respectively) represents the preferred configuration (least environmentally damaging practicable alternative) through the Mansfield Hollow area.

**Table 3-1: Chronological Summary of Alternatives Analyses: Mansfield Hollow Area**

Date	CL&P Alternatives Analyses
Initial Project Design–2008	<p>150-Foot-Wide Easement Expansion Proposed. Initial proposal to expand the ROW by 150 feet to the north, requiring 27 additional acres of easement from the USACE, creating a 300-foot-wide ROW comparable to the width of other CL&amp;P ROWs in the Project area, and allowing the development of the new 345-kV line in overhead configurations that would match the line structure types of the existing 330 Line. CL&amp;P proposed to include un-managed areas along the northern portion of the expanded ROW.</p> <p>Willimantic South Overhead and Underground Variations Identified. These route variations would avoid the Mansfield Hollow area entirely, but would create new “greenfield” utility corridors, which would be in addition to the existing CL&amp;P ROWs along which the existing 330 Line is located. Due to overriding cost and environmental issues, neither variation was preferred.</p> <p>Public Outreach. Comments solicited on routing options in the Mansfield Hollow area as part of CSC public outreach processes (August 2008 MCF, town open houses, etc.).</p>
2009	<p>150-Foot-Wide Easement Expansion Dismissed. Initially proposed 150-foot-wide easement expansion option dismissed after consultations with the USACE and CT DEEP.</p> <p>11-Acre ROW Expansion Configuration Option Identified. This option limited the proposed easement expansion to 11 acres and involved only the lands necessary to allow the installation of the new 345-kV line using structure types that would match the existing 330 Line in Segments 1 and 2, but without any un-managed vegetation areas within the northern portions of the easement. Specifically, the ROW along Segment 1 would have been expanded by 55 feet to the north, whereas the ROW along Segment 2 would have increased by 85 feet to the north.</p> <p>No ROW Expansion Option Identified. This option would involve the removal and reconstruction of the existing 345-kV line (i.e., the 330 Line), as well as the installation of the new 345-kV line, within the existing 150-foot-wide ROW. No additional easement would be required from the USACE, but this option would require complicated construction, including line outages, and would be costly.</p>
2010-2011	<p>Additional Analyses of Identified Options. Conducted additional analyses of the 11-Acre ROW Expansion and No ROW Expansion Options</p> <p>5-Acre Minimal ROW Expansion Option Identified. This option would require only approximately 5 acres of additional easement from the USACE and would minimize the ROW expansion required to 25 feet and 35 feet in Segments 1 and 2, respectively. Under this option, new structures would be steel monopoles that would not match the existing 330 Line structures.</p> <p>Public Outreach. Comments were solicited on Mansfield Hollow configuration options as part of CSC public outreach process (2011 Supplemental MCF, town open houses) and agency scoping for this EA.</p> <p>CSC Application Filed December 23, 2011. In the CSC Application, the 11-acre ROW Expansion Option was identified as part of the Project, but both the No ROW Expansion Option and the 5-Acre Minimal ROW Expansion Option were identified as viable.</p>
2012	<p>5-Acre Minimal ROW Expansion Option Identified as Preferred. Based on input from the EA agency scoping process and analyses conducted in early 2012 (after the submission of the CSC Application), the 5-Acre Minimal ROW Expansion Option was determined to be the preferred configuration for the alignment of the new 345-kV transmission line across the Mansfield Hollow area. This configuration was incorporated into the proposed Project design.</p>

### **3.1 NO ACTION**

Under the “no action” alternative, CL&P and National Grid would not develop the Project. Therefore, no additional ROW (easement) width through the federal Mansfield Hollow properties would be required.

The existing 345-kV transmission lines would remain as the only 345-kV link in northeastern Connecticut. However, the “no action” alternative would not allow CL&P and National Grid to meet the ISO-NE mandate for developing needed improvements to the regional electric transmission system, and would result in the system’s continued contravention of federal electric system reliability standards.

Consequently, the region would remain at risk for electrical outages, which could have adverse economic effects, as well as adverse environmental effects (if higher cost and more polluting generation resources had to be put into service to meet local electric demand). For these reasons, the “no action” alternative was eliminated from consideration as a viable option.

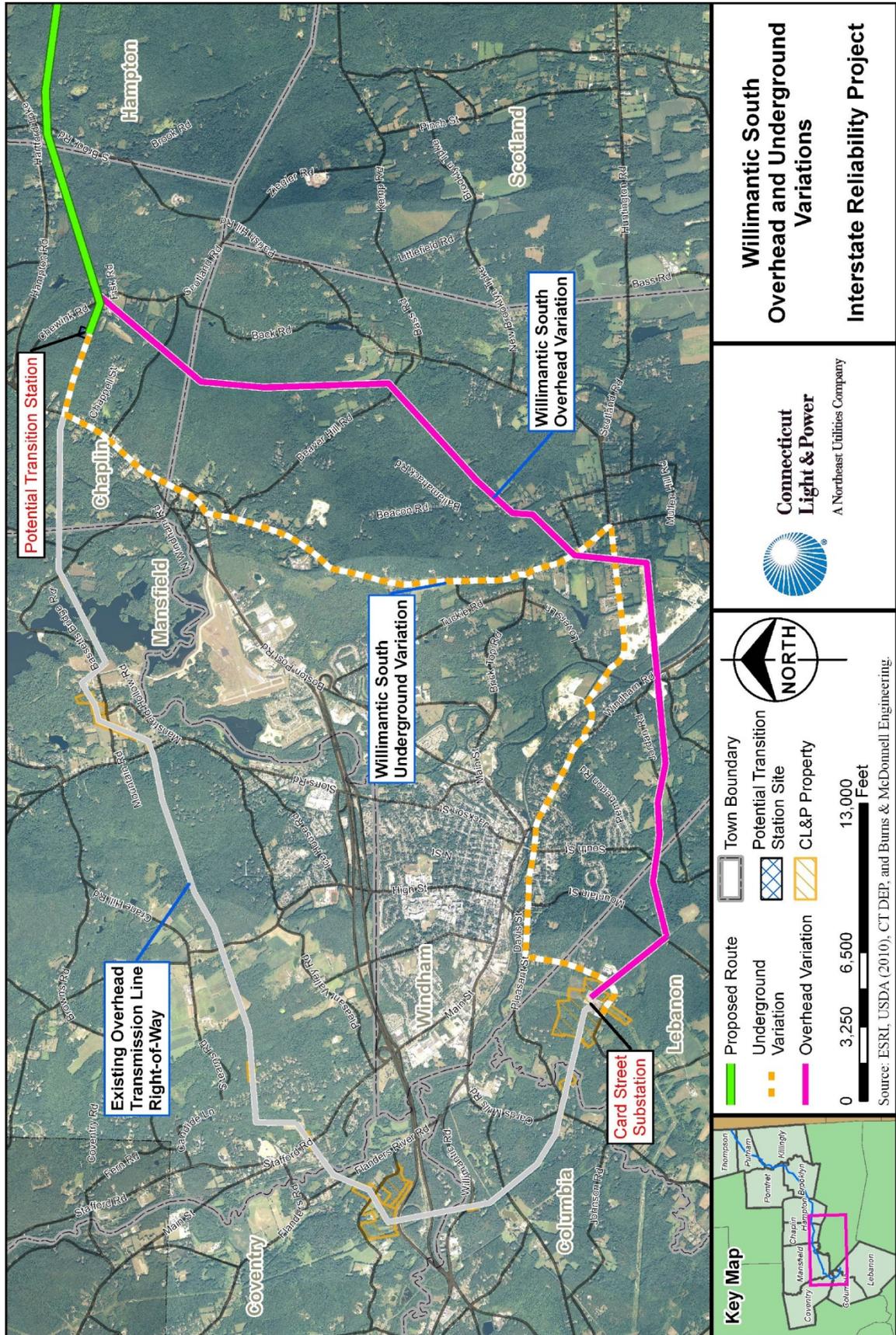
### **3.2 MAJOR OFF-ROW ALTERNATIVE ROUTES: WILLIMANTIC SOUTH VARIATIONS**

CL&P identified and assessed the environmental, engineering, and cost effects of alternative routes that would avoid the alignment of the new 345-kV transmission line through the Mansfield Hollow properties. Two major alternative routes – one an overhead transmission line configuration and the other an underground transmission line configuration – were identified and evaluated.

These alternatives, referred to as the Willimantic South Overhead Variation and the Willimantic South Underground Variation, would avoid the 1.4 miles of federal lands in Mansfield Hollow by re-aligning the entire western portion of the new 345-kV transmission line along new (“greenfield”) ROWs. Both variations would be located substantially south of the existing 330 Line transmission line ROW. The locations of these two variations were selected to avoid both the federally-owned properties (which generally extend linearly both north of the existing CL&P ROW along the Natchaug, Mount Hope, and Fenton rivers and south to U.S. Route 6) and developed areas in the vicinity of the City of Willimantic.

Either route variation would commence at CL&P’s Card Street Substation and traverse east, south of Willimantic, before continuing east-northeast to interconnect with the Proposed Route (i.e., along the existing CL&P ROW) east of U.S. Route 6 in the Town of Chaplin. The Willimantic South Overhead Variation would replace approximately 11.9 miles of the Proposed Route (including the Mansfield Hollow segments), whereas the Willimantic South Underground Variation would replace approximately 11.6 miles of the Proposed Route (including the Mansfield Hollow segments). Figure 3-1 illustrates the locations of these two variations.

**Figure 3-1: Willimantic South Variations**  
 (Note: portion of Proposed Route that would be replaced by variations is shown as gray line)



As described in the following subsections, neither of these variations represents a cost-effective or environmentally sound alternative for the development of the Project. While both would offer the advantage of avoiding the alignment of the new transmission line through the federally-owned Mansfield Hollow properties, the Willimantic South Variations would result in substantially greater environmental effects and significantly greater capital costs than the Proposed Action.

Further, any of the configuration options along the ROW in the Mansfield Hollow area (i.e., not only the Proposed Action [the 5-Acre Minimal ROW Expansion], but also the 11-Acre ROW Expansion Option or the No ROW Expansion Option) would be less environmentally damaging and less costly than either of the Willimantic South Variations. Sections 3.5 and 3.6 discuss the two Mansfield Hollow area configurations that provide options to the Proposed Action (5-Acre Minimal ROW Expansion); Appendix B includes cross-sections and aerial segment maps depicting these configuration options.

Appendix C provides detailed information regarding the environmental characteristics and potential impacts of the Willimantic South Variations and includes aerial mapsheets that illustrate the variations in relation to environmental and land use features. This information is summarized below. (Note that Appendix C is excerpted from CL&P's December 23, 2011 Application to the CSC. When that Application was filed, the Willimantic South Variations were both compared to 11-Acre Easement Expansion Option because the Proposed Action (i.e., the 5-Acre Minimal ROW Expansion) had not yet been selected. The analyses in Sections 3.2.1 and 3.2.2 update the Appendix C data to include comparisons to the Proposed Action (i.e., the 5-Acre Minimal ROW Expansion).

### **3.2.1 Willimantic South Overhead Variation**

The Willimantic South Overhead Variation would extend for approximately 9.6 miles through the towns of Lebanon, Windham, and Chaplin. The variation would replace the western-most 11.9 miles of the Proposed Route, including the segments within the Mansfield Hollow area. As illustrated in Figure 3-1, the route variation would extend south and then east-northeast from the Card Street Substation and would interconnect to the Proposed Route on CL&P's ROW in the Town of Chaplin, east of U.S. Route 6. Along 8.6 miles of the variation, CL&P would have to acquire new easements, predominantly from private landowners, to develop a new 150-foot-wide ROW for the overhead 345-kV line. Along this "greenfields" portion of the variation, the base design of the new overhead transmission line would be H-frame structures with a typical height of 85 to 90 feet.

Along approximately 1 mile of the route in Lebanon, the variation would be either on CL&P property (i.e., 0.3 mile on the Card Street Substation property) or aligned along an existing 125-foot-wide CL&P ROW (0.7 mile). This ROW is presently occupied by two existing 115-kV transmission lines (the 1080/1490 circuits), supported on H-frame structures. A 23-kV distribution line shares the ROW from the substation to Card Street.

To accommodate the new 345-kV overhead line along this existing ROW segment, the existing ROW would have to be expanded by 15 feet along the eastern side. Because residences are located along Card Street near the existing ROW, options for widening the ROW to accommodate the new 345-kV overhead line are limited. Specifically, the new 345-kV line could not be developed using H-frame structures (which require more ROW) without affecting residences. Therefore, to allow the installation of the new 345-kV line along this segment of ROW, the existing double-circuit 115-kV line would have to be rebuilt using vertical conductor configurations on double-circuit steel monopole structures. The new 345-kV line would also be constructed with a vertical conductor configuration on single-circuit steel-monopole structures. The existing distribution line would be relocated to one edge of the ROW.

Overall, the Willimantic South Overhead Variation would be approximately 2.3 miles shorter than the 11.9-mile portion of the Proposed Route that it would replace. However, in order to develop the Project along this variation, CL&P would have to acquire new ROW (easements), totaling approximately 156 acres, from private landowners or, where the ROW is located on public properties, from local and state governments.

An estimated 128 acres of forestland would have to be cleared to accommodate the construction and operation of the new transmission line along the variation. The creation of this new utility corridor would change wildlife habitats and fragment forested tracts of land. In addition, based on the review of available maps (e.g., National Wetland Inventory maps, soil surveys) and the interpretation of aerial photography, approximately 22 acres of wetlands would be located within the new ROW. Such wetlands would be affected, either directly or indirectly, by the construction and operation of the transmission line. The variation also would create new utility crossings of the Shetucket River, as well as 14 other watercourses.

The variation would traverse land uses that consist of a mix of rural residential areas, agricultural lands, and undeveloped forested tracts. In the Town of Lebanon, near the Lebanon/Windham town line, the variation also would cross a 0.5-mile portion of Pomeroy State Park and Scenic Reserve and Pomeroy

State Forest. Pomeroy State Park and Scenic Reserve, a state designated area of preserved open space (encompassing approximately 90 acres), is primarily undeveloped and contains no public facilities. Development of a new transmission line ROW in this area would be inconsistent with this use. In addition, the variation would be aligned adjacent to Beaver Brook State Park in Windham and Chaplin for approximately 1.5 miles. Table 3-2 summarizes the principal characteristics of the Willimantic South Overhead Variation.

**Table 3-2: Summary Characteristics: Willimantic South Overhead Variation**

Feature	Variation Characteristics
ROW Length (total):	9.6 miles
ROW Miles, by Town	Lebanon (1.5 miles) Windham (6.9 miles) Chaplin (1.0 miles)
New ROW Width Required:	0.3 mile CL&P Card Street Substation property 0.7 mile CL&P existing 115-kV ROW to be expanded by 15 feet 150 feet along 8.6 miles
Length of Proposed Route to be Replaced:	11.9 miles
New ROW (Easement) Required	156 acres
Transmission Structure Base Design:	Steel monopole, vertical conductor configuration Wood or Steel H-Frames, Typical Height of 85-90 feet
ROW Vegetation Clearing Required:	148 acres
Stream Crossings (number):	15, including Shetucket River, Jordan Brook, Chestnut Hill Brook, Pottens Brook, Ames Brook (all Class A except for the Shetucket River, which is Class B)
Wetland Crossings (number, acreage);	22, approximately 29 acres (estimated) (17 acres estimated to be forested)
Homes (number within 300 feet of ROW):	22
Cultural Resources	1 recorded archaeological site
Cost:	\$79.3 million

Compared to the portion of the Proposed Route that it would replace, the variation would require 151 more acres of new ROW, approximately 57 more acres of forest clearing, and would create a new 8.6-mile 150-foot-wide linear utility corridor. In addition, an approximately 0.7-mile segment of CL&P's existing ROW in the Town of Lebanon near Card Street Substation would have to be expanded.

Whereas the route variation would avoid the Mansfield Hollow area, it would create a new corridor across Pomeroy State Park in the Town of Lebanon, the Shetucket River in Windham, and the Airline State Park Trail in Chaplin. The new ROW would also abut portions of Beaver Brook State Park in the towns of Windham and Chaplin. Furthermore, the new overhead transmission line ROW would create a new linear

corridor through the Quinebaug – Shetucket Rivers Valley National Heritage Corridor<sup>8</sup> and would not be consistent with the general goals for resource protection in the towns encompassed by the Heritage Corridor.

Overall, the Willimantic South Overhead Variation was determined to be decisively inferior to the proposed overhead 345-kV line aligned along CL&P's existing ROW. The variation would result in the creation of a new "greenfield" utility corridor, which is not consistent with federal policy for the collocation of utilities as contained in the Federal Energy Regulatory Commission's "*Guidelines for the Protection of Natural Historic, Scenic, and Recreational Values in the Design and Location of Rights-of-Way and Transmission Facilities*", with which any transmission line approved by the CSC must be consistent (per Connecticut General Statutes §15-50p(a)(2)(D)). Further, for the new "greenfield" ROW, CL&P would have to acquire new utility easements across privately and publicly owned properties. The use of the variation would result in comparatively significant long-term environmental impacts associated with the creation of such a new ROW (e.g., forest clearing, wetland and stream crossings).

In addition, the use of the Willimantic South Overhead Variation, which would result in the installation and operation of 345-kV transmission lines on two separate ROWs, would not provide the opportunity for reducing magnetic fields along at least one edge of the existing ROW. Such reduced magnetic fields could be achieved by cancellation through best circuit phasings if the new 345-kV line were aligned adjacent to the existing 330 circuit within the existing CL&P ROW. Further, compared to the 11.9-mile Proposed Route segment that would be replaced, the variation would not present a clear magnetic field reduction advantage and would be significantly more costly. (Refer to Section 5.9 for further discussion of magnetic field cancellation effects.)

The Willimantic South Overhead Variation would be approximately \$15.7 million more expensive than the comparable portion of the Proposed Route that it would replace. Table 3-3 provides a summary comparison of the variation and the 11.9-mile segment of the Proposed Route that it would replace.

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<sup>8</sup> The Quinebaug-Shetucket Rivers Valley National Heritage Corridor was designated by Congress in 1994 and encompasses approximately 695,000 acres defined by the rivers systems and the adjoining areas. In total, the heritage corridor includes 35 towns in Massachusetts and Connecticut. Within the heritage corridor, citizens, businesses, non-profit groups, and local / state governments work with the National Park Service to protect the region's cultural, historical, and natural heritage. Most northeastern Connecticut towns are within the national heritage corridor. Along the Proposed Route, 10 of the 11 towns traversed, including Mansfield and Chaplin, are within the corridor; however, the Proposed Route follows CL&P's existing transmission line ROW, whereas the Willimantic South Overhead Variation would create a new utility ROW through the heritage corridor region.

**Table 3-3: Comparison of the Willimantic South Overhead Variation to the Proposed Transmission Line Segment (Overhead Line) on Existing CL&P ROW to be Replaced**

Route Characteristic	Proposed Overhead Transmission Line Segment on Existing CL&P ROW to be Replaced	Willimantic South Overhead Variation
<b>Location, Design, and Appearance</b>		
Route Location (ROW, Town)	Existing CL&P ROW (Lebanon, Columbia, Coventry, Mansfield, Chaplin)	0.7 mile ROW expansion; 0.3 mile on CL&P property (Lebanon) 8.6 miles new ROW (Lebanon, Windham, Chaplin)
Route Length (miles)	11.9 miles	9.6 miles
Structures (type)	H-frames Delta steel poles	H-frames Delta steel pole
New ROW Easements or Land Acquisition Required (approximate acres)	5 acres (USACE property, Mansfield Hollow)	156 acres
<b>Biological Resources</b>		
Upland Forest Clearing (est. acres)	56.0 acres	111.6 acres
Forested Wetland Clearing (est. acres)	9.2 acres	16.1 acres
Scrub-Shrub Clearing (est. acres)	9.6 acres (upland) 0.7 acre (wetland)	17.2 acres (upland) 5.5 acres (wetland)
Watercourse Crossings (no.)	26 (span)	15
Wetlands, Permanent Effects (Fill) (est. acres)	1 structure 0.4 acre (access roads)	0 structures 0 (access roads)
Wetlands, Temporary Effects (est. acres)	1.1 acres (access roads)	3.1 acres (access roads) <sup>2</sup>
Listed Species (no. species)	0	0
<b>Land Uses</b>		
Designated Recreational or Open Space along ROW (length, miles)	3.0 miles	1.4 miles
CL&P-Owned Land Traversed (miles)	1.8 miles	0
Total Construction ROW / Work Space, Temporary Land Disturbance (est. acres)	130.9 acres	172.5 acres
<b>Cost of Transmission Line Segment (\$ Million, \$ 2010)</b>		
Capital Cost	\$63.6	\$79.3

Notes:

- For the overhead route variation, specific structure locations were not defined. However, for this impact evaluation, CL&P assumed that all structures could be located outside of wetlands and that all access roads would minimize the crossing of wetlands and streams to the extent practicable.
- Costs exclude real estate easement acquisition.

### 3.2.2 Willimantic South Underground Variation

The Willimantic South Underground Variation would require the installation, operation, and maintenance of a 10.7-mile underground 345-kV transmission cable system, which would be aligned primarily beneath paved road ROWs or areas adjacent to such ROWs through the towns of Lebanon, Windham, and Chaplin. In addition, the variation would require the construction and operation of a new 345-kV above-ground line transition station in Chaplin, where the underground cable system facilities would interconnect to the rest of the new proposed overhead 345-kV transmission line.

As illustrated on Figure 3-1, the Willimantic South Underground Variation would extend north and then east from the Card Street Substation, following road ROWs (e.g., Card Street, Pleasant Street, Windham Road [State Road 32], Plains Road). The variation would continue east across the Shetucket River to State Route 14/203, and would then turn north and follow State Route 203 to U.S. Route 6 (Boston Post Road/Willimantic Road), to interconnect to CL&P's existing 345-kV line ROW.

At the intersection of U.S. Route 6 and the CL&P ROW, the variation would diverge east from the road ROW to follow CL&P's existing ROW. The variation would be aligned for approximately 0.6 mile underground along CL&P's existing 300-foot-wide ROW to the site where a new 345-kV line transition station would have to be developed. The new line transition station, which would require the acquisition and development of a 4-acre parcel of land, would be located approximately 100 feet east of Park Road in Chaplin, in part within CL&P's existing ROW and in part on adjacent privately-owned land near the Natchaug State Forest. The line transition station site would be converted to industrial (utility) use. Table 3-4 summarizes the principal characteristics of the underground route variation.

The alignment of the new 345-kV transmission line underground would entail excavation along the entire route for the installation of the transmission cable duct banks, as well as excavations, at approximately 1,600-foot intervals, for the installation of pre-cast splice vaults. The underground technology most likely to be used for an underground cable system along the Willimantic South Underground Variation would be cross-linked polyethylene (XLPE) insulated cables.

The 345-kV cable system would consist of nine cables (three parallel sets of three XLPE cables), placed in individual polyvinyl chloride (PVC) ducts and contained within 3-foot-wide by 3-foot-tall concrete duct banks. The trench for the cable system typically would be 7 to 10 feet deep and approximately 5 feet wide. Shoring or other types of trench boxes are typically used to stabilize the trench.

**Table 3-4: Summary Characteristics: Willimantic South Underground Variation**

Feature	Variation Characteristics
ROW Length (total):	10.7 miles
ROW Miles, by Town	Lebanon (0.8 mile) Windham (8.1 miles) Chaplin (1.8 miles)
New ROW Width Required:	Approximately 40 feet during construction, within or next to public road ROWs, except for splice vaults; 4-acre 345-kV line transition station site. Estimated 60-acre construction footprint, 11.2 acres of easements or new land acquisition required overall (4.2 acres splice vaults; 3 acres new underground easement along existing CL&P ROW; 4 acres line transition station). Additional permanent easements may be required to access each splice vault, depending on location
Length of Proposed Route to be Replaced:	11.6 miles
Underground Transmission System Base Design:	Underground cable system, consisting of buried ducts, cables, and splice vaults
ROW Vegetation Clearing Required:	6.8 acres of forested vegetation (adjacent to road ROWs and at transition station site). Additional vegetation clearing may be required at watercourse crossings.
Stream Crossings (number):	17, including Shetucket River (horizontal directional drill or jack and bore required to install the cable system) and Potash Brook
Wetland Crossings (number, acreage);	34, approximately 1.1 acres (trenching required)
Homes (number within 300 feet of ROW):	Numerous: route traverses suburban and urban areas
Cultural Resources	16 Native American archaeological sites within 1 mile; 72% of the unpaved portions of road ROWs is sensitive for locating archaeological sites. Seven significant above ground historic properties (including 32 individual structures or sites) – all within Windham -- are located within 500 feet of the variation.
Cost:	\$325.9 million

At approximately 1,600-foot intervals along the route, three pre-cast concrete splice vaults (one per each set of three XLPE cables) would be installed. Such splice vaults are required for pulling the transmission cables through the PVC conduits and for splicing the cables together. Once the system is operational, the vaults provide access to portions of the cable system for maintenance and repair activities. Each splice vault for the 345-kV transmission cables is approximately 10 feet wide by 10 feet deep and up to 32 feet long.

For the Willimantic South Underground Variation, three vaults would be required at each splice vault location. The excavation required for each vault typically is a minimum of approximately 14 feet wide, 13 feet deep, and 36 feet long. Based on the 10.7-mile length of the underground route, and the requirement for splice vaults approximately every 1,600 feet, this variation would include 35 vault locations, each with three separate vaults (for a total of 105 vault excavations). Permanent easements,

amounting to approximately 0.3 acre per vault, would have to be acquired to provide access for operation and maintenance.

If the “along road” portions of the underground variation could be installed primarily within paved road ROWs (which is not certain), potential environmental effects associated with vegetation clearing would be minimized. However, the variation would involve continuous trenching and excavation for the cable system’s duct bank and splice vaults. This would result in extensive soil disturbance and potential direct effects to water resources, including small streams and wetlands. The installation of the cable system beneath larger watercourses (e.g., the Shetucket River) and railroads would require the use of special construction techniques (e.g., jack and bore or horizontal directional drilling [HDD]). In addition, the construction and operation of a new 345-kV line transition station on the eastern end of the cable system would require the acquisition and conversion to utility use of up to 4 acres of property. On the western end of the underground cable system, the line transition facilities could be accommodated within the fenced area at CL&P’s Card Street Substation.

Apart from the environmental effects associated with the excavation of a continuous trench for the cable system and for the installation of the splice vaults, the significant cost of this underground alternative, compared to the cost of overhead technology, makes this option impractical. Specifically, the cost of the underground variation is estimated at \$325.9 million. In comparison, the estimated capital cost of the portion of the Proposed Route (including through the Mansfield Hollow area) that the variation would replace is \$62.1 million.

The significant additional costs associated with the underground variation, compared to the use of overhead technology along the Proposed Route, would have to be borne by Connecticut ratepayers. CL&P estimates that the costs that would thus be allocated to Connecticut alone would be approximately \$283.6 million, as compared to approximately \$19.7 million for the segment of the Proposed Route replaced by this variation. Table 3-5 provides a comparative summary of the route variation and the portion of the Proposed Route that it would replace.

In sum, although this underground variation would be approximately 0.9 mile shorter than the portion of the Proposed Route that would be replaced, it would cost significantly more, take longer to install, and require continuous excavation through and direct impacts to both upland and water resource areas.

**Table 3-5: Comparison of the Willimantic South Underground Variation to the Proposed Project Segment (Overhead Line) to be Replaced**

Route Characteristic	Proposed Route Segment to be Replaced	Willimantic South Underground Variation
<b>Location, Design, and Appearance</b>		
Route Location (ROW, Town[s])	Existing CL&P ROW (Lebanon, Columbia, Coventry, Mansfield, Chaplin)	Within or adjacent to road ROWs, CL&P ROW (Lebanon, Windham, Chaplin)
Route Length (miles)	11.6 miles	10.7 miles
Splice Vaults (est. number)	N/A	35 sets (105 separate splice vaults)
New ROW Easements or Land Acquisition Required (est. acres)	5 acres (ROW expansion: USACE Property, Mansfield Hollow State Park and WMA)	11.2 acres (Line transition station and splice vaults) Underground easement rights along existing ROW and adjacent to road ROWs as needed
<b>Biological Resources</b>		
Upland Forest Clearing (est. acres)	57.3 acres	6.7 acres
Forested Wetland Clearing (est. acres)	8.9 acres	0.2 acre
Scrub-Shrub Clearing (est. acres)	8.6 acres (upland) 0.5 acre (wetland)	2.7 acres (upland) 0.9 acre (wetland)
Watercourse Crossings (no.)	24 (span)	3 (direct effects, trenching)
Wetlands, Permanent Effects (Fill) (est. acres)	1 structure 104 0.4 acre (access roads, structure)	Approximately 1.1 acres
Wetlands, Temporary Effects (est. acres)	1.1 acres (access road)	0.1 acre
<b>Land Uses</b>		
Designated Open Space or Recreational Uses along ROW (length)	0	0
CL&P-Owned Land Traversed	1.8 miles	Less than 0.1 mile
Total Construction ROW / Work Space, Temporary Land Disturbance (est. acres)	136 acres	60 acres
<b>Cost of Transmission Line Segment (\$ Million, \$ 2010 )</b>		
Capital Cost	\$62.1	\$325.9

### 3.3 UNIFORM EASEMENT EXPANSION ALTERNATIVE

In August 2008, CL&P identified the Uniform Easement Expansion Alternative as the initially preferred option for aligning the new 345-kV transmission line across the Mansfield Hollow area. This alternative would increase the total width of the CL&P ROW through the federal properties from 150 to 300 feet, thereby making the easement width across the federal lands consistent with the typical width of the easement on privately-owned properties along the rest of the 36.8-mile transmission line route in Connecticut. For this alternative, CL&P would obtain a grant of easement for the additional 150 feet in ROW width, amounting to a total of approximately 27 acres, from the federal government.

However, CL&P would only use portions of the additional 150-foot-wide easement, totaling approximately 11 acres of the total 27 acres, for the construction and operation of the new overhead 345-kV transmission line, parallel and adjacent to the existing 330 Line through Segments 1 and 2. Specifically, the portions of the additional 150-foot-wide ROW that would be cleared of vegetation, used for construction, and thereafter managed in low-growing vegetation that would not interfere with the safe operation of the line, would be the same as those that would be affected by the 11-Acre ROW Expansion Option (refer to Section 3.5), as follows:

- Along the approximately 0.9-mile segment of the ROW in Mansfield across Mansfield Hollow State Park and WMA, including the span of Mansfield Hollow Lake, CL&P would use 55 feet of the additional 150-foot-wide ROW to install the new transmission line using steel delta monopole structures, with a typical height of 130 feet; and
- Along the approximately 0.5-mile segment of the ROW across and in the vicinity of the Natchaug River, CL&P would use 85 feet of the additional 150-foot-wide easement to install the new transmission line using H-frame structures, with a typical height of 85 to 90 feet.

The remainder of the 150-foot-wide additional easement areas (amounting to approximately 16 acres) would not be affected by the planned transmission line construction or operation, and would remain as a vegetated buffer, unless and until required by CL&P for utility use at some point in the indefinite future. The additional 55- and 85-foot widths represent the minimum needed for the construction, operation, and maintenance of the new 345-kV transmission line, assuming the installation of transmission structures that would be similar in design and typical height to those of the existing 330 Line. These limits also reflect the required clearances between the new transmission line (using matching structures) and both the existing 330 Line conductors and vegetation.

As a result, the near-term environmental effects of selecting the Uniform Easement Expansion Alternative would be the same as described for the 11-Acre ROW Expansion Option (refer to Section 3.5), since the

new 345-kV line would be installed in the same location under either option. However, under the Uniform Easement Expansion Alternative:

- The federal government would convey a grant of easement for 27 acres to CL&P, allowing CL&P to obtain easement rights for a uniform 300-foot-wide ROW through the federal properties.
- CL&P would acquire the right to utilize the entire 300-foot-wide ROW, should additional transmission lines be needed in an indefinite future time.
- CL&P would maintain undisturbed vegetative buffer zones within the 300-foot-wide ROW, pursuant to electric transmission line standards and any agreements with the USACE and CT DEEP regarding the use of the ROW.

This alternative was dismissed from consideration after consultations with CT DEEP and the USACE in the fall 2008. At that time, CL&P determined that the new 345-kV transmission line could be installed across the Mansfield Hollow area using the 11-Acre ROW Expansion Option, at a lower cost, while using the same line matching structure design and resulting in the same limited adverse environmental effects.

### **3.4 UNDERGROUND ROUTE ALTERNATIVES**

As part of the evaluation of transmission line alternatives, CL&P evaluated two underground alternative routes for the entire Connecticut portion of the Project. Both underground alternatives would traverse approximately 39 miles and would use a buried cable system, installed along a combination of road ROWs and the existing CL&P ROW. Along the western portion of the route, both of these alternatives would be aligned along road ROWs in Windham and Chaplin (generally following the same route as the Willimantic South Underground Variation) and would avoid an alignment through the federally-owned Mansfield Hollow area properties. These underground route alternatives are summarized in Section 3.4.1 and are discussed in detail in CL&P's Project Application to the CSC (refer to Volume 1A, Sections 14.3.3.5 and 14.3.3.6).

In addition, CL&P initially reviewed the feasibility of two alternative routes for the development of a 345-kV transmission line in an underground cable system configuration through only the Mansfield Hollow area. These alternatives, which are discussed in Section 3.4.2, would involve the installation of an underground cable system (conduits, cable, and splice vaults):

- Within an approximately 2.5-mile segment of the existing overhead 345-kV line ROW, including within the 150-foot-wide ROW across the 1.4 miles of federal property in the Mansfield Hollow area and across the approximately 0.8-mile segment of existing 300-foot-wide ROW on privately-owned property between Segments 1 and 2; or

- Beneath or adjacent to existing road ROWs that traverse through the federally-owned lands, such as Bassetts Bridge Road.

However, as described further in the following subsections, all of these underground alternatives were determined to be impractical, due to overriding environmental, engineering, and/or cost factors. As a result, each was eliminated from consideration as a viable alternative.

### **3.4.1 Underground Line-Route Alternatives: Connecticut Portion of the Project**

As part of the alternatives analysis process, CL&P evaluated routes along a combination of both highway and transmission line ROWs to achieve the objectives of minimizing the overall length of the route, avoiding or minimizing adverse environmental and social effects, and minimizing cable-system costs.<sup>9</sup> This combined highway and transmission line ROW underground route alternative was identified and considered after CL&P determined that the development of an underground transmission system exclusively within the existing CL&P ROW or exclusively within or adjacent to road ROWs would be impractical due to significant constructability issues and environmental constraints (e.g., large waterbody crossings such as Mansfield Hollow Lake along an in-ROW route, crossings of wetlands and waterbodies that are spanned by highways).

Accordingly, as the shortest potential alignment for an underground cable system between Card Street Substation, Lake Road Switching Station, and National Grid's facilities at the Connecticut / Rhode Island border, CL&P identified a 39.1-mile route that would use a combination of ROWs (road and CL&P transmission line) and would involve a short (1.1-mile) segment of overhead line in the Town of Thompson. This alternative assumed that National Grid's new 345-kV line would be overhead and, therefore, the new CL&P line would also have to be in an overhead configuration to interconnect with the National Grid line at the Connecticut / Rhode Island border.

A variation to this combination highway and transmission line route also was identified that would involve no overhead line segments, instead aligning the eastern-most portion of the route entirely underground. Because both of these alternative underground routes would follow the same alignment to avoid the Mansfield Hollow area (i.e. a route along road ROWs in Lebanon, Windham, and Chaplin), this discussion focuses on the Combination Highway and Transmission Line ROW Underground Alternative Route.

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<sup>9</sup> Note: Any underground 345-kV cable system for the Project would be significantly more costly than an overhead 345-kV line. Consequently, the goal in the underground cable-route alternatives evaluation was to identify the most potentially desirable underground cable alignment: that is, the route that would minimize the costs and environmental and social effects compared to other cable routing options.

Along this route, the new 345-kV line would consist of approximately 38 miles of underground cable system extending for approximately 36.3 miles along road ROWs and for 1.8 miles along two segments of CL&P's existing transmission line ROW. Along the remaining 1.1-mile segment of the route (between a new 345-kV line transition station in the Town of Thompson and the Connecticut / Rhode Island border), the new 345-kV line would be developed in an overhead configuration.

For this alternative, a new 345-kV line transition station would be required on the Connecticut side of the Connecticut / Rhode Island border to interconnect to National Grid's overhead 345-kV transmission line (assuming the underground cable route did not continue into Rhode Island). A potential site for this line transition station was identified on property owned by CL&P east of Quaddick Town Farm Road and Elmwood Hill Road in the Town of Thompson. However, to accommodate the line transition station, it is likely that some additional adjacent privately-owned property would have to be purchased.

Line transition facilities also would have to be developed at CL&P's Card Street Substation and Lake Road Switching Station. These line transition facilities would likely require the expansion of both stations beyond the existing station fence lines.

The cable system would have to be installed across all of the watercourses using methods such as a highway bridge attachment (if the bridges have the design capacity to handle the weight of the cable system and if the Connecticut Department of Transportation [ConnDOT] permits the attachment) or a subsurface crossing method (jack and bore, HDD). In addition, the cable system would have to be installed beneath Interstate 395 and railroads using HDD or jack and bores. The installation of the cable system beneath watercourses, roads, and railroads would require substantial staging areas, typically on private property, on either side of the crossing in order to position construction equipment and materials.

Except for the isolated crossings where trenchless technologies (e.g., HDD, jack and bore) could be used, the cable-system installation would require continuous excavations for the duct banks, as well as excavations for splice vaults. ConnDOT would likely specify that splice vaults be located outside of state road ROWs, thus requiring the acquisition of easements from private property owners and land disturbance on such private property. Where the cable system could be installed within the paved portions of road ROWs, lane closures (resulting in traffic delays), trench dewatering (where groundwater is encountered), and trimming of trees overhanging or adjacent to the ROWs, would be required.

Where the underground cable system would be aligned within CL&P's transmission line ROW in the towns of Putnam and Thompson, it would directly affect wetlands, habitat for state-listed species, and various confirmed vernal pools and amphibian breeding habitats.

The majority of the road ROWs along which the underground cable system route would be located were selected because they are generally wide enough to accommodate the construction of a cable system, using lane closures, rather than full road closures. However, these roads also represent important components of the regional highway system. As a result, they generally traverse more developed areas and, in some locations, residential, commercial, and industrial uses abut the road ROWs. Such land uses would be affected in areas where the construction or alignment of the cable system would have to occur on private property (e.g., at splice-vault locations, or areas where in-street buried utilities leave no space for the cable system).

Although the combined highway and transmission line ROW route reflects the optimal underground cable system alignment between Card Street Substation, Lake Road Switching Station, and National Grid's Rhode Island facilities, this alternative is not a practical, cost-effective, or environmentally-sound solution for meeting the Project objectives. Compared to an overhead transmission line configuration using existing CL&P ROWs, the use of the cable system along the combined alternative route would be significantly more expensive and would require substantially more time to construct, delaying the Project's scheduled in-service date by at least one year.

Whereas the estimated cost for the construction of the new 345-kV transmission line overhead is \$194.3 million (assuming the Proposed Action [5-Acre ROW Expansion] is constructed through the Mansfield Hollow area), the estimated cost for the combined underground alternative is \$1.1 billion.

In sum, the combined road and transmission line route alternative between the Card Street Substation and the Connecticut / Rhode Island border does not represent a practical, cost-effective, or environmentally-sound solution for meeting the Project objectives. Construction of the alternative would be prohibitively costly, would require more time to construct, would disrupt local traffic patterns, would result in potential environmental impacts associated with major watercourse crossings and land use/soil disturbance adjacent to roads, and would be more difficult to operate within the system than a comparable overhead line. For these reasons, this alternative route, was eliminated from consideration as a viable option.

### 3.4.2 Underground Alternatives Reviewed in the Mansfield Hollow Area

CL&P conceptually reviewed the feasibility of installing a segment of underground cables to avoid an overhead transmission line alignment through the Mansfield Hollow properties. However, as described in the following subsections, neither of the options evaluated (i.e., underground cable system placed within road ROWs or underground cable system aligned within CL&P's existing 330 Line ROW) was determined to be practicable or cost-effective.

For example, typical 345-kV underground cable-system installation is 5-to-10 times more costly (about \$30-40 million/ mile) than comparable 345-kV overhead transmission line construction. The higher end of this range tends to apply when there are high real estate costs for the cable ROW and 345-kV line-transition stations and/or obstacles that require longer routing or special construction techniques, such as HDD. Compared to the \$14.3 million estimated cost of the Proposed Action (5-Acre Minimal ROW Expansion), an underground 345-kV cable system in the Mansfield Hollow area would cost thus between \$71.5 million and \$143 million, using the 5- to 10-times higher ratios. (Note that this cost range is for the use of a cable system only within the 1.4 miles of federal lands along the ROW. Longer cable system alternatives, such as discussed in Sections 3.4.2.1 and 3.4.2.2, would be even more costly.)

Moreover, whereas the cable system itself would be buried, above-ground 345-kV line transition stations, each requiring up to approximately 4 acres of land, would have to be built on either end of the cable system to interconnect to the overhead transmission line segments. Land for such line transition stations would have to be acquired from either the federal government or private landowners and then permanently dedicated to utility use.

If two separate segments of underground cable were installed (i.e., one for Segment 1 and one for Segment 2), separated by a 0.8-mile segment of overhead transmission line, a total of four 345-kV line transition stations would be required, involving up to a total of 16 acres of land acquisition and development. Even if a single 2.5-mile underground cable segment were installed (i.e., extending across Segment 1, the 0.8-mile section of privately-owned property, and Segment 2), two 345-kV line transition stations would be required on either end of the cable system, involving the acquisition of a total of 8 acres. Each 345-kV line transition station typically costs about \$15 million.

Compared to the Proposed Action, either of the underground alternatives would require more land permanent converted to utility use (i.e., 8 acres for two line transition stations, 16 acres for four line transition stations) and would be significantly more costly (between \$105 million -\$203 million,

including the four – eight 345-kV line transition stations). As a result, both underground variations were eliminated from detailed consideration, as described below.

### 3.4.2.1 In-ROW Underground Alternative

This alternative would involve the installation of an approximately 2.5-mile segment of nine underground 345-kV cables within CL&P's existing 150-foot-wide ROW through the Mansfield Hollow area in lieu of an overhead line. The underground segment would commence at a new, above-ground 345-kV line transition station, which would have to be constructed on an approximately 4-acre site near the intersection of the ROW and Bassetts Bridge Road (west of Mansfield Hollow Lake) in Mansfield. From this line transition station, the underground cables would extend east, following the existing transmission line ROW across the Mansfield Hollow Dam levee, through Mansfield Hollow State Park, beneath the lake, and across the WMA. The underground cable segment would continue within CL&P's ROW across the 0.8-mile segment of privately-owned land, located between the two federally-owned parcels, into the WMA in Segment 2. The underground segment would cross the Natchaug River and terminate near Willimantic Road (U.S. Route 6) in Chaplin, where a second line transition station would have to be constructed (on another 4-acre site) to connect the underground segment with the overhead transmission line.

After preliminary field reviews and engineering analyses, CL&P determined that this in-ROW underground alternative would not provide a practicable, cost-effective, or environmentally sound option for traversing the Mansfield Hollow area. The factors that led to the elimination of this alternative from detailed consideration included:

- The construction of the cable system would require the excavation of a continuous trench for the cable duct bank, as well as for the splice vaults. Within the 150-foot-wide existing overhead transmission line ROW, an approximately 40-foot-wide construction area would be required. This area would have to be entirely cleared of vegetation and graded as necessary to create a level and safe working area for the installation of the cable system.
- The development of two new line transition stations, one on each end of the underground cable segment and each requiring approximately 4 acres of land, would result in the conversion of up to 8 additional acres of land to utility use. The line transition stations include above-ground utility facilities similar to substations and would create visual contrasts with surrounding land uses. Further, the line transition station on the eastern end of the underground segment (near U.S. Route 6) would potentially have to be sited in a wetland.
- The underground cable system could not cost-effectively be installed across Mansfield Hollow Lake. The use of subsurface installation techniques, such as HDD or conventional bore, to install the cable system across the lake would be hampered by engineering and environmental

constraints, such as the topography on either side of the lake, length of the drilled crossing, and the lack of suitable staging areas. Further, even if the use of the HDD technique or other subsurface techniques were feasible, the cost of such an installation would be significant since three separate drills or bores, one for each of the three separate underground cable ducts, could be required.

### **3.4.2.2 Bassetts Bridge Road Underground Alternative**

Under this alternative, an underground cable segment would be located within or adjacent to local road ROWs (e.g., Bassetts Bridge Road, Bates Road, Station Road, and Willimantic Road [U.S. Route 6]) to avoid the alignment of the new 345-kV line across the 1.4 miles of federally-owned land. Because there are no roads that directly parallel the CL&P ROW in the Mansfield Hollow area, this alternative would extend for approximately 4 miles, and would replace a 2.5-mile segment of the proposed overhead line along CL&P's existing ROW.

However, initial field investigations revealed that this variation would not be practicable because an underground cable system could not be effectively installed either on or beneath (e.g., using HDD technology) the Bassetts Bridge Road crossing of Mansfield Hollow Lake. The topography, depth of the lake, length of the crossing, and lack of available space on either side of the lake to stage the crossing all combine to pose constraints to the cost-effective use of an HDD.

Attaching nine 345-kV transmission cables (and appurtenances) to a bridge is a complex operation that requires detailed engineering to determine the feasibility and practicality of attaching to the bridge support structures. At the Bassetts Bridge Road crossing of Mansfield Hollow Lake, the town or state would need to concur with the bridge attachment, as this effects bridge maintenance and reconstruction.

In addition to the Mansfield Hollow Lake crossing constraint, the development of the underground cable segment along local highways, such as Bassetts Bridge Road, would have adverse effects on traffic patterns and would require lane closures and possibly detours for substantial periods of time during construction. Bassetts Bridge Road is two lanes wide and provides primary access to various major recreational areas within the state park and WMA, including the state boat launch located on the western shore of the lake.

In addition, through the state park, Bassetts Bridge Road may be considered scenic, with bordering forest lands, vistas of the lake, and overhanging woody vegetation. Installation of a cable system within or adjacent to this and other local roads would require a 40-foot-wide construction work area and, in order

for cable system construction equipment to operate safely, tree trimming along the road would likely be required.

Lastly, this alternative would be significantly more costly than the \$14.3 million cost of the Proposed Action. Given the complexities of the crossing of Mansfield Hollow Lake and in-road construction issues, the development of the 4-mile cable system would likely be more than 10 times the cost of the overhead line (i.e., \$143 million), whereas the two line transition stations on either end of the cable system would cost an additional \$60 million. The total cost of this option thus would be more than \$200 million.

### **3.5 NO ROW EXPANSION OPTION ALONG EXISTING ROW**

The No ROW Expansion Option would involve the development of the new 345-kV line within CL&P's existing 150-foot-wide ROW through the federally-owned properties along Segments 1 and 2. To accommodate both 345-kV lines within the 150-foot-wide ROW, the existing 330 Line would have to be removed and rebuilt closer to the southern edge of the ROW, while the new 3271 Line would be installed within the northern portion of the 150-foot-wide ROW.

Both the reconstructed 330 Line and the new 345-kV line would require taller line structures than those presently used in either Segments 1 or 2. Overall, construction would be more complex and costly. Moreover, all of the vegetation within the existing 150-foot-wide ROW would have to be removed, including the existing forest vegetation along the southern portion of the ROW. After the completion of construction, vegetation within the entire 150-foot-wide ROW would be converted to scrub-shrub communities, consisting of low-growth species compatible with overhead transmission lines.

This option would require complex construction sequencing to install a temporary line of poles for the 330 Line, remove the existing 330 Line in each segment, install the new 345-kV line, and rebuild the 330 Line within the confines of the 150-foot-wide ROW. During the process of removing and relocating the 330 Line, circuit outages would be required. Appendix B.1 provides cross-sections (refer to XS-3-MH-NRE and XS-5-MH-NRE) and details regarding the proposed sequence for constructing this configuration option (refer to construction sequence drawings CS-3-MH-NRE and CS-5-MH-NRE) across Segments 1 and 2. [Note that while the length of the ROW across the federally-owned lands is approximately 1.4 miles, the length of the No ROW Expansion Option is 1.5 miles due to structure placement. The additional 0.1 mile is on privately-owned land, where CL&P's existing easement is 300 feet wide.]

### 3.5.1 Technical Description (Land Requirements, Design, Appearance, Cost)

**Land Requirements.** CL&P's existing easement through the federal lands allows the development of additional transmission lines within the 150-foot-wide ROW. The use of the No ROW Expansion Option would not require the acquisition of any additional easements from the USACE. On the federally-owned properties, it was assumed for the purposes of this evaluation that all access roads and construction work pads would be located within the existing 150-foot-wide ROW.

**Design and Appearance.** To accommodate the collocation of the two 345-kV lines within the 150-foot-wide ROW without violating conductor clearance requirements, both the rebuilt 330 Line and the new 345-kV transmission line would have to be supported on steel-monopole structures along Segments 1 and 2. Table 3-6 identifies the design and heights of the rebuilt 330 Line structures and new 345-kV line structures, compared to the design and heights of the existing 330 Line structures through the Mansfield Hollow area. Appendix B.1 includes mapsheets and cross-sections that illustrate the configurations of the rebuilt 330 Line and the proposed 3271 Line under the No ROW Expansion Option.

As Table 3-6 shows, along Segment 1, five existing 330 Line steel-pole delta structures and one existing steel-pole vertical structure, ranging in height from 106 feet to 137 feet, would be removed. Within Segment 1, the 330 Line would be reconstructed near the southern edge of the ROW on six, taller steel-monopole structures, ranging from 130 to 160 feet in height. Similarly, the steel-monopole structures along the new 3271 Line segment would range in height from 130 to 155 feet.

Through Segment 2, existing conductors and five of the existing 330 Line H-frame structures (which range in height from 73 to 81 feet) would be removed. Like Segment 1, both the rebuilt 330 Line and the new 3271 Line along Segment 2 would be supported on steel-monopole structures. The rebuilt 330 Line structures would range in height from 110 feet to 130 feet, whereas the proposed 3271 Line steel-pole structures would be 115 to 135 feet tall. XS-5-MH-NRE (refer to Appendix B.1) illustrates the typical configuration of the rebuilt 330 Line and the proposed 3271 Line along Segment 2 under the No ROW Expansion Option.

In addition to the removal and reconstruction of the existing 330 Line within Segments 1 and 2, two 330 Line H-frame tangent structures (Structure Nos. 9087 and 9094) within the 0.8-mile ROW segment between the federally-owned properties would have to be removed and reconstructed as vertical strain<sup>10</sup>

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<sup>10</sup> A strain structure, which is designed to withstand unbalanced tensions on one face of the structure, aligns insulators in series with conductors to bring wind, weight, and line angle loads to the structure.

structures. These structure changes would be required in order to transition from the 150-foot-wide ROW to the 300-foot-wide ROW segment.

As summarized in Table 3-6, Structure No. 9087, which is 103 feet tall and located on CL&P-owned property adjacent to and east of the WMA in Mansfield, would be reconstructed as a 160-foot-tall steel-pole strain structure. The proposed 3271 Line structure (Structure No. 88), which would be located generally parallel to and north of Structure No. 9087, would be the same design and height. Likewise, existing 330 Line Structure No. 9094, which is 68 feet tall and located just west of the western border of the WMA in Chaplin, would be removed and reconfigured as a 105-foot-tall vertical strain structure. The corresponding 3271 Line structure (Structure No. 95) would be the same design and height.

**Cost.** The cost of the No ROW Expansion Option is estimated at \$28.5 million. This cost is \$14.2 million more than the \$14.3 million cost of the Proposed Action (5-Acre Minimal ROW Expansion).

### **3.5.2 Construction Procedures and Sequence**

The overhead line construction procedures described in Section 2.3 also would apply to the development of the No ROW Expansion Option. However, the implementation of the No ROW Expansion Option would involve a detailed sequence of construction activities within both Segment 1 and Segment 2, as depicted generally on the Construction Sequence Drawings in Appendix B.1 (refer to Drawings CS-3-MH-NRE and CS-5-MH-NRE).

As these drawings illustrate, in order to accommodate two 345-kV circuits within the 150-foot-wide ROW and still maintain necessary conductor separations, the existing 330 Line would first have to be relocated from the center of the ROW along Segments 1 and 2. As a first step in accomplishing this relocation, temporary structures for one phase of the 330 Line would be erected along the southern edge of the ROW.

To minimize circuit outages and associated impacts during the reconstruction of the existing 330 Line segments and the development of the new 345-kV line, construction work would have to be carefully sequenced. The construction sequence would include the following steps:

**Table 3-6: Comparison of Structure Types and Heights: Existing 330 Line to No ROW Expansion Option**

Existing 330 Line				No ROW Expansion Configuration Option								
(Line 330 Structures to be Removed shown in Shading)				Rebuilt 330 Line			New 3271 Line					
Structure No.	Height (feet)	Base Elevation (feet)	Structure Type	Structure No.	Height (feet)	Base Elevation (feet)	Structure Type	Structure No.	Height (feet)	Base Elevation (feet)	Structure Type	
<b>Segment 1</b>												
9081	117	252.5	Delta Tangent	9081	150	254.2	Vertical Strain	82	150	253.5	Vertical Strain	
9082	137	258.2	Vertical Deadend	9082	130	258.4	Vertical DE	83	130	258.0	Vertical DE	
9083	117	235.1	Delta Tangent	9083	150	234.3	Vertical Tangent	84	150	233.9	Vertical Tangent	
9084	106	262.2	Delta Tangent	9084	135	257.0	Vertical Tangent	85	130	262.1	Vertical Tangent	
9085	111	256.0	Delta Tangent	9085	160	250.7	Vertical Tangent	86	150	261.0	Vertical Tangent	
9086	116	255.0	Delta Tangent	9086	160	251.7	Vertical Tangent	87	155	256.2	Vertical Tangent	
<b>0.8-mile Privately-Owned ROW Segment</b>												
9087	103	267.9	H-Frame Tangent	9087	160	266.6	Vertical Strain	88	160	268.8	Vertical Strain	
9088	81	354.1	3-Pole Deadend					89	95	364.6	3-Pole Running Angle	
9089	83	339.8	H-Frame Tangent					90	80	346.3	H-Frame Tangent	
9090	86	297.7	H-Frame Tangent					91	85	299.1	H-Frame Tangent	
9091	86	283.4	H-Frame Tangent					92	85	295.0	H-Frame Tangent	
9092	86	283.2	H-Frame Tangent					93	80	291.3	H-Frame Tangent	
9093	75	297.2	H-Frame Tangent					94	65	299.5	H-Frame Strain	
9094	68	275.4	H-Frame Tangent	9094	105	275.2	Vertical Strain	95	105	274.7	Vertical Strain	
<b>Segment 2</b>												
9095	81	247.1	H-Frame Tangent	9095	125	238.2	Vertical Tangent	96	115	247.4	Vertical Tangent	
9096	77	281.7	H-Frame Tangent	9096	115	280.1	Vertical Tangent	97	115	281.1	Vertical Tangent	
9097	73	255.1	H-Frame Tangent	9097	110	258.0	Vertical Tangent	98	115	251.8	Vertical Tangent	
9098	80	250.3	H-Frame Tangent	9098	130	253.2	Vertical Tangent	99	135	248.6	Vertical Tangent	
9099	75	260.0	3-Pole Running Angle	9099	115	260.7	Vertical Strain	100	120	259.1	Vertical Strain	

Existing 330 Line Structures to Remain

For illustrations of typical H-frame and steel-pole (i.e., delta, vertical) structures, refer to Appendix 3B.

- Remove vegetation from the entire 150-foot-wide ROW along Segments 1 and 2. (*Note:* Scrub-shrub vegetation along the ROW on the slopes adjacent to Mansfield Hollow Lake and abutting the Natchaug River would not have to be removed because no structures would be removed or installed in these areas. However, across the full 150-foot-width of the ROW, trees would have to be trimmed or removed adjacent to these waterbodies.)
- Develop access roads and work pads along and to the ROW, where necessary. Multiple work pads and access roads would be required to reach and subsequently perform construction activities at the existing 330 Line structure sites, the temporary 330 Line pole sites, and the sites of the relocated 330 Line and new 3271 Line structures.
- Install a temporary, single-wood-pole line to support one phase of the 330 Line. The poles of this temporary line would be aligned approximately 20 feet from the southern edge of the ROW. The temporary wood-pole line would support the relocated northerly phase conductors of the existing 330 Line segment.
- Relocate the northerly phase conductors on the 330 Line to the temporary wood poles and then remove the un-used arms of the existing 330 Line segment.
- Install the steel monopoles and vertically-configured conductors for the new 345-kV line segment.
- Temporarily use the new 345-kV transmission line segment to support all phases of the 330 Line segment.
- Remove the existing 330 Line structures (delta steel monopoles and H-frames) and the temporary wood-pole line. The concrete foundations for the existing 330 Line monopole structures in Segment 1 would typically be chipped to 2 feet below grade and then covered with soil. The wood poles for the H-frames along Segment 2 would typically be removed from upland areas, but in wetlands would typically be cut flush with the ground surface and left in place.
- Install the new steel monopoles and conductors for the relocated 330 Line segment.
- Reconnect the existing 330 Line to its replacement line segment.
- Complete the new 345-kV line using the new line segment.
- Remove temporary work pads and access roads and restore the ROW.

During the cutover (transfer) of one phase of the 330 Line to the temporary structures, a circuit outage would be required. Likewise, after the new 345-kV transmission line section is installed, a two- to three-day outage would be required to temporarily cutover the 330 Line to the new line segment. Upon completion of the new line segments for the 330 Line, a three- to four-day outage would be required for cutovers to the final configurations of both circuits. These outages could be difficult to schedule and could result in outage-related costs to consumers. Overall, the construction of this option also would take

about four months (twice as long as the schedule for the construction of the new 345-kV line using either the Proposed Action or the 11-Acre ROW Expansion Option).

### **3.5.3 Existing Environmental Features**

The environmental resources along the existing 150-foot-wide ROW that would be affected by the No ROW Expansion Option are illustrated on the mapsheets in Appendix B.1 and are summarized in Table 3-7. In general, these environmental resources are similar to those described for the Proposed Action (5-Acre Minimal ROW Expansion) in Section 4 of this document.

### **3.5.4 Potential Environmental Effects and Mitigation Measures**

In evaluating the No ROW Expansion Option, CL&P considered the potential effects to the environmental resources within the ROW segments across the federally-owned properties in Mansfield Hollow, as well as the potential incremental effects on the visual character of the surrounding areas. In general, the types of potential environmental effects and mitigation measures associated with the development of the proposed 3271 Line using the No ROW Expansion Option would be similar to those described in Section 5 for overhead transmission line construction for the Proposed Action (i.e., the 5-Acre Minimal ROW Expansion).

However, because the No ROW Expansion Option would involve the removal and reconstruction of the existing Line 330 structures, construction activities would affect the majority of the ROW along both Segments 1 and 2, thus leaving little flexibility for avoiding in-ROW environmental resources. Table 3-7 summarizes the potential environmental effects of the No ROW Expansion Option. These potential impacts were estimated by applying standard assumptions regarding construction requirements for access roads and work pads, based on the No ROW Expansion Option structure configurations and construction sequence requirements.

To construct this configuration option, most vegetation (including all forested areas) within the 150-foot width of the ROW would have to be removed and the entire width of the ROW (except for the span crossings of Mansfield Hollow Lake and the Natchaug River) would likely be directly affected by construction activities. Construction activities would include, in addition to vegetation removal, grading, temporary access road construction and use, 330 Line structure removals, temporary pole and conductor installation, new structure and conductor installation, and then the removal of the temporary structures and conductors. After the new 3271 Line and the rebuilt 330 Line are installed, the entire 150-foot-wide ROW would be restored and managed in scrub-shrub vegetation.

**Table 3-7: No ROW Expansion Option: Summary of Environmental Resources and Potential Environmental Effects, by ROW Segment (Assumes use of entire 150-foot-wide ROW)**

ENVIRONMENTAL FEATURE	POTENTIAL ENVIRONMENTAL EFFECTS, BY SEGMENT		OPTION TOTAL
	1	2	
ROW Length (miles)	1.0 (0.9 federal land)	0.5	1.5
Towns	Mansfield	Chaplin	
Construction ROW Width (feet)	150	150	
New ROW Width Required (feet)	0	0	0
<b>Water Resources</b>			
Waterbody Crossings (number / name)	1 1 span (Mansfield Hollow Lake)	2 1 span (S20-22 Natchaug River), 1 crossing with temporary culvert for pad (S20-24)	3 (2 spans, 1 temporary culvert)
<b>Wetlands</b>			
Number of Wetlands Affected (number / name)	2 W20-65, W20-66 (Mansfield Hollow Lake border)	6 W20-70, W20-71, W20-72/73, W20-75, W20-76, W20-77	8
Wetlands, Temporary Effects (est.)	< 0.1 acre	3.1 acre	3.1 acres
Wetlands, Permanent Fill Effects (est.)	0	< 0.1 acre	< 0.1 acre
<b>Vegetation</b>			
Vegetation Potentially Affected (est.)			
Forested Upland	4.2 acres	1.7 acres	5.9 acres
Forested Wetland	< 0.1 acre	0.8 acre	0.8 acre
Scrub-shrub Upland	6.8 acres	5.0 acres	11.8 acres
Scrub-shrub Wetland	< 0.1 acre	2.3 acres	2.3 acres
Open Field Upland	2.3 acres	0	2.3 acres
<b>Subtotal Vegetation</b>	<b>13.3</b>	<b>9.8</b>	<b>23.1</b>
<b>Biological Resources</b>			
Vernal Pools Affected (number)	0	2 CH-1-VP (in W20-70), CH-2-VP (in W20-72/73)	2
Natural Diversity Database Areas (number)	1	1	2
<b>Land Use / Recreational Areas (miles along ROW)</b>			
Mansfield Hollow State Park	0.8 mile	0	0.8 mile
Mansfield Hollow WMA	0.1 mile	0.5 mile	0.6 mile
Trails	3 Levee Trail, Red Trail (in Park); Nipmuck Trail East Branch (within WMA)	0	3
<b>Visual Resources</b>			
Structure Appearance	Weathering Steel Finish	Weathering Steel Finish	
<b>Transportation</b>			
Road Crossings	1 Bassetts Bridge Road	0	1
<b>Cultural Resources</b>			
Designated Historic Sites	1 Mansfield Hollow Dam Historic District	0	1

**Notes:**

- All vegetation within the 150-foot-wide ROW assumed to be affected by the complex construction sequence required for this configuration.
- The wetland bordering Mansfield Hollow Lake (designated as Wetland W20-66) would be spanned, but within the ROW some tree removal or trimming would be required. Secondary effects associated with this tree clearing are not included.
- Wetland impacts estimated based on preliminary survey data and preliminary locations of structures, work pads, and access roads. All effects except structure locations are assumed to be temporary (i.e., work pads and access roads across wetlands would be removed after the completion of construction. All access roads are assumed to be within the 150-foot-wide ROW. Estimates for forested wetland vegetation clearing assume wetland W20-73 near Natchaug River (Segment 2) would be affected across the entire 150-foot-wide ROW. Stream S20-24 would be crossed on USACE property, but the culvert would be installed on privately-owned easement just to the east of the federal lands. Second culvert would be on USACE property.

Moreover, the No ROW Expansion Option has the potential to result in comparatively greater long-term, visual effects due to the use of taller and different types of transmission line structures than those that presently characterize the existing 330 Line through Segments 1 and 2. As summarized in Table 3-6, the rebuilt 330 Line and new 3271 Line structures would mostly range from 29 to 49 feet taller than the existing steel-pole delta structures along Segment 1, and from 34 feet to 55 feet taller than the existing wood-pole H-frame structures along Segment 2. (Along Segment 1, one of the new structures would be slightly shorter than the tallest existing 330 Line structures due to differences in the placement of the structures and topography.)

Appendix B.1 includes “leaf off” and “leaf on” photo-simulations that illustrate the anticipated appearance of the ROW along Segment 1 at different seasons of the year, after implementation of the No ROW Expansion Option. Based on field investigations and on the photo-simulations, the taller structures required for the No ROW Expansion Option would be potentially more visible than the structures of the Proposed Action (i.e., the 5-Acre Minimal ROW Expansion) from various locations in the vicinity of Mansfield Hollow State Park (e.g., Mansfield Hollow Lake and Dam, the levee trail both north and south of the dam, Bassetts Bridge Road, and U.S. Route 6). In most locations, this is not only because of the taller structures that would be required for the No ROW Expansion Option, but also because the existing 25-foot-wide area of forest vegetation located within the southern portion of the ROW would be removed.

However, this effect would be incremental since some of the existing structures are already visible from certain locations within the state park and WMA, including from points along the levee trail, the Red Trail within the park, and the Nipmuck Trail (East Branch) within the WMA, as well as from Mansfield Hollow Dam and vantage points along Bassetts Bridge Road and Mansfield Hollow Lake. The presence of the existing structures and ROW do not appear to affect the recreational uses of the state park and WMA, as evidenced by the four-season popularity of these areas. The difference in structure heights would be most apparent within Segment 2, where the existing H-frames (approximately 80 feet tall) would be replaced with steel-pole structures with heights of 110 feet to 135 feet.

In addition, compared to the Proposed Action, the No ROW Expansion Option would take longer to construct, thus increasing the time that the ROW across the federally-owned properties would be disturbed and increasing the potential for temporary nuisance effects to recreational users of the state park and WMA. Such effects could include disruptions in traffic patterns on Bassetts Bridge Road and other local roads leading to the Mansfield Hollow State Park and WMA, as well as disturbance to the recreational trails (Red Trail, Nipmuck Trail [East Branch]) that extend across the ROW in Segment 1.

### 3.5.5 Electric and Magnetic Fields

Electric and magnetic fields were calculated for the No ROW Expansion Option with the rebuilt 330 Line and the new 3271 Line configured as illustrated on the cross sections in Appendix B.1. The magnetic field calculations used represent anticipated transmission line annual average loading (AAL) conditions for the pre- Project (2015) and post-Project (2020) timeframes. (Refer to CL&P's CSC Application, Volume 1, Section 7 for details regarding the assumptions for these electric load conditions and other details concerning the EMF calculations. In addition, refer to Section 5.9 of this EA for additional information regarding electric and magnetic fields associated with the existing and proposed overhead transmission lines.)

For both the Segment 1 and Segment 2 portions of the ROW, magnetic and electric fields analyses were conducted to calculate the EMF levels produced by the following:

- The existing 330 Line alone;
- The existing 330 Line with the new 3271 Line assuming that the No ROW Expansion Option is implemented; and
- The existing 330 Line with the new 3271 Line assuming that the Proposed Action (5-Acre Minimal ROW Expansion) is implemented.

Electric and magnetic fields were calculated at the northern ROW edge, the southern ROW edge, and within the ROW. (Note that whereas the southern ROW remains the same under all three calculation scenarios, the northern ROW edge location is 25 feet and 35 feet wider in Segments 1 and 2 for the Proposed Action.) Table 3-8 summarizes the results of these studies.

As illustrated in Table 3-8, the No ROW Expansion Option would produce magnetic field levels that are comparable, or even lower, than the existing levels along the ROW edges and generally across the ROW width for each of the Mansfield Hollow ROW segments. This reduction would be most pronounced in Segment 2.

**Table 3-8: Summary of Electric and Magnetic Field Levels at ROW Edges for Existing 330 Line, Proposed Action (5-Acre Minimal ROW Expansion), and the No ROW Expansion Option**

ROW Segment and Cross-Section	Transmission Line Loading Conditions	Magnetic Field (mG)		Electric Field (kV/m)	
		North ROW Edge*	South ROW Edge	North ROW Edge*	South ROW Edge
Segment 1					
Existing 330 Line	Pre-Project (2015)	21.9	24.7	1.10	0.86
Proposed Action (refer to Appendix A.2; XS-3-MH-MRE)	Post-Project (2020)	38.1	26.4	0.70	1.00
No ROW Expansion Option (refer to Appendix B.1; XS-3-MH-NRE)	Post-Project (2020)	21.7	20.8	0.62	0.62
Segment 2					
Existing 330 Line	Pre-Project (2015)	35.2	35.2	1.63	1.63
Proposed Action (refer to Appendix A.2; XS-5-MH-MRE)	Post-Project (2020)	42.7	31.8	0.70	1.80
No ROW Expansion Option (refer to Appendix B.1; XS-5-MH-NRE)	Post-Project (2020)	21.7	20.8	0.62	0.62

\* For the Proposed Action, the north edge of ROW is 25 feet wide along Segment 1 and 35 feet wider along Segment 2.

### 3.5.6 Comparison of the No ROW Expansion Option and the Proposed Action (5-Acre Minimal ROW Expansion)

The No ROW Expansion Option is a viable configuration for the alignment of the new 345-kV transmission line across the federally-owned properties in the Mansfield Hollow area. However, the selection of this option over the Proposed Action (the 5-Acre Minimal ROW Expansion) would involve increased costs to consumers, several outages of the 330 circuit during construction, a longer construction schedule within Mansfield Hollow State Park and WMA, and more extensive land disturbance and environmental effects within the existing 150-foot-wide ROW.

In comparison, using CL&P's Proposed Action, the grant of the 5 additional acres of easement across the federally-owned properties, would allow the installation of the new 345-kV transmission line to be accomplished more cost-effectively and efficiently through the Mansfield Hollow area properties. Further, because the existing 330 Line would not have to be removed and rebuilt, the Proposed Action would result in less disturbance along the existing ROW during construction and would not affect the

non-managed forest vegetation along the southern boundary of the ROW. However, land would be disturbed along the northern portion of the existing 150-foot-wide ROW and within the entire 5-acre easement expansion area.

Overall, along Segment 1, the same amount of additional forest clearing (50-foot width) would be required for either the No ROW Expansion Option or the Proposed Action; only the location of the vegetation clearing would vary. Specifically, if the No ROW Expansion Option were implemented along Segment 1, all of forest vegetation within the 25-foot-wide un-managed areas that border either side of the 100-foot-wide managed portion of the ROW would be cleared.

In comparison, for the Proposed Action, the existing 25-foot-wide area of forested vegetation along the southern portion of the existing ROW would not be affected. However, a 50-foot-wide area of forest vegetation would be removed along the northern portion of the ROW (consisting of the existing 25 feet of forest within the existing 150-foot-wide ROW and the proposed 25-foot-wide ROW expansion area).

Table 3-9 compares the No ROW Expansion Option to the Proposed Action. In addition to the impacts summarized in Table 3-9, the No ROW Expansion Option would be substantially more expensive, costing approximately \$28.5 million, compared to an estimated \$14.3 million for the Proposed Action.

**Table 3-9: Comparison of Proposed Action (5-Acre Minimal ROW Expansion) and No ROW Expansion Option  
(Areas Affected by Construction: Portions of Existing ROW and Easement Expansion)**

FACTOR	SEGMENT 1		SEGMENT 2	
	PROPOSED ACTION	NO ROW EXPANSION OPTION	PROPOSED ACTION	NO ROW EXPANSION OPTION
<b>Location, Design, and Appearance</b>				
Length (miles)	1.0 (0.9 mile federal land)	1.0 (0.9 mile federal land)	0.5	0.5
New ROW Required (approximate acres)	2.6 acres	0	2.2 acres	0
Structure Height Range (feet) (Existing 330 Line Structure Height Ranges: 106-137 feet in Segment 1; 68-81 feet in Segment 2)	125-155	130-160 (rebuilt 330 Line), 130-155 (new 3271 Line)	115-135	110-130 (rebuilt 330 Line), 115-135 (new 3271 Line)
<b>Environmental Resources</b>				
<b>Waterbodies</b>				
Waterbody crossings (number)	1 (Mansfield Hollow Lake)	1 (Mansfield Hollow Lake)	2 Natchaug River (S20-22); S20-24	2 Natchaug River (S20-22); S20-24
<b>Wetlands</b>				
Temporary Wetland Effects	0	< 0.1 acre	0.8 acre	3.1 acres
Permanent Wetland Fill Effects	0	0	< 0.1 acre	< 0.1 acre
<b>Vegetation and Land Uses</b>				
Forested Upland Vegetation Removal	3.7 acres	4.2 acres	2.1 acres	1.7 acres
Forested Wetland Vegetation Removal	0	< 0.1 acre	1.3 acres	0.8 acre
Scrub-Shrub Upland Vegetation Potentially Affected	2.6 acres	6.8 acres	1.4 acres	5.0 acres
Scrub-Shrub Wetland Vegetation Potentially Affected	0	< 0.1 acre	0.8 acres	2.3 acres
Open Field Upland Vegetation Potentially Affected	1.2 acres	2.3 acres	0	0
<b>Subtotal: Vegetation</b>	<b>7.5 acres</b>	<b>13.3 acres</b>	<b>5.6 acres</b>	<b>9.8 acres</b>
Open Water	1.1 acres	1.9 acres	0.1 acre	0.3 acre
Road ROWs / Levee Trail	0.3 acre	0.5 acre	0	0
<b>Total: Vegetation and Land Uses</b>	<b>8.9 acres</b>	<b>15.7 acres</b>	<b>5.7 acres</b>	<b>10.1 acres</b>
<b>Biological Resources</b>				
Vernal Pools Potentially Affected	0	0	2 CH-1-VP (in W20-70), CH-2-VP (in W20-72/73)	2 CH-1-VP (in W20-70), CH-2-VP (in W20-72/73)
State-listed Species Habitat Traversed	1	1	1	1
<b>Visual Resources</b>				
Difference in existing and proposed structure heights	7 feet shorter to 43 feet taller	8 feet shorter to 44 feet taller	27 feet shorter to 59 feet taller	34 to 53 feet taller

**Table 3-9 Notes:**

Vegetation types were determined by land use data and delineated wetland boundaries.

Potential environmental impacts for the comparisons presented in this table were estimated based on preliminary survey data and preliminary locations of structures, work pads, and access roads, as well as on estimated vegetation removal limits associated with each configuration. These assumptions are as follows:

1. For the Proposed Action (5-Acre Minimal ROW Expansion), it was assumed that the presently un-managed forested areas south of the existing Line 330 (which include approximately 25 feet along the south side of the ROW in Segment 1 and 5 feet along the southern portion of the existing ROW in Segment 2) would remain in place and would not be affected by the proposed Project (refer to Appendix A). Further, it is assumed that the areas affected by construction would typically include the following:
  - Segment 1. Along this 0.9-mile segment, construction workspace of 85 feet in width (typical) would be required. This workspace includes the 25-foot-wide ROW expansion area, plus the 25-foot-wide area of un-managed (generally forested) vegetation on the north side of the existing ROW and approximately 35 feet of shrubland within the existing CL&P ROW, north of the 330 Line conductors (for the purposes of this analysis, it was assumed that construction work space would extend up to 15 feet from the northern outside conductors on the 330 Line).
  - Segment 2. Along this 0.5-mile segment, construction workspace of 85 feet in width (typical) would be required. This workspace includes the 35-foot-wide ROW expansion area, plus the 5-foot-wide area of un-managed (generally forested) vegetation on the north side of the existing ROW and approximately 45 feet of shrubland to the north of the existing 330 Line conductors (15 feet from the outside conductors).
2. The No ROW Expansion Option assumes construction workspace (including vegetation removal) would be required within the entire 150-foot-wide ROW along both Segments 1 and 2 to accommodate the more complex sequence of construction activities, including the installation of the temporary poles for the relocation of the existing 330 Line (refer to Appendix B.1).

### 3.6 11-ACRE ROW EXPANSION OPTION

In 2009, CL&P identified a configuration for aligning the new 345-kV transmission line through the Mansfield Hollow area using structures that would match, in general appearance and height, the types of structures along the existing 330 Line, while requiring 11 additional acres of easement expansion through the federal properties. This 11-Acre ROW Expansion Option would result in generally minor environmental effects and would represent the least-cost alternative for developing the new line through the federally-owned lands. Accordingly, in its December 23, 2011 Application to the CSC, CL&P identified this option as the part of the proposed Project, but also stated that both the No ROW Expansion Option and the 5-Acre Minimal ROW Expansion represented viable alternatives.

After the submission of the CSC Application, in early 2012, CL&P consulted further with both the federal government (i.e., the USACE, as the landowner of the Mansfield Hollow properties) and the CT DEEP (which leases the properties from the USACE). Both agencies expressed a preference for the 5-Acre Minimal ROW Expansion Option because it would require less forested vegetation clearing and would minimize water resource effects, while still remaining close in cost to the original 11-Acre ROW Expansion configuration. Consequently, CL&P determined that the proposed Project should incorporate the 5-Acre Minimal ROW Expansion.

This section reviews the characteristics of the 11-Acre ROW Expansion Option compared to the Proposed Action.

#### 3.6.1 Technical Description (Land Requirements, Design, Appearance, Cost)

**Land Requirements.** For the 11-Acre ROW Expansion Option, 55 feet of additional easement would be required through the federal lands along Segment 1, while 85 feet of additional easement would be required across Segment 2. Overall, approximately 11 acres of additional easement would be required from the federal government (approximately 5.8 acres along Segment 1 and 5.2 acres along Segment 2).

**Design and Appearance.** The 11-Acre ROW Expansion Option would allow the development of the new overhead 345-kV transmission line north of and adjacent to the existing 330 Line through the 1.4 miles of federally-owned lands, using structures that are similar in height and appearance to those of the existing 330 Line. Thus, along Segment 1, the new 345-kV transmission line would be supported on steel-monopole structures with delta-configured conductors, whereas along Segment 2, the new 345-kV line would be supported on H-frame structures. Appendix B.2 provides cross-sections that illustrate the design and appearance of these structures and the additional easement width that would be required along

Segments 1 and 2 for this option. Table 3-10 identifies the design and heights of the new 345-kV line structures, compared to the design and heights of the existing 330 Line structures through the Mansfield Hollow area.

**Table 3-10: Comparison of Structure Types and Heights: Existing 330 Line and 11-Acre ROW Expansion Option (Using Matching Structures)**

Existing 330 Line				11-Acre ROW Expansion Option: New 3271 Line Using Matching Structures			
Structure No.	Height (feet)	Base Elevation (feet)	Structure Type	Structure No.	Height (feet)	Base Elevation (feet)	Structure Type
<b>Segment 1</b>				<b>Segment 1</b>			
9081	117	252.5	Delta Tangent	82	120	254.9	Delta Tangent
9082	137	258.2	Vertical Deadend	83	130	258.5	Vertical Deadend
9083	117	235.1	Delta Tangent	84	145	231.0	Delta Tangent
9084	106	262.2	Delta Tangent	85	115	261.9	Delta Tangent
9085	111	256.0	Delta Tangent	86	125	259.4	Delta Tangent
9086	116	255.0	Delta Tangent	87	135	255.4	Delta Tangent
<b>0.8-mile Privately-Owned ROW Segment</b>				<b>0.8-mile Privately-Owned ROW Segment</b>			
9087	103	267.9	H-Frame Tangent	88	140	268.2	H-Frame Tangent
9088	81	354.1	3-Pole Deadend	89	95	364.6	3-Pole Running Angle
9089	83	339.8	H-Frame Tangent	90	80	346.3	H-Frame Tangent
9090	86	297.7	H-Frame Tangent	91	85	299.1	H-Frame Tangent
9091	86	283.4	H-Frame Tangent	92	85	295.0	H-Frame Tangent
9092	86	283.2	H-Frame Tangent	93	80	291.3	H-Frame Tangent
9093	75	297.2	H-Frame Tangent	94	65	299.5	H-Frame Tangent
9094	68	275.4	H-Frame Tangent	95	70	272.6	H-Frame Tangent
<b>Segment 2</b>				<b>Segment 2</b>			
9095	81	247.1	H-Frame Tangent	96	80	239.1	H-Frame Tangent
9096	77	281.7	H-Frame Tangent	97	70	275.9	H-Frame Tangent
9097	73	255.1	H-Frame Tangent	98	80	247.6	H-Frame Tangent
9098	80	250.3	H-Frame Tangent	99	80	246.5	H-Frame Tangent
9099	75	260.0	3-Pole Running Angle	100	85	262.9	3-Pole Running Angle

Notes:  
For illustrations of typical H-frame and steel-pole delta structures, refer to the cross-sections in Appendix B.

Within both Segment 1 and Segment 2, the new 3271 Line would be constructed near the northern edge of the expanded ROW. As identified in Table 3-10, the new steel-monopole structures along Segment 1 would range from 115 to 145 feet in height. Through Segment 2, the 3271 Line’s H-frame structures would be 70 to 85 feet tall.

**Cost.** The construction cost of the 11-Acre ROW Expansion Option is estimated at \$13.0 million, based on the use of new 345-kV transmission line structures that would generally match the structures on the existing 345-kV line (i.e., steel monopole structures with delta configurations in Segment 1 and H-frame structures in Segment 2). Principally because the H-frame structures would be less expensive to build than the steel monopoles planned for Segment 2 under the Proposed Action, this option would cost \$1.3 million less than the \$14.3 million estimated for the Proposed Action (5-Acre Minimal ROW Expansion). (Note: the construction cost excludes the cost of real estate (easement) acquisition, which would have to be determined based on consultations with the USACE.)

### 3.6.2 Construction Procedures and Sequence

The typical overhead line construction procedures and sequence described in Section 2 also would apply to the development of the 11-Acre ROW Expansion Option. Because the existing 330 Line would remain in place, no special construction sequence would be required. The construction activities would include the following:

- Remove vegetation along the northern portions of the ROW along Segments 1 and 2.
  - Along Segment 1, woody vegetation would be removed along a 80-foot-wide area (encompassing both the 25-foot-wide portion of the existing 150-foot-wide ROW that is not presently managed and the 55-foot-wide expanded easement area).
  - Along Segment 2, woody vegetation would be removed along a 90-foot-wide area (including the 5-foot-wide portion of the existing ROW that is not presently managed and the 85-foot-wide expanded easement area).

*(Note: Scrub-shrub vegetation along the ROW on the slopes adjacent to Mansfield Hollow Lake and abutting the Natchaug River would not have to be removed because no structures would be removed or installed in these areas. However, along these slopes, tree removal or trimming would be performed as required for consistency with overhead transmission line standards.)*

- Develop access roads along and to the ROW, where necessary.
- Install the structures and conductors for the new 345-kV line segments.
- Restore and reseed disturbed portions of the ROW.

After the installation of the new 3271 Line, 185 feet of the total 205-foot-wide ROW along Segment 1 would be managed in low-maturing vegetative species. The existing forested vegetation along the southern boundary of the ROW (south of the existing 330 Line) would not be affected. Similarly, along

Segment 2, 180 feet of the total 185-foot-wide expanded ROW would be managed in low-maturing vegetation. The approximately 5-foot-wide strip of existing forested vegetation located along the southern boundary of the ROW would not be affected.

### **3.6.3 Existing Environmental Features**

The environmental resources that would be affected by the 11-Acre ROW Expansion Option are illustrated on the mapsheets in Appendix B.2 and are summarized in Table 3-11. Most of these environmental features are the same as or similar to those that will be affected by the Proposed Action, as summarized in Section 4.

### **3.6.4 Potential Environmental Effects and Mitigation Measures**

The types of potential environmental effects and mitigation measures associated with the development of the proposed 3271 Line using the 11-Acre ROW Expansion Option would be similar to those described in Sections 2.3 and 5 for overhead transmission line construction for the Proposed Action (5-Acre Minimal ROW Expansion). However, the 11-Acre ROW Expansion Option would require approximately 6.2 more acres of land and thus would affect more environmental resources than the Proposed Action.

In general, the configuration of the new 345-kV line using the 11-Acre ROW Expansion Option would affect vegetation, soils, and water resources along the northern portion of the existing 150-foot-wide ROW, as well as within the 11 acres of additional easement width (5.8 acres along Segment 1 and 5.2 acres along Segment 2). Environmental resources (e.g., vegetation, soils, wetlands) located along the southern portion of the existing ROW and beneath the existing 330 Line would generally not be affected by the construction and operation of the new 3271 Line. Table 3-11 summarizes the potential effects of the 11-Acre ROW Expansion Option.

Appendix B.2 includes “leaf on” and “leaf off” photo-simulations that illustrate the anticipated appearance of the ROW along Segments 1 and 2 in different seasons, after implementation of the 11-Acre ROW Expansion Option. As these photo-simulations illustrate, the structures that would be used for this option would be very similar in height and appearance to the existing 330 Line structures.

**Table 3-11: 11-Acre ROW Expansion Option: Summary of Environmental Resources and Potential Environmental Effects, by ROW Segment  
(Areas Affected by Construction: Portions of Existing ROW and Easement Expansion)**

ENVIRONMENTAL FEATURE	POTENTIAL ENVIRONMENTAL EFFECTS, BY SEGMENT		OPTION TOTAL
	1	2	
ROW Length (miles)	1.0 (0.9 mi. federal property)	0.5	1.5
Towns	Mansfield	Chaplin	
ROW Expansion Width (feet)	55	85	
Construction ROW Width (feet)	80	90	
New ROW Width Required (feet)	55	85	0
<b>Water Resources</b>			
<b>Waterbodies</b>			
Waterbody Crossings (number / name)	1 1 span (Mansfield Hollow Lake)	3 1 span (S20-22 Natchaug River), 1 crossing (S20-23), 1 work pad (S20-24)	4 2 spans, 1 crossing, 1 work pad
<b>Wetlands</b>			
Number of Wetlands Affected (number / name)	1 W20-66 (Mansfield Hollow Lake border, possible tree trimming)	6 W20-70, W20-72/73, W20-74, W20-75, W20-76, W20-77	7
Wetlands, Temporary Effects (est.)	0	0.8 acre	0.8 acre
Wetlands, Permanent Fill Effects (est.)	0	< 0.1 acre	< 0.1 acre
<b>Vegetation</b>			
Vegetation Potentially Affected (est.)			
Forested Upland	6.0 acres	4.1 acres	10.1 acres
Forested Wetland	0	2.5 acres	2.5 acres
Scrub-shrub Upland	2.6 acres	1.4 acres	4.0 acres
Scrub-shrub Wetland	0	0.8 acre	0.8 acre
Open Field Upland	1.6 acres	0	1.6 acres
<b>Subtotal: Vegetation</b>	<b>10.2 acres</b>	<b>8.8 acres</b>	<b>19.0 acres</b>
<b>Biological Resources</b>			
Vernal Pools Affected (number)	0	2 CH-1-VP (in W20-70), CH-2-VP (in W20-72/73)	2
Natural Diversity Database Areas (number)	1	1	2
<b>Land Use / Recreational Areas (miles along ROW)</b>			
Mansfield Hollow State Park	0.8 mile	0	0.8 mile
Mansfield Hollow WMA	0.1 mile	0.5 mile	0.6 mile
Trails	3 Levee Trail, Red Trail (in Park); Nipmuck Trail East Branch (within WMA)	0	3
<b>Visual Resources</b>			
Structure Appearance	Monopole; Galvanized Steel Finish 115-145 feet in height	H-Frame; Weathering Steel Finish 70-85 feet in height	
<b>Transportation</b>			
Road Crossings	1 Bassetts Bridge Road	0	1
<b>Cultural Resources</b>			
Designated Historic Sites	1 Mansfield Hollow Dam Historic District	0	1

**Table 3-11 Notes:**

Vegetation types were determined by land use data / aerial photo interpretation, field surveys, and delineated wetland boundaries.

The wetland bordering Mansfield Hollow Lake (Wetland W20-66) in Segment 1 would be spanned. Trees in this wetland would be cut or trimmed to maintain clearance from conductors, as required. These secondary effects are not included in this table.

Potential environmental impacts presented in this table were estimated based on potential preliminary locations of structures, and access roads, as well as on standard assumptions regarding access roads and work pad dimensions. These assumptions are as follows:

1. It was assumed that the presently un-managed forested areas south of the existing Line 330 (which include approximately 25 feet along the south side of the ROW in Segment 1 and 5 feet along the southern portion of the existing ROW in Segment 2) would remain in place and would not be affected by the 11-Acre ROW Expansion Option. Further, it was assumed that the areas affected by construction would typically include the following (refer to Appendix B.2 for cross-section drawings):
  - Segment 1. Along this 0.9-mile segment, construction workspace of 115 feet in width (typical) would be required to install the delta-steel monopoles. This workspace includes the 55-foot-wide ROW expansion area, plus the 25-foot-wide area of un-managed (generally forested) vegetation on the north side of the existing ROW and approximately 35 feet of shrubland within the existing CL&P ROW, north of the 330 Line conductors (for the purposes of this analysis, it was assumed that construction work space would extend up to 15 feet from the northern outside conductors on the 330 Line.
  - Segment 2. Along this 0.5-mile segment, construction workspace of 135 feet in width (typical) would be required to install the H-frame structures. This workspace includes the 85-foot-wide ROW expansion area, plus the 5-foot-wide area of un-managed (generally forested) vegetation on the north side of the existing ROW and approximately 45 feet of shrubland to the north of the existing 330 Line conductors (15 feet from the outside conductors).
2. All effects except structure locations are assumed to be temporary (i.e., work pads and temporary roads across wetlands will be removed after the completion of construction.).

### 3.6.5 Electric and Magnetic Fields

Electric and magnetic fields were calculated for the 11-Acre ROW Expansion Option with the 330 Line and the new 3271 Line configured as illustrated on the cross-sections in Appendix B.2. The calculations are for projected AAL conditions for the pre- Project (2015) and post-Project (2020). Refer to CL&P's CSC Application, Volume 1, Section 7, for details regarding the assumptions for these electric load conditions and other details concerning the EMF calculations. In addition, refer to Section 5.9 of this EA for additional information regarding electric and magnetic fields associated with the existing and proposed overhead transmission lines.

For both the Segment 1 and Segment 2 portions of the ROW, magnetic and electric fields analyses were conducted to calculate the EMF levels produced by the following:

- The existing 330 Line alone;
- The existing 330 Line with the new 3271 Line assuming that the 11-Acre ROW Expansion Option is implemented; and
- The existing 330 Line with the new 3271 Line assuming that the Proposed Action (5-Acre Minimal ROW Expansion) is implemented.

Electric and magnetic fields were calculated at the northern ROW edge, the southern ROW edge, and within the ROW. (Note that whereas the southern ROW remains the same under all three calculation scenarios, the northern ROW edge location varies for the Proposed Action and for the 11-Acre ROW Expansion Option.)

As Table 3-12 illustrates, the 11-Acre ROW Expansion Option would yield lower post-Project magnetic field levels at the ROW edges than the Proposed Action (5-Acre Minimal ROW Expansion). However, electric field levels along the northern edge of the ROW would be higher than those produced by the configuration of the lines under the Proposed Action.

**Table 3-12: Summary of Electric and Magnetic Field Levels at ROW Edges for Existing 330 Line, Proposed Action (5-Acre Minimum ROW Expansion), and the 11-Acre ROW Expansion Option**

ROW Segment and Cross-Section	Transmission Line Loading Conditions	Magnetic Field (mG)		Electric Field (kV/m)	
		North ROW Edge*	South ROW Edge	North ROW Edge*	South ROW Edge
<b>Segment 1</b>					
Existing 330 Line	Pre-Project (2015)	21.9	24.7	1.10	0.86
Proposed Action (refer to Appendix A.2; XS-3-MH-MRE)	Post-Project (2020)	38.1	26.4	0.70	1.00
11-Acre ROW Expansion Option (refer to Appendix B.2; XS-3)	Post-Project (2020)	24.1	22.6	1.47	0.93
<b>Segment 2</b>					
Existing 330 Line	Pre-Project (2015)	35.2	35.2	1.63	1.63
Proposed Action (refer to Appendix A.2; XS-5-MH-MRE)	Post-Project (2020)	42.7	31.8	0.70	1.80
11-Acre ROW Expansion Option (refer to Appendix B.2; XS-5)	Post-Project (2020)	25.1	24.1	1.66	1.62

\* For the Proposed Action, the north edge of ROW is 25 feet wide along Segment 1 and 35 feet wider along Segment 2, whereas for the 11-Acre ROW Expansion Option, the north ROW edge is 55 and 85 feet wider in Segments 1 and 2, respectively.

### 3.6.6 Comparison of the 11-Acre ROW Expansion Option and the Proposed Action (5-Acre Minimal ROW Expansion)

Table 3-13 summarizes and compares the potential effects associated with the 11-Acre ROW Expansion Option and the Proposed Action (5-Acre Minimum ROW Expansion), based on preliminary design information for both configurations. As this table shows, compared to the 11-Acre ROW Expansion Option, the Proposed Action will minimize both the additional easement acreage required from the USACE and the removal of forested vegetation needed to install the new 3271 Line. Compared to the Proposed Action, the use of the 11-Acre ROW Expansion Option would require approximately 6 additional acres of easement from the USACE; result in slightly greater temporary effects on wetlands; and involve the conversion of approximately 1.2 more acres of forested wetlands to scrub-shrub wetlands. However, the Proposed Action will involve steel monopoles that would be noticeably taller than the existing 330 Line structures, particularly along Segment 2 in Chaplin.

The 11-Acre ROW Expansion Option would be slightly less expensive than the Proposed Action (approximately \$13 million vs. \$14.3 million, respectively). However, both cost estimates exclude expenditures for easement acquisition, which have not yet been defined. Since the Proposed Action will require approximately 6 fewer acres of easement from the USACE than the 11-Acre ROW Expansion Option, it can be assumed that the real estate acquisition costs for the Proposed Action will ultimately be comparatively less.

Because the Proposed Action and the 11-Acre ROW Expansion Option would be comparatively similar in terms of cost, CL&P conducted additional constructability reviews for each configuration. These constructability reviews involved field investigations of the Segment 1 and Segment 2 ROW to assess site-specific requirements for work pads, pulling pads, access roads (locations and width), based on ROW grades, equipment turning radii, and the anticipated structure sites for the implementation of the two configuration options. The results of these constructability reviews provided more detail than included in Table 3-13, taking into consideration that under either configuration the following temporary construction effects would occur along the ROW in Segment 2:

- Access road widths would have to be approximately 30 feet in some locations, including across wetlands, to accommodate equipment turning requirements and/or provide a stable base for construction access;
- A pulling pad (for conductor stringing) would have to be located in wetland W20-76; and
- Work pads for structures would have to be located partially within wetland W20-76.

Taking these constructability factors into consideration, the 11-Acre ROW Expansion Option would result in approximately 1.3 acres of temporary impacts to wetlands, whereas the Proposed Action (5-Acre Minimal ROW Expansion) would result in approximately 1 acre of temporary impacts. For either configuration, two structures would have to be located in wetland W20-76, resulting in permanent impacts associated with the fill for structure foundations. The permanent fill impacts under either configuration would be minor (less than 0.1 acre).

**Table 3-13: Comparison of Proposed Action (5-Acre Minimal ROW Expansion) and 11-Acre ROW Expansion Option  
(Areas Affected by Construction: Portions of Existing ROW and Easement Expansion)**

FACTOR	SEGMENT 1		SEGMENT 2	
	PROPOSED ACTION	11-ACRE ROW EXPANSION OPTION	PROPOSED ACTION	11-ACRE ROW EXPANSION OPTION
<b>Location, Design, and Appearance</b>				
Length (miles)	1.0 (0.9 mile federal land)	1.0 (0.9 mile federal land)	0.5	0.5
New ROW Required (approx.)	2.6 acres	5.8 acres	2.2 acres	5.2 acres
Structure Height Range (feet) (Existing 330 Line Structure Height Ranges: 106-137 feet in Segment 1; 68-81 feet in Segment 2)	125-155	115-145	115-135	70-85
<b>Environmental Resources</b>				
<b>Waterbodies</b>				
Waterbody crossings (number)	1 (Mansfield Hollow Lake)	1 (Mansfield Hollow Lake)	2 S20-22 (Natchaug River); S20-24	3 S20-22 (Natchaug River); S20-23; S20-24
<b>Wetlands</b>				
Temporary Wetland Effects	0	0	0.8 acre	0.8 acre
Permanent Wetland Fill Effects	0	0	< 0.1 acre	< 0.1 acre
<b>Vegetation and Land Uses</b>				
Forested Upland Vegetation Removal	3.7 acres	6.0 acres	2.1 acres	4.1 acres
Forested Wetland Vegetation Removal	0	0	1.3 acres	2.5 acres
Scrub-Shrub Upland Vegetation Potentially Affected	2.6 acres	2.6 acres	1.4 acres	1.4 acres
Scrub-Shrub Wetland Vegetation Potentially Affected	0	0	0.8 acre	0.8 acre
Open Field Upland Vegetation Potentially Affected	1.2 acres	1.6 acres	0	0
<b>Subtotal: Vegetation</b>	<b>7.5 acres</b>	<b>10.2 acres</b>	<b>5.6 acres</b>	<b>8.8 acres</b>
Open Water	1.1 acres	1.5 acres	0.1 acre	0.2 acre
Road ROWs / Levee Trail	0.3 acre	0.4 acre	0	0
<b>Total: Vegetation and Land Uses</b>	<b>8.9 acres</b>	<b>12.1 acres</b>	<b>5.7 acres</b>	<b>9.0 acres</b>
<b>Biological Resources</b>				
Vernal Pools Potentially Affected	0	0	2 CH-1-VP (in W20-70), CH-2-VP (in W20-72/73)	2 CH-1-VP (in W20-70), CH-2-VP (in W20-72/73)
State-listed Species Habitat Traversed	1	1	1	1
<b>Visual Resources</b>				
Difference in existing and proposed structure heights	7 feet shorter to 43 feet taller	7 feet shorter to 24 feet taller	27 to 59 feet taller	13 feet shorter to 13 feet taller

**Notes:**

Potential environmental effects are estimated based on preliminary locations of structures, work pads, and access roads, as well as on estimated vegetation removal limits and the use of standard-sized access roads and work pads. Vegetation types were determined by land use data and delineated wetland boundaries. Both the Proposed Action and the 11-Acre ROW Expansion Option impact analyses assume that the existing 330 Line is left in place, and that the forested areas south of Line 330 (totaling approximately 3.5 acres) would not be affected.

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## 4.0 ENVIRONMENTAL SETTING

This section describes the existing environmental features along CL&P's existing easement and the proposed 5-Acre Minimal ROW Expansion (Proposed Action) through the two segments of federally-owned property, totaling approximately 1.4 miles, in the Mansfield Hollow area. The environmental features along the approximately 1.4 miles of ROW in the Mansfield Hollow area are illustrated on the aerial alignment maps in Appendices A.1 and A.2. These maps identify the federally-owned properties, as well as water resources, land uses, and vegetative cover types in relation to CL&P's existing and proposed ROW. The maps also depict the locations of the existing 330 Line 345-kV structures within the current ROW, as well as the proposed areas of ROW expansion and anticipated locations of the proposed 345-kV transmission line structures within the federally-owned property.

### 4.1 PHYSICAL ENVIRONMENT (GEOLOGY, TOPOGRAPHY, AND SOILS)

#### 4.1.1 Topography

The topography along the ROW through the Mansfield Hollow area is varied. To the west of Mansfield Hollow Lake, the topography along the ROW is relatively flat, with elevations that average about 260 feet above mean sea level. To the east of the lake, the terrain along the ROW becomes more irregular, with elevations ranging from about 220 feet to 350 feet. On either side of the lake, the topography slopes down 30 to 40 feet.

#### 4.1.2 Geology

The Mansfield Hollow area is located within the Eastern Uplands geologic terrain. Bedrock that underlies this area consists primarily of metamorphic rocks (gneiss and schist).

As indicated on the *Surficial Materials Map of Connecticut* (U.S. Geological Survey 1992), the surficial geology along the ROW through the Mansfield Hollow area consists primarily of alluvium overlying coarse deposits of sand and gravel, along with stacked coarse deposits of gravel overlying sand and gravel or sand and gravel overlying sand, and gravel overlying sand. These surficial deposits predominate near Mansfield Hollow Lake and the Natchaug River. Thin till (i.e., areas where till is generally less than 10-15 feet thick and including areas of bedrock outcrop) is common along the portions of the route between the lake and the Natchaug River.

### 4.1.3 Soils

The soils along the existing and the proposed ROW in the Mansfield Hollow area were identified based on the review of on-line county soil survey data published by the U.S. Department of Agriculture, Natural Resources Conservation Service (USDA NRCS). Table 4-1 lists these soils, identifying each in terms of parent material and characteristics such as slope, classification as hydric or state Prime Farmland, soil erosion factor, depth to bedrock, and depth to water table.

“Prime Farmlands” are soils defined by the USDA as best suited to producing food, feed, forage, fiber, and oilseed crops, whereas “Farmland of Statewide Importance” is defined as land that is nearly prime farmland and that economically produces high yields of crops similar to prime farmland when properly treated and managed. Because development pressure has resulted in the loss of a significant portion of the state’s agricultural base, Connecticut has determined that the conservation of certain arable agricultural land and adjacent pastures, woods, natural drainage areas and open space areas is vital for the well-being of the people of Connecticut (refer to Connecticut General Statutes Section 22-26aa). Similarly, the federal Farmland Protection Policy Act (FPPA)<sup>11</sup> is intended to minimize the impacts of federal programs on the conversion of prime farmland, unique farmland, and soils of state-wide or local importance.

In addition to providing information about agricultural productivity, the USDA NRCS data provides useful baseline characteristics regarding other soil types found along the ROWs. For example, the soils data included in Table 4-1 can be used to identify areas of hydric soils (a soil formed under conditions of saturation, flooding, or ponding, and generally indicating the presence of state- and potential federal-jurisdictional wetlands); to assess “erodability potential” of the soil and therefore the potential for erosion and sedimentation during construction; and to plan for the appropriate type and deployment of erosion and sedimentation controls during construction to minimize adverse effects associated with soil disturbance.

Based on a review of soils mapping data, the existing and proposed CL&P ROW through Segments 1 and 2 will encompass approximately 4.1 acres of soils considered to be prime farmland soils and approximately 14.5 acres of soils considered to be farmlands of statewide importance. These acreages represent the approximate acreages of such soils mapped within the width of the existing ROW and the proposed easement expansion. (The existing 150-foot-wide ROW encompasses 2.7 acres of prime

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<sup>11</sup> The federal Agriculture and Food Act of 1981 (Public Law 97-98) contains the FPPA, subtitle I of Title XV, Section 1539-1549.

farmland in Segment 1 and 0.7 acre in Segment 2, as well as 8.5 acres of farmland of state-wide importance in Segment 1 and 3.8 acres in Segment 2.)

**Table 4-1: Summary of Soils and Soil Characteristics: Mansfield Hollow Area**

Soil Map Unit Name and Symbol	Parent Material	Hydric Soil	Erosion Factor	Depth to Bedrock (inches)	Depth to Water Table (feet)
18 Carden and Freetown	Deep organic - inland	Yes	-	Very deep	0.0-1.0
23A** Sudbury sandy loam, 0 to 5 % slopes	Sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss, and coarse-loamy aeolian deposits over sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss	No	--	>60 (Typical)	1.5-3.0
29B** Agawam fine sandy loam, 3 to 8 % slopes	Coarse-loamy aeolian deposits over sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss	No	0.29	>60 (Typical)	>6
32A** Haven and Enfield soils, 0 to 3 % slopes	Coarse-loamy and coarse-silty aeolian deposits over sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss	No	0.32	>60 (Typical)	>6
34A** Merrimac sandy loam, 0 to 3 % slopes	Sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss	No	0.24	>60 (Typical)	>6
38C* Hinckley gravelly sandy loam, 3 to 15 % slopes	Sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss	No	0.15	>60 (Typical)	>6
38E Hinckley gravelly sandy loam, 15 to 45 % slopes	Sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss	No	0.15	>60 (Typical)	>6
101** Occum fine sandy loam	Coarse-loamy alluvium	No	0.28	>65 (Typical)	5.0-6.0
108 Saco silt loam	Coarse-silty alluvium	Yes	0.28	>60 (Typical)	0.0-0.5

Source: USDA Natural Resources Conservation Service, Online Soil Surveys and Geographic Data of Tolland and Windham Counties, accessed 2009, and United States Department of Agriculture, Natural Resources Conservation Service, 2008, Soil Survey of the State of Connecticut (<ftp://ftp-fc.sc.egov.usda.gov/CT/soils/connecticut.pdf>), accessed November 2010.

\* Soils classified as Farmland Soils of Statewide Importance are soils that fail to meet one or more of the requirements of prime farmland, but are important for the production of food, feed, fiber, or forage crops. They include those soils that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. ([http://www.cteco.uconn.edu/guides/resource/CT\\_ECO\\_Resource\\_Guide\\_Soils\\_Farmland.pdf](http://www.cteco.uconn.edu/guides/resource/CT_ECO_Resource_Guide_Soils_Farmland.pdf), November 2010)

\*\* Soils classified as Prime Farmland Soils, according to 7 Code of Federal Regulation 657.5, have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and are also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water). Prime Farmland has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. Prime Farmland soils are permeable to water and air, are not excessively erodible or saturated with water for a long period of time, and either do not flood frequently or are protected from flooding.

1. Erosion Factor (K (dimensionless)): Indicates the erodability of the whole soil, the higher the value, the more susceptible the soil to erosion.

## 4.2 WATER RESOURCES

The surface water resources along the Mansfield Hollow portion of the ROW consist of Mansfield Hollow Lake, the Natchaug River, wetlands, and several small watercourses. Potable water is obtained from individual groundwater wells.

Based on Connecticut's water use classifications (refer to Table 4-2), the quality of both surface and ground water in the area is considered generally good. Both Mansfield Hollow Lake and the Natchaug River are classified as having B/AA water quality, while the tributaries to the Natchaug River are classified as AA, A/AA. Ground water in the Mansfield Hollow area is classified as GAA; the entire area is underlain by a stratified drift aquifer.

**Table 4-2: Summary of Connecticut Water Use Classifications and Criteria**

<b>WATER RESOURCE</b>	<b>CLASSIFICATION USE DESCRIPTION</b>
<b>Surface Waters</b>	
Class AA	Existing or proposed drinking water supplies, habitat for fish or wildlife or other aquatic life, recreation, and water supply for industry and agriculture.
Class A	Potential drinking water supplies, habitat for fish and other aquatic life and wildlife, recreation, navigation, industrial water supply, agricultural water supply.
Class B	Fish and other aquatic life and wildlife habitat, recreation, navigation, industrial water supply, agricultural water supply.
<b>Ground Waters</b>	
Class GAA	Existing or potential public supply of water suitable for drinking without treatment; baseflow for hydraulically-connected surface water bodies.
Class GAAs	Sub-classification of GAA. Groundwater that is tributary to a public water supply reservoir.
Class GA	Existing private and potential public or private supplies of water suitable for drinking without treatment; baseflow for hydraulically-connected surface water bodies.
Class GB	Industrial process water and cooling water; baseflow for hydraulically-connected surface water bodies; presumed not suitable for human consumption without treatment.
Class GC	Assimilation of discharges authorized by the Commissioner pursuant to Connecticut General Statutes Section 22a-430.

Source: CT DEEP 2011, Connecticut Water Quality Standards.

### 4.2.1 Waterbodies and Floodplains

The 1.4-mile Mansfield Hollow portion of the CL&P ROW traverses four waterbodies, including Mansfield Hollow Lake, the Natchaug River, and tributaries to the Natchaug River (refer to Table 4-3 and the Appendix A maps). The locations and characteristics of these waterbodies were verified during field investigations conducted by CL&P representatives in 2008 and 2011, as well as during constructability reviews performed in 2012.

**Table 4-3: Waterbodies along Mansfield Hollow Portion of the Proposed Route**

Municipality	Waterbody Series Number <sup>1</sup> and Name	Water Quality <sup>2</sup> / Fisheries Classification <sup>3</sup>	Waterbody Type (P or I) <sup>4</sup>
<b>Segment 1</b>			
Mansfield	Mansfield Hollow Lake	AA/Warm-water	Lake
<b>Segment 2</b>			
Chaplin	S20-22/Natchaug River	B/AA/cold-water	P
Chaplin	S20-23	AA/cold-water	P
Chaplin	S20-24*	AA/cold-water	P

1. Series No. refers to designations in the CL&P field reports and on the aerial segment maps in Appendix A.
  2. Table 4-3 defines the water classifications pursuant to the Connecticut Water Quality Standards:
  3. Fishery Classification obtained based on personnel communication with Don Gonyea & Neal Hagstrom at CT DEEP.
  4. P = Perennial; I = Intermittent.
- \* Indicates stream with existing culvert

Mansfield Hollow Lake, which is also referred to as Lake Naubesatuck, is a 460-acre reservoir that was created by the USACE as part of a flood control project. The lake was created by the construction of Mansfield Hollow Lake Dam, which was completed in 1952 and impounds waters from the Natchaug, Fenton, and Mt. Hope rivers, which together drain an area of 159 square miles. The USACE regulates flows into the Natchaug River by virtue of five hydraulically operated sluice gates at Mansfield Hollow Lake Dam. The dam, which allows for the storage of 16.1 billion gallons of flood water at a maximum level of 257 feet mean sea level, is part of a network of six flood control dams in the Thames River Basin that were constructed and are maintained by the USACE. Water stored during potential flooding conditions is released after water levels downstream recede. Near Bassetts Bridge Road (along the border of the Mansfield Hollow State Park and WMA), the existing CL&P ROW crosses the flood control levee for Mansfield Hollow Lake.

The Federal Emergency Management Agency (FEMA) classifies flood zones for insurance and floodplain management purposes and has prepared maps that designate certain areas according to the frequency of

flooding. An area within the 100-year flood designation has a 1% chance of flooding each year or is expected to flood at least once every 100 years. Within the Mansfield Hollow area, both Mansfield Hollow Lake and the Natchaug River have an associated 100-year flood boundary. The 100-year flood boundaries associated with these waterbodies are depicted on the Appendix A maps.

#### 4.2.2 Wetlands

In the spring and summer of 2008 and again in the spring of 2011, CL&P representatives performed field surveys to delineate federal jurisdictional wetlands along the proposed Project ROW, including the existing 150-foot-wide ROW and proposed 25- and 35-foot-wide expansion areas in Segments 1 and 2, respectively. As a result of these surveys, nine wetlands were identified within the existing CL&P ROW through the Mansfield Hollow area (refer to Table 4-4). Wetlands along the managed portions of the ROW consist of palustrine emergent (PEM), palustrine scrub-shrub (PSS), and palustrine open water (POW) types. Palustrine forested (PFO) wetlands are predominant in un-maintained portions of the ROW and in areas adjacent to the existing ROW.

Wetland information for the proposed 25- and 35-foot-wide expansion areas was compiled based on field reviews, combined with information from the CT DEEP wetlands Geographic Information System (GIS) data layer. Based on this information:

- Segment 1. The only wetlands within the 25-foot-wide proposed expansion area within the state park and WMA in Mansfield are Mansfield Hollow Lake (POW) and the bordering PFO wetlands (the lake and associated wetlands are designated as wetland W20-66). This lake is spanned by CL&P's existing 330 Line and similarly will be spanned by the new 345-kV transmission line conductors.
- Segment 2. Five wetlands are located, entirely or in part, within the 35-foot-wide proposed expansion area within the WMA in Chaplin. These wetlands are W20-70, W20-72, W20-73, W20-74, and W20-76. In addition, Wetland W20-75 is located along the southern portion of the existing ROW, but could be affected by Project construction activities.

The predominant wetland cover type in the areas of the proposed 5-acre ROW expansion is PFO. In addition to these wetlands on federally-owned land, to access the approximately 0.5 mile of ROW along Segment 2 in Chaplin, other wetlands located within CL&P's ROWs across privately-owned properties will have to be crossed. Refer to the maps in Appendix A for information regarding the locations of wetlands along the ROW adjacent to the federally-owned segments.

**Table 4-4: Wetlands along Existing 150-Foot-Wide ROW in the Mansfield Hollow Area**

Municipality	CL&P Wetland Number <sup>1</sup>	Wetland Class <sup>2</sup>	Length of Crossing (Feet, Approx.)	Acres of Wetland in ROW (Est.)	Comments
<b>Segment 1</b>					
Mansfield	W20-65	PUB/PFO	Adjacent	-	Located along south side of existing 150-foot-wide ROW, south of the 330 Line and adjacent to Mansfield Hollow Lake. This portion of ROW is presently not managed (no vegetative clearing).
Mansfield	W20-66	PUB/PFO/POW	575	2.0 (lake span)	Mansfield Hollow Lake and forested border; spanned by overhead transmission lines
<b>Segment 2</b>					
Chaplin	W20-70	PFO/PSS	79 feet	0.3	Wetland functions as a vernal pool, and extends across ROW, including within proposed ROW expansion area. Confirmed vernal pool habitat, designated as CH-1-VP
Chaplin	W20-71	PFO/PSS	Adjacent	-	Extends only into southern portion of existing 150-foot-wide ROW, south of 330 Line
Chaplin	W20-72/73	PFO/PSS	294	0.7	Includes Natchaug River. Wetland includes a vernal pool (designated CH-2-VP), and extends across ROW
Chaplin	W20-75	PSS/PFO	860	0.8	Extends along southern portion of existing ROW, south of existing access road
Chaplin	W20-76	PFO/PSS	870	0.8	Extends along northern portion of existing ROW, north of existing access road, including in ROW expansion area. Influenced by unnamed tributary (S20-24) to Natchaug River
Chaplin	W20-77	POW/PSS/PFO	60 feet	0.1	Primarily east of USACE property. Western portion of this wetland is within federal land, along existing and proposed access road.

- 1.) CL&P Wetland Number is project-specific and is used to identify wetlands on the maps in Appendix A.
- 2.) Wetlands classification per Cowardin et al 1979: PEM = Palustrine Emergent Marsh, PFO = Palustrine Forested Wetland, and PSS = Palustrine Scrub-Shrub Wetland, POW = Palustrine Open Water, PUB = Palustrine Unconsolidated Bottom.
- 3.) "Feet traversed" refers to the linear distance crossed by the center line of the proposed new 345-kV transmission line as depicted on the maps in Appendix A. "Adjacent" refers to a wetland that is within the CL&P easement, but will not be traversed by the center of the proposed new 345-kV transmission line. "Adjacent" wetlands are typically found along the south side of the existing 150-foot-wide ROW, south of the 330 Line.

## 4.3 BIOLOGICAL RESOURCES

### 4.3.1 Vegetation

Overall, most of the federally-owned properties are encompassed by Mansfield Hollow State Park and WMA are characterized by forest lands. Forest management activities on these properties include thinning, harvesting, and reforestation to improve timber quality, enhance wildlife habitat, and provide for recreational opportunities. Predominant forest species include Eastern white pine (*Pinus strobus*), Northern red oak (*Quercus rubra*), white oak (*Quercus alba*), and sugar maple (*Acer saccharum*).

Vegetation along CL&P's existing ROW and proposed ROW expansion through the Mansfield Hollow area consists of a mix of cover types. The predominant cover types are old field/shrub land, upland forest, and wetlands (forested, shrub-scrub, and open water). The vegetation along the ROW and within the proposed ROW expansion areas is illustrated on the maps in Appendix A.

Within CL&P's existing ROW, vegetation beneath and in the vicinity of the existing overhead transmission line is managed to assure consistency with electric utility use and conformity with utility industry standards for vegetation clearance from conductors. Accordingly, woody vegetation along the ROW that could interfere with the operation of the overhead transmission line is periodically cut, creating and maintaining shrub and herbaceous species habitat. Common species in this habitat type along the ROW in Mansfield Hollow include lowbush blueberry, spindle tree, blackberry, stout dewberry, sweet fern, Morrow's honeysuckle, and Eastern red cedar, among others. Vegetation along the edge of the ROW is typically left in a natural condition, to serve as a buffer (except for periodic tree trimming or removal if necessary to avoid interference with the overhead line). The CL&P ROW has been maintained through the Mansfield Hollow area for approximately 40 years.

The existing vegetation maintenance limits within CL&P's existing ROW through the Mansfield Hollow area are as follows:

- Segment 1: Mansfield Hollow State Park and WMA (approximately 0.9 mile). Approximately 100 feet of the existing 150-foot-wide ROW is managed in shrub, low-growing woody species, or herbaceous vegetation. A 25-foot-wide buffer of unmaintained vegetation, consisting primarily of upland forest, is located on either side of this 100-foot-wide area.
- Segment 2: Mansfield Hollow WMA (approximately 0.5 mile). Along CL&P's existing 150-foot-wide ROW, approximately 140 feet are managed in shrub, low-growing woody species, or herbaceous vegetation. A 5-foot-wide buffer of un-managed vegetation, which is comprised primarily of a mix of upland forest and palustrine forested vegetation, is located on either side of this 140-foot-wide area. (Note: along Segment 2, east of the Natchaug River, taller shrub

vegetation is located on the ROW because routine management activities have not been conducted recently.)

Within both Segments 1 and 2, CL&P is seeking an additional easement width from the USACE along the north side of the existing ROW. Along the proposed 25-foot-wide ROW expansion within Segment 1, the existing vegetation consists entirely of upland forest, except for an area of open field adjacent to Bassetts Bridge Road and the wetland vegetation bordering Mansfield Hollow Lake. Similarly, within the proposed 35-foot-wide ROW expansion along Segment 2, the vegetation consists predominantly of upland forest, although areas of forested wetlands are present as well.

### **4.3.2 Wildlife**

The vegetative communities associated with the existing CL&P ROW and surrounding areas provide habitat for a variety of wildlife species. Old field/shrub land areas generally support the greatest variety of wildlife because of the interspersed of different habitat types. Mammalian wildlife typical of these habitats include small mammals such as meadow voles, short-tailed shrews, and deer mice; woodchuck; rabbit; white-tailed deer; and predators such as red fox, coyote, weasel, skunk, and raccoon. Various species of birds, as well as reptiles and amphibians (collectively referred to as herptiles), also are commonly associated with the habitats found in the area.

The predominant vegetative cover types found within the areas of the proposed ROW expansion consists of upland or wetland forests. Species typically common in forested habitats include white-tailed deer, rabbit, coyote, fox, striped skunk, Virginia opossum, chipmunk, squirrel, and numerous small mammals (e.g., deer mouse, red-backed vole, shrews, bats). Various species of birds and herptiles also are common in wooded areas. Birds typical of wooded areas include raptors (owls, hawks), grouse, wild turkey, woodpeckers, and numerous species of songbirds. Herptiles likely to occur in wooded areas include salamanders, as well as certain species of toads, frogs, turtles, and snakes.

Many of the species that use wooded and shrub land (successional upland) habitats also utilize wooded, scrub-shrub, and emergent wetland communities. In addition, there are species that are adapted primarily to wetland or other aquatic habitat. These include mink, beaver, otter, muskrat and water shrew; as well as birds such as heron, waterfowl, and certain types of raptors and songbirds. Numerous herptiles are particularly adapted to wetlands and aquatic habitats; typical species include most salamanders at some time in their life cycle, frogs, turtles, and snakes.

Both the existing CL&P easement and the proposed 5 acres of ROW expansion traverse portions of the Mansfield Hollow Lake WMA, which encompasses approximately 2,012 acres in the towns of Mansfield, Chaplin, and Windham and provides a range of wildlife habitats. The WMA is managed by CT DEEP for regulated hunting and related activities, including hunting for small game, waterfowl, turkey, and deer.

The CT DEEP also stocks the area with pheasant. In addition, the WMA includes a 300-acre field trial area for hunting dog training, which is located south of the Proposed Route. The WMA borders Mansfield Hollow State Park, a 251-acre recreation area adjacent to Mansfield Hollow Lake. Mansfield Hollow Lake, which is bordered by the state park and the WMA, has an area of approximately 460 acres and offers public boating, fishing, and other recreational opportunities.

### **4.3.3 Vernal Pools and Amphibians**

Field investigations for amphibians were performed in conjunction with the identification and evaluation of wetlands located along the CL&P ROWs within which the Proposed Route would be located. During the spring and early summer of 2008 and in the spring of 2011, all wetlands with potentially suitable vernal pool/amphibian breeding habitat (as defined below) were investigated to confirm the presence / absence of such amphibian breeding activity. The surveys were conducted during the optimum time to identify areas functioning as vernal pools and/or amphibian-breeding habitat; typically, amphibian breeding follows the first significant rain in the spring when evening low temperatures remain in the 40s (° Fahrenheit).

The CT DEEP defines vernal pools as small bodies of standing fresh water found throughout the spring that typically result from various combinations of snowmelt, precipitation, and high water tables. In Connecticut, to meet the definition of a vernal pool, an area must:

- Contain water for approximately two months during the growing season;
- Occur within a confined depression or basin lacking a permanent outlet stream;
- Lack any fish populations; and
- Dry out most years, usually by late summer.

Species that rely upon vernal pool habitat for reproductive success are referred to as obligate vernal pool species. Vernal pools and amphibian breeding habitats are influenced by local environmental conditions and seasonal weather patterns. For the purposes of the studies of the CL&P ROWs, a vernal pool was defined as an area that supported obligate species in the 2008 or 2011 breeding season and met the majority of the vernal pool criteria. Vernal pool habitats remain as relatively consistent features in the

landscape and are therefore used by successive generations of obligate vernal pool species that belong to a regional population.

In the Mansfield Hollow area, two wetlands along the CL&P ROW were identified as vernal pools and/or observed as providing amphibian-breeding habitat: wetlands W20-70 (containing vernal pool CH-1-VP) and W20-72/73 (containing vernal pool CH-2-VP). Both of these wetlands are along the Segment 2 portion of the ROW in Chaplin. No vernal pools or amphibian breeding habitats are located along the Segment 1 ROW in Mansfield. These wetlands are listed in Tables 4-4 and 4-5 and are depicted on the aerial segment maps (Appendices A.1 and A.3).

These areas were identified based upon observations of the physical characteristics of the wetlands (e.g., pools of water, calls of obligate vernal pool amphibians); direct evidence of obligate amphibian breeding (egg masses, amphibian larvae); distinct depressions in wetlands combined with water stained leaves (if dry); significant water marks on vegetation and/or rocks; and marked pit and mound topography.

**Table 4-5: Vernal Pool / Amphibian Breeding Habitat along the ROW in the Mansfield Hollow Area: Segment 2**

CL&P Vernal Pool Number	CL&P Wetland Number	Wetland Class	Relationship to Existing and Proposed ROW	Species Observed or Heard
CH-1-VP	W20-70	PFO/PSS	East of existing Structure No. 9094; within both existing managed ROW and along proposed ROW expansion	Spotted salamander, spring peeper, caddis fly larvae
CH-3-VP	W20-70	PFO	Vernal pool is located off-ROW, outside of proposed ROW expansion	Wood frog, stonefly larvae, green frog
CH-2-VP	W20-72/73	PSS/PFO	Beneath existing 330 Line within managed portion of ROW	Spotted salamander, wood frog, fairy shrimp

Note: Wetland and vernal pool numbers are as identified on the Appendix A maps.

#### 4.3.4 Fisheries

Twenty freshwater fish species have been identified by the CT DEEP Inland Fisheries Division as inhabiting Mansfield Hollow Lake, including largemouth bass, smallmouth bass, brown trout, rainbow trout, northern pike, chain pickerel, black crappie, yellow perch, brown bullhead, yellow bullhead, bluegill, pumpkinseed, green sunfish, bluegill/pumpkinseed hybrid, tessellated darter, fallfish, golden

shiner, spottail shiner, banded killifish, and white sucker. The CT DEEP has designated Mansfield Hollow Lake a Bass Management Lake/Northern Pike Lake. CT DEEP's goal for "Big Bass Lakes" such as Mansfield Hollow Lake is to increase the numbers of quality bass. The CT DEEP also is stocking northern pike in Mansfield Hollow Lake to develop the lake for that fishery (CTDEP 2010).

The CT DEEP also stocks hatchery-raised adult-sized brook, brown, and rainbow trout for put-and-take purposes in the Natchaug River. In addition, pursuant to the CT DEEP's 1999 *Trout Management Plan*, the Natchaug River is a proposed Trophy Trout Water, as well as proposed for a Trout Park and Intensive/High Yield Area. Trout Parks are waterbodies in easily accessible areas that the CT DEEP (or others) frequently stocks to enhance trout fishing opportunities for young and novice anglers, as well as for those with mobility challenges. Intensive/High Yield Areas are waterbodies identified as good trout habitat that are frequently stocked to increase angler success.

#### 4.4 LISTED SPECIES

CL&P consulted with both the CT DEEP Natural Diversity Data Base (NDDDB) and the U.S. Fish and Wildlife Service (USFWS) to determine whether any species listed, or proposed for listing, by the federal or state governments as threatened, endangered, or species of special concern are known to occur along or in the vicinity of the Proposed Route and to assess if there is a potential for the Project to affect such species. These consultations encompassed the entire Connecticut portion of the Project, including the Mansfield Hollow area.

The USFWS has determined that the Connecticut portion of the Project does not encompass the known habitat of any federally-listed species. One candidate species, the New England cottontail (*Sylvilagus transitionalis*), is known to occur in the Town of Lebanon, which is not in proximity to the Mansfield Hollow area. Because there are no federally-listed species in the Project region, preparation of a Biological Assessment<sup>12</sup> or further consultation with the USFWS under Section 7 of the Endangered Species Act is not required. Based on a review of the USFWS website on December 9, 2010, October 28, 2011, and January 25, 2012, CL&P verified that no federally-listed species are known to occur in the Project area. Further, CL&P solicited comments from the USFWS concerning the Mansfield Hollow area during the preparation of this EA. Correspondence with the USFWS is included in Appendix D.

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<sup>12</sup> Section 7 of the Endangered Species Act requires the preparation of a Biological Assessment Report to document the effects of proposed actions on federally-protected species and resources.

CL&P also consulted with the CT NDDDB, submitting written requests in 2007, 2009, and 2010 for information concerning the presence / absence of state-listed or state proposed threatened, endangered, or special concern species in the vicinity of the Project (refer to Appendix D for copies of correspondence). Initially, 21 state-listed species were identified as potentially occurring in the vicinity of the Connecticut portion of the Project (refer to Table 4-6). No state-listed plant species are known to occur in the Mansfield Hollow area.

Subsequent to the receipt of the CT NDDDB's initial correspondence regarding the state-listed species in the vicinity of the Project, CL&P and its representatives met with the CT NDDDB on April 1, 2008. The purpose of the meeting was to discuss the proposed Project; to review methods, as necessary; for determining the actual presence / absence of the state-listed species along the Proposed Route; and to assess options for mitigating or avoiding adverse effects on the listed species as a result of the development of the Project. The CT NDDDB also provided the following recommendations:

- Surveys of the ROWs to evaluate the presence / absence of the state-listed bird, butterfly, and moth species must be performed. CT NDDDB recommended host plant and species-specific surveys in an effort to locate Lepidoptera (moths and butterflies) along the Proposed Route.
- No surveys for wood turtles, Eastern ribbon snakes, or Eastern hognose snakes are required. However, specific mitigation measures must be implemented during the construction of the Project to ensure the well-being of these species.
- No field surveys for the aquatic snail are required. However, during construction, erosion and sedimentation controls will be critical to the long-term viability of this species and its habitat.

In response to the CT DEEP request for field investigations to document moth and butterfly species along the ROWs, CL&P retained the University of Connecticut (UCONN), Center for Conservation and Biodiversity (CCB). CL&P commissioned AECOM Environmental to perform the bird surveys. The CT DEEP-recommended field surveys for moths, butterflies, and birds were subsequently conducted in 2008-2011. During the 2008 bird surveys, another state-listed bird species of special concern (the Brown Thrasher) was identified in the vicinity of the Mansfield Hollow portion of the Proposed Route; this species was not previously identified by the CT NDDDB as occurring in the Project vicinity. Except for two species found in aquatic habitats (which will not be directly affected by the Project), the identified species inhabit upland areas characterized principally by shrub-scrub type vegetation or open areas commonly found on ROWs. CL&P is continuing to review updated NDDDB data and to consult with the CT DEEP regarding state-listed species in the Project area, including along the ROW in the Mansfield Hollow area.

**Table 4-6: State-Listed Endangered, Threatened, or Species of Special Concern: Mansfield Hollow Area**

Species (Common Name)	Species (Scientific Name)	Status*	General Location Reported in NDDB and Habitat Type
<b>Butterflies</b>			
Horace's duskywing	<i>Erynnis horatius</i>	SSC	Mansfield and Chaplin - open woodlands and edges
Frosted elfin	<i>Callophrys irus</i>	ST	Mansfield, Chaplin, Brooklyn, and Killingly - xeric and open disturbance-dependent habitats on sandy soil
Sleepy duskywing	<i>Erynnis brizo</i>	ST	Mansfield, Barrens, and areas with poor, thin or well drained (often sandy) soils
Harris' checkerspot	<i>Chlosyne harrisii</i>	ST	Mansfield, Chaplin, and Windham - moist areas such as bogs, meadows and marshes
<b>Moths</b>			
Noctuid moth	<i>Zale oblique</i>	SSC	Mansfield - pitch pine-scrub oak barrens
Pine barrens noctuid moth	<i>Zanclognatha martha</i>	SSC	Mansfield - pitch pine-scrub oak barrens
Scribbled sawfly	<i>Sympistis pescriptionis</i>	SSC	Mansfield - disturbed areas with sandy soil
Noctuid moth	<i>Apamea burgessi</i>	SSC	Mansfield and Hampton - xeric, sandy areas
Noctuid moth	<i>Chaetagnathia cerata</i>	SSC	Mansfield - pitch pine-scrub oak barrens on heathlands and sand plains
Noctuid moth	<i>Euclyptocnemis fimbriaris</i>	SSC	Mansfield - dry grassy or sandy fields with remnant pine barrens and scrub oak barrens
Noctuid moth	<i>Shinia spinosae</i>	SSC	Mansfield - associated with jointweed
Shrub euchaena	<i>Euchaena madusaria</i>	ST	Mansfield - scrub oak shrubland
<b>Birds</b>			
Horned Lark	<i>Eremophila alpestris</i>	SE	Mansfield - open areas with little cover
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	SE	Mansfield - grasslands, pastures and old fields
American Kestrel	<i>Falco sparverius</i>	ST	Mansfield - grassland or shrubland at the edge of forest; requires cavities for nesting
Savannah Sparrow	<i>Passerculus sandwichensis</i>	SSC	Mansfield - grassy fields with damp soils
Eastern Meadowlark	<i>Sturnella magna</i>	SSC	Mansfield - large, grassy fields
Brown Thrasher <sup>2</sup>	<i>Toxostoma rufum</i>	SC	Mansfield - dry thickets, second-growth areas, brushy fields; foraging habitat near Bassetts Bridge Road
<b>Snakes</b>			
Eastern hognose snake	<i>Heterodon platirhinos</i>	SSC	Mansfield - sandy, wooded areas
<b>Aquatic Species</b>			
Aquatic snail	<i>Gyraulus circumstriatus</i>	SSC	Mansfield - fresh, clear water
Moustached clubtail dragonfly	<i>Gomphus adelphus</i>	ST	Mansfield and Chaplin - clean gravelly or rocky rivers

\*Key: SSC=State Species of Special Concern, ST=State Threatened, SE=State Endangered

1. The Persius duskywing and buck moth were identified during field surveys of the ROW conducted by CCB.
2. The Brown Thrasher was observed in the vicinity of the ROW during 2008 field surveys conducted by CL&P consultants.

## 4.5 LAND USE AND RECREATION

CL&P's existing 150-foot-wide ROW extends across the southern portion of the federally-owned properties that border Mansfield Hollow Lake, as well as the Natchaug, Mt. Hope, and Fenton rivers (refer to Figures 1-2 and 1-3). The approximately 1.4 miles of federally-owned land along the ROW represent only approximately 4% of the total Project route in Connecticut.

In the vicinity of the Mansfield Hollow area, the USACE owns 2,472 acres, including the Mansfield Hollow Dam and levee system and lands encompassed by Mansfield Hollow State Park, Mansfield Hollow Lake WMA, and Mansfield Hollow Lake (Lake Naubesatuck). These federally-owned lands generally extend north from U.S. Route 6 in the Town of Windham through portions of Mansfield and Chaplin.

The upland areas adjacent to the lake and rivers are characterized primarily by undeveloped forest, and are used for a variety of passive and active, year-round recreational activities. The CT DEEP leases approximately 2,300 acres of the federally-owned property for recreational and natural resource management purposes (including the state park and WMA). Lands also are leased to farmers, who generally grow feed corn for livestock and leave portions of their crop standing for wildlife. The USACE's West Thompson Lake Project personnel and the CT DEEP cooperatively manage natural resources in the area.

The 251-acre Mansfield Hollow State Park is used for a variety of recreational activities, including bicycling, picnicking, cross-country skiing, ice sports, hiking, and nature viewing. Similarly, the 460-acre Mansfield Hollow Lake is used year-round for water-based recreational activities such as boating, fishing, and ice sports. A public boat launch, owned by the USACE and maintained by the CT DEEP, provides for lake access. This boat ramp is located in the state park, off Bassetts Bridge Road in the Town of Mansfield, approximately 2,000 feet north of CL&P's transmission line ROW in Segment 1.

Lands within the Mansfield Hollow Lake WMA are managed by the CT DEEP for the regulated hunting of small game, waterfowl, turkey, and deer. In addition, the WMA includes a 300-acre field trial area for hunting dog training; this area is located approximately 0.2 mile south of the CL&P ROW, on the eastern side of Mansfield Hollow Lake.

The Friends of Mansfield Hollow (FMH) is a private group that was incorporated in 2001 to preserve, maintain, and enhance Mansfield Hollow State Park, including the park's hiking trail system, for the

overall benefit of the public. The FMH also aims to educate the public about the state park and raise funds targeted toward the goal of preserving and enhancing the park. CL&P has coordinated with representatives of the FMH regarding the proposed Project; correspondence to and from the FMH is included in Appendix D.

In Mansfield (Tolland County), Segment 1 of the CL&P ROW traverses approximately 0.7 mile across the southwestern portion of the state park and a small portion of the WMA, 600 feet (0.1 mile) across Mansfield Hollow Lake, and then 0.1 mile across a portion of the WMA, bordering the east side of the lake. Through the state park, the Segment 1 ROW crosses Bassetts Bridge Road near the flood control levee associated with Mansfield Hollow Dam, and then is aligned south of the road and designated recreational areas such as the boat launch, picnic area, and scenic viewing area. The park's Red-Blazed hiking trail, which makes a 1.5-mile loop near the lake and Bassetts Bridge Road, crosses the ROW several times. In addition, north of Bassetts Bridge Road, the ROW crosses the flood control levee, which is used extensively by hikers, joggers, and others. Within the WMA on the eastern side of the lake, the ROW crosses the Nipmuck Trail, a 14-mile hiking path that extends along the lake and is part of the Connecticut Forest and Parks Association's (CFPA's) 700-mile Blue-Blazed hiking trail system.

Within Segment 1, CL&P proposes to expand its existing ROW by acquiring an additional 25-foot-wide area (2.2 acres) north of and adjacent to the existing ROW through the state park, across the lake, and the WMA. Lands within this 25-foot-wide area consist of open field (located near Bassetts Bridge Road and the flood control levee), undeveloped upland forest, and the Red-Blazed hiking trail. Narrow wetland areas (which are spanned by the existing 345-kV conductors) border either side of the lake crossing.

Segment 2, located in the Town of Chaplin (Windham County), follows CL&P's existing ROW for 0.5 mile through the WMA, including a crossing of the Natchaug River. There is no public access to this portion of the WMA, which does not include any designated hiking trails or other recreational sites. The area north of and adjacent to the existing ROW where CL&P proposes a 35-foot-wide expansion of its utility easement is undeveloped and is characterized by a mix of forested upland and wetland areas.

The Mansfield Hollow area also falls within the boundaries of the Quinebaug-Shetucket Rivers Valley National Heritage Corridor, which encompasses approximately 695,000 acres in northeastern Connecticut and south-central Massachusetts. Ten of the 11 Connecticut towns along the Project route in Connecticut, including Mansfield and Chaplin, are located within this designated heritage corridor. The National Heritage Corridor Program is administered by the National Park Service (NPS) under the Department of

the Interior. Locally, the Quinebaug-Shetucket Rivers Valley National Heritage Corridor is administered by a non-profit organization, The Last Green Valley, Inc. Within the Heritage Corridor, citizens, businesses, non-profit cultural and environmental organizations, local and state governments, and the NPS work together to preserve the region's cultural, historical, and natural heritage.

## **4.6 ARCHAEOLOGICAL AND HISTORIC (CULTURAL) RESOURCES**

### **4.6.1 Cultural Resources Overview**

Section 106 of the National Historic Preservation Act (NHPA), as amended, as well as the Connecticut statutes, require the consideration of the potential effects of projects on significant cultural resources. Cultural resources include buried archaeological sites, standing historic structures, or thematically-related groups of structures. To be considered significant and eligible for listing on the National or State Registers of Historic Places (NRHP/SRHP), a cultural resource must exhibit physical integrity and contribute to American history, architecture, archaeology, technology, or culture; and must possess at least one of the following four criteria:

- Association with important historic events;
- Association with important persons;
- Distinctive design or physical characteristics; and/or
- Potential to provide important new information about prehistory or history.

The Connecticut State Historic Preservation Officer (SHPO), which is part of the Connecticut Department of Economic and Community Development, is responsible for reviewing projects to assure that significant cultural resources are protected or otherwise preserved. CL&P consulted with the SHPO regarding the Project to define the analyses required to assess areas of potential cultural resource sensitivity and to identify and evaluate areas where Project activities could potentially affect known or as yet unrecorded significant cultural resources. Correspondence with the SHPO is included in Appendix D. In addition, CL&P consulted with the USACE as the owner of the Mansfield Hollow properties, coordinating with USACE cultural resources specialists and obtaining Archaeological Resources Protection Act permits to conduct both initial (2009) and follow-up (2012) field studies along the ROW in both Segments 1 and 2.

CL&P retained Raber Associates (Raber), a firm specializing in historical and social sciences, to compile baseline research about the history and prehistory of the Project area; to identify the known cultural resources in the vicinity of the proposed ROW; and, based on such information, to make recommendations regarding the potential for locating as yet undiscovered resources during the development of the Project. The Raber study was performed using methods consistent with the *Environmental Primer for Connecticut's Archaeological Resources* (1987), and included an assessment of visual effects on historic resources that followed the guidelines in Connecticut General Statutes § 16-50p(a)(4)(c) and the regulations of the Advisory Council on Historic Preservation (36 CFR § 800.5). The results of these studies are summarized in the 2008 *Cultural Resources Assessment* report, which is included as Volume 3 of CL&P's December 23, 2011 Application to the CSC.

The assessment report addresses both archaeological and historic resources, and was prepared using both research and reconnaissance-level field investigations, and is based on information obtained from the Office of State Archaeology, previously published technical studies of cultural resources, reviews of the NRHP and SRHP listings, the Historic American Engineering Record (HAER) Connecticut Inventory, and consultations with the SHPO and the Connecticut State Archaeologist. As is standard procedure, the report does not provide exact locational information about buried archaeological sites in order to protect the integrity of such resources.

Subsequent to the completion of the 2008 assessment report, CL&P commissioned Raber to conduct further field studies of the Mansfield Hollow area (2009). CL&P has since retained the Public Archaeology Laboratory (PAL) to conduct more detailed analyses, as well as to perform field reviews of the Mansfield Hollow ROW with representatives of involved Native American Tribes (2011 and 2012).

### **Native American Resources: Prehistoric and Contact Period**

Prehistoric Native American occupation of northeastern Connecticut occurred over a long period, beginning between about 10,000 BC to about 1,600 AD, when the Contact period of early historic times began. The prehistory of the region is divided into several time periods based on changing ecological conditions and corresponding cultural adaptation. These major periods are the Paleoindian, Archaic, Woodland, and Contact periods, some of which are subdivided into shorter periods based on distinctive technological and/or stylistic changes.

Hundreds of prehistoric Native American sites are known for northeastern Connecticut. To assess the Project area in terms of Native American resource sensitivity, data on sites reported within approximately

1 mile of the transmission line route were collected from the files of the Office of the State Archaeologist (OSA) and from cultural resource management reports on file at the University of Connecticut's Special Collections in the Dodd Center.

### **Euroamerican Resources**

Euroamerican settlement in Project area towns began in the late 17<sup>th</sup> century. Settlers took advantage of the large number of readily exploited waterpower available from the smaller rivers in the area to power grist, saw, and fulling mills. This allowed these upland towns to develop as agricultural communities based primarily on grain, forest, and livestock products. The region played an important role during the American Revolution, in part as a section of the route traveled by the French army under Comte de Rochambeau from Rhode Island to Yorktown.

Although farmers and merchants in some of these towns were able to participate in the West Indies trade by moving products or animals to the nearest coastal or river ports, limited road development and distance from navigable waterways generally inhibited economic and population growth until the early 19<sup>th</sup> century. Communities on larger streams or rivers then began to emerge around textile manufacture, which by the mid 19<sup>th</sup> century stimulated rail construction into some towns. Towns without manufacturing or rail access remained small and agrarian well into the 20<sup>th</sup> century.

In 1676, Joshua (the son of Uncas, the Mohegan Sachem) bequeathed his hunting grounds in eastern Connecticut, including the present-day Town of Mansfield, to a group of 16 colonists from Norwich. In 1692, the area was first incorporated as part of Windham, becoming the Town of Mansfield in 1703. Until 1822, the town included portions west of the Natchaug River within present-day Chaplin. Prior to being included in Tolland County in the 1820s, Mansfield was part of Hartford County and subsequently Windham County.

The occupants of the Mansfield area, as others in the general vicinity, primarily focused on small-scale farming, with most families living on scattered farmsteads. Abundant small waterpower privileges on Stonehouse Brook and the Mount Hope, Fenton, and Natchaug rivers drove equipment or provided process water for saw, grist, powder, fulling, clover-seed and textile mills, as well as a few tanneries and metal works. The construction of a silk mill in 1810, based on a locally-invented mechanical device for spinning silk, brought an economic impetus to the area until the 1840s, when economic depression, uncontrolled speculation on mulberry trees, and ravaging diseases had drastic effects on overall silk

production. The importation of silk from the Orient allowed these mills to recover rapidly and regain profitability.

Following the Civil War, the tendency towards centralized industries in larger towns struck a significant economic blow to these small mills which eventually failed, and Mansfield's population dropped rapidly. The founding of an agricultural school in the 1880s and its subsequent expansion culminating into the University of Connecticut in the late 1930s channeled new growth in the area as the academic community relocated in the surrounding villages.

### **Historic Properties and Visual Environment**

To identify significant aboveground historic properties in proximity to the ROW, a review was performed to identify resources listed on the NRHP or SRHP, identified as eligible for these registers in previous surveys and cultural resource studies, identified as historic cemeteries subject to State protection and potentially eligible for register listing, or designated a National Scenic Byway. Such significant historic properties within 0.25 mile of the proposed overhead transmission line ROW were identified, based primarily on the following:

- Maps available with NRHP nomination forms, SRHP nominations or other materials, town-wide surveys of historic architectural or industrial resources, and other cultural resource management studies;
- Lists with addresses of properties considered eligible for NRHP listing in town-wide surveys of historic architectural or industrial resources; and
- A statewide inventory of many historic bridges (ConnDOT 1994, 2001; Historic Resource Consultants 1990, 1991).

#### **4.6.2 Summary of Cultural Resources Information for the Mansfield Hollow Area**

The following summarizes the key characteristics of cultural resources within or in the vicinity of the Mansfield Hollow area, based on the studies conducted to date:

- In the Town of Mansfield, 15 reported Native American archaeological sites are located within approximately 1 mile of the transmission line ROW and of these, two are within 300 feet of the ROW and one is reportedly within the ROW. In the Town of Chaplin, nine recorded Native American archaeological sites are located within approximately 1 mile of the transmission line ROW; of these, none are reported to occur within 300 feet of the ROW. The available data concerning these sites is insufficient to determine whether any are eligible for listing on the NRHP. Most of these sites are described as campsites of unknown date.

- Results of the archaeological sensitivity assessment found that most of the areas along 1.4-mile Mansfield Hollow ROW appear to have low sensitivity for discovering as yet unrecorded Native American sites.
- Eleven reported Euroamerican archaeological sites, none of which are listed on or known to be eligible for the NRHP, are located within 1 mile of the transmission line ROW in the towns of Mansfield, Windham, and Chaplin. These sites include Mansfield Hollow Lake Dam, which is approximately 2,100 feet from the ROW, as well as several former mill sites. With the exception of Mansfield Hollow Lake Dam, all of these sites are farther than approximately 0.6 miles from the ROW.
- Seven significant aboveground historic architectural resources are located within approximately 0.25 mile of the ROW within the Mansfield Hollow area. These include: three Jewish Cemeteries, Mansfield Hollow Historic District, Mansfield Hollow Lake Dam, Mansfield Center Historic District, and Mansfield Center Cemetery in Mansfield; and Chewink Cemetery and the Old Cemetery in Chaplin. Of these, the Mansfield Hollow Historic District is listed on the NRHP and the Mansfield Hollow Lake Dam is pending NRHP listing.

After the sensitivity analysis of the areas in the Mansfield Hollow area was performed, reconnaissance and Phase 1b archaeological testing was conducted along the existing and potential ROW expansion areas on the federally-owned properties. This testing, which was completed in October – November 2009, was performed under a permit issued by the USACE in September 2009 under the Archaeological Resources Protection Act of 1979. Testing was conducted at proposed transmission line structure foundations and work areas; along proposed new or upgraded access roads where ground disturbance would be required; and in vegetated areas where forest or brush clearance might result in ground disturbance. The testing included a total of 103 shovel test pits in the permit area, generally within 15 meters of an additional 99 shovel tests on federal land within the existing CL&P easement.

Along the existing and proposed ROW in the Mansfield Hollow area, the archaeological testing resulted in the recovery of pieces of quartz, quartzite, or rhyolite possibly resulting from Native American manufacture or repair of stone tools. One soil feature was also found. Analyses indicate that it is possible that these materials may represent three distinct Native American sites, all of which are potentially eligible for the National Register of Historic Places (NRHP). As a result, additional archaeological investigations will be required to define site limits within areas subject to Project effects, and to obtain a sufficient sample of site contents. In addition, CL&P, with the assistance of PAL, has initiated Section 106 consultations with the Native American Tribes involved in the Project: the Mashantucket Pequot Tribal Nation, the Mohegan Tribe, the Wampanoag Tribe of Gay Head (Aquinnah) and the Narragansett Indian Tribe. During site walks along the ROW in the Mansfield Hollow area, representatives from the tribes requested additional testing in certain other areas of interest.

CL&P will continue to coordinate with the USACE and the SHPO, as well as Tribal representatives, regarding future archaeological testing plans and test results.

#### **4.7 TRANSPORTATION AND ACCESS**

The Mansfield Hollow area is accessible via Bassetts Bridge Road in the Town of Mansfield, which traverses the state park and crosses Mansfield Hollow Lake, as well as Bedlam Road and U.S. Route 6 (Willimantic Road) in the Town of Chaplin. The Windham Airport is located approximately 0.8 mile south of the transmission line ROW, west of the southern boundary of Mansfield Hollow Lake and north of U.S. Route 6.

#### **4.8 AIR QUALITY**

Ambient air quality is affected by pollutants emitted from both mobile sources (e.g., automobiles, trucks) and stationary sources (e.g., manufacturing facilities, power plants, and gasoline stations). In addition, naturally occurring pollutants, such as radon gas or emissions from forest fires, affect air quality. In addition to emissions from sources within the state, Connecticut's air quality is significantly affected by pollutants emitted in states located to the south and west, and then transported into Connecticut by prevailing winds. Ambient air quality in the state is monitored and evaluated by the CT DEEP. Air quality is assessed in terms of compliance with the National Ambient Air Quality Standards (NAAQS) for selected "criteria" pollutants, as well as conformance with regulations governing the release of toxic or hazardous air pollutants.

The State of Connecticut is currently designated as in attainment or is unclassified with respect to the NAAQS standards for five criteria air pollutants: particulate matter no greater than 10 micrometers in diameter (PM<sub>10</sub>), sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), and lead (Pb). The state is currently designated as being in non-attainment with respect to two criteria air pollutants: the 8-hour NAAQS standard for ozone (O<sub>3</sub>) and the 24-hour standard for particulate matter less than 2.5 micrometers in diameter (PM<sub>2.5</sub>).

The Mansfield Hollow area is located within the Town of Mansfield (Tolland County) and the Town of Chaplin (Windham County). Tolland and Windham Counties are in conformance with all the NAAQS except for the 8-hour ozone criterion. Both counties are located in a region referred to as the "Greater Connecticut, CT" area, which is designated as "moderate" non-attainment for the 8-hour ozone standard (U.S. Environmental Protection Agency, 2012a).

The U.S. Environmental Protection Agency (EPA) has determined that carbon dioxide (CO<sub>2</sub>) is a pollutant and has included CO<sub>2</sub> in its list of criteria pollutants. Areas of non-attainment have not yet been established for CO<sub>2</sub> or other greenhouse gases.

The Connecticut State Implementation Plan (SIP) sets the basic strategies for implementation, maintenance, and enforcement of the NAAQS. The SIP is the federally enforceable plan that identifies how that state will attain and/or maintain the primary and secondary NAAQS established by the EPA.

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## 5.0 ENVIRONMENTAL IMPACTS

The development of the 345-kV transmission line as proposed using CL&P's existing ROW and a minimal additional ROW expansion (i.e., the 5-Acre Minimal ROW Expansion) through the Mansfield Hollow area will avoid or minimize potential adverse environmental effects.

### 5.1 PHYSICAL ENVIRONMENT (TOPOGRAPHY, GEOLOGY, AND SOILS)

The construction and operation of the new 345-kV transmission line across the Mansfield Hollow area will have negligible long-term effects on topography and geology. Soil resources will be affected by the creation or expansion of access roads along the ROW, grading required to create work pads, as well as by the earth-disturbing activities required to install the transmission line structures. However, effects on soil resources will be short-term, lasting only for the duration of the construction period, until the affected areas are restored and re-vegetation or other forms of site stabilization are achieved.

The construction of the proposed transmission line will result in minor changes in topography, localized at structure locations or along access roads. Grading will only be performed to improve existing access roads, to create new access roads, or to create level work pads for the safe operation of construction equipment during the installation of the transmission line structures. Work pads will be removed from the majority of the construction locations after construction. Grading will generally not be required along the ROW where the terrain is flat and open, or where no access road improvements are needed.

Based on the proposed construction plan for the Mansfield Hollow area, certain access roads, work pads, and pulling pads will temporarily affect the Prime Farmland soils and Farmland of Statewide Importance soils along both Segment 1 and 2. In addition, certain structures will be placed in these soils. The following summarizes these potential soil effects:

Segment No.	Prime Farmlands	Farmlands of Statewide Importance
1 (Mansfield)	1.1 acres (Temporary) (Permanent: 2 structures; 158 square feet)	3.1 acres (Temporary) (Permanent: 3 structures; 237square feet)
2 (Chaplin)	0.5 (Temporary) (Permanent: 0, no structures in prime farmland soils)	1.4 acres (Temporary) (Permanent: 1 structure: 79 square feet)

CL&P has consulted with the NRCS concerning the potential effects of the Proposed Action on farmland preservation and on the consistency of the Proposed Action with the Farmland Protection Policy Act (FPPA). The Proposed Action will not affect any actively farmed areas and will be located on federal lands within which soils classified as prime farmland or farmlands of statewide importance are already preserved for recreational use. The Proposed Action will involve the placement of seven new transmission line structures (each affecting 79 square feet) within prime farmlands or farmlands of statewide importance. In total, these structures will impact approximately 474 square feet (0.01 acre) of soils designated as prime farmland or farmlands of statewide importance. The NRCS determined that this minor impact will not have a significant adverse effects on the preservation of farmland (refer to correspondence from the NRCS in Appendix D).

Where grading and earth-disturbing activities are required, temporary erosion and sedimentation control measures (e.g., silt fence, hay/straw bales) will be installed to minimize the potential for soil erosion and sedimentation off the ROW or into watercourses or wetlands. The need for and extent of temporary and permanent erosion and sedimentation controls will be a function of considerations such as:

- Slope (steepness, potential for erosion, and presence of resources such as wetlands or streams at the bottom of the slope).
- Type of vegetation removal method used and extent of vegetative cover remaining after removal (e.g., presence/absence of understory or herbaceous vegetation that will minimize the potential for erosion and degree of soil disturbance as a result of the movements of clearing equipment).
- Type of soil and erodibility factor (K value).
- Soil moisture regimes.
- Schedule of future construction activities.
- Proximity of disturbed areas to water resources, public roads, or other sensitive environmental resources.
- Time of year: The types of erosion and sedimentation control methods for a particular area will depend on the time of year. For example, reseeding will not typically be effective during the winter months. In winter, with frozen ground, controls other than re-seeding (such as the use of wood chips, straw and hay, geotextile fabric, waterbars, crushed stone) will be used to stabilize disturbed areas until seeding can be performed.
- Extreme weather conditions during or immediately following soil disturbance.

The measures selected will be appropriate to minimize the potential for erosion and sedimentation in areas where soils are disturbed. CL&P will adhere to its *Connecticut Best Management Practices*

*Manual*, and will prepare a Project-specific Erosion and Sedimentation Control Plan, in compliance with the 2002 Connecticut Guidelines for Soil Erosion and Sedimentation Control.

Temporary erosion controls will be maintained, as necessary, throughout the period of active construction until restoration has been deemed successful, as determined by standard criteria for storm water pollution control/prevention and erosion control. In addition to silt fence or hay/straw bales, temporary erosion controls may include the use of mulch, jute netting (or equivalent), erosion control blankets, reseeding to establish a temporary vegetative cover, temporary or permanent diversion berms (if warranted), and/or other equivalent structural or vegetative measures. After the completion of construction activities in any area, permanent stabilization measures (e.g., seeding, mulching) will be performed.

For the most part, blasting is not expected to be needed to install structures. As currently proposed, the proposed transmission line structures in the Mansfield Hollow area are steel poles, requiring poured concrete foundations with anchor bolts. The preferred techniques for removing rock, if encountered, will be to use either mechanical methods (e.g., mechanical excavators and pneumatic hammers) or mechanical methods supplemented by controlled drilling and blasting.

Potential effects from rock removal may include dust and vibration/noise from rock drilling, blasting (if required), and removal. If blasting is required, CL&P will develop a blasting control plan in compliance with state, industry, and CL&P standards: this plan will be provided to the state and local Fire Marshals. Excess rock (if any) generated from construction activities may be stockpiled at approved locations along the ROW, with the landowner's permission, to create wildlife habitat or placed across or along the ROW near road crossings to provide barriers to unauthorized vehicular traffic. Any excess rock not otherwise used along the ROW will be disposed off-site at an appropriate location, pursuant to regulatory requirements.

## **5.2 WATER RESOURCES**

The 1.4-mile portion of the ROW through the Mansfield Hollow area will encompass four waterbodies (including Mansfield Hollow Lake and the Natchaug River) and six wetlands. Groundwater resources will not be affected. In addition, no work will be required within the lake or the Natchaug River.

CL&P proposes to locate the new 345-kV transmission line structures and associated access roads within the ROW to minimize or avoid water resources whenever possible. As a result, most potential disturbances to water resources will be short-term (limited to the construction phase) and highly localized.

An exception is the removal of tall-growing trees from wooded wetlands within the ROW, which will be required both to allow construction and to allow the safe operation and maintenance of the 345-kV transmission line. Such vegetation removal will not cause a net loss of wetland habitat, but will result in a permanent modification of the wetland vegetative cover type from forested to scrub-shrub or emergent marsh.

### **5.2.1 Waterbodies and Wetlands**

Of the 11 transmission line structures planned for location along the 1.4-mile Mansfield Hollow portion of the ROW (six structures along Segment 1 and five structures along Segment 2), only two (structure Nos. 99 and 100 within the WMA in Chaplin; refer to the maps in Appendix A.3) must unavoidably be located within a wetland (W20-76). All of the other structures will be located in upland areas, and all of the other waterbodies and wetlands along the 1.4-mile ROW will be spanned by the overhead conductors (wires). Wetland W20-76 is a large wetland complex, located across and north of the existing ROW on the eastern edge of the WMA in Segment 2 (Chaplin). In this area, the ROW will be expanded by 35 feet in width. The new monopole structures will require the use of temporary work pads, portions of which will be within the wetland, as well as permanent fill, totaling approximately 78 square feet each (0.003 acre total for both) for the new structure foundations.

Access roads will be required along the ROW to reach structure construction sites and in some areas for operation and maintenance purposes. However, as illustrated on the maps in Appendix A.3, CL&P has located proposed access roads to avoid water resources whenever possible. No access roads will be located across wetlands or waterbodies along Segment 1 (through Mansfield Hollow State Park, across Mansfield Hollow Lake, and the WMA).

Along the 0.5-mile Segment 2 through the WMA in Chaplin, two access roads – each extending along the ROW from public roads – will be required to provide construction ingress and egress to the Natchaug River, while avoiding a crossing of the river itself. The access road that will be aligned along the ROW between South Bedlam Road and the Natchaug River will unavoidably cross a total of about 200 feet through the following streams and wetlands: S20-20, W20-68, S20-21, and W20-69 (along the ROW across privately-owned property) and wetlands W20-70 and W20-72/73 (on federally-owned property). The second access road, which will extend along the ROW from east of the Natchaug River to U.S. Route 6 (Willimantic Road) will follow an existing on-ROW access road across wetlands W20-75, W20-76, and W20-77, as well as stream S20-24 (refer to the maps in Appendix A.3 for an estimate of the temporary impacts associated with each of these crossings)

Temporary culverts will be installed at the crossing of wetlands W20-70 W20-75 to maintain flow during the use of these access roads. In addition, temporary culverts will be installed in wetland W20-76 to carry flow beneath the work pad that is required to install Structure No. 100. Access roads not needed for the operation of the transmission line will be removed following the completion of construction.

Transmission line construction also can be expected to cause short-term and localized effects on water resources due to temporary increases in turbidity during wetland and stream crossings, or as a result of other soil-disturbing activities. However, CL&P will prepare and follow a Project-specific *Stormwater Pollution Control Plan*, in accordance with CT DEEP requirements. CL&P will require its construction contractor(s) to adhere to this plan, as well as to any other best management practices and regulatory conditions relevant to water resources, in order to minimize the potential for soil erosion and sedimentation during all phases of construction.

Similarly, CL&P will implement its construction best management practices to minimize the potential for and effects from accidental spills or inadvertent releases of petroleum based products or other materials used during construction, including from the operation or malfunction of construction equipment. CL&P will contain, clean up, and (as necessary) report any spills/leaks in accordance with its emergency response plan and CT DEEP requirements. Further, CL&P and National Grid have developed a Project-wide protocol for avoiding or minimizing impacts to waterbodies (refer to Appendix E).

In addition, any construction work in or near water resources will be performed in accordance with the conditions of the regulatory approvals that will be required from the USACE, the CT DEEP, and the CSC. For example, the Project as a whole will require an Individual Clean Water Act Section 404 permit from the USACE. The mitigation of direct impacts to wetlands as a result of the construction and operation of the new 345-kV transmission line on the federally owned lands in Mansfield Hollow will be incorporated into the Mitigation Plan for the Connecticut portion of the Project.

Further, construction activities in Mansfield Hollow will not commence until the Section 404 permit is issued by the USACE. To mitigate for temporary impacts from construction activities along the ROW in the Mansfield Hollow area (e.g., from line work and pulling pads, access roads, guard structures), site-specific wetland enhancement activities, such as wetland invasive species control, will be undertaken along the ROW within the Mansfield Hollow area. These enhancement measures will be included as a Special Condition to the USACE Section 404 permit for the Project.

## 5.2.2 Floodplains

Three structures will be located within the 100-year floodplain west of Mansfield Hollow Lake, and four structures will be located on upland sites within the Natchaug River floodplain (refer to the maps in Appendix A). These structures are proposed for location adjacent to the existing 330 Line structures, which also are located in the 100-year floodplain in these areas.

In addition, one structure (No. 82) in the state park is proposed for location approximately 60 feet southeast of the Mansfield Hollow Lake Dam flood control levee. This proposed structure is planned for location adjacent to existing structure No. 9081, which is approximately 30 feet from the levee. The levee will be spanned by the overhead transmission lines and will not be affected by either the construction or the operation of the Project.

The location of the proposed structures on upland sites within the 100-year floodplain will not adversely affect flood storage capacity or other floodplain characteristics. Any temporary fill placed within the floodplains for access roads or work pads will be removed following the completion of construction, unless the USACE requests otherwise.

## 5.3 BIOLOGICAL RESOURCES

The proposed ROW expansion will result in both temporary and long-term, highly localized effects on vegetation communities and wildlife assemblages.

### 5.3.1 Vegetation

The vegetative communities that will be affected by the Project along and adjacent to the existing ROW are common to the region. Within the Mansfield Hollow area, approximately 5.4 acres of forested uplands, consisting of deciduous and coniferous forest cover types, and 1.5 acres of forested wetland will be affected by construction.<sup>13</sup> These currently forested areas will be converted, for the life of the Project, to scrub shrub, emergent marsh, low-growing woody communities, or similar habitats.

During construction, CL&P will take particular care to maintain vegetation along watercourses and within wetlands to the extent possible. In general, CL&P may alter, to some degree, its vegetation management activities in the following areas:

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<sup>13</sup> Of this, approximately 3.7 acres of forested upland and 0.2 acre of forested wetland are within the northern portion CL&P's existing 150-foot-wide ROW (which CL&P could presently manage in low-growth vegetation.)

- Areas of visual sensitivity where vegetation removal may be limited for aesthetic purposes;
- Steep slopes and valleys that are spanned by transmission lines;
- Agricultural lands;
- Within wetlands, vernal pools, or along streams to preserve some shrub cover; and
- To the extent feasible, maintain a 25-foot vegetated riparian zone adjacent to watercourses and waterbodies.

After the installation of the proposed transmission facilities, CL&P will restore the contours, seed and mulch disturbed areas with appropriate grass-type mixes and hay/straw mulch. Vegetative species compatible with the use of the ROW for transmission line purposes are expected to regenerate naturally, over time. CL&P will promote the re-growth of desirable species by implementing vegetative maintenance practices to control tall-growing trees and certain undesirable invasive species, thereby enabling native plants to dominate.

The removal of vegetation along the ROW in order to construct and operate the new transmission lines will result in both short- and long-term effects on vegetative communities. The effects on existing shrub-scrub and other low-growth vegetation will be short-term, as these community types are compatible with overhead transmission line uses and thus will be allowed to become re-established along the ROW. However, because tall-growing woody vegetation is not compatible with utility use, the development of the transmission lines will result in long-term effects on forested vegetation.

The creation of additional shrub land habitat along the ROW will represent a long-term positive effect on some wildlife species, since shrub land habitat is otherwise declining in New England. This decline is a result of various factors (e.g., development, ecological succession, absence of fire).

In this regard, transmission line ROWs are considered a major source of shrub land habitat.<sup>14</sup> Scrub-shrub habitats within the ROW can provide wildlife habitat such as nesting for birds, browse for deer, and cover for small mammals (Ballard et al., 2004).<sup>15</sup>

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<sup>14</sup> Shrubland habitat information from “Wildlife Habitat in Connecticut: Shrubland”, Laura Saucier, Habitat Management Program, in *Connecticut Wildlife*, July/August 2003.

<sup>15</sup> Ballard, B.D., H.L. Whittier, and C.A. Nowak. 2004. Northeastern Shrubs and Short Tree Identification, A Guide for Right-of-way Vegetation Management. State University of New York-College of Environmental Science and Forestry.

### **Vegetation Management and Preservation on CL&P ROWs**

In general, vegetation on CL&P's ROWs is managed in accordance with the company's vegetation management program, the objective of which is to maintain safe access to the transmission facilities and to promote the growth of vegetative communities along ROWs that are compatible with transmission line operation and consistent with federal and state standards. Since April 7, 2006, all public utilities have been required to comply with mandatory standards adopted by the North American Electric Reliability Council (NERC) following the August 14, 2003 Northeast blackout, an event which was found to have been triggered by line outages caused by overgrown vegetation. CL&P's vegetation management practices are designed to allow the safe operation of transmission lines by preventing the growth of trees or invasive vegetation that will interfere with the transmission facilities or access along the ROW. As a result, the vegetation within the maintained portions of CL&P's ROW typically consists of shrubs, herbaceous species, and other low-growing species.

While undesirable tall-growing woody species within the ROW and proximate to the existing or new transmission lines will be removed during construction, desirable species will be preserved to the extent practicable. In selected locations, certain desirable low-growing trees that, due to their growth characteristics and locations relative to the new line, may be allowed to remain on the ROW and trimmed to ensure adequate clearance from wires and structures, pursuant to CL&P's *Right-of-Way Vegetation Initial Clearance Standard for 115-kV and 345-kV Transmission Lines*.

However, any vegetation that is preserved during construction activities may be removed in the future in accordance with CL&P's *Specification for Rights-of-Way Vegetation Management*. Generally, all tall growing tree species will be removed from the ROW and low-growing tree species and taller shrub species will be retained in the areas outside of the conductor zones (the area directly under the conductors extending outward a distance of 15 feet from the outermost conductors for this Project).

During and following the new transmission line construction, off-ROW "danger" trees, that have been determined to present an imminent hazard to the integrity of the lines, also will be identified and removed. Danger trees are structurally weak, broken, damaged, decaying or infested trees that could contact the structures or conductors or violate the conductor clearance zones if they were to fall into the ROW. Prior to the removal of danger trees located on federal property outside the boundaries of the CL&P easement, CL&P will coordinate with the USACE's Mansfield Hollow Project Manager.

### 5.3.2 Wildlife

The removal of forested vegetation within the ROW will affect wildlife species composition by favoring species that prefer shrub land/emergent habitat to those that inhabit forested communities. During construction, temporary and localized displacement of wildlife from the ROW will occur due to the initial disturbance from vegetation removal and the operation of construction equipment.

However, the ability of the area to provide wildlife habitat is not expected to be adversely effected post-construction. A study conducted by Nickerson and Thibodeau (1984) indicated an increase in wildlife utilization, especially in avian species, following clearing of ROWs.<sup>16</sup> The study attributed this increase in wildlife usage to the conversion of forested areas into both wetland and upland shrub and emergent plant communities. The maintenance of ROWs provided edge effect feeding, nesting, and cover habitat for various species. The ROW also serves as open corridors connecting non-contiguous natural areas.

Overall, the operation and maintenance of the new transmission lines will have a localized positive effect on wildlife species that utilize shrub land habitat, including mammals (e.g., New England cottontail, white-tailed deer, eastern mole, bats) and various bird species (e.g., American woodcock, prairie warbler, brown thrasher, field sparrow, eastern towhee, red-tailed hawk, indigo bunting, gray catbird). Because shrub land and old field habitat are becoming less prevalent in Connecticut, this increase in shrub land and old field habitat will have a positive effect on habitat diversity and will benefit species that use such habitat. Emphasizing the importance of shrubland habitat to certain bird species, the Connecticut Audubon Society has endorsed the Project as a whole (refer to correspondence in Appendix D).

### 5.3.3 Vernal Pools / Amphibian Breeding Habitat

Based on the results of field surveys, the ROW in the Mansfield Hollow area will traverse or be located near three wetlands determined to function as vernal pools/ amphibian breeding habitats within the WMA in Segment 2. These vernal pools/confirmed amphibian breeding habitats occupy areas on the existing ROW where there is shrub-scrub growth, and may extend into adjacent forested areas. In this respect, the existing ROW is affording habitat for these species and, after the completion of construction, the expanded areas of maintained vegetation along the new ROW could increase the available habitat.

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<sup>16</sup> Nickerson, N.H. and F.R. Thibodeau. 1984. Wetlands and Rights-of-Way. Final Report Submitted to the new England Power Company, 25 Research Drive, Westborough, MA.

However, potential effects on amphibians could occur during construction, particularly if work activities are performed during critical amphibian breeding or migration periods. Within the three wetlands, the amphibians identified include spotted salamander, wood frog, and green frog.

Within the Mansfield Hollow segments, proposed structure locations and construction work pads have been located to avoid vernal pools/amphibian breeding habitats to the extent practicable. However, potential effects on amphibians could still occur from activities such as vegetation removal; access road development; movements of heavy equipment on access roads; sedimentation into amphibian habitats; destruction of structural habitat features; or through the use of equipment staging areas (work pads) and timber mats in amphibian breeding habitats during breeding periods.

To avoid or minimize effects to vernal pools, CL&P will adhere to Project-wide protocol regarding work in the vicinity of vernal pools (refer to Appendix E) and will continue to consult with CT DEEP to identify other mitigation measures, if required. The USACE also will consider impacts to vernal pools during the Section 404 Clean Water Act permitting process.

#### **5.3.4 Fisheries**

The Project will have no direct adverse effect on fisheries resources in Mansfield Hollow Lake and the Natchaug River. The transmission line conductors will span these waterbodies, as is the case with the existing 330 Line. Low-growing vegetation adjacent to both the lake and the river will be maintained to the extent practicable to provide shading and to minimize the potential for erosion and sedimentation. Riparian vegetation along the ROW will be cut only if required to maintain safe clearances and access to and from the transmission facilities.

Measures also will be taken to minimize the potential for sedimentation into watercourses resulting from construction activities in nearby upland areas. In particular, temporary soil erosion and sedimentation controls will be installed around areas of disturbed soils at work sites up gradient from streams. These temporary erosion controls will remain in place until the disturbed areas are re-vegetated or otherwise stabilized (for further discussion, refer to Section 5.1).

### **5.4 LISTED SPECIES**

The existing and proposed ROW expansion in the Mansfield Hollow area does not encompass any federally-listed threatened or endangered species. However, based on the results of consultations with the

CT DEEP NDDB and field surveys, 21 state-listed species may occur in the vicinity of the transmission line route in Mansfield and Chaplin.

CL&P is particularly cognizant of the need to carefully design and implement measures to minimize or avoid the potential for adverse effects on state-listed species and has consulted with the CT DEEP to identify potential mitigation measures with respect to the development of the Project. CL&P will continue to consult with CT DEEP to determine the state-listed species that may specifically occur along the ROW in Mansfield Hollow and to define mitigation for these species, as warranted. CL&P anticipates that state-listed protection and mitigation measures will be included, as warranted, as conditions the 401 Water Quality Certification issued for the Project by the CT DEEP.

## **5.5 LAND USE, RECREATION, AND VISUAL RESOURCES**

The development of the proposed Project through the Mansfield Hollow area will require an additional grant of easement for approximately 5 acres from the USACE for the expansion of the existing CL&P ROW. Long-term effects will occur due to the conversion of forested areas to low-growing vegetative species within the expanded ROW. In addition, the second overhead 345-kV line will result in a long-term incremental change in the visual environment from certain vantage points. The Project also will cause short-term and localized effects associated with construction activities, which could temporarily disrupt or create nuisance effects on certain recreational uses within the state park and WMA.

The new 345-kV line structures will be located generally adjacent to the existing 330 Line structures. However, because the 330 Line has been in existence for approximately 40 years, the addition of the new 345-kV line can be expected to have only an incremental effect on land uses and the visual environment. The forested vegetation that predominates in the area will screen views of the transmission lines from most locations within the state park and WMA. Further, the transmission lines generally span public viewpoints (e.g., Bassetts Bridge Road, the Red-Blazed and Nipmuck hiking trails) perpendicularly, thereby limiting the viewshed distance.

The Project will not affect primary use areas within the state park, such as the public boat launch or picnic area. In addition, the expansion of the existing maintained ROW through the Mansfield Hollow WMA will result in a long-term improvement in hunting opportunities by increasing shrub land habitat within the predominantly forested portions of the federally-owned property.

## 5.6 ARCHAEOLOGICAL AND HISTORIC (CULTURAL) RESOURCES

CL&P has coordinated with the Connecticut SHPO, USACE cultural resource specialists, and representatives of involved Native American Tribes regarding the alignment of the proposed 345-kV transmission line across the federally owned properties in Mansfield Hollow. The 2008 *Cultural Resources Assessment Report* and the 2011 *Supplement* to this report define the known or potential archaeological resources within the Project areas and also evaluate the potential indirect visual effects of the Project on historic properties listed or eligible for listing on the NRHP or SRHP.

**Archaeological and Native American Tribal Resources.** For the archaeological evaluations, the resource assessment involved the analysis of background data, as a prerequisite to a reconnaissance survey, which included surface inspection and subsurface testing. The assessment included visual inspection of the existing transmission line structure locations and examinations of the ROW to assess the presence of characteristics that affect the potential for archaeological site location (i.e., slope, drainage, ledge, ground disturbance, land fill). The study also involved an extensive review of documentary sources, as well as personal consultations with SHPO and the Connecticut State Archaeologist. The resulting assessment provided the basis for recommendations for further reconnaissance investigations, which were conducted in Project areas subject to subsurface disturbance.

Field investigations, which were conducted along the ROW and proposed areas of ROW expansion, were performed after consultation and agreement with the USACE and the SHPO regarding Project-specific survey protocol. The objective of the investigations was to field-locate any as yet unrecorded sites and, to determine their potential NRHP eligibility of sites discovered. In addition, reconnaissance of the existing ROW and proposed ROW expansion areas were performed with representatives of the involved Native American Tribes.

As a result of this process, the Native American Tribal representatives identified three stone features located within the proposed ROW expansion area. Two of these were identified as areas of interest and the one as an area of concern. It has been determined that the three stone features can be avoided and protected during Project construction. These avoidance and protective measures will be incorporated into an Historic Resources Management Plan that will be developed as part of the Section 106 consultation for the Project under the Section 404 permitting process. No impacts to the stone features will occur as a result of construction.

In addition, three archaeological sites were identified that may potentially be eligible for the NRHP. More detailed studies (i.e., Phase II field investigations) will be conducted of these three sites in the fourth quarter of 2012. If determined to be eligible for the NRHP, these sites will be avoided, if possible, through modifications to Project design and/or construction means and methods. Such modifications and methods may include shifts in the location of transmission line structures, structure construction work sites, or access roads or may entail the use of “Protective Fill” to avoid direct and indirect disturbance to soils and any subsurface cultural/archaeological materials at these sites (i.e., placement of layers of sand, geotextile material, and gravel).

If site avoidance is not possible, mitigation strategies involving special construction protocols or data recovery will be developed for review and approval by the USACE, the SHPO, and Native American Tribal representatives. The goal of any mitigation effort will be to minimize impact to the sites and/or assure the recovery and documentation of artifacts and site information that may be affected by Project development.

Site avoidance and mitigation plans for the construction activities across the federally-owned properties in the Mansfield Hollow area will be finalized and included in the cultural resources mitigation program for the Project as a whole. The USACE will review this mitigation program for conformance to the National Historic Preservation Act as part of the Section 404 process.

**Historic Resources.** Analyses of the potential effects of the Project development on standing historic resources (e.g., NRHP or SRHP historic districts, structures, or sites) were also performed, using field observations and visual simulations to assess the aesthetic effects of the new 345-kV line adjacent to the existing 330 Line. Within 0.25 mile of the ROW through the Mansfield Hollow area, seven significant historic resources were identified, including five resources in Mansfield and two in Chaplin. Two of the resources in Mansfield are NRHP-listed historic districts (Mansfield Center Historic District and Mansfield Hollow Historic District). The resources in Mansfield also include the Mansfield Hollow Lake Dam, three Jewish cemeteries, and the Mansfield Center Cemetery, whereas the resources in Chaplin are both cemeteries, which are located south of the existing ROW.

The 0.25 mile distance from the ROW was selected to evaluate possible visual effects of new overhead transmission structures. However, based on simulations and digital topographic profiles of the views of the proposed 345-kV transmission line, the Project is not expected to significantly change the existing visual environment in the Mansfield Hollow area. Further, the forest cover that characterizes the areas

adjacent to the ROW through the Mansfield Hollow area will continue to screen most views of the transmission line structures from historic resources. As a result, the Project is not expected to have an adverse effect on such designated historic resources.

## **5.7 TRANSPORTATION AND ACCESS**

The construction of the proposed 345-kV transmission line will result in localized increases in traffic on public roads leading to and from the ROW through the Mansfield Hollow area (e.g., Bassetts Bridge Road, Bedlam Road, U.S. Route 6) as a result of the movement of construction equipment and personnel to work sites. However, these increases will be short-term.

Through most of the Mansfield Hollow area, on-ROW access roads will be used to reach transmission line structure locations. Unless required for operation and maintenance purposes (to reach structure locations), most access roads are expected to be developed and used only during construction. After the completion of transmission line installation, these temporary access roads will be removed and the ROW restored.

Activities involving the overhead installation of conductors at or near road crossings also could result in minor, short-term, and localized traffic congestion, delays, or detours.

The operation of the new 345-kV transmission line will have no long-term effects on transportation patterns.

## **5.8 AIR QUALITY**

Within the Mansfield Hollow area, primary transmission line construction activities would occur over a total approximately four months. Construction activities would require equipment such as backhoes, cranes, bulldozers, dump trucks, highway trucks, pick-up trucks, front-end loaders, and other similar equipment such as dewatering pumps and small loaders.

The operation of construction equipment would emit pollutants, including nitrogen oxides and carbon monoxide that can lead to the formation of ozone. Emissions also will be associated with vehicles used by construction personnel to reach the Mansfield Hollow area. All construction-related vehicles will be in compliance with the state's vehicle emission program. The emissions for construction vehicles and related equipment will have an insignificant impact to local air quality.

Construction of the proposed project could cause a temporary reduction in local ambient air quality because of fugitive dust and emissions generated by construction equipment. The extent of dust generated would depend on the level of construction activity and dryness. Proper dust suppression techniques would be employed to avoid creating a nuisance during dry and windy weather.

To minimize air quality effects during construction, all construction activities will comply with applicable provisions of Connecticut air quality control regulations pertaining to dust, odors, construction, noise, and motor vehicle emissions. No direct or indirect increases or other changes in local or regional air quality are likely to occur as a result of the construction and operation of the Proposed Action.

Section 176 (c) of the Clean Air Act (CAA) requires that Federal agencies assure that their activities are in conformance with Federally-approved CAA state implementation plans for geographic areas designated as non-attainment and maintenance areas under the CAA. A General Conformity review, provided in Section 6.3, demonstrates that the construction and operation of the new overhead transmission line in Mansfield Hollow using off-road vehicles and equipment will not degrade air quality.

## **5.9 ELECTRIC AND MAGNETIC FIELDS ASSOCIATED WITH THE PROPOSED AND EXISTING TRANSMISSION LINES**

Electric and magnetic fields (EMF) are two forms of energy that surround an electrical device. The strength of a power-frequency electric field (EF) is proportional to the amount of electric voltage at the source, and decreases rapidly with distance from the source, diminishing even faster when interrupted by conductive materials, such as buildings and vegetation. The level of a power-frequency magnetic field (MF) is proportional to the amount of electric current (not voltage) at the source, and it, too, decreases rapidly with distance from the source; but magnetic fields are not easily interrupted, as they pass through most materials. EF is often measured in units of kilovolts per meter (kV/m). MF is often measured in units of milliGauss (mG).

Transmission lines are common sources of EMF, as are other components of electric power infrastructure, ranging from transformers at substations to the wiring in a home. Further, any piece of machinery run by electricity can be a source of EMF: household objects as familiar as electric tools, hair dryers, televisions, computers, refrigerators, and electric ovens.

In the United States, EMF associated with electric power has a frequency of 60 cycles per second (or 60 Hz). Estimated average background levels of 60-Hz MF in most homes, away from appliances and

electrical panels, range from 0.5 to 5.0 mG (NIEHS, 2002). MF near operating appliances such as an oven, fan, hair dryer, television, etc. can range from 10's to 100's of mG. Many passenger trains, trolleys, and subways run on electricity, producing MF: for instance, MF in a Metro-North Railroad car averages about 40-60 mG, increasing to 90-145 mG with acceleration.

Over the last 40 years, scientists have investigated suggestions that EMF associated with electric transmission lines and distribution lines may produce adverse health effects in humans with long-term exposure to them. Concerns remaining after this research focus on magnetic fields, rather than electric fields, and on the possibility that higher average levels of magnetic exposure may increase the risk of leukemia, particularly childhood leukemia. This is because some epidemiological studies have reported an increased risk of leukemia associated with estimates of magnetic field exposure. Other lines of inquiry, such as whole animal studies and laboratory studies at the cellular and molecular level, have not produced evidence of carcinogenicity.

The United States Congress established the U.S. EMF Research and Public Information Dissemination (EMF RAPID) Program in 1992 to study whether exposure to EMF produced by the generation, transmission or use of electric power posed a risk to human health. The U.S. Department of Energy (DOE) administered the overall EMF Rapid Program, but health effects research and risk assessment were supervised by the National Institute of Environmental Health Sciences (NIEHS), a branch of the U.S. National Institutes of Health. Studies extending over several years were funded by grants of approximately \$45 million. In June 1999, the NIEHS reported to Congress that “the weak epidemiological associations and lack of any laboratory support for these associations provide only marginal scientific support that exposure to this agent is causing any degree of harm” and that “aggressive regulatory action [was] not warranted.” (NIEHS Report on Health Effects from Exposure to Power Frequency Electric and Magnetic Fields, June 1999, <http://www.niehs.nih.gov/emfrapid>, at 36.) No regulatory action was recommended to, or taken by, Congress.

There have been many inter-disciplinary reviews of the research relating to potential EMF health effects by national and international health organizations and scientific bodies, the most recent being that of the World Health Organization, published in 2007. Most of these reviews are summarized in the NIEHS publication *Electric and Magnetic Fields Associated with the Use of Electric Power, Questions and Answers* (2002) <http://www.niehs.nih.gov/health/docs/emf-02.pdf> (NIEHS 2002) ; and in the Connecticut Siting Council's *Electric and Magnetic Fields Best Management Practices for the Construction of Electric Transmission Lines in Connecticut* (Dec. 14, 2007)

[http://www.ct.gov/csc/lib/csc/emf\\_bmp/emf\\_bmp\\_12-14-07\\_20080603083907.pdf](http://www.ct.gov/csc/lib/csc/emf_bmp/emf_bmp_12-14-07_20080603083907.pdf) (CSC BMP)<sup>17</sup>. The conclusions of these reviews have been broadly similar to that of the NIEHS, quoted above.

“There are no state or federal exposure standards for 60-Hz MF based on demonstrated health effects. Nor are there any such standards world-wide. Among those international agencies that provide guidelines for acceptable MF exposure to the general public, the International Commission on Non-Ionizing Radiation Protection established a level of 2,000 mG, based on an extrapolation from experiments involving transient neural stimulation by MF at much higher exposures. Using a similar approach, the International Committee on Electromagnetic Safety calculated a guideline of 9,040 mG for exposure to workers and the general public (ICNIRP, 2010; ICES/IEEE, 2002). This situation reflects the lack of credible scientific evidence for a causal relationship between MF exposure and adverse health effects.” (CSC BMP, at 3.)

Nevertheless, the CSC requires that precautionary measures be taken in the siting of new transmission lines, including “the use of effective no-cost and low-cost technologies and management techniques on a project-specific basis to reduce MF exposure to the public while allowing for the development of efficient and cost-effective electrical transmission projects” (p.11). The proposed 345-kV line that will traverse the state park and WMA properties in Mansfield will incorporate such design strategies, e.g., best phasing with the parallel, existing line.

The CSC BMP also requires that a company proposing a new transmission line use computer modeling to project MF levels that are likely be associated with the new line. CL&P accordingly projected MF levels that will be associated with the lines on the ROW through Mansfield Hollow State Park and WMA under projected annual average load (“AAL”) conditions, based on future electric load conditions, and compared those levels with the anticipated pre-Project fields that will be associated with the line currently on the ROW alone. The results show that while magnetic fields on the west/north edge of the ROW will be increased, as opposed to what they would be if the proposed line and the other projects were not built, the increase will be to levels comparable to pre-Project fields along the other side of the ROW, which will actually be reduced slightly by the construction of the Project.

The calculated levels of both magnetic and electric fields at the ROW edges before and after construction of the new 345-kV line across the Mansfield Hollow area are summarized in Table 5-1. Overall, the

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<sup>17</sup> The discussion in this section is, for the most part, taken from the CSC BMP and, to a lesser extent, NIEHS 2002.

operation of the new 345-kV transmission line through the Mansfield Hollow area will not significantly affect EMF levels.

**Table 5-1: Summary of EMF Levels at the Edge of the ROW for Existing 330 Line and Proposed Action (5-Acre Minimal ROW Expansion) at Annual Average Loading (AAL)**

ROW Segment and Cross-Section	Transmission Line Loading Conditions	Magnetic Field (mG)		Electric Field (kV/m)	
		North ROW Edge*	South ROW Edge	North ROW Edge*	South ROW Edge
Segment 1					
Existing 330 Line	Pre-Project (2015)	21.9	24.7	1.10	0.86
Proposed Action (refer to Appendix A.2; XS-3-MH-MRE)	Post-Project (2020)	38.1	26.4	0.70	1.00
Segment 2					
Existing 330 Line	Pre-Project (2015)	35.2	35.2	1.63	1.63
Proposed Action (refer to Appendix A.2; XS-5-MH-MRE)	Post-Project (2020)	42.7	31.8	0.70	1.80

\* For the Proposed Action, the north edge of ROW is 25 feet west of the existing north edge along Segment 1 and 35 feet west along Segment 2, whereas the EMF levels for the existing 330 Line are calculated at the edge of the existing 150-foot-wide ROW.

## 5.10 SUMMARY OF ENVIRONMENTAL IMPACTS: PROPOSED ACTION

The implementation of the Proposed Action (the 5-Acre Minimal ROW Expansion), involving the expansion of CL&P's existing ROW through Segments 1 and 2 by 25 feet and 35 feet, respectively, will result in minor, localized, and predominantly temporary impacts on environmental resources. Table 5-2 summarizes these potential impacts, by segment.

**Table 5-2: Summary of Environmental Impacts: Proposed Action  
(5-Acre Minimal ROW Expansion)**

ENVIRONMENTAL FEATURE	POTENTIAL ENVIRONMENTAL EFFECTS, BY SEGMENT		TOTAL
	1	2	
<b>Location, Design, and Appearance</b>			
ROW Length (miles)	1.0 (0.9 federal property)	0.5	1.5
ROW Expansion Width (feet)	25	35	-
ROW Expansion (total acres)	2.6	2.2	5
Structure Height Range (feet)	125-155	115-135	
<b>Environmental Resources</b>			
<b>Water Resources</b>			
Waterbody Crossings (number)	1 span Mansfield Hollow Lake	2 Natchaug River (S20-22); S20-24; 2 temporary culverts	3
<b>Wetlands</b>			
Number Affected	1 (W20-66, Mansfield Hollow Lake border, tree trimming or removal)	6 (W20-70, W20-72/73, W20-74, W20-75, W20-76, W20-77)	7
Wetlands, Temporary Effects (estimated acres)	0	1 acre	1 acre
Wetlands, Permanent Fill Effects (estimated acres)	0	<0.1 acre	<0.1 acre
<b>Vegetation</b>			
Forested Upland Vegetation Removal (Permanent)	3.7 acres	1.7 acres	5.4 acres
Forested Wetland Vegetation Removal (Permanent)	<0.1 acre	1.5 acres	1.5 acres
Scrub-shrub Upland Vegetation Potentially Affected	7.3 acres	4.7 acres	12.0 acres
Open Field Upland Vegetation Potentially Affected	2.1 acres	0	2.1 acres
Scrub-shrub Wetland Vegetation Potentially Affected	< 0.1 acre	2.3 acre	2.3 acres
<b>Biological Resources</b>			
Vernal Pools Affected (number)	0	2 (CH-1-VP, CH-2-VP)	2
State-listed Species Habitat Traversed (number)	1	1	2
<b>Land Uses</b>			
Recreational Areas (linear miles traversed along ROW)			
• Mansfield Hollow State Park	0.8 mile	0	0.8 mile
• Mansfield Hollow WMA	0.1 mile	0.5 mile	0.6 mile
• Trails	2 Red Trail (within Park) Nipmuck Trail East Branch (within WMA)	0	2
<b>Visual Resources</b>			
Structure Appearance	Monopoles with vertically-configured conductors; galvanized steel finish; 115-155 feet in height		

**Notes\*:**

1. The wetland bordering Mansfield Hollow Lake (Wetland W20-66) would be spanned. Trees in this wetland would be cut or trimmed to maintain clearance from conductors.
2. Wetland effects based on constructability field reviews and locations of work pads, pulling sites, and access roads as depicted on the maps in Appendix A.3.

## 5.11 CUMULATIVE IMPACTS

Pursuant to the Council of Environmental Quality (CEQ) “Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR §§ 1500-1508)”, federal agencies must integrate environmental considerations into their decision-making processes by considering alternatives and by specifically addressing the potential direct, indirect, and cumulative effects of a project. These effects are defined as follows:

- **Direct effects** are caused by the project and occur at the same time and place.
- **Indirect effects** are caused by the project and are reasonably foreseeable, but occur either later in time or are farther removed in terms of location (e.g., induced changes in land use patterns, ecosystems, population growth).
- **Cumulative effects** are the impacts on a natural resource, ecosystem, or human community that result from the incremental effect of a project, when added to the effects of other past, present and reasonably foreseeable future actions, regardless of what agency or persons undertakes such acts.

The proposed alignment of the new 345-kV transmission line adjacent to the existing 330 Line across the Mansfield Hollow properties is designed to minimize direct and indirect effects on the environment and cultural resources, and to avoid significant adverse cumulative effects on individual natural resources, ecosystems, or human communities by upgrading the regional electric transmission grid in response to a direct need.

The Project is part of a long-range plan to improve the southern New England transmission grid and responds to an existing public need for improved energy reliability, as documented by the Independent System Operator – New England (ISO-NE). The need for improvements to the transmission system now is considered critical to the continued reliability of the New England electric grid.

The alignment of the new 345-kV line across the Mansfield Hollow properties, adjacent to CL&P’s existing 330 Line, maximizes the use of this existing utility corridor, in accordance with established siting principles, and minimizes environmental effects. Compared to other options (e.g., avoiding the Mansfield Hollow properties by creating a new “greenfields” overhead transmission corridor [the Willimantic South Overhead Variation], or by installing the 345-kV line as an underground cable system within road ROWs [the Willimantic South Underground Variation and options considered along U.S. Route 6 and Bassett’s Bridge Road]), the alignment across the Mansfield Hollow area represents the least environmentally damaging, most cost-effective, practical alternative for improving the reliability of the power supply.

Overall, because the alignment of the new 345-kV line through the federally-owned properties will maximize the use of CL&P's existing transmission line ROW, the effects on ecosystems, cultural resources, and communities will generally be short-term and highly localized. For the most part, the impacts that will occur from the construction and operation of the Project (e.g., additional forested vegetation clearing) represent marginal, rather than new, effects associated with the expansion of the existing overhead transmission line ROW to safely accommodate the 345-kV structures.

The development of the new 345-kV transmission line as proposed (i.e., the 5-Acre Minimal ROW Expansion) along the approximately 1.4-mile ROW in the Mansfield Hollow area will result in the following anticipated effects, which will occur both within the easement expansion area and on the portions of CL&P's existing ROW that will be affected by construction activities:

- **Additional ROW Grant of Easement**

- Approximately 5 acres of additional easement required
  - ⇒ Net Effect: CL&P will coordinate with the USACE regarding compensation for the grant of additional easement.

- **Farmland Soils**

- 0.01 acre of permanent fill associated with the placement of new structure foundations in prime farmland soils or statewide important farmland soils
  - ⇒ Net Effect: No significant adverse effect on prime farmland soils or statewide important farmland soils, as determined based on consultation with the NRCS.

- **Wetlands**

- Approximately 1 acre of temporary construction impacts associated with new transmission structure installation (work pads, pulling pads) and access roads
- <0.1 acre of permanent fill associated with new structure foundations
  - ⇒ Net Effect: There will be a loss of <0.1 acre of wetlands. Wetlands temporarily affected during construction will be restored. The <0.1 acre of permanent fill in wetlands will be mitigated through compensation.

- **Vegetation Clearing**

- 5.4 acres of upland forest clearing (long-term conversion to shrub-scrub or low-growing trees)
- 14.1 acres of upland shrub and upland open field (no long-term effects)
- 1.5 acres of forested wetland clearing (long-term conversion to shrub-scrub or low-growing trees)

- 2.3 acres of shrub/scrub wetland clearing (no long-term effects)
  - ⇒ Net Effect: There will be a long-term conversion (but not loss) of habitat from forested upland to shrub-scrub upland and from forested wetlands to shrub-scrub wetland. The conversion of forest to shrubland can have a positive effect on wildlife, particularly because shrubland habitat is becoming increasingly scarce in Connecticut.
- **Threatened and Endangered Species**
  - No adverse effects to federally-listed species
- **Cultural and Social Effects**
  - Short-term social nuisance effects during construction
  - Implementation of measures to avoid or minimize adverse effects to significant cultural resources, coordinating closely with the USACE and SHPO, as well as with representatives of involved Native American Tribes
  - No likely significant adverse indirect (visual) effects on historic properties

CL&P is committed to minimize adverse impacts that cannot otherwise be avoided through the implementation of measures such as best management practices and other mitigation.

The Project is designed to improve the reliability of the electric transmission system within the already developed southern New England area (including Connecticut) and, as a result, is not foreseen to cause significant adverse induced or cumulative effects on the environment. Overall, the Project is expected to have a potentially positive effect on the environment by allowing power to flow into Connecticut from newer, more efficient, and less-polluting generation facilities. Compared to the operation of older generating plants, this could reduce emissions of nitrogen oxide and carbon dioxide. In addition, the Project will result in the creation of construction jobs, which will stimulate the local and regional economy in the short-term, and will involve the payment of additional taxes to the municipalities traversed by the ROW, which will have a long-term positive effect.

## **6.0 OTHER COMPLIANCE REQUIREMENTS**

### **6.1 ENVIRONMENTAL JUSTICE**

Pursuant to Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”, federal agencies must identify and address disproportionately high and adverse human health or environmental effects of an agency’s programs, policies, and activities on minority populations and low-income populations. The Proposed Action will not result in any adverse effects on minority or low-income groups since the new 345-kV transmission line and associated facilities will be located along CL&P’s existing ROW, which has been defined for utility use for almost 40 years.

The portion of the proposed 345-kV transmission line within the USACE properties will be located within and adjacent to CL&P’s existing utility ROW through the state park and WMA, and will not be in proximity to any neighborhood areas. Finally, the proposed Project will benefit all consumers of electricity in the southern New England area by improving the reliability of the electric transmission system. Overall, the Project will not cause any disproportionately adverse effects to any minority or low-income neighborhoods.

### **6.2 PROTECTION OF CHILDREN**

In accordance with Executive Order 13045, “Protection of Children from Environmental Health Risks and Safety Risks”, federal agencies are required to examine proposed actions to determine whether they will have disproportionately high human health or safety risks on children. The construction and operation of the proposed Project will be strictly in conformance to federal and state regulatory requirements designed to protect public health and safety, as well as the environment. The portion of the Project that extends across the Mansfield Hollow area will not result in any disproportionate direct, indirect, or cumulative environmental health or safety risks to children.

There are no schools, day-care facilities, or designated children’s playgrounds in the immediate vicinity of the existing or proposed expanded ROW through the federally-owned property in the Mansfield Hollow area. The closest public school is the Southeast Elementary School, which is situated along Warrenville Road (State Route 189) in Mansfield Center, approximately 1 mile north of the ROW. The private Green Dragon Day Care and Mount Hope Montessori School are located off Bassetts Bridge Road, approximately 0.4 and 0.6 mile, respectively, west of the Segment 1 ROW. However, portions of the ROW in the Mansfield Hollow area extend across undeveloped recreational lands. In this area, access to the ROW is limited to established hiking trails in Segment 1: there is no designated public access to Segment 2.

During the construction of the proposed transmission line, heavy construction equipment, materials, and vehicles will be required to access and operate on the ROW, including the portion of the ROW through Mansfield Hollow State Park and WMA. As a result, traffic on nearby state and local roads will increase, not only as a result of construction equipment movements, but also as construction workers drive to and from construction sites each work day.

In the vicinity of the Mansfield Hollow properties, construction-related traffic increases can be expected to occur temporarily along Bassetts Bridge Road, Bedlam Road, and U.S. Route 6. These increases will be highly localized, and will occur only during the time required to complete the installation of the new transmission line facilities within the Mansfield Hollow area.

Within the Mansfield Hollow properties, the existing ROW (and the proposed 5-Acre Minimal ROW expansion) will traverse several public-use recreational hiking trails, as well as Mansfield Hollow Lake and the Natchaug River. North of Bassetts Bridge Road, CL&P's existing and proposed expanded 345-kV transmission line ROW is situated west of open fields and a parking area located and also extends across the flood control levee trail (within the WMA / state park). South of Bassetts Bridge Road, within the park, the ROW extends through an open field, paralleling the flood control levee trail to the east, and also crosses the Red Trail in the park (west of Mansfield Hollow Lake). After crossing the lake, the ROW extends through a portion of the WMA, traversing the Nipmuck Trail (a CFPA Blue-Blazed Trail) within the WMA on the east side of the lake. However, construction activities near these locations will be confined to the approved utility easement and access roads. The new transmission lines also will span Mansfield Hollow Lake and the Natchaug River.

CL&P will coordinate with the USACE, CT DEEP, the CFPA, and the towns of Mansfield and Chaplin to develop appropriate mitigation measures for use during the construction period within the state park and WMA. These measures will be designed to provide for the safety of the public in general and of hikers using the trails during the construction period and to minimize potential effects on the recreational users, including children, of these resources.

Mitigation measures expected to be used to inform and protect the public during construction in the state park and WMA include the placement of construction warning signs along Bassetts Bridge Road near the ROW, signs along the hiking trails, hiking trail detours, and use of fencing (e.g., temporary orange "snow" fencing or equivalent) as necessary around work sites. CL&P also will provide construction updates, identifying construction locations and schedules, on its Project website. The information also

will be provided to the agencies, the towns of Mansfield and Chaplin, and the CFPA for inclusion on their websites, if desired.

In general, construction activities will conform to all applicable safety requirements (e.g., OSHA standards). CL&P also will employ flagpersons and police officers to direct traffic on public roads near construction work sites (e.g., where the ROW traverses public roads). The operation of the new 345-kV transmission line will be in accordance with electric industry standards, regulatory requirements, and CL&P specifications.

### **6.3 CLEAN AIR ACT CONFORMITY**

USACE guidance on air-quality compliance is summarized in Appendix C of the USACE's Planning Guidance Notebook (ER1105-2-100, Appendix C, Section C-7, pg. C-47). Section 176 (c) of the Clean Air Act (CAA) requires that Federal agencies assure that their activities are in conformance with Federally-approved CAA state implementation plans for geographic areas designated as non-attainment and maintenance areas under the CAA. The EPA General Conformity Rule to implement Section 176 (c) is found at 40 CFR Part 93.

Clean Air Act compliance, specifically with EPA's General Conformity Rule, requires that all Federal agencies, including the Department of the Army, review new actions and decide whether the actions would worsen an existing NAAQS violation, cause a new NAAQS violation, delay the SIP attainment schedule of the NAAQS, or otherwise contradict the State's SIP.

The State of Connecticut is designated as attainment or non-attainment with respect to the NAAQS for seven criteria air pollutants: particulate matter no greater than 10 micrometers in diameter ( $PM_{10}$ ); particulate matter no greater than 2.5 micrometers in diameter ( $PM_{2.5}$ ), sulfur dioxide ( $SO_2$ ); ozone ( $O_3$ ); nitrogen dioxide ( $NO_2$ ); carbon monoxide (CO); and lead (Pb). The Project area is located in the towns of Mansfield (Tolland County) and Chaplin (Windham County). Tolland and Windham Counties are in conformance with all the NAAQS except for the 8-hour ozone criterion. Both counties are located in a region referred to as the "Greater Connecticut, CT" area which is designated as "moderate" non-attainment for the 8-hour ozone standard (Environmental Protection Agency, 2012a).

The Connecticut SIP for air quality is a collective of historical plans and regulations, which were approved by EPA as meeting certain requirements of the Clean Air Act. EPA has the authority to enforce

the Connecticut air quality regulations incorporated into the SIP. EPA's record of the SIP-incorporated regulations is set out in [40 CFR Part 52 Subpart H](#).

Connecticut's SIP sets the basic strategies for implementation, maintenance, and enforcement of the National Ambient Air Quality Standards (NAAQS). The SIP is the Federally-enforceable plan that identifies how that state will attain and/or maintain the primary and secondary National Ambient Air Quality Standards (NAAQS) established by the EPA. The USACE must evaluate and determine if the proposed action (construction and operation) will generate air pollution emissions that aggravate a non-attainment problem or jeopardize the maintenance status of the area for ozone. When the total direct and indirect emissions caused by the operation of the Federal action/facility are less than threshold levels established in the rule (40 C.F.R. § 93.153), a Record of Non-applicability (RONA) is prepared and signed by the facility environmental coordinator.

### **6.3.1 Construction and Operation**

Within the Mansfield Hollow area, the construction of the new 345-kV overhead transmission line would occur over a total period of approximately four months. Construction activities along the approximately 1.4-mile Project ROW in Mansfield Hollow would require a variety of on-road and off-road vehicles, such as rollers, drill rig, excavator, chainsaws, cranes, dozers, highway trucks, pick-up trucks, etc.

During construction, equipment operating in Mansfield and Chaplin would emit pollutants, including nitrogen oxides that can lead to the formation of ozone. The Project would involve on-road vehicles transporting construction equipment and materials to and from the site. These on-road vehicles will be in compliance with the state's vehicle-emission program.

Equipment operating on the ROW (non-road construction equipment) will emit pollutants that contribute to increased levels of criteria pollutants such as carbon monoxide, nitrogen oxides, and ozone. The emissions for construction vehicles and related equipment will have an insignificant impact to local air quality.

Construction of the Project could cause a temporary reduction in local ambient air quality because of fugitive dust and emissions generated by construction equipment. The extent of dust generated would depend on the level of construction activity and dryness. Proper dust suppression techniques would be employed to avoid creating a nuisance for nearby residents during dry and windy weather.

In order to minimize air-quality effects during construction, all construction operations would comply with applicable provisions of the State of Connecticut air-quality control regulations pertaining to dust, odors, construction noise, and motor vehicle emissions. No direct or indirect increases or other changes in local or regional air quality are likely to occur with the construction and operation of the proposed project.

### **6.3.2 General Conformity**

The general conformity rule was designed to ensure that Federal actions do not impede local efforts to control air pollution. It is called a conformity rule because Federal agencies are required to demonstrate that their actions "conform with" (i.e., do not undermine) the approved SIP for their geographic area. Federal agencies make this demonstration by performing a conformity review. The conformity review is the process used to evaluate and document project-related air pollutant emissions, local air quality impacts and the potential need for emission mitigation (Polyak, K and Webber, L. 2002). A conformity review must be performed when a Federal action generates air pollutants in a region that has been designated a non-attainment or maintenance area for one or more NAAQS. Non-attainment areas are geographic regions where the air quality fails to meet the NAAQS.

The Proposed Action is located in the towns of Mansfield and Chaplin, Connecticut in Tolland and Windham Counties, respectively. Tolland and Windham Counties are located in a region referred to as the "Greater Connecticut, CT" area which is designated as "moderate" non-attainment for the 8-hour ozone standard (EPA, 2012a). The General Conformity thresholds for ozone in a moderate non-attainment area have an emission rate threshold of 50 tons per year (tons/year) of VOC (volatile organic compounds) and 100 tons/year of NO<sub>x</sub> (nitrogen oxides) (Polyak, K and Webber, L. 2002) (40 CFR 51.853, 7-1-03).

To conduct a general conformity review and emission inventory for the proposed utility upgrade project, a list of construction equipment was identified. The first column of the emissions calculations table provides a summary equipment list (see General Conformity – Record of Non-Applicability (RONA) at the end of this Environmental Assessment). The USACE New England District prepared calculations of the worst-case project specific emissions of NO<sub>x</sub> and VOCs to determine whether project emissions would be under the General Conformity Trigger Levels. Because of the small scale of the Proposed Action, several simplifying assumptions were applied in performing the calculations to prepare a worst-case analysis. The actual emissions would most likely be much lower, but in no case above the calculated values. For instance, the load factor is the average percentage of rated horsepower used during a source's

operational profile. To simplify the calculations, a worst-case estimate of 1.0, or 100 percent, was used for all equipment. Based on these calculations, the worst-case NO<sub>x</sub> emissions were 14.79 tons and the worst-case VOC emissions were 2.09 tons. In both cases, the total construction emissions were below the General Conformity Trigger Levels.

The total estimated direct and indirect emissions that would result from the utility upgrade Proposed Action in Mansfield and Chaplin, Connecticut are below the General Conformity trigger levels of 100 tons per year of NO<sub>x</sub> and 50 tons per year of VOCs. General Conformity under the Clean Air Act, Section 176 has been evaluated for the Proposed Action according to the requirements of 40 CFR 93, Subpart B. The requirements of this rule are not applicable to this project because the total direct and indirect emissions from the project are below the conformity threshold values established at 40 CFR 93.153 (b) for ozone (NO<sub>x</sub> and VOCs) in a moderate attainment area.

The determination of whether or not a project is regionally significant is if its emissions exceed 10% of the state's total emissions budget for the criteria pollutants (40 CFR 93.153 (i)). Emissions data can be used as an indicator of the potential for an area to contribute to nearby observed violations. An estimate of ozone season (May-September) emissions is 38,913 tons for NO<sub>x</sub> and 65,317 tons for VOCs for the State of Connecticut (CT DEP 2009) (emissions data was extracted from EPA's 2005 National Emissions Inventory (NEI), Version 1 (EPA 2012b)).

As noted, the emissions estimates for the utility upgrade project in Mansfield and Chaplin are estimated to be 14.79 and 2.09 tons for NO<sub>x</sub> and VOCs, respectively. These values are below 10% of the total emissions inventory for the ozone season which is only a portion of the total annual emissions in the State of Connecticut.

This 5-Acre Minimal ROW Expansion project through USACE property within the Mansfield Hollow flood control project does not reach the threshold levels established by the EPA rule, and is not regionally significant, and therefore the conformity rule is inapplicable here. A Record of Non-Applicability (RONA) and the supporting emissions calculations for the utility upgrade project are provided at the end of this Environmental Assessment.

## **7.0 ACTIONS TO AVOID, MINIMIZE, AND COMPENSATE FOR ENVIRONMENTAL EFFECTS (MITIGATION MEASURES)**

### **7.1 OVERVIEW OF MITIGATION MEASURES**

As part of the planning and initial design of the Project, including the 1.4-mile section of ROW through the Mansfield Hollow area, CL&P incorporated or otherwise identified measures to avoid, minimize, or mitigate the potential adverse effects of the construction and operation of the new 345-kV transmission line facilities on environmental and cultural resources. These measures focus on the avoidance or minimization of impacts on the ROW. In addition, CL&P also proposes to compensate for impacts to water resources by preserving an off-ROW parcel consisting of approximately 93 acres adjacent to the Quinebaug River in the Town of Pomfret. Additional mitigation measures are expected to be defined during the comprehensive environmental reviews that will occur as part of CL&P's applications for permits and certificates to federal and state regulatory agencies; subsequently, such measures are typically included as conditions in Project-specific approvals.

All mitigation measures and best management practices, including those identified by CL&P as well as those required pursuant to regulatory approvals, will be included in CL&P's final construction plans for the Project. CL&P's construction contractors will be required to follow such plans. The mitigation measures that CL&P has defined to date include:

- The proposed collocation of the new 345-kV transmission line within or adjacent to CL&P's long-established ROW, thereby avoiding the creation of a new "greenfield" linear corridor.
- The placement of the proposed new structures and access roads outside of wetlands wherever practicable.
- The avoidance of any structure placement or access roads across or in major waterbodies (i.e., lakes or rivers).
- The minimization of the amount of additional easement expansion needed in the Mansfield Hollow area (5 acres).
- The incorporation of best management practices (e.g., as detailed in CL&P's *Best Management Practices Manual for the State of Connecticut, Construction & Maintenance Environmental Requirements*, including erosion and sedimentation control, spill prevention and response, and vegetation clearing and maintenance, into Project plans.
- Coordination with the CT DEEP to define and implement approaches for avoiding or limiting adverse effects on state-listed species.
- Coordination with the SHPO, USACE, and Native American Tribes to define and implement protocols for conducting field surveys for archaeological resources along the ROW and proposed

area of ROW expansion, and thereby to assure that significant cultural resource sites, if any, are avoided or are appropriately mitigated prior to the commencement of construction in the vicinity of such sites.

- Consultations with representatives of recreational areas (e.g., the USACE, CT DEEP) to identify site-specific mitigation measures, including possible construction scheduling and ROW restoration techniques.
- Adherence to defined construction procedures for work in or near wetlands and for crossing waterbodies, including clearly marking water resource boundaries, installing appropriate erosion and sedimentation controls, minimizing temporary disturbances within water resources, and fully restoring wetlands and stream banks to pre-construction configurations and contours where practical.
- Refuel construction equipment (apart from equipment that cannot be practically moved) 25 feet or more from a wetland. If refueling must occur within a wetland, temporary containment will be provided.
- Where existing access roads that cross stream bottoms must be improved, clean materials will be used (e.g., clean riprap or equivalent).
- Flow in watercourses (if water is present at the time of construction) will not be constrained at any time during construction, and culverts will be installed as needed to maintain flow.
- Concrete (used for structure foundations) will not be mixed or placed so as to enter a watercourse.
- To the extent feasible, a 25-foot-wide riparian zone of existing vegetation will be maintained along the ROW at the banks of watercourses. (Refer also to the protocols in Appendix E regarding watercourse crossings and minimization of impacts to vernal pools.)

## **7.2 WATER RESOURCE IMPACT MITIGATION MEASURES**

The Proposed Action will result in direct, indirect, and secondary impacts to water resources. Although most impacts will be temporary (e.g., associated with the temporary access roads and work pads required for construction), CL&P recognizes that some permanent or longer-term impacts to water resources will be unavoidable. In the Mansfield Hollow area, direct effects will result from the placement of two structures in wetlands along the Segment 2 ROW (in Chaplin) and secondary effects will occur as a result of the conversion of forested wetlands to scrub-shrub or emergent marsh wetland habitat.

To offset such effects, CL&P has been coordinating with the CT DEEP and USACE regarding compensatory mitigation. The compensatory mitigation plan currently under consideration for the Connecticut portion of the Project as a whole includes preservation of the approximately 93-acre parcel of property along the Quinebaug River in the Town of Pomfret. This parcel encompasses wetlands, vernal pools, riparian areas, and bordering forested upland and meadow areas.

In addition, along the ROW in Mansfield Hollow, CL&P will restore water resources temporarily affected by construction activities and will enhance wetlands within the federally-owned properties by monitoring and controlling wetland invasive species as part of long-term ROW management.

On-ROW mitigation will focus principally on the restoration of the wetlands and watercourses temporarily affected by Project construction activities, such as the placement of temporary fills (e.g., for work pads, access roads). Such water resources will be restored to pre-existing conditions to the extent practicable during the final phase of the Project construction effort. The effectiveness of the restoration will be monitored as required (pursuant to regulatory requirements) and, if necessary, corrective action will be taken to maximize restoration success.

In addition, as part of the long-term vegetation management of the Project ROWs, CL&P will implement a wetland invasive species monitoring and control program, pursuant to its agreement with CT DEEP (refer to Attachment C.12-1). As part of CL&P's routine vegetation management program, the wetlands along the Project ROWs will be monitored at least once every four years. Based on the results of the monitoring, wetland invasive species control measures will be implemented as necessary in accordance with the CT DEEP agreement. This program will enhance the value of wetlands on the Project ROWs by controlling the spread of invasive wetland plants.

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## 8.0 COORDINATION

As part of the Project planning process in the Mansfield Hollow area, CL&P consulted with various federal, state, and local agencies and interest groups. The objective of these consultations was to provide agency and interest group representatives with information regarding the Project and to solicit input concerning the Project.

Table 8-1 lists the various agencies and groups with whom CL&P has consulted to date regarding the Mansfield Hollow area or alternatives to the alignment within the federal properties. Copies of correspondence to and from agencies and groups regarding the Mansfield Hollow area are included in Appendix D.

In addition to these agency consultations, as part of the CSC application process, CL&P conducted both formal and informal consultations with all of the municipalities that may potentially be affected by the Project by virtue of location along either the proposed Project transmission line route or any of the route variations. Pursuant to CSC requirements, in August 2008, CL&P submitted to each of the potentially affected municipalities a MCF describing the proposed Project; a Supplemental MCF was issued to the same municipalities in July 2011.

The MCF and Supplemental MCF were available for public review and comment, and included CL&P's identification and evaluation of primary and alternative transmission line routes and the Mansfield Hollow area design configuration options, the environmental characteristics of the routes and Project region, and potential environmental impacts and mitigation measures. In conjunction with the MCF process, CL&P also held public "open house" meetings in potentially affected municipalities in order to provide information concerning the proposed Project and to receive feedback from local government, residents, and other interested parties.

Further, after the December 23, 2011 submission of the Project Application to the CSC, the CSC held public meetings and field reviews of the proposed Project through the Mansfield Hollow area; a route tour and public meeting was held in Mansfield on April 24, 2012.

In June, July, and August 2012, the CSC held evidentiary hearings regarding the Connecticut portion of the Project as a whole, thereby affording additional opportunities for comment by parties or intervenors to the proceedings.

As part of the CSC process, the CT DEEP submitted comments regarding the Project, including the Mansfield Hollow area. A copy of the CT DEEP's June 19, 2012 letter to the CSC is included in Appendix D.

In addition to the CSC process, agency scoping was conducted as part of the preparation of this EA. Information regarding the potential design configurations and route alternatives in the Mansfield Hollow area was provided to various federal and state agencies in the fall of 2011. Copies of correspondence received from agencies as part of this scoping process are included in Appendix D.

**Table 8-1: List of Federal, State, and Local Agency Consultations Regarding the Mansfield Hollow Area or Alternatives**

**Federal**

U.S. Army Corps of Engineers, New England District  
U.S. Department of Agriculture, Natural Resources Conservation Service  
U.S. Fish and Wildlife Service

**State**

Connecticut Siting Council  
Connecticut Department of Energy and Environmental Protection

- Inland Water Resources Division
- Inland Fisheries Division
- Wildlife Division
- Natural Diversity Data Base
- Mansfield Hollow Wildlife Management Area

Commission on Arts, Culture and Tourism

- State Historic Preservation Officer
- Office of State Archaeologist

**Local**

Town of Lebanon, Inland Wetlands Commission  
Town of Columbia, Inland Wetlands Commission  
Town of Coventry, Inland Wetlands Commission  
Town of Mansfield, Inland Wetlands Commission  
Town of Chaplin, Inland Wetlands Commission

**Other**

Friends of Mansfield Hollow  
Connecticut Audubon

**Native American Tribes**

Stockbridge Munsee Tribe  
Mohegan Tribe  
Mashantucket Pequot Tribal Nation  
Narragansett Tribe  
Wampanoag Tribe of Gay Head (Aquinnah)

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## 9.0 COMPLIANCE WITH ENVIRONMENTAL FEDERAL STATUTES AND EXECUTIVE ORDERS

Table 9-1 summarizes the status of the Project in relation to conformance with federal environmental statutes and executive orders.

**Table 9-9-1: Summary of Project Conformance to Federal Environmental Statutes, Executive Orders, and Executive Memorandum**

Statute, Executive Order, or Executive Memorandum	Project Compliance Status
<b>Federal Statutes</b>	
Archaeological Resources Protection Act of 1979, as amended, 16 U.S.C. 470 <u>et seq.</u>	Consultation with SHPO ongoing
Preservation of Historic and Archaeological Data Act of 1974, as amended, 16 U.S.C. 469 <u>et seq.</u>	Consultation with SHPO ongoing
American Indian Religious Freedom Act of 1978, 42 U.S.C., 1996	Native American Tribal consultations ongoing
Clean Air Act, as amended, 42 U.S.C. 7401 <u>et seq.</u>	Public notice of the availability of this report to the EPA signifies compliance pursuant to Sections 176c and 309 of the Clean Air Act
Clean Water Act of 1977 (Federal Water Pollution Control Act Amendments of 1972), 33 U.S.C. 1251 <u>et seq.</u>	A Section 404 Individual Permit will be acquired from the USACE, New England District, for the entire project (inclusive of the Mansfield Hollow project area). CT DEEP has been consulted regarding the Mansfield Hollow portion of the Project.
Coastal Zone Management Act of 1972, as amended 16 U.S.C. 1451 <u>et seq.</u>	Not applicable
Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 <u>et seq.</u>	Coordination with the USFWS determined that there are no federally-listed endangered or threatened species in the Project area and, as such, there are no formal consultation requirements pursuant to Section 7 of the Endangered Species Act
Estuarine Areas Act, 16 U.S.C. 1221 <u>et seq.</u>	Not applicable
Farmland Protection Policy Act, 7 U.S.C. 4201-4209	The Farmland Protection Policy Act is intended to minimize the impact of federal programs on the irreversible conversion of farmland to non-agricultural uses. The Proposed Action is located within federally-owned properties already dedicated to recreational use. Six transmission line structures will be located in soils designated as prime farmland or farmlands of statewide importance; none of these soils are presently in agricultural use. Coordination with the USDA NRCS determined that the Proposed Action will not adversely affect farmland protection.
Federal Water Project Recreation Act, as amended, 16 U.S.C. 4601-12 <u>et seq.</u>	Public notice of availability of this report to the NPS and Office of Statewide Planning relative to Federal

	and state comprehensive outdoor recreation plans signifies compliance with this Act.
Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661 et seq.	Coordination with the USFWS and CT DEEP signifies compliance with this act. (National Marine Fisheries Service consultation not required because no marine or tidal waters in the Project area.)
Land and Water Conservation Fund Act of 1965, as amended, 16 U.S.C. 4601-4 et seq.	Public notice of availability of this report to the NPS and Office of Statewide Planning relative to Federal and state comprehensive outdoor recreation plans signifies compliance with this Act.
Marine Protection, Research, and Sanctuaries Act of 1971, as amended, 33 U.S.C., 1401 et seq.	Not applicable. Project does not involve the transportation or disposal of dredged material in ocean waters pursuant to Sections 102 and 103 of the Act, respectively.
National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470 et seq.	Coordination with SHPO, USACE, and Native American Tribes is ongoing
Native American Graves Protection and Repatriation Act, 25 U.S.C. 3000-3013, 18 U.S.C. 1170	Regulations implementing this act will be followed if human remains and/or funerary items are discovered during the implementation of the Project
National Environmental Policy Act of 1969, as amended, 42 U.S.C. 3421 et seq	Preparation of this report signifies partial compliance with NEPA. Full compliance shall be noted at the time the Finding of No Significant Impact is issued.
Rivers and Harbor Act of 1899, as amended, 33 U.S.C. 401 et. seq	Not applicable. The Project will not affect any navigable waters and therefore no Section 10 permit is required.
Watershed Protection and Flood Prevention Act, as amended, 16 U.S.C. 1001 et. seq.	No requirement for USACE activities.
Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, et seq.	Not applicable. The Project will not affect a federally-designated wild or scenic river.
Magnuson-Stevens Act, as amended, 16 U.S.C. 1801 et seq.	Not applicable
Coastal Barrier Resources Act of 1982, 16 U.S.C. 3501 et. seq.	Not applicable
<b>Executive Orders</b>	
11593, Protection and Enhancement of the Cultural Environment (May 13, 1971)	Coordination with the SHPO signifies compliance
11988, Floodplain Management (May 24, 1977), as amended by 12148 (July 20, 1979)	Public notice of the availability of this report or public review fulfills the requirements of Executive Order 11988, Section 2(a)(2).
11990, Protection of Wetlands (May 24, 1977)	Public notice of the availability of this report or public review fulfills the requirements of Executive Order 11900, Section 2(b).
12114, Environmental Effects Abroad of Major Federal Actions (January 4, 1979)	Not applicable
12989, Environmental Justice (February 11, 1994)	The Project is not expected to have any significant or disproportionate impact on minority or low-income population
13007, Accommodation of Sacred Sites (May 24, 1977)	Consultations with Native American Tribes ongoing
13045, Protection of Children from Environmental Health Risks and Safety Risks (April 21, 1997)	The Project would not create a disproportionate environmental health or safety risk for children

13175, Consultation and Coordination with Indian Tribal Governments (November 6, 2000)	Consultations with Native American Tribes ongoing
<b>Executive Memorandum</b>	
Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing NEPA (August 11, 1980)	Coordination with the USDA and submission of this report for review signifies compliance with this memorandum
White House Memorandum, Government-to-Government Relations with Indian Tribes (April 29, 1994)	Consultations with Native American Tribes ongoing

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## 12.0 GLOSSARY OF TERMS

**115-kV:** 115 kilovolts or 115,000 volts

**345-kV:** 345 kilovolts or 345,000 volts

**AAL:** Annual Average Loading (measure of power transmitted)

**ANSI:** American National Standards Institute

**ASTM:** American Society for Testing and Materials

**BMP:** Best Management Practice

**Bundle (circuit):** Two or more parallel 3-conductor circuits joined together to operate as one single circuit.

**Bundle (conductor):** Two or more phase conductors or cables joined together to operate as a single phase of a circuit.

**Cable:** A fully insulated conductor usually installed underground but in some circumstances can be installed overhead.

**CCB:** Center for Conservation and Biodiversity (UConn)

**CEII:** Confidential Energy Infrastructure Information

**Certificate:** Certificate of Environmental Compatibility and Public Need (from the Connecticut Siting Council)

**CFPA:** Connecticut Forests and Parks Association

**CGS:** Connecticut General Statutes

**Circuit:** A system of conductors (three conductors or three bundles of conductors) through which an electrical current is intended to flow and which may be supported above ground by transmission structures or placed underground.

**CL&P:** The Connecticut Light and Power Company

**ConnDOT:** Connecticut Department of Transportation

**Conductor:** A metallic wire, busbar, rod, tube or cable which serves as a path for electric current flow.

**Conduit:** Pipes, usually PVC plastic, typically encased in concrete, for housing underground power cables.

**Corona:** A luminous discharge due to ionization of the air surrounding conductors, hardware, accessories, or insulators caused by a voltage gradient exceeding a certain critical value. Surface irregularities such as stranding, nicks, scratches, and semiconducting or insulating protrusions are usual corona sites, and weather has a pronounced influence on the occurrence and characteristics of overhead power-line corona.

**Council or CSC:** Connecticut Siting Council

**CT DEEP:** Connecticut Department of Energy and Environmental Protection. As of July 1, 2011, the former CTDEP was consolidated with the former DPUC into the Connecticut Department of Energy and Environmental Protection.

**CWA:** Clean Water Act (federal)

**D&M Plan:** Development and Management Plan (required by the Connecticut Siting Council)

**dBA:** Decibel, on the A-weighted scale.

**Deadend Structure:** is a line structure that is designed to have the capacity to hold the lateral strain of the conductor in one direction

**Distribution:** Line, system. The facilities that transport electrical energy from the transmission system to the customer.

**Duct:** Pipe or tubular runway for underground power cables (see also Conduit).

**Duct Bank:** A group of ducts or conduit usually encased in concrete in a trench.

**EA:** Environmental Assessment

**Electric Field:** Produced by voltage applied to conductors and equipment. The electric field is expressed in measurement units of volts per meter (V/m) or kilovolts per meter (kV/m); 1 kV/m is equal to 1,000 V/m.

**Electric Transmission:** The facilities (69 kV+) that transport electrical energy from generating plants to distribution substations.

**EMF:** Electric and magnetic fields.

**EPA:** United States Environmental Protection Agency, also USEPA

**FAA:** Federal Aviation Administration

**Fault:** A failure (short circuit) or interruption in an electrical circuit.

**FEMA:** Federal Emergency Management Agency

**FERC:** Federal Energy Regulatory Commission

**FPPA:** Farmland Protection Policy Act

**FMD:** Field Management Design (Plan) (for EMF)

**FONSI:** Finding of No Significant Impact

**FTB:** Fluidized thermal backfill

**G:** Gauss; 1G = 1,000 mG (milligauss); the unit of measure for magnetic fields.

**GPS:** Global Positioning System

**Ground Wire:** Cable/wire used to connect wires and metallic structure parts to the earth. Sometimes used to describe the lightning shield wire.

**HAER:** Historic American Engineering Record

**HDD:** Horizontal directional drill (subsurface method for installing underground cables)

**H-frame Structure:** A wood or steel structure constructed of two upright poles with a horizontal cross-arm and bracings.

**Hz:** Hertz, a measure of alternating current frequency; one cycle/second.

**IEEE:** Institute of Electrical and Electronics Engineers

**ISO-NE:** Independent System Operator New England, Inc. New England's independent system operator.

**kV:** kilovolt, equals 1,000 volts

**kV/m:** Electric field unit of measurement (kilovolts/meter)

**Lightning Shield Wire:** Electric cable located to prevent lightning from striking transmission circuit conductors.

**Line:** A series of overhead transmission structures which support one or more circuits; or in the case of underground construction, a duct bank housing one or more cable circuits.

**Load:** Amount of power delivered as required at any point or points in the system. Load is created by the power demands of customers' equipment (residential, commercial, industrial).

**Magnetic Field:** Produced by the flow of electric currents; however, unlike electric fields, most materials do not readily block magnetic fields. The level of a magnetic field is commonly expressed as magnetic flux density in units called gauss (G), or in milligauss (mG), where 1 G = 1,000 mG.

**MCF:** Municipal Consultation Filing (Connecticut Siting Council)

**MF:** Magnetic field

**mG:** milligauss (see Magnetic Field)

**MVA:** (Megavolt Ampere) Measure of electrical capacity equal to the product of the voltage times the current times the square root of 3. Electrical equipment capacities are sometimes stated in MVA.

**MW(s):** (Megawatt(s)) Megawatt equals 1 million watts, measure of the work electricity can do.

**NAAQS:** National Ambient Air Quality Standards

**National Grid:** National Grid, USA, parent company of Narragansett Electric Company and the New England Power Company

**NDDB:** Connecticut Natural Diversity Data Base (CT DEEP)

- NEEWS:** New England East – West Solution
- NEPOOL:** New England Power Pool
- NERC:** North American Electric Reliability Council, Inc. (initially, the National Electric Reliability Council)
- NESC:** National Electrical Safety Code
- NGVD:** National Geodetic Survey Datum
- NHD:** National Hydrography Database
- NPCC:** Northeast Power Coordinating Council
- NPS:** United States National Park Service
- NRCS:** Natural Resources Conservation Service (United States Department of Agriculture)
- NRHP:** National Register of Historic Places
- NU:** Northeast Utilities (NUSCO and CL&P are wholly owned subsidiaries of NU)
- NUSCO:** Northeast Utilities Service Company
- NWI:** National Wetlands Inventory
- OPGW:** Optical groundwire (a shield wire containing optical glass fibers for communication purposes)
- PEM:** Palustrine emergent (wetlands)
- PFO:** Palustrine forested (wetlands)
- Phases:** Transmission (and some distribution) AC circuits are comprised of three phases that have a voltage differential between them.
- POW:** Palustrine open water (wetlands)
- PSI:** Pounds per square inch
- PSS:** Palustrine scrub-shrub (wetlands)
- PUB:** Palustrine unconsolidated bottom (wetlands)
- PURA:** Public Utilities Regulatory Authority (part of CT DEEP, formerly DPUC)
- PVC:** Polyvinyl chloride (conduits for XLPE-insulated cable)
- RGGI:** Regional Greenhouse Gas Initiative
- RONA:** Record of Non-Applicability
- ROW:** Right-of-Way
- Shield Wire:** See Lightning Shield Wire
- SHPO:** State Historic Preservation Office
- SPCC:** Spill Prevention, Containment, and Control (plan)
- Splice Vault:** A buried concrete enclosure where underground cable ends are spliced and cable-sheath bonding and grounding is installed.
- SRHP:** State Register of Historic Places
- Steel Monopole Structure:** Transmission structure consisting of a single tubular steel column with horizontal arms to support insulators and conductors.
- Stormwater Pollution Control Plan:** Is a sediment and erosion control plan that also describes all the construction site operator's activities to prevent stormwater contamination, control sedimentation and erosion, and comply with the requirements of the Clean Water Act
- Supplemental MCF:** Supplemental Municipal Consultation Filing (Connecticut Siting Council process), issued for the Connecticut Portion of the Interstate Reliability Project in July 2011
- TLGV:** The Last Green Valley, Inc., non-profit group that manages planning within the Quinebaug – Shetucket Rivers Valley National Heritage Corridor (also known as The Last Green Valley)
- Transformer:** A device used to transform voltage levels to facilitate the efficient transfer of power from the generating plant to the customer. A step-up transformer increases the voltage while a step-down transformer decreases it.
- Transmission Line:** Any line operating at 69,000 or more volts.
- THPO:** Tribal Historic Preservation Office
- UCONN:** University of Connecticut (Center for Conservation and Biodiversity)

**UG (Underground):** Electrical facilities installed below the surface of the earth.

**USACE:** United States Army Corps of Engineers (New England District)

**USDA:** United States Department of Agriculture

**USEPA:** United States Environmental Protection Agency, also EPA

**USFWS:** United States Fish and Wildlife Service

**USGS:** United States Geological Survey (U.S. Department of the Interior).

**Vault:** See Splice Vault.

**V/m:** volts per meter, kilovolt per meter:  $1,000 \text{ V/m} = 1 \text{ kVm}$ ; electric field measurement

**Voltage:** A measure of the push or force that transmits energy.

**Watercourse:** Rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs, and all other bodies of water, natural or artificial, public or private.

**Wetland:** is an area of land consisting of soil that is saturated with moisture, such as a swamp, marsh, or bog

**WMA:** Wildlife Management Area (CT DEEP)

**XLPE:** Cross-linked polyethylene (solid dielectric) insulation for transmission

**Record of Non-Applicability (RONA)****GENERAL CONFORMITY - RECORD OF NON-APPLICABILITY**

Project/Action Name: Mansfield Hollow Easement Expansion for the Interstate Reliability Project

Project/Action

Point of Contact: Judith Johnson, Environmental Resources Section

Phone: 978-318-8138

General Conformity under the Clean Air Act, Section 176 has been evaluated for the Mansfield Hollow Easement Expansion Project according to the requirements of 40 CFR 93, Subpart B. The project worst-case NO<sub>x</sub> emissions were estimated to be 14.79 tons for NO<sub>x</sub> and 2.09 tons for VOC emissions. In both cases, the total construction emissions were below the General Conformity Trigger Levels of 100 tons per year of NO<sub>x</sub> and 50 tons per year of VOCs.

**AND**

The project/action is not considered regionally significant under 40 CFR 93.153(i).

Supporting documentation and emissions estimates are

- ATTACHED
- APPEAR IN APPENDIX F OF THE NEPA DOCUMENTATION
- OTHER

SIGNED

*Joseph MacKay, Chief, Environmental Resources*