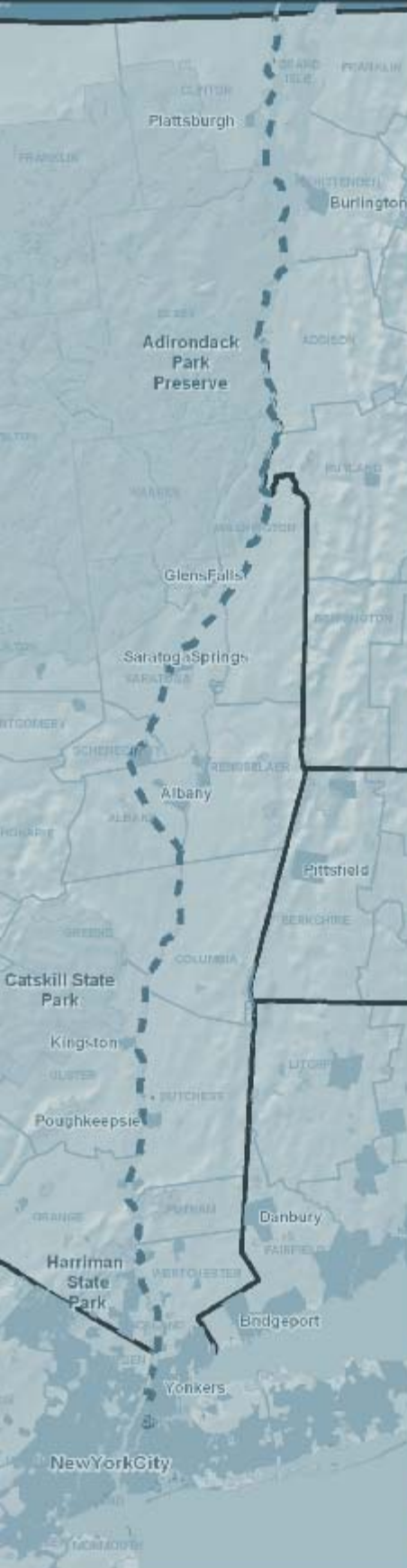




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# Champlain Hudson Power Express Transmission Line Project Environmental Impact Statement Volume II: Appendices



U.S. DEPARTMENT OF ENERGY  
OFFICE OF ELECTRICITY DELIVERY AND ENERGY RELIABILITY  
WASHINGTON, DC

September 2013



***DRAFT***

**CHAMPLAIN HUDSON POWER EXPRESS  
TRANSMISSION LINE PROJECT  
ENVIRONMENTAL IMPACT STATEMENT**

**Volume II: Appendices**

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**U.S. DEPARTMENT OF ENERGY  
OFFICE OF ELECTRICITY DELIVERY  
AND ENERGY RELIABILITY**



***COOPERATING AGENCIES***

**U.S. ENVIRONMENTAL PROTECTION AGENCY  
U.S. ARMY CORPS OF ENGINEERS  
U.S. FISH AND WILDLIFE SERVICE  
U.S. COAST GUARD  
NEW YORK STATE DEPARTMENT OF PUBLIC SERVICE  
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION**

**SEPTEMBER 2013**



**DRAFT**

**CHAMPLAIN HUDSON POWER EXPRESS  
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ENVIRONMENTAL IMPACT STATEMENT**

**VOLUME II: APPENDICES**

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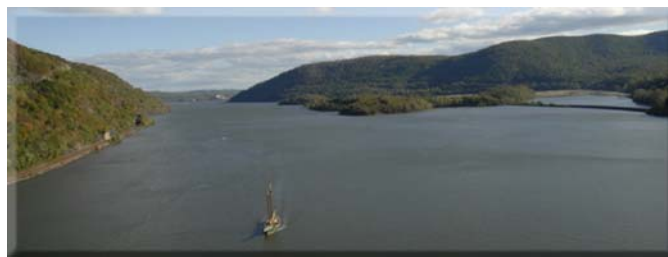
<b>A</b>	<b>PROPOSED CHPE PROJECT TRANSMISSION SYSTEM DETAILED MAP ATLAS</b>
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## APPENDIX A

# Proposed CHPE Project Transmission System Detailed Map Atlas







## Appendix A

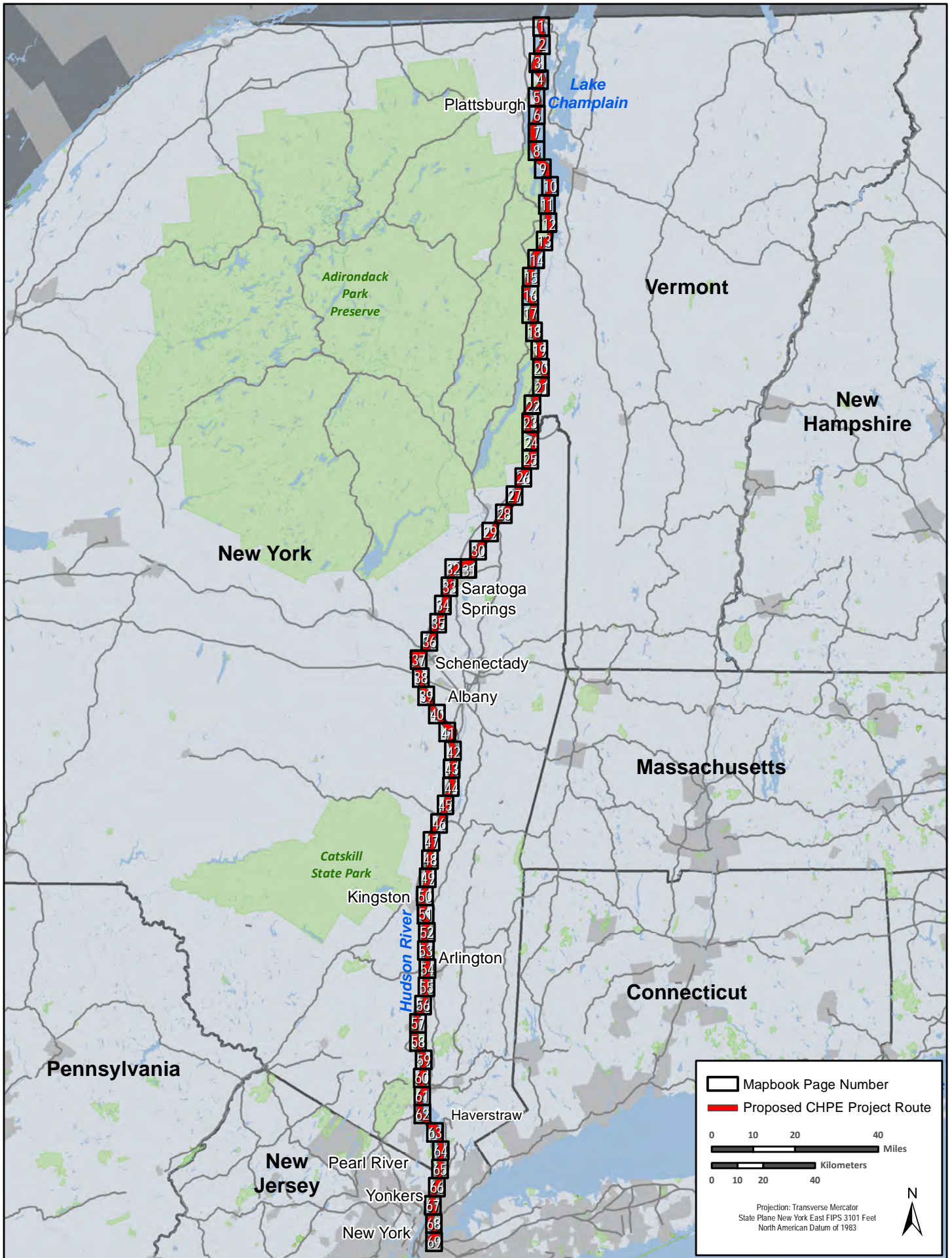
# Proposed CHPE Project Transmission System Detailed Map Atlas

This appendix provides detailed maps of the entire proposed Champlain Hudson Power Express (CHPE) Project route. The sources of the base maps used for the figures are U.S. Geological Survey (USGS) 1:24,000-scale topographic quadrangle maps. **Table A-1** lists each of the maps presented in the appendix. The maps are presented in an order that geographically is from north to south.

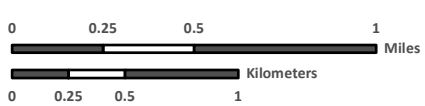
**Table A-1. Map Guide**

Map Number	Mileposts	Segment	Key Geographic Feature
1	0–4	Lake Champlain	Rouses Point, NY
2	5–9	Lake Champlain	Point au Fer
3	9–13	Lake Champlain	Trembleau Point
4	14–18	Lake Champlain	Beekmantown, NY
5	19–23	Lake Champlain	Cumberland, NY
6	23–27	Lake Champlain	Sawyer Island
7	28–31	Lake Champlain	Providence Island
8	32–36	Lake Champlain	Port Kent, NY
9	37–41	Lake Champlain	Schuyler Island
10	42–46	Lake Champlain	Four Brothers Islands
11	46–50	Lake Champlain	Jones Point
12	51–55	Lake Champlain	Essex, NY
13	55–60	Lake Champlain	Split Rock Mountain
14	61–65	Lake Champlain	North West Bay
15	66–70	Lake Champlain	Beaver Brook
16	70–75	Lake Champlain	Crown Point State Park
17	75–79	Lake Champlain	Indian Ridge
18	80–84	Lake Champlain	Spar Mill Bay
19	85–89	Lake Champlain	Fort Ticonderoga, NY
20	90–94	Lake Champlain	Huckleberry Mountain
21	95–99	Lake Champlain	Mill Bay
22	100–105	Lake Champlain, Overland	Dresden, NY
23	105–110	Overland	Pine Lake Brook
24	110–115	Overland	Whitehall, NY
25	116–120	Overland	Great Meadows State Prison
26	120–125	Overland	Fort Ann, NY
27	126–130	Overland	Kingsbury, NY
28	131–135	Overland	Hudson Falls NY
29	136–141	Overland	Moreau, NY
30	142–146	Overland	Ballard Corners, NY

<b>Map Number</b>	<b>Mileposts</b>	<b>Segment</b>	<b>Key Geographic Feature</b>
31	147–149	Overland	Wilton, NY
32	150–153	Overland	Saratoga Springs, NY
33	154–158	Overland	Saratoga Spa State Park
34	159–163	Overland	Ballston Spa, NY
35	164–168	Overland	Burnt Hills, NY
36	168–173	Overland	Mohawk River
37	174–180	Overland	Rotterdam, NY
38	181–185	Overland	Watervliet Reservoir
39	186–190	Overland	Voorheesville, NY
40	191–195	Overland	Unionville, NY
41	196–201	Overland	South Bethlehem, NY
42	202–206	Overland	Ravena, NY
43	207–210	Overland	New Baltimore, NY
44	211–215	Overland	Coxsackie, NY
45	216–219	Overland	Athens, NY
46	220–225	Overland	Catskill, NY
47	225–230	Overland, Hudson River	Germantown, NY
48	231–235	Hudson River	Saugerties, NY
49	235–239	Hudson River	Tivoli Bay State Unique Area
50	240–244	Hudson River	Ulster, NY
51	245–249	Hudson River	Port Ewen, NY
52	249–253	Hudson River	Norrie State Park
53	254–258	Hudson River	Hyde Park, NY
54	258–262	Hudson River	Poughkeepsie, NY
55	263–267	Hudson River	Poughkeepsie, NY
56	267–271	Hudson River	Newburgh, NY
57	272–276	Hudson River	Beacon, NY
58	277–281	Hudson River	Cornwall, NY
59	282–286	Hudson River	West Point, NY
60	287–291	Hudson River	Highlands, NY
61	292–296	Hudson River	Stony Point, NY
62	297–301	Hudson River	Haverstraw, NY
63	302–307	Hudson River	Rockland Lake State Park
64	308–311	Hudson River	Tarrytown, NY
65	312–316	Hudson River	Greenburgh, NY
66	317–321	Hudson River	Yonkers, NY
67	321–326	Hudson River, New York City Metropolitan Area	Spuyten Duyvil, NY
68	327–332	New York City Metropolitan Area	Bronx, NY
69	333–336	New York City Metropolitan Area	Queens, NY

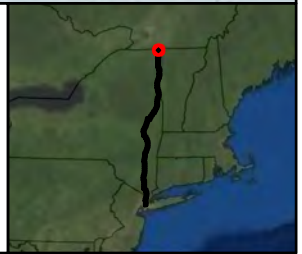


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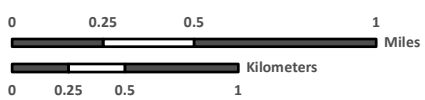


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Projection: Transverse Mercator  
 State Plane New York East FIPS 3101 Feet  
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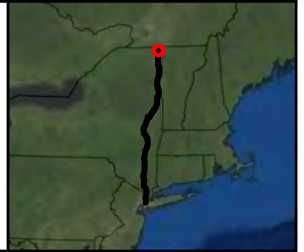


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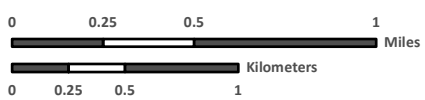


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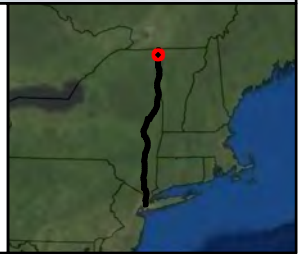


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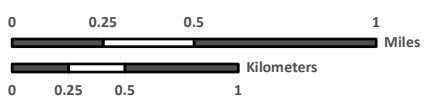
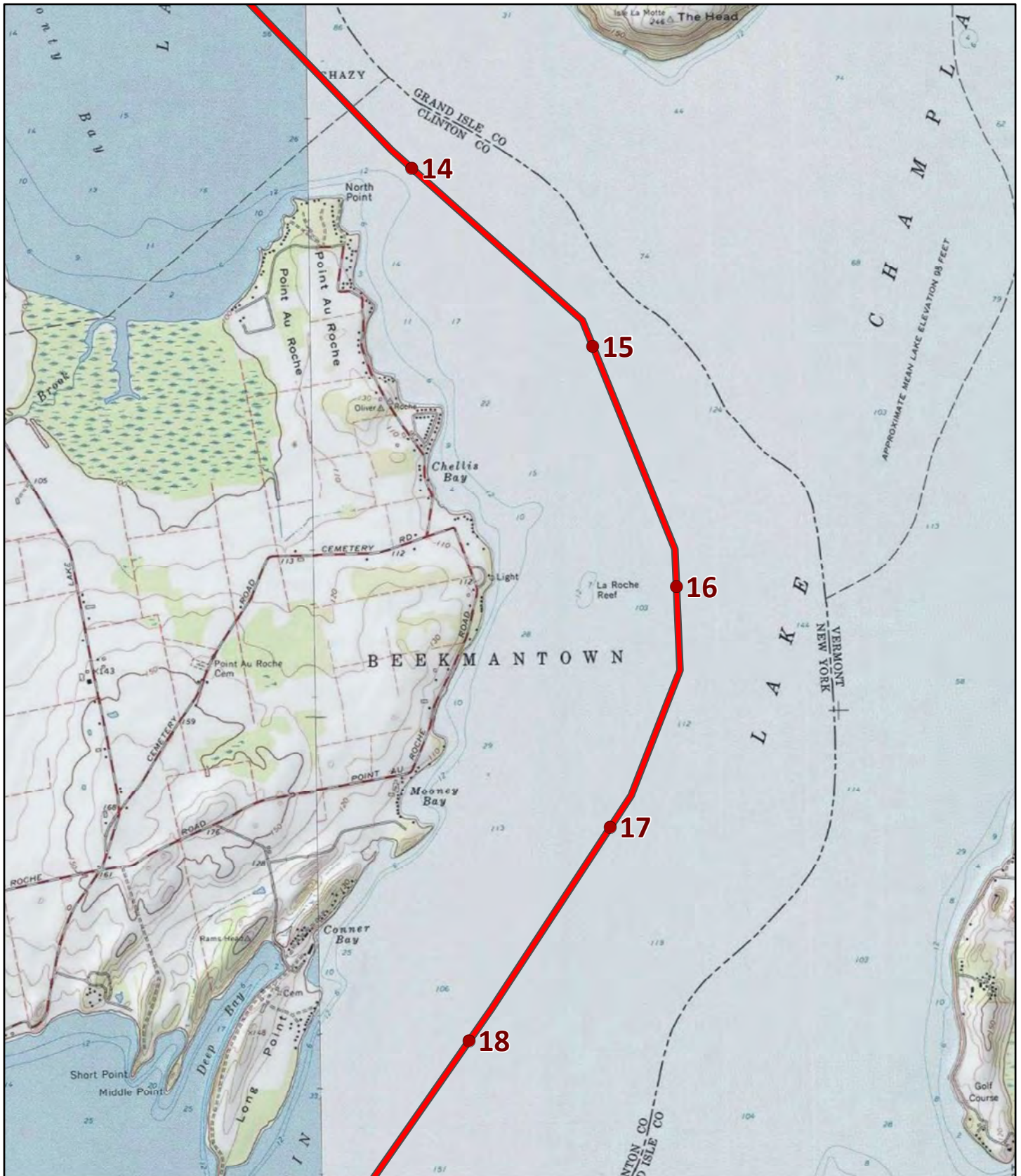


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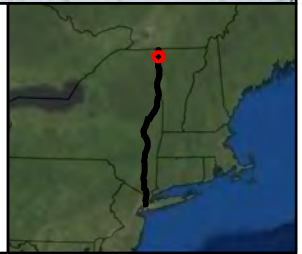


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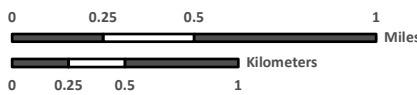


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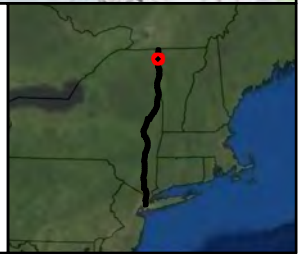


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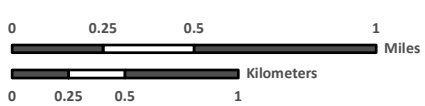
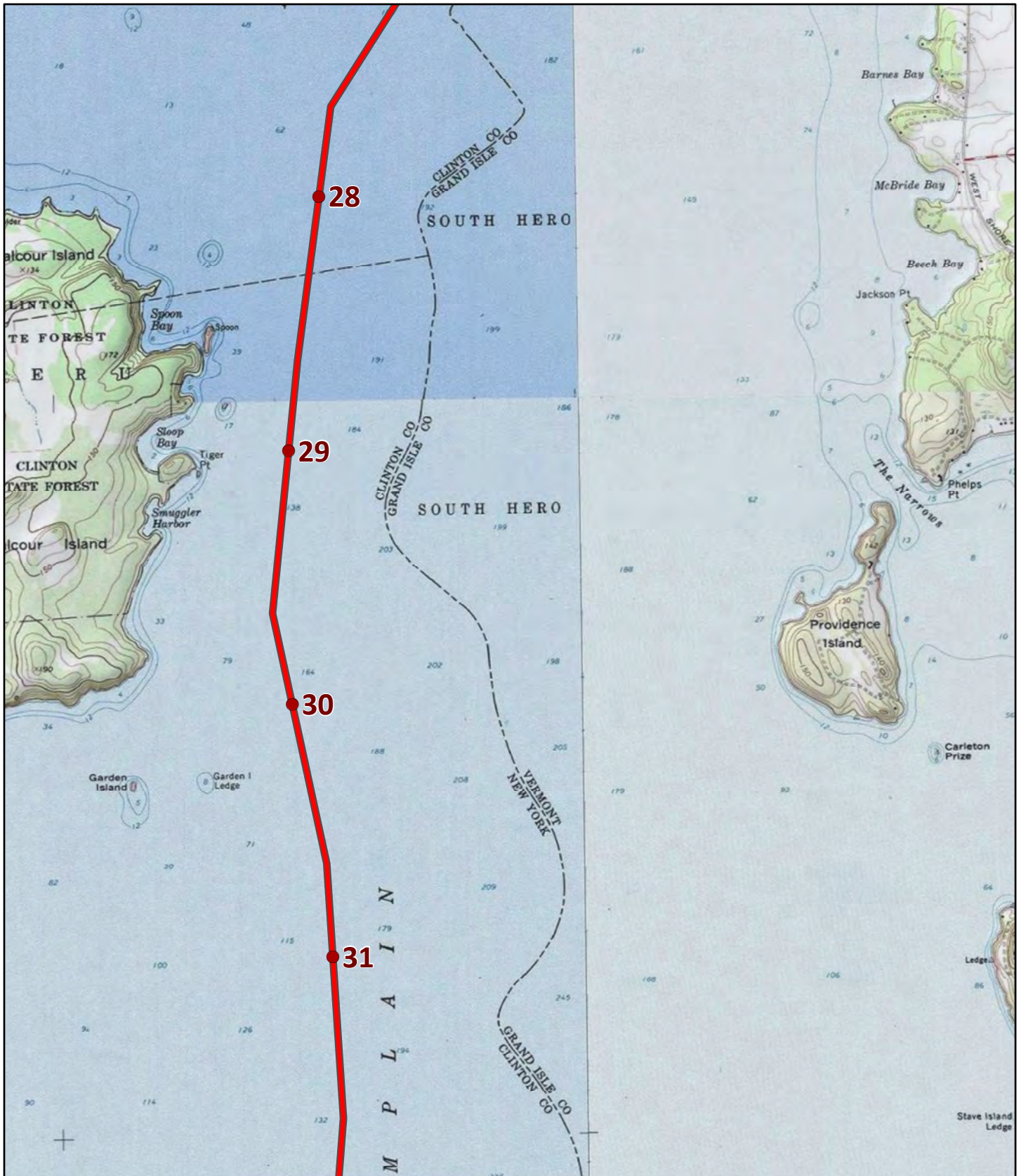
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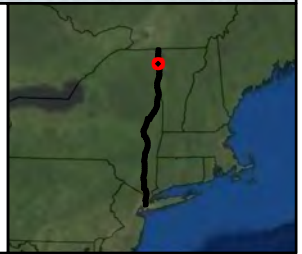




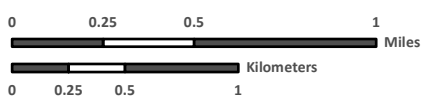
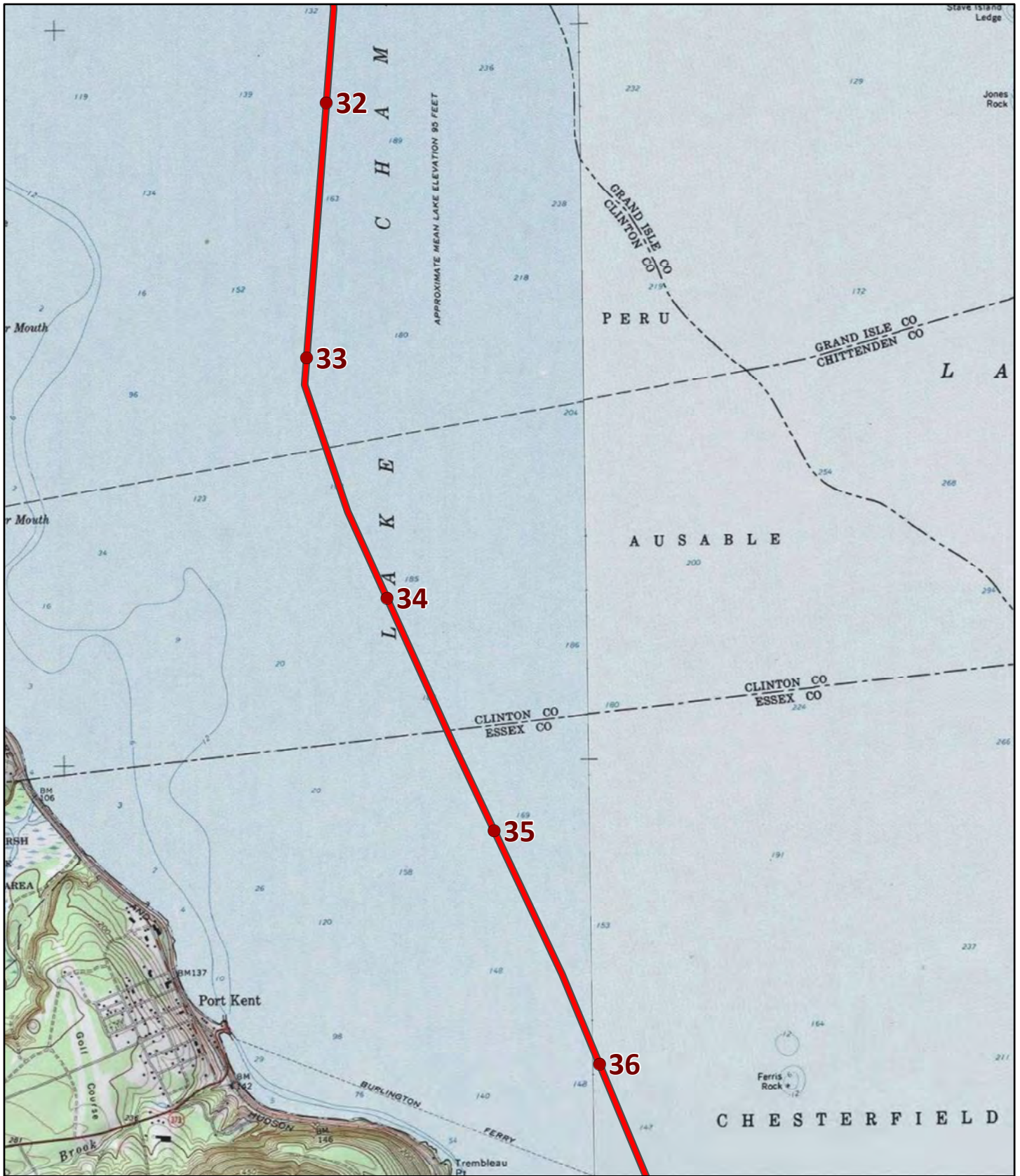


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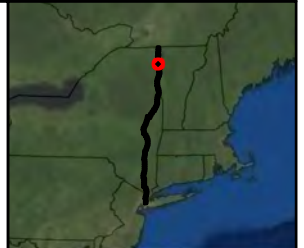


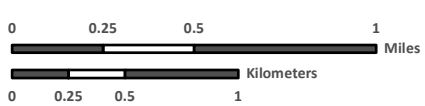
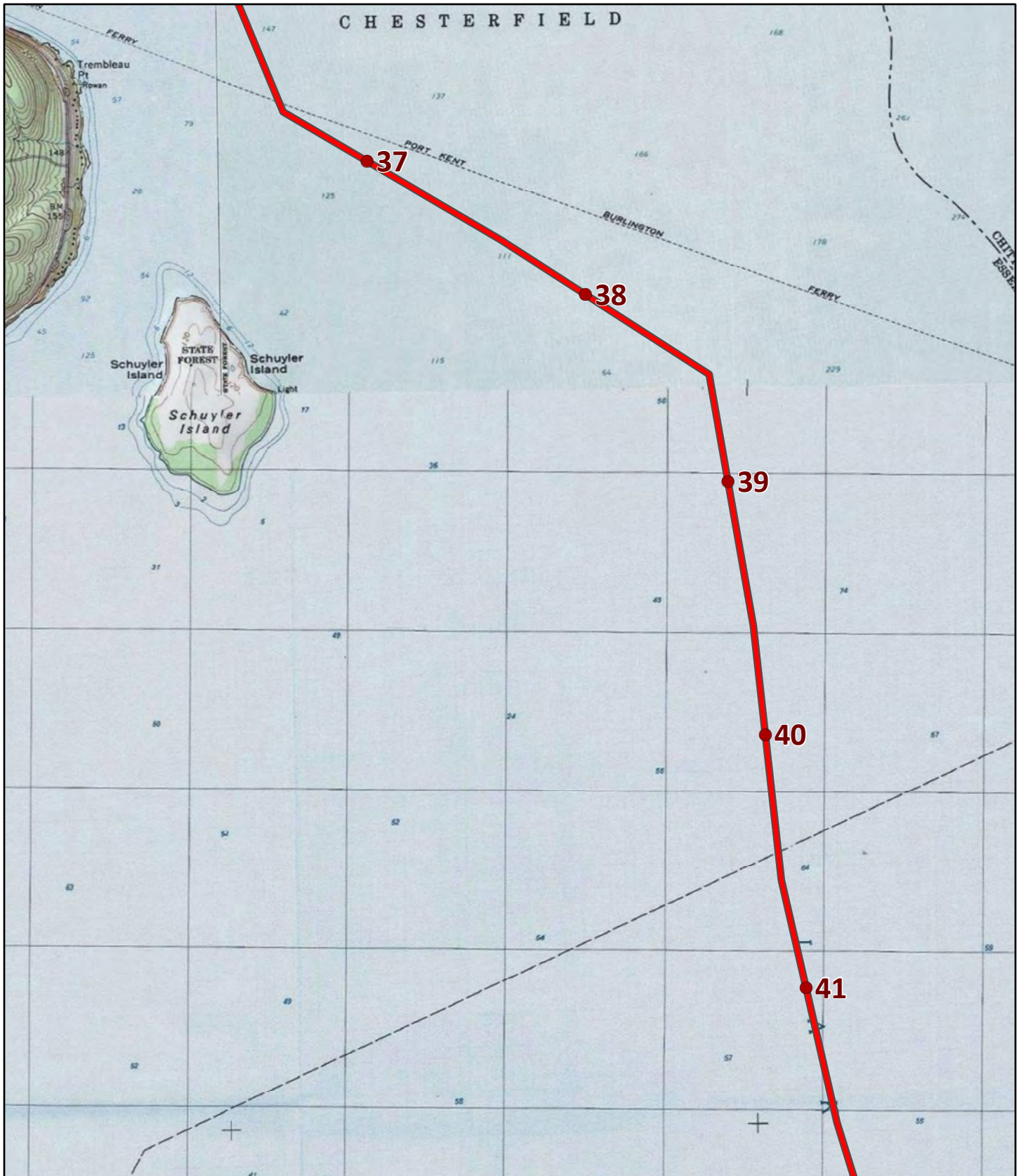
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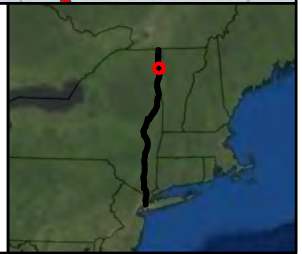
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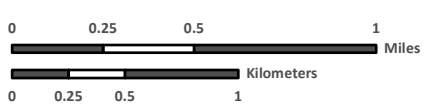
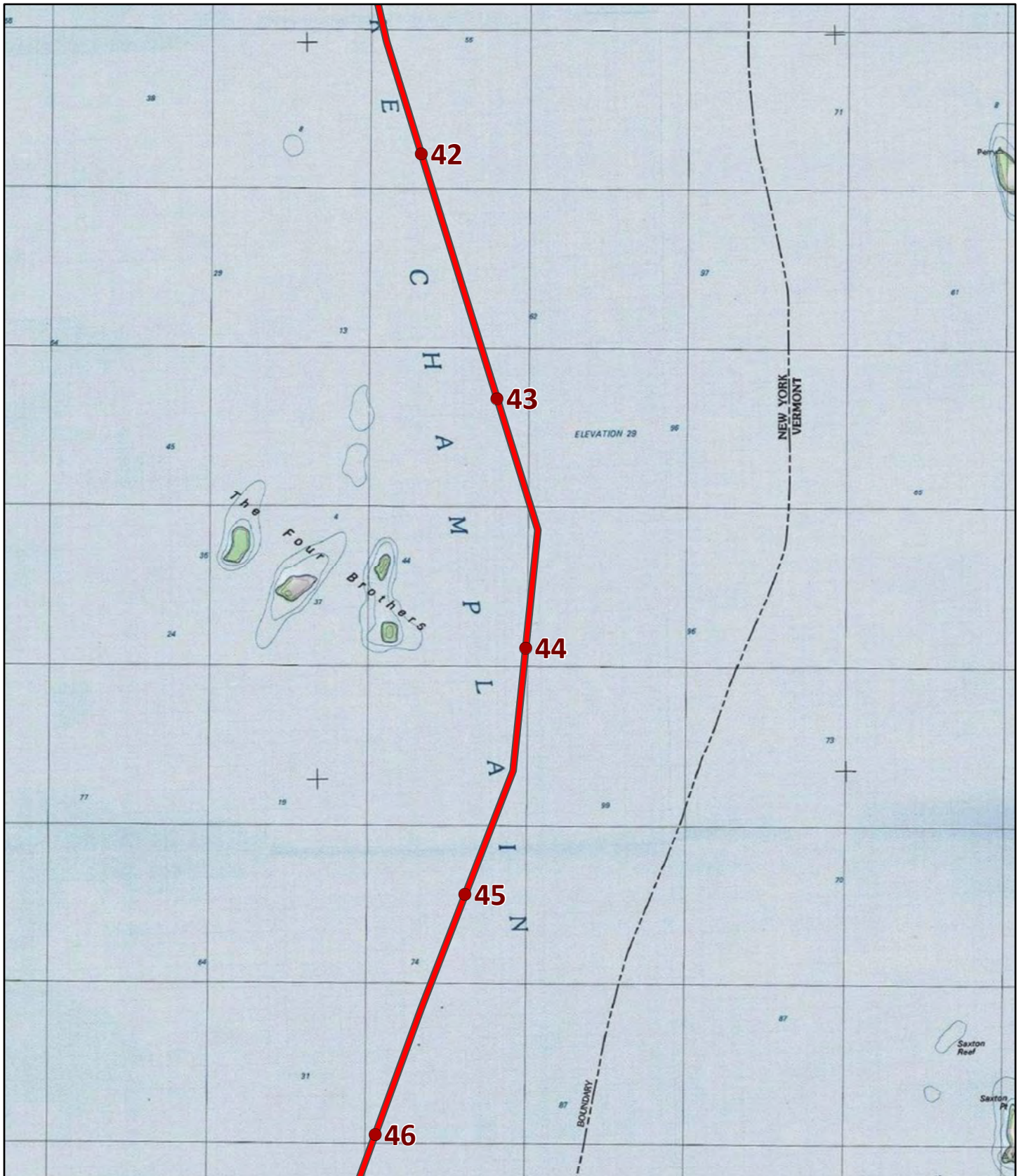


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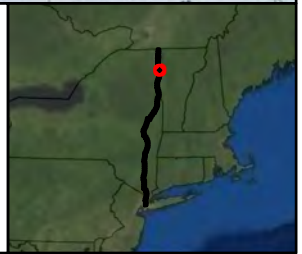


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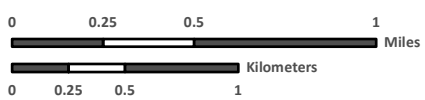


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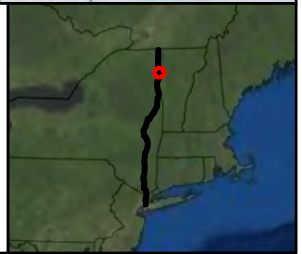


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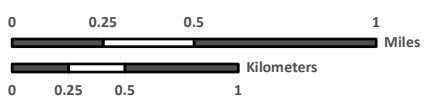
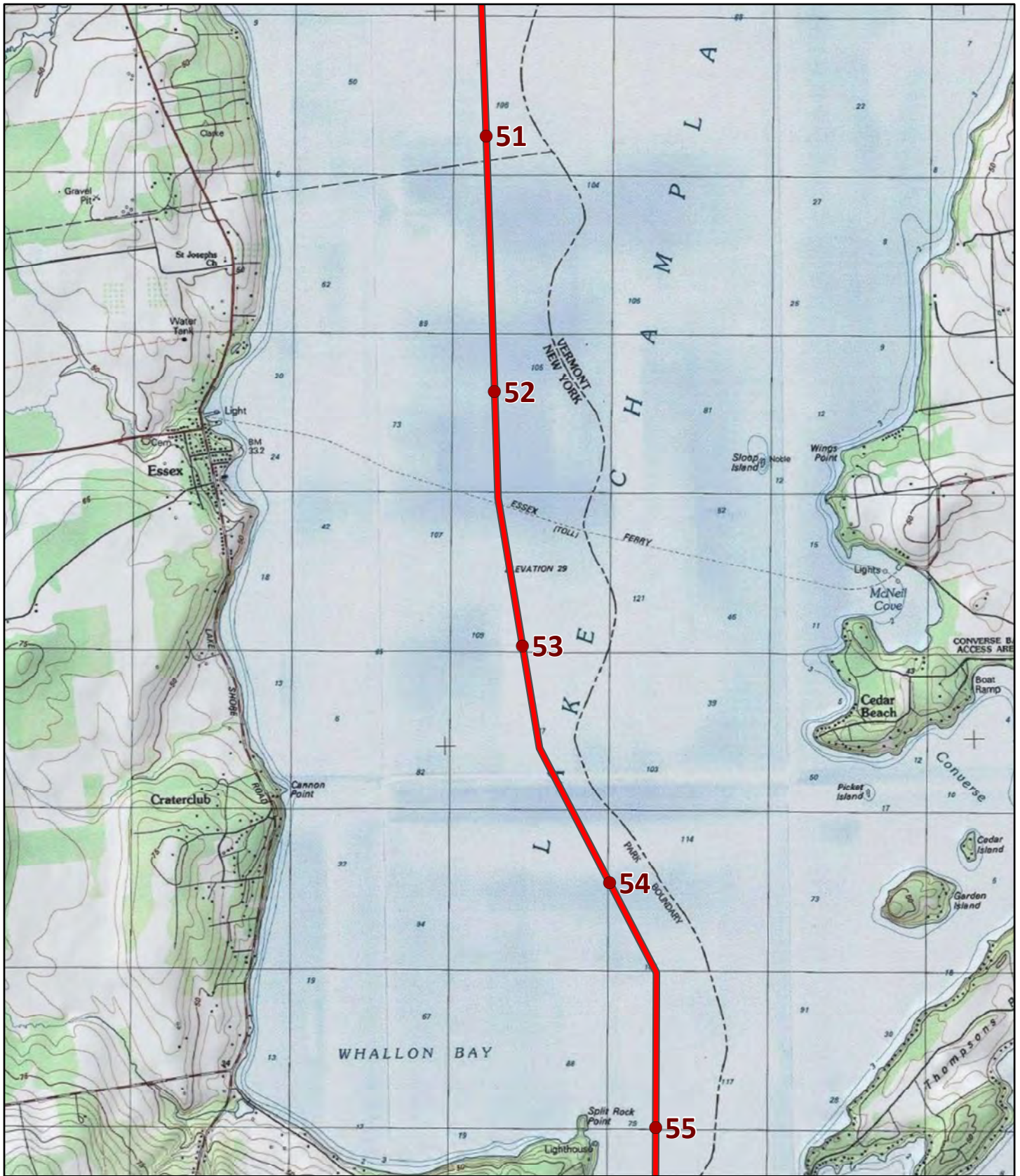


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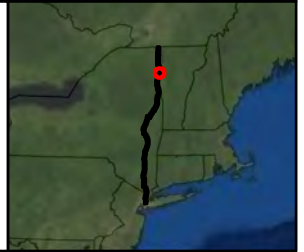


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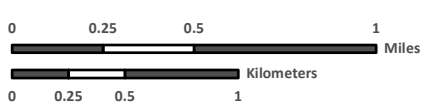


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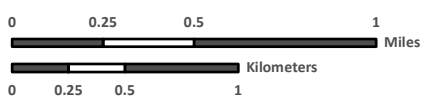
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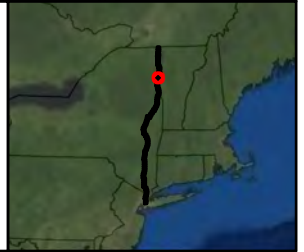
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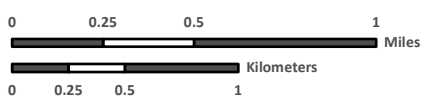


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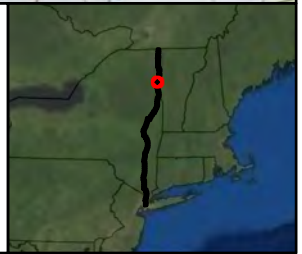


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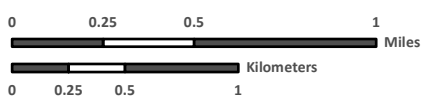


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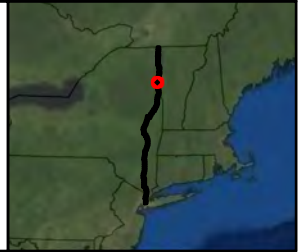


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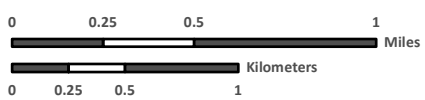
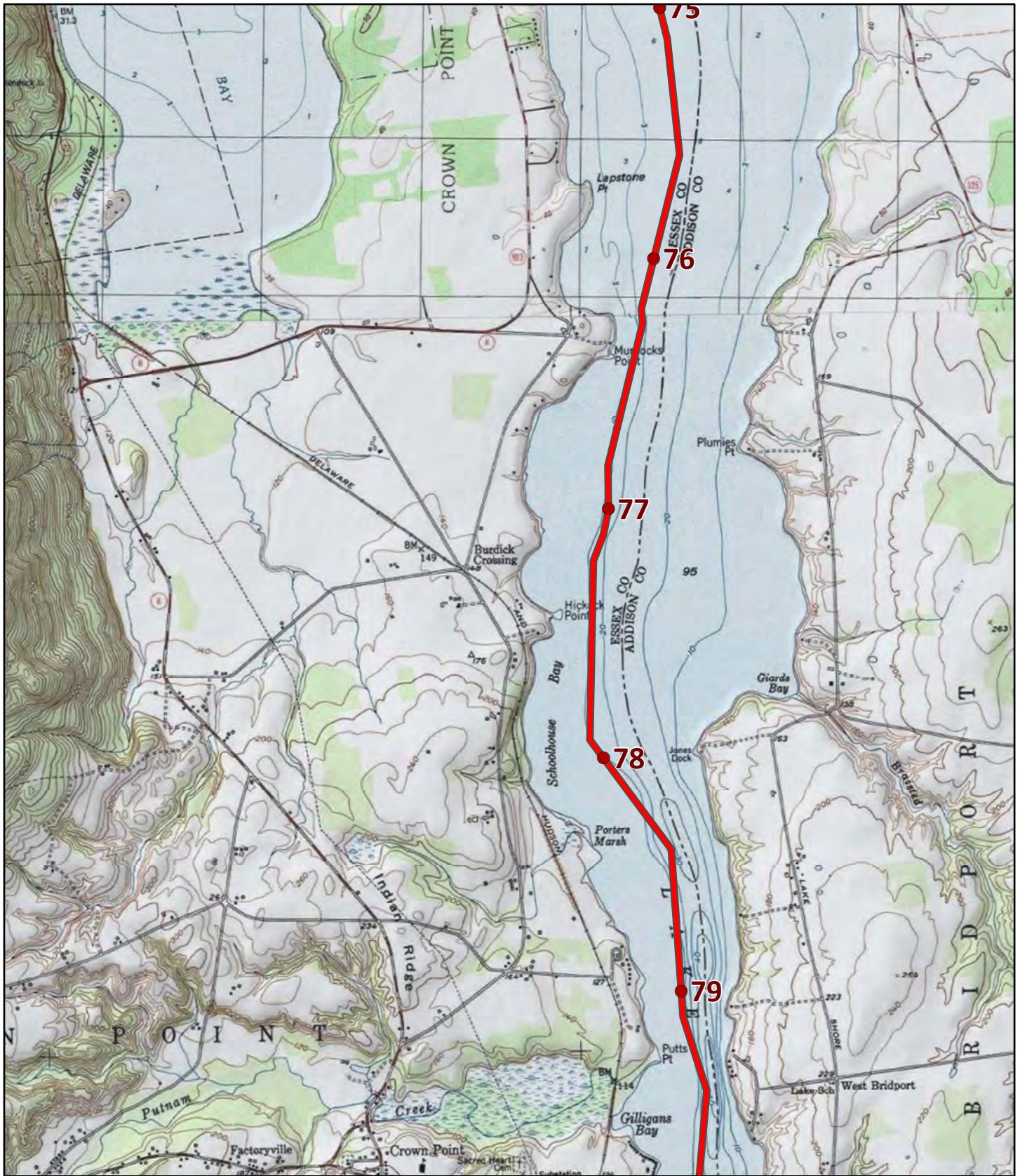


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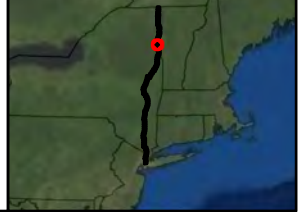
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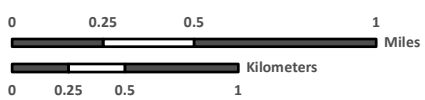
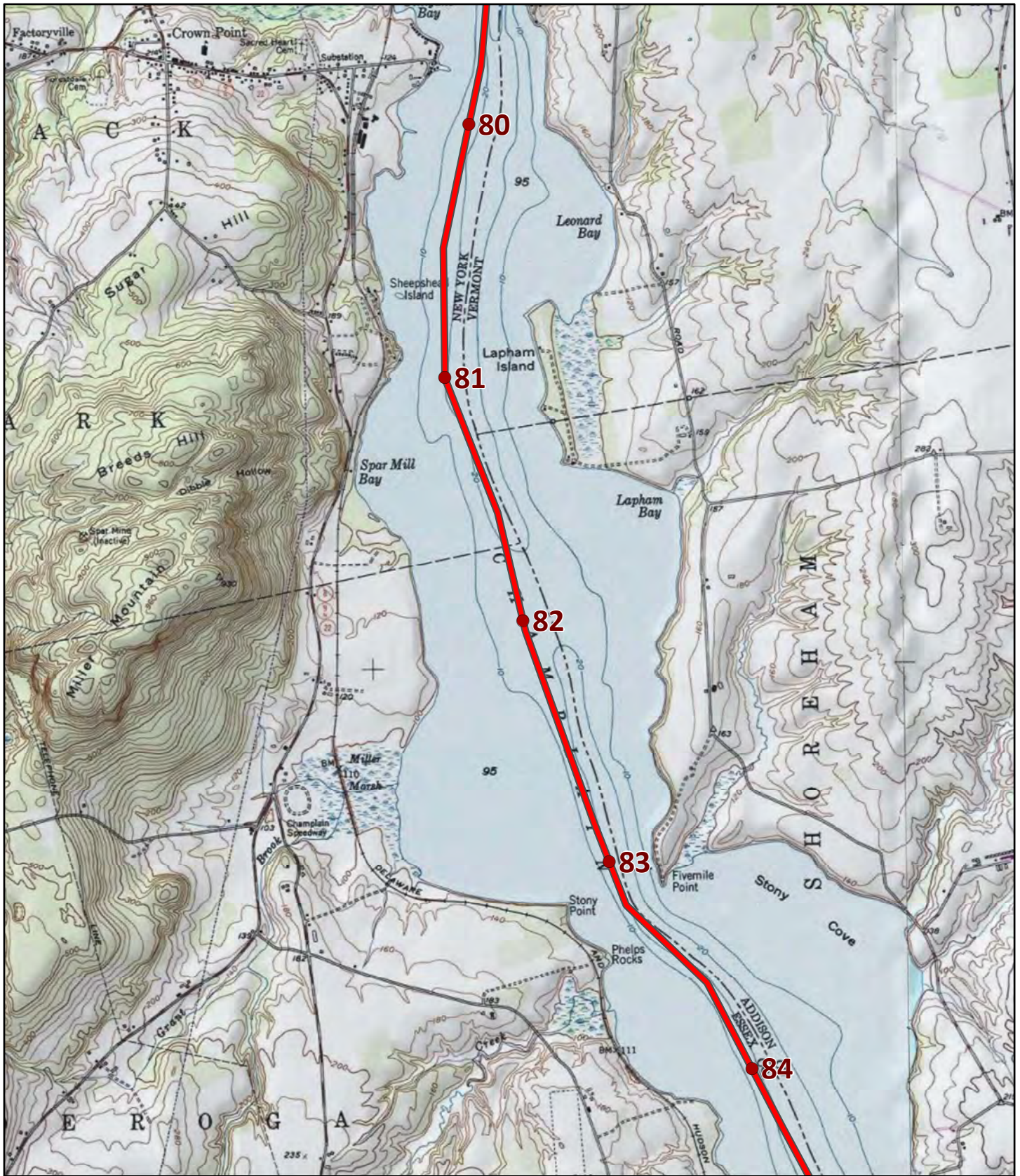
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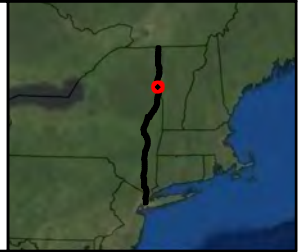


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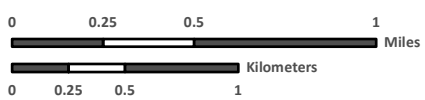
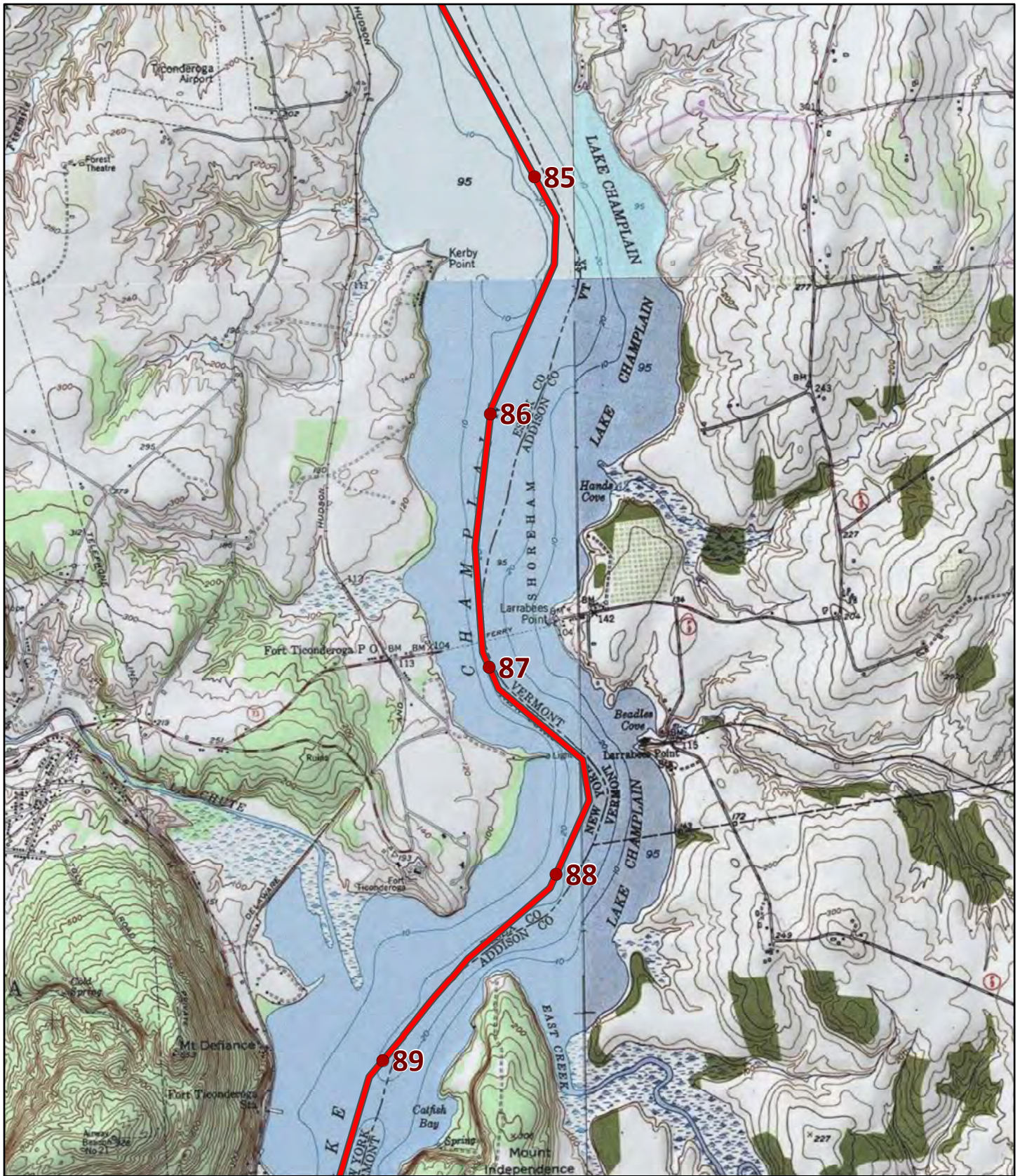


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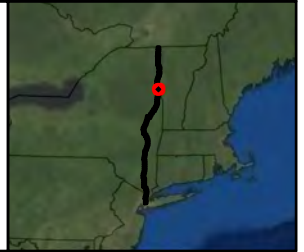


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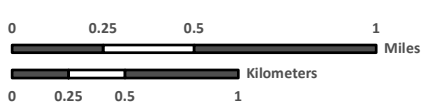
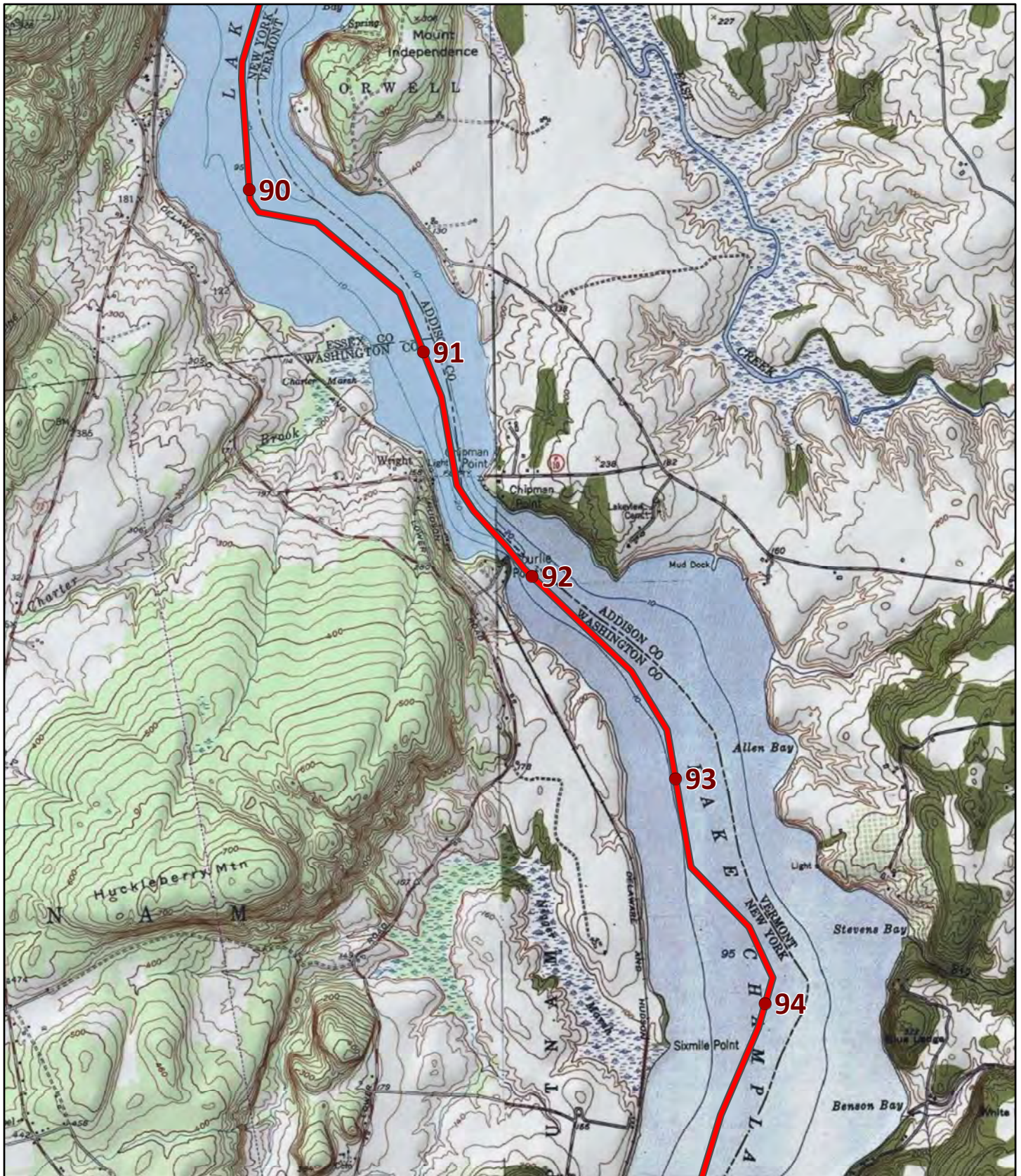


Projection: Transverse Mercator  
 State Plane New York East FIPS 3101 Feet  
 North American Datum of 1983

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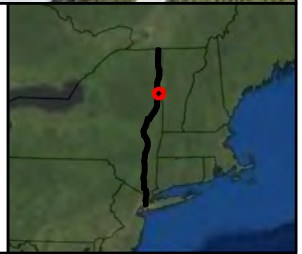


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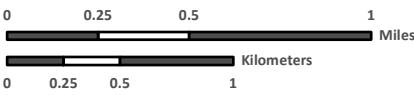
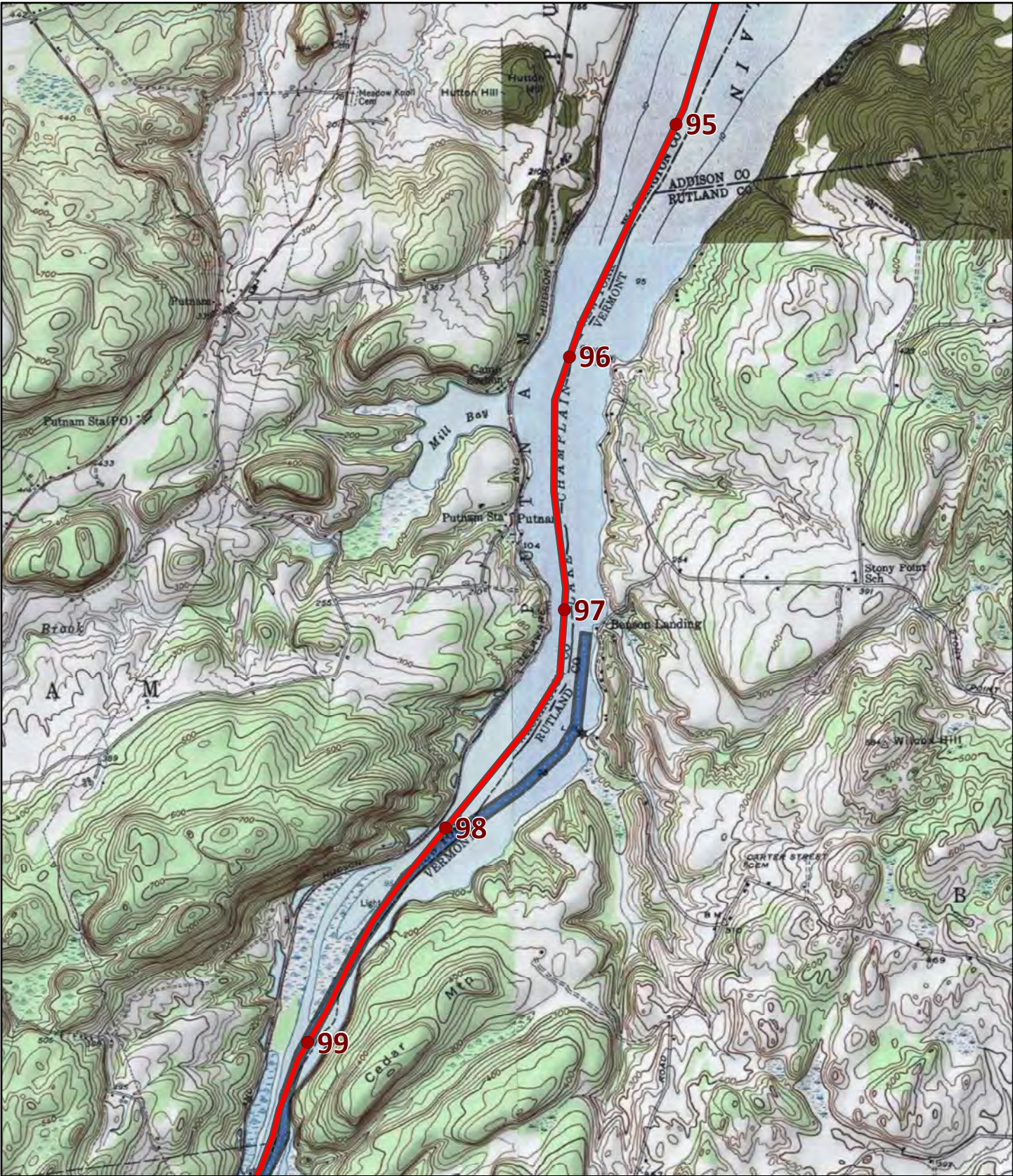


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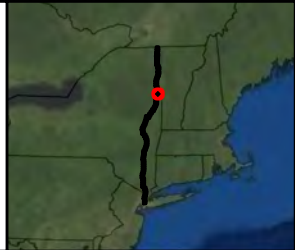


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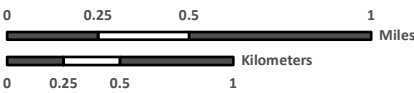
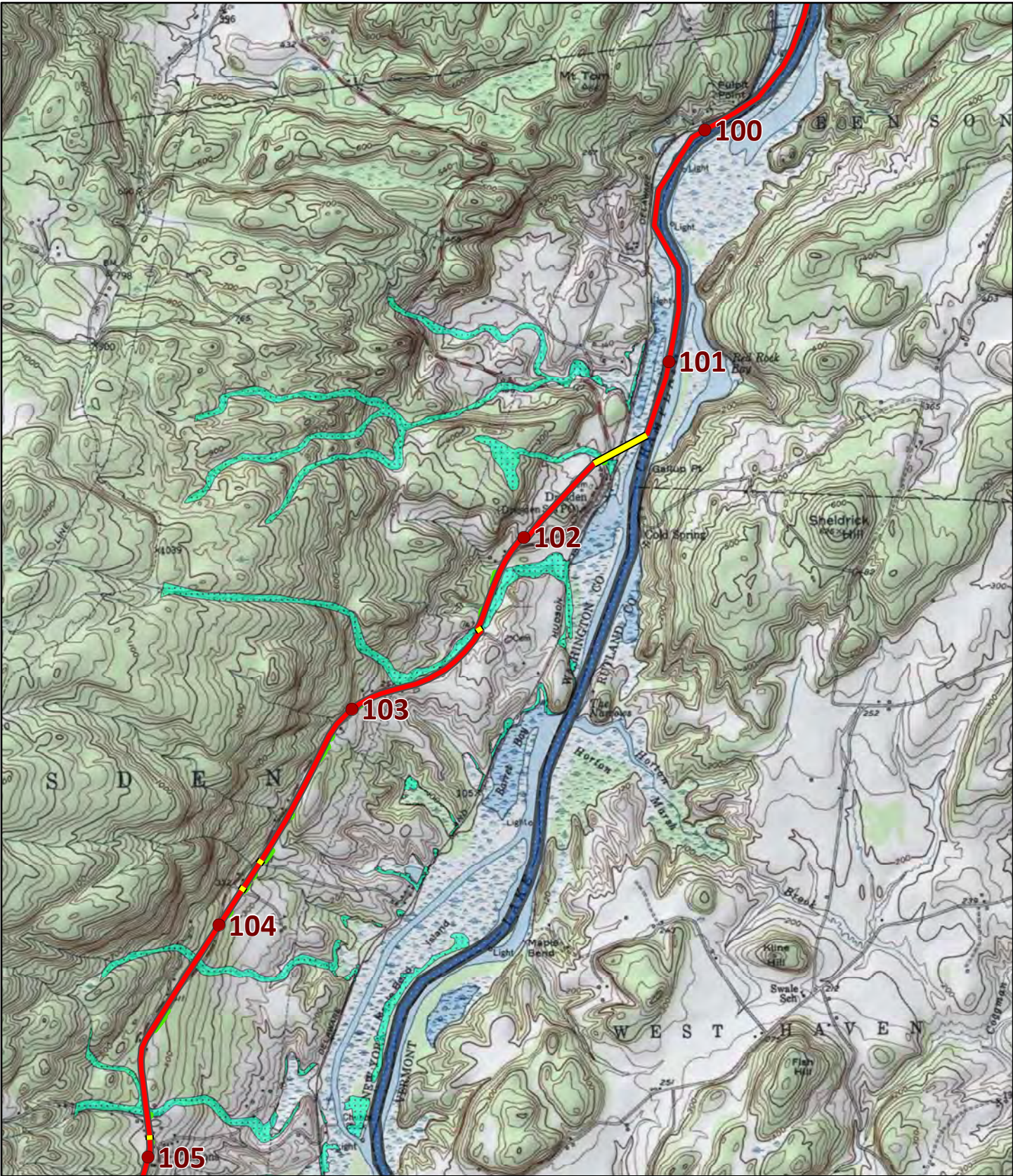
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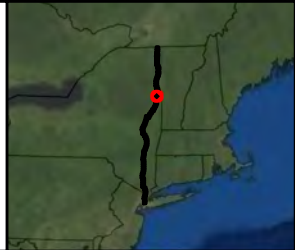
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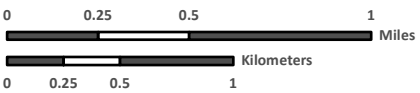
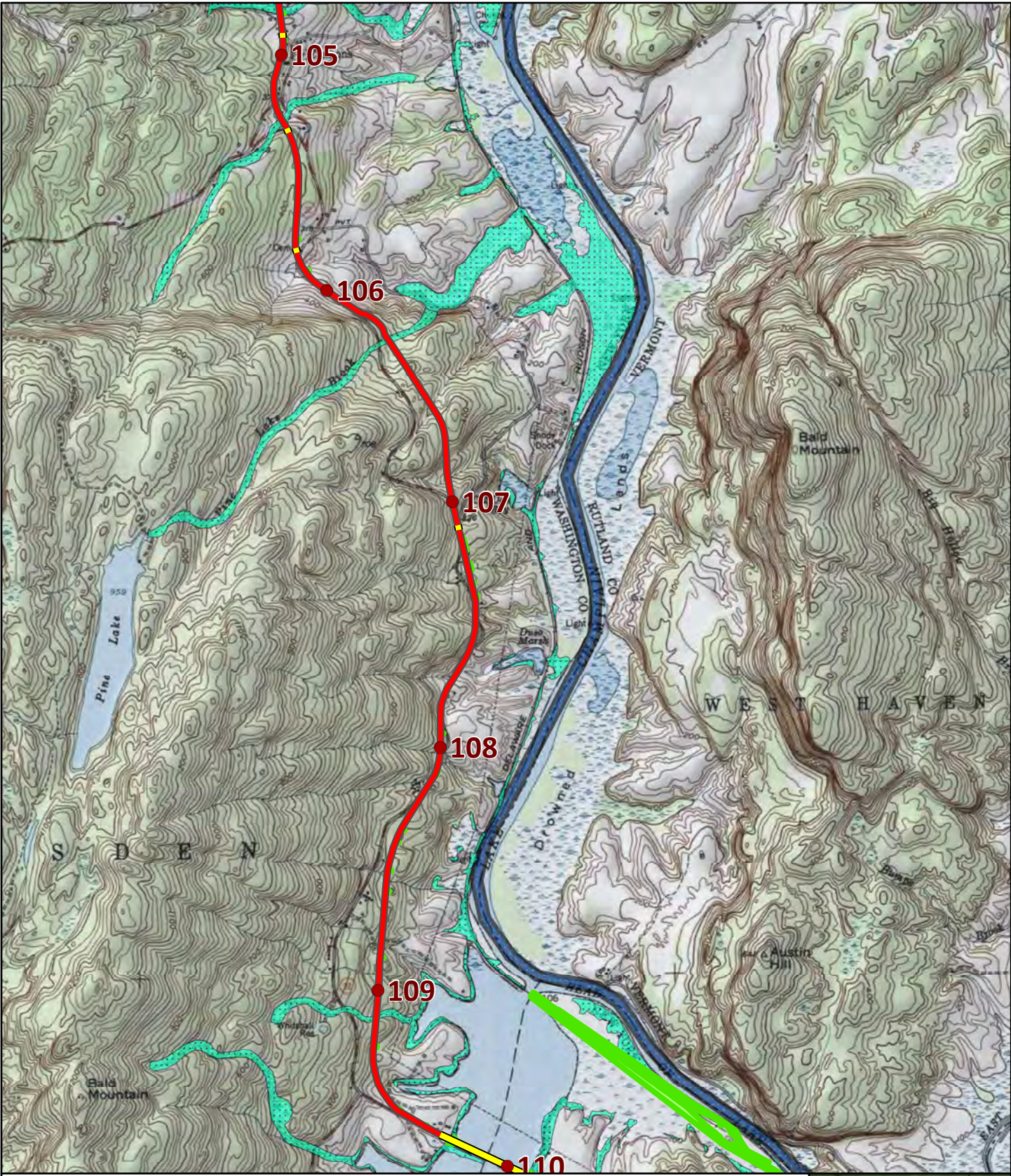


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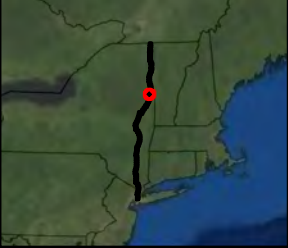


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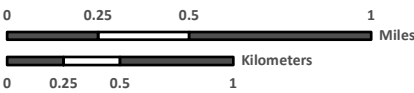
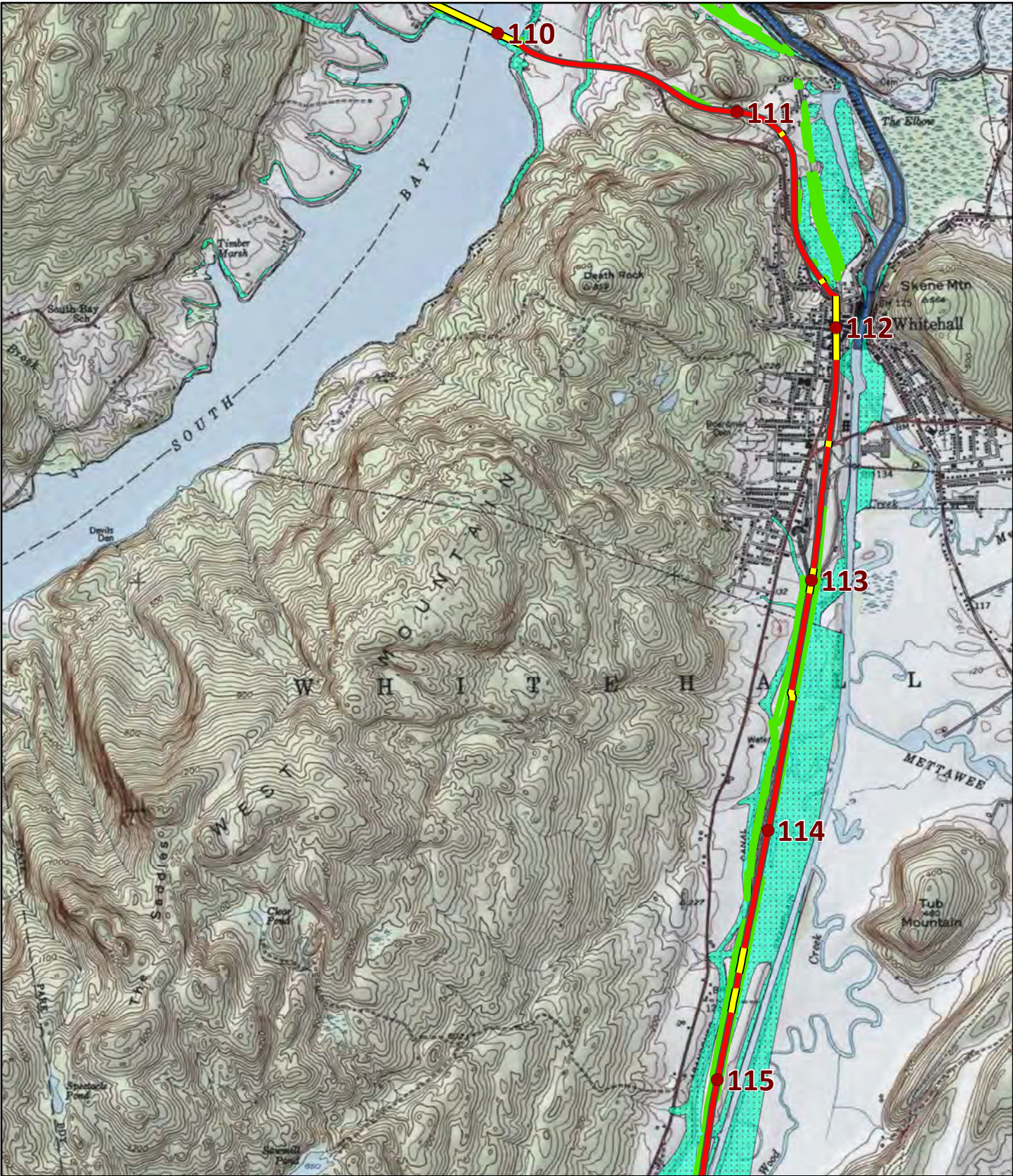


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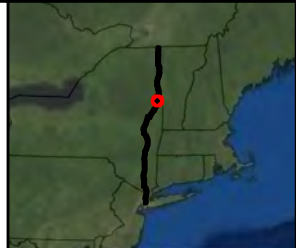
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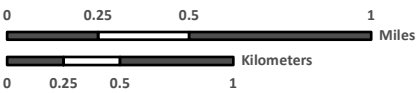
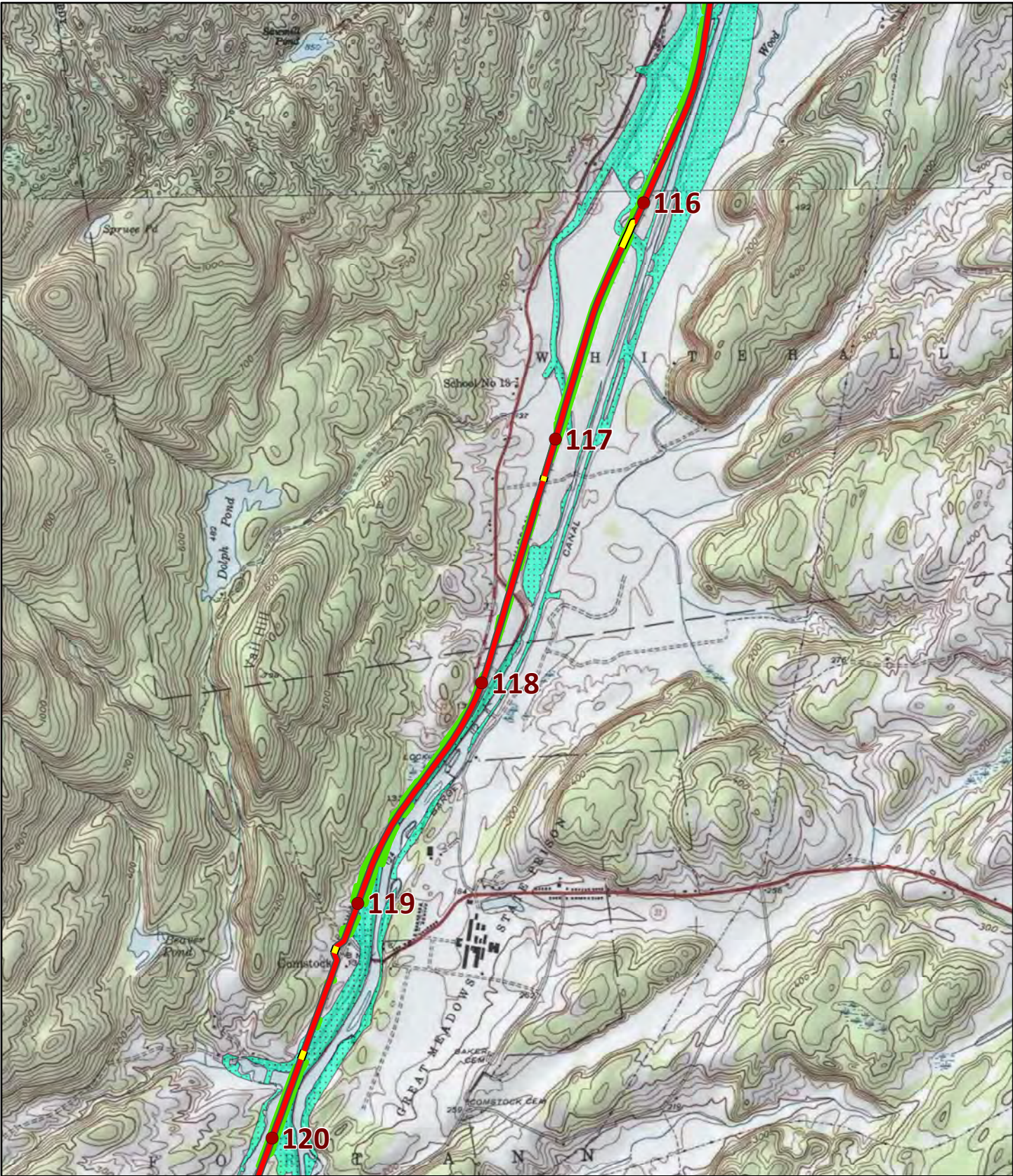
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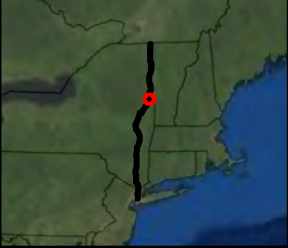


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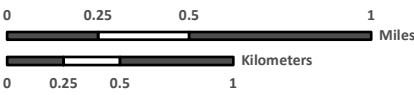
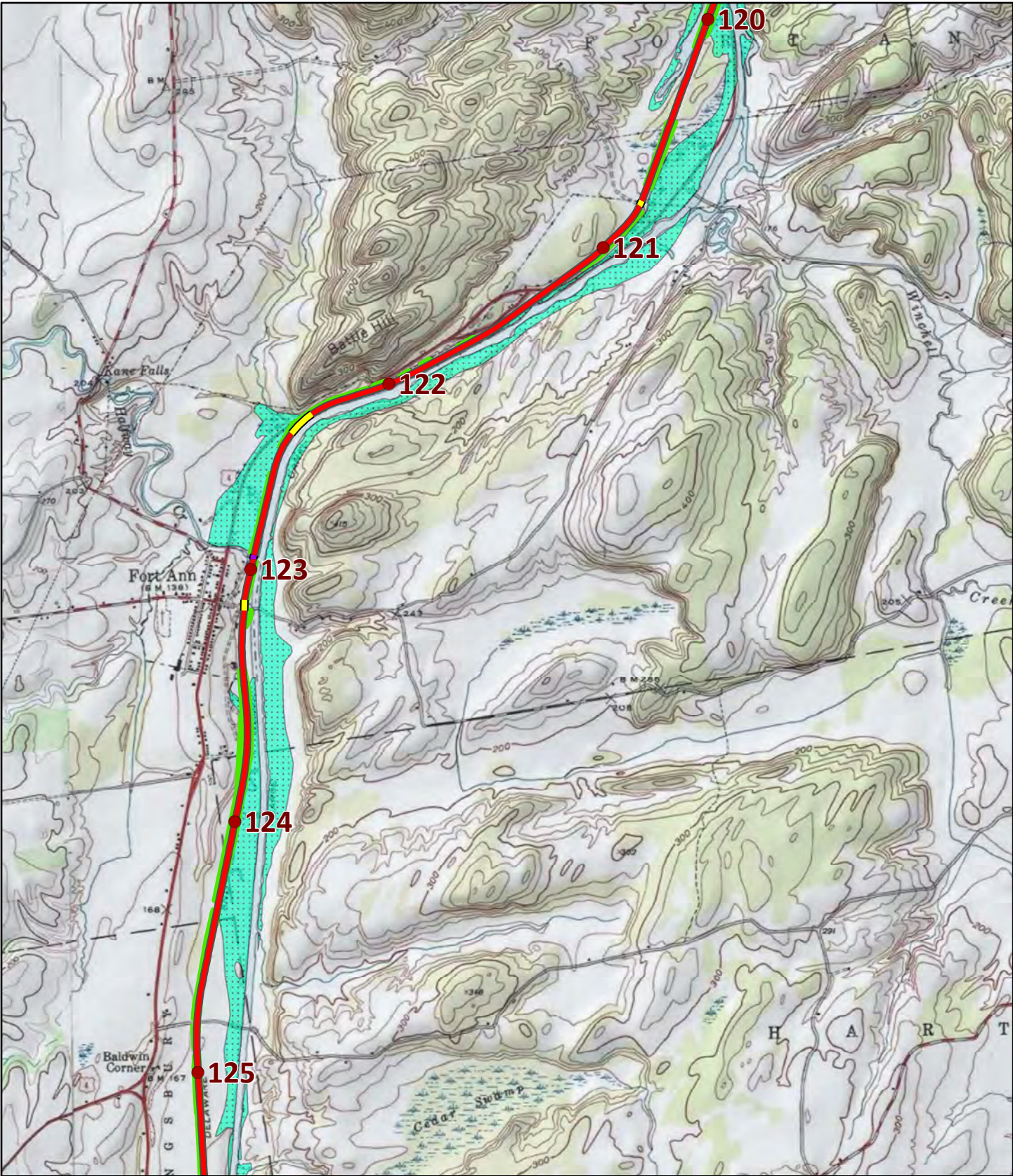


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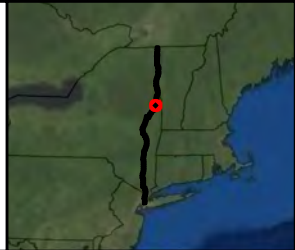
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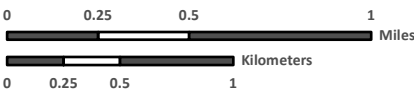
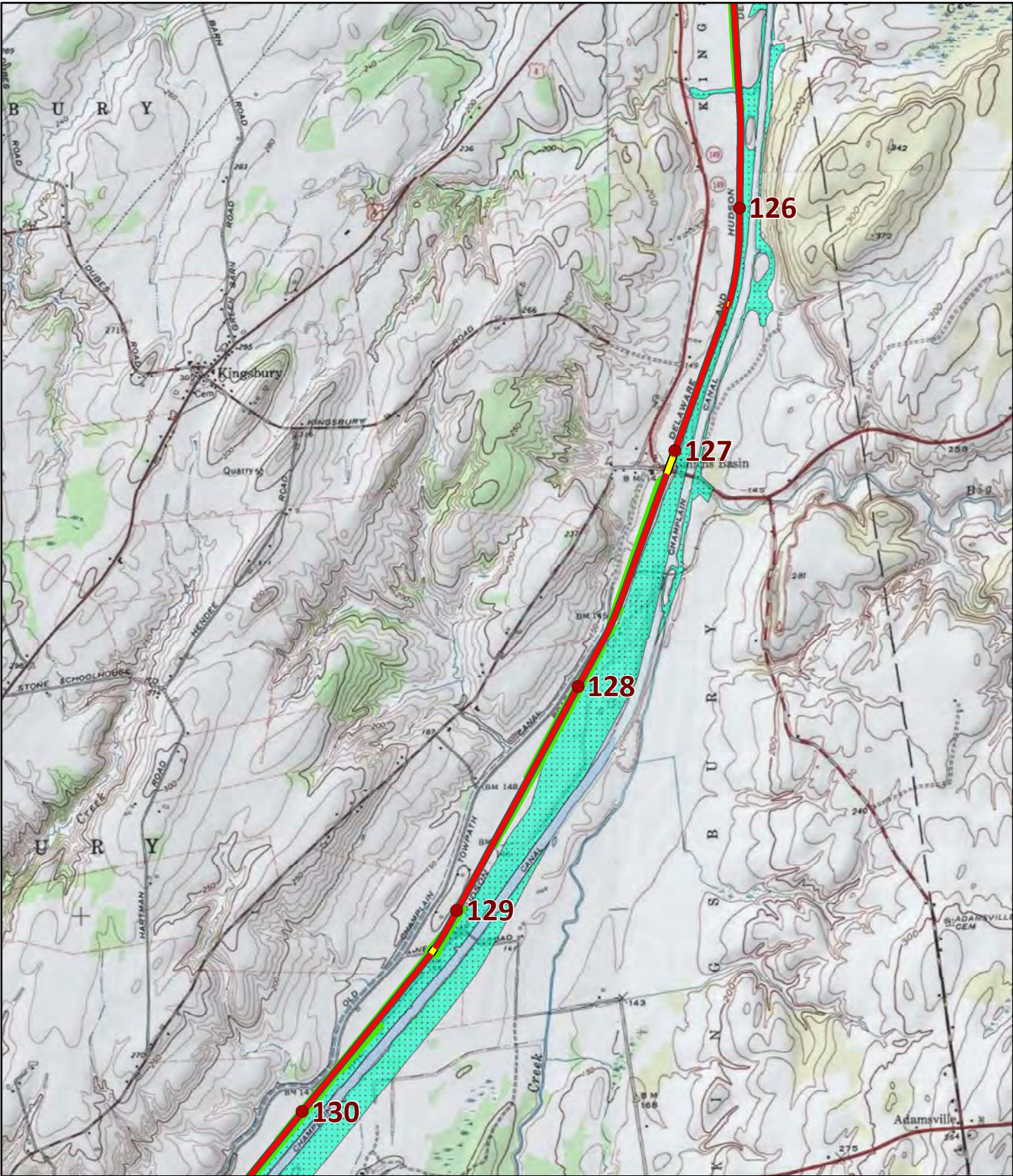
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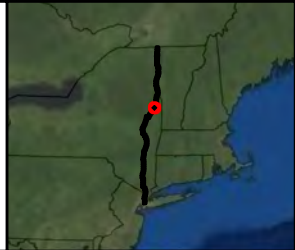


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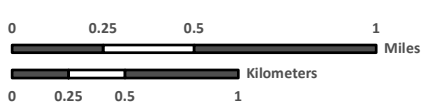
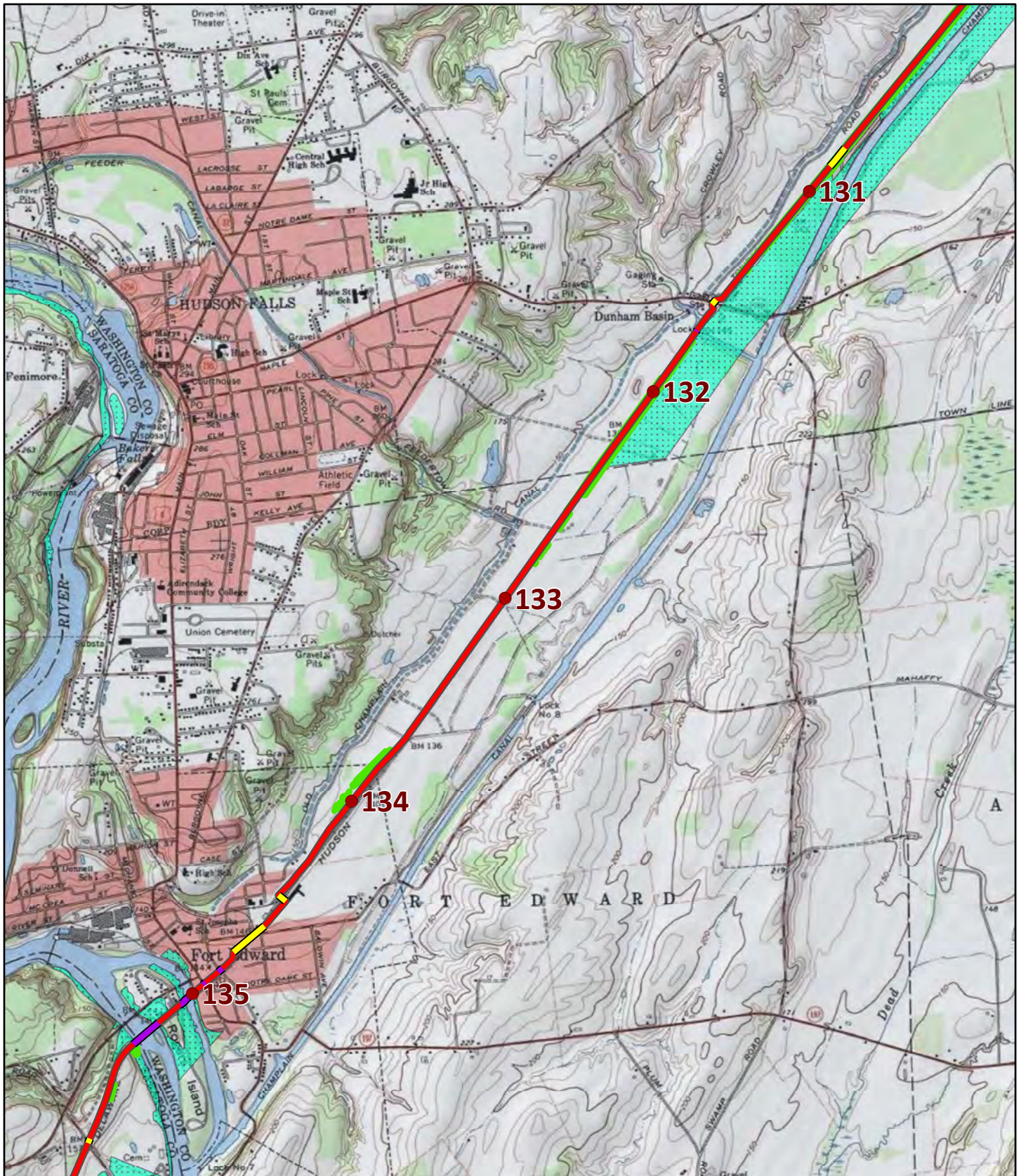


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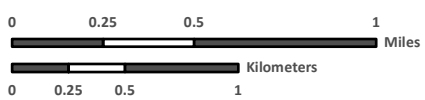
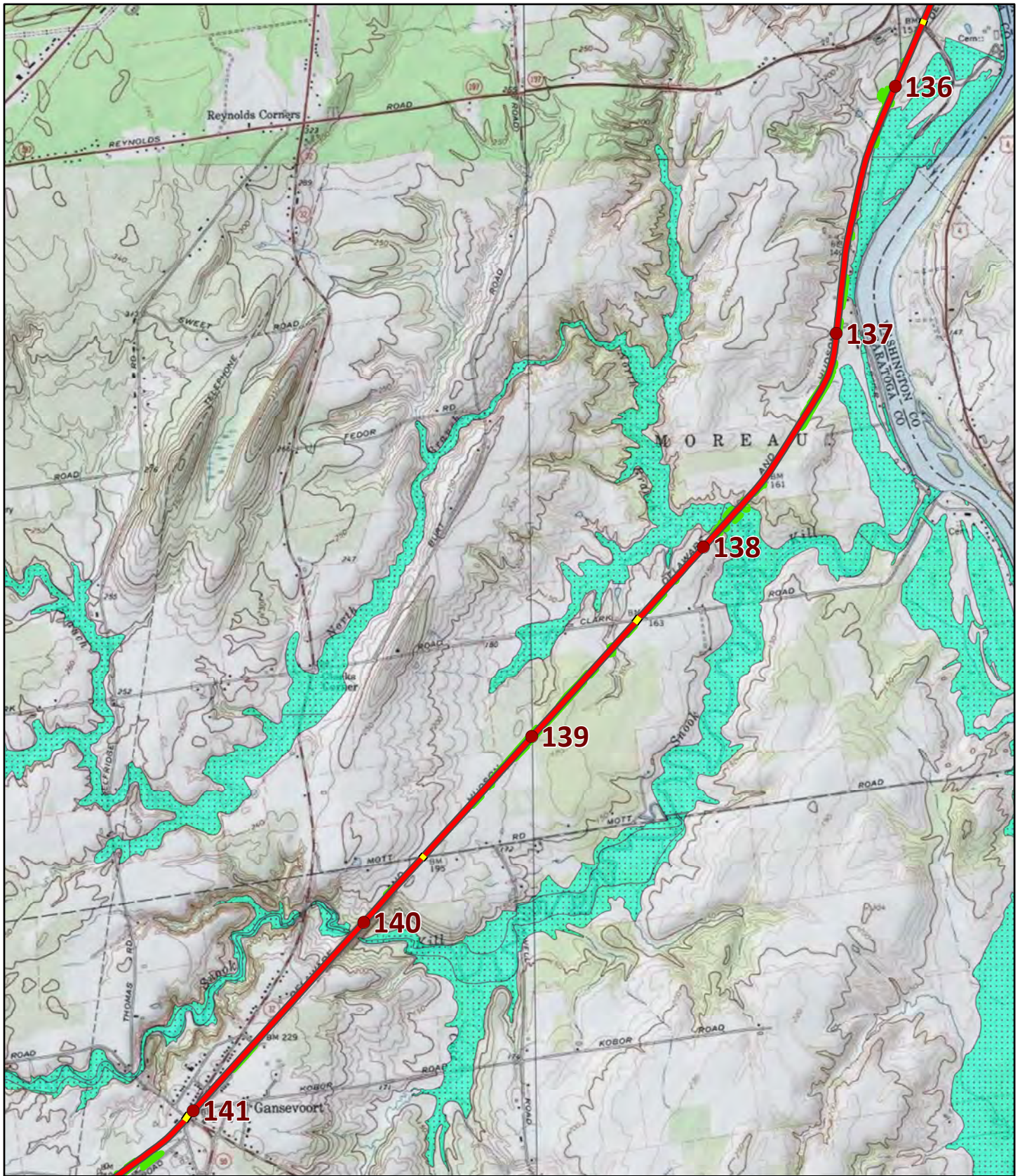


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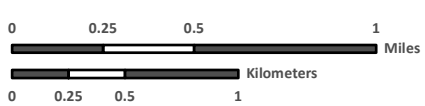
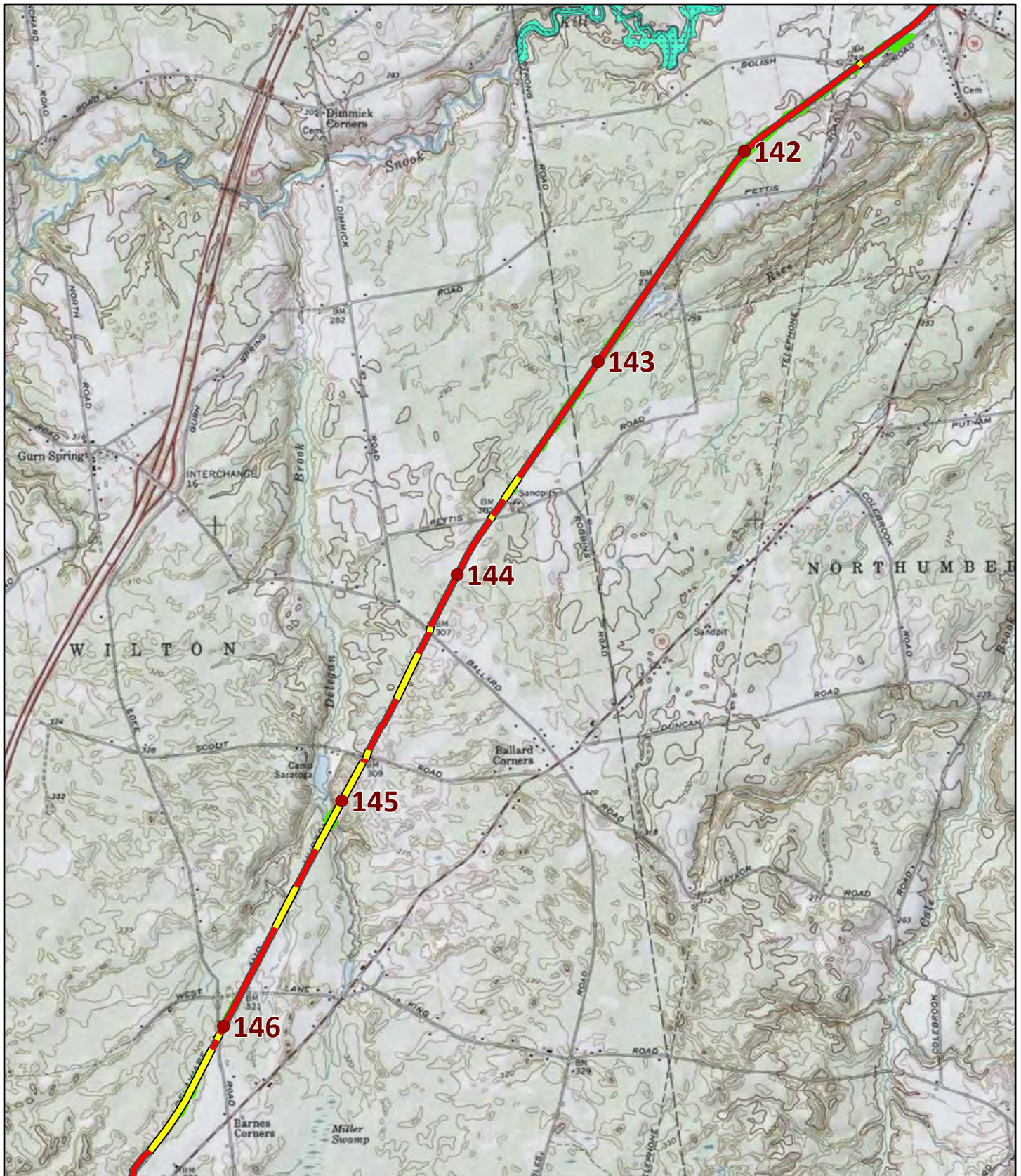
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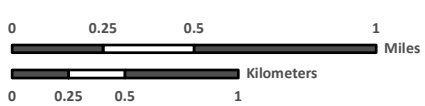
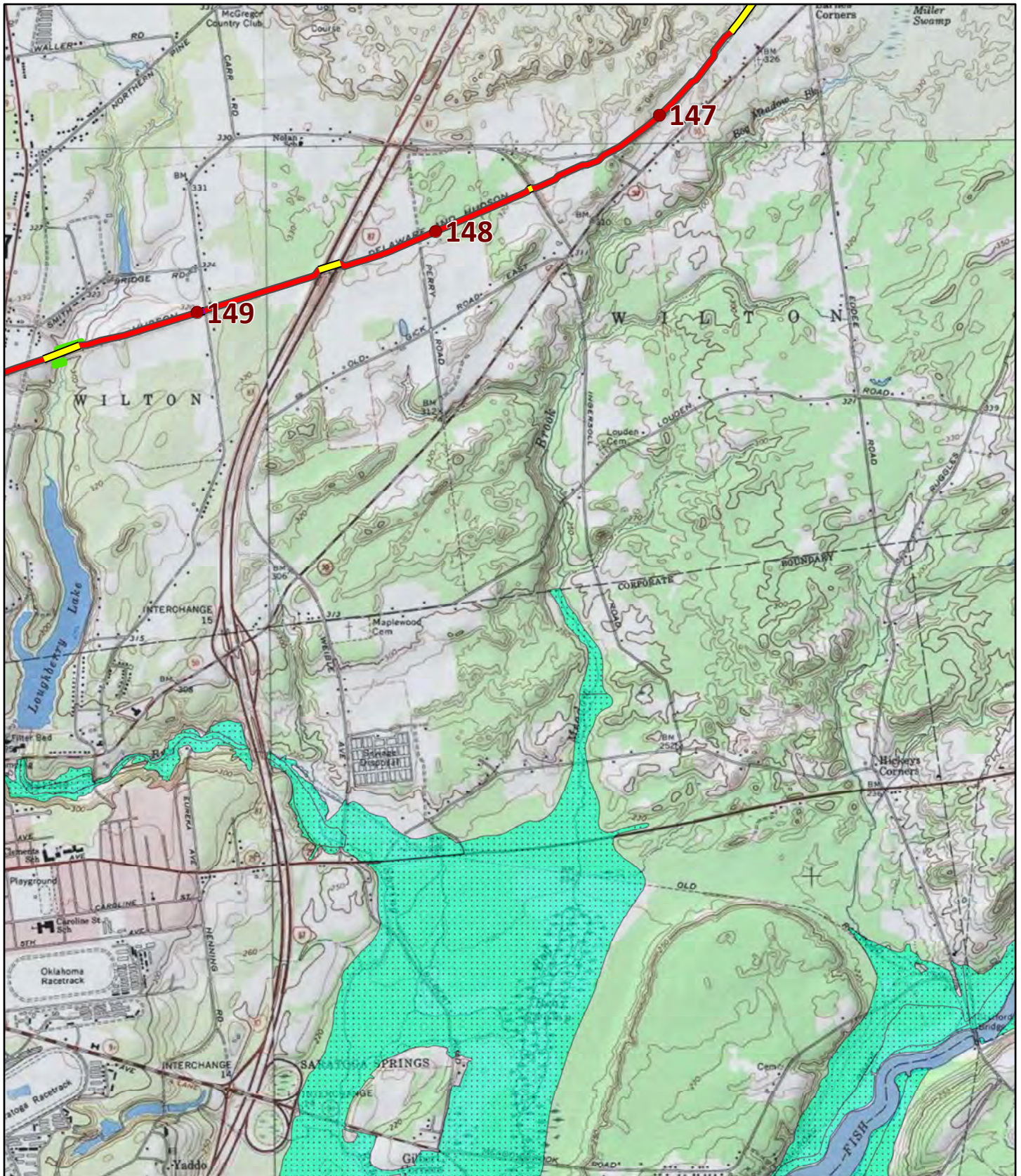


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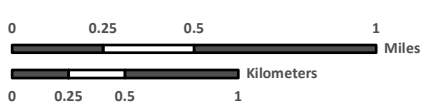
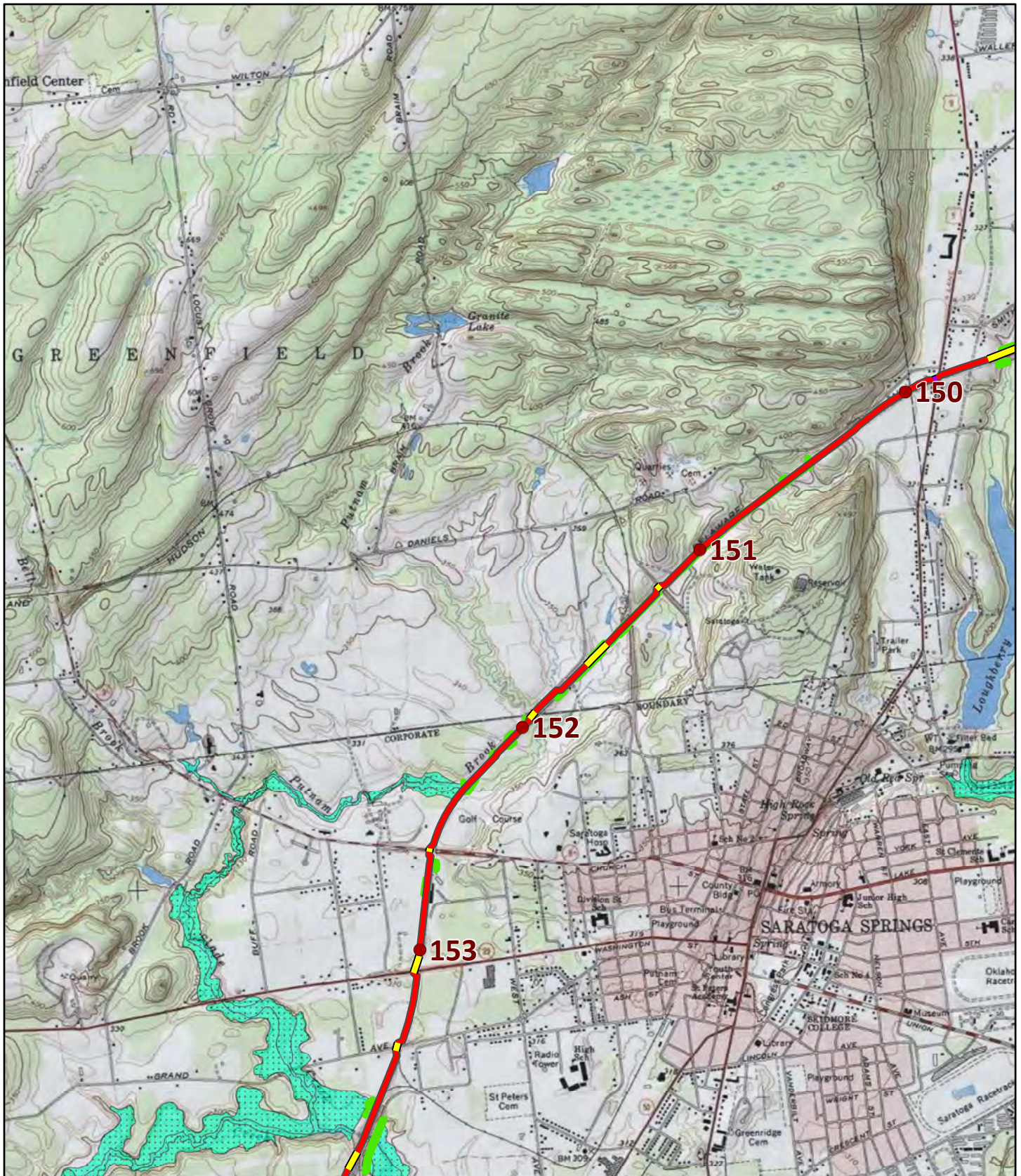


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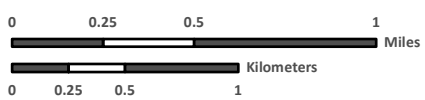
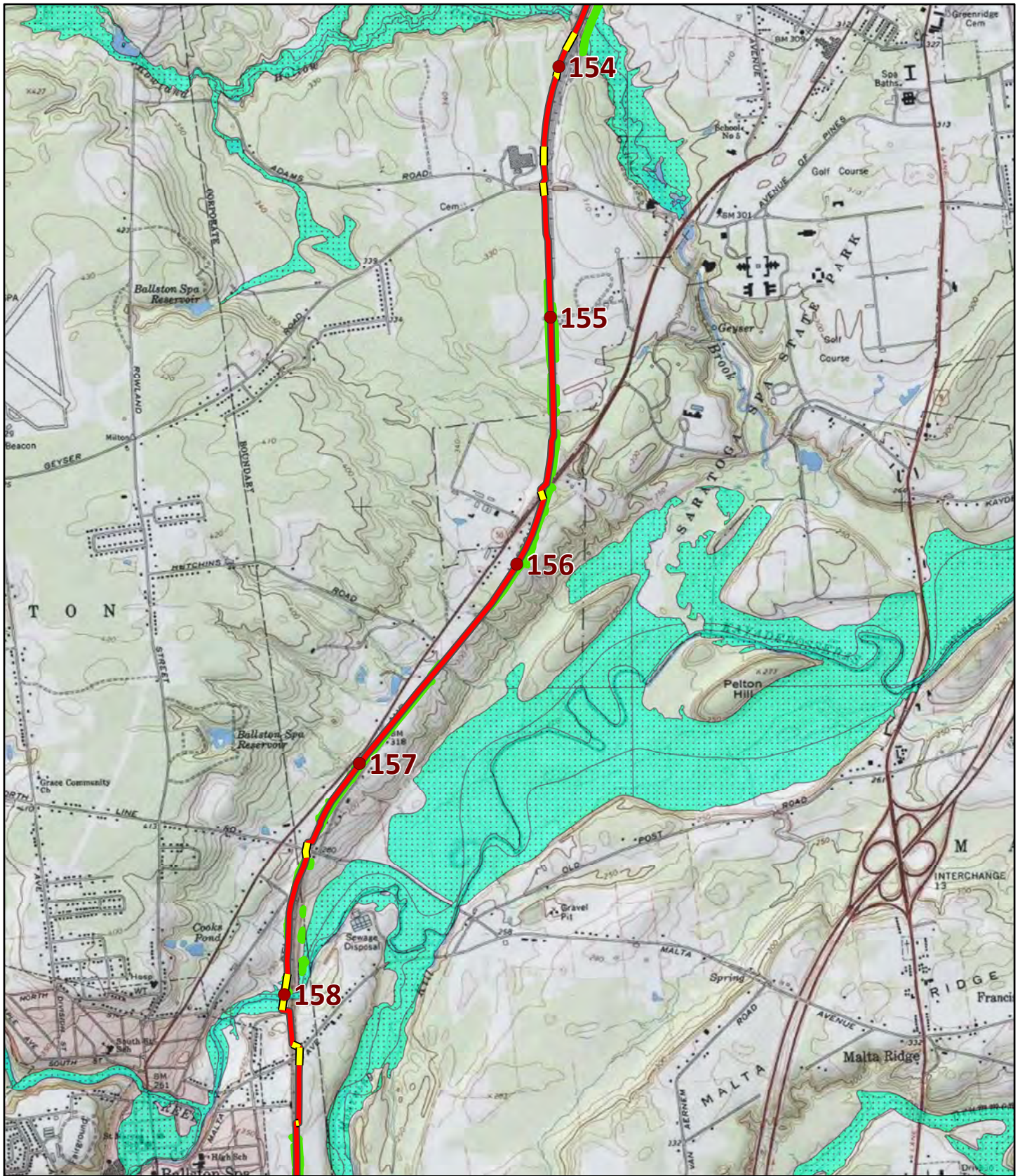


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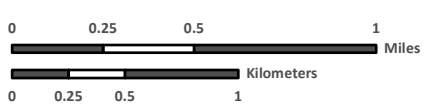
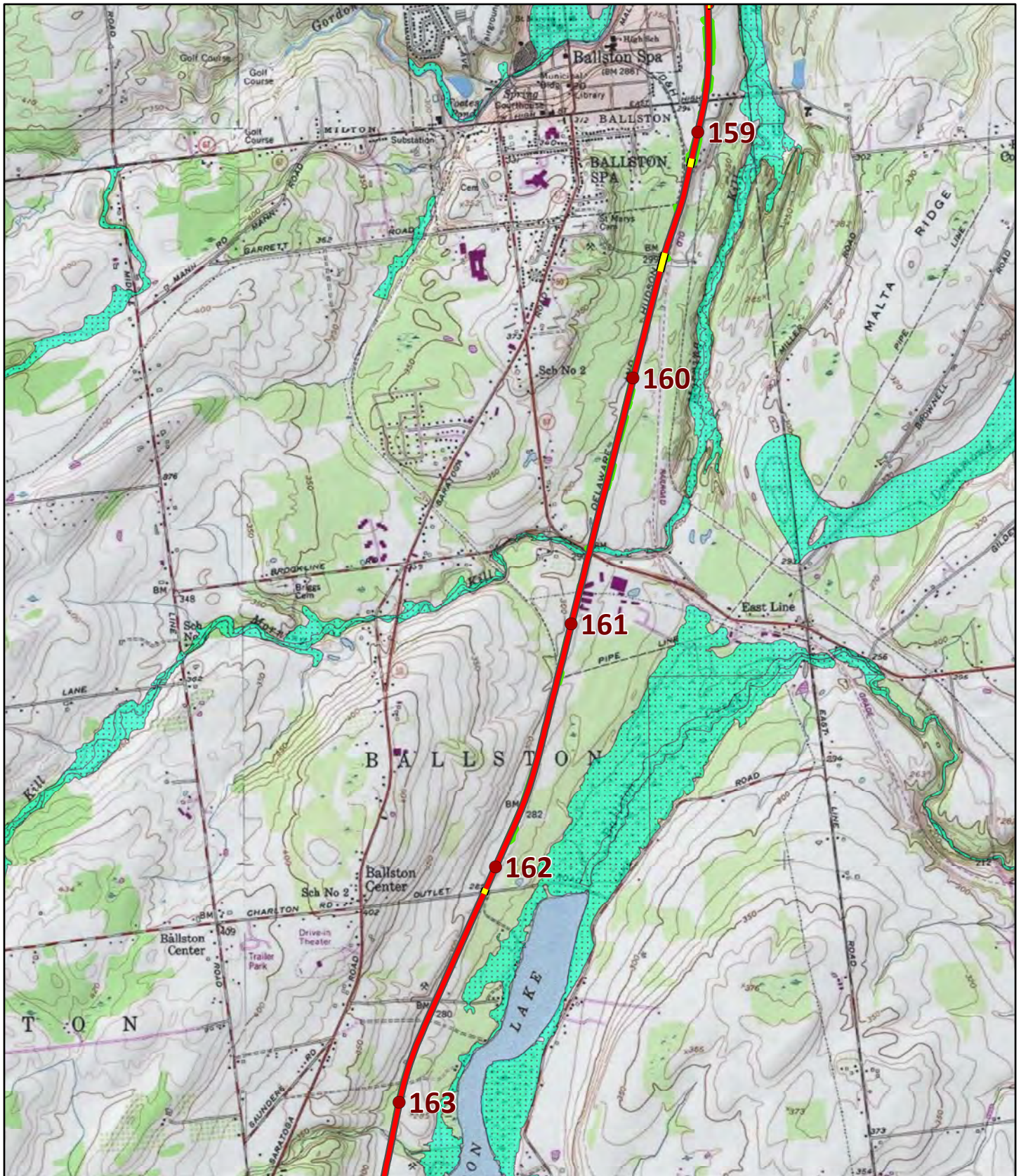


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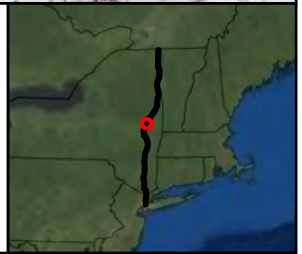


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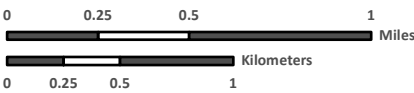
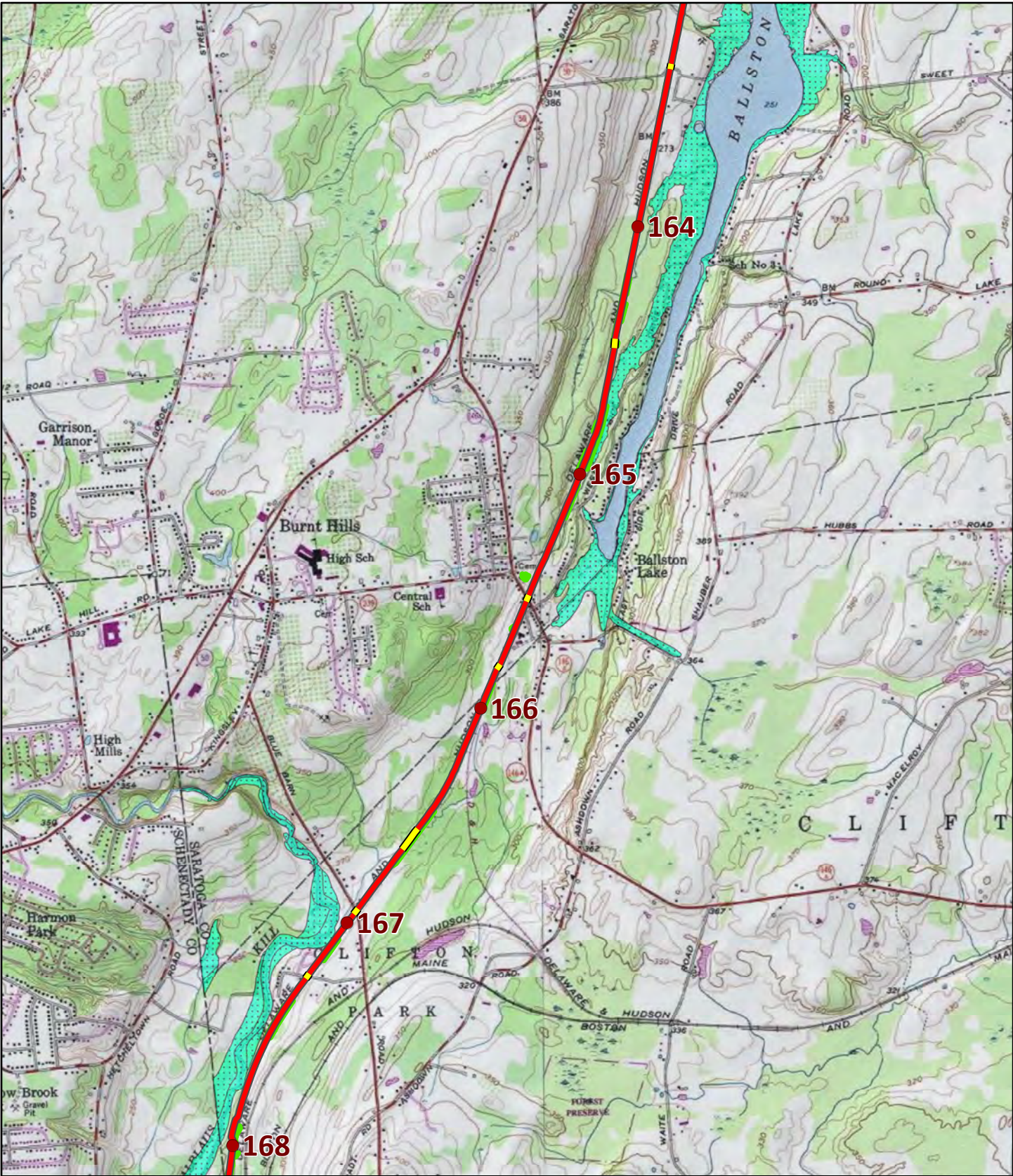


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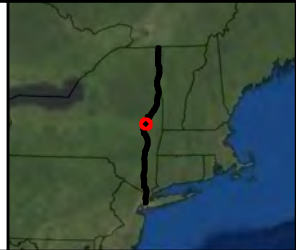


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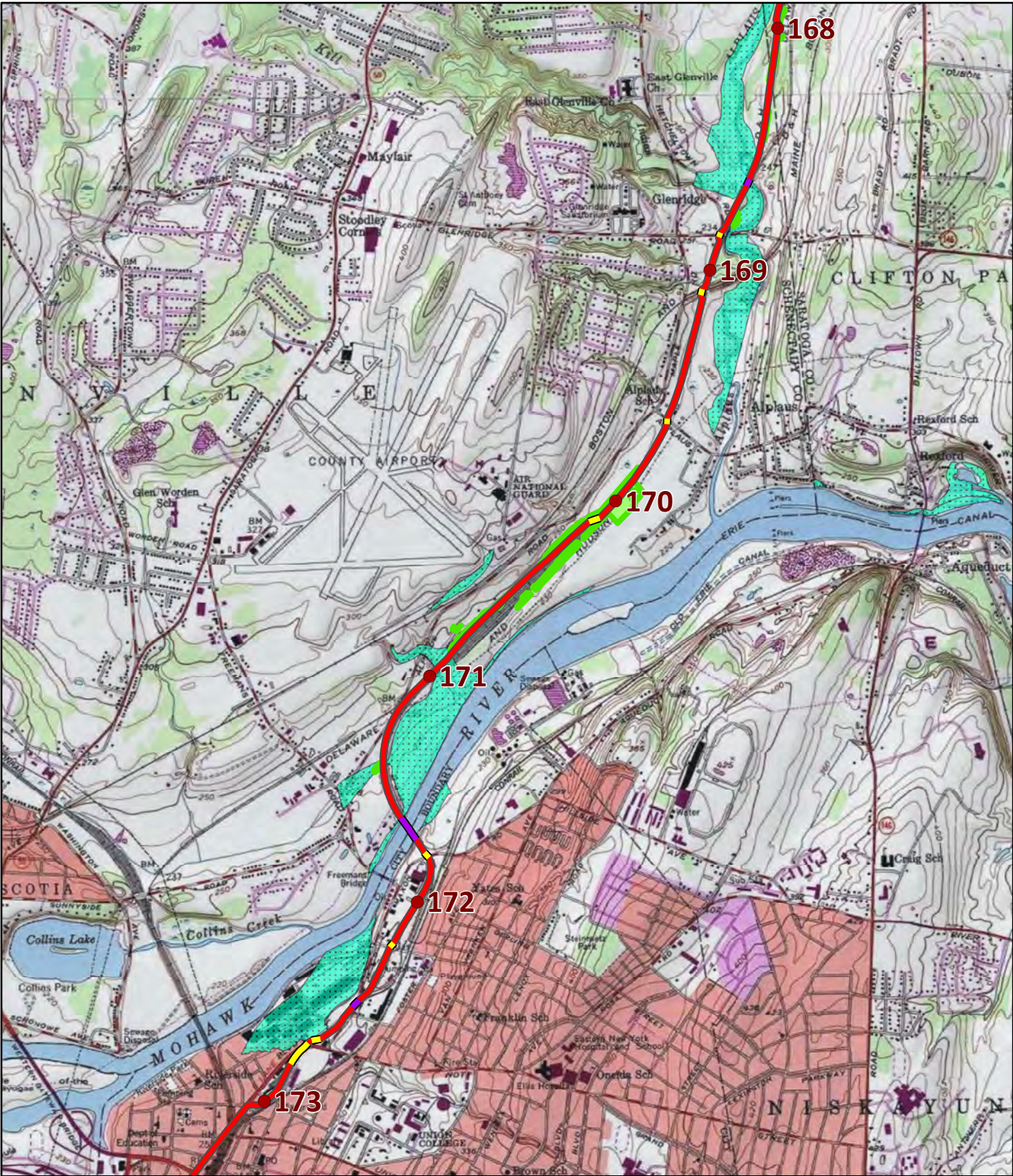


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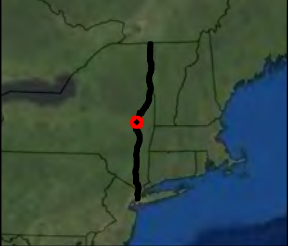


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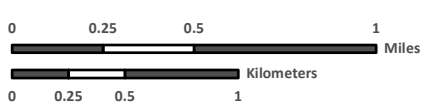
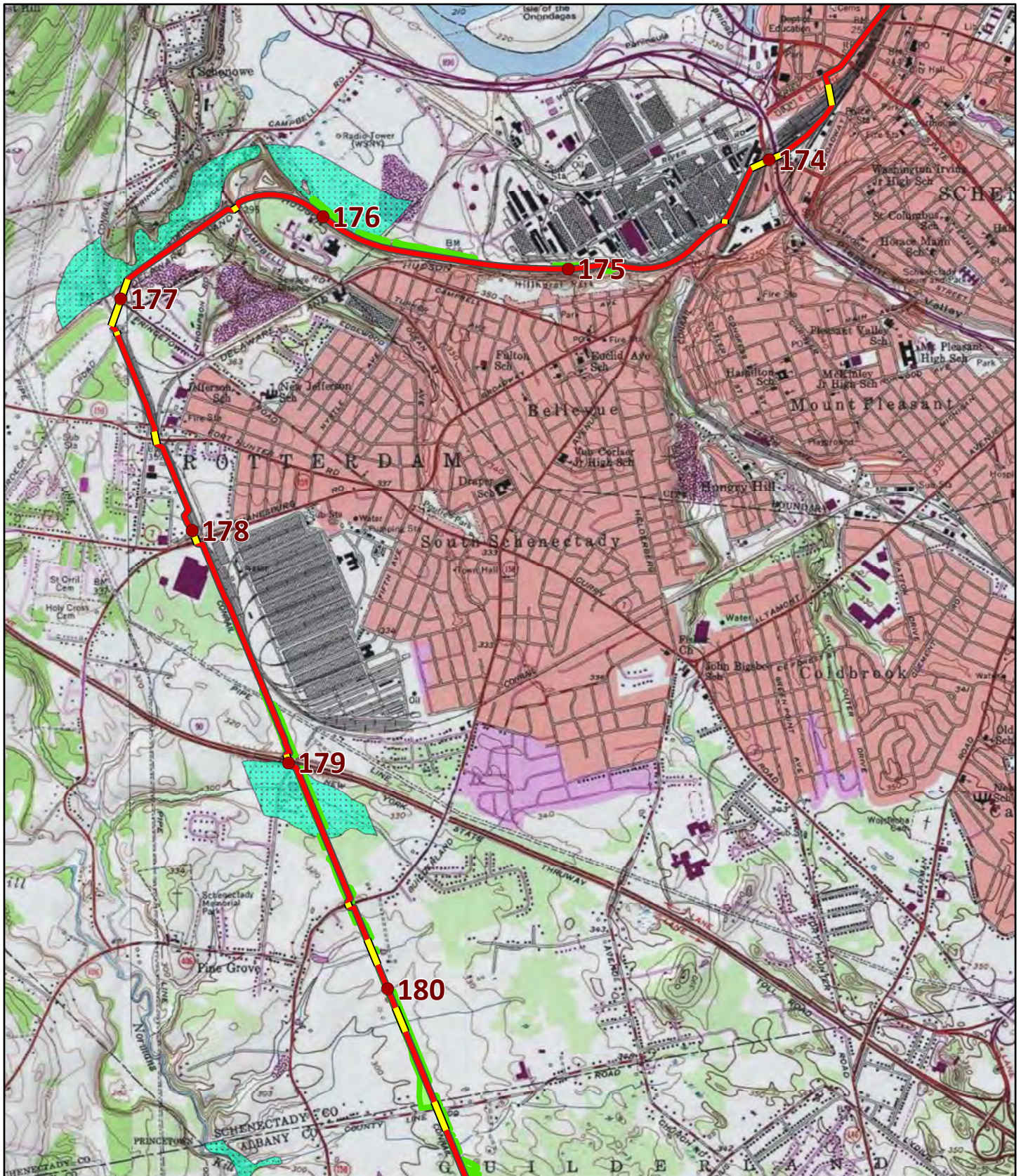


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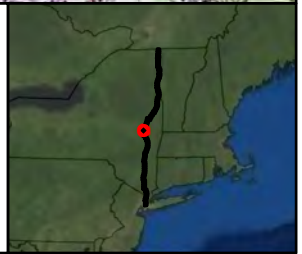


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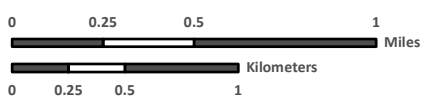
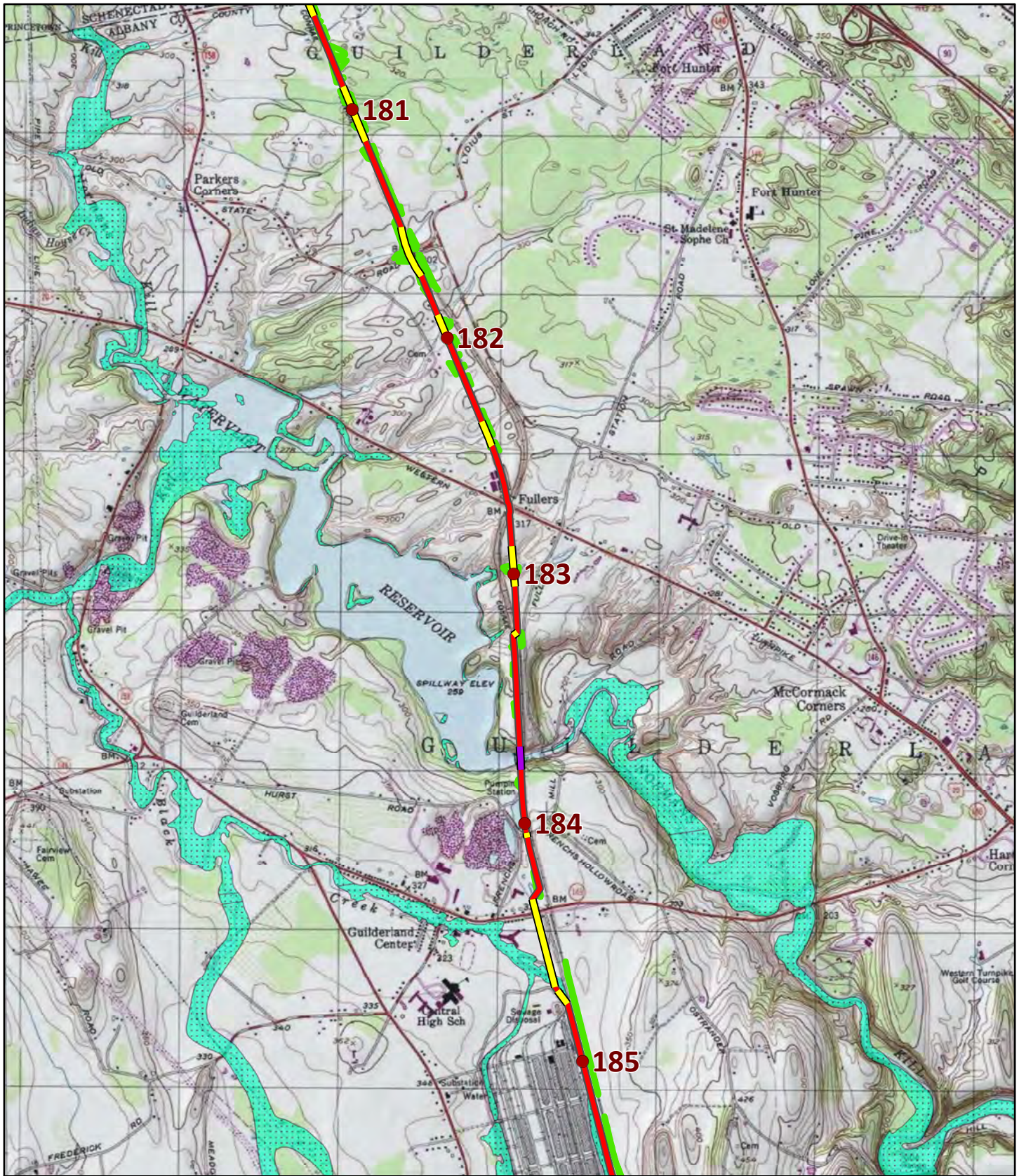
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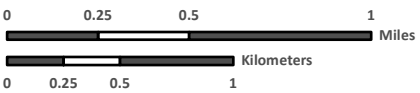
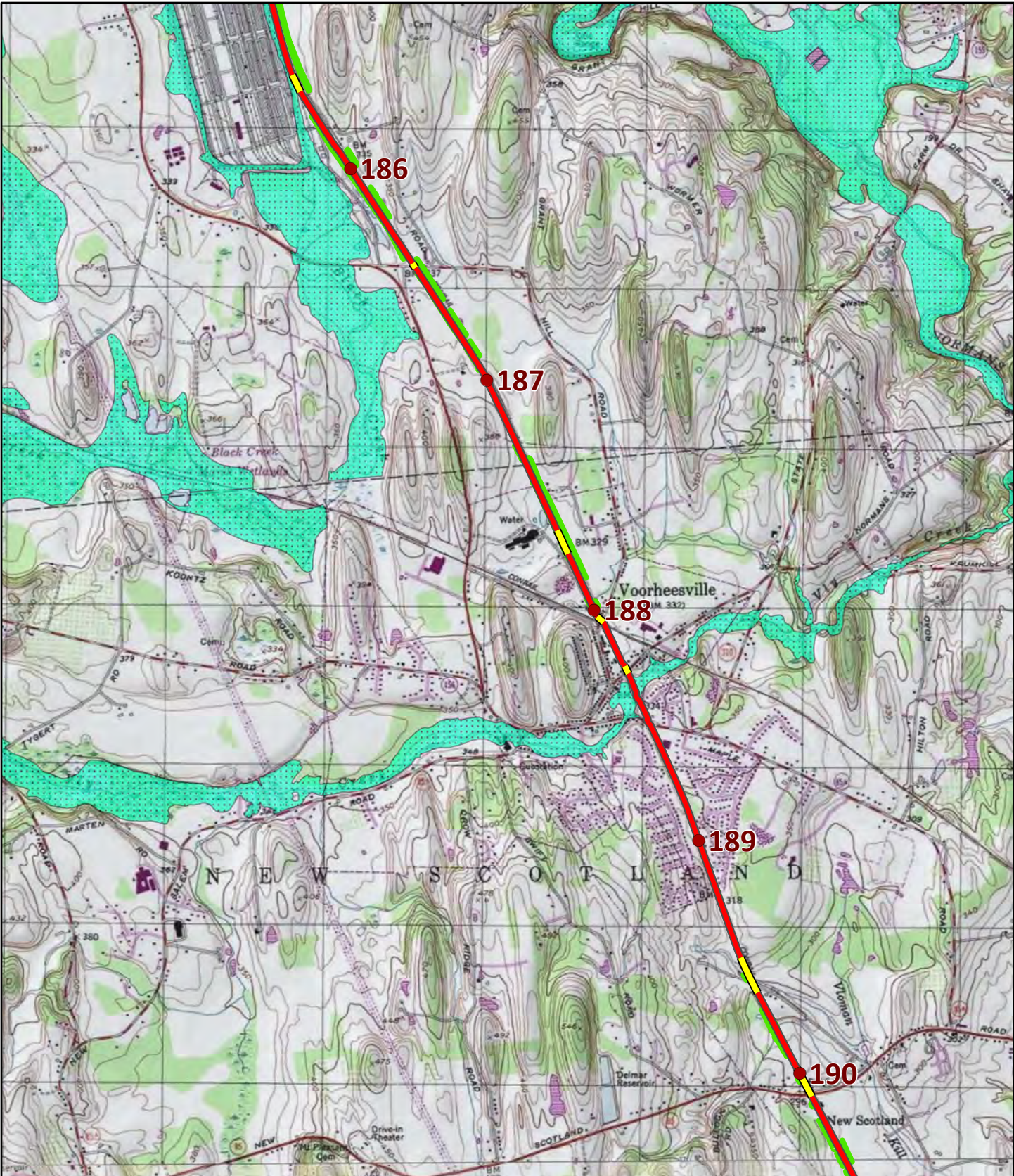


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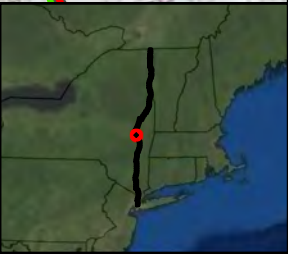


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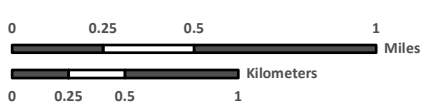
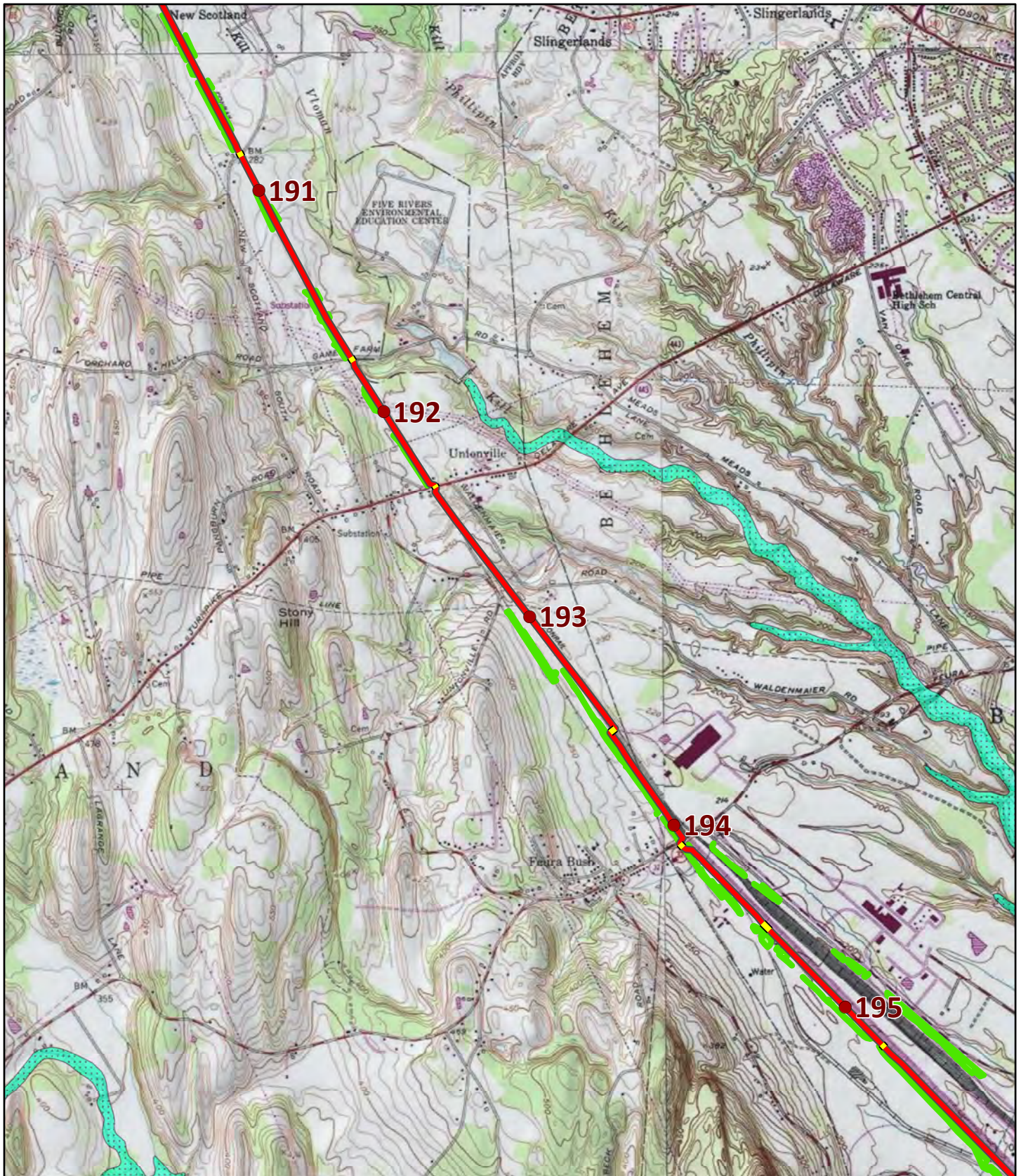


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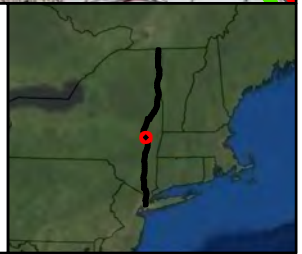


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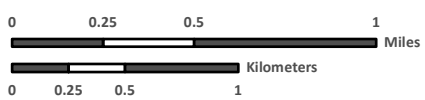
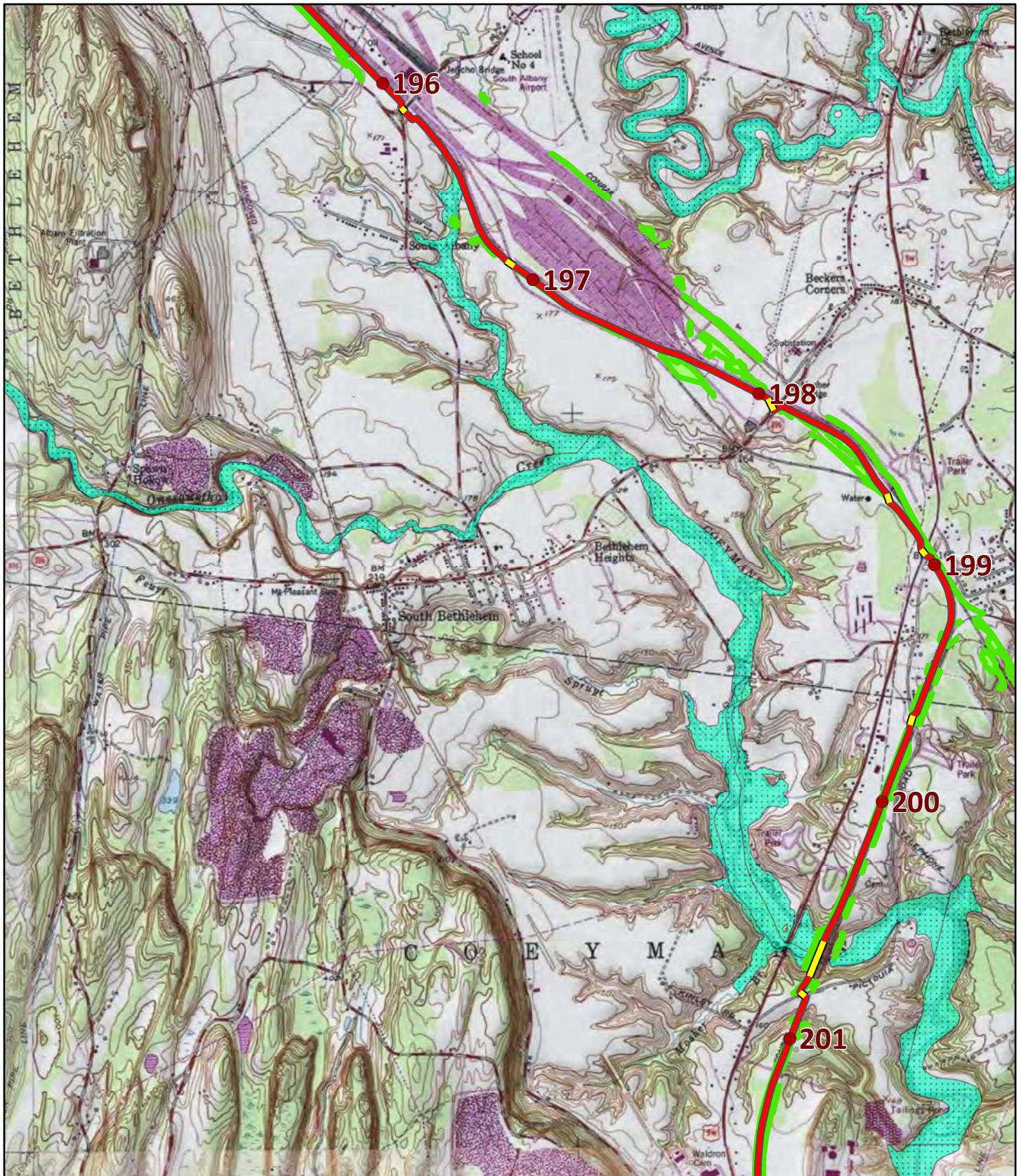


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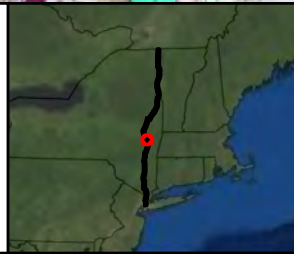


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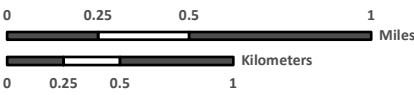
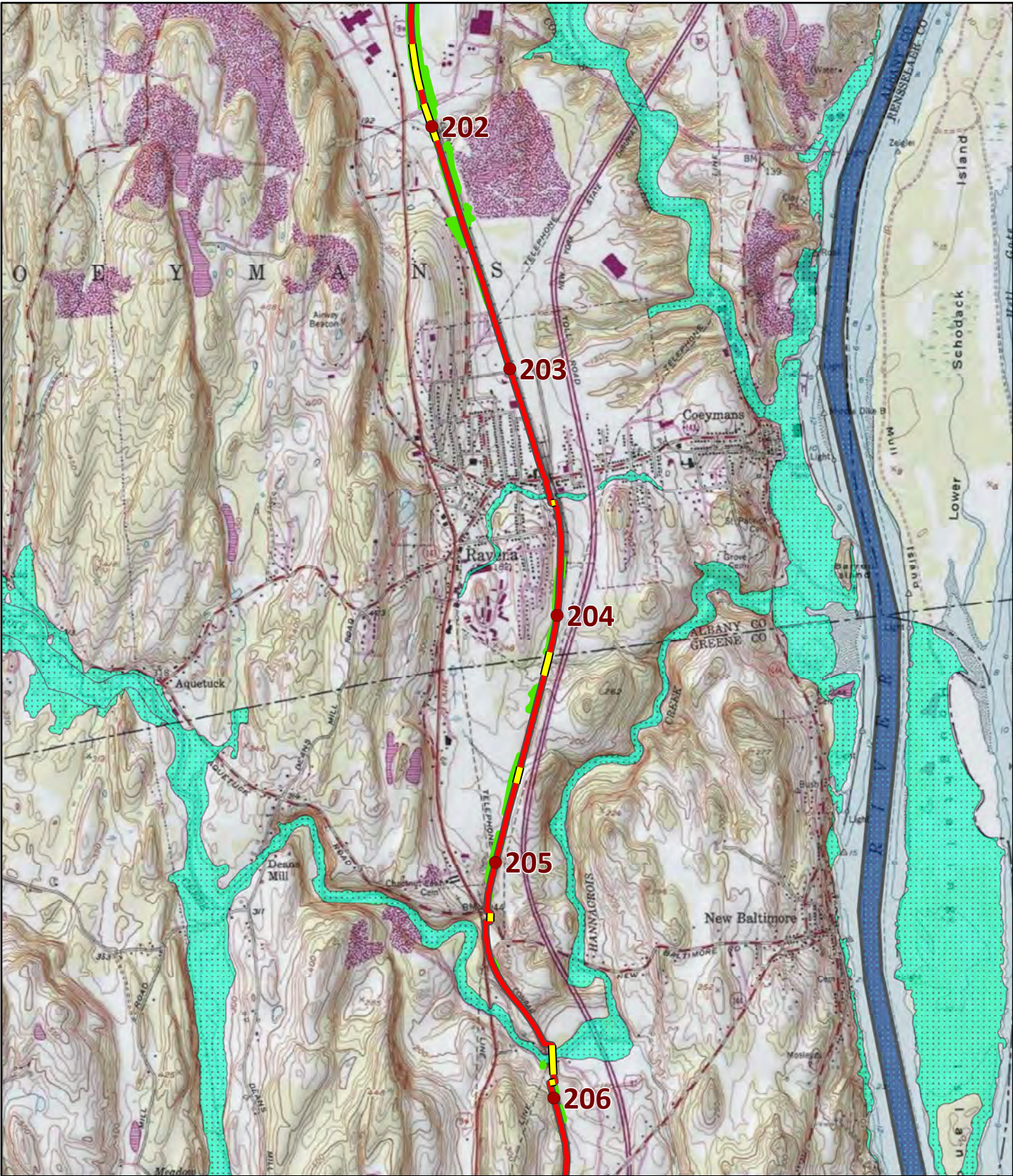


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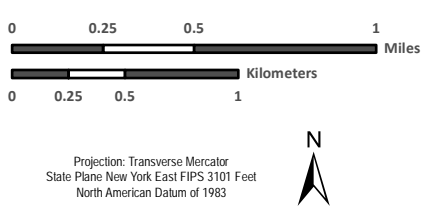
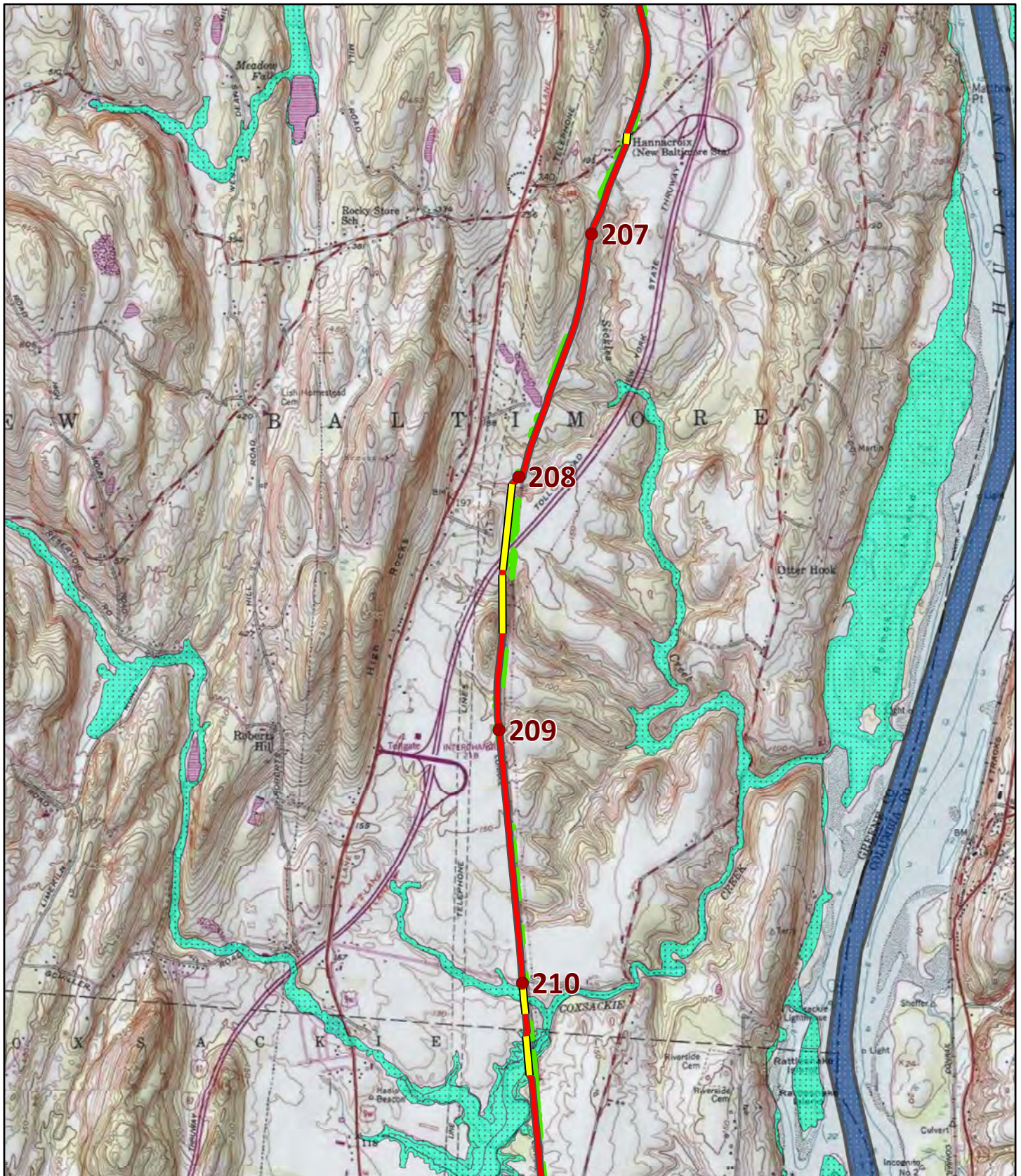


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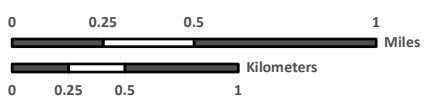
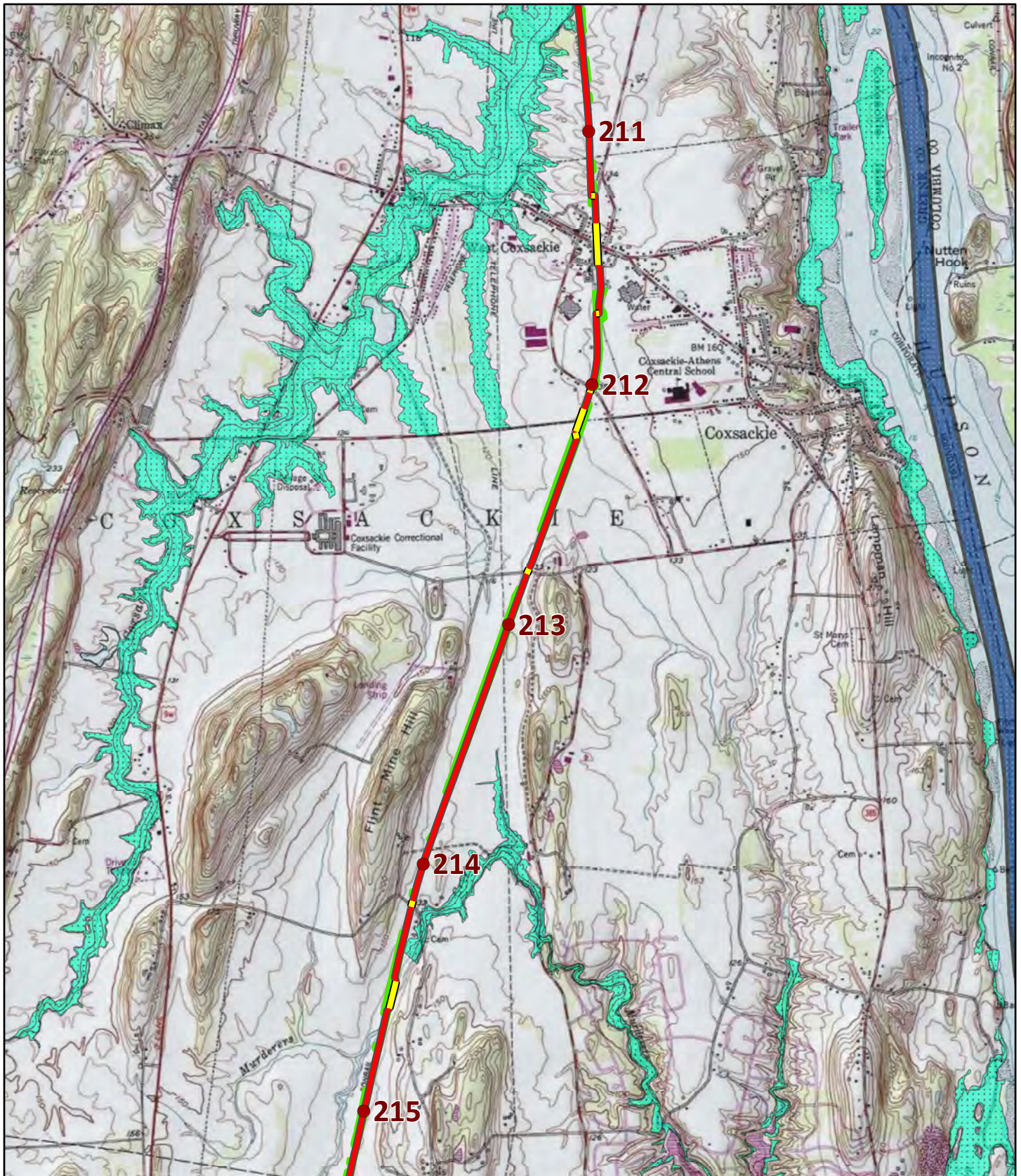
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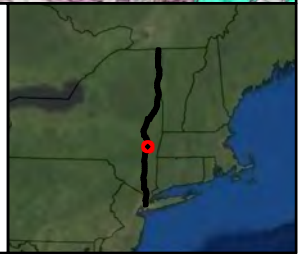
Projection: Transverse Mercator  
 State Plane New York East FIPS 3101 Feet  
 North American Datum of 1983

Source: Imagery - (c) 2010 Microsoft Corporation and its data suppliers.

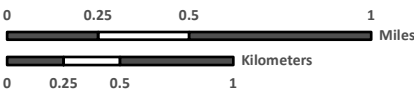
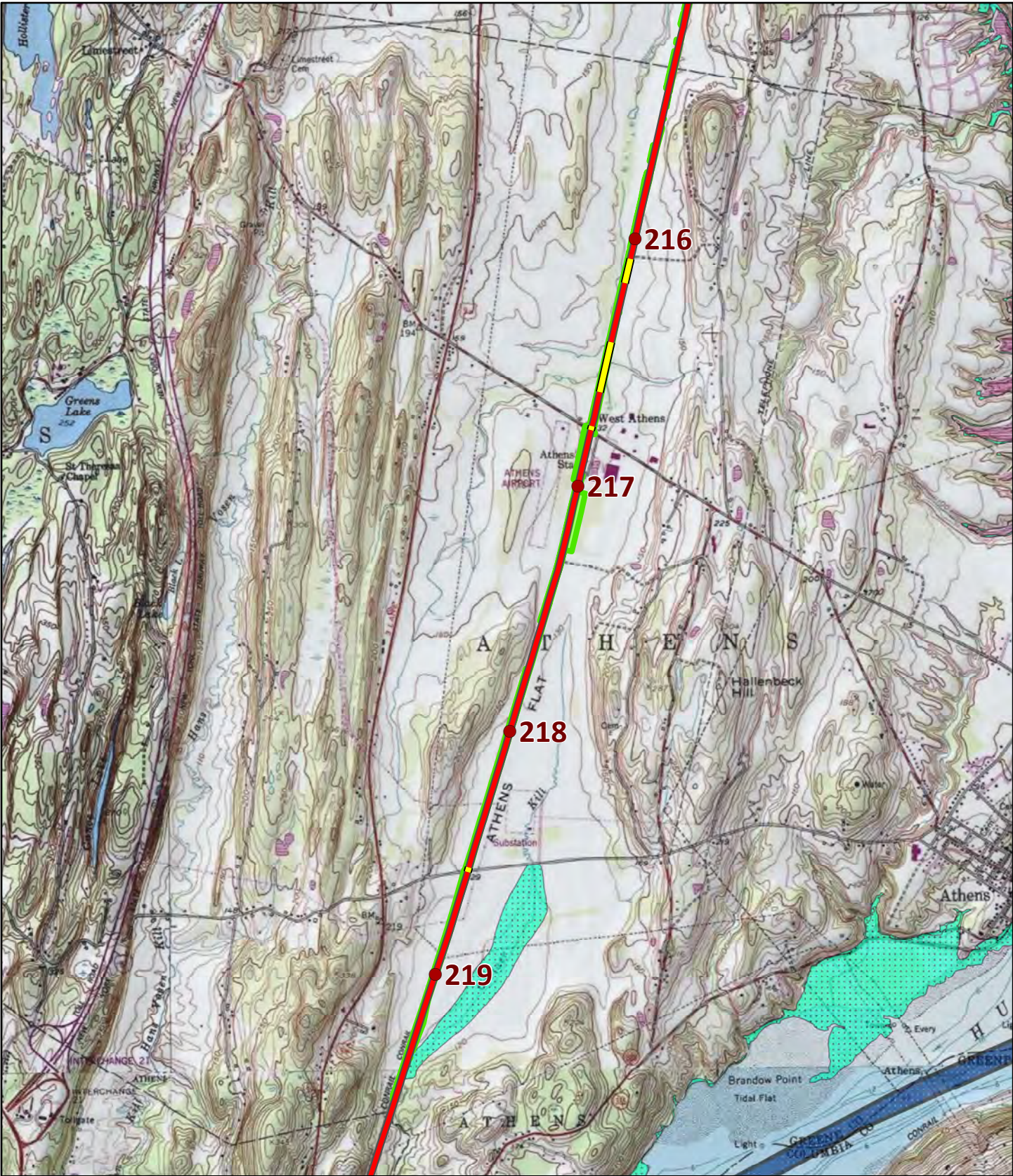


Projection: Transverse Mercator  
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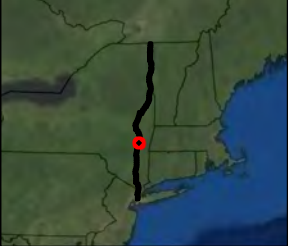


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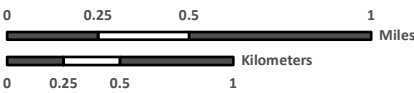
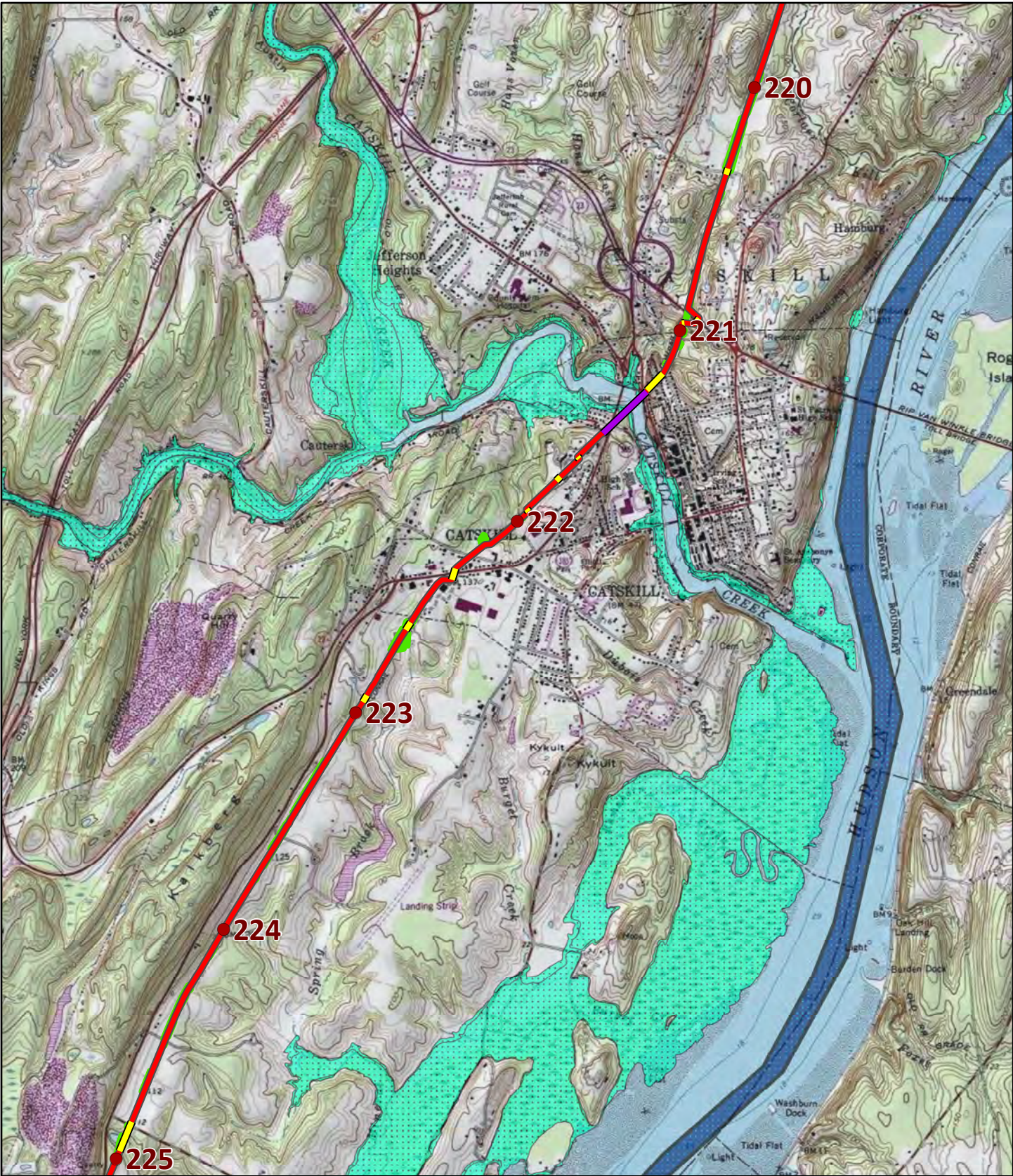
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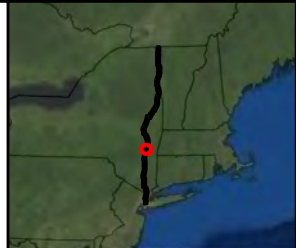
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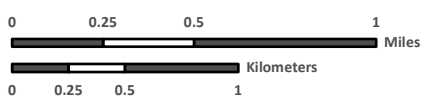
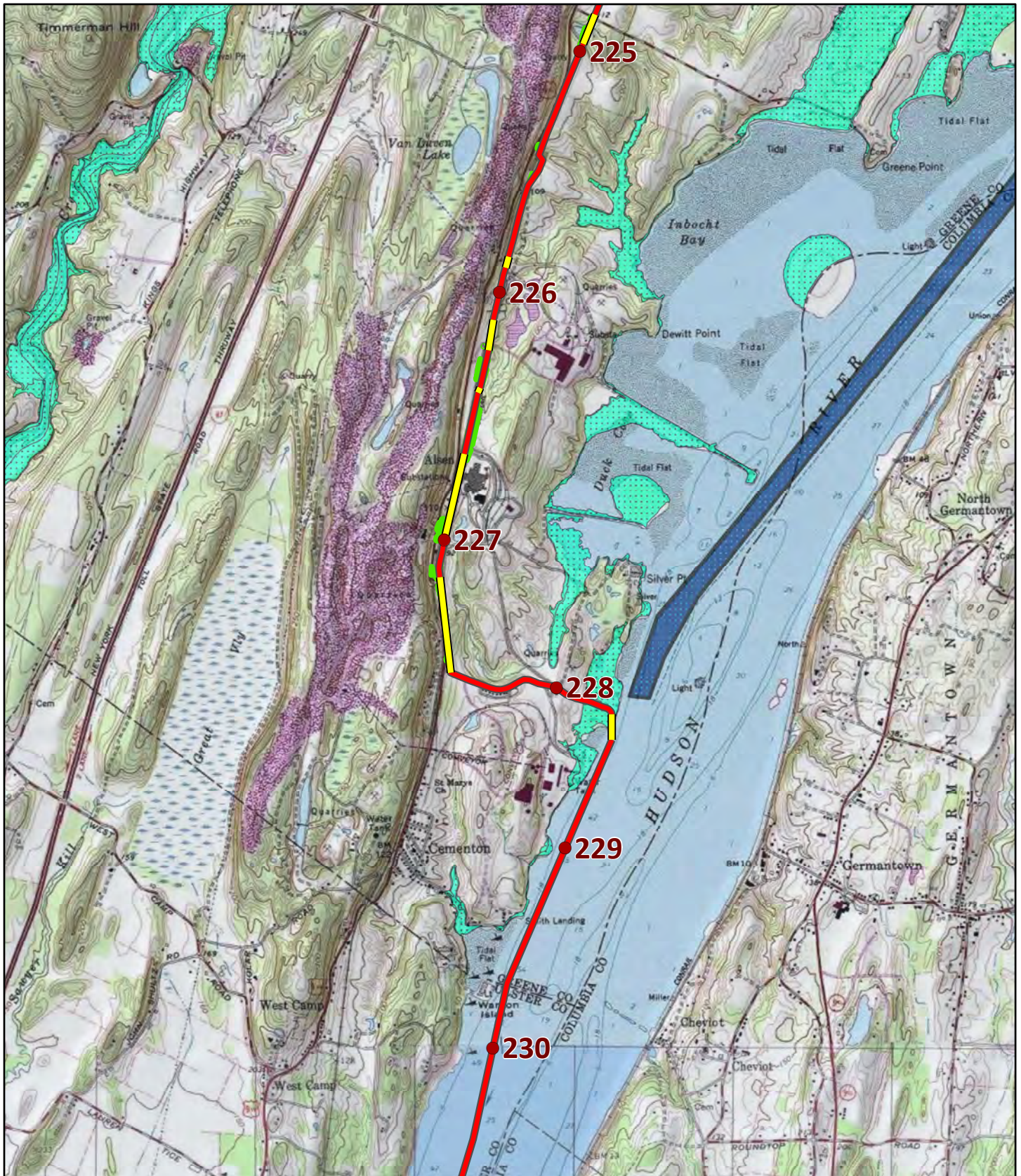




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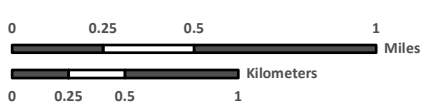
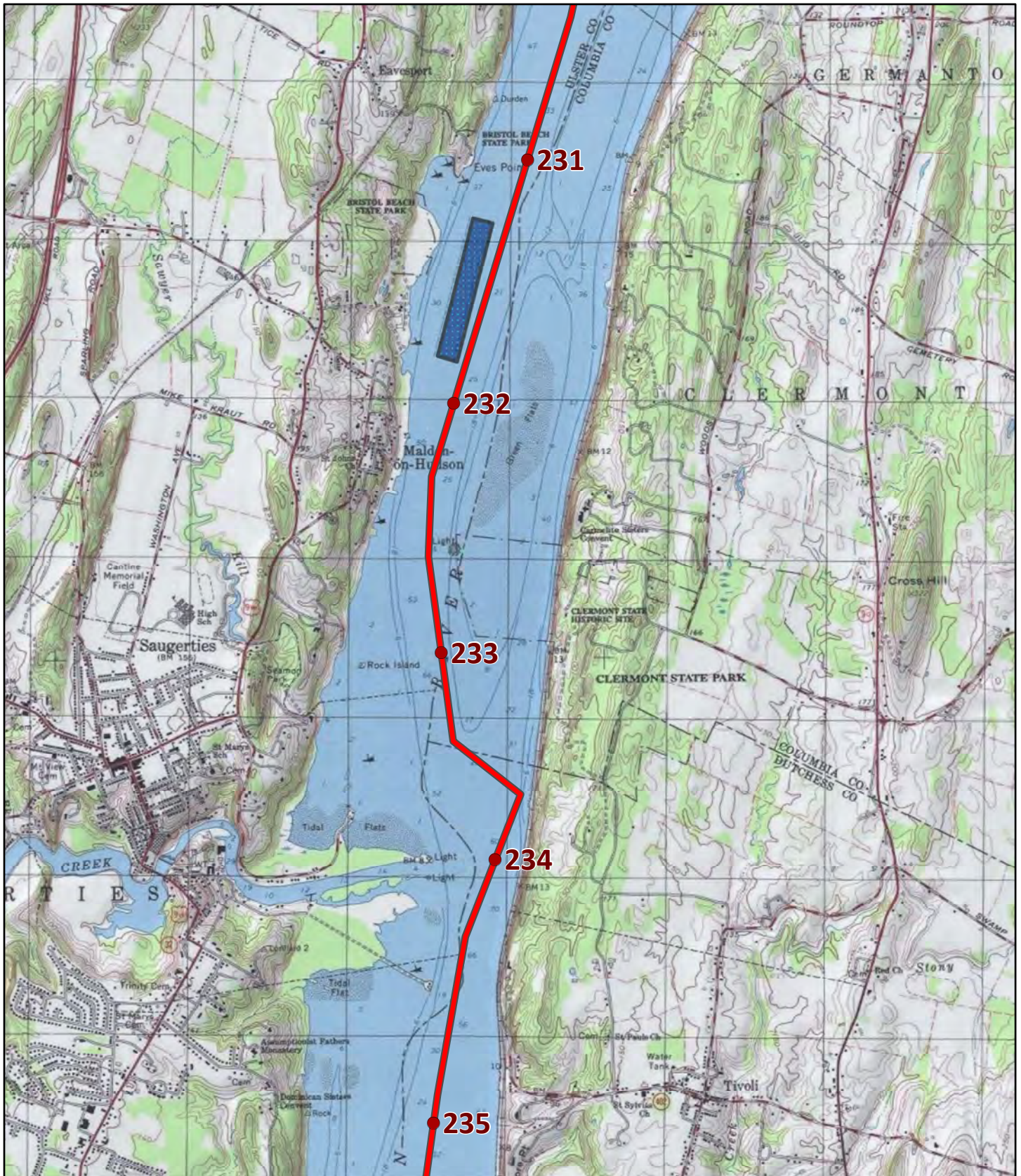


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- ▭ (dotted) FEMA 100-Year Flood Zone

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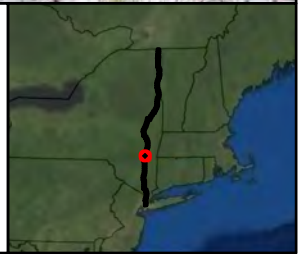


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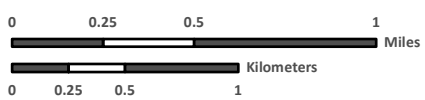
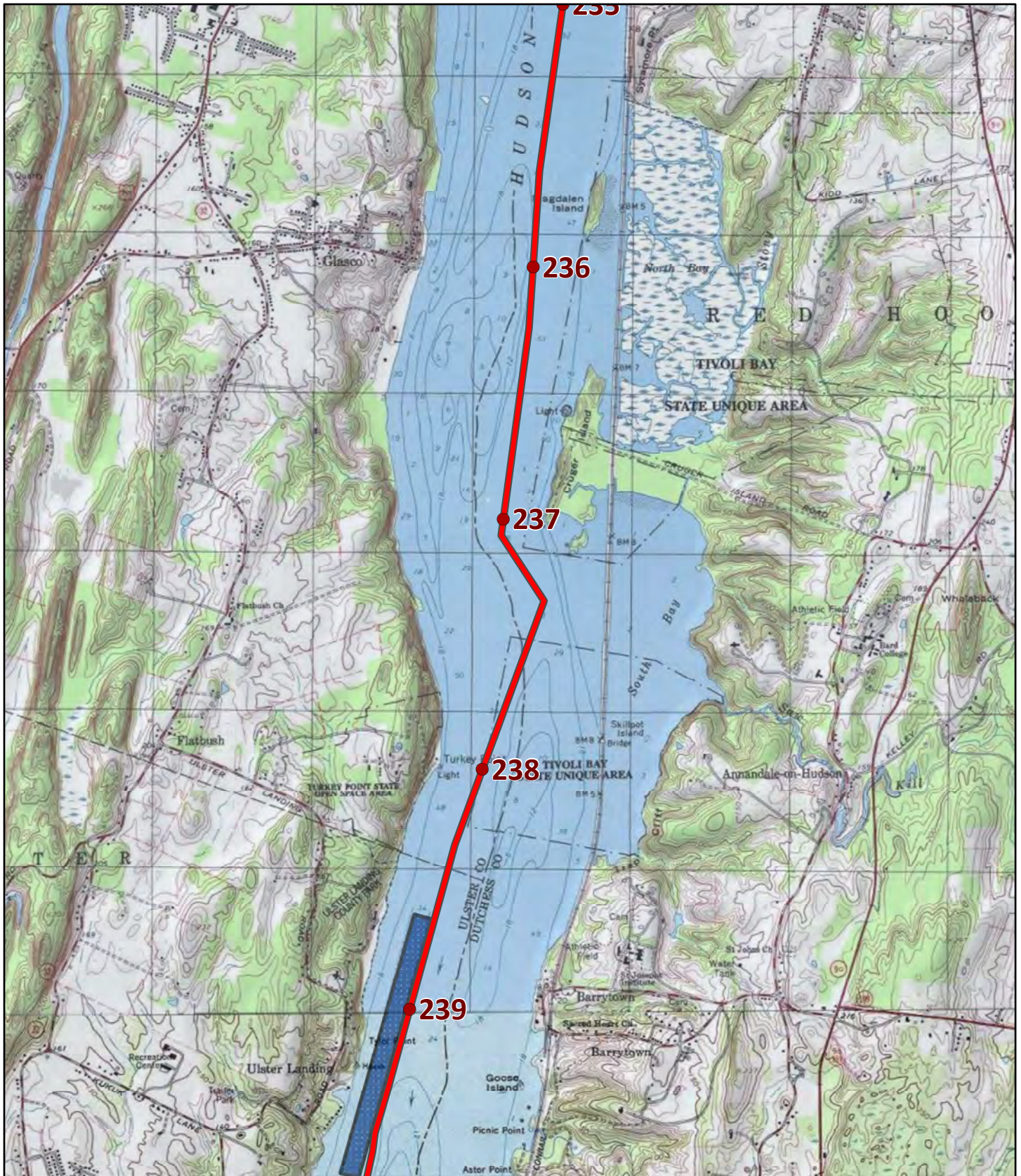


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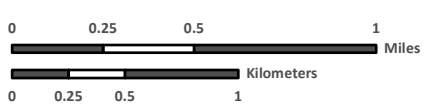
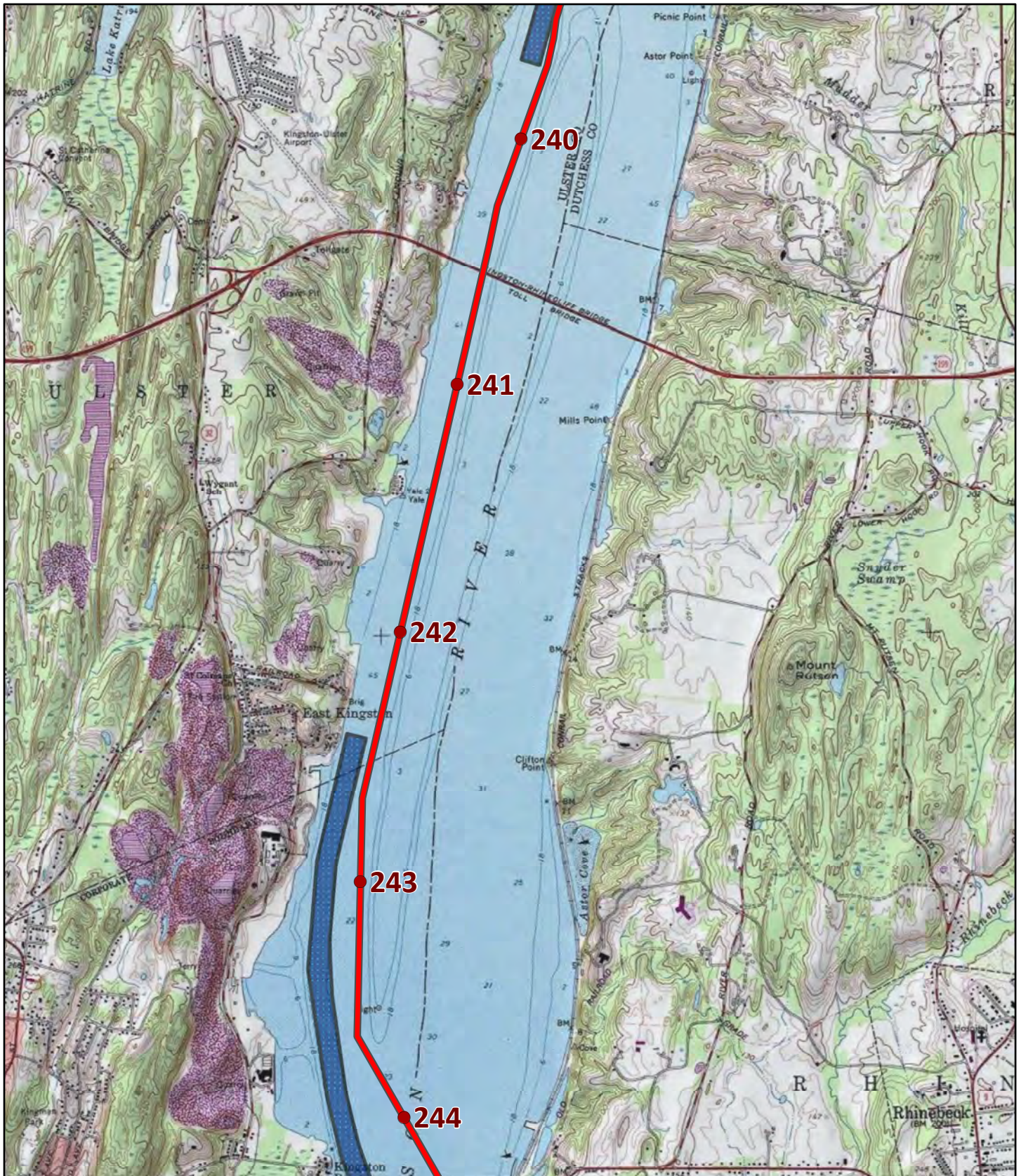


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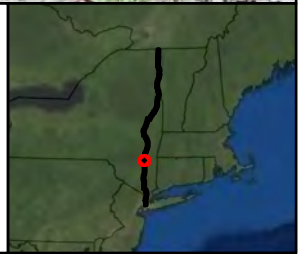


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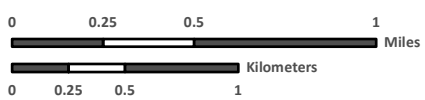
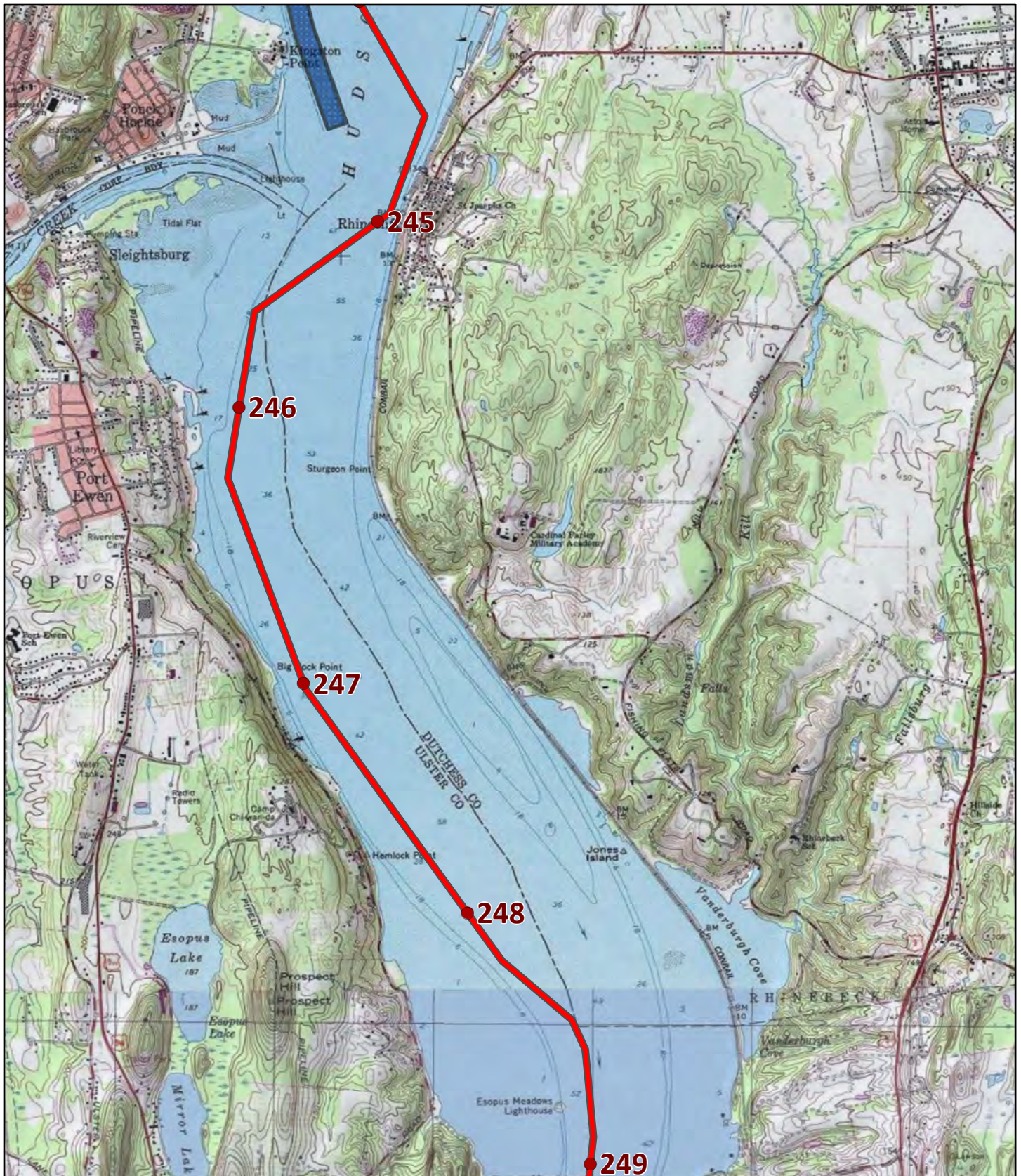


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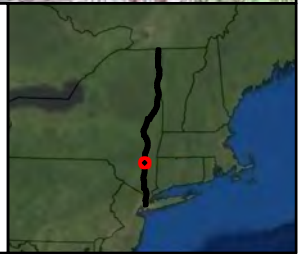


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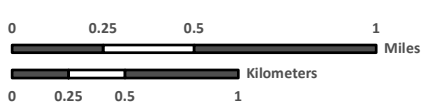
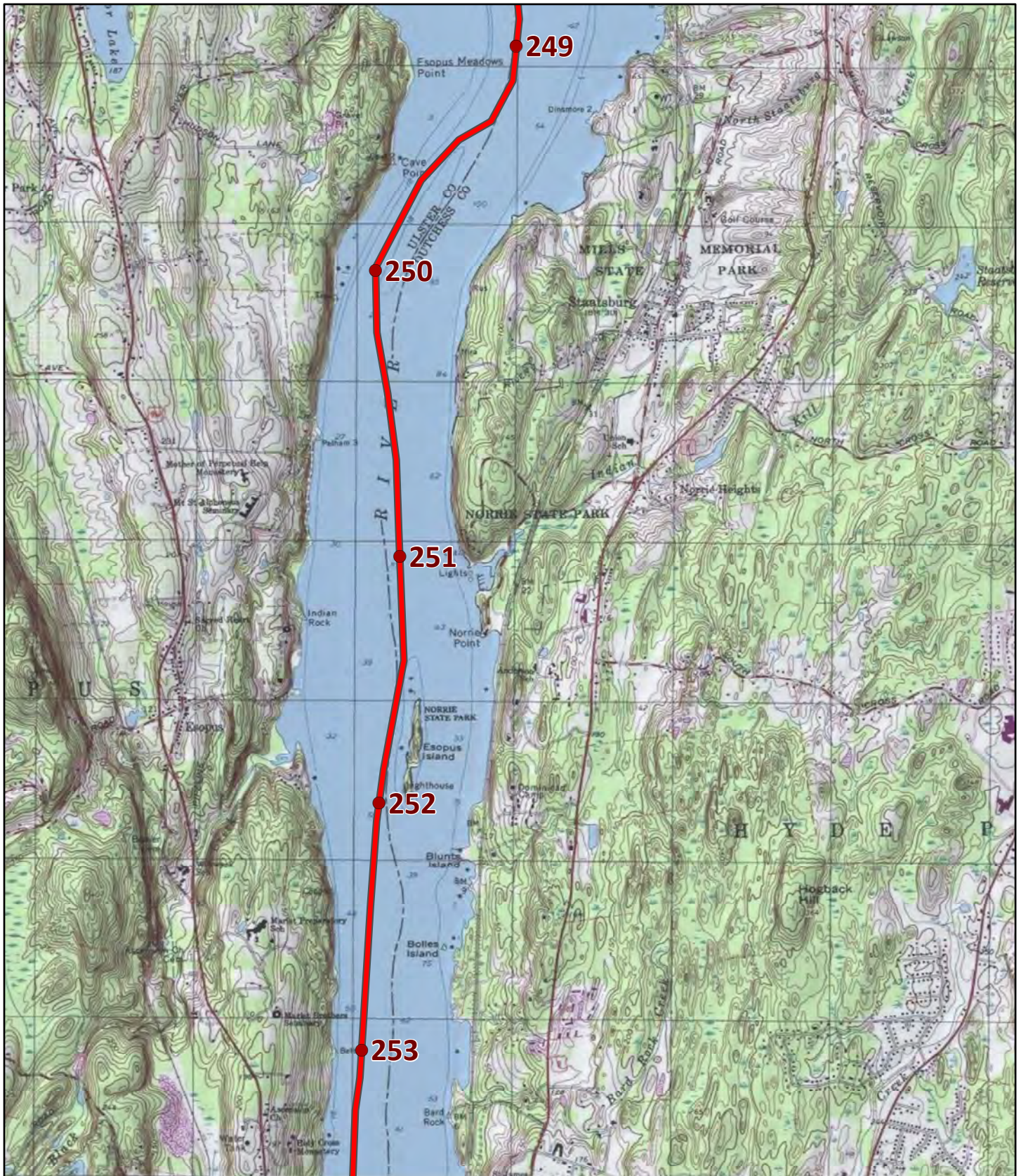


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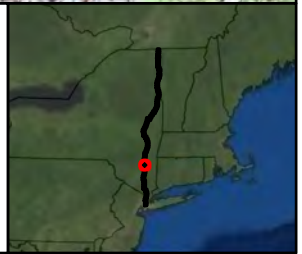


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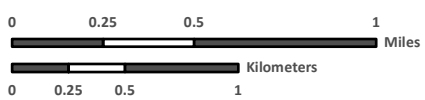
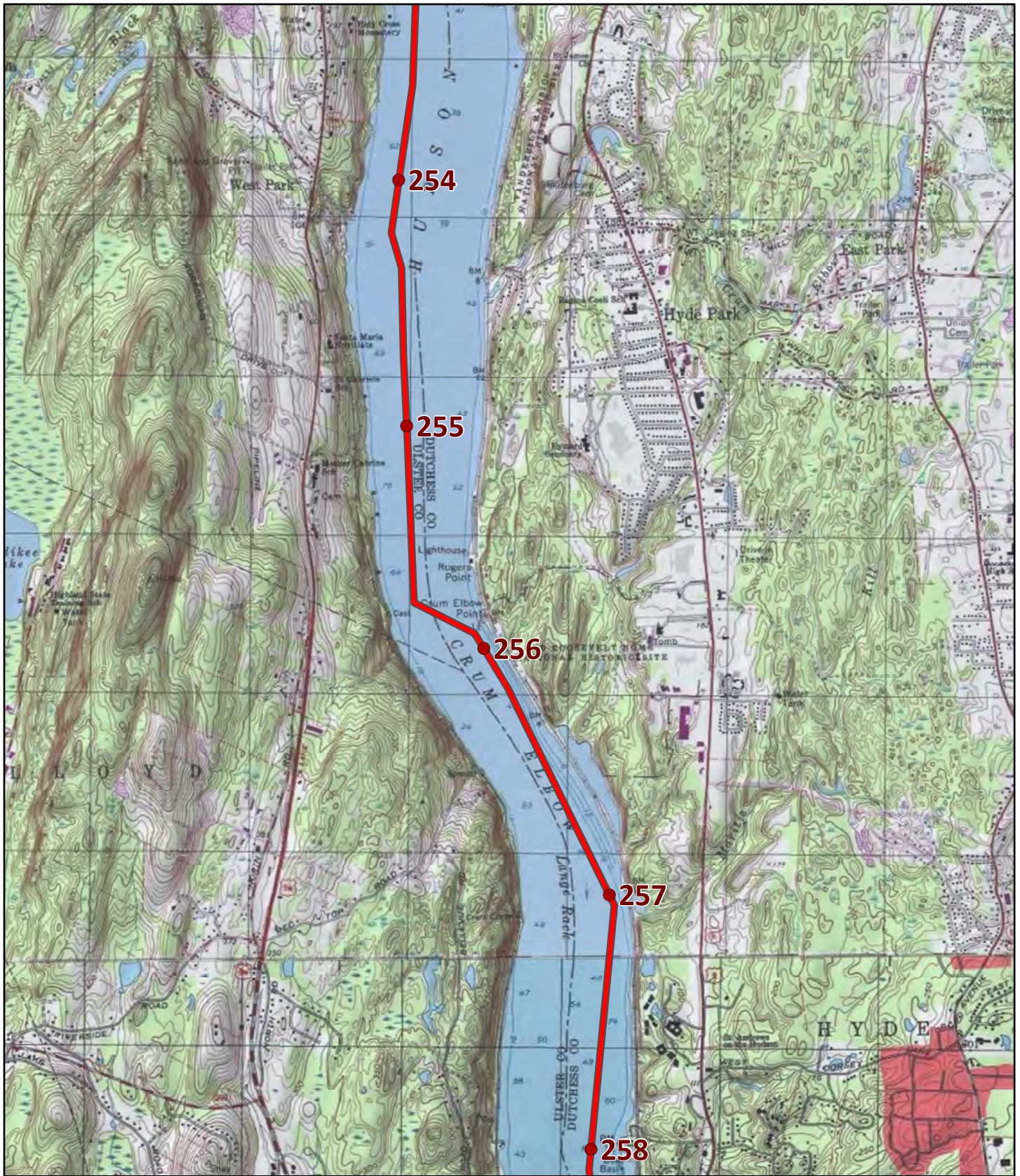


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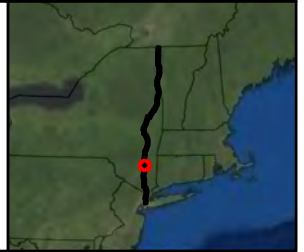


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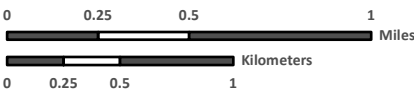
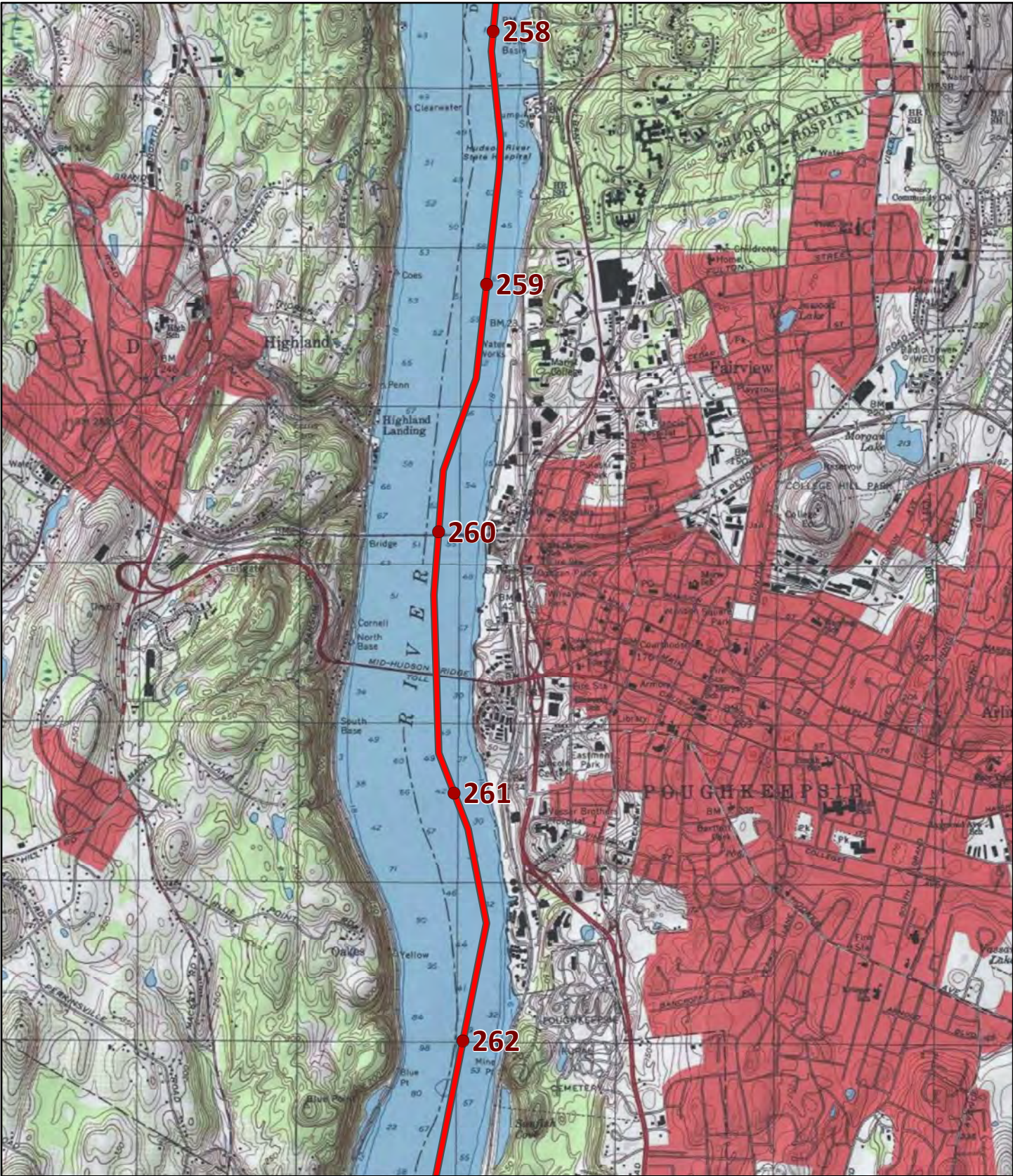
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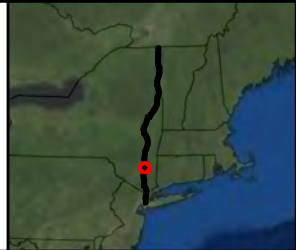
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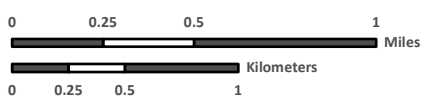
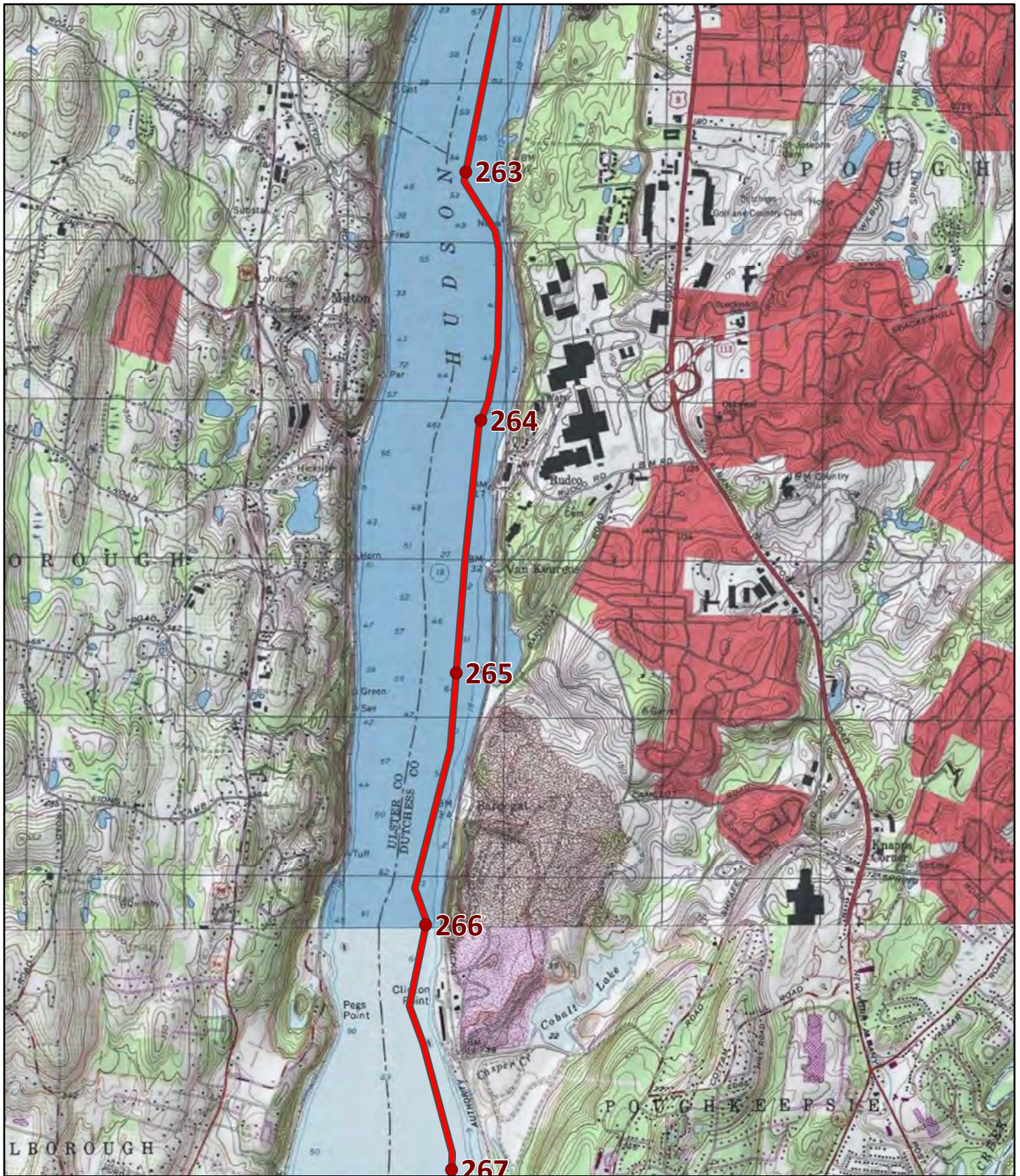




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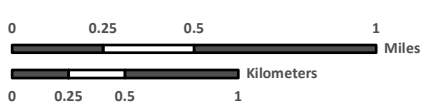
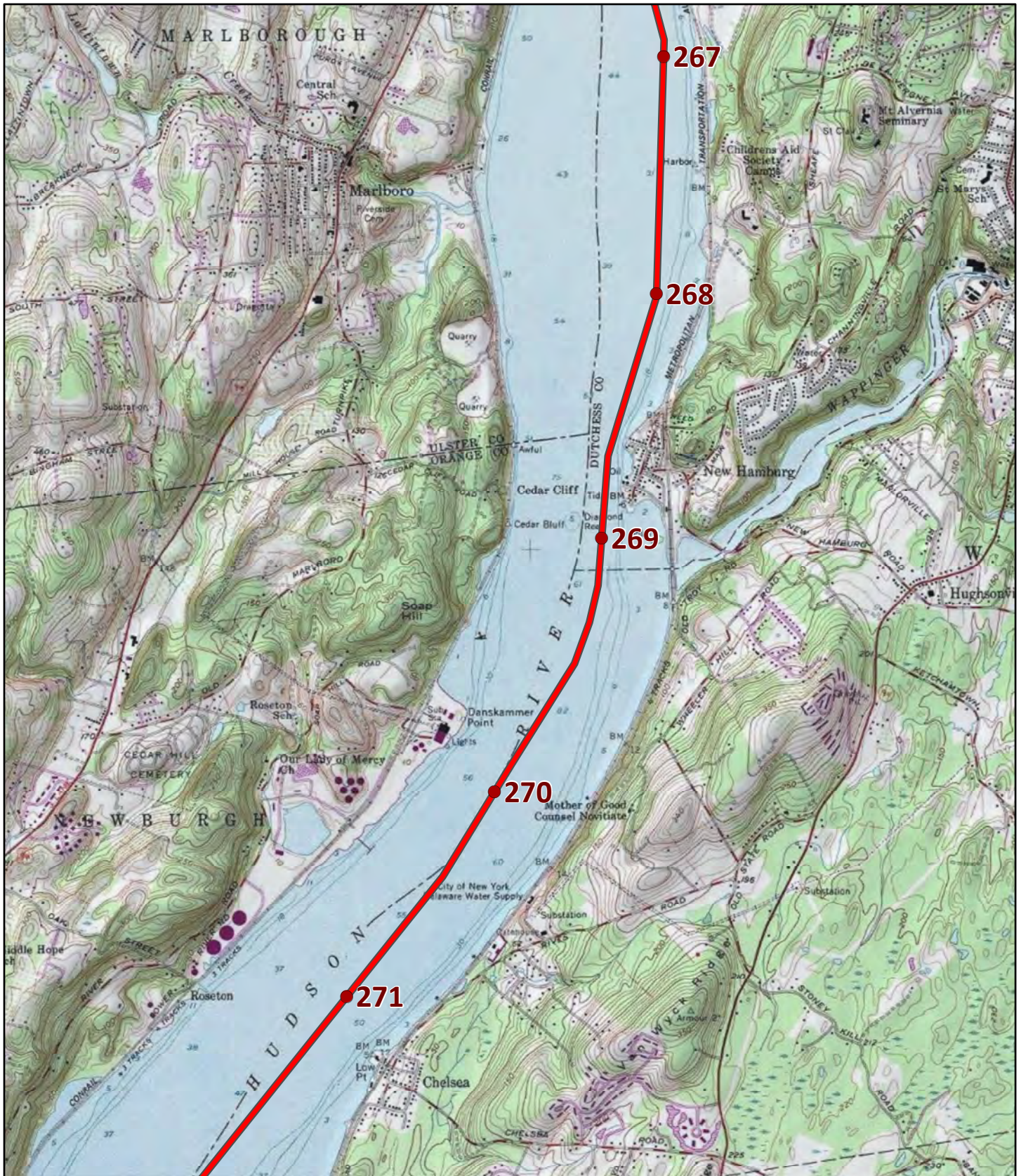
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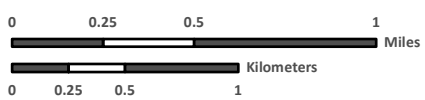
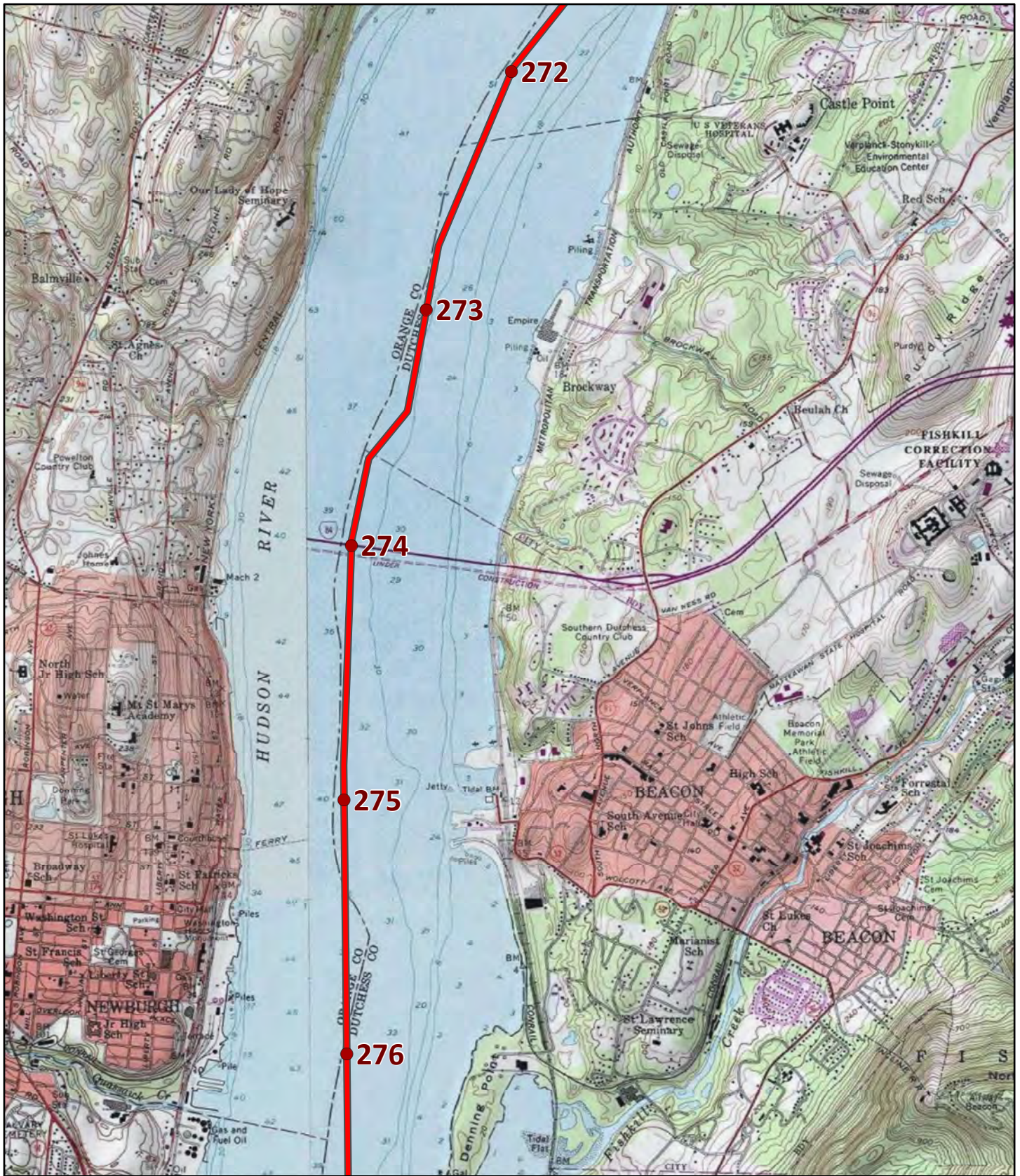


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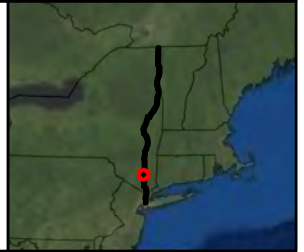


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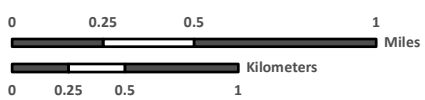
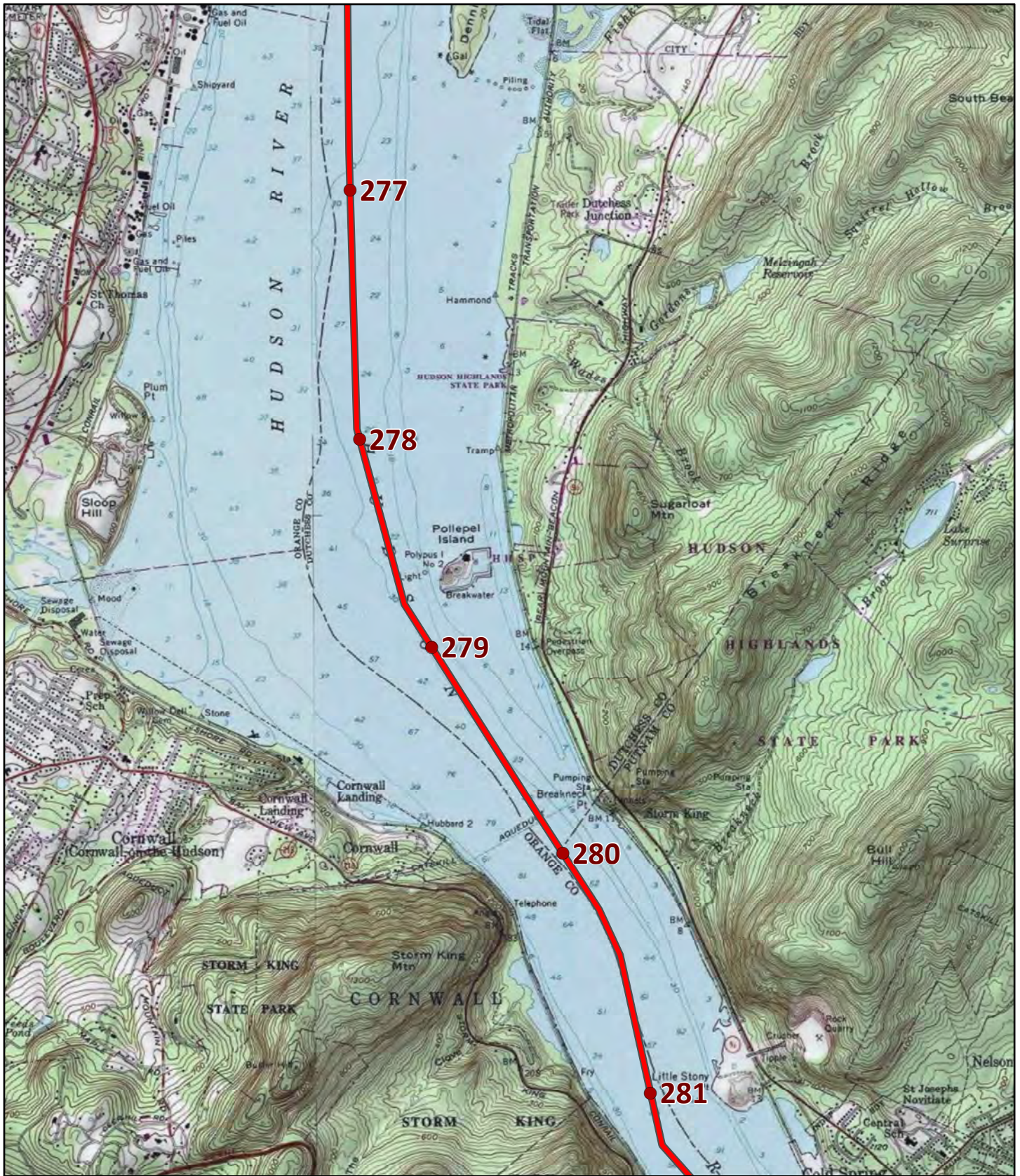


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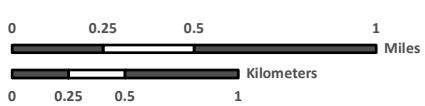
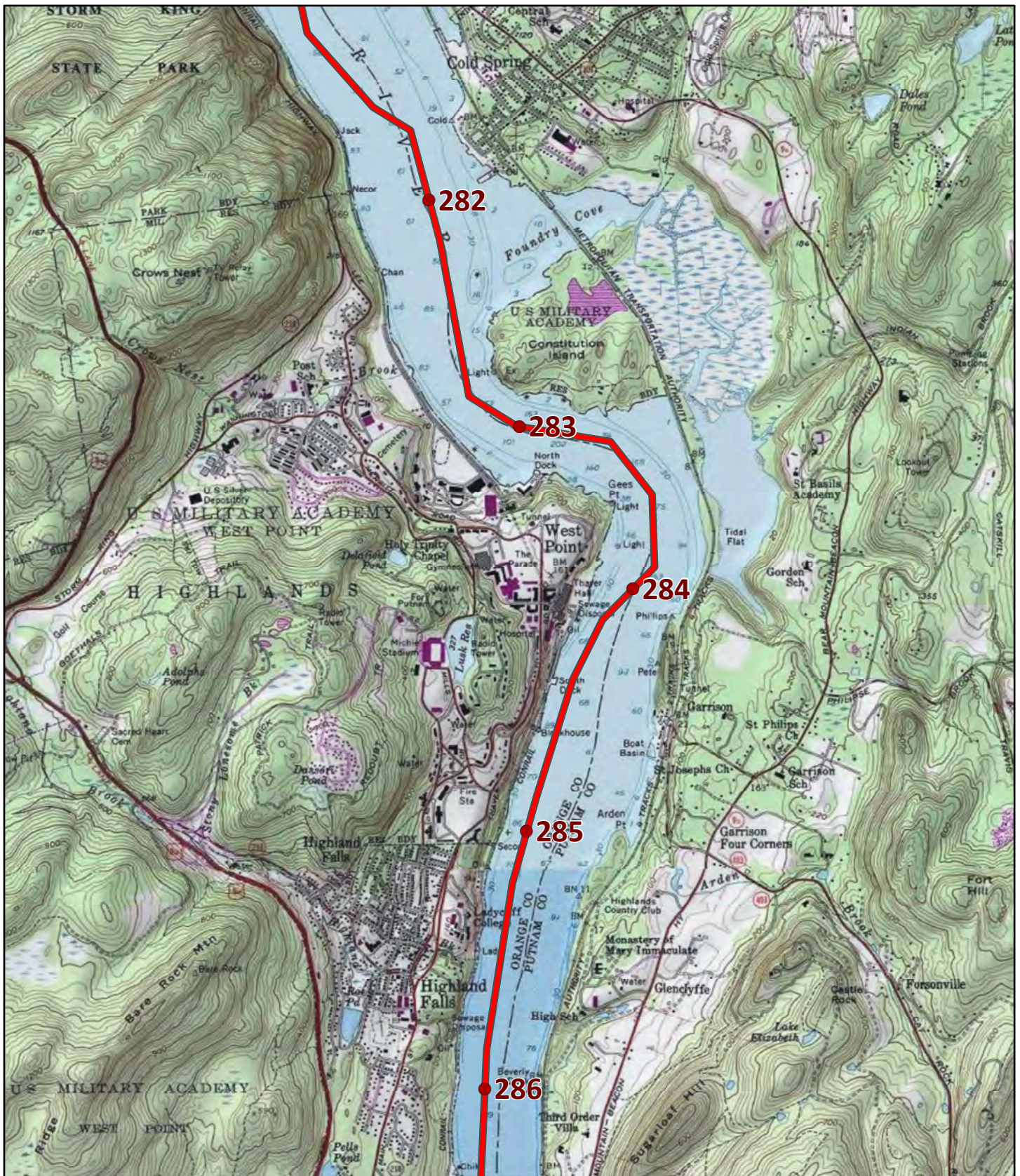
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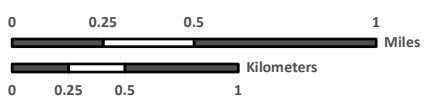
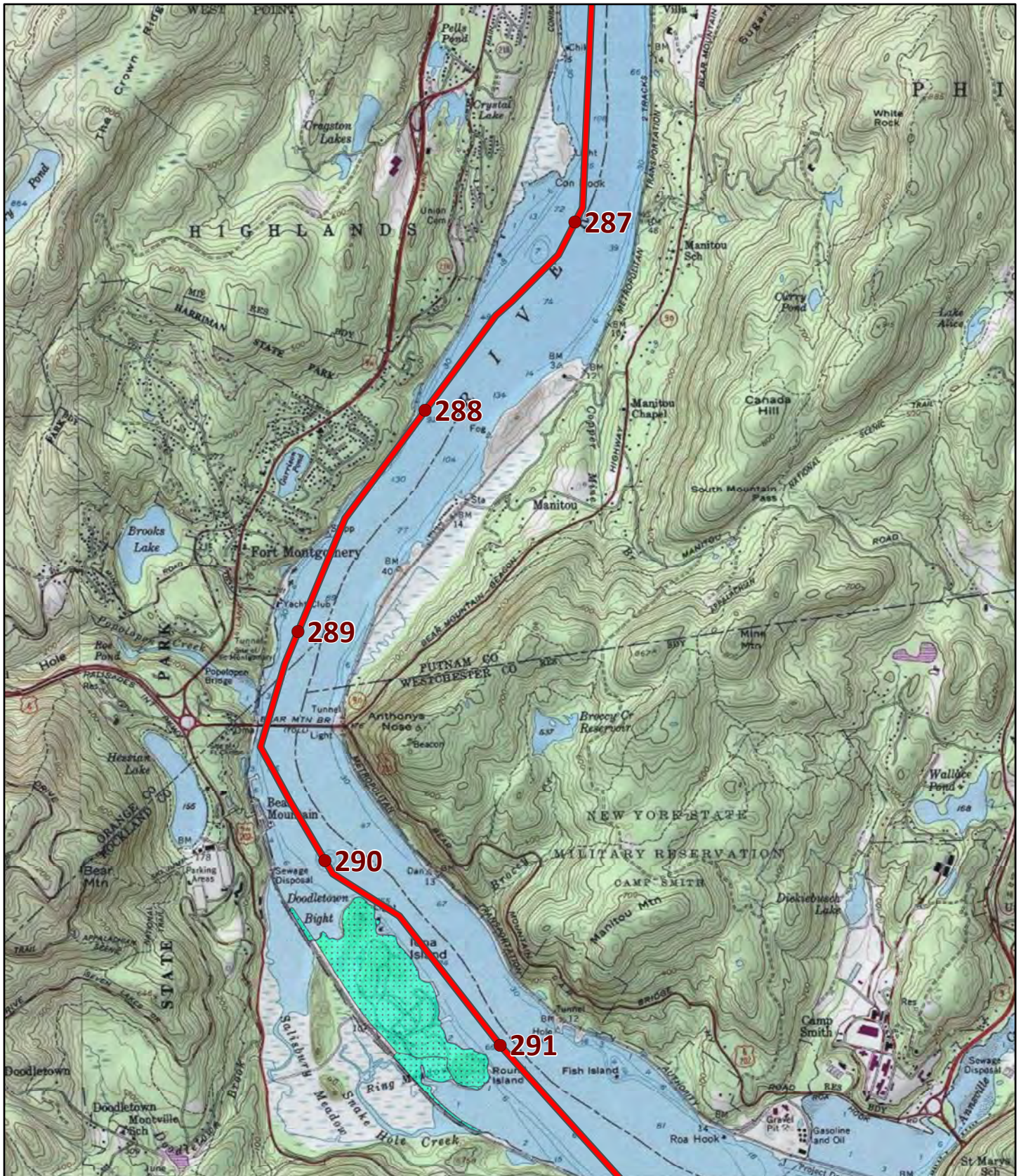


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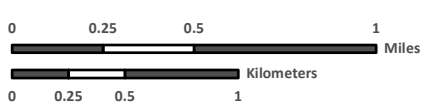
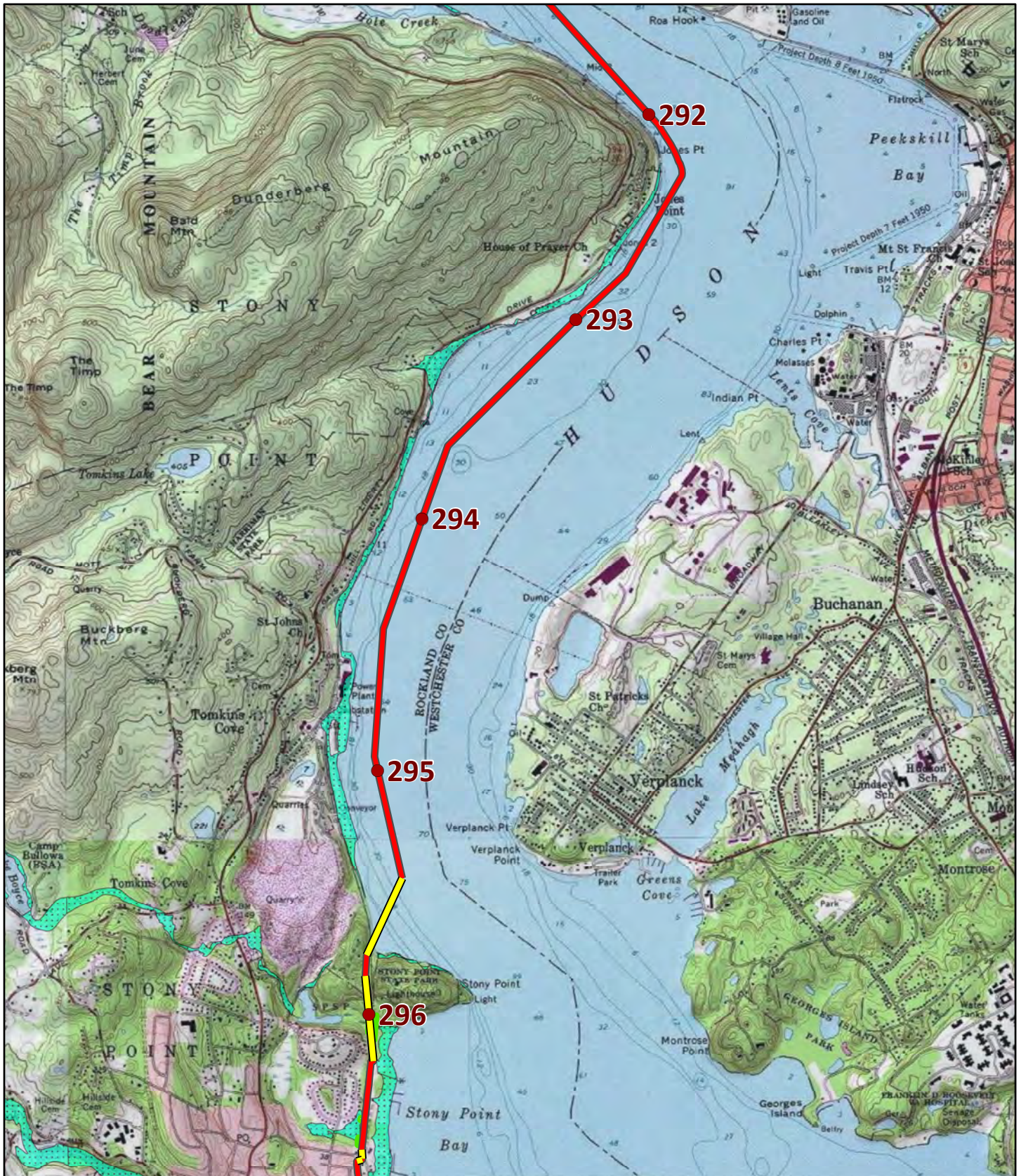


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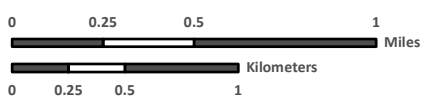
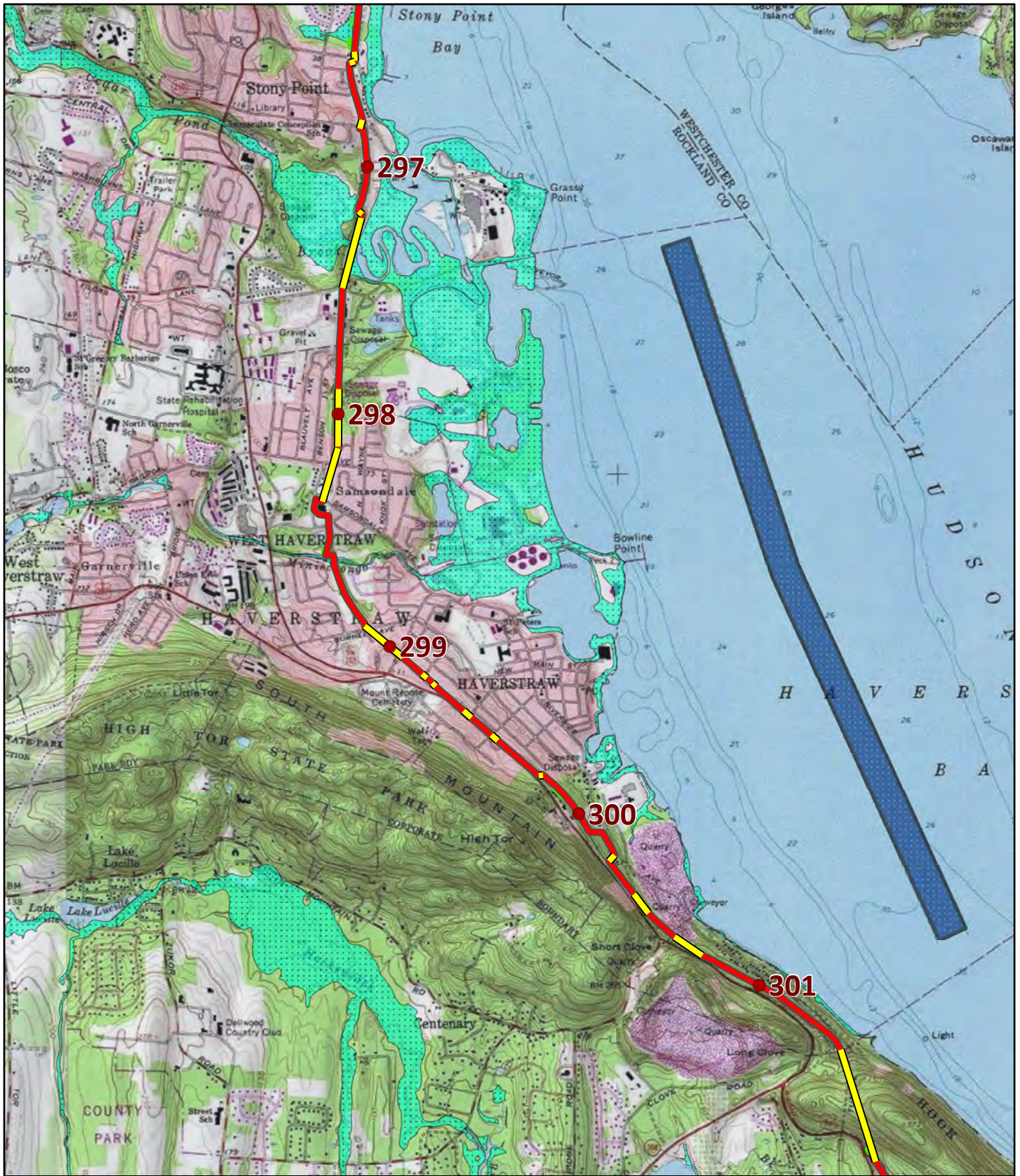
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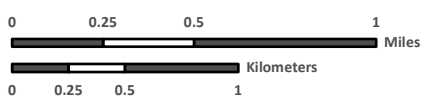




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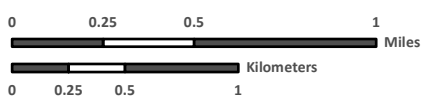
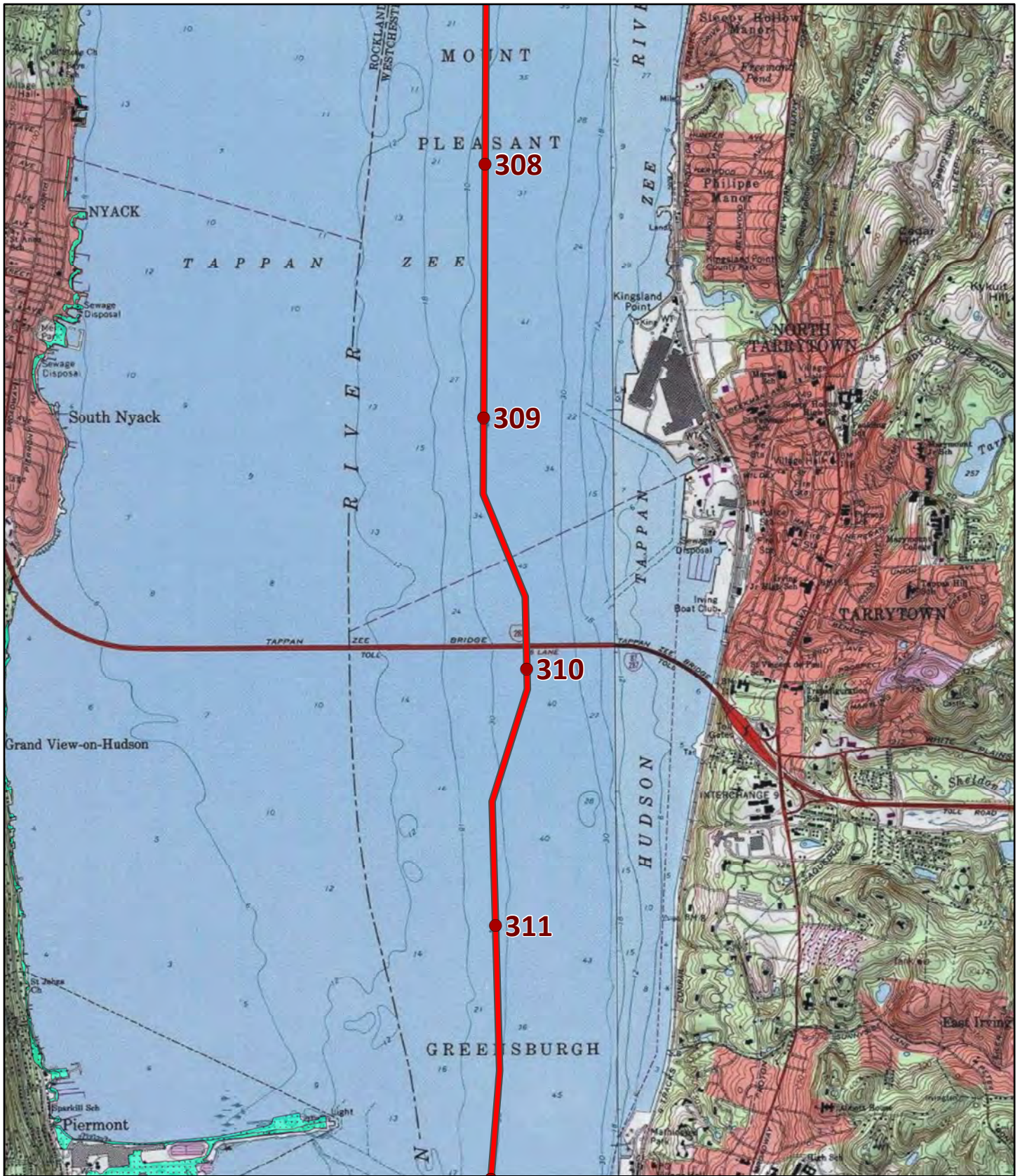
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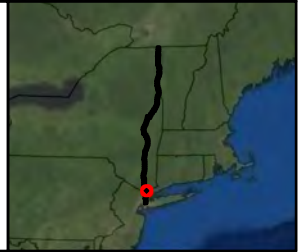
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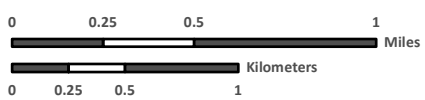
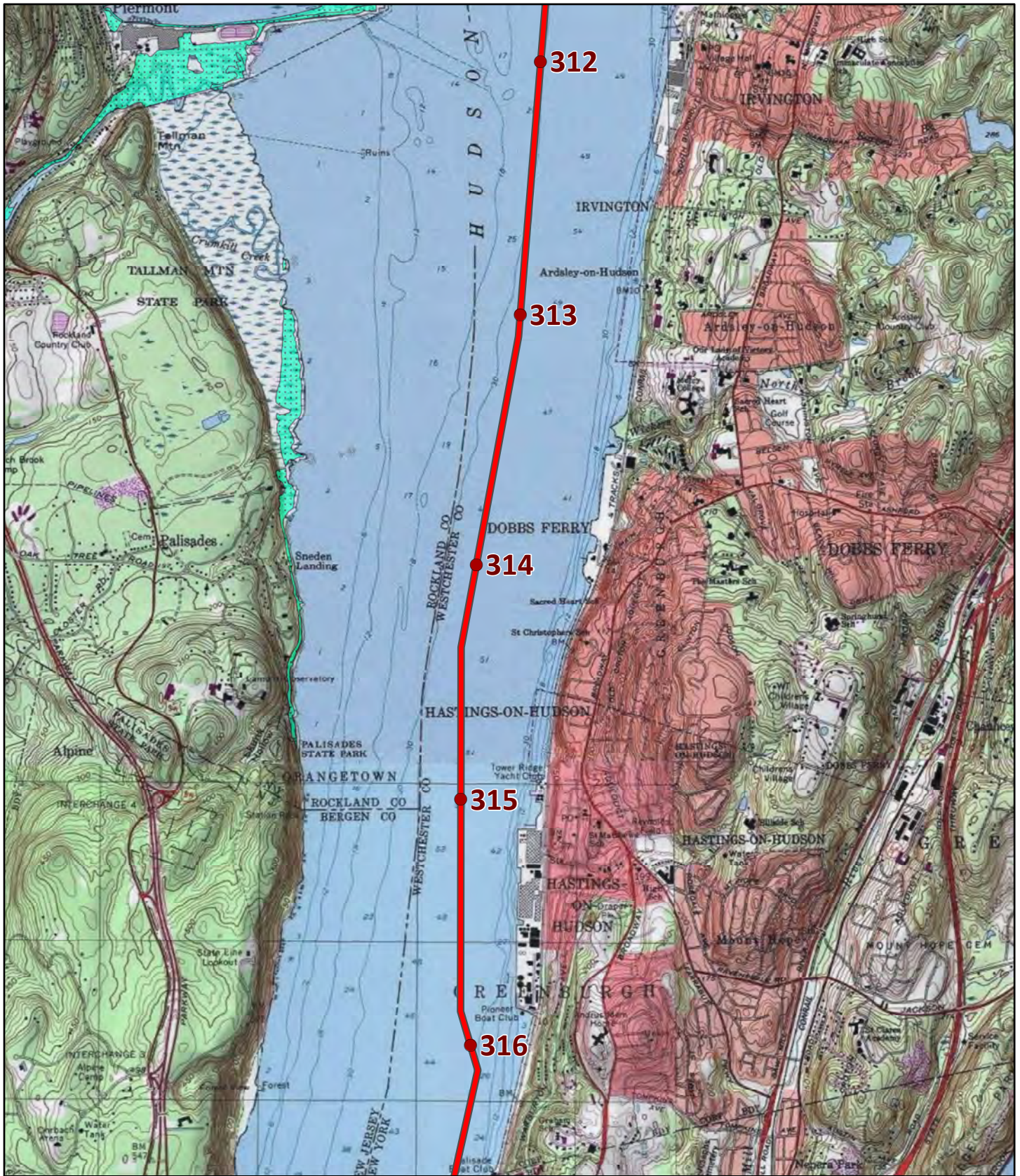


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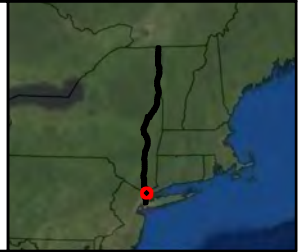


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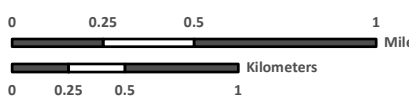
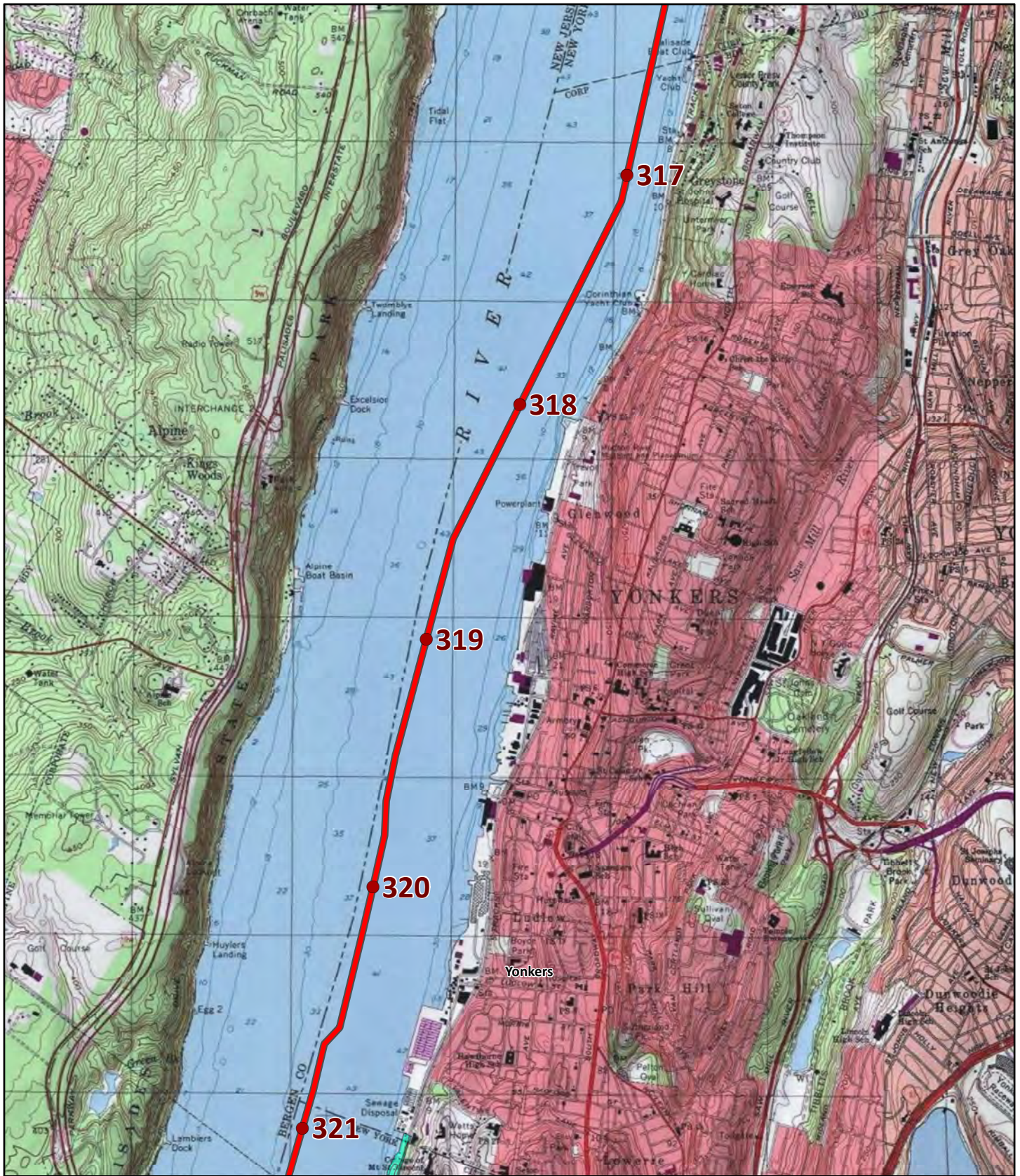


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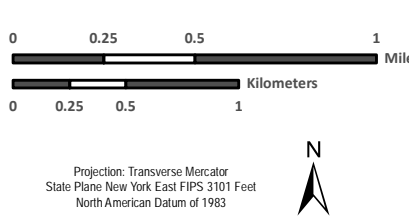
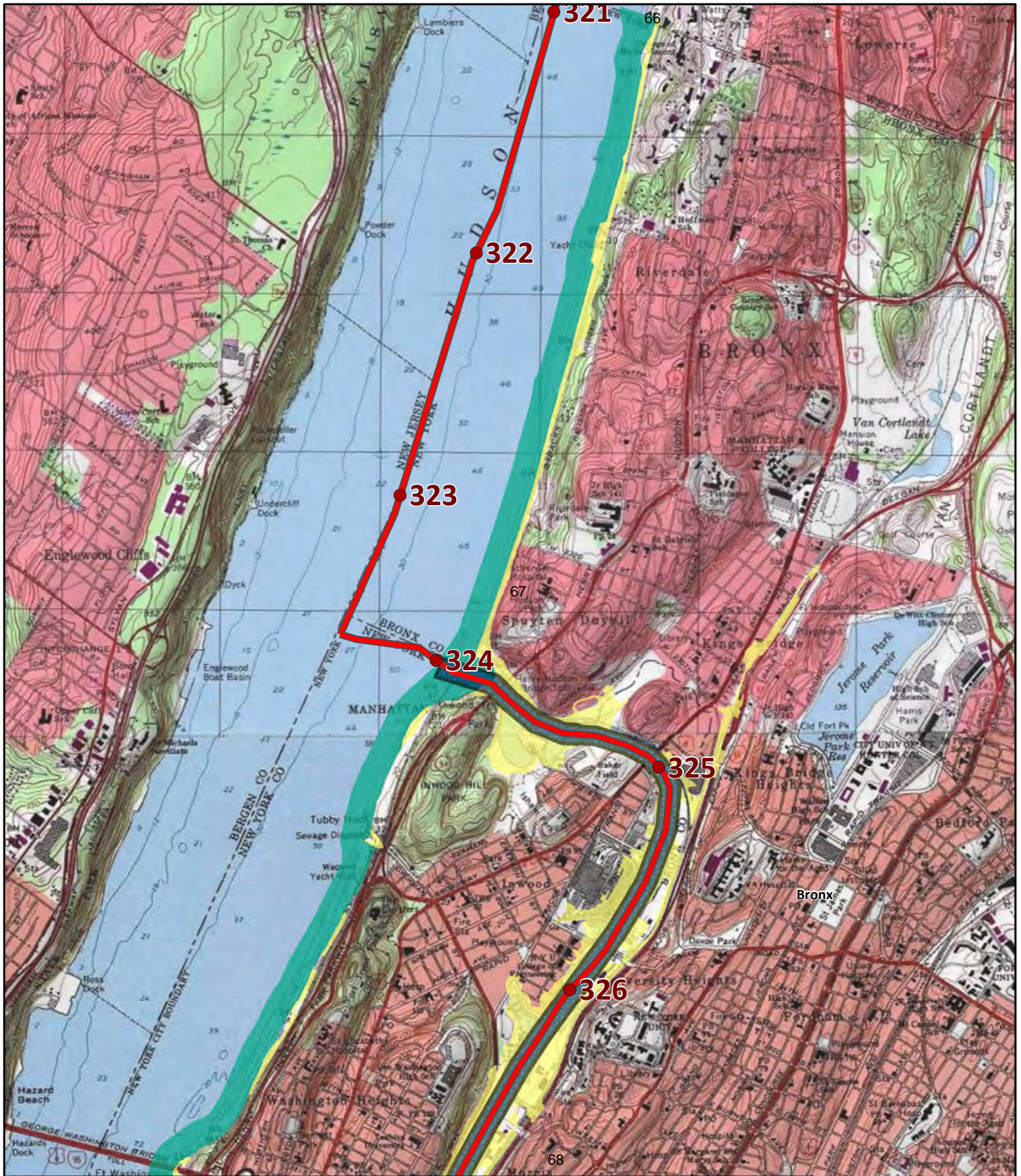


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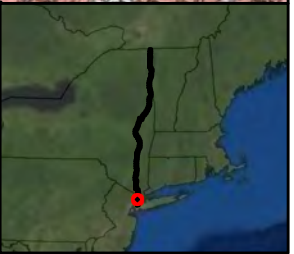
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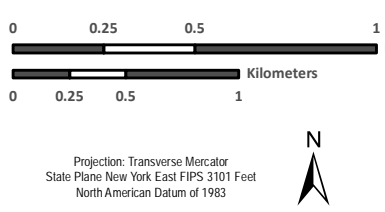
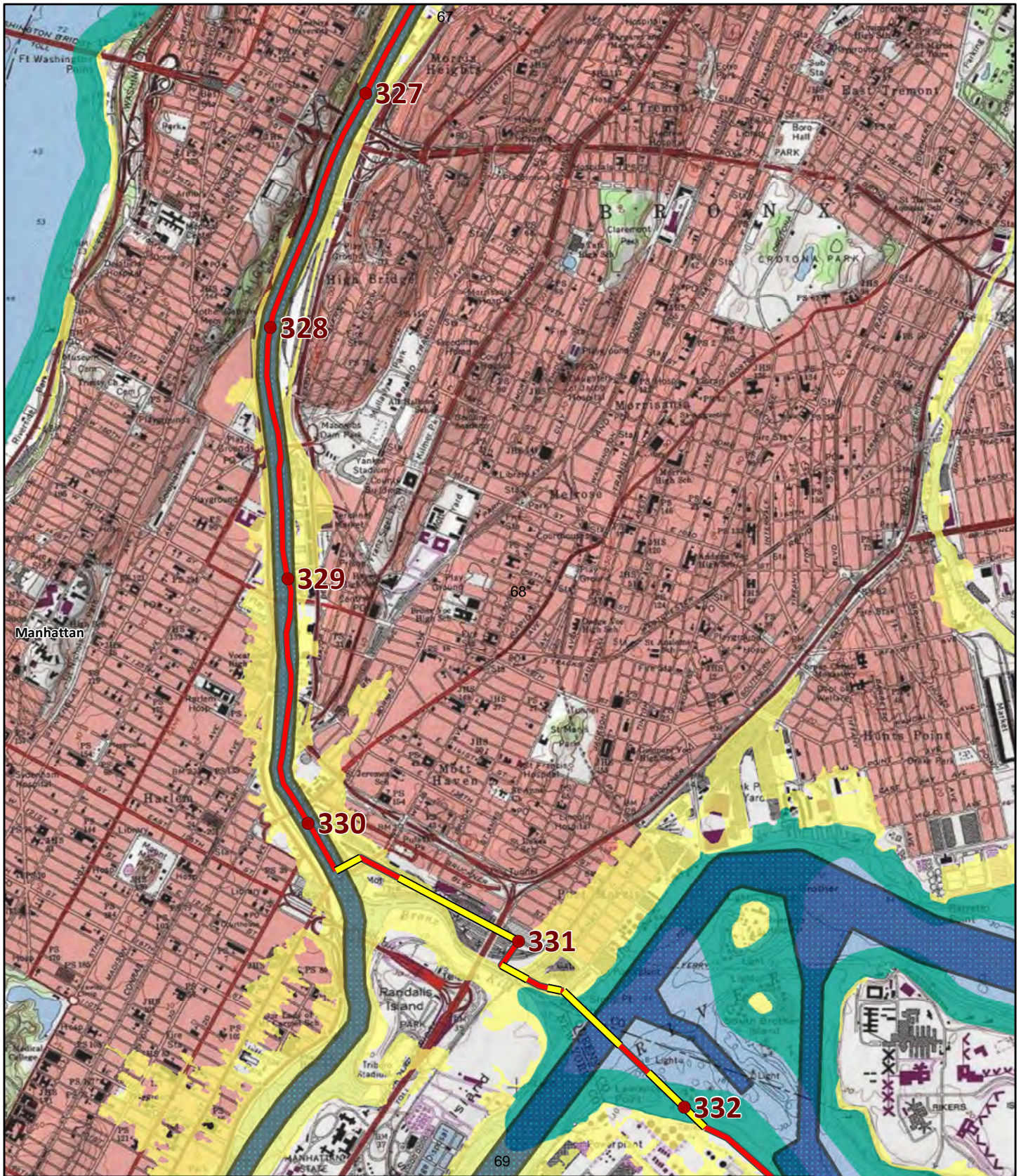
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  - Zone AE - High flood risk subject to inundation by the 1% annual-chance flood event. Base Flood Elevations (BFEs) have been determined.
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- Federal Navigation Channel
- HDD Installation

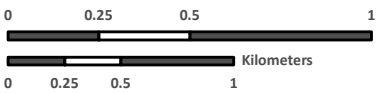
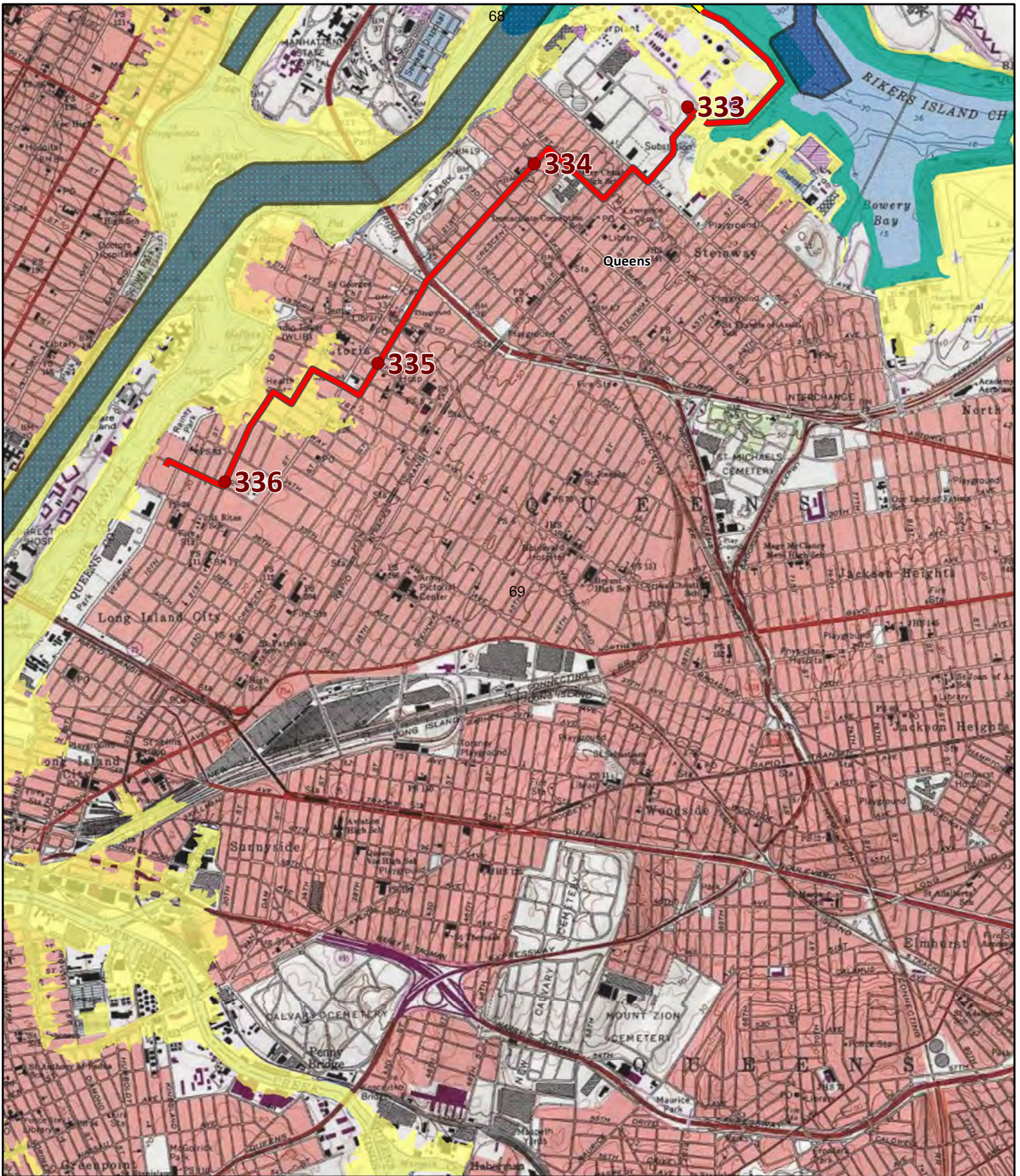


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- Pipe Bridge Installation
- FEMA Preliminary Draft Work Map Data
- Zone AE - High flood risk subject to inundation by the 1% annual-chance flood event. Base Flood Elevations (BFEs) have been determined.
- Zone VE - High flood risk subject to inundation by the 1% annual-chance flood event and storm-induced velocity wave action (a 3-foot or higher breaking wave).
- Delineated Wetlands
- Federal Navigation Channel

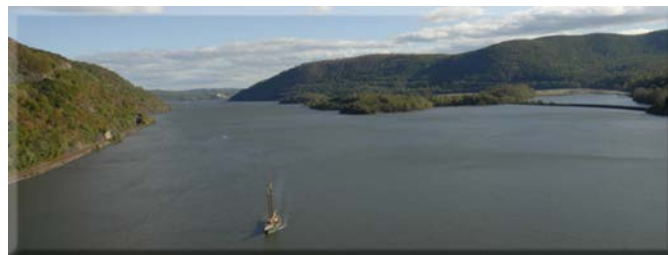
Source: Imagery -(c) 2010 Microsoft Corporation and its data suppliers.





## APPENDIX B

# CWA Section 404 Permit Application Alternatives Analysis Report





**CHAMPLAIN HUDSON POWER EXPRESS  
HVDC TRANSMISSION PROJECT**

**UPDATED LEAST ENVIRONMENTALLY  
DAMAGING PRACTICABLE ALTERNATIVE  
EVALUATION**

**CHAMPLAIN HUDSON POWER EXPRESS, INC.**

**Albany, New York**

**USACE Application 2009-01089-EYA**

**July 3, 2013**

**CHAMPLAIN HUDSON POWER EXPRESS  
HVDC TRANSMISSION PROJECT  
UPDATED LEAST ENVIRONMENTALLY DAMAGING  
PRACTICAL ALTERNATIVE EVALUATION**

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**CHAMPLAIN HUDSON POWER EXPRESS  
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# List of Acronyms

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AC.....	Alternating current
Article VII.....	Article VII of New York State Public Service Law
Astoria-Rainey Cable.....	Proposed set of HVAC cables from the Astoria Annex substation, which would be located within the streets of New York City for approximately three miles to Con Edison’s Rainey Substation
BMP .....	Best Management Practices Manual
Certificate.....	Article VII Certificate of Environmental Compatibility and Public Need
CHPEI.....	Champlain Hudson Power Express, Inc.
CO <sub>2</sub> .....	Carbon dioxide
Con Edison.....	Consolidated Edison Company of New York, Inc.
Corps or USACE.....	U.S. Army Corps of Engineers
CP.....	Canadian Pacific Railway
CSX.....	CSX Transportation, Inc.
CWA .....	Clean Water Act
D&H.....	Delaware and Hudson Railway
DC .....	Direct current
DOE .....	U.S. Department of Energy
Dredging Project .....	Upper Hudson River PDB Dredging Project
EM&CP.....	Environmental Management and Construction Plan
EMF .....	Electromagnetic fields
EPC .....	Engineering, Procurement and Construction
EPC .....	Engineering, Procurement and Construction
FERC.....	Federal Energy Regulatory Commission
FHWA.....	Federal Highway Administration



GHG.....	Greenhouse gas
Guidelines .....	Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR Part 230)
HDD .....	Horizontal directional drilling
HDPE .....	High density polyethylene
HVAC .....	High-voltage alternating current
HVDC .....	High-voltage direct current
J&B .....	Jack and Bore
kPA .....	Kilopascals
kV.....	Kilovolt
LEDPA.....	Least environmentally damaging practicable alternative
LEI .....	London Economics International, LLC
MNCR.....	Metro-North Commuter Railroad Co.
MP.....	Milepost
MTA.....	Metropolitan Transit Authority
MW .....	Megawatt
NAAQS.....	National ambient air quality standards
NE-ISO .....	New England Independent System Operator
NIETC.....	Mid-Atlantic Area National Interest Electric Transmission Corridor
NYISO .....	New York Independent System Operator
NYPA.....	New York Power Authority
NYPSC.....	New York Public Service Commission
NYRI.....	New York Regional Interconnect Project
NYSCC .....	New York State Canal Corporation

NYSDEC.....	New York State Department of Environmental Conservation
NYSDOS.....	New York State Department of State
NYSDOT .....	New York State Department of Transportation
NYSDPS .....	State of New York Department of Public Service
PAAA.....	New York State Public Accountability Act of 2005
PCBs .....	Polychlorinated biphenyls
PM.....	Particulate matter
Project .....	Champlain Hudson Power Express Project
RAP.....	Realistic achievable potential
RGGI.....	Regional Greenhouse Gas Initiative
RNA .....	Reliability Needs Assessment
ROV .....	Remotely-Operated Vehicle
ROW .....	Right-of-way
RSU Route .....	Uninterrupted submarine route between the Hertel substation located near Quebec and potential converter station locations within the NIETC and the vicinity of New York City
RWS .....	Gestion RSW, Inc.
SCFWH.....	Significant Coastal Fish and Wildlife Habitat
SPCC.....	Spill Prevention, Countermeasure, and Control Plan
TIGER.....	U.S. Census Bureau’s Topologically Integrated Geographic Encoding and Referencing data files
USACE or Corps.....	U.S. Army Corps of Engineers
USEPA.....	U.S. Environmental Protection Agency
VOCs.....	Volatile organic compounds
West Point.....	West Point Military Academy
XLPE.....	Cross-link polyethylene

# Executive Summary

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The U.S. Environmental Protection Agency (“USEPA”) developed Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR Part 230) (“Guidelines”) to implement Section 404(b)(1) of the Clean Water Act.<sup>1</sup> Pursuant to § 230.10 of the Guidelines, an applicant for a U.S. Army Corps of Engineers (“USACE”) permit under Section 404 of the Clean Water Act must demonstrate that the proposed action is the least environmentally damaging practicable alternative (“LEDPA”).

Specifically, applicants must demonstrate that there is no “practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem” and which “does not have other significant adverse environmental consequences” (40 C.F.R. § 230.10(a)). The Guidelines consider an alternative practicable “if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes” (40 C.F.R. § 230.10(a)(2)). In accordance with the Guidelines, Champlain Hudson Power Express, Inc. evaluated several alternatives to the Champlain Hudson Power Express Project (“Project”).

Consistent with the Guidelines, the following alternatives analysis incorporates the extensive alternatives analysis undertaken as part of the New York State siting and permitting process.<sup>2</sup> As part of that proceeding, Settlement Parties undertook an intensive review of Project routing, with a specific focus on locating the cables out of the water to the extent practical and feasible. The Applicants also completed an alternatives analysis for the New York State Department of State as part of its review of the consistency certification for the Project in accordance with the Coastal Zone Management Act.<sup>3</sup> Based on consultation prior to the state proceeding, the State’s alternatives analysis, and the ensuing settlement discussions and resultant Joint Proposal settlement, the Project incorporated a number of design and route changes.

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<sup>1</sup> 33 U.S.C. § 1344. See <http://www.law.cornell.edu/uscode/text/33/1344>.

<sup>2</sup> 230.10(a)(5). (Stating, in part, “[t]o the extent that practicable alternatives have been identified and evaluated under a Coastal Zone Management program, a § 208 program, or other planning process, such evaluation shall be considered by the permitting authority as part of the consideration of alternatives under the Guidelines.”). See <http://www.wetlands.com/epa/epa230pb.htm>.

<sup>3</sup> New York State Department of State, *Champlain Hudson Power Express Conditional Concurrence with Consistency Certificate* (June 8, 2011). See <http://www.chpexpress.com/docs/regulatory/F-2010-1162%20CondCCR.PDF>.

While these changes resulted in significant cost increases to the Project, the changes also ensured that the Project route was the least environmentally damaging practicable alternative consistent with the Project purpose (*i.e.*, the delivery of clean sources of generation from Canada into New York City in an economically efficient manner). As noted by the settlement parties in the state proceeding:

*The preferred route as presented in this [settlement] was determined to be the best suited for the Facility, since it provides an appropriate balance among the various state interests, and it represents the minimum adverse environmental impact, considering the state of available technology, the nature and economics of the studied alternatives and other pertinent considerations.*

The New York State Public Service Commission issued an order granting Certificate of Environmental Compatibility and Public Need for the Project on April 18, 2013.<sup>4</sup>

As part of its LEDPA analysis, the Applicants reviewed three routes provided by the New York State Department of Public Service as part of the Article VII proceedings and three additional routes requested by the USACE. One of these alternatives, the Hell Gate Bypass, was accepted by the Applicants during the Article VII proceedings while segments of the Hudson River Western Rail Line Route were also incorporated into the Project. Each of the remaining alternatives was assessed for their overall practicability based on existing technology, logistics and costs. As summarized in the table below, when evaluated in terms of logistics and costs, the alternatives presented various logistical hurdles including engineering complexity, site access, and adverse affects to existing development, as well the potential for political and public opposition. All of the alternatives had projected costs, when coupled with the additional costs associated with the route designs accepted during the Article VII process, which would result in substantially greater costs than are normally associated with the particular type of project.

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<sup>4</sup> Order Granting Certificate of Environmental Compatibility and Public Need at 256, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Apr. 18, 2013), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={A71423C8-B489-4996-9C5A-016C9F334FFC}>.

### Evaluation of Practicality of Alternatives to Project

	<b>Logistics</b>	<b>Cost</b>
Hudson River Western Rail Line Route	<ul style="list-style-type: none"> <li>• Long HDD installations</li> <li>• Narrow work spaces</li> <li>• Installation in close proximity to residences/businesses</li> <li>• Access restrictions</li> <li>• Increased construction duration</li> <li>• Four tunnel segments</li> <li>• Potential for public and political opposition</li> </ul>	Increase in Project costs of ~\$620 million or 42% over Article VII baseline route.
Harlem River Rail Route	<ul style="list-style-type: none"> <li>• Busy passenger and rail usage</li> <li>• Geotechnical challenges</li> <li>• Access restrictions on rail trestle by NYSDOT and MTA</li> <li>• Increased risk of cable damage</li> <li>• Increased construction duration</li> <li>• High uncertainty as to engineering feasibility</li> </ul>	Increase in costs from ~\$81 million (305% of segment cost, 6% of Project cost) to \$189 million (15%) over Article VII baseline route.
Existing ROW – West of Adirondack Park	<ul style="list-style-type: none"> <li>• Difficult HDD installations</li> <li>• Narrow work spaces</li> <li>• Installation in close proximity to residences/businesses</li> <li>• Density of aboveground utilities and other features</li> <li>• Underground utility avoidance</li> <li>• Increased construction duration</li> <li>• Potential for public and political opposition</li> </ul>	Increase in project costs of ~\$512 million or 35% over Article VII baseline route.
Existing ROW – East of Hudson River	<ul style="list-style-type: none"> <li>• Long HDD installations</li> <li>• Narrow work spaces</li> <li>• Installation in close proximity to residences/businesses</li> <li>• Density of aboveground utilities and other features</li> <li>• Underground utility avoidance</li> <li>• Increased construction duration</li> <li>• Potential for public and political opposition</li> </ul>	Increase in project costs of ~\$508 million or 35% over Article VII baseline route.
Overland Using New Power Line Route	<ul style="list-style-type: none"> <li>• Potential long and difficult HDD installations</li> <li>• Increased construction duration</li> <li>• Potential for public and political opposition</li> </ul>	Increase in project costs of ~\$1.14 billion or 79% over Article VII baseline route.

As part of the Article VII proceeding and consistency review under the Coastal Zone Management Act, the Applicants have accepted a number of Project routing changes aimed at locating the cables out of the water to the extent practical and feasible. While these changes resulted in significant cost increases to the Project, the changes also ensured that the Project route was the least environmentally damaging practicable alternative consistent with the Project purpose (*i.e.*, to deliver clean sources of generation from Canada into New York City in an economically efficient manner). The further analysis undertaken here, pursuant to the Guidelines, confirms that the Project — when evaluated against other alternatives based on logistics, existing technology, and costs — is the least environmentally damaging practicable alternative.

# Section 1

## Introduction

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The U.S. Environmental Protection Agency (“USEPA”) developed Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR Part 230) (“Guidelines”) to implement Section 404(b)(1) of the Clean Water Act.<sup>5</sup> Pursuant to § 230.10 of the Guidelines, an applicant for a U.S. Army Corps of Engineers (“USACE”) permit under Section 404 of the Clean Water Act must demonstrate that the proposed action is the least environmentally damaging practicable alternative (“LEDPA”).

In accordance with the Guidelines, Champlain Hudson Power Express, Inc. (“CHPEI”, and together with its wholly owned subsidiary, CHPE Properties, Inc., the “Applicants”) has developed this alternatives analysis to evaluate several alternatives considered for the Champlain Hudson Power Express Project (“Project”). This document provides an overview of the proposed Project and describes the alternatives considered in the Project’s design process. As summarized in this analysis, the Applicants evaluated several alternatives in relation to the Project’s purpose, need, and geographic requirements, as well as the practicability and environmental consequences of each alternative.

Consistent with the Guidelines, this analysis incorporates the extensive alternatives analysis undertaken as part of the New York State siting and permitting process.<sup>6</sup> As a consequence of that process, many alternatives were evaluated and the Project has been revised significantly since it was originally proposed. Thus, as demonstrated below, the Project – as currently proposed – is the least environmentally damaging practicable alternative.

### 1.1 Project Background

The discussion below provides an overview of the development of the Project and identifies the various environmental, regulatory, cost, and political factors that informed the routing of the Project.

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<sup>5</sup> 33 U.S.C. § 1344. See <http://www.law.cornell.edu/uscode/text/33/1344>.

<sup>6</sup> 230.10(a)(5). (Stating, in part, “[t]o the extent that practicable alternatives have been identified and evaluated under a Coastal Zone Management program, a § 208 program, or other planning process, such evaluation shall be considered by the permitting authority as part of the consideration of alternatives under the Guidelines.”). See <http://www.wetlands.com/epa/epa230pb.htm>.

### 1.1.1 Original Project

In 2008, the Applicants commissioned Gestion RSW, Inc. (“RSW”) to conduct feasibility studies of possible HVDC submarine transmission cable projects that would deliver power to the Mid-Atlantic Area National Interest Electric Transmission Corridor (“NIETC”). RSW developed an uninterrupted submarine route between the international border and potential converter station locations within the NIETC and the vicinity of New York City (the “RSW Route”).<sup>7</sup> The RSW Route utilized the Richelieu River, Lake Champlain (within New York State), the Champlain Canal, the Hudson River, and other parts of the waters in and around New York City.

As a result of Applicants’ consultation prior to filing a state siting permit with New York State, the New York State Canal Corporation (“NYSCC”) staff raised concerns over its legal authority to enter into a long-term agreement providing the Applicants with the right to locate cables within the Champlain Canal. Among other state constitutional and statutory obstacles, the NYSCC is subject to certain restrictions under the New York State Public Authorities Accountability Act of 2005 with regard to the transfer of real property rights.<sup>8</sup> Additionally, after consultation with state and federal regulatory agencies (including the USEPA), it became evident that the HVDC submarine cables should not be installed within the Upper Hudson River before completion of the dredging activities associated with the Upper Hudson River PCB Dredging Project (“Dredging Project”), which was estimated to continue through 2016.<sup>9</sup> Therefore, the Applicants identified a terrestrial bypass route to circumvent the Dredging Project area to ensure the Project would not exacerbate existing water quality issues or otherwise interfere with the Dredging Project.<sup>10</sup>

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<sup>7</sup> *Attachment Q: Supplemental Alternatives Analysis at 2 -3, Application of Champlain Hudson Power Express, Inc. and CHPE Properties, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the Public Service Law for the Construction, Operation and Maintenance of a High-Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. July 22, 2010) <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={D6AC823D-402A-4E1F-A621-8E7FF1906D7D}>.

<sup>8</sup> New York State Public Authorities Law Section 2897. See <http://codes.lp.findlaw.com/nycode/PBA/9/5-A/2897>.

<sup>9</sup> General Electric. 2008. Phase 2 Intermediate Design Report, Hudson River PCBs Superfund Site. Accessed on-line on April 28, 2013 at: [http://www.epa.gov/hudson/pdf/2008\\_5\\_13\\_phase\\_2\\_intermediate\\_design\\_report\\_text.pdf](http://www.epa.gov/hudson/pdf/2008_5_13_phase_2_intermediate_design_report_text.pdf).

<sup>10</sup> The northern portion of the Upper Hudson River PCB Dredging Project begins near the former Fort Edward Dam at Lock C7 and moves south to Troy Dam.



### 1.1.2 New York Regional Interconnection

In designing the Project to incorporate the overland bypasses described above, the Applicants attempted to maximize the use of existing rights-of-way (“ROW”) and bury the transmission cables as a consequence of the failed New York Regional Interconnect (“NYRI”) project. NYRI was a New York company that attempted to obtain authorization from New York State to construct a 1,200 MW, HVDC transmission line from the Edic substation in Marcy, New York to the Rock Tavern substation in New Windsor, New York.<sup>11</sup> The NYRI project, as proposed, would have been completely overhead with no burial.<sup>12</sup> NYRI’s sponsors argued that the line would reduce congestion and help meet state goals regarding renewable energy, fuel and locational supply diversity, and greenhouse gas reduction.<sup>13</sup>

Citizen groups organized against the project (*e.g.*, STOPNYRI, Communities Against Regional Interconnect, Upstate New York Citizen’s Alliance)<sup>14</sup> due to the use of overhead lines and the potential for NYRI to use eminent domain to take homes within its proposed project area.<sup>15</sup> Over 2,000 people attended thirteen (13) public hearings held by the New York Public Service Commission (“NYPSC”) and more than 2,600 letters and e-mails from the public were received by the NYPSC.<sup>16</sup> Various hearings regarding the project drew over-capacity crowds and, in the

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<sup>11</sup> *Application of New York Regional Interconnect, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII for a high voltage direct current electric transmission line running between National Grid’s Edic Substation in the Town of Marcy, and Central Hudson Gas & Electric’s Rock Tavern Substation located in the Town of New Windsor*, Case No. 06-T-0650, <http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=06-T-0650>.

<sup>12</sup> Comments of NYSDEC Regarding the Application at 3, *Application of New York Regional Interconnect, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII for a high voltage direct current electric transmission line running between National Grid’s Edic Substation in the Town of Marcy, and Central Hudson Gas & Electric’s Rock Tavern Substation located in the Town of New Windsor*, Case No. 06-T-0650 (N.Y. P.S.C. July 18, 2006), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={DC7B9711-93BB-450F-8166-6A4D09D16169}>.

<sup>13</sup> Rebuttal Testimony of Jonathan A. Lesser and J. Nicholas Puga on Behalf of New York Regional Interconnect, Inc. at 15-16, *Application of New York Regional Interconnect, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII for a high voltage direct current electric transmission line running between National Grid’s Edic Substation in the Town of Marcy, and Central Hudson Gas & Electric’s Rock Tavern Substation located in the Town of New Windsor*, Case No. 06-T-0650 (N.Y. P.S.C. Mar. 2, 2009), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={5EDB6D60-3CD7-4F6E-9504-E706A6B3D07A}>.

<sup>14</sup> Fritz Mayer, *The Year of the Power Line Battles*, *The River Reporter* (Dec. 28, 2006), <http://www.riverreporter.com/issues/06-12-28/news-power.html>.

<sup>15</sup> New York Transportation Corporation Law (N.Y. Transp. Corp. L. § 11(3-a) (McKinney 1996)) generally allows an electric corporation to take private property if needed for a public purpose.

<sup>16</sup> Press Release, New York State Public Service Commission, *Commission Officially Dismisses NYRI, New Application Must Be Filed if Company Wants to Pursue Project* (Apr. 21, 2009),

later stages, required police presence to maintain order.<sup>17</sup> Reports indicated that approximately \$2,397,000 was spent in opposition to the project.<sup>18</sup>

Community opponents argued that the line would traverse historic areas, raise upstate electricity prices, increase the risk of childhood cancers as a result of electromagnetic fields (EMF), and reduce property values in a part of the state already struggling economically. The seven (7) counties which would be occupied by the proposed NYRI transmission system organized against the project.<sup>19</sup> Local media coverage of the project was intense and hostile. In addition to local community concerns, the project was opposed by upstate business, utilities, and state agencies.<sup>20</sup>

Attempts to stop the project occurred in several venues. Market opponents attempted to frustrate the project during interconnection proceedings before the New York Independent System Operator (“NYISO”).<sup>21</sup> In addition, NYRI became a high-visibility issue for the New York State Legislature. The first legislative response was a proposal to fund opposition to the project.<sup>22</sup> As opposition grew, however, opponents demanded that the legislature do more to definitively terminate the project. As a result, Governor George Pataki enacted legislation limiting the use of

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<http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={6F0413CF-6EB1-4695-A65B-82AC65D682D3}>.

<sup>17</sup> Brendan Scott, *High-voltage Line Ignites Crowd's Ire*, The Herald-Record (Apr. 28, 2006), <http://www.recordonline.com/apps/pbcs.dll/article?AID=/20060428/NEWS/304289999&cid=sitesearch>.

<sup>18</sup> Elizabeth Cooper, *NYRI Quits; Power Line Project Dead*, Utica Observer-Dispatch (Apr. 4, 2009), [http://www.uticaod.com/news/x1525913735/NYRI-Quits-power-line-project-dead?zc\\_p=1](http://www.uticaod.com/news/x1525913735/NYRI-Quits-power-line-project-dead?zc_p=1).

<sup>19</sup> Melissa deCordova, *County Leaders Strategize Against NYRI*, The Evening Sun (June 13, 2006), <http://www.evesun.com/news/stories/2006-06-13/99/County-leaders-strategize-against-NYRI/>.

<sup>20</sup> Comments and testimony in opposition to the NYRI project either wholly or in part as proposed were provided by, among others, the New York Chapter of the National Federation of Independent Business, Con Edison, the New York Power Authority, New York State Department of Environmental Conservation, New York State Attorney General, New York State Department of Public Service and New York State Department of Agriculture and Markets. See *Application of New York Regional Interconnect, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII for a high voltage direct current electric transmission line running between National Grid's Edic Substation in the Town of Marcy, and Central Hudson Gas & Electric's Rock Tavern Substation located in the Town of New Windsor*, Case No. 06-T-0650, <http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=06-T-0650>.

<sup>21</sup> Companies expressing concerns were Con Edison, Orange and Rockland Utilities, Central Hudson, and Long Island Power Authority. See *Power Line near Delaware Hits Snag*, Pocono News (June 2, 2008), <http://www.pocononews.net/news/June08/02/02Jun08-5.html>.

<sup>22</sup> Jeff Genung, *Libous Announces \$1M to Fight NYRI*, The Evening Sun (Aug. 30, 2006), <http://www.evesun.com/news/stories/2006-08-30/461/Libous-announces-1M-to-fight-NYRI/>.

eminent domain to acquire rights-of-way generally, making it “virtually impossible” for NYRI to build the power line.<sup>23</sup>

After several unfavorable NYISO, court, and Federal Energy Regulatory Commission (“FERC”) decisions, NYRI filed a letter with the NYPSC on April 6, 2009 (as clarified on April 8, 2009) withdrawing its petition for a certificate to construct the power line.<sup>24</sup> On April 21, 2009, the NYPSC granted the withdrawal “with prejudice,” indicating that, if NYRI decided to resurrect the project, it would need to file a new application and begin the process anew.<sup>25</sup> The magnitude of public and political opposition that NYRI faced, and which ultimately killed the NYRI project, substantially informed Applicants’ approach to the design and route of the Project. More specifically, Applicants avoided, to the extent practicable, proposing a Project route that would locate the line near homes and business or otherwise rely significantly on eminent domain to achieve its routing.

In the ensuing analysis, when the Applicants state that public or political opposition is likely, this characterization is directly based on NYRI’s experience and its failed outcome.

### 1.1.3 New York State Article VII Settlement Process

In addition to the Project route configurations resulting from pre-filing consultation and the lessons learned from the failed NYRI project, the current Project route was shaped significantly by the New York State permitting process. Specifically, the alternatives analysis set forth herein includes and incorporates information and analysis undertaken pursuant to Article VII of the

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<sup>23</sup> Fritz Mayer, *Citizen Groups Still Fighting NYRI*, The River Reporter (Nov. 9, 2006), <http://www.riverreporter.com/issues/06-11-09/head2-nyri.html>.

<sup>24</sup> NYRI Submits Notification that it is Suspending its Application filed under Article VII of the Public Service Law, *Application of New York Regional Interconnect, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII for a high voltage direct current electric transmission line running between National Grid’s Edic Substation in the Town of Marcy, and Central Hudson Gas & Electric’s Rock Tavern Substation located in the Town of New Windsor*, Case No. 06-T-0650 (N.Y. P.S.C. Apr. 6, 2009), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={7241B9D8-8B9C-4A92-B19E-4446DF4D0F9D}>.

<sup>25</sup> Letter from Jaclyn A. Brillling, New York State Public Service Commission, to Leonard H. Singer, Esq., Couch White LLP, Regarding a Certificate of Environmental Compatibility and Public Need, *Application of New York Regional Interconnect, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII for a high voltage direct current electric transmission line running between National Grid’s Edic Substation in the Town of Marcy, and Central Hudson Gas & Electric’s Rock Tavern Substation located in the Town of New Windsor*, Case No. 06-T-0650 (N.Y. P.S.C. Apr. 21, 2009), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={26743727-8726-4A5D-9DB6-64ABD60BA7CB}>.

New York State Public Service Law (“Article VII”).<sup>26</sup> Through the Article VII process, the Applicants, along with a number of state regulatory agencies and non-governmental public interest organizations (“Settlement Parties”),<sup>27</sup> conducted an intensive and thorough review of the Project’s proposed routing, with a specific focus on locating the cables out of the water to the extent practical and feasible. After consideration of various alternative routes, the Settlement Parties established a route that “represents the minimum adverse environmental impact, considering the state of available technology, the nature and economics of the studied alternatives and other pertinent considerations.”<sup>28</sup> The Settlement Parties’ findings were recently affirmed by the NYPSC when an Article VII Certificate of Environmental Compatibility and Public Good was issued to the Applicants on April 18, 2013.<sup>29</sup>

Concurrently with the Article VII process, the New York State Department of State (NYSDOS) completed its review of the consistency certification for the Project in accordance with the Coastal Zone Management Act.<sup>30</sup> As part of this process, the NYSDOS requested that the Applicants provide an analysis of alternative routes considered.<sup>31</sup> In its decision, the NYSDOS

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<sup>26</sup> N.Y. Pub. Serv. Law §§ 120-130. In New York State, Article VII governs the state siting and environmental review process for transmission facilities. See <http://public.leginfo.state.ny.us/LAWSSEAF.cgi?QUERYTYPE=LAWS+&QUERYDATA=@SLPBS0A7+&LIST=LAW+&BROWSER=EXPLORER+&TOKEN=27396543+&TARGET=VIEW>.

<sup>27</sup> Settlement endorsing the Joint Proposal for all purposes include: the Applicants, New York State Department of Public Service; New York State Department of Environmental Conservation; New York State Department of State; Adirondack Park Agency; New York State Office of Parks, Recreation and Historic Preservation, Riverkeeper, Inc.; Scenic Hudson, Inc.; and New York State Council of Trout Unlimited. The New York State Department of Transportation and Vermont Electric Power Company signed the JP for the limited purposes of participating in the sections of importance to them.

<sup>28</sup> Joint Proposal at 46, *Application of Champlain Hudson Power Express, Inc. and CHPE Properties, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the Public Service Law for the Construction, Operation and Maintenance of a High-Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Feb. 24, 2012) (“Joint Proposal” or “Joint Proposal of Settlement”), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={C5F63E41-5ED5-46A2-99A5-F1C5FC522D36}>.

<sup>29</sup> Order Granting Certificate of Environmental Compatibility and Public Need, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Apr. 18, 2013), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={A71423C8-B489-4996-9C5A-016C9F334FFC}>.

<sup>30</sup> New York State Department of State, *Champlain Hudson Power Express Conditional Concurrence with Consistency Certificate* (June 8, 2011). See <http://www.chpexpress.com/docs/regulatory/F-2010-1162%20CondCCR.PDF>.

<sup>31</sup> Article VII Updated Alternatives Analysis, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border*

note that “while the project does not itself constitute a “water dependent” use, several conditions ensures that the transmission cables will be sited and installed in a manner that facilitates water dependent economic uses and avoids interference with other important water dependent uses such as navigation and fishing.”<sup>32</sup> The conditions imposed by the NYSDOS, which in general address burial depth, utilization of horizontal directional drilling, routing and construction windows, have all be incorporated into the Applicants’ Project as confirmed in a letter sent to the USACE on July 7, 2011.

#### **1.1.4 Impacts of Revised Routing on Costs**

As a result of changes to the Project route that occurred during the Article VII process, the cost of the Project has already increased significantly as compared to the original Project design. Thus, in assessing the cost of the various alternatives discussed below, it is important to note that the baseline cost of the Project as currently proposed includes significant additional costs to account for the various alternatives that have already been incorporated into the Project through both pre-application consultation and the New York State siting process. These incorporated alternatives – all designed to ensure the Project is both able to be permitted and the least environmentally damaging – have increased the original cost of the Project substantially.

As a result, the true magnitude of cost increase that could result from the alternatives discussed below is often masked because the Project baseline cost already accounts for substantial cost increases that resulted from the New York State siting process. As CHPE already has absorbed significant cost increases associated with incorporating various alternatives routes, even relatively small incremental additional costs may have a disproportionate impact on the Project. Therefore, in the context of this Project, which has already incorporated a significant number of alternatives to date as a result of the state siting process, the cost of the alternative as compared to the overall Project cost is not necessarily an accurate measure of whether an alternative is practical. Rather, the LEDPA analysis must account for the significantly increased costs that have already been imposed on the Applicants to revise the Project route, and the impact that

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*to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Feb. 24, 2012) (“Article VII Updated Alternatives Analysis”), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={1376106E-8A60-4BC8-B601-EA7C43ECC0BB}>.

<sup>32</sup> New York State Department of State, *Champlain Hudson Power Express Conditional Concurrence with Consistency Certificate* at 5 (June 8, 2011). See <http://www.chpexpress.com/docs/regulatory/F-2010-1162%20CondCCR.PDF>.

additional costs will have on the Applicants' ability to effect the Project purpose. As the EPA has noted, "[w]e consider it to be implicit that, to be practicable, an alternative must be capable of achieving the basic purposes of the proposed activity."<sup>33</sup>

## 1.2 Project Purpose

The purpose of the Project is as follows:

The Project will deliver clean, renewable power<sup>34</sup> generated from the Canadian province of Quebec into New York City through a new 1,000 MW HVDC underground/underwater transmission line that is economically efficient.

## 1.3 Project Need

The Project is consistent with state and municipal energy policies, which call for the increased use of energy from renewable/sustainable resources.

### 1.3.1 State Energy Policy

In his 2012 State of the State Address, Governor Andrew Cuomo announced a plan to build a private sector funded \$2 billion "Energy Highway" system, specifically referring to an "energy expressway down from Quebec."<sup>35</sup> The goal of the Energy Highway is to ensure that a "cost-efficient, reliable and environmentally sustainable supply of power is available to fuel the state's economic growth and to meet the needs of its residents."<sup>36</sup> The Energy Highway Task force issued a Request for Information that solicited information related to "sustainable and environmentally responsible" projects and requested that respondents provide details on how their project would "help to reduce the carbon footprint of electricity consumed in New York,

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<sup>33</sup> Preamble to Guidelines for Specification of Disposal Sites for Dredged or Fill Material, 45 Fed. Reg. 85,336, 85,343 (Dec. 24, 1980) as referenced in U.S. Env'tl. Prot. Agency & U.S. Army Corps of Engineers, *Memorandum: Appropriate Level of Analysis Required for Evaluating Compliance with the Section 404(b)(1) Guidelines Alternatives Requirements* § 3.b. (Aug. 23, 1993) ("Section 404(b)(1) Compliance Memorandum"), <http://water.epa.gov/lawsregs/guidance/wetlands/flexible.cfm>.

<sup>34</sup> See Certificate, Pg. 54

<sup>35</sup> Press Release, N.Y. State Governor's Office, *Governor Cuomo Outlines Plan to Continue Building a New York by Growing the Economy, Reinventing State Government, and Advancing New York as a Progressive Leader* (Jan. 4, 2012), <http://184.106.78.18/press/sos2012>.

<sup>36</sup> Press Release, N.Y. State Governor's Office, *Governor Cuomo's Energy Highway Task Force Holds Summit* (Apr. 4, 2012), <http://184.106.78.18/press/04042012Energy-Highway>.

regardless of where electricity is produced.”<sup>37</sup> Additionally, New York State developed an Energy Plan with the goal of “Increasing Reliance on Renewables,” including “expanding the State’s purchases of hydropower.”<sup>38</sup> The Energy Plan noted that “the prospect of securing hydro power from Canada increases the likelihood that we will be able to reduce [Greenhouse Gas] emissions 80 percent by 2050.”<sup>39</sup>

The City of New York also recognized the importance of increasing the amount of renewable electricity available to consumers in New York City. In its “PlaNYC” update, the City calls for diversifying the City’s supply portfolio through, among other options, “harnessing cleaner resources outside the city.”<sup>40</sup>

### 1.3.2 Greenhouse Gases

The Project supports established state and federal goals to reduce Green House Gas (“GHG”) emissions and other air emissions associated with electric generation. On August 6, 2009, then-New York Governor David Paterson issued Executive Order No. 24 setting a goal of reducing the state’s greenhouse gas emissions 80 percent from 1990 levels by 2050.<sup>41</sup> The New York State Energy Plan calls for an increase in renewable energy to reduce the emissions of GHGs, nitrous oxides, sulfur dioxide, particulate matter (“PM”), and volatile organic compounds (“VOCs”) associated with traditional fossil-fuel-fired power plants.<sup>42</sup> The New York State Department of Environmental Conservation (“NYSDEC”), as a settlement party in the Project’s Article VII process, represents the State on the Regional Greenhouse Gas Initiative, which is a cooperative effort to cap and reduce GHG air emissions associated with the production of electricity.<sup>43</sup>

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<sup>37</sup> N.Y. Energy Highway, *Request for Information* at 13 (Apr. 19, 2012), [http://www.nyenergyhighway.com/Content/pdf/EH\\_RFI\\_Brochure\\_2012.pdf](http://www.nyenergyhighway.com/Content/pdf/EH_RFI_Brochure_2012.pdf).

<sup>38</sup> N.Y. State Energy Planning Board, *2009 State Energy Plan*, Vol. I at 93 (Dec. 2009), [http://www.nysenergyplan.com/final/New\\_York\\_State\\_Energy\\_Plan\\_VolumeI.pdf](http://www.nysenergyplan.com/final/New_York_State_Energy_Plan_VolumeI.pdf) (“State Energy Plan”).

<sup>39</sup> *Id.* at xvii.

<sup>40</sup> City of New York, *PlaNYC: A Greener, Greater New York* at 112 (Apr. 2011), [http://nytelecom.vo.llnwd.net/o15/agencies/planyc2030/pdf/planyc\\_2011\\_planyc\\_full\\_report.pdf](http://nytelecom.vo.llnwd.net/o15/agencies/planyc2030/pdf/planyc_2011_planyc_full_report.pdf).

<sup>41</sup> N.Y. State Dep’t of Env’tl. Conservation, *Executive Order No. 24 (2009): Establishing a Goal to Reduce Greenhouse Gas Emissions Eighty Percent by Year 2050 and Preparing a Climate Action Plan*, <http://www.dec.ny.gov/energy/71394.html> (last visited Apr. 22, 2013).

<sup>42</sup> See State Energy Plan at xiii, 3-5.

<sup>43</sup> N.Y. State Dep’t of Env’tl. Conservation, *The Regional Greenhouse Gas Initiative (RGGI): Carbon Dioxide Budget Trading Program*, <http://www.dec.ny.gov/energy/rggi.html> (last visited Apr. 22, 2013).

The 2009 New York State Energy Plan indicates that infrastructure investments are necessary to support the state's transition to a clean energy system with very low GHG emissions.<sup>44</sup> The Plan goes on to state that hydroelectric power from Canada could increase the likelihood of achieving an 80% reduction of GHG gases by 2050.<sup>45</sup>

The Clean Air Act also requires states, at a minimum, to meet national ambient air quality standards ("NAAQS").<sup>46</sup> When a state is in nonattainment of one or more of the NAAQS, such as New York, it must have a plan to come into attainment. The New York City metropolitan area is currently considered to be in nonattainment of the ground level ozone NAAQS and in nonattainment of the PM<sub>10</sub><sup>47</sup> and PM<sub>2.5</sub><sup>48</sup> NAAQS. Ground level ozone is created by emissions of nitrous oxides and VOCs, which are emitted by all fossil-fuel-fired electric generating facilities. PM<sub>10</sub>, PM<sub>2.5</sub>, and sulfur dioxide are also emitted by fossil-fuel-fired electric generating facilities.

London Economics International, LLC ("LEI") conducted an analysis for the Project and concluded that in 2018 the electricity produced via the type of generation to be transmitted by the Project into New York City would reduce emissions of CO<sub>2</sub> by 2.5 to 2.9 million tons, sulfur dioxide (SO<sub>2</sub>) by 454 to 571 tons, and oxides of nitrogen ("NOx") by 952 to 1,114 tons, with no offsetting emissions at the point of generation.<sup>49</sup> A separate analysis completed by the State of New York Department of Public Service ("NYSDPS") estimated reductions of 1.5 to 2.2 million tons of CO<sub>2</sub>, 499 to 828 tons of SO<sub>2</sub>, and 748 to 1,432 tons of NOx.<sup>50</sup>

### 1.3.3 Transmission Congestion

The 2009 National Electric Transmission Congestion Study conducted by the U.S. Department of Energy ("DOE") identified the metropolitan areas of New York southward through Northern

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<sup>44</sup> State Energy Plan at 4.

<sup>45</sup> *Id.* at xvii.

<sup>46</sup> U.S. Env'tl. Protection Agency, *National Ambient Air Quality Standards (NAAQS)* (Dec. 14, 2012), <http://www.epa.gov/air/criteria.html>, .

<sup>47</sup> U.S. Env'tl. Protection Agency, *Particulate Matter (PM-10) Nonattainment State/Area/County Report* (Dec. 14, 2012), <http://www.epa.gov/oar/oaqps/greenbk/pncs.html> (New York).

<sup>48</sup> U.S. Env'tl. Protection Agency, *Particulate Matter (PM-2.5) 2006 Nonattainment State/Area/County Report* (Dec. 14, 2012), <http://www.epa.gov/oar/oaqps/greenbk/rncs.html> (New York).

<sup>49</sup> London Economics International LLC, *Results of the 2018 Test Year Modeling Analysis* (Jan. 18, 2010), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={E7E08BDC-E247-4C08-9922-3E9A90A05015}>.

<sup>50</sup> Joint Proposal of Settlement at 59-60 & Fig. 2.



Virginia (the Mid-Atlantic Coastal area) as a Critical Congestion Area.<sup>51</sup> This is an area in which the DOE determined that it is critically important to remedy existing or growing transmission congestion problems because the current and/or projected effects of transmission congestion in terms of economic cost and reliability are severe. The report noted that while there are many projects in the NYISO generation interconnection queues, “new generation is slow to come on-line and is often offset by retirement of older generation capacity.”<sup>52</sup>

As noted in the New York State Energy Plan.<sup>53</sup>

Because New York’s electric infrastructure is old, significant capital investments will need to be made in the utilities’ electric transmission and distribution system to meet future electric demand and allow them to continue to provide reliable service. Replacement and improvement of existing aging infrastructure are critical, as system failures not only raise safety and reliability concerns, but can also lead to increased system congestion and therefore higher emissions and costs.

The document further notes that the construction of new infrastructure may be required regardless of economic and reliability benefits, to achieve New York State’s clean energy policy goals.<sup>54</sup>

Additionally, New York State’s Energy Highway Plan Request for Information noted:

Most of New York State’s transmission lines were built more than 50 years ago. It is estimated that about 25 percent of the State’s transmission system will have to be replaced within the next 10 years and nearly 50 percent will require replacement in the next 30 years. The utilities that own the transmission lines continue to invest in them, and the system can still be operated with utmost reliability. However, physical limitations and congestion on the grid at times prevent excess power supplies from upstate and Canada from reaching the downstate region, where demand is greatest. These transmission bottlenecks have a number of actual and potential consequences in terms of economics, the reliability of the power supply, the environment and public health:

- Many higher-cost downstate power plants must run even when cheaper plants are available because power from the cheaper plants cannot be delivered. This can result in higher costs for consumers and cost-effective solutions need to be sought.

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<sup>51</sup> U.S. Dep’t of Energy, *National Electric Transmission Congestion Study* § 4.4 (Dec. 2009), [http://energy.gov/sites/prod/files/Congestion\\_Study\\_2009.pdf](http://energy.gov/sites/prod/files/Congestion_Study_2009.pdf)

<sup>52</sup> *Id.* at 51.

<sup>53</sup> State Energy Plan at 65.

<sup>54</sup> *Id.* at 66.

- The downstate area lacks diversity in its power supply and relies mostly on natural gas-fired generation to meet its needs.
- Older plants in urban areas must run at peak hours, increasing air pollution and health risks in the summer months when these effects are most pronounced.
- At times, bottlenecks limit downstate access to renewable power.

In addition to addressing these concerns, investments in new and upgraded transmission lines will provide substantial economic benefits. For example, a recent national report concluded that every \$1 billion of transmission investments “supports approximately 13,000 full-time-equivalent years of employment and \$2.4 billion in total economic activity.”<sup>55</sup>

The Project enables distant generators to serve a portion of the regional load while bypassing locations where the transmission system experiences congestion. It avoids the challenges associated with building new generation capacity within the NYC load pocket, which include air quality restrictions, high real estate values, fuel supply problems, and local opposition to power plants. Energy efficiency, demand response, and other demand-side measures can reduce loads and improve the balance between supply and demand, but those measures must be pursued over extended periods (often with uncertain results) in order for their impacts to grow to transmission or power-plant-equivalent quantities.<sup>56</sup>

## 1.4 Geographic Requirements

The Project is intended to connect clean generation sources with the New York City load center. The majority of New York’s existing generation portfolio is composed of gas- and/or oil-fueled facilities, which accounts for approximately 61 percent of the total installed capacity in the state.<sup>57</sup> The vast majority of these gas and oil facilities tend to be older; about 65 percent of them were built before 1980, and therefore are relatively inefficient.<sup>58</sup>

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<sup>55</sup> New York Energy Highway: Request for information, pgs 7-8 ((2012).

<sup>56</sup> U.S. Dep’t of Energy, *National Electric Transmission Congestion Study* at 43 (Aug. 2006) (“2006 Transmission Congestion Study”), [http://energy.gov/sites/prod/files/oeprod/DocumentsandMedia/Congestion\\_Study\\_2006-9MB.pdf](http://energy.gov/sites/prod/files/oeprod/DocumentsandMedia/Congestion_Study_2006-9MB.pdf).

<sup>57</sup> See N.Y. Independent Sys. Operator, 2012 Load and Capacity Data “Gold Book” at Table III-2 (Apr. 2012) (“2012 Gold Book”), [http://www.nyiso.com/public/webdocs/media\\_room/publications\\_presentations/Planning\\_Reports/Planning\\_Reports/2012\\_GoldBook\\_V3.pdf](http://www.nyiso.com/public/webdocs/media_room/publications_presentations/Planning_Reports/Planning_Reports/2012_GoldBook_V3.pdf).

<sup>58</sup> *Id.*

There are currently no proposed renewable energy projects in the interconnection queue in the vicinity of New York City – in fact, over 3,500 MW has been withdrawn from the queue since 2007.<sup>59</sup> Therefore, other new generation sources in the New York City region are not anticipated to provide a significant increase in energy supply capacity and a resultant enhancement in system reliability comparable to the Project<sup>60</sup> and sources from locations outside of New York City must be identified. Hydropower projects in Canada currently generate excess electrical capacity, thereby making clean sources of generation in Canada the most practical choice for providing the additional capacity needed to help fulfill regional demands, while increasing the stability and security of the grid.<sup>61</sup>

The current and/or projected effects of transmission congestion in New York are complex and will be difficult to resolve.<sup>62</sup> The Project enables generators in Canada to serve a portion of the regional load without further increasing transmission congestion in the region. To do so effectively requires interconnection to the grid at locations within the load pocket. This design allows electricity generated outside of the region to be delivered without the need to rely significantly on the existing transmission facilities that are already suffering congestion.

In analyzing the potential solutions to congestion in the New York City region, the DOE's National Electric Transmission Congestion Study concluded that construction of major new transmission lines from north of the city would significantly increase the options available to the city for power.<sup>63</sup> Such transmission lines would deliver relatively inexpensive electricity from Canadian hydroelectric power plants and other renewable sources to load centers in major metropolitan areas.<sup>64</sup>

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<sup>59</sup> *Id.*

<sup>60</sup> Joint Proposal of Settlement at 14.

<sup>61</sup> U.S. Dep't of Energy, *National Electric Transmission Congestion Study* at 43 (Aug. 2006) ("2006 Transmission Congestion Study"), [http://energy.gov/sites/prod/files/oeprod/DocumentsandMedia/Congestion\\_Study\\_2006-9MB.pdf](http://energy.gov/sites/prod/files/oeprod/DocumentsandMedia/Congestion_Study_2006-9MB.pdf)

<sup>62</sup> *Id.*

<sup>63</sup> *Id.*

<sup>64</sup> *Id.*

## Section 2

# Proposed Project

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The Project consists of a 1,000 MW underwater/underground HVDC electric transmission system extending from the international border between Canada and the United States to Queens, New York City, New York. The Applicants propose to develop the Project to deliver clean sources of power to New York City.

### 2.1 Proposed Project Route

As discussed earlier, the Project as currently configured, represents the alternatives incorporated as part of the New York State siting and permitting process.

The Project originates at the international border between the United States and Canada and continues south within Lake Champlain for approximately 101.5 miles in waters of the state of New York. The cables will be located to the east of Rouses Point, Point au Fer, Chazy Landing, Point Au Roche and Cumberland Head, east of Valcour Island and the Four Brothers islands, and then would continue towards the New York – Vermont border near the middle of the lake. From Split Rock Point south, the cables will be located closer to the New York shoreline. Proceeding southward from Crown Point, the waters of the lake become shallower, and the cable route would be closer to the New York-Vermont border near the middle of the narrow water body.

At milepost (“MP”) 101.5, in the town of Dresden, Washington County, New York, the transmission cables would transition from the waters of Lake Champlain to the land on the western shore via a horizontal directional drill (“HDD”). The cables would then transition from under Lake Champlain to land owned by the Delaware and Hudson Railway (“D&H”)<sup>65</sup> and other property owners, and then enter the ROW of New York State Route 22. The cables would continue south within the Route 22 ROW until MP 111.9, except for a crossing of South Bay at MP 109.7. The cable route would continue within the Route 22 ROW into the Village of Whitehall and then would enter the Canadian-Pacific Railway (“CP”) ROW on lands owned by the D&H within the Village of Whitehall. The cables would remain primarily within the CP ROW and lands owned by the D&H for approximately 65.1 miles, crossing the Washington

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<sup>65</sup> The D&H was acquired some years ago by the Canadian Pacific Railway Company, but it still operates for many purposes under the D&H name.

County municipalities of Whitehall, Fort Ann, Hartford, Kingsbury, Fort Edward Town and Village; the Saratoga County municipalities of Moreau, Northumberland, Wilton, Greenfield, City of Saratoga Springs, Malta, Milton, Ballston, and Clifton Park; the Schenectady County municipalities of Glenville, Rotterdam and the City of Schenectady. Along this portion of the overland route, the cable route would have relatively minor deviations out of the CP ROW onto private and public lands for various engineering constraints, such as a narrow section of ROW, buildings, railroad developments, and sensitive habitat areas. In Schenectady, the proposed route would leave the CP ROW at MP 173 to be installed within Erie Boulevard so as to bypass a section of railroad bridges. The cables would re-enter the CP ROW around MP 173.6, but would exit again at MP 173.7 to utilize largely vacant land to pass beneath Interstate I-890. The cables re-enter the CP ROW at MP 174.3 and would continue to the Town of Rotterdam.

Around MP 177 in Rotterdam, the cables would transfer from the CP ROW to the CSX Transportation Railroad (“CSX”) ROW. The cables would be located within the CSX ROW southeasterly for approximately 22 miles through the Albany County municipalities of Guilderland, New Scotland, Voorheesville, Bethlehem and Coeymans. From MP 199, the cables would continue along a CSX ROW that runs south parallel to the Hudson River within the Town of Coeymans and the Village of Ravena, and the Greene County municipalities of New Baltimore, Town and Village of Coxsackie, Town of Athens, and the Town and Village of Catskill. There are relatively minor deviations from the CSX ROW due to engineering constraints such as bridges, roadway crossings, and areas where the existing ROW is too narrow to permit cable installation while meeting established railroad clearance criteria.

In the Town of Catskill north of the hamlet of Cementon, the cable route would exit the CSX ROW at MP 227.5 and turn easterly to follow Alpha Road, which terminates at a landing area at MP 228.2. At this point the cables would transition into the Hudson River via an HDD. The cables would be located within the Hudson River south from Cementon for approximately 67 miles. The cable route has been sited to avoid known sensitive habitat, potential cultural resources, contamination zones and navigation hazards to the extent practicable.

At MP 295.7, the cables would transition from the Hudson River via an HDD and enter a CSX ROW in the Rockland County Town of Stony Point. The cables subsequently would follow the CSX route and a public road (Route 9W) ROW for a 7.7-mile overland bypass of Haverstraw

Bay, which has been identified as one of the most sensitive significant coastal habitats within the Hudson River. The cable route then would travel through the Town of Haverstraw, Village of West Haverstraw and Village of Haverstraw primarily within the CSX ROW, although there are deviations to avoid engineering constraints such as bridges and roadway crossings. At MP 300.8, the CSX ROW is bordered on the east and then on both sides by Haverstraw Beach State Park; therefore, starting at MP 301.4, an HDD would be established to install the cables under Rockland Lake State Park and Hook Mountain State Park (comprising portions of Palisades Interstate Park) to enter the ROW of NYS Route 9W in the Town of Clarkstown. From MP 301.8 to 302.4, the cables would be located within the Route 9W ROW. At this point, another HDD would install the cables beneath the two parks and transition the cables into Hudson River.

From MP 302.8 south of Haverstraw Bay, the cables would be located within the New York State section of the Hudson River for approximately 20.7 miles. As with the other in-water segments, the routing has been designed so as to avoid sensitive resources. At MP 324, the cable would turn easterly and enter Spuyten Duyvill Creek and the Harlem River within the borough of Manhattan in New York City. The cable route would be located within the Harlem River for 6.58 miles, and then transition to land via an HDD to enter a CSX ROW in the borough of the Bronx. The cable route along the CSX ROW would cross lands owned by the New York State Department of Transportation, cross beneath the Robert F. Kennedy Bridge and the Hell Gate railroad bridge and then transition via an HDD to cross beneath and into the East River. After a short jet plow installation, the cable route would transition to land via another HDD in the borough of Queens in New York City, and would continue easterly to the Luyster Creek converter station site in Astoria, north of 20th Avenue on lands of Consolidated Edison Company of New York, Inc. (“Con Edison”).

The converter station would be a “compact type” with a total footprint (i.e., building and associated equipment and related areas) of approximately five (5) acres. Gas insulated HVAC cables would connect the converter station to the New York Power Authority (NYPA) Astoria Annex 345 kilovolt (“kV”) substation. In addition, the NYISO may require the Applicants to construct a four-breaker gas-insulated ring bus in a building to be located on the same parcel as the converter station, unless a preferable location for this ring bus can be found closer to the Astoria Annex.

From the Astoria Annex substation, another set of HVAC cables would be located within the streets of New York City for approximately three miles to Con Edison's Rainey Substation ("Astoria-Rainey Cable"). The cable would run north parallel along 20th Avenue before crossing 20th Avenue southwesterly onto 29th Street. The cable route would continue within 29th Street for one city block before turning northwest onto 21st Avenue and continuing within 21st Avenue until 23rd Street. The cable route would turn onto 23rd Street and continue southerly, including crossing under the Triborough Bridge, until 30th Drive. The cable route would then turn westerly on to 30th Drive and then southerly within 14th Street. The cable route would turn to the west onto 31st Drive for one city block before turning to the south onto 12th Street. The cable route would turn west onto 35th Avenue and continue to the Rainey Substation.

The proposed Project route is shown in Figure 2-1.

**FIGURE 2-1  
PROPOSED PROJECT ROUTE**





## 2.2 Proposed Project Construction Techniques

Given the length of the route from the Canadian border to New York City (approximately 333.3 miles from the international border to the converter station plus the Astoria-Rainey Cable which is approximately 3.5 miles) and the diversity of landforms and water areas that are crossed by the cable route, a variety of construction methods and equipment will be employed. As part of Settlement Parties' Joint Proposal filed in the Article VII proceeding, the Applicants developed a Best Management Practices ("BMP") Manual, which details BMPs to be utilized during Project construction. The BMP Manual was included as Attachment O to Applicants' Supplemental Application.<sup>66</sup>

### 2.2.1 Underwater Installation Methods

The two HVDC underwater cables associated with the Project would be bundled and laid together within the same trench. The cables would be initially placed in a vertical position (one on top of the other) in the trench, although sediment conditions may allow for slumping into a horizontal position (side-by-side) relative to each other. Cable burial would generally be performed at the same time the cable is laid or at a later date, as deemed appropriate or necessary due to subsurface conditions. The cables would be laid by specialized cable-laying vessels or a specially outfitted laybarge, depending on navigation constraints along the Project route.

The cables would be transported from the manufacturer by a special cable transport vessel and transferred onto the cable installation vessel. The linear cable machines onboard the installation vessel would pull the cables from coils on the transport vessel onto the installation vessel and into prefabricated tubs. After the cable has been transferred, the installation vessel would travel to the construction commencement location. This process would be repeated as necessary to deliver and install the cable along the length of the various waterways.

Based on the sediment data collected during the spring 2010 Marine Route Survey,<sup>67</sup> it is not anticipated that a backfill plow would be needed. As the cables would be simultaneously laid

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<sup>66</sup> Attachment O: Best Management Practices, Champlain Hudson Power Express Inc., Supplement to U.S. Army Corps of Engineers Application, No. 2009-1089-EHA (Feb. 10, 2012) ("CHP Supplemental Application"), <http://www.chpexpress.com/docs/regulatory/permit-application/Attachment%20O%2020120229.pdf>.

<sup>67</sup> See Attachment E: Marine Route Survey Summary Report, Champlain Hudson Power Express Inc., U.S. Army Corps of Engineers Application, No. 2009-1089-EHA (Dec. 6, 2010),

and buried, the majority of displaced sediments would refill the trench. In addition, due to the natural dynamic processes in the lakes, rivers and estuaries, sediments would be naturally deposited within the trench. Post-installation bathymetric and sediment surveys would be conducted to monitor benthic habitats and sediment conditions.

### 2.2.1.1 Jet Plow/Water Jetting

The proposed method for laying and burial of the majority of the underwater cable is the jet plow/water jetting embedment process. These methods involve the use of a positioned cable vessel and a hydraulically powered water jetting device that simultaneously lays and embeds the cables in one continuous trench. At this time, the primary proposed installation vessel would be dynamically positioned, using thrusters and the vessel propulsion system. Deeper draft vessels equipped with dynamic positioning thrusters are proposed for deeper water locations. Dynamically positioned cable installation vessels do not contact or impact the bottom. However, there may be limited circumstances such as in relatively shallow water depths (typically less than 15 feet) where shallow draft vessels/barges using anchors for positioning may be used for installation. An anchor-positioned vessel would propel itself along the Project route with forward winches while letting out on aft winches with other lateral anchors holding the side-to-side alignment during the installation. In the event that an anchor-positioned vessel is needed, it is assumed that a 4-to-8 point anchor mooring system would be used in this process and requires an anchor-handling tug to move anchors while the installation and burial proceeds uninterrupted on a 24-hour basis.

The jet plow/water jetting embedment methods for underwater cable installations are considered to be the most effective and least environmentally damaging when compared to traditional mechanical dredging and trenching operations.<sup>68</sup> This method of laying and burying the cables simultaneously ensures the placement of the underwater cable system at the target burial depth with minimum bottom disturbance, with much of the fluidized sediment settling back into the trench. For these reasons, it is the installation methodology that appears to be preferred by state

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[http://www.chpexpress.com/docs/regulatory/USACE/CHPE\\_USACE\\_Application\\_E.pdf](http://www.chpexpress.com/docs/regulatory/USACE/CHPE_USACE_Application_E.pdf). Sediment data can be found on pages 20 to 27 of this report.

<sup>68</sup> Bureau of Ocean Energy Management, *Cape Wind Final Environmental Impact Statement* at 2-11 (Jan. 2009), [http://www.boem.gov/uploadedFiles/BOEM/Renewable\\_Energy\\_Program/Studies/Cape%20Wind%20Energy%20Project%20FEIS.pdf](http://www.boem.gov/uploadedFiles/BOEM/Renewable_Energy_Program/Studies/Cape%20Wind%20Energy%20Project%20FEIS.pdf).

and federal regulatory agencies based on review of past underwater cable projects<sup>69</sup> and the Settlement Parties concluded that “no permanent or long-term impacts to water quality from cable installation are expected.”<sup>70</sup>

Jet Plow/water jetting equipment uses pressurized water (taken from ambient waterbodies) from water pump systems onboard the cable vessel to fluidize sediment. The water jetting device is typically fitted with hydraulic pressure nozzles located down the length of “swords” that are inserted into the sediment on either side of the cable and which create a direct downward and backward “swept flow” force inside the trench. This provides a down and back flow of re-suspended sediments within the trench, thereby “fluidizing” the *in situ* sediment column as the equipment progresses along the cable route such that the underwater cable settles into the trench under its own weight to the planned depth of burial. The water jetting device’s hydrodynamic forces do not work to produce an upward movement of sediment into the water column, since the objective of this method is to maximize settling of re-suspended sediments within the trench to bury or “embed” the cable system. The pre-determined deployment depth of the jetting swords controls the cable burial depth using adjustable hydraulics on the water jetting device.

The cable system location and burial depth would be recorded during installation for use in the preparation of as-built location plans. The water jetting device is equipped with horizontal and vertical positioning equipment that records the laying and burial conditions, position, and burial depth. This information is monitored continually on the installation vessel. This information

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<sup>69</sup> See, e.g., Order Granting Certificate of Environmental Compatibility and Public Need, *Application of Hudson Transmission Partners, LLC for a Certificate of Environmental Compatibility and Public Need for a 345 Kilovolt Submarine/Underground Electric Transmission Line Between Manhattan and New Jersey*, Case No. 08-T-0034 (N.Y. P.S.C. Sept. 15, 2010), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={CAFAD145-3C87-4E33-ACDF-45D87B7A76C6}>; Order Adopting the Terms of a Joint Proposal and Granting Certificate of Environmental Compatibility and Public Need, With Conditions and Clean Water Act §401 Water Quality Certification, *Application of Bayonne Energy Center, LLC for a Certificate of Environmental Compatibility and Public Need for the Construction of the New York State Portion (Kings County) of a 6.6 Mile, 345 kV AC, 3 Phase Circuit Submarine Electric Transmission Facility Pursuant to Article VII of the PSL*, Case No. 08-T-1245 (N.Y. P.S.C. Nov. 12, 2009), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={8BF803F7-E587-439E-AB32-83C01BB41401}>.

<sup>70</sup> Joint Proposal at 21, *Application of Champlain Hudson Power Express, Inc. and CHPE Properties, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the Public Service Law for the Construction, Operation and Maintenance of a High-Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Feb. 24, 2012), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={C5F63E41-5ED5-46A2-99A5-F1C5FC522D36}>.

would be forwarded to appropriate agencies and organizations as required for inclusion on future navigation charts.

Burial can be performed by either a towed or self-propelled burial machine. In this instance, the self-propelled water jetting device moves forward by the reaction of the backward thrust of the hydraulic jetting power that is fluidizing the soil and keeping the created trench open for the cable to sink into. The forward rate of progress is regulated by the varying types of sediment and the water pressure applied through the jets.

A skid/pontoon-mounted jet plow/water jetting device or wheeled, frame-mounted water jetting device, deployed and operated in conjunction with the cable-laying vessel, is proposed for the underwater installation operations. For burial, the cable vessel is used as the platform to operate the water burial device at a safe distance as the laying/burial operation progresses. The cable system is deployed from the vessel to the funnel of the water jetting device. The water jetting swords are lowered onto the bottom, pump systems are initiated, and the jet trencher progresses along the cable route with the simultaneous lay and burial operation. The pontoons can be made buoyant to serve different installation needs.

Temporarily resuspended in-situ sediments are largely contained within the limits of the trench wall, although a small percentage of the re-suspended sediments are transported outside of the trench. Any resuspended sediments that leave the trench generally tend to settle out quickly in areas immediately flanking the trench. However, the amount of sediment transported out of the trench, the residence time of sediment suspension, and the distance suspended sediments are transported are dependent upon multiple factors, including sediment grain-size, composition, hydrodynamic forces, trench depth, and the hydraulic jetting pressures imposed on the sediment column necessary to achieve desired burial depths. Water quality modeling specific to the conditions in Lake Champlain and the Hudson, Harlem, and East Rivers is provided in Attachment M of the Supplemental Application.<sup>71</sup>

As the jetting device progresses along the route, the water pressure at the device nozzles would be adjusted as sediment types or densities change to achieve the required water quality

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<sup>71</sup> Attachment M: Water Quality Modeling, CHP Supplemental Application, <http://www.chpexpress.com/docs/regulatory/permit-application/Attachment%20M%2020120229.pdf>.

standards.<sup>72</sup> A test trench may be preformed to ensure proper depth of burial. In the unlikely event that the minimum burial depth is not met during water jetting embedment, additional passes with the water jetting device or the use of diver-assisted water jet probes would be utilized to achieve the required installation target depth.

Jet water pressure varies with different bottom sediment materials, with typical pressures including:

<b>Material</b>	<b>Estimated Jet Water Pressure</b>
Sand and Silt	400-600 psi
Soft Clay	600-800 psi
Hard Clay	800-1,000 psi

Some types of water jetting devices also employ an ejector system to assist in the trenching operation in certain sediment types that do not fluidize well. The ejector system employs an airlift system to create a suction force within the ejector pipes that entrains sediment and releases it at the end of the ejector pipes to either side of the water jetting device. This addition to the water jetting methodology would only be employed to assist in burial if monitoring of the installation reveals difficulty in obtaining the required burial depth due to lack of adequate fluidization of sediments.

In addition to continuous closed circuit video monitoring, divers would make regularly scheduled dives in order to monitor the cable installation operation and inspect the condition of the cable trench and jet sled. Occasionally, the jet sled may require maintenance during cable burial operations due to nozzle wear or loss. During these maintenance periods, the jet leg roller load cells, suction piping, and hose connections are checked, and hydraulic fluid is replenished as required. As necessary, a Spill Prevention, Countermeasure, and Control (“SPCC”) Plan or its

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<sup>72</sup> New York State Public Service Commission 401 Water Quality Certification, Application of Champlain Hudson Power Express, Inc. and CHPE Properties, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the Public Service Law for the Construction, Operation and Maintenance of a High-Voltage Direct Current Circuit from the Canadian Border to New York City, Case No. 10-T-0139 (N.Y. P.S.C. Jan. 1, 2013), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={E992FA4C-1906-44EB-9B92-8567F410F660}>

equivalent would be developed pursuant to federal and/or state regulations and would be followed during construction equipment maintenance and repair activities.

In certain small areas, typically transition areas between shoreline HDDs and underwater cable trenches, a diver-operated hand jet or Remotely-Operated Vehicle (“ROV”) may be used to bury the cable. In this process, a support vessel provides pressurized water through a hose with a nozzle that is maneuvered by a diver or ROV. The jet of water works the sediment under the cable to create a trench into which the cable settles. This method would be employed for short distances only, typically less than one hundred (100) feet.

#### **2.2.1.2 Plowing**

For the plowing technique, a trench is made for the cables by towing a plow, and the cables are simultaneously fed into the trench as it is created by the plow. The plow is not self-propelled, but is instead tethered to a surface support vessel, which supplies the pulling power. Usually, the bottom sediment is allowed to naturally backfill the trench over the cable by slumping of the trench walls, wave action, or bed load transport of sediments.

Shear plows can potentially reduce sediment disturbance as they do not fluidize the sediment and generally require less force to create a narrower trench in the riverbed or lakebed to bury underwater cables than other types of cable installation equipment. Some issues that affect the suitability of shear plows for underwater cable installation and burial are sediment cohesiveness and burial depth. Use of the shear plow is typically limited to sediments that have shear strengths less than 20 Kilopascals (“kPa”). Also, shear plows are typically used with shallower burial depths (less than four (4) feet), which generally reduces the overall amount (i.e., volume) of sediment disturbed during installation.

#### **2.2.1.3 Conventional Dredging**

While it is intended that the use of conventional underwater trench excavation methods would be avoided or minimized, there would be some locations where conventional dredging would be used to meet required installation depths, or to install cofferdams associated with shoreline HDD installations. These circumstances may include instances where the cable route crosses an existing Federal navigation channel. In these locations, either a clam-shell dredge or a barge-

mounted excavator would be used to pre-dredge a trench into which the cable would be laid. Dredge material would be brought to the surface to be placed on barges for approved disposal and would not be used for backfill. This work would most likely occur from spud barges, although anchor-moored or jack-up barges may also be employed, depending upon equipment availability and site conditions. A typical spud dredge barge would be equipped with two or more legs, with one spud being a walk-away spud. The barge would have a crane, typically outfitted with a 6 to 9 cubic yard clamshell bucket. Alternatively, the barge may have a track hoe excavator working off the deck of the barge, possibly with an extended boom for areas of deeper water. Once a segment of trench is excavated, cable would be laid, and the clam-shell dredge or excavator would place clean backfill sediment back into the trench.

#### **2.2.1.4 Infrastructure Crossing**

A preliminary review of the underwater cable route identified areas where cable installation activities would occur in the vicinity of or cross existing infrastructure (e.g., electric cables, gas pipelines, ferry cables, etc.). There are several different installation techniques that can be utilized when crossing existing infrastructure based on the type, burial depth, and existing protective coverings of the infrastructure. The design of utility crossings would follow industry standards.

When crossing utilities that are owned by a third party, the design of the protection at existing cables and pipelines would require formal consultations with the owners and/or operators of this collocated infrastructure. Detailed discussions on coordination, design and installation methodologies and safety issues would be conducted with the owners of these infrastructures, as specified in the Article VII Certificate Conditions.<sup>73</sup> The detailed designs for each crossing would be provided as part of the Environmental Management and Construction Plan (“EM&CP”), which will be filed with the NYS Public Service Commission for approval.

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<sup>73</sup> Order Granting Certificate of Environmental Compatibility and Public Need at 86, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Apr. 18, 2013), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={A71423C8-B489-4996-9C5A-016C9F334FFC}>.

### Crossing of Fiber Optic and Telecommunication Cables

Wherever possible, the HVDC cables would cross existing fiber optic and telecommunication cables at right angles, extending approximately one hundred fifty (150) to three hundred (300) feet in length. The method of embedding and protection would be determined by the burial depth of the existing cables. The details of these crossings would be coordinated with the owners and/or operators of the existing facilities as well as the USACE.

### Crossing of Gas or Oil Pipelines and Power Cables

Where the cables cross existing pipelines or power cables, the cables would cross the existing infrastructure as close as possible to right-angles, extending up to three hundred (300) feet on each side of the crossing point. The method of cable embedding and protection would be determined by the burial depth of the existing infrastructure. The details of these crossings would be coordinated with the owners and/or operators of the existing facilities as well as the USACE.

### Crossings of Other Infrastructure Types

A “chain-ferry” operates across the proposed underwater cable route within Lake Champlain. The chain ferry utilizes ferry cables laid on the bottom of Lake Champlain. The normal penetration of the ferry cables into the lakebed would be assessed, and if deemed necessary, additional protection in the form of deeper cable burial at the crossing point or the use of an outer protection sleeve to guard against abrasion would be installed. The ferry cables would be temporarily removed to facilitate the installation of the underwater cables. The ferry cables would then be replaced over the top of the transmission cables. The ferry operator reports that its cables are replaced every four years; therefore, there may be an opportunity to coordinate the HVDC cable installation schedule with the ferry cable replacement schedule. Detailed coordination and discussions with the ferry operator on methodologies and scheduling will occur.

The underwater HVDC cables would also be routed beneath overhead infrastructures, including road bridges and electrical transmission lines. These would not be of concern for the cable systems once in operation, but the superstructure on the cable-laying vessels would be designed to take account of any height restrictions



### 2.2.2 Terrestrial Installation Methods

For the overland portions of the cable route, the cables will be buried via excavated trenches or trenchless technology (HDD or Jack and Bore (“J&B”)) methods. The majority of the overland portion of the cable route is located within or immediately adjacent to the existing CP, CSX, and NYS Routes 22 and 9W ROWs. Standard and typical diagrams, which include details representing various methods and equipment to be used during Project construction, were provided as Attachment H to Applicants’ Supplemental Application.<sup>74</sup>

A minimum separation distance is required from the rails to the cables by each railroad; CP requires a minimum separation of ten (10) feet from the centerline of the outermost track to the cable trench, and CSX requires a minimum separation of twenty-five (25) feet from the centerline of the outermost track. The typical and preferred layout is to have the bipole (two cables) installed on one (same) side of the railroad tracks. With this layout, the limits of anticipated construction activity extend forty (40) feet beyond the required minimum setback of the railroads. This 40-foot area would include the area needed for excavation of the trench (approximately four (4) feet wide), installation of erosion and sediment control measures, and stockpiling of excavated material.<sup>75</sup> There are areas that would require different configurations and pose additional engineering challenges, such as steep slopes, environmentally sensitive areas, and existing structures. These areas would be identified and site-specific engineering solutions would be developed as part of the Environmental Management and Construction Plan (“EM&CP”). The EM&CP, which represents the final design phase of the Project, will be filed with the NYS Public Service Commission for approval. A minimum construction corridor of 25 feet would be required along the edge of Routes 22 and 9W for installation of the two HVDC cables, although a wider width may be employed to allow for more efficient construction and quicker completion of the work in these areas.<sup>76</sup>

Each of the two (2) overland cables would require a number of joints and a temporary flat pad would be installed underneath each joint for splicing activities.<sup>77</sup> The number of joints would be

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<sup>74</sup> Attachment H – Revised Attachment H: Cross Section Diagrams, CHP Supplemental Application, <http://www.chpexpress.com/docs/regulatory/permit-application/Attachment%20H%2020120229.pdf>.

<sup>75</sup> *Id.* at 13, 16.

<sup>76</sup> *Id.* at 19.

<sup>77</sup> *Id.* at 12.

kept to a minimum and would be determined either by the maximum length of cable that can be transported in a single piece or by the maximum length of cable that can be pulled, whichever is less, as well as the number of HDD and J&B locations. For land installation, the expected maximum segment lengths between splices would be approximately one-half mile. The jointing for both cables would be performed in a single jointing pit, with typical pit dimensions being 30 feet long, 12 feet wide, and four (4) feet deep.<sup>78</sup> Subsequent to completion of cable jointing, the jointing pit would be backfilled primarily with native soils to the original contours/conditions. As further described in Section 5 and shown in the diagrams included in Attachment H of the Supplemental Application,<sup>79</sup> thermal resistivity sand and a protective covering may be used around the immediate vicinity of the buried cables.

The following sections identify the general construction sequence for routine cable installation along the overland portion of the cable route:

- Initial clearing operations and storm water and erosion control installation;
- Trench excavation;
- Cable installation;
- Backfilling; and
- Restoration and revegetation.

#### **2.2.2.1 Initial Clearing Operations & Stormwater and Erosion Controls**

Initial clearing operations would include the removal of vegetation within the cable trench area and within any temporary additional construction workspace (e.g., HDD workspace, cable joint pits, access roads and staging areas) either by mechanical or hand cutting. Vegetation would be cut at ground level, leaving existing root systems intact except for the immediate trench area, and the aboveground vegetation removed for chipping or disposal. Tree stumps and rootstock would be left undisturbed in the temporary workspace wherever possible to encourage natural revegetation. Brush and tree limbs would be chipped and spread in approved locations or hauled

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<sup>78</sup> *Id.*

<sup>79</sup> *Id.* at 11.

off-site for disposal. Timber would be removed from the ROW for salvage or to approved locations.

The cleared width within the ROW and temporary construction workspace would be kept to the minimum that would allow for spoil storage, staging, assembly of materials, construction vehicle passage, and all other activities required to safely install the cables and associated equipment.

Prior to or closely following initial disturbance of the soil, erosion controls would be properly installed as required. Representational drawings of erosion control methods are included in Attachment H of the Supplemental Application (see “Silt Fence,” Figure 176764-UM-21<sup>80</sup> and “Straw Bale Dike,” Figure 176764-UM-22).<sup>81</sup> Design of the stormwater and erosion controls would be completed as part of the development of the EM&CP and would include measures such as silt fences, hay bales, temporary mulching, etc.

#### **2.2.2.2 Trench Excavation**

The typical cable trench along the overland portion of the route would be four (4) feet wide at the bottom and approximately four (4) to five (5) feet deep to allow for the proper depth required for the burial of the cables (see “Typical Trench Cross Section,” Figure 176764-UM-08).<sup>82</sup> The cables would generally be installed side-by-side; although in some situations there may be up to three (3) feet of spacing between the cables within the four-foot-wide trench.

In normal terrain where the soil conditions range from organic loam, sand, gravel or other unconsolidated material and sufficient clearances exist, traditional excavation equipment would be used. The mixing of topsoil with subsoil would be minimized by using topsoil segregation construction methods in agricultural lands and wetlands (except when standing water or saturated soils are present). Topsoil would be stripped from the trench and placed on one side of the trench. The subsoil stockpile area (trench plus spoil side method) would be placed on the other side of the trench or otherwise segregated. Representative drawings of stockpile placement and management are included in Attachment H of the Supplemental Application (see “ROW Top

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<sup>80</sup> Attachment H – Revised Attachment H: Cross Section Diagrams at 32, CHP Supplemental Application, <http://www.chpexpress.com/docs/regulatory/permit-application/Attachment%20H%2020120229.pdf>.

<sup>81</sup> *Id.* at 33.

<sup>82</sup> *Id.* at 11.

Soil Segregation Techniques”).<sup>83</sup> Should it become necessary to remove water from the trench, it would be pumped to a stable, vegetated upland area (where practical) or filtered through a filter bag or siltation barrier.

Based on review of soils and geologic maps of the routing area, shallow bedrock has the potential to be encountered along some portions of the overland segment of the Project route. The technique selected to remove bedrock encountered during cable installation activities is dependent on relative hardness, fracture susceptibility, and expected volume of the material. Techniques include the following:

- Conventional excavation with a backhoe;
- Hammering with a pointed backhoe attachment followed by backhoe excavation;
- Rock saw/trencher; or
- Blasting followed by backhoe excavation.

All blasting activity would be performed by licensed professionals according to strict guidelines designed to control energy release. Proper safeguards will be taken to protect personnel and property in the area. Charges would be kept to the minimum required to break up the rock. Where appropriate, mats made of heavy steel mesh or other comparable material or trench spoil would be utilized to prevent the scattering of rock and debris. These activities would strictly adhere to all industry standards that apply to controlled blasting and blast vibration limits with regard to structures and underground utilities. Blasting in the vicinity of nearby utilities and railroads would be coordinated with the owner, as necessary. Blasted rock would be hauled off-site and disposed of in an appropriate manner. Details of blasting controls and safety procedures would be specified in the EM&CP filing.

### **2.2.2.3 Cable Installation**

For the overland sections of the Project route, the two (2) power cables would typically be laid side-by-side in a trench approximately four (4) feet wide and four (4) to five (5) feet deep.<sup>84</sup> Once a pre-selected length of trench is excavated to the necessary depth and the base prepared,

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<sup>83</sup> *Id.* at 23.

<sup>84</sup> *Id.* at 11.

rollers would be placed in the bottom of the trench (or along the upper rim of the excavation) to facilitate pulling the cable into the trench. A cable attached to a winch at the opposite end of the trench from the cable spool would be attached to the cable and reeled in, pulling the cable down the length of the trench on the rollers. Depending upon the soil conditions on the bottom of the trench, the bottom of the trench may require padding fill (i.e., clean sand) before pulling the cable into the trench. Once the cable segment is pulled down the length of the trench, it is moved off the rollers and the rollers are re-used at a different location. Given the need to schedule work with the railroads and the overall construction schedule, it is anticipated that cable installation activities would occur twenty four (24) hours per day/seven (7) days per week in most areas, with nighttime shutdowns occurring in select sensitive receptor areas.<sup>85</sup>

During cable installation along railroad corridors, it is anticipated that the railroads would be used to transport heavy equipment such as cable drums to centralized stockpiling areas. Final transport of the cable spools, construction equipment, and supplies would be transported on roadways and so it would be necessary for vehicles to arrive and depart from work areas via local roadways. Workers may arrive at contractor yards or the right-of-way in pickup trucks, supplies may be delivered directly to the site, and equipment such as dewatering pumps, generators, or excavators may also need to access the site via local roads. Along the NYS Routes 22 and 9W corridors, all equipment and supplies would be delivered via the roadways. Within New York City, equipment and supplies would be delivered by roadway, rail, or water transport. Procedures for traffic management would be included in the EM&CP and may include items such as detours, police details, and signage.

#### **2.2.2.4 Backfilling**

Subsequent to laying the cables, the trench would be backfilled with a layer of soil exhibiting the required low thermal resistivity properties needed to surround the cables, which may include non-native material if the native materials do not exhibit the required low thermal resistivity properties. Because the operation of the cables results in the generation of heat, and heat reduces

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<sup>85</sup> Environmental Impacts Associated with Routing Proposed in Joint Proposal at 5, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Feb. 24, 2012), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={4CC6BFC1-1945-401B-8EF9-D67CB3C263FB}>.

the electrical conductivity of the cables, it is important to backfill with soil having a low thermal resistivity. The soil's ability to conduct heat to the atmosphere would limit the temperature build-up in the soil around the cable and prevent heat from one cable affecting the nearby cable. There would be a protective concrete or high density polyethylene ("HDPE") cover plate directly above the low thermal resistive backfill material, which is anticipated to be one to two feet above the bottom of the trench. A safety marker tape would be placed approximately two (2) feet below the ground surface and directly above the cables. The top of the trench may be slightly crowned to compensate for settling. Excess clean spoil material from trench excavation would be disposed of by spoiling on site where approved, or properly disposed of off site at an approved location. Contaminated spoils would be disposed of as required by federal and/or state regulation.

#### **2.2.2.5 Restoration and Re-vegetation**

Cleanup crews would complete the restoration and revegetation of the ROW and temporary construction workspace. In conjunction with backfilling operations, any remnant woody material and construction debris would be removed from the rights-of-way or as allowed by state and federal regulators. The construction area would be seeded with an approved seed mix for the temporary work area and allowed to further revegetate naturally. Paved areas would be restored to match existing conditions in accordance with NYSDOT requirements.

#### **2.2.2.6 Wetland Crossings**

As part of the Joint Proposal, the Applicants agreed to a condition which required that they "minimize disruption to regulated wetlands during the construction, operation, and maintenance activities of the Facility."<sup>86</sup> This condition further requires that any activities that may affect regulated wetlands shall be designed and controlled to minimize adverse impacts, giving due consideration to the environmental values and functions of the regulated wetlands and the adjacent area. The Applicants are also required "to the maximum extent practicable, avoid direct

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<sup>86</sup> Order Granting Certificate of Environmental Compatibility and Public Need at 256, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Apr. 18, 2013), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={A71423C8-B489-4996-9C5A-016C9F334FFC}>.

impacts to regulated wetlands and construct access roads outside regulated wetlands and adjacent areas.”<sup>87</sup> Pursuant to another condition, the Applicants will establish and implement a program to monitor the success of wetland and stream restoration upon completion of construction and restoration activities.<sup>88</sup>

Routing construction equipment working along the overland portions of the route will operate primarily from the railroad bed, railroad access roads, embankments, along the road shoulder, or other upland areas. If any construction equipment needs to operate within wetlands that are likely to be impacted by soil compaction or rutting, based on conditions at the time of construction, the Applicants will use equipment mats or low-ground-pressure tracked vehicles to avoid and/or minimize impacts to wetland soils.<sup>89</sup> Clearing of existing vegetation within wetlands and/or in or near waterbodies will be limited to the area necessary to allow for completion of construction activities and to allow for reasonable access for long term maintenance.<sup>90</sup>

To avoid increases in erosion and sedimentation into waterbodies and wetlands from land disturbance in nearby construction areas, the Applicants will install temporary and permanent erosion control measures along the construction corridor and adjacent to soil stockpiles, as needed, and will manage construction stormwater in accordance with a Storm Water Pollution Prevention Plan (“SWPPP”) for the Project.<sup>91</sup> If dewatering is required within the excavated trench, water will be discharged to a well-vegetated upland area, a properly constructed dewatering structure, or through a filter bag.<sup>92</sup>

In addition to the requirements of the Certificate Conditions, the Applicants have also agreed to implement Best Management Practices (“BMPs”), which establish basic procedures to be followed during construction, operation and maintenance of the Project<sup>93</sup>. Topics covered in the BMPS include stormwater pollution prevention, protection of streams and wetlands, and the

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<sup>87</sup> *Id.*

<sup>88</sup> *Id.* at 264.

<sup>89</sup> *Id.*

<sup>90</sup> *Id.* at 260.

<sup>91</sup> *Id.* at 262.

<sup>92</sup> *Id.*

<sup>93</sup> *Id.* at 368.

cleanup and restoration of disturbed lands. The complete document was provided to the USACE in Appendix O of the Supplemental Application.<sup>94</sup>

### **2.2.2.7 Overland Infrastructure/Waterway Crossings**

The Project route would result in multiple river, stream, road, and other crossings by the cables and construction equipment. Cable installation options for the infrastructure and/or waterway crossings include trenching, HDD (see Section 2.2.2 below), or attachment to existing structures such as bridges or railroad trestles. The specific design for each crossing would address the conditions at the particular location, owner/operator design requirements and the preferences of the Engineering, Procurement and Construction (“EPC”) contractor, or the Conditions of the Article VII Certificate of Environmental Compatibility and Public Need (“Certificate”) and would be detailed in EM&CP.

### **2.2.3 Horizontal Directional Drilling Installation Methods**

HDD is a common technique used to install transmission cable projects to avoid or minimize environmental impacts as well as to address engineering or infrastructure constraints associated with traditional trench installation (e.g., major highway crossings). HDD is a trenchless method for installing pipelines and conduit beneath other facilities or resources of concern, including habitats, archeological sites, waterbodies, or existing infrastructure. HDD is a multi-stage process<sup>95</sup> composed of the five steps listed below:

- Pre-site planning;
- Drilling a pilot hole;
- Expanding the pilot hole by reaming if necessary;
- Pull back of drill string with simultaneous installation of conduit; and
- Cable pull through the conduit.

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<sup>94</sup> Attachment O: Best Management Practices, Champlain Hudson Power Express Inc., Supplement to U.S. Army Corps of Engineers Application, No. 2009-1089-EHA (Feb. 10, 2012) (“CHP Supplemental Application”), <http://www.chpexpress.com/docs/regulatory/permit-application/Attachment%20O%2020120229.pdf>.

<sup>95</sup> Attachment H – Revised Attachment H: Cross Section Diagrams at 26, CHP Supplemental Application, <http://www.chpexpress.com/docs/regulatory/permit-application/Attachment%20H%2020120229.pdf>.



For each proposed HDD location, two separate drills would be required, one for each cable. Each cable would be installed within a 10-inch-diameter, or larger, HDPE casing. To maintain appropriate separation between the two cables, a minimum of six (6) feet would be required between each drill path. HDD would be employed in a number of situations during construction, including both overland sections of the Project route and at shoreline land/water transition locations. HDD locations along the Project route would have both the entry and exit holes staged on land. The HDD locations are shown on the Terrestrial Route Plan View Map provided in Attachment E of the Supplemental Application.<sup>96</sup> All HDD locations would be engineered on a site-specific basis during development of the final design phase for inclusion in the EM&CP.

At the seven (7) locations along the Project route where the cables transition from water to land (and vice versa), installation would be accomplished through the use of HDD methodology in order to avoid or minimize disturbance to the banks and near-shore areas. The HDD would be staged at the onshore landfall area and would involve the drilling of the boreholes from land toward the offshore entry/exit point. Two (2) conduits (one for each cable) would then be installed through the length of the boreholes and the transmission cable would be pulled through the conduit from the submarine end toward the land. A transition manhole or transmission cable-splicing vault would be installed using conventional excavation equipment (backhoe) at the onshore transition point where the underwater and overland transmission cables would be connected (see “Typical Terrestrial Transition” Figure 176764-UM-41<sup>97</sup> and “Typical Splice Vault” Figure 176674-UM-35<sup>98</sup> in Attachment H of the Supplemental Application).

A drill rig would be set up onshore behind a bentonite pit, where a drill pipe with a pilot-hole drill bit would be set in place to begin the horizontal drilling. Drilling fluid would then be pumped into the hole as the cutting head is advanced into the soil. The HDD construction process would involve the use of drilling fluid in order to transport drill cuttings to the surface for recycling, aid in stabilization of the in situ soil/sediment to keep the hole open, and to provide lubrication for the HDD drill string and down-hole assemblies. This drilling fluid is composed of a carrier fluid and solids. The selected carrier fluid for this drilled crossing would consist of

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<sup>96</sup> Attachment E – Revised Attachment D: Plan View Maps – Overland Route, CHP Supplemental Application, <http://www.chpexpress.com/docs/regulatory/permit-application/Attachment%20E%2020120229.pdf>.

<sup>97</sup> Attachment H – Revised Attachment H: Cross Section Diagrams at 10.

<sup>98</sup> *Id.* at 12.

water (approximately 95 percent) and inorganic bentonite clay (approximately 5 percent). The bentonite clay is a naturally occurring hydrated aluminosilicate composed of sodium, calcium, magnesium, and iron that is environmentally benign.

After each section of drilling, an additional length of drill pipe is added until the final drill length is achieved. To avoid or minimize the release of the bentonite drilling fluid into the water, freshwater may be used as a drilling fluid to the extent practicable for the final section of drilling, just prior to the drill bit emerging in the pre-excavated pit. This would be accomplished by pumping the drilling fluid out of the drill stem and replacing it with freshwater as the drill bit nears the pre-excavated pit. When the drill bit emerges in the pre-excavated pit, the bit is replaced with a hole-opening tool called a reamer to widen the borehole. It is anticipated that a single reaming pass would be necessary to allow installation of the conduit. Once the desired hole diameter is achieved, a pulling head is attached to the end of the drill pipe and the drill pipe is used to pull back the HDPE conduit pipe into the bored hole. As with the pilot hole drilling process, freshwater would be utilized, if practicable, as the reaming tool nears the pre-excavated pit. Once the HDPE conduits are in place, the underwater cables would be pulled through the conduit, which would be permanently sealed at each end to complete the installation process.

A temporary cofferdam would be constructed at the offshore entry/exit hole location for HDD cable installation at major land-water transitions. The cofferdam would be rectangular in shape and approximately sixteen (16) feet by thirty (30) feet. The cofferdam would generally be constructed using steel sheet piles driven from a barge-mounted crane. The cofferdam is intended to help reduce turbidity associated with the dredging and HDD operations as well as to help maintain the exit pit (see “Typical Terrestrial Transition, Figure 176764-UM-41,”<sup>99</sup> in Attachment H of the Supplemental Application). The area inside the cofferdam would be dredged to create an entry/exit pit typically six (6) feet deep. The dredged material would be temporarily placed on a barge for storage and ultimate disposal at an upland permitted facility. Upon completion, the exit pit would be backfilled with clean sand to restore the bottom to preconstruction grade.

After the HDD conduit is installed, the ends of the conduit would be sealed with plastic caps until the subsequent installation of the HVDC transmission cables. After the cables have been

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<sup>99</sup> *Id.* at 10.

installed, it is anticipated that the excess annular space with the HDD installed conduit and the installed cable would be backfilled with a thermal grout to help dissipate excess heat generated by the cable. The requirements for the backfill material would be determined in the final design, which would be included in the EM&CP.

The drilling fluid system would recycle drilling fluids (made up of a combination of water, bentonite, and the material being excavated) and contain and process drilling returns for offsite disposal. Although considered environmentally benign, the discharge or release of drilling fluids to the water would be minimized by implementing appropriate techniques and controls to be specified in a drilling fluid overburden breakout monitoring and response plan. It is likely that some residual volume of drilling fluid would be released into the pre-excavated exit pit when the pilot hole and reaming cutting heads come to the surface. The depth of the pit and the temporary cofferdam are expected to contain much of the drilling fluid. The drilling fluid will be removed from the cofferdam prior to removal of the cofferdam.

It is expected that the HDD conduit systems would be drilled through sediment overburden at the landfall location. However, it is anticipated that drilling depths in the overburden would be sufficiently deep to avoid pressure-induced breakout of drilling fluid through the sediments along most of the length of the drill path. Nevertheless, a visual and operational monitoring program will be implemented during the HDD operation to detect a fluid loss as part of the Best Management Practices program.<sup>100</sup> This monitoring includes:

- Visual monitoring of surface waters along the drill path and in the vicinity of the exit hole on a daily basis to observe potential drilling fluid breakout points.
- Drilling fluid volume monitoring by technicians throughout the drilling and reaming operations for each HDD conduit system.
- Implementation of a fluid loss response plan and protocol by the drill operator in the event that a fluid loss occurs. The response plan could include injection of loss circulation additives such as Benseal that can be mixed in with drilling fluids at the mud tanks, and other mitigation measures as appropriate.

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<sup>100</sup> Attachment O: Best Management Practices at 8-7, CHP Supplemental Application, <http://www.chpexpress.com/docs/regulatory/permit-application/Attachment%20O%2020120229.pdf>.

# Section 3

## Alternatives Analysis Methodology

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### 3.1 USACE Requirements for LEDPA Analysis

Projects subject to the individual permitting process by the USACE under the Clean Water Act (“CWA”) must comply with Section 404(b)(1) guidelines (40 CFR Part 230) for discharge of dredge and/or fill material into waters of the U.S. The Guidelines generally require applicants to demonstrate there is no “practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem” and which “does not have other significant adverse environmental consequences” (40 C.F.R. § 230.10(a)). The Guidelines consider an alternative practicable “if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes” (40 C.F.R. § 230.10(a)(2)).

The “404(b)(1) Alternatives Analysis” assesses alternatives from which the “least environmentally damaging practicable alternative” is determined. The list of alternatives from which the LEDPA is selected is created after the overall purpose of the project is identified, as only those alternatives which meet the project’s overall purpose are considered. The geographic scope of the alternatives considered are determined by the project purpose and would include locations typically considered in similar projects. The level of review required under a LEDPA analysis depends on the nature and severity of the project's impact on the environment.<sup>101</sup> Many of this Project’s impacts have been already eliminated or mitigated as a result of the New York State Article VII permitting process.<sup>102</sup>

Once the alternatives have been identified, the practicability of each alternative is evaluated using specific criteria. Any alternative which does not meet the screening criteria is eliminated from further consideration.

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<sup>101</sup> See U.S. Evtl. Prot. Agency & U.S. Army Corps of Engineers, *Memorandum: Appropriate Level of Analysis Required for Evaluating Compliance with the Section 404(b)(1) Guidelines Alternatives Requirements* (Aug. 23, 1993) (“Section 404(b)(1) Compliance Memorandum”),

<http://water.epa.gov/lawsregs/guidance/wetlands/flexible.cfm>.

<sup>102</sup> Order Granting Certificate of Environmental Compatibility and Public Need at 2, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City*, Case 10-T-0139 (N.Y. P.S.C. Apr. 18, 2013), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={A71423C8-B489-4996-9C5A-016C9F334FFC}>.

### 3.2 Alternatives Analysis Evaluation Criteria

The purpose and need for the proposed Project as described in Section 1, as well as the practicability criteria laid out in 40 C.F.R. 230.10(a)(2), were formulated as criteria against which each alternative would be evaluated, as shown in Table 3-1. Each individual criterion is described below.

**TABLE 3-1  
ALTERNATIVE ANALYSIS CRITERIA**

<b>Evaluation Category</b>		<b>Basis for Criterion</b>
Purpose	Must meet Project purpose	An alternative must achieve Project purpose.
Existing Technology	Must use proven technology.	An alternative's technological methods for transmission must be tested and proven to minimize the risk of failing.
Logistics	Must not require extraordinary technical effort to overcome site conditions or pose difficult-to-overcome constructability issues.	Must not require complex or significant additional means to overcome difficult access or site conditions or require engineering solutions that may not accommodate long-term performance.
	Must be located outside areas having incompatible land use plans or existing incompatible land uses that could pose a risk to the transmission system.	Displacing or adversely affecting existing or planned development is likely to encounter significant regulatory hurdles, as well as political and public opposition.
	Must be located entirely within the State of New York	The proposed Project is delivering power to the New York Control Area; as the benefits of this power will accrue to New York State, regulatory approvals sought in other regions (i.e. New England) would likely face significant regulatory hurdles, as well as public and political opposition.
Cost	Must not be unreasonably expensive to the Applicant, based on costs of similar merchant or participant-funded transmission projects.	The cost of each alternative must be reasonable in the terms of not being substantially higher than the costs of similar merchant or participant-funded projects. As a <i>merchant</i> transmission line, Applicants are without captive wholesale customers and guaranteed rate recovery.

### 3.2.1 Evaluation of Cost

An alternative is not practicable when it is unreasonably expensive to the applicant.<sup>103</sup> The evaluation of cost is not based on the financial standing of the applicant, but rather on what are reasonable costs for the proposed Project. According to the USACE and EPA, “[t]he determination of what constitutes an unreasonable expense should generally consider whether the projected cost is substantially greater than the costs normally associated with the particular type of project”.<sup>104</sup>

Unlike traditional utilities – which recover their cost-of-service from captive wholesale customers – the Applicants’ Project is a merchant transmission line that assumes the full risk of market development; the Project must therefore be competitively-priced in order to attract transmission customers and provide a rate of return sufficient to retain and attract equity investors and secure debt financing.<sup>105</sup> As is true for similarly-situated merchant developers, if the cost of the transmission line becomes unreasonably expensive then the proposed transmission line is not likely to be attractive to power generators because the transmission service is cost-prohibitive. CHPE has already absorbed significant cost increases associated with incorporating various alternatives routes, even relatively small incremental additional costs may have a disproportionate impact on the Project. Therefore, in the context of this merchant Project, which has already incorporated a significant number of alternatives to date as a result of the state siting process, the cost of the alternative as compared to the overall Project cost must account for the significantly increased costs that have already been imposed on the Applicants to revise the Project route, and the impact that additional costs will have on the Applicants’ ability to effect the Project purpose. As the USACE Regulatory Guidance acknowledges: “It is important to emphasize, however, that it is not a particular Applicants’ financial standing that is the primary

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<sup>103</sup> Preamble to Guidelines for Specification of Disposal Sites for Dredged or Fill Material, 45 Fed. Reg. 85,336, 85,343 (Dec. 24, 1980) as referenced in U.S. Env’tl. Prot. Agency & U.S. Army Corps of Engineers, *Memorandum: Appropriate Level of Analysis Required for Evaluating Compliance with the Section 404(b)(1) Guidelines Alternatives Requirements* § 3.b. (Aug. 23, 1993) (“Section 404(b)(1) Compliance Memorandum”), <http://water.epa.gov/lawsregs/guidance/wetlands/flexible.cfm>.

<sup>104</sup> See U.S. Env’tl. Prot. Agency & U.S. Army Corps of Engineers, *Memorandum: Appropriate Level of Analysis Required for Evaluating Compliance with the Section 404(b)(1) Guidelines Alternatives Requirements* § 3.b. (Aug. 23, 1993) <http://water.epa.gov/lawsregs/guidance/wetlands/flexible.cfm>.

<sup>105</sup> See Allocation of Capacity on New Merchant Transmission Projects and New Cost-Based, Participant-Funded Transmission Projects; Property Rights to New Participant Funded Transmission, 142 FERC ¶ 61,038 at P 1 (2013) at <http://www.ferc.gov/whats-new/comm-meet/2013/011713/E-2.pdf>

consideration for determining practicability, but rather the characteristics of the project and what constitutes a reasonable expense for these projects that are most relevant to practicability determinations.”

In order to determine the costs normally associated with a transmission project of this type, four recent representative projects were selected. They are described as follows:

Juan de Fuca Project: The Juan de Fuca Project will be an approximately 31-mile-long, 550-megawatt (MW) submarine HVDC cable that extends beneath the Strait of Juan de Fuca to connect View Royal, British Columbia, with Port Angeles in the State of Washington. The expected construction cost of this project is \$750 million.<sup>106</sup>

Trans Bay Cable Project: The Trans Bay Cable Project is a 57-mile-long, 400-MW<sup>107</sup> submarine HVDC transmission line located in San Francisco Bay and the Carquinez Straits, extending from a terminus in the City of Pittsburg in Contra Costa County to a terminus in the City of San Francisco in the vicinity of Potrero Point. Its construction costs are estimated to be \$505 million.<sup>108</sup>

Neptune Regional Transmission System: The Neptune Regional Transmission System is a 65-mile-long submarine HVDC electric transmission line that connects Sayreville, New Jersey, to Long Island, New York. Construction costs for this project were approximately \$600 million.<sup>109</sup>

Northern Pass: The Northern Pass Transmission Project proposes to bring 1,200 MW of energy from Canada to the Northeast region through a primarily overhead transmission system

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<sup>106</sup> Stephan Burckhardt, *US-Canadian HVDC Transmission*, CleanTechies Blog (Feb. 7, 2012), <http://blog.cleantechies.com/2012/02/07/us-canadian-hvdc-transmission/>.

<sup>107</sup> TD World. *Trans Bay Cable to Build Undersea Link to San Francisco*. October 15, 2007. Accessed on-line on April 28, 2013 at: <http://tdworld.com/underground-tampd/trans-bay-cable-build-undersea-link-san-francisco>

<sup>108</sup> Chuck Bunton, *Cable Laying Ops Begin on Trans Bay Cable Project*, Maritime Professional Blog (Oct. 8, 2009 11:16 AM EST), <http://www.maritimeprofessional.com/Blogs/Subsea/October-2009/Cable-Laying-Ops-Begin-on-Trans-Bay-Cable-Project.aspx>.

<sup>109</sup> *Neptune Underwater HVDC Project Saves LIPA \$20 Million*, Transmission & Distribution World (Oct. 25, 2007), [http://tdworld.com/projects\\_in\\_progress/announcements/neptune-hvdc-lipa/](http://tdworld.com/projects_in_progress/announcements/neptune-hvdc-lipa/).

comprised of approximately 140 miles of HVDC and 40 miles of AC cables.<sup>110</sup> Construction costs in 2010 were estimated to be \$1.1 billion.<sup>111</sup>

Table 3-2 below shows the costs of the Project as proposed against the three primarily submarine cable installation projects and one primarily overland cable installation project. The selected metric, cost per MW, is appropriate as it has a direct bearing on the costs which must be charged to transmission customers (and the attendant ability of those customers to deliver power at a competitive rate).

**TABLE 3-2  
CONSTRUCTION COSTS PER MW FOR PROJECT AND COMPARISONS**

	CHPE Project	Neptune	Port Angeles - Juan de Fuca	Transbay	Northern Pass
<b>Overall Cost</b>	\$ 1,999,800,000	\$ 600,000,000	\$ 750,000,000	\$ 505,000,000	\$ 1,100,000,000
<b>MW</b>	1,000	660	550	400	1,200
<b>Cost Per MW</b>	\$ 1,999,800	\$ 909,091	\$ 1,363,636	\$ 1,262,500	\$ 916,667

As shown in Table 3-2, the Project's cost per MW of power is already significantly higher (47%) than the next closest project, the Port Angeles – Juan de Fuca transmission system. The source of this cost differential is the overland sections of the route which have been added to the Project since its inception through consultation and the Article VII process.

### 3.2.2 Evaluation of Logistics

For the purposes of this analysis, logistical factors may include the following: engineering constraints, utility and other public infrastructure, topography and geology, conformance to federal and state laws, social feasibility, regulatory hurdles, public and political opposition, and other consequences to the applicant and the public. The ability to utilize roadways as potential alternatives is limited by Federal Highway Law,<sup>112</sup> New York Highway Law,<sup>113</sup> New York State

<sup>110</sup> Northern Pass FERC Transmission Service Agreement at 51.(Dec. 13, 2010), <http://www.northernpass.us/assets/permits-and-approvals/FERCTransmissionServiceAgreementFiling.pdf>

<sup>111</sup> *Id.* at 2..

<sup>112</sup> 23 U.S. Code §§ 101 et seq. [http://www.ecfr.gov/cgi-bin/text-idx?&c=ecfr&tpl=/ecfrbrowse/Title23/23tab\\_02.tpl](http://www.ecfr.gov/cgi-bin/text-idx?&c=ecfr&tpl=/ecfrbrowse/Title23/23tab_02.tpl)

<sup>113</sup> New York State Highway Law §§ 10 and 52. See <http://public.leginfo.state.ny.us/LAWSSEAF.cgi?QUERYTYPE=LAWS+&QUERYDATA=@LLHAY+&LIST=LAW+&BROWSER=EXPLORER+&TOKEN=40947028+&TARGET=VIEW>



Transportation Regulations,<sup>114</sup> and the Accommodation Plan for Longitudinal Use of Freeway ROW by Utilities issued by the NYSDOT.<sup>115</sup> The NYSDOT, which signed the Joint Proposal for Settlement, has indicated that it would highly restrict the longitudinal use of limited access highway ROW by utilities (see Appendix A).<sup>116</sup> In a letter sent during the NYRI Article VII proceeding,<sup>117</sup> the NYSDOT stated that it has an agreement with, and an obligation to, the Federal Highway Administration (“FHWA”) on how utility facilities are accommodated on controlled access highways in New York State.<sup>118</sup> Under the “Accommodation Plan for Longitudinal Use of Freeway Right-of-Way by Utilities” only communication facilities were currently permitted to longitudinally occupy New York State freeway rights-of-way with the control of access.<sup>119</sup> The NYSDOT further noted that any requests for non-highway use of controlled access highways must be submitted for approval by the FHWA and that “all alternatives must be exhausted before FHWA approval of an exception can be granted.”<sup>120</sup> As of December of 2006, the NYSDOT stated only one exception had been granted by the FHWA.<sup>121</sup>

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<sup>114</sup> New York State Department of Transportation Rules and Regulations, 17 NYCRR § 131 (2013). See <http://government.westlaw.com/linkedslice/default.asp?SP=nycrr-1000>

<sup>115</sup> NYSDOT, *Accommodation Plan for Longitudinal Use of Freeway Right-of-Way by Utilities* (1995), <https://www.dot.ny.gov/divisions/engineering/design/dqab/dqab-repository/accommod.pdf?nd=nysdot>.

<sup>116</sup> See, e.g., Article VII Updated Alternatives Analysis at 8, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Feb. 24, 2012), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={1376106E-8A60-4BC8-B601-EA7C43ECC0BB}>.

<sup>117</sup> See *Application of New York Regional Interconnect, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII for a high voltage direct current electric transmission line running between National Grid’s Edic Substation in the Town of Marcy, and Central Hudson Gas & Electric’s Rock Tavern Substation located in the Town of New Windsor*, Case No. 06-T-0650, <http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=06-T-0650>.

<sup>118</sup> NYSDOT, *Accommodation Plan for Longitudinal Use of Freeway Right-of-Way by Utilities* (1995), <https://www.dot.ny.gov/divisions/engineering/design/dqab/dqab-repository/accommod.pdf?nd=nysdot>.

<sup>119</sup> NYSDOT Letter Clarifying Its Position at 1, *Application of New York Regional Interconnect, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII for a high voltage direct current electric transmission line running between National Grid’s Edic Substation in the Town of Marcy, and Central Hudson Gas & Electric’s Rock Tavern Substation located in the Town of New Windsor*. Case No. 06-T-0650 (N.Y. P.S.C. Dec. 18, 2006), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={7EEEDE23-E552-4741-A528-707F1FD866E7}>.

<sup>120</sup> *Id.* at 2

<sup>121</sup> *Id.* at 2

The evaluation of logistics also considers whether an alternative is “available” to the applicant.<sup>122</sup> Legal restrictions that prohibit site development are also considered in determining whether an alternative site is available.

### 3.2.3 Evaluation of Existing Technology

Any technology found to be technically infeasible to construct and operate should be removed from consideration.<sup>123</sup> In terms of ensuring that the cable technology is tested and proven, only HVDC cable technology is considered in this analysis. HVDC has the ability to transmit large amounts of power over long distances with lower capital costs and with lower energy losses than HVAC.<sup>124</sup> HVDC can carry more power per conductor because, for a given power rating, the constant voltage in a HVDC line is lower than the peak voltage in an HVAC line.<sup>125</sup> HVAC transmission is limited by the amount of reactive power required to deliver active power through transmission lines, so that long distances are technically unreachable with HVAC lines due to limitations on how far reactive power will travel.<sup>126</sup>

In terms of environmental impacts, HVDC cables do not emit fluctuating electric and magnetic fields so they do not raise the health concerns as HVAC power lines.<sup>127</sup> The only field present is a low static magnetic field in close proximity to the cables which is similar to the background

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<sup>122</sup> 40 C.F.R. § 230.10(a)(2) (2012), See <http://www.law.cornell.edu/uscode/text/33/1344>.

<sup>123</sup> U.S. Env'tl. Protection Agency & U.S. Army Corps of Engineers, EPA842-B-92-008, *Evaluating Environmental Effects of Dredged Material Management Alternatives: A Technical Framework* at 21 (revised Mar. 2004), <http://water.epa.gov/type/oceb/oceandumping/dredgedmaterial/evaluation.cfm>.

<sup>124</sup> Ex. 122: Report to Parties – XLPE at 9, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (Feb. 24, 2012), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={42265426-A2D8-4BB4-9B0F-669847596CEB}>.

<sup>125</sup> *Id.* at 9.

<sup>126</sup> *Importance of Reactive Power for System*, Electrical Notes & Articles (Mar. 21, 2011), <http://electricalnotes.wordpress.com/2011/03/21/importance-of-reactive-power-for-system/>.

<sup>127</sup> Environmental Impacts Associated with Routing Proposed in Joint Proposal at 306, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Feb. 24, 2012), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={4CC6BFC1-1945-401B-8EF9-D67CB3C263FB}>.

magnetic field of the Earth.<sup>128</sup> HVDC cables use a strong polymeric insulating material so they do not contain oils for cooling.<sup>129</sup>

Given there are no demonstrated environmental advantages to the use of HVAC cables and the costs are generally greater over longer distances, only HVDC cables will be considered in terms of the cable technology.

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<sup>128</sup> Joint Proposal at 42, *Application of Champlain Hudson Power Express, Inc. and CHPE Properties, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the Public Service Law for the Construction, Operation and Maintenance of a High-Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Feb. 24, 2012), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={C5F63E41-5ED5-46A2-99A5-F1C5FC522D36}>.

<sup>129</sup> *Id.* at 44.

## Section 4

# New York State Department of Public Service Alternatives

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As part of the review of the Project conducted pursuant to Article VII of the New York State Public Service Law, the New York State Public Service Commission Administrative Law Judges invited parties to the proceeding to submit alternative routes for the Project.<sup>130</sup> The NYSDPS submitted three alternative route segments which it considered to be “reasonable.”<sup>131</sup> No other party to the proceeding provided an alternative for consideration.

The three NYSDPS alternatives – Hudson River Western Rail Line Route, Harlem River Rail Route, and the Hell Gate Bypass Route – and the outcome of their consideration, are discussed below.

### 4.1 Existing Technology

For each of the alternatives described in this section, the cable system would be buried. Buried overland installation of the cables is described in Section 2.2.2 above. The typical cable trench along the overland portion of the route would be four (4) feet wide at the bottom and approximately four (4) to five (5) feet deep to allow for the proper depth required for the burial of the cables. A minimum separation distance is required from railroad rails to the cables by each railroad; CP requires a minimum separation of ten (10) feet from the centerline of the outermost track to the cable trench, and CSX requires a minimum separation of twenty-five (25) feet from the centerline of the outermost track. The permanent ROW is anticipated to be thirteen (13) feet in the railroad

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<sup>130</sup> Ruling on Schedule and Other Procedural Matters, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Oct. 4, 2010), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={F91C8DC4-973C-403F-B32C-F763D67B62F5}>.

<sup>131</sup> NYSDPS Staff Submits Proposed Alternative Routes, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Oct. 27, 2010), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={421FD837-98B0-4E31-9B46-CCDA62591D73}>.

ROW and seventeen (17) feet in other areas<sup>132</sup>. Based on typical construction configurations, the temporary construction zone is assumed to be thirty-one (31) to thirty-three (33) feet wide<sup>133</sup>.

## 4.2 Hudson River Western Rail Line Route

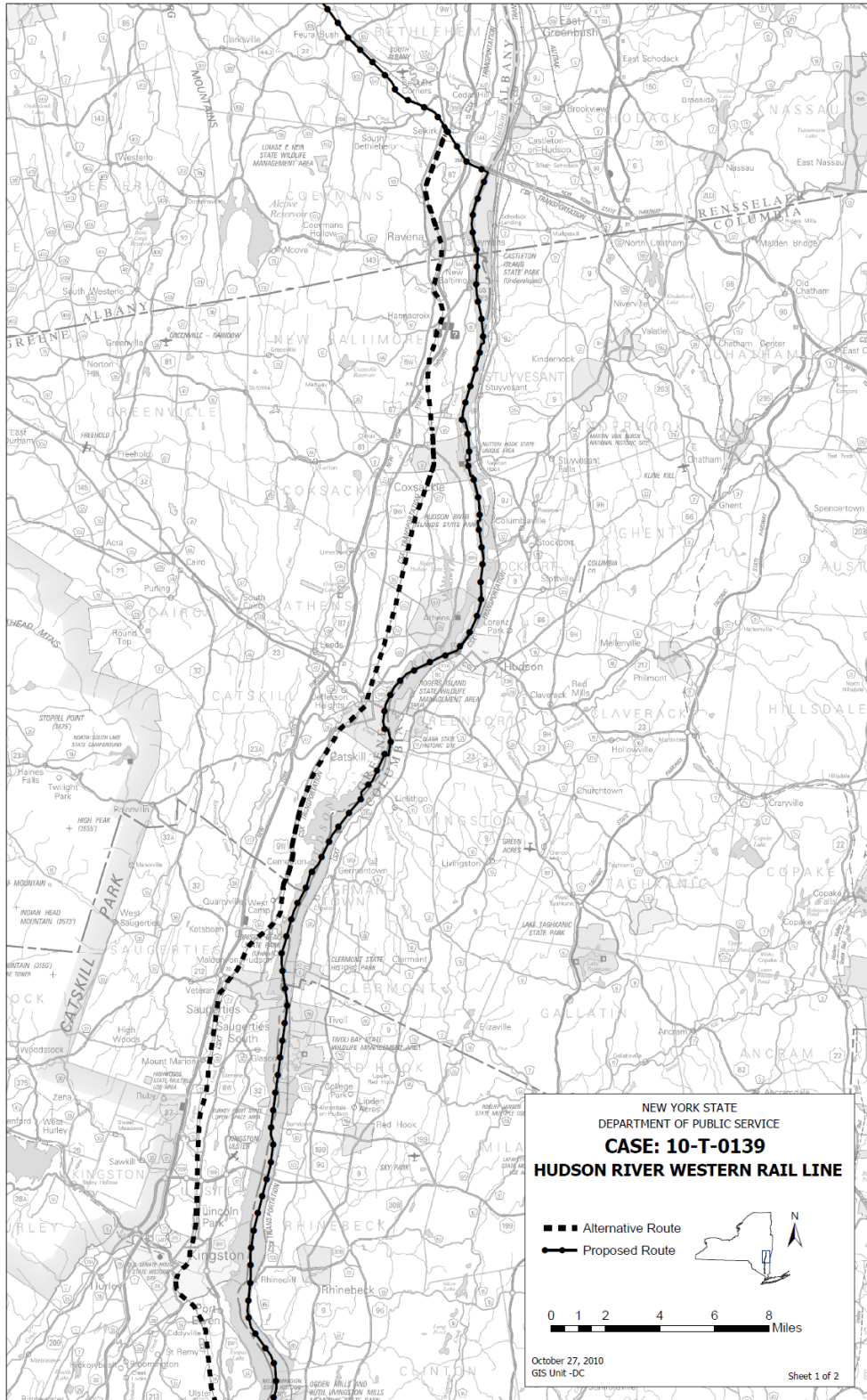
NYSDPS staff described the Hudson River Western Rail Line Route alternative as beginning in the Town of Bethlehem, Albany County and following with the CSX ROW to the west of the Hudson River. The proposed route would enter the Hudson River in the Town of Clarkstown, Rockland County. The route is shown on Figure 4-1.

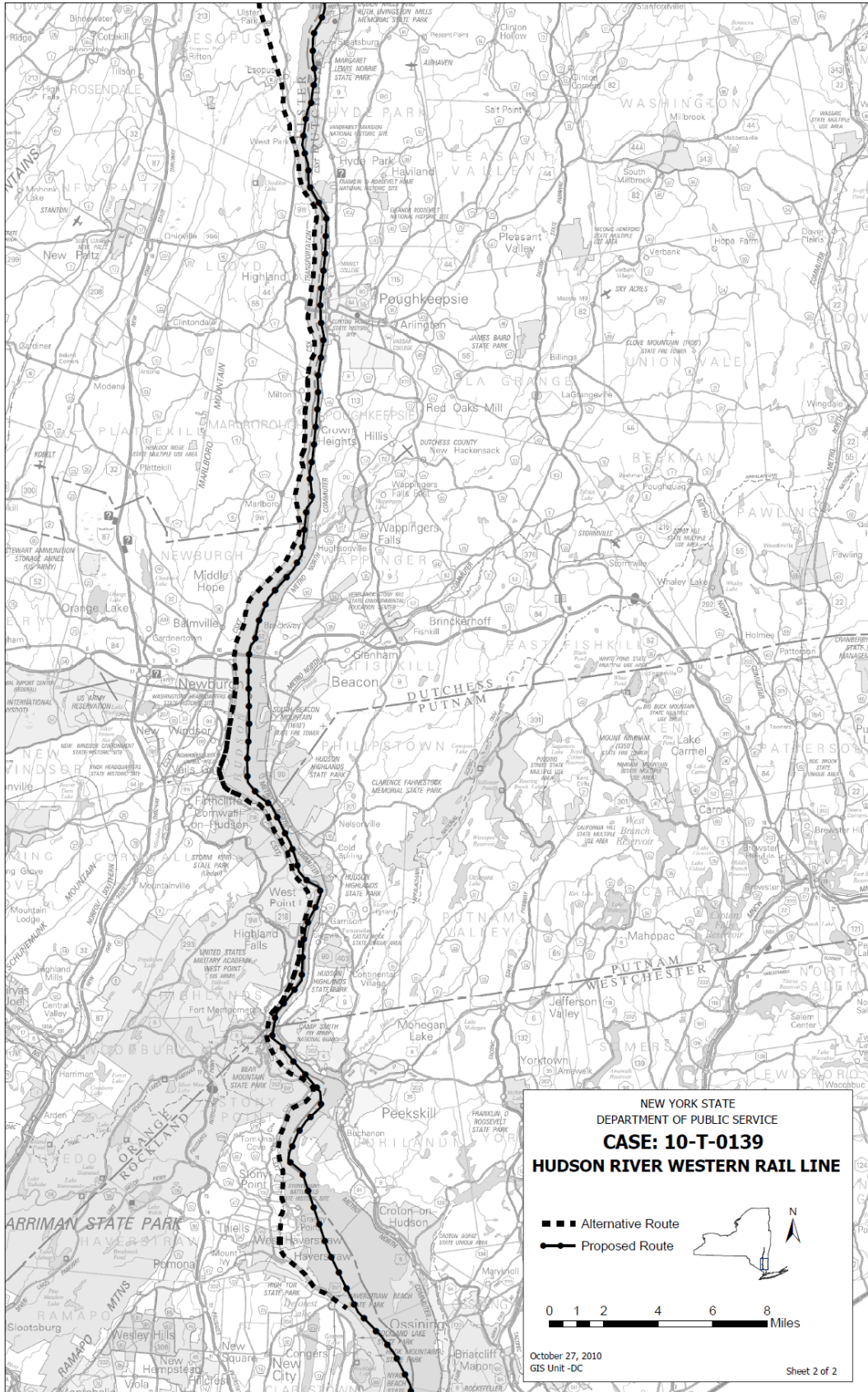
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<sup>132</sup> Order Granting Certificate of Environmental Compatibility and Public Need at 101, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Apr. 18, 2013), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={A71423C8-B489-4996-9C5A-016C9F334FFC}>.

<sup>133</sup> Attachment H – Revised Attachment H: Cross Section Diagrams, CHP Supplemental Application, <http://www.chpexpress.com/docs/regulatory/permit-application/Attachment%20H%2020120229.pdf>.

**FIGURE 4-1  
HUDSON RIVER WESTERN RAIL LINE**





## Practicable Alternatives

At the request of Settlement Parties and the NYSDOS, the Applicants conducted a detailed analysis of the routing constraints and available alternatives along the entirety of this route.<sup>134</sup> This analysis included a review of potential roadway ROWs which could be utilized in locations where the use of the railroad ROW was considered impractical. The following segments were determined to be practicable based on cost, available technology, and logistics.

### Route Mile 202 to 223 (Coeymans to Catskill)

The Project route as originally proposed would have entered the Hudson River in Coeymans, New York, reaching that point by following the CSX ROW. The Applicants reviewed the CSX ROW from Selkirk south to north of Catskill and identified no significant engineering constraints. Therefore, this portion of the Hudson River Western Rail Line was accepted by the Settlement Parties as practicable.

### Route Mile 296 to 303 (Haverstraw Bay – Stony Point to Clarkstown)

The Project route as originally proposed would traverse Haverstraw Bay by utilizing portions of the existing navigation channel. Haverstraw Bay, however, represents one of the most significant coastal habitats within the Hudson River; consequently, the Applicants worked collaboratively with Settlement Parties to develop a practicable bypass route of Haverstraw Bay, which roughly follows the southern portion of the Hudson River Western Rail Line Route.

## Non-Practicable Alternatives

The Applicants' review of the portion of the Hudson River Western Rail Line Route between Catskill and Stony Point indicated that the route was not practicable based on logistics and costs. This analysis is provided below.

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<sup>134</sup> Article VII Updated Alternatives Analysis, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Feb. 24, 2012) (“Article VII Updated Alternatives Analysis”), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={1376106E-8A60-4BC8-B601-EA7C43ECC0BB}>.



## Logistics

The constraints based on access, topography and geology are presented below. For ease of review, the Hudson River Western Rail Line Route was divided into segments with reference to the route miles. The anticipated construction duration for the segments described below would exceed thirty-two months utilizing multiple crews, compared to the three months estimated by a contractor for in-water burial.

### Route Mile 223 to 233 (Catskill to Malden-on-Hudson)

From Catskill to Malden-on-Hudson (north of Saugerties), Applicants identified CSX's Catskill Trestle, which crosses Catskill Creek and Route 9, as an engineering issue, as there is not a practicable alternative to bring the cables to the Hudson River. While the cables could be laid within the Route 34 right-of-way to connect to Riverside Road, the only parcel adjacent to the Hudson River with sufficient acreage for a HDD into the Hudson River was determined by the NYSDPS to be classified as a municipal park and therefore the rights to the land could not be transferred to a private party without state legislation.<sup>135</sup> Based on the logistics involved in obtaining access to this site, it was determined to be impractical.

### Route Mile 233 to 245 (Malden-on-Hudson to Kingston)

Siting in this segment is logistically complicated due to the dense development within the Ulster / Kingston area. As the CSX railroad travels beneath Route 209 in Ulster, the railroad corridor is constrained by existing overhead transmission lines on both sides of the railroad ROW. It would not be possible to maintain a significant separation from these other facilities within the railroad ROW, so the cables would need to be located adjacent to John M. Clark Drive, which runs parallel to the tracks until they both intersect with Route 157, at which point the transmission lines no longer run on both sides of the railroad ROW. As a consequence, certain municipal approvals would be needed. After passing through the Kingston railyard and over Route 32/Flatbush Avenue, the railroad corridor traverses the middle of St. Mary's Cemetery with an overhead transmission line on the western side of the railroad corridor. There is insufficient room between the cemetery

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<sup>135</sup> See, e.g., *Friends of Van Cortlandt Park v. City of New York*, 95 N.Y.2d 623, 631-32 (2001) (“[O]ur law is well settled: dedicated park areas in New York are impressed with a public trust for the benefit of the people of the State. Their use for other than park purposes, either for a period of years or permanently, requires the direct and specific approval of the State Legislature, plainly conferred.”) (internal quotations omitted).

(actual gravestones) and the railroad tracks along the eastern side of the railroad corridor to install the Project's cables with traditional trenching methods; moreover, the extent of development would prevent the use of HDD. A roadway bypass would require utilizing the Route 32 ROW to access Farrelly Street to the east or Foxhall Avenue to the west. Utilizing either of these roadways would require traveling through residential neighborhoods where the houses are very close to each other and close to the roads, making installation extremely difficult; moreover, utilizing these roadways would likely generate significant local opposition from homeowners.

**View (Looking East) of the Railroad Corridor  
Extending through St. Mary's Cemetery in Kingston**



Immediately south of the cemetery, the railroad corridor extends through a heavily developed urban area where large buildings are located immediately adjacent to the railroad corridor (within ~10 feet), resulting in insufficient horizontal clearance to install the Project cables within this section of ROW. This level of development is intermittent until the railroad crosses a small bridge over the Broadway roadway. As with the roads proximal to the cemetery, the roadways that might be utilized as an alternative to this segment (e.g. Foxhall Avenue, Cornell Street, Ten Broeck Avenue, and Grand Street) also have buildings immediately adjacent to the roadway as well as residential houses where construction would be disruptive. As with the above segment, there is likely to be public opposition to construction in close proximity to homes and businesses.

**View of Large Buildings Immediately Adjacent to Railroad Corridor in Kingston**

Roadway alternatives that would bypass the City of Kingston were also reviewed. Route 9W could be accessed by following Route 157 east at the terminus of John M. Clark Drive. While Route 9W has a low density of development north of Route 32, it becomes a limited access highway (controlled-access road) once it crosses Route 32. As discussed in Section 3.2.2, the NYSDOT has indicated that it would highly restrict the longitudinal use of limited access highway ROW by utilities (see Appendix A).<sup>136</sup>

Route 32 becomes Flatbush Road and Flatbush Avenue as it passes within the city center and experiences the same high level of development as other roadways within the city. Based on this analysis, the Applicants were unable to identify any practicable alternative that traversed the municipalities of Ulster and Kingston and therefore the cables would need to enter the water prior to this point.

In terms of roadway alternatives, the only road that travels in relatively close proximity to the Hudson River is Route 32 with a separation distance of approximately one-half mile. However, this roadway, as well as Route 9W, traverses the Esopus Creek Bridge to cross the Esopus Creek in

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<sup>136</sup> See, e.g., Article VII Updated Alternatives Analysis at 8 and Appendix A of this document.

Saugerties. The NYSDOT has indicated that it would not permit hanging cables on structures owned and operated by the agency.<sup>137</sup> An HDD would be complicated by the depth of the gorge (approximately 75 feet), the gravity dam downstream of the bridge, and existing buildings at both ends of the bridge. There are no existing launch /exit sites that meet the necessary spacing criteria for a safe drill under these constraints. Therefore, routes 9W and 32 south of Esopus Creek are considered inaccessible to the northern portion of the cable route and therefore not a practical alternative.

#### Route Mile 245 to 254 (Kingston to West Park)

At the southern edge of Kingston, the railroad corridor enters a tunnel which leads onto a raised trestle bridge crossing the Rondout River. Cable burial within a tunnel is considered infeasible because adequate separation from the track is not possible; additionally, the cables would be susceptible to damage from the trains, which would pose a risk to the reliability of the cable system.

To access this portion of the alternative from the Hudson River, the cables would need to be installed within Rondout Creek. Rondout Creek been designated by the NYSDOS as a Significant Coastal Fish and Wildlife Habitat (“SCFWH”), as it is one of the largest freshwater tributaries of the Hudson River Estuary and the concentrations of anadromous and resident freshwater fish have been described by the NYSDOS as unusual in Ulster County.<sup>138</sup> Thus, it would have more significant environmental impacts than the proposed route. In addition, there is a former gasification plant at the mouth of the creek and soil remediation in the waterway is currently being conducted, which would severely limit the construction window.<sup>139</sup>

#### Route Mile 254 to 261 (West Park to Highland)

South of the intersection with Route 9W, the railroad ROW runs adjacent to the Hudson River and there are multiple instances where there is only a narrow strip of land between the edge of the Hudson River to the east and large rock outcroppings or very steep terrain to the west. Installation in these areas would require either blasting of the bedrock to create a sufficient degree of separation from the railroad or an expensive HDD installation (assuming that there is available space for this

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<sup>137</sup> Article VII Updated Alternatives Analysis at 5.

<sup>138</sup> *Id.* at 6.

<sup>139</sup> *Id.*

technique).<sup>140</sup> Using on-line aerial photography, sixteen distinct outcrops with an estimated average length of 490 feet and a range of 230 to 1,020 feet were identified. This estimate of bedrock material should be considered conservative as the desktop analysis only accounts for exposed outcroppings. In Highland, Oakes Road runs immediately adjacent to the railroad ROW for approximately 3,200 feet, so there is insufficient room to install the cables for the majority of this stretch.<sup>141</sup>

**View of Railroad Route on a Steep Embankment (opposite Hyde Park)**



<sup>140</sup> *Id.* Blasting within a railroad ROW is a normally not permitted by railroads. If such work was approved, the cost would vary depending on rock hardness, location, quantity, size requirements, hauling rates, etc. A unit rate of \$ 100 /cubic yard would not be unusual under typical railroad ROW conditions. Horizontal directional drills would also be costly, with unit costs in rock of near \$1,000/ linear foot.

<sup>141</sup> Article VII Updated Alternatives Analysis at 6.

**View of Railroad on a Steep Embankment (continued south of photo above)**

The use of Route 9W was also considered, as this roadway initially travels through largely undeveloped countryside. Transmission poles border only one side of the road for less than two (2) miles until it intersects with Upper North Road in Highland. However, a short distance after the intersection with Upper North Road, Route 9W expands to four lanes. Over the next approximately four (4) miles, the transmission system switches sides eight times. In order to maintain the required separation, the cables would need to cross underneath the roadway. As Routes 44 and 55 overlap with Route 9W in Highland, the transmission system poles occupy both sides of the roadway. In addition, the density of businesses with access points on the roadway increases. Route 9W also crosses two bridges before it connects with Route 44/55 for which there are no readily identifiable bypasses. Overall this route would present severe logistical challenges in terms of identifying a constructible route. The intensity of development along Route 9W, particularly as it enters Highland, would result in insufficient room to install the cables for the majority of this stretch. Further, high traffic volume, as well as the presence of bridges, would further make utilization of Route 9W impracticable.

**View of 9W at Intersection with Routes 55 and 44 in Highland****Route Mile 261 to 277 (Highland to Newburgh)**

Immediately south of where the railroad ROW goes under the Route 44 bridge, a maintenance road or other limited roadway is located to the west of the tracks. The distance between this road and the ROW is insufficient to meet CSX's minimum separation distance from the tracks. Between the Route 44 bridge and U.S. Highway 84 bridge in Newburgh, eighteen rock outcrops were identified using aerial photography that would significantly complicate installation if the railroad companies allowed for the necessary construction activities. The average length of each outcrop is approximately 770 feet with a range of 160 feet to 2,950 feet. This segment also has seven instances where the railroad has water on both sides of the tracks for an average distance of 1,250 feet. As was noted earlier, the desktop analysis only accounts for visible bedrock and so the actual length of ROW where upland construction is essentially infeasible may be far longer. A short distance south of the U.S. Highway 84 bridge, the railroad occupies a raised berm. The cables would either need to be laid at the foot of the berm with HDDs for the road crossings or, in congested sections, the ROW of an alternate roadway such as Water Street would need to be accessed. Based on these geological and engineering logistical issues, installation in this section of railroad ROW is considered to be impractical.

### View of Railroad and Culvert Located along Hudson River Southeast of Milton



In terms of roadway alternatives, Oakes Road passes under the Route 44 bridge but reaches a dead end within a mile. Other roadway route alternatives would need to be accessed through Highland and, as previously discussed, the intensity of development in the vicinity of the intersection of Routes 9W and 44 would result in insufficient room to install the cables for the majority of this stretch.

Following the Hudson River south from Highland, the first roadway to come in close proximity to the river is Old Indian Trail Road in Milton at approximately Route Mile 266. At its closest point, the road is adjacent to the railroad ROW and is less than a mile away from connecting to Route 9W. As Route 9W travels south, it traverses lightly to moderately developed areas. However, as was observed in a northern segment, the transmission poles cross the roadway multiple times which would require HDD drillings or open cut trenching at each location. The transmission line crossings are often necessary in order to avoid natural and anthropogenic obstacles,<sup>142</sup> thereby

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<sup>142</sup> These natural and anthropogenic obstacles include street lights, isolated utility poles and rock outcrops,



making installation of the Project's cables more impractical since cables would not only need to avoid the transmission lines but also these features.

As the road approaches Marlboro, development becomes more pronounced with the hamlet buildings directly adjacent to the roadway. South of the hamlet's center, the road has transmission poles on one side and a cemetery on the other for approximately five hundred (500) feet. Bypassing this section would require utilizing residential roads for approximately one-half mile. Continuing south, Route 9W continues to travel through low to moderate density developments, with transmission poles that cross the highway at infrequent intervals. Based on the existing utility and development constraints, as well as the likely public opposition to construction in close proximity to homes and businesses, installation in this roadway alternative is considered to be impractical.

#### Route Mile 277 to 280 (Newburgh to Cornwall on Hudson)

South of Newburgh, where the railroad reaches Cornwall on Hudson where Shore Road is proximal to the railroad tracks, it would not be possible to meet minimum setbacks along much of this section.

Within a one-half mile distance of the Route 84 bridge, Route 9W experiences significant industrial development. In the center of Newburgh, the road is bordered by closely spaced packed residential houses as well as occasional park and recreational facilities. South of Newburgh proper, Route 9W becomes a divided four-lane highway for approximately two miles with transmission poles on the eastern side of the road. Once the divided highway ends, there is a bridge crossing of Moodna Creek which, based on NYSDOT's previously stated position about installation of transmission cables on agency bridges, would require that the Project utilize an HDD drill to cross under the creek.<sup>143</sup> As Route 9W crosses Route 107 in Cornwall, it transitions to a limited access highway and the collocation of transmission cables in the ROW of limited access highways is highly restricted and discouraged by NYSDOT.<sup>144</sup> Due to constraints in the Hamlet of Newburg and engineering constraints at Cornwall on Hudson, installation of the cables in this alternative section is impractical.

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<sup>143</sup> Article VII Updated Alternatives Analysis at 8.

<sup>144</sup> *Id.*

Route Mile 280 to 284 (Cornwall on Hudson to West Point)

As the railroad reaches Cornwall on Hudson, Shore Road runs parallel to the tracks for approximately one mile and for more than half that distance the Hudson River lies along the eastern side. Five (5) rock outcroppings with an average length of 960 feet (range of 380 to 1,920 feet) were identified as well as a berm through a water way extending approximately 300 feet. In West Point, River Road and the Upton Road run parallel to the railroad tracks with the Hudson River to the east for approximately 4,060 feet before entering the tunnel beneath West Point Military Academy (“West Point”).

As previously discussed, Route 9W becomes a limited access highway in Cornwall and NYSDOT has indicated that it would highly restrict the collocation in the ROW of limited access highways.<sup>145</sup> As an alternate route, Route 218 -- which intersects the highway prior to the transition to a limited access roadway -- was considered. However, this roadway travels through the center of Cornwall on Hudson through closely spaced residential houses and commercial districts. Trees line both sides of road through the town, so that any installation would either require their removal or risk damage as well as overcome any opposition from local residents and businesses. Outside the town proper, Route 218 enters Storm King State Park and climbs up Storm King Mountain along a steep and windy roadway. As the road crosses the front of the mountain, there is an approximately half-mile stretch where the road has been carved out of the cliff face. Based on the access and engineering constraints, this roadway is not considered to be a practical alternative.

Route Mile 284 to 285 (West Point)

The railroad tunnel beneath West Point extends for approximately 3,500 feet. As discussed earlier, the railroad company has specified safety setbacks which could not be met within this tunnel through burial installation. Rock cuts into the sides of the wall were considered, but railroad representatives indicated that they would not allow this approach as it would require work within the tunnel for months, significantly impacting railway use.<sup>146</sup> Installation of the cables within the tunnel ceiling would also require significant construction time and would present a serious liability should any type of failure occur. As the railroad tracks leave the tunnel, there is a short stretch

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<sup>145</sup> *Id.*

<sup>146</sup> *Id.*

(approximately 500 feet) where an Academy parking lot lies to the east and Williams Road to the west. The parking lot would need to be excavated in order to install the cables or an HDD constructed. Installation in this section of railroad ROW is considered to be impractical.

There are no state roads in close proximity to either entrance to the tunnel. Both River Road and Upton Road are in close proximity to the water and connect into existing local roads. However, these roads are built perpendicular to the slope of the foothills of Storm King Mountain and the rights-of-way are narrow.

### **View of Railroad and Roads along Storm King State Park & Hudson Highlands State Park**



#### Route Mile 285 to 290 (West Point to Fort Montgomery)

As with earlier segments, the railroad runs parallel to the Hudson River. Ten rock outcroppings with an average length of 720 feet (range of 265 to 1,606) were identified in addition to four water crossings with an average length of approximately 490 feet (range of 402 to 644). In addition, the ROW travels through the Bear Mountain tunnel, which extends for approximately 800 feet. Installation in this section of railroad ROW is considered to be impractical.

**View of Railroad and Bridge Located South of West Point**



**View of Tunnel and Waterbody Crossing in Bear Mountain State Park**



### View of Railroad along Bear Mountain State Park



There are no state roads or local roads in close proximity to the water for this segment. Mine Dock Road in Fort Montgomery could be accessed if the cables came out of the water into the railroad ROW and were laid a short distance before entering the road. However, Mine Dock Road runs underneath Route 9W and private homes are located on either side of the bridge abutments, posing significant logistical concerns.

#### Route Mile 290 to 296 (Fort Montgomery to Stony Point)

Six rock outcroppings were identified with an average length of 490 feet (range of 190 to 860) and seven water crossings with an average length of 1,080 feet (range 391 to 2,373). In addition, north of Stony Point Lighthouse is an approximately 2,020-foot stretch of railroad where water is to the east and utility grade transmission lines are to the west. As the railroad curves around Dunderberg Mountain past Jones Point, River Road runs parallel to the tracks for approximately 1,400 feet. Further along the tracks, West Shore Drive in Tomkins Cove runs in close proximity to the railway for approximately 1,600 feet. Installation in this section of railroad ROW is considered to be impractical due to the constrained ROW.

A steep rock embankment lies beneath the bridge that connects Routes 6/202 into a round-about with 9W/202 and the Palisades Interstate Parkway, which is a limited access highway that terminates at this traffic circle. As there is a toll-collection area associated with the bridge to the east, consultation would need to occur with the NYSDOT as they have indicated that the use of the ROW of limited access highways would be highly restricted.<sup>147</sup> Moreover, the roadway travels south through Bear Mountain State Park and trees line both sides of the road, which is kept in a natural setting. The roadway passes a boat launch near Iona Island, whose bay is a SCFWH. Six rock outcroppings of an average length of 850 feet (range of 141 to 2,556 feet) were identified. Installation in this section of road is considered to be impractical due to the extent of clearing, blasting and/or other activities that would be required within a state park for a relatively short overland segment.

### **Cost**

The Hudson River Western Rail Route entails an upland section from Catskill to Stony Point. These 96 miles include a number of challenging and costly installation measures including;

- Requirements for long horizontal directional drills;
- Accommodating extremely narrow work areas;
- Incorporating interim bypasses on roadways;
- Avoiding conflicts with existing utilities;
- Crossing of 11 waterways and 2 areas of Significant Coastal Fish and Wildlife Habitat;
- Construction through 61 areas with predominately rock conditions; and
- Passing through or around 4 tunnel sections.

Only for the purpose of preparing a cost estimate is it assumed that engineering solutions can be developed for all of the listed challenges; however, given the complexity of some of the challenges, engineering solutions or agency approvals may not, in fact, be attainable. The installation problems are more pronounced in the urban and industrial areas of Ulster, Kingston and Newburgh due to the existing developed landscape conditions. Engineering solutions will also require extensive

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<sup>147</sup> Article VII Updated Alternatives Analysis at 8.

discussions with local municipalities, NYSDOT and with CSX to secure variances from conventional protocols for construction and installation in their busy freight rail corridor.

The estimated costs per mile for the additional 96 miles upland section ranges from \$ 4.8M/mile to \$9.0M/mile, as compared to the \$3.5M/mile for the Article VII proposed marine route. Extending these estimated costs results in a net increase to the Project costs for installation of the cables from Catskill to Stony Point of approximately \$620M or a 42% increase from the cost of the Article VII baseline cable installation estimate. The Hudson River Western Rail Route also represents a net additional twenty-four (24) miles of installation when compared to the baseline route.

Additional information on the comparative costs is shown in Table 4-1.

### **Analysis**

NYSDPS staff described the Hudson River Western Rail Line Route alternative as beginning in the Town of Bethlehem, Albany County and following with the CSX ROW to the west of the Hudson River. During settlement negotiations, the Applicants agreed to the segment from Coeymans to Catskill (21 miles) and the bypass around Haverstraw Bay (7 miles).

However, the section from Catskill to Stony Point posed significant engineering issues, including insufficient room to install the cables around existing development and utility features, tunnel features, and the requirements for the long HDD installations that would be required in places. Access is also an issue for the alternative in areas where the land is restricted because of existing regulations and laws (e.g. limited access highways, municipal parks, federal land). The installation of the transmission cables in close proximity to homes and business will likely generate public opposition based on the experience of the NYRI project (particularly as the construction duration will be more than a ten-fold increase over in-water installation).

In addition to the logistical issues which would pose difficult issues as well as likely political and public opposition, the complete Hudson River Western Rail Route also has significant cost implications. Project costs would increase by approximately 43% from the current Project; at that cost, there would be no transmission customers that would take service on the transmission line. For these reasons, the Hudson River Western Rail Line Route is not a practical alternative.

**TABLE 4-1  
PROPOSED PROJECT AND HUDSON RIVER WESTERN RAIL ROUTE**

Section	Upland or Marine	Distance (Miles)	Cost per mile (\$million)	Project Cost (\$million)	Hudson River Western Rail Cost (\$million)
International Border to Dresden	Marine	101.5	2.9	\$ 290.7	\$ 290.7
Dresden to Catskill	Upland	126.8	5.3	\$ 666.1	
	Upland	118.3	5.3		\$ 621.5
Catskill to Stony Point	Marine	67.4	3.5	\$ 237.4	
	Upland	100	9.0		\$ 900.0
Stony Point to Clarkstown	Upland	7.9	12.7	\$ 100.4	\$ 100.4
Clarkstown to Bronx	Marine	27.6	4.4	\$ 122.6	\$ 122.6
Bronx to Astoria Converter site	Upland	2.3	15.0	\$ 34.5	\$ 34.5

	Project	Hudson River Western Rail
Marine Distance (miles)	196.5	129.1
Upland Distance (miles)	135.5	227.1
Total Distance (miles)	332.1	356.2
Total Cost (\$millions)	\$ 1,451.72	\$ 2,069.6
Cost Variance from Project (\$millions)		<b>\$ 617.92</b>
Cost Variance from Project (%)		<b>42.6%</b>

Notes:

1. Baseline pricing based on estimate provided by reliable contractor in August 2012.
2. Distances based on segment lengths.
3. Marine costs/mile vary due to sub-bottom conditions, turbidity, installation methods, navigation and other considerations.
4. Estimate assumes that engineering solutions and CSX concurrence can be secured for challenging conditions.
5. Engineering solutions to some challenges may not be obtainable.

### 4.3 Harlem River Rail Route

This proposed alternative would begin in the Hudson River and make landfall at Spuyten Duyvil in the Bronx. The route would then proceed along the Metropolitan Transit Authority and New York State Department of Transportation railroad corridor along the northern and eastern banks of the Harlem River for approximately six miles to the rail yards west of Willis Avenue, where it would join the alignment of the Hell Gate Bypass Route described below. The route is shown in Figure 4-2.

#### Logistics

The Harlem River Rail Route alternative entails a six mile upland section through the Bronx along rail corridors. The Harlem Rail Line along the river's edge on the Bronx side of the Harlem River provides a near direct upland course within a rail corridor, built in 1851, on trestles set in "rip-rap" foundations. In the northern portion, the route extends through the neighborhoods of the southwest

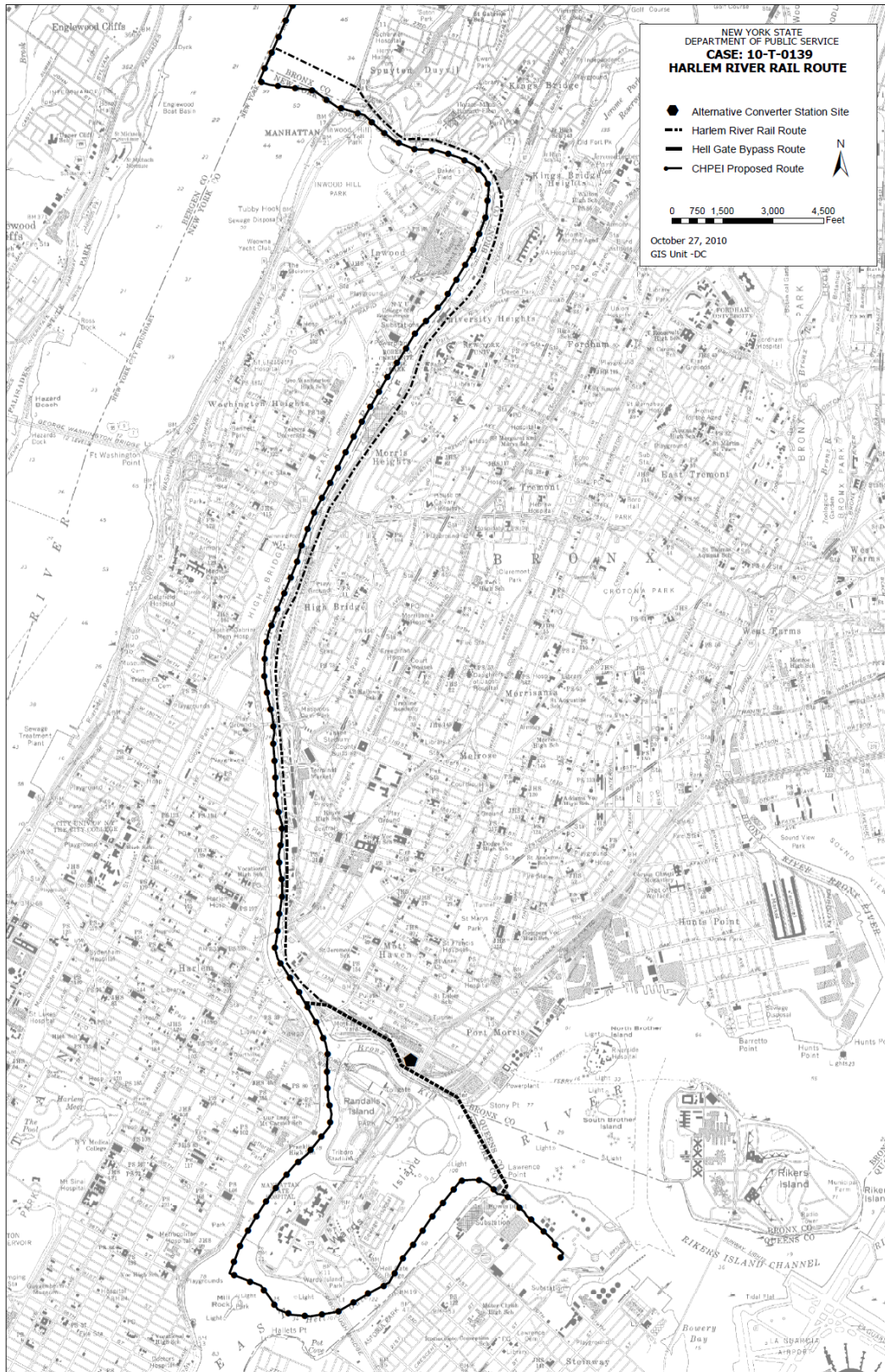


Bronx in challenging geotechnical conditions (e.g., Fordham gneiss and Inwood marble). The corridor is narrow and construction of a buried HVDC line will entail extended lengths of direct attachments of the cables to the supporting trestles which entail an increased risk of damage to the cables because the cables will be exposed in a high traffic area. Also, approval from the Metropolitan Transit Authority (“MTA”) and NYSDOT would be required and it is not clear that such authorizations would be granted.<sup>148</sup> In the southern portion, the route follows a 1.9 mile section of the Oak Point Link which connects the Metro-North Railroad's Hudson Line (“MNCR”) with the Harlem River Intermodal Yard and the CSX Transportation Oak Point Yard. Along the route, the cables would pass through three passenger stations and a rail maintenance facility. The Harlem River Rail Route passes under nine bridges and includes a six hundred (600) foot length segment between West Tremont Avenue and the Harlem River Park Bridge where it passes under a building.

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<sup>148</sup> For a discussion of NYSDOT’s goals with regards to increasing the utilization of rail freight service in the New York City metropolitan area, see Comparison of Alternative Converter Station Sites Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City, Case No. 10-T-0139 (N.Y. P.S.C. Feb. 24, 2012), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={F78693D0-6E5B-4E71-BA6E-53D4A3445A15}>.

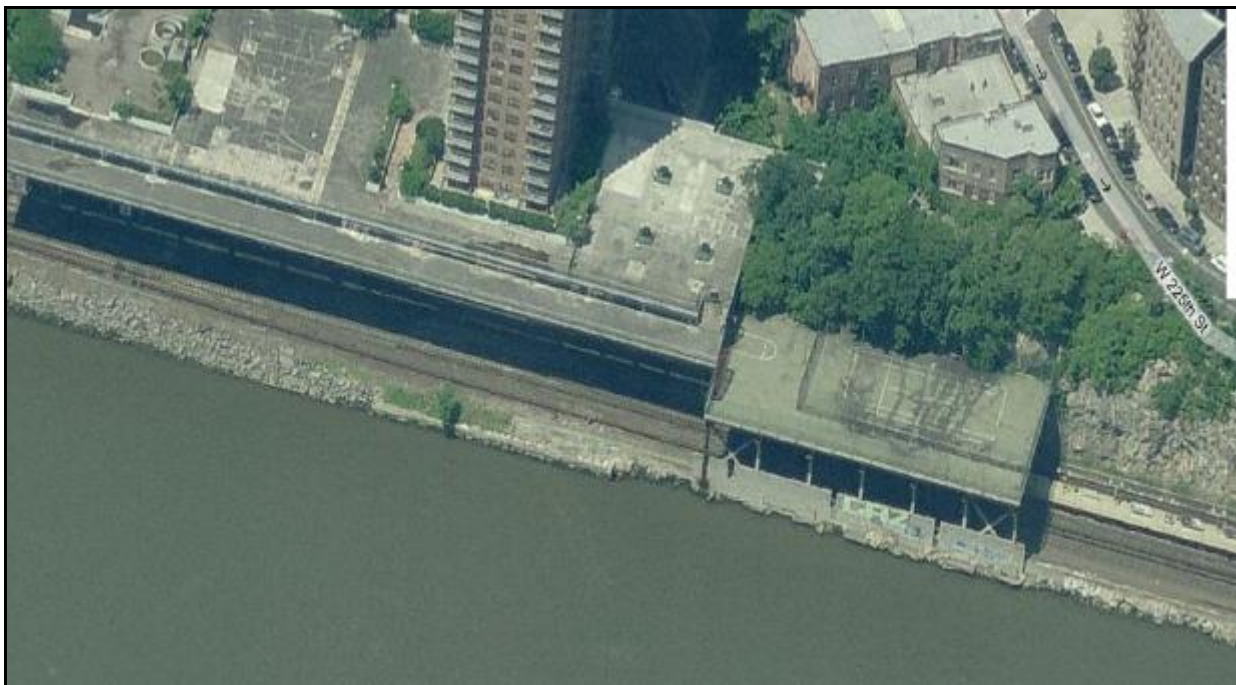
**FIGURE 4-2  
HARLEM RIVER RAIL ROUTE**



**View of Railroad between Large Rock Outcropping along Harlem River**



**View of Building over Railroad along the Harlem River**



### View of Building Immediately adjacent to Railroad along Harlem River



Given the challenges of obtaining approvals to secure to the railroad trestle, an additional alternative was assessed; this alternative entails a landing on the west side of Manhattan and an upland route across the City and along a greenway on the western shore of the Harlem River. This route also would require the need for approvals from an assortment of City and State agencies. Working within the City of New York is replete with challenges (e.g. utility relocations, City-imposed work moratoriums) and production rates will likely range from 0 feet/day to 30 feet/day at the high end. Consequently, the overland through the City could disrupt City traffic for more than two years.

#### **Cost**

Only for the purpose of preparing this cost estimate is it assumed that engineering solutions can be developed for all of the listed challenges. Scheduling restraints will be most pronounced along the passenger lines. Engineering solutions also will require extensive discussions with the NYSDOT, MTA and with CSX to secure variances from conventional protocols for construction and installation in their busy passenger and freight rail corridor. Given the complexity of some of the challenges, engineering solutions and/or agency approvals may not be attainable.

The estimated cost per mile for the approximately 6 mile upland section ranges is \$18M/mile, as compared to the \$4.4M/mile for the Article VII proposed marine route, a four-fold increase. The Harlem River Route therefore represents a cost increase of approximately \$81 million (305%) compared to in-water installation over the same segment. This results in an overall net increase to the Project costs of approximately 6% above the cost of the Article VII baseline cable installation estimate.

For the overland alternative across the City of New York, the estimated cost per mile for the approximately 6 miles upland section is \$32.5 M/mile, as compared to the \$4.4M/mile for the Article VII proposed marine route, almost an eight-fold increase. This results in a net increase to Project of approximately \$189 M or a 15% increase from the cost of the Article VII baseline cable installation estimate.

Additional information on the comparative costs is shown in Table 4-2.

**TABLE 4-2  
PROPOSED PROJECT AND HARLEM RIVER RAIL ROUTE**

Section	Upland or Marine	Distance (Miles)	Cost per mile (\$million)	Project Cost (\$million)	Harlem River Rail Cost (\$million)	Harlem River (Manhattan)
International Border to Dresden	Marine	101.5	2.9	\$ 290.7	\$ 290.7	\$ 290.7
Dresden to Catskill	Upland	126.8	5.3	\$ 666.1	\$ 666.1	\$ 666.1
Catskill to Stony Point	Marine	67.4	3.5	\$ 237.4	\$ 237.4	\$ 237.4
Stony Point to Clarkstown	Upland	7.9	12.7	\$ 100.4	\$ 100.4	\$ 100.4
Clarkstown to Bronx	Marine	27.6	4.4	\$ 122.6		
	Marine	21.6	4.4		\$ 95.0	
Clarkstown to Manhattan	Marine	28.5	4.4			\$126.60
Bronx (Inwood) to Bronx (HRY)	Upland	6	18		\$ 108.0	
Manhattan (Landing to Launch)	Upland	6.5	32.5			\$211.25
Bronx to Astoria Converter site	Upland	2.3	15.0	\$ 34.5	\$ 34.5	\$34.5

	Project	Harlem River Rail	Harlem River (Manhattan)
Marine Distance (miles)	196.5	190.5	197.4
Upland Distance (miles)	135.5	141.6	142.1
Total Distance (miles)	332.1	332.3	339.5
Total Cost (\$millions)	\$ 1,451.72	\$ 1,532.2	\$1,666.97
Cost Variance from Project on Harlem River (\$millions)		<b>\$ 81.35</b>	<b>\$188.59</b>
Cost Variance from Project on Harlem River (%)		<b>305.2%</b>	<b>707.6%</b>
Cost Variance from Overall Project (\$millions)		<b>\$ 80.44</b>	<b>\$215.25</b>
Cost Variance from Overall Project (%)		<b>5.5%</b>	<b>14.8%</b>

**Notes:**

1. Baseline pricing based on estimate provided by reliable contractor in August 2012.
2. Distances based on segment lengths.
3. Marine costs/mile vary due to sub-bottom conditions, turbidity, installation methods, navigation and other considerations.
4. Estimate assumes that engineering solutions and CSX concurrence can be secured for challenging conditions.
5. Engineering solutions to some challenges may not be obtainable.

**Analysis**

The six-mile Harlem River Rail Route presents enormous logistical and engineering challenges on a busy passenger and freight rail corridor in the most densely populated city in the US. Engineering issues include: attaching the cables to the railway in such a manner that will both ensure the security of the transmission system and maintain existing railway use; installing the cables under buildings; and poor geotechnical conditions. Access to this corridor also would require substantial negotiations with the Metropolitan Transit Authority and NYSDOT; as has been discussed, the NYSDOT does not allow cables on their bridge structures. The construction costs for this segment of the route, even if achievable, are approximately 305% higher than the in-water installation. An alternative route buried in Manhattan would have a net increase to the Project costs of approximately \$189 M or a 15% increase from the cost of the Article VII

baseline cable installation estimate. Based on the higher construction costs as well as the extreme uncertainty as to whether it is feasible from an engineering perspective, this alternative is impractical.

#### 4.4 Hell Gate Bypass Route

The Hell Gate Bypass Route alternative begins north of the Willis Avenue Bridge, and proceeds easterly to landfall at the NYSDOT railroad corridor and rail yards, following the rail corridor along the northerly side of the Bronx Kill to the East River. This route proceeds southeasterly across the East River to landfall at the power plant complex at Lawrence Point in Astoria, Queens. See Figure 4-3.

NYSDPS Staff noted that this alternative avoided installing the transmission cables in a longitudinal occupancy of the Hell Gate reach of the East River, where engineering constraints and environmental conditions may limit constructability.<sup>149</sup> Furthermore, this alternative minimized conflicts with proposed development of renewable hydrokinetic energy demonstration projects in the East River.<sup>150</sup>

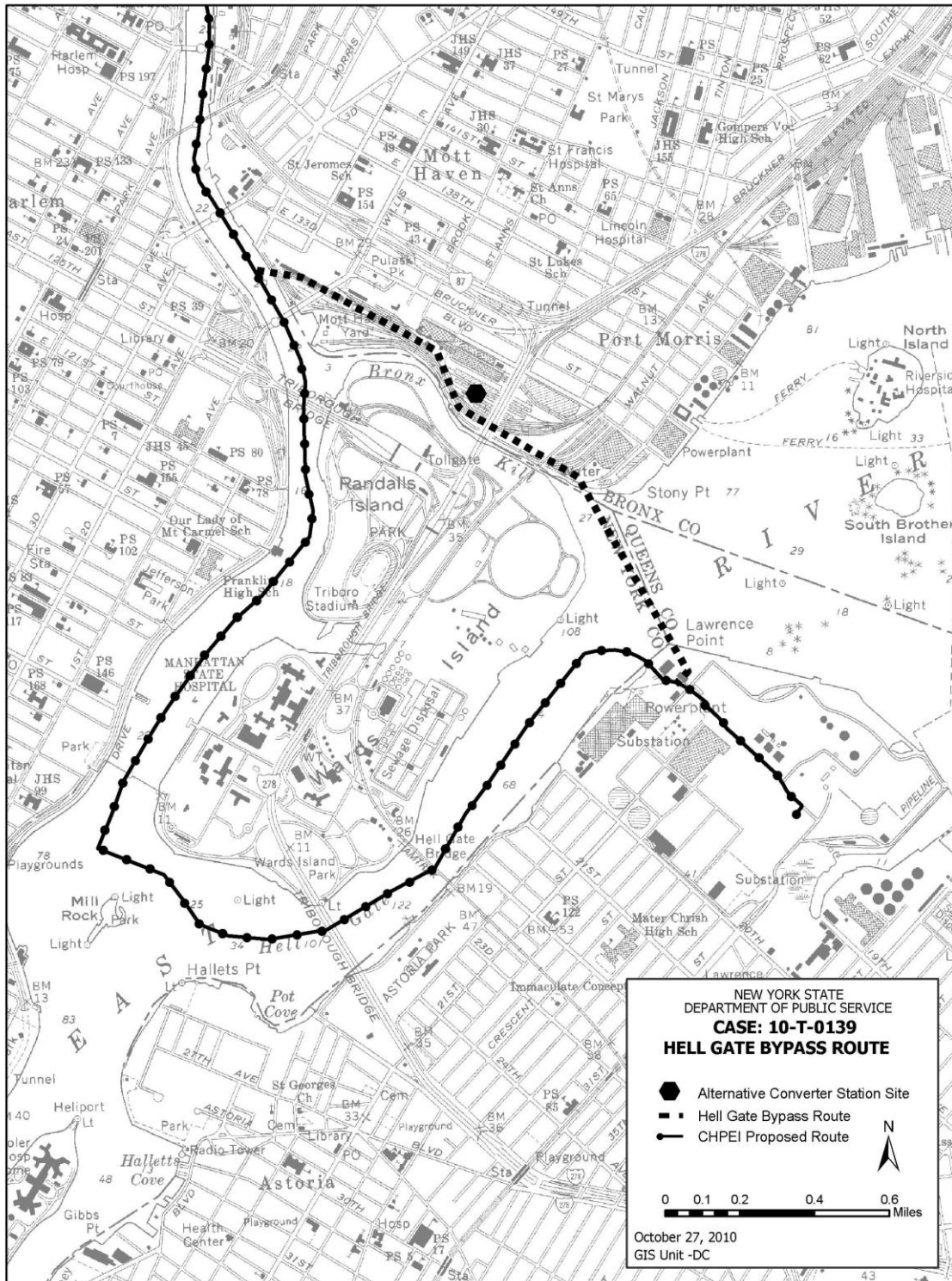
Based on an analysis of this alternative as part of the Article VII proceeding, it was determined to be practical in terms of cost, available technology, and logistics and, therefore, was incorporated into the proposed Project.

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<sup>149</sup> NYSDPS Staff Submits Proposed Alternative Routes at 3, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Oct. 27, 2010), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={421FD837-98B0-4E31-9B46-CCDA62591D73}>.

<sup>150</sup> New York East River Tidal Project, FERC Docket P-12665, and Roosevelt Island Tidal Project, FERC Docket P-12611. See [http://web2.uconn.edu/seagrantnybight/documents/Energy%20Docs/6\\_Hydrokinetic.pdf](http://web2.uconn.edu/seagrantnybight/documents/Energy%20Docs/6_Hydrokinetic.pdf)

**FIGURE 4-3  
HELLGATE BYPASS ROUTE**





# Section 5

## U.S. Army Corps of Engineers Alternatives

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The USACE requested that the following alternatives be considered:<sup>151</sup>

- a) A new overland power line route through a combination of road right-of-way (ROW), railroad ROW, and new power line ROW.
- b) A new overland power line route through a new power line ROW.

Each of these alternatives is evaluated below.

### 5.1 Existing Technology

For each of the alternatives described in this section, the cable system would be buried. Buried overland installation of the cables is described in Section 2.2.2 above. The typical cable trench along the overland portion of the route would be four (4) feet wide at the bottom and approximately four (4) to five (5) feet deep to allow for the proper depth required for the burial of the cables. A minimum separation distance is required from railroad rails to the cables by each railroad; CP requires a minimum separation of ten (10) feet from the centerline of the outermost track to the cable trench, and CSX requires a minimum separation of twenty-five (25) feet from the centerline of the outermost track. The permanent ROW is anticipated to be thirteen (13) feet in the railroad ROW and seventeen (17) feet in other areas.<sup>152</sup> Based on typical construction configurations, the temporary construction zone is assumed to be thirty-one (31) to thirty-three (33) feet wide.<sup>153</sup>

### 5.2 Overland Using Existing Rights-of-Way

The proposed alternative using existing ROWs is presented in segments: 1) west of Adirondack Park; and 2) east of the Hudson River.

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<sup>151</sup> U.S. Army Corps of Engineers. 2013 USACE File Number 2009-01089-WRY, Transmission Developers Inc., Champlain Hudson Power Express Transmission Line Project, OE Docket N.O. PP-362. USACE Comments on Preliminary Draft Environmental Impact Statement dated December 2012. Letter to Brian Mills, U.S. Department of Energy and Donald Jessome, TDI dated February 19, 2013.

<sup>152</sup> Order Granting Certificate of Environmental Compatibility and Public Need at 101, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Apr. 18, 2013), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={A71423C8-B489-4996-9C5A-016C9F334FFC}>.

<sup>153</sup> Attachment H – Revised Attachment H: Cross Section Diagrams, CHP Supplemental Application, <http://www.chpexpress.com/docs/regulatory/permit-application/Attachment%20H%2020120229.pdf>.

### 5.2.1 West of Adirondack Park

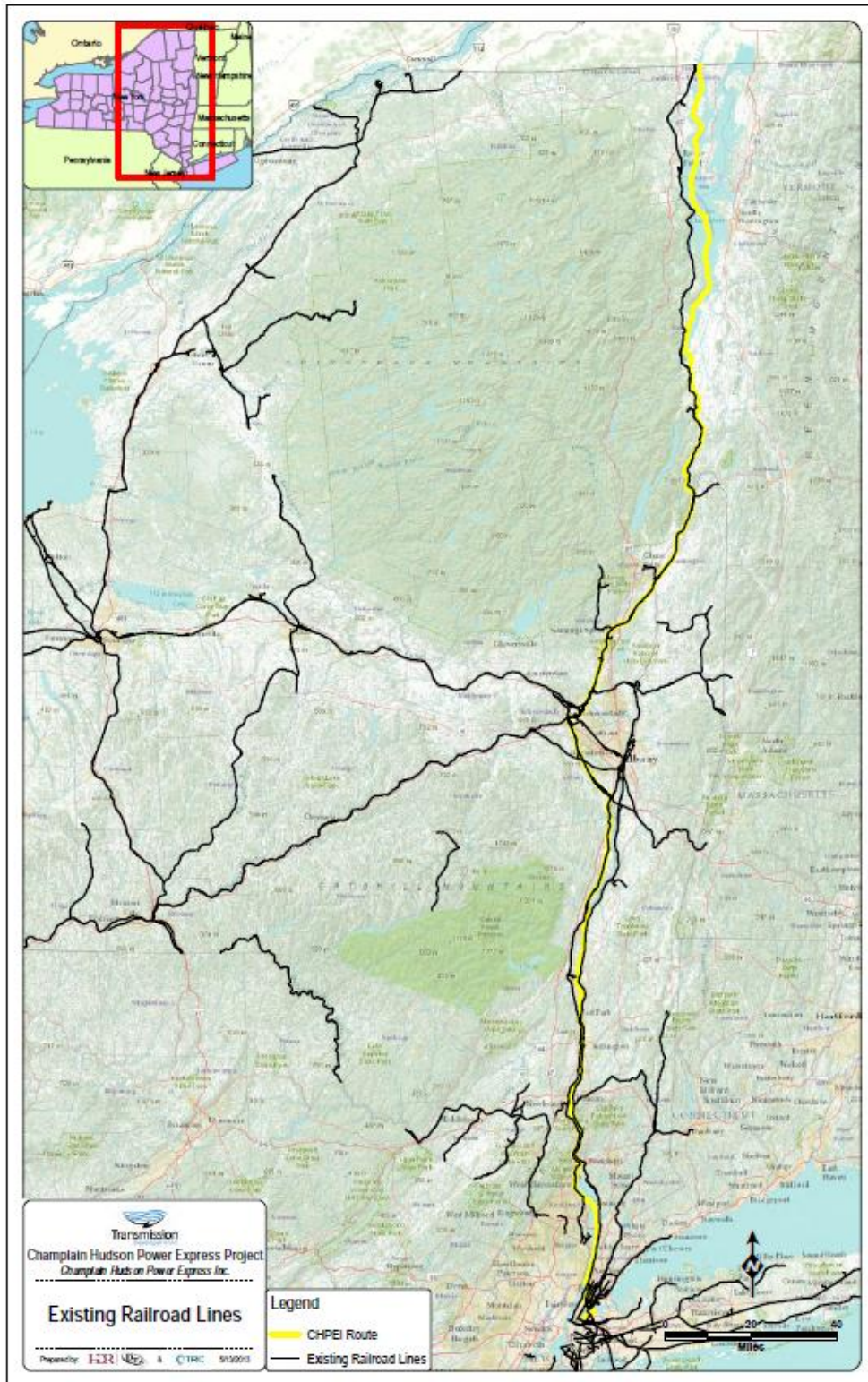
Based on the US National Transportation Atlas developed by the U.S. Department of Transportation's Research and Innovative Technology Administration, (see Figure 5-1), there are no major railroad routes which travel around the perimeter to the west of Adirondack Park.<sup>154</sup> CSX operates a railroad line that crosses the international border at Massena, New York, travels southwest to Syracuse, New York, then continues to the east to connect with the proposed Project route in Rotterdam, New York, for a total of 280 miles. As this routing would be approximately 100 miles more than the proposed routing for this section (of which approximately 40% is overland), a combination of railroad and roadway routing was selected for this alternative.

The alternative under consideration (see Figure 5-2) would follow the CSX railroad ROW from the U.S. – Canada border near Massena, New York and travel to the southwest for approximately 100.1 miles to the town of Evans Mills, New York. The route would enter the Route 46 ROW which, after a short distance, becomes Route 26. Route 26 would be utilized for approximately 27.1 miles past the municipalities of, among others, Great Bend, West Carthage, Sterlingville, Carthage, and Castorland before entering Lowville.

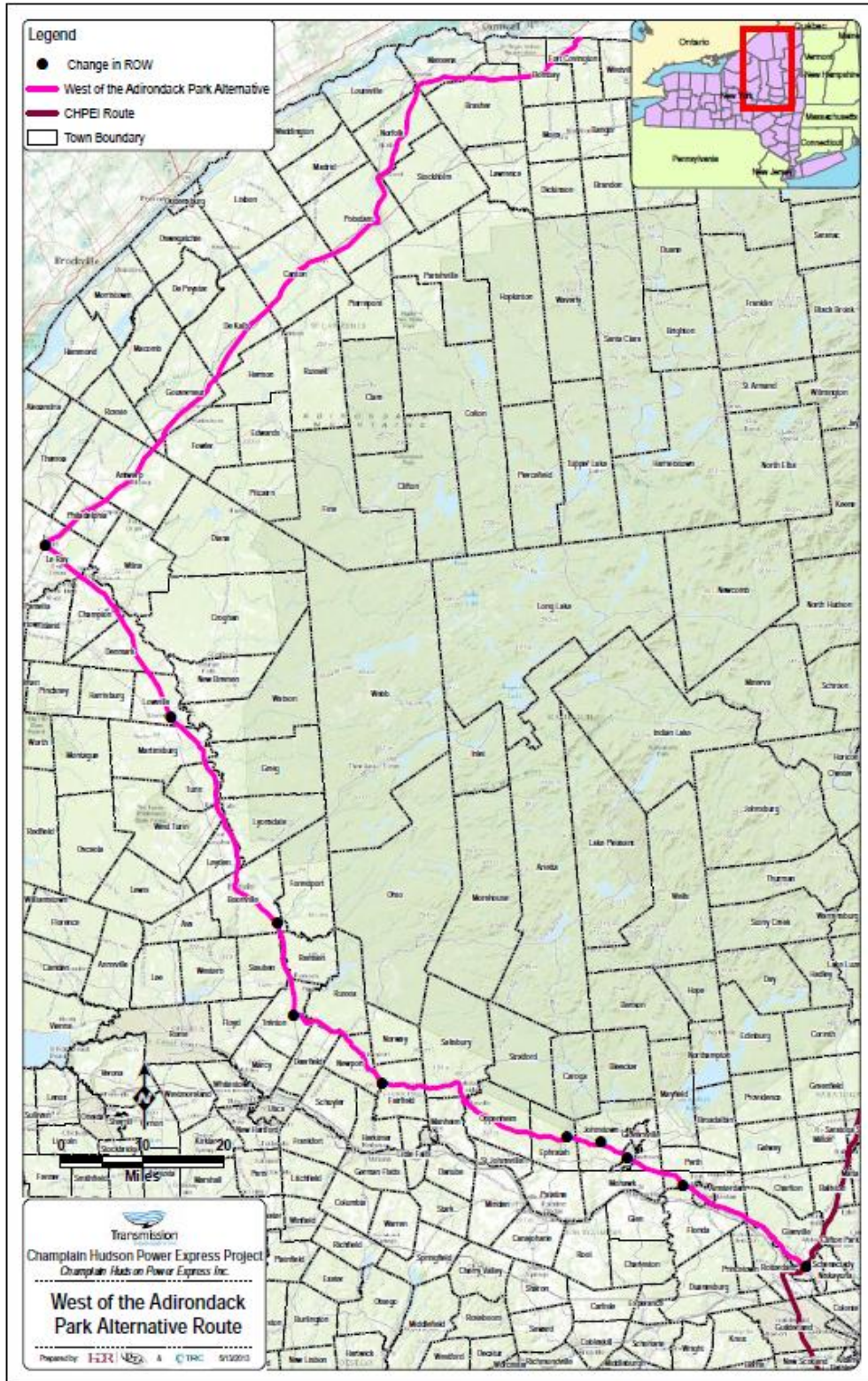
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<sup>154</sup> U.S. Dep't of Transp. Research & Innovative Tech. Admin., *National Transportation Atlas Database* (2012), [http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national\\_transportation\\_atlas\\_database/2012/index.html](http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_atlas_database/2012/index.html).

**FIGURE 5-1  
EXISTING RAILROAD LINES**



**FIGURE 5-2**  
**WEST OF ADIRONDACK PARK EXISTING RIGHTS-OF-WAY ALTERNATIVE**



Leaving Lowville, the route would connect into the Route 12 ROW and proceed south for 30.8 miles along this roadway, crossing through, among others, Lewis, Port Leviden, Glendale and Boonville. The alternative continues on Route 12 before intersecting with Route 28 in Alder Creek. These two roadways overlap for approximately 11.7 miles until diverging in Trenton.

The alternative would be installed in the Route 28 ROW to the east / southeast for approximately 15.6 miles before intersecting with Route 29 in Middleville.

The Route 29 ROW would be utilized for approximately 27.1 miles before entering Ephratah just after the intersection with Route 10, where Old State Road /Watershed Road and Red School House Road would provide a bypass of the section of Route 29 that enters the Adirondack Park (4.5 miles). Continuing along Route 29, the alternative would transfer from Route 29 to Route 67 in Johnstown after 4.0 miles. The alternative will follow Route 67 for 8.3 miles, overlapping with Route 5 from Fort Johnson to Amsterdam. After 18.6 miles, Route 5 connects to the proposed Project route in Schenectady. The total route length is approximately 247.8 miles.

### **Logistics**

The route would enter the United States near Fort Covington, New York and travel along the railroad corridor primarily through rural areas. Along this route, there are eleven notable water crossings and a wetlands area near DeKalb. The line also passes through a G&W railroad yard. Passing through the towns of Norwood and Potsdam, there are houses in close proximity to the railroad ROW. The crossing of the Racquette River would be complicated by the limited available area on the southern side in which to establish an HDD operation and the presence of the Route 11 bridge abutments. In Canton, the railroad corridor narrows with existing development in close proximity, so that HDDs may be required. The crossing of the Grass River via HDD would be complicated by transmission lines on the northern side of the existing trestles. In Gouverneur, towards the center of town, the tracks divide with Route 11 to the west/northwest and existing development to the east/southeast. There are on-going track improvement projects currently underway. The freight rail traffic on this alignment is anticipated to be moderate.

In Evans Mills, the alternative would shift from utilizing a railroad ROW to a series of roadway ROWs. Construction for the first approximately half-mile, as the route leaves the CSX railroad ROW to the Route 46 ROW, will cross through commercial and residential buildings on both sides

of the road, resulting in disruption as the cables are installed in the roadway. Route 26 traverses primarily rural countryside with limited development. There are two notable water crossings at Champion and Denmark, which will require special measures. The crossing at Champion may not lend itself to a HDD and the NYSDOT has stated that it will not allow cables to be attached to their bridges. In Lowville, buildings are immediately adjacent to the Route 26 roadway and include residential houses where construction would be disruptive; as a consequence, there will likely be local opposition to this alternative route.

### View of Route 26 in Lowville



As with Route 26, Route 12 primarily traverses rural areas with limited development (e.g. Lewis, Port Levden, Glendale). In Boonville, there is a half-mile section where the roadway is bordered on one side by buildings and water bodies on the other. The landscape remains roughly the same after the roadway intersects with Route 28 in Alder Creek and continues southbound, although the roadway widens to four lanes. As the roadway enters Trenton, existing development is located on both sides of the roadways, which is two-lane highway in this area, so that there is not a clear location in which to locate the transmission cables.

Route 28 primarily travels through rural areas. In centers of Poland, Newport, and Middleville, the roadway is bordered on each side by residential and limited commercial buildings, so that construction associated with installation would be disruptive and may encounter opposition. The construction corridor is particularly constrained in Newport due to the density of buildings adjacent to the roadway.

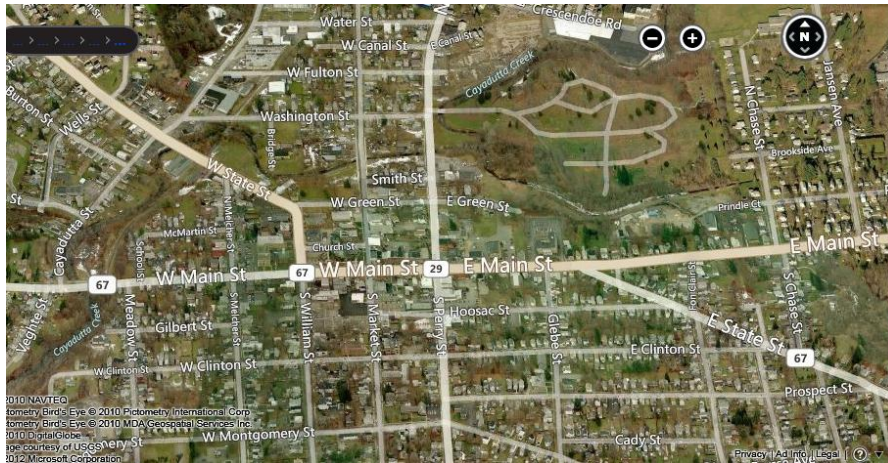
### View of Route 28 in Newport



As with Route 28, residential properties are located on each side of the Route 29 ROW as it moves through the Middletown center. There are smaller communities along this length of this route (e.g. Fairfield, Salisbury Center) where construction will be disruptive to residential homes. More significantly, in Dolgeville, there are closely packed buildings immediately adjacent to the roadway as well as residential houses where construction would be disruptive. Crossing under the East Canada Creek will be severely complicated by the density of buildings on the west side of the waterway.

In Johnstown, the alternative will transfer from Route 29 to Route 67. There is an approximately one-mile segment where residential and commercial buildings are located close together on both sides of the roadway ROWs. There will likely be public opposition to construction in close proximity to homes and businesses, and construction would be further complicated by existing utilities.

### View of Routes 29 / 67 in Johnstown



Outside of Johnstown, Route 67 continues the pattern of installation within rural land uses. After intersecting with Route 5, the alternative enters Amsterdam. Construction in this municipality would be severely complicated by the Amtrak railroad line along one side and commercial and residential buildings on the other. This situation is particularly pronounced where Routes 67 and 5 diverge as the existing road networks and buildings occupy all of the likely construction corridors.

### Views of Sections of Routes 67 / 5 within Amsterdam





Outside of Amsterdam, installation within the Route 5 roadway would primarily need to be located along the northern side of the roadway due to the railroad to the south. A review of the route using available aerial photography indicates that rock outcrops will occur at sporadic locations along the roadway. In Glensville there are streetlights and transmission poles on both sides of the roadway for approximately a mile so that the cables would need to be installed beneath the state route. A similar situation occurs within Scotia and Schenectady, as utility poles and buildings on both sides of the road would require that installation of the cables occur within the road itself. The construction of the proposed upland alternative to the west of Adirondack Park would likely require, utilizing multiple crews, more than 70 months or 5 years, a more than three-fold increase.

### **Cost**

Only for the purpose of preparing this cost estimate is it assumed that engineering solutions can be developed for all of the listed challenges. Engineering solutions, however, would require discussions with the NYSDOT, G&W, CSX and possibly other short-line owners to secure variances from conventional protocols for construction and installation in their freight rail right-of-way. The most notable engineering challenge appears to be a water crossing at Champion.

The estimated costs per mile for the approximately 240 miles upland section ranges from \$3M/mile to \$6M/mile, as compared to the Project route's 101 miles of marine burial at \$2.9M/mile and 71 miles of upland burial at \$5.3M/mile. The added cost of this alternate is approximately \$512M or 77% higher than the comparable costs for the corresponding Project segment. These estimated costs would result in a net increase to the Project costs of approximately \$512M or a 35% increase from the cost of the Article VII baseline cable installation estimate.

Additional information on the comparative costs is shown in Table 5-1.

### **Analysis**

The proposed routing west of the Adirondack Park entails a 247.8 miles upland section from the Canadian border to Schenectady that passes west of the Adirondack Park along the existing DOT and rail rights-of-way in lieu of the Article VII proposed routing that is principally marine through Lake Champlain and the Champlain Channel. Elimination of the installation of approximately 101

miles of marine cable results in an additional 109 miles of upland cable installation when compared to the Article VII route.

Although the alternative utilizes existing ROWs, there are a number of engineering challenges that would need to be addressed. Specifically, there are a number of water crossings where long HDD installations would be required and, in some locations, there is limited available space to establish an HDD landing area (e.g. Racquette River, Grass River, and East Canada Creek). As the route moves south, it will cross through municipalities (e.g. Johnstown, Amsterdam) where construction would need to occur within close proximity to homes and businesses, which is likely to generate public concern. In certain communities such as Glenville, Scotia and Schenectady, the density of utility infrastructure such as transmission poles and streetlights present on both sides of the roadways will require complicated engineering solutions as well as extensive discussions with local municipalities and NYSDOT.

Moreover, the costs for this alternative represent a significant increase compared to the estimated Project costs. As with the Hudson River Western Rail Route, overland routing presents a number of challenging and costly installation measures including long HDD installations, accommodating narrow work areas, avoiding conflicts with existing utilities, and working in roadways. A buried overland route would represent an approximately 35% increase in the total costs of the Project, making it commercially infeasible. Therefore, this routing is not a practical alternative. As it represents one of the shortest potential routes around the Adirondack Park, all similarly situated routes would also be impractical.

**TABLE 5-1  
PROPOSED PROJECT AND WEST OF ADIRONDACK PARK OVERLAND ROUTE**

Section	Upland or Marine	Distance (Miles)	Cost per mile (\$million)	Project Cost (\$million)	West of Adirondack Park Cost (\$million)
International Border to Dresden	Marine	101.5	2.9	\$ 290.7	
Dresden to Rotterdam	Upland	75.5	5.3	\$ 396.62	
International Border to Rotterdam	Upland	280	5.0		\$1,200.0
Rotterdam to Catskill	Upland	51.2	5.3	\$ 268.95	\$268.95
Catskill to Stony Point	Marine	67.4	3.5	\$ 237.4	\$ 237.4
Stony Point to Clarkstown	Upland	7.9	12.7	\$ 100.4	\$ 100.4
Clarkstown to Bronx	Marine	27.6	4.4	\$ 122.6	\$ 122.6
Bronx to Astoria Converter site	Upland	2.3	15.0	\$ 34.5	\$ 34.5

	Project	West of Adirondack Park
Marine Distance (miles)	196.5	95
Upland Distance (miles)	135.5	300
Total Distance (miles)	332.1	395.2
Total Cost (\$millions)	\$ 1,451.72	\$ 1,963.84
Cost Variance from Project for Border to Rotterdam (\$millions)		<b>\$ 512.66</b>
Cost Variance from Project for Border to Rotterdam (%)		<b>77.2%</b>
Cost Variance from Project (\$millions)		<b>\$ 512.66</b>
Cost Variance from Project (%)		<b>35.3%</b>

**Notes:**

1. Baseline pricing based on estimate provided by reliable contractor in August 2012.
2. Distances based on segment lengths.
3. Marine costs/mile vary due to sub-bottom conditions, turbidity, installation methods, navigation and other considerations.
4. Estimate assumes that engineering solutions and CSX concurrence can be secured for challenging conditions.
5. Engineering solutions to some challenges may not be obtainable.

### 5.2.2 East of Hudson River

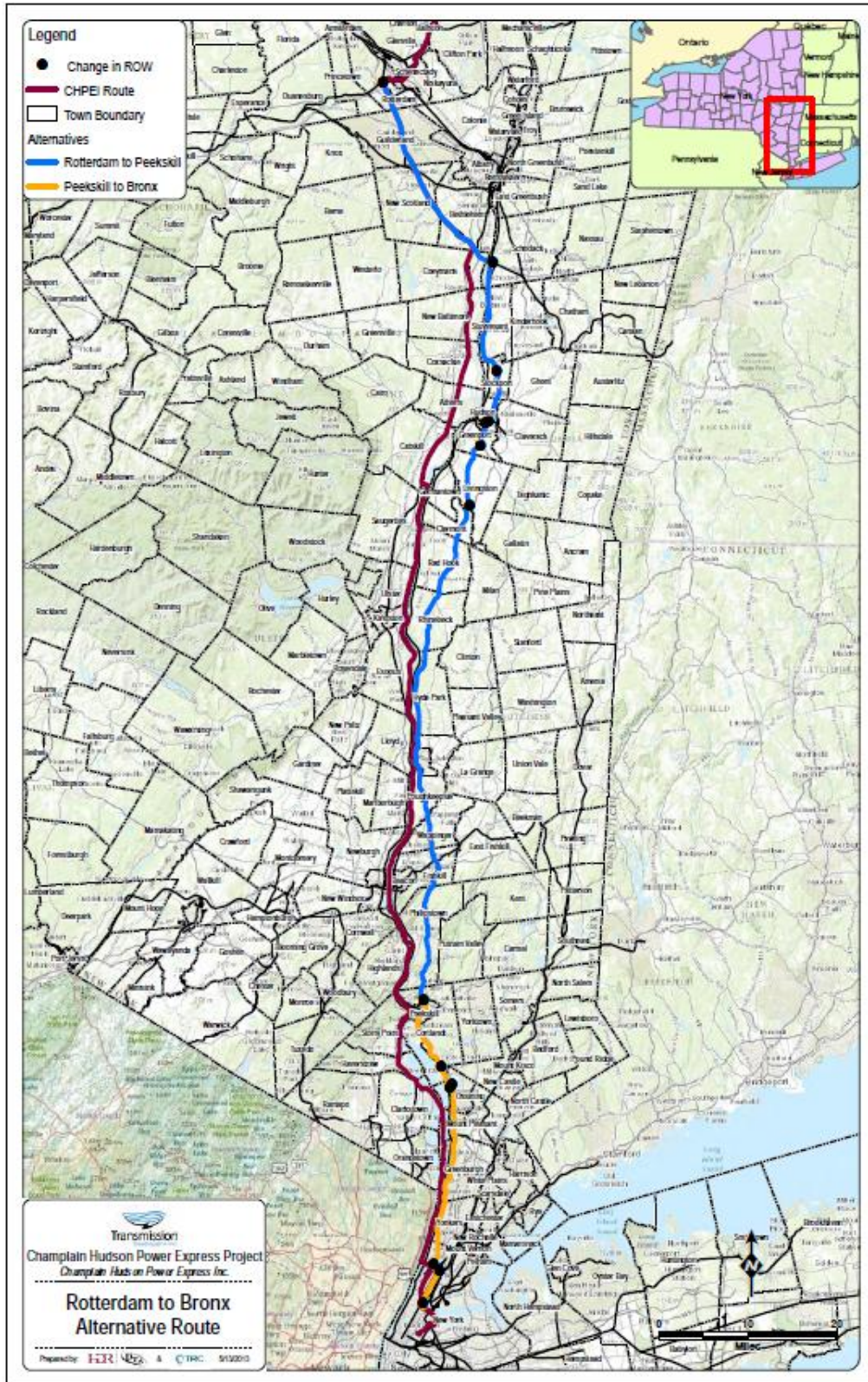
The East of Hudson River proposed alternative would follow the Project route along the CP railroad until it connects to the CSX railroad in Rotterdam and travels 24.7 miles southeast past Selkirk, where it crosses under the Hudson River. The alternative would enter the Route 9J ROW and travel south for 13.3 miles before intersecting with Route 9 in Stockport. Following Route 9 south for 6.1 miles to Greenport, the alternative would shift to Prospect Avenue (0.4 miles) and then back onto Route 9 south for 2.7 miles until reaching the intersection with Route 23. The alternative would be in the Route 31 South ROW for 7.5 miles before connecting again to Route 9 south in Blue Store. The route would be located in the Route 9 south for 60.1 miles, travelling through Nevis, Red Hook, Rhinebeck, Staatsburg, Hyde Park, Poughkeepsie, Wappingers Fall, North Highland and Graymoor. In Annsville, the alternative would follow the Old Albany Post Road into Peekskill as Route 9 becomes a parkway at the intersection with Routes 202 and 6.

In Peekskill, the alternative route would travel south along Highland Avenue, Route 63 / North Division Street, and South Street. South Street transitions to Lower South Street, which connects into Route 9A / Albany Post Road. The alternative would continue for 9.3 miles along Route 9A until Croton, where it would enter the Amtrak ROW for 2.7 miles utilizing Municipal Place and Half Moon Bay Drive before Route 9A shifts onto the Route 9 parkway. In Ossining, the route would connect to Route 9 via Snowden Avenue (0.6 miles).

Following Route 9 south for 21.3 miles the alternative would cross through Sleepy Hollow, Tarrytown, Irvington, Dobbs Ferry, and Yonkers. In Marble Hill to the north of the Harlem River, the alternative would travel south along Route 9 before crossing into Exterior Street, then it would travel east/southeast along West Kingsbridge Road for 1.2 miles to the Grand Concourse. Travelling south along the Grand Concourse, the alternative would be installed for 4.2 miles before intersecting with E 138th Street. Following E 138th to the east, the alternative would connect with Lincoln Avenue and, travelling south, connect to the current Project route (0.8 miles).

Figure 5-3 shows the proposed routing.

**FIGURE 5-3**  
**EAST OF HUDSON RIVER EXISTING RIGHTS-OF-WAY ALTERNATIVE**



### **Logistics**

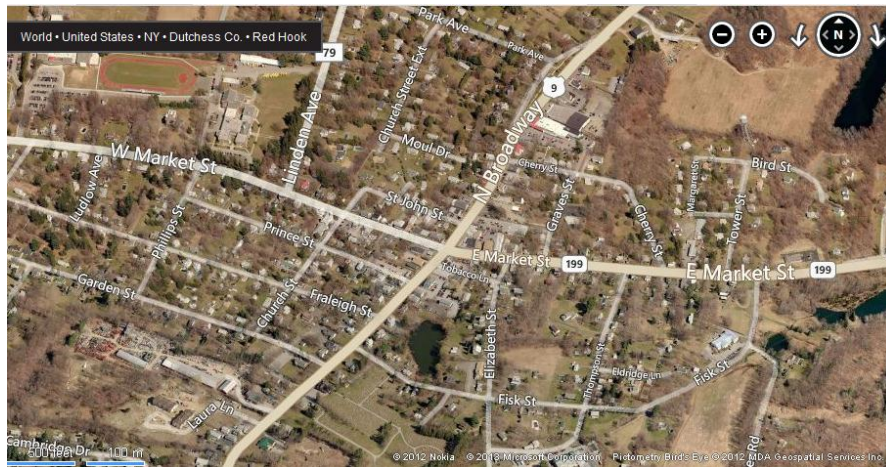
The proposed east of the Hudson River route entails a routing similar to the Project route through Selkirk, where the line includes a challenging cross-Hudson River horizontal directional drill (HDD) of almost a mile in length. This HDD under these conditions may be a first of its kind and will have a notable price premium due to its inherent technical difficulty.

Route 9J is primarily located in a rural area with little development other than residential houses and the railroad line to the west. However, there are locations with municipalities such as Schodack and Stuyvesant where buildings are located immediately adjacent or in close proximity to the roadway where there is likely to be public opposition to construction in close proximity to homes and businesses. Route 9 is similarly predominantly set in an area with a low density of development. In Stottville center, transmission lines are located on the western side of the road and residential houses are located in close proximity to the roadway ROW. Within Greenport proper, there are significant stretches of ROW with utility poles on both sides of the roadway and development abutting the roadway, so that construction would need to occur in the roadway itself. Prospect Avenue also has utilities poles and buildings along both sides of its ROW before reconnecting with Route 9.

South of Greenport, the primary land use is rural and residential, but there is a continuous line of utility poles located on one side of the road with sporadic features (e.g. transmission poles, trees, buildings) along the other. A similar network of utility poles is found along Route 31, although the poles are on occasion located some distance from the road.

In Blue Store, the route transfers back to Route 9. As with earlier segments, there is a low density of development. Utility poles are located along the majority of the route with other features (e.g. houses, buildings, additional utility poles) periodically being located on the other side, thereby presenting routing concerns. In the center of municipalities such as Red Hook, Rhinebeck, and Hyde Park, houses are located more closely together in near proximity to the roadway so there may be public opposition to construction in close proximity to homes and businesses.

### Views of Section of Route 9 within Red Hook



In Poughkeepsie, installation would be logistically demanding. The route passes through an urban area with a number of grade separations and water crossing (i.e., Sprout Brook) which will entail six to ten HDDs, as well as the other challenges of underground work in heavily trafficked roadways. The road becomes a two-way highway with development located adjacent to the ROW. The intersection of Routes 44 and 55 and Route 113 with Route 9 would pose significant challenges as construction will need to be sited so as to not affect the structural integrity of the extensive road and bridge network in this location. Further south, there is a one mile segment of road occupied by area businesses within and serving the South Hills Mall and Poughkeepsie Galleria. The high volume of traffic in this area would present safety concerns. This segment ends with a cloverleaf intersection of Routes 9 and 113, which poses the same concerns as the earlier intersection with Routes 44 and 55 in terms of siting so as to avoid impacts to the transportation structures.

### Views of Section of Route 9 within Poughkeepsie



South of Poughkeepsie, the route traverses another forty-two (42) miles through suburban areas to Peekskill, through Tarrytown and Sleepy Hollow before its final section to New York City. Route 9 has a mix of open areas and commercial development, with utility poles largely eliminating half of the potential construction corridor. As the route enters into Peekskill, residential homes and some commercial buildings are densely packed and close to the road. This trend is found along Highland Avenue, North Division Street, and the upper portion of South Street. Development is still present but not as dense along Lower South Street and Route 9A.

In Croton, Route 9A is bordered by residential homes on the north/northeast and Route 9 to the south/southwest. Installation in this area would be complicated due to the presence of buildings and the roadway structures. Installation within the Municipal Place ROW would require consideration of the supporting structures for Route 9, which crosses over the roadway. The Amtrak facilities are located to the south of the intersection of the railroad ROW with Half Moon Bay Drive, thereby limiting installation to beneath a busy parking lot.

The cables would cross the Croton River, which will require another notably long HDD with limited work areas. After crossing the Croton River, the railroad ROW is closely bounded to the west by the Hudson River. Installation in this segment would be significantly slower as work would need to stop each time a train passed on one of the two sets of track. Snowden Avenue has a moderate level of residential development while Route 9 has a high density of homes and businesses as it extends through Ossining, as well as utility poles and other features on both sides of the roadway. With regard to construction in close proximity to homes and businesses, the NYRI



experience suggests there may significant opposition to a disruption that is perceived to primarily benefit the City of New York.

South of Ossining, Route 9 primarily traverses residential and light commercial zones. Utility poles tend to be located along only one side although they can shift to service individual buildings or side roads. In a portion of Mount Pleasant, Rockefeller State Park borders the roadway to the east while a wall and transmission poles are located immediately to the west.

As the route transitions into first Sleepy Hollow and then Tarrytown, there is increased development on both sides of Route 9. There are also locations listed as public parks, where the Applicants would be unable to obtain access rights for a private venture.<sup>155</sup> Route 9 crosses the New York State Thruway (287/87) via a bridge. As the NYSDOT would not allow collocation on their bridges,<sup>156</sup> the Applicants would need to obtain authorization to cross under the federal interstate so as to not affect the integrity of the road system. Immediately south of the New York State Thruway intersection is a segment with parklands to the west and utility poles to the east of Route 9.

South of Tarrytown, Route 9 experiences a pattern of crossing through residential areas with utility poles occupying one side of the road with the occasional obstruction on the other, then a higher level of development density as it crosses through municipalities such as Dobbs Ferry and Hastings-On-Hudson. In these more urban areas installation would be complicated by close development and multiple situations where utility or traffic features are on both sides of the roadway. Public opposition to the Project would also be more likely to develop. Development within Yonkers is located particularly close to the road, so that it would be necessary to install beneath the pavement for most of this segment.

As the line approaches New York City, there are increasing engineering challenges. Due to existing structures, utilities, and heavy traffic a number of HDDs would be required. As Route 9 enters the Bronx, Van Cortlandt Park is located to the east and development borders the western side of the road, as well as the Henry Hudson Parkway crossing. At the intersection of Manhattan College

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<sup>155</sup> See, e.g., *Friends of Van Cortlandt Park v. City of New York*, 95 N.Y.2d 623, 631-32 (2001) (“[O]ur law is well settled: dedicated park areas in New York are impressed with a public trust for the benefit of the people of the State. Their use for other than park purposes, either for a period of years or permanently, requires the direct and specific approval of the State Legislature, plainly conferred.”) (internal quotations omitted). See [http://www.law.cornell.edu/nyctap/I01\\_0003.htm](http://www.law.cornell.edu/nyctap/I01_0003.htm).

<sup>156</sup> Article VII Updated Alternatives Analysis at 5.

Parkway and Route 9, a series of buildings occupy the area to the west of the road followed by the MTA rail tracks. As the road travels south, the MTA continues to occupy the area to the west.

### View at intersection of Manhattan College Parkway and Route 9



As the alternative traverses Exterior Street, West Kingsbridge Road, and Grand Concourse, development continues to be densely packed. Further complicating installation is the City of New York's extensive utility network. To put this issue in perspective, for the three (3) mile connection between the Astoria Substation to the Rainey Substation, the City of New York identified only one routing alternative which would, in the City's opinion, accommodate its requirements in terms of the safety and reliability of their existing infrastructure.<sup>157</sup> It is unlikely that a similar pathway could be identified along or in close proximity to this proposed alternative. The alternative as presented would then follow E 138th Street to Lincoln Avenue before connecting into the current Project route. However, as with the earlier segment, the City of New York's utility network as well as the railroad and road infrastructure, may require that the final routing would need to follow a less direct pathway with a commensurate increase in the construction duration.

<sup>157</sup> Alternatives Analysis for AR Cable, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Feb. 24, 2012), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={4E927BAD-DD51-4E89-AA31-9B856BC95FA8}>.

This alternative entails an additional estimated 25 miles to the overall route and an increase of the direct burial portion of approximately 120 miles; both increases contribute to a longer construction schedule than what had been anticipated for route described in the Article VII submission. The construction of the proposed upland alternative to the east of the Hudson River would likely require, utilizing multiple crews, more than 50 months or 4 years.

### **Cost**

Notwithstanding the identified logistical issue that make this alternative impractical, the estimated costs per mile for the approximately one hundred fifty-five (155) miles upland section from Selkirk to the Bronx ranges from \$4.9 to \$19.2M/mile, as compared to Project route's ninety-five (95) miles of marine burial at \$3.5 to 4.4M/mile and thirty-five (35) miles of upland burial at \$5.3M/mile. For comparable sections from Selkirk to the Bronx, the East of the Hudson upland route represents an approximately 83% increase in costs compared to the baseline route. These estimated costs result in a net increase to the Project costs of approximately \$508M or a 35% increase from the cost of the Project's installation estimate.

Additional information on the comparative costs is shown in Table 5-2.

**TABLE 5-2  
PROPOSED PROJECT AND EAST OF HUDSON RIVER ROUTE**

Section	Upland or Marine	Distance (Miles)	Cost per mile (\$million)	Project Cost (\$million)	East of Hudson River Cost (\$million)
International Border to Dresden	Marine	101.5	2.9	\$ 290.7	\$ 290.7
Dresden to Catskill	Upland	126.8	5.3	\$ 666.12	
Dresden to Selkirk	Upland	98.5	5.3		\$ 517.45
Selkirk to Castleton-on-the-Hudson (HDD)	HDD	0.95	12.0		\$11.36
Castleton-on-the-Hudson to Poughkeepsie	Upland	72.2	4.9		\$ 353.78
Catskill to Stony Point	Marine	67.4	3.5	\$ 237.4	
Poughkeepsie to Peekskill	Upland	42.1	5.6		\$ 235.76
Stony Point to Clarkstown	Upland	7.9	12.7	\$ 100.4	
Clarkstown to Bronx	Marine	27.6	4.4	\$ 122.6	
Peekskill to Yonkers	Upland	26	9.5		\$247.0
Yonkers to Bronx	Upland	14	19.2		\$ 268.8
Bronx to Astoria Converter site	Upland	2.3	15.0	\$ 34.5	\$ 34.5

	Project	East of Hudson River
Marine Distance (miles)	196.5	101.5
Upland Distance (miles)	135.5	255.65
Total Distance (miles)	332.1	357.15
Total Cost (\$millions)	\$ 1,451.72	\$ 1,959.36
Cost Variance from Project for Selkirk to Bronx (\$millions)		<b>\$ 507.64</b>
Cost Variance from Project for Selkirk to Bronx (%)		<b>83.0%</b>
Cost Variance from Project (\$millions)		<b>\$ 507.64</b>
Cost Variance from Project (%)		<b>35.0%</b>

**Notes:**

1. Baseline pricing based on estimate provided by reliable contractor in August 2012.
2. Distances based on segment lengths.
3. Marine costs/mile vary due to sub-bottom conditions, turbidity, installation methods, navigation and other considerations.
4. Estimate assumes that engineering solutions and CSX concurrence can be secured for challenging conditions.
5. Engineering solutions to some challenges may not be obtainable.

**Analysis**

The logistical challenges posed by this approximately one hundred fifty-five (155) mile upland alternative would be similar to those of the previous alternatives but even more intensive in scope. Beginning with the HDD installation under the Hudson River, the routing would traverse several small communities where the construction would need to occupy their downtown areas. South of Greenport along Route 9, utility poles occupy one side of the roadway while the periodic presence of other features (e.g. houses, buildings, additional utility poles) on the opposite would limit installation options. The route crosses a number of municipalities such as Red Hook, Rhinebeck, Hyde Park, Poughkeepsie, Tarrytown, Sleepy Hollow and Croton where the density of development

along the road will require construction in near proximity residences and businesses. The engineering challenges and likelihood of public opposition increase as the route approaches and enters the Bronx, as the complexity of land uses and existing utility networks will result in a protracted construction period. Resolving all of the engineering issues associated with this alternative would require discussions with an extensive number of state, local and private agencies.

Moreover, the complex engineering solutions necessitated by these concerns would significantly affect costs. The proposed route east of the Hudson River would increase overall Project costs by approximately 35% as the alternative would add an estimated \$507.64 million to construction costs. Therefore, this routing is not a practical alternative as the costs would be unreasonably high, particularly for a merchant transmission line. Moreover, as it represents an almost directly southern route to the east of the Hudson River, it demonstrates that other routes of this type would be similarly impracticable.

### **5.3 Overland Using New Power Line Route**

A new power line route was developed with extended 1) west of Adirondack Park; and 2) east of the Hudson River.

#### **Logistics**

In the State of New York, the development of new power line rights-of-way must be considered in the context of the recent NYRI project. Section 1.1.2 describes the opposition that arose from local groups, politicians, businesses and others. One of the key elements of this opposition was NYRI's proposal to utilize eminent domain to obtain required lands, as evidenced by legislation signed by Governor George Pataki limiting the use of eminent domain to acquire rights-of-way.<sup>158</sup>

#### **Cost**

To demonstrate the potential costs of an overland route utilizing a new power right-of-way, Figure 5-4 shows an alternative route which approximately represents the shortest reasonable overland route that connects into New York City. The routing was based on the following assumptions:

1. The route would be within the state of New York, so it would need to be installed to the west of Adirondack Park.

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<sup>158</sup> Fritz Mayer, *Citizen Groups Still Fighting NYRI*, The River Reporter (Nov. 9, 2006), <http://www.riverreporter.com/issues/06-11-09/head2-nyri.html>.

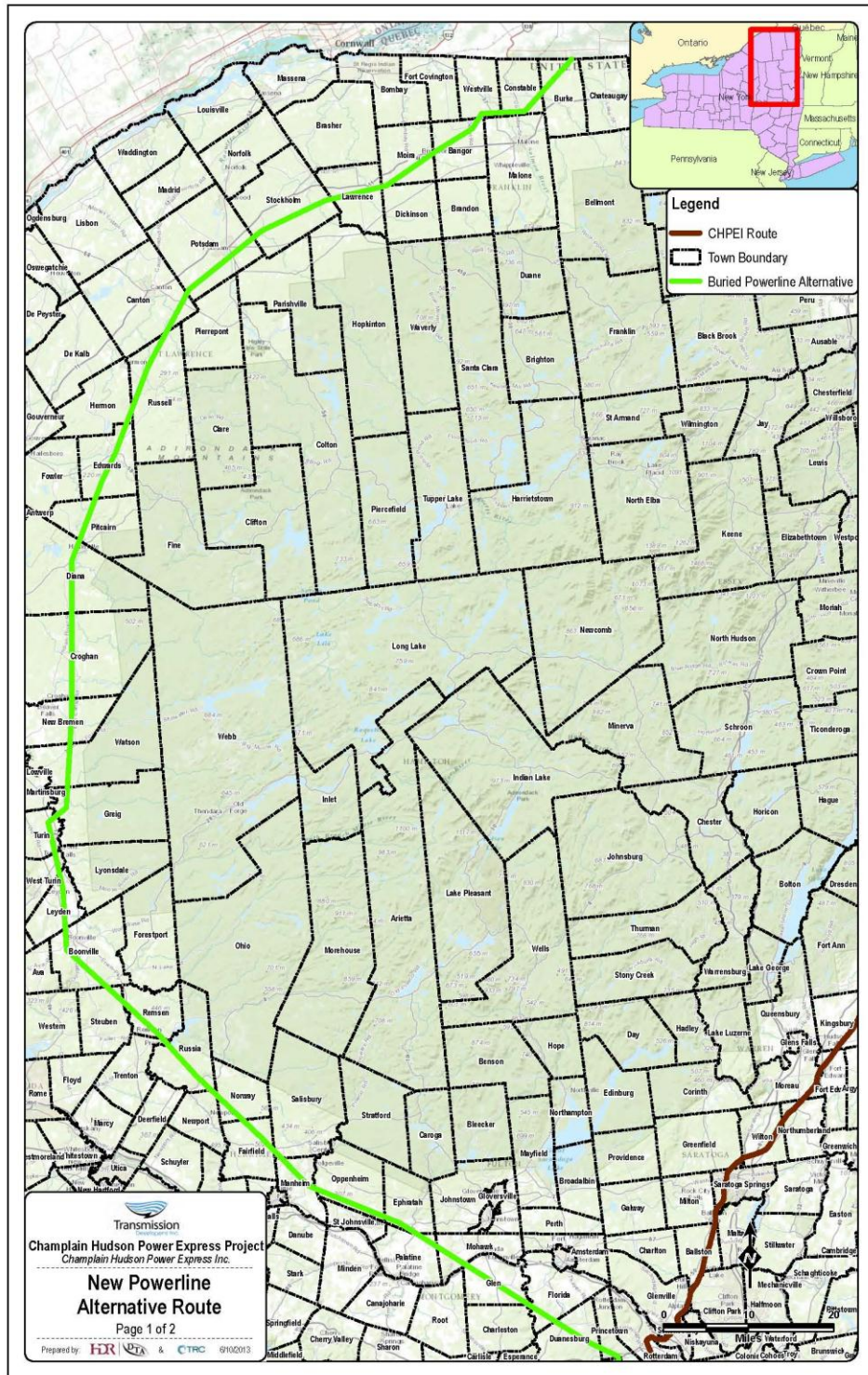
2. The overhead lines would not be acceptable within the close proximity to the Catskill Mountain region and could not cross into the Catskill Park.
3. The cable system would avoid developed areas such as village or town centers, due to the higher construction costs associated with burying the cables.

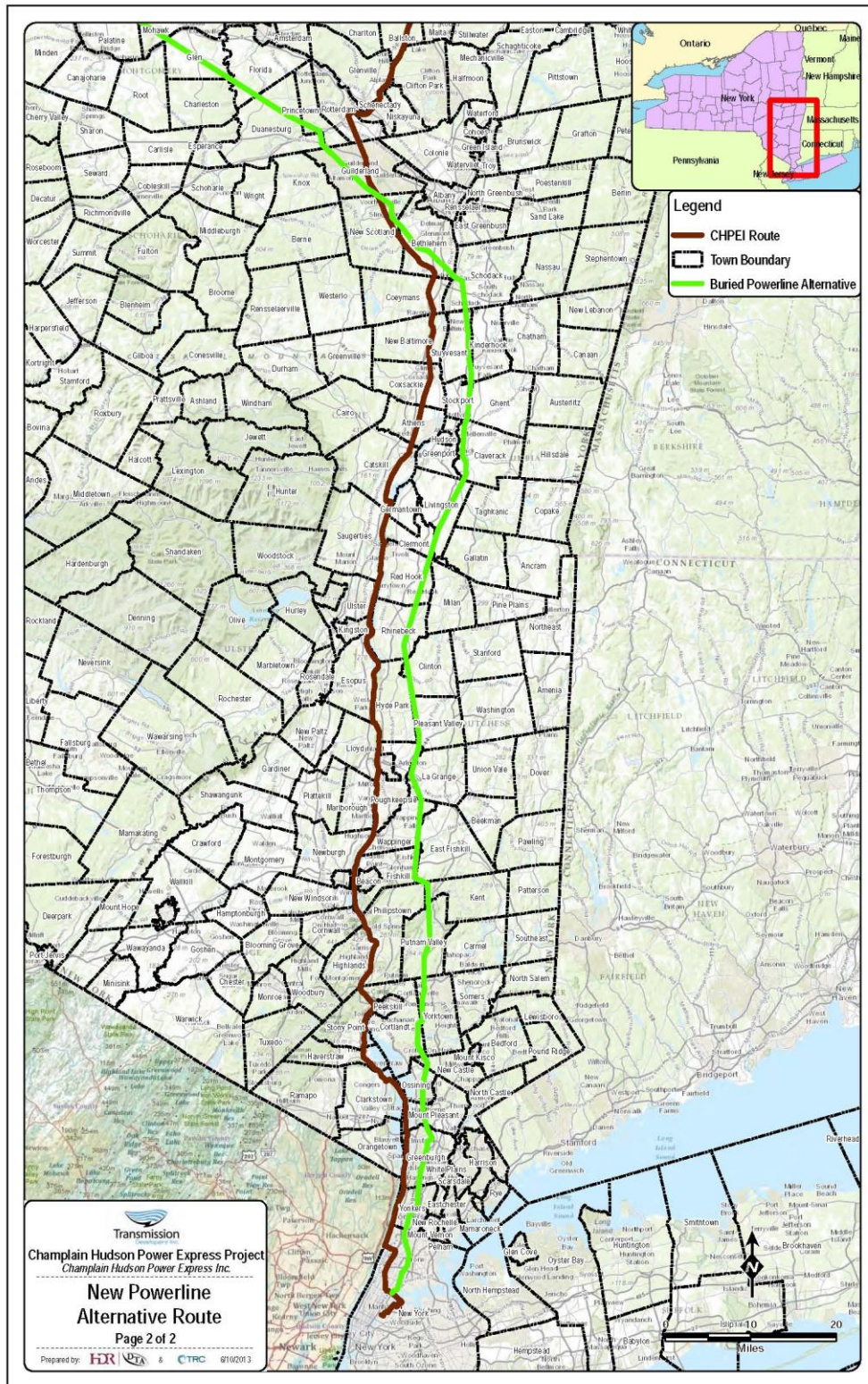
Costs for the buried routing include higher unit rates due the nature of the work, likelihood of HDDs for multiple water and street crossings, as well as the likelihood of rock excavation and difficult terrain. The estimated costs per mile for the approximately 385 miles of buried cable from the Canadian Border to the Bronx ranges from \$5 to \$15M/mile or an average of \$6.4M/mile, as compared to the comparable aggregate cost of \$4.4M/mile for the Project route. Extending these estimated costs results in a net increase to the Project costs by approximately \$1.14B or a 79% increase from the cost of the Project's cable installation estimate.

This alternative entails an additional approximately 50 miles to the overall route and an increase of the direct burial portion which contributes to a longer construction schedule than what had been anticipated for route described in the Article VII submission. The construction of the proposed upland alternative to the west of Adirondack Park and east of the Hudson River would likely require, utilizing multiple crews, at least 67 months or more than 5 years.

Additional cost information for a new power line that is installed to west of the Adirondack Park and east of the Hudson River is shown in a Table 5-3.

**FIGURE 5-4**  
**ILLUSTRATIVE OVERLAND NEW POWER LINE ALTERNATIVE**







**TABLE 5-3  
PROPOSED PROJECT AND NEW POWER LINE TRANSMISSION ROUTE**

Section	Upland or Marine	Distance (Miles)	Cost per mile (\$million)	Project Cost (\$million)	New Power Route Cost Buried (\$million)
International Border to Dresden	Marine	101.5	2.9	\$ 290.7	
International Border to Greenbush	Upland	256	5.0		\$ 1,280
Greenbush to Poughkeepsie	Upland	64	5.2		\$ 332.8
Dresden to Catskill	Upland	126.8	5.3	\$ 666.12	
Catskill to Stony Point	Marine	67.4	3.5	\$ 237.4	
Stony Point to Clarkstown	Upland	7.9	12.7	\$ 100.4	
Clarkstown to Bronx	Marine	27.6	4.4	\$ 122.6	
Poughkeepsie to Bronx	Upland	64	14.8		\$ 947.2
Bronx to Astoria Converter site	Upland	2.3	15.0	\$ 34.5	\$ 34.5

	Project	New Power Route Cost Buried
Marine Distance (miles)	196.5	0
Upland Distance - Buried (miles)	135.5	385.8
Total Distance (miles)	332.1	385.8
Total Cost (\$millions)	\$ 1,451.72	\$ 2,594.5
Cost Variance from Project (\$millions)		<b>\$ 1,142.8</b>
Cost Variance from Project (%)		<b>78.7%</b>

**Notes:**

1. Baseline pricing based on estimate provided by reliable contractor in August 2012.
2. Distances based on segment lengths.
3. Marine costs/mile vary due to sub-bottom conditions, turbidity, installation methods, navigation and other considerations.
4. Estimate assumes that engineering solutions and CSX concurrence can be secured for challenging conditions.
5. Engineering solutions to some challenges may not be obtainable.

**Analysis**

As this alternative was developed as a demonstration of the likely costs associated with a new power line, no assessment was completed as to the engineering challenges that would be encountered along the routing. However, this alternative likely would need to employ at least some long and difficult HDD installations similar to the routes west of Adirondack Park and east of the Hudson River. More importantly, this type of routing would require agreements with hundreds of landowners and/or condemnation through eminent domain along its entire length to develop the necessary easement corridor. The previously discussed NYRI project encountered significant public and political opposition to the use of eminent domain (even though the majority of the proposed route was in an existing ROW), which led to legislation curtailing NYRI's use of that power. If a similar level of opposition developed for this Project, even a small group of determined landowners could block the Project or require costly re-routings.

In addition, the proposed route west of Adirondack Park and east of the Hudson River would increase overall Project costs by approximately 79% as the alternative would add an estimated \$1.14 billion to construction costs. This increase represents only construction costs and not the multiple landowner agreements that would need to be established. Therefore, this routing is not a practical alternative. Moreover, as it represents an almost directly southern route to the west of the Adirondack and the east of the Hudson River, it demonstrates that other routes of this type would be similarly impracticable.

## Section 6

# Other Alternatives Considered

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The following alternatives were not requested by the USACE, but were considered as part of the extensive alternatives analysis undertaken as part of the New York State siting and permitting process and so, consistent with the Guidelines,<sup>159</sup> are presented as part of this assessment.

### 6.1 Overhead Alternative

#### 6.1.1 Overhead Installation

The overhead transmission system alternatives considered in this analysis would all utilize a bipolar configuration, consisting of two conductors per pole (one positive and one negative) and a ground wire. In general, conductors would have a spacing of approximately 18 inches apart, and each conductor would have an overall diameter of approximately 1.75 inches. A metallic return conductor with a fiber optic core would be installed in the shield wire position above the electrical pole conductors to provide protection against lightning strikes. The return conductor would also provide a communication path between converter stations. A separate shield wire may be necessary on towers with a horizontal arrangement.

Several different transmission tower configurations may be utilized for overhead alternatives. In general, the potential transmission tower types can be defined as “lattice” or “monopole” designs. Lattice towers are constructed of galvanized steel and are assembled on site. These freestanding towers are widely used as transmission line support structures across the United States. Lattice towers have a relatively wide base, and their design requires greater clearance along rights-of-way. Their larger size and framework design make lattice towers suitable for areas where the visual/aesthetic impacts of tower installation are not a significant concern and for locations where adequate right-of-way easements can be acquired. The modular design of lattice towers makes them an economical choice for large-scale transmission lines linking distant endpoints.

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<sup>159</sup> 230.10(a)(5). (Stating, in part, “[t]o the extent that practicable alternatives have been identified and evaluated under a Coastal Zone Management program, a § 208 program, or other planning process, such evaluation shall be considered by the permitting authority as part of the consideration of alternatives under the Guidelines.”) See <http://www.wetlands.com/epa/epa230pb.htm>.

In contrast to the lattice design, monopole towers have a single-shaft, tubular structure. Because of their smaller footprint, monopole towers are well-suited to right-of-way locations where space is limited. Overall, monopole towers are less obtrusive and offer aesthetic benefits over conventional lattice tower designs. Notwithstanding these benefits, monopole towers tend to be more expensive;<sup>160</sup> one transmission study estimated that the total costs for monopole towers were 25% higher than for lattice towers.<sup>161</sup>

The specific height and design of each monopole or lattice tower would be determined by the angle of the conductor bundles, the span between towers, and the topography. In general, the lattice or monopole steel support structures for +/-320-kV would be expected to vary from approximately 65 to 135 feet in height, although some configurations require greater than 150 feet in height. Spans would range from 600 to 700 feet between monopole towers and 800 to 1,000 feet between lattice towers.

The width of the transmission line's permanent right-of-way is generally determined by the voltage of the system, to provide for adequate setbacks, maintenance and other concerns. A review of existing projects indicates that typical widths of existing 115-kV rights-of-way are approximately 90 to 130 feet wide. In comparison, +/- 320-kV rights-of-way (which would be the voltage of the Project) are typically about 150 feet wide. The transmission line clearing for construction purposes is dependent on the type of tower, topography, span, location, existing utility rights-of-way, and other factors. The precise rights-of-way would vary along sections of the lines. Vegetation-clearing activities along the rights-of-way may include cutting, grubbing, or other mechanized/hand-clearing techniques of shrubs and trees, as well as the removal of "danger trees" that could potentially damage the conductors. Vegetation management practices would continue after construction to ensure that the rights-of-way are maintained and that trees posing a threat of danger to the line are eliminated.

Access roads, lay-down areas, wire-pulling sites, and turnaround areas would also be required along the transmission line to facilitate construction equipment and vehicles. These areas would

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<sup>160</sup> Fabrimet, *Advantages of Lattice Towers*, <http://www.fabrimet.com/advantages-lattice-towers.html> (last visited Apr. 22, 2013).

<sup>161</sup> Joseph J. Seneca, Michael L. Lahr, James W. Hughes & Will Irving, *Economic Impacts on New Jersey of Upgrading PSE&G's Susquehanna-Roseland Transmission System* (May 2009), <http://www.pseg.com/family/pseandg/powerline/pdf/rutgersjobreport.pdf>.

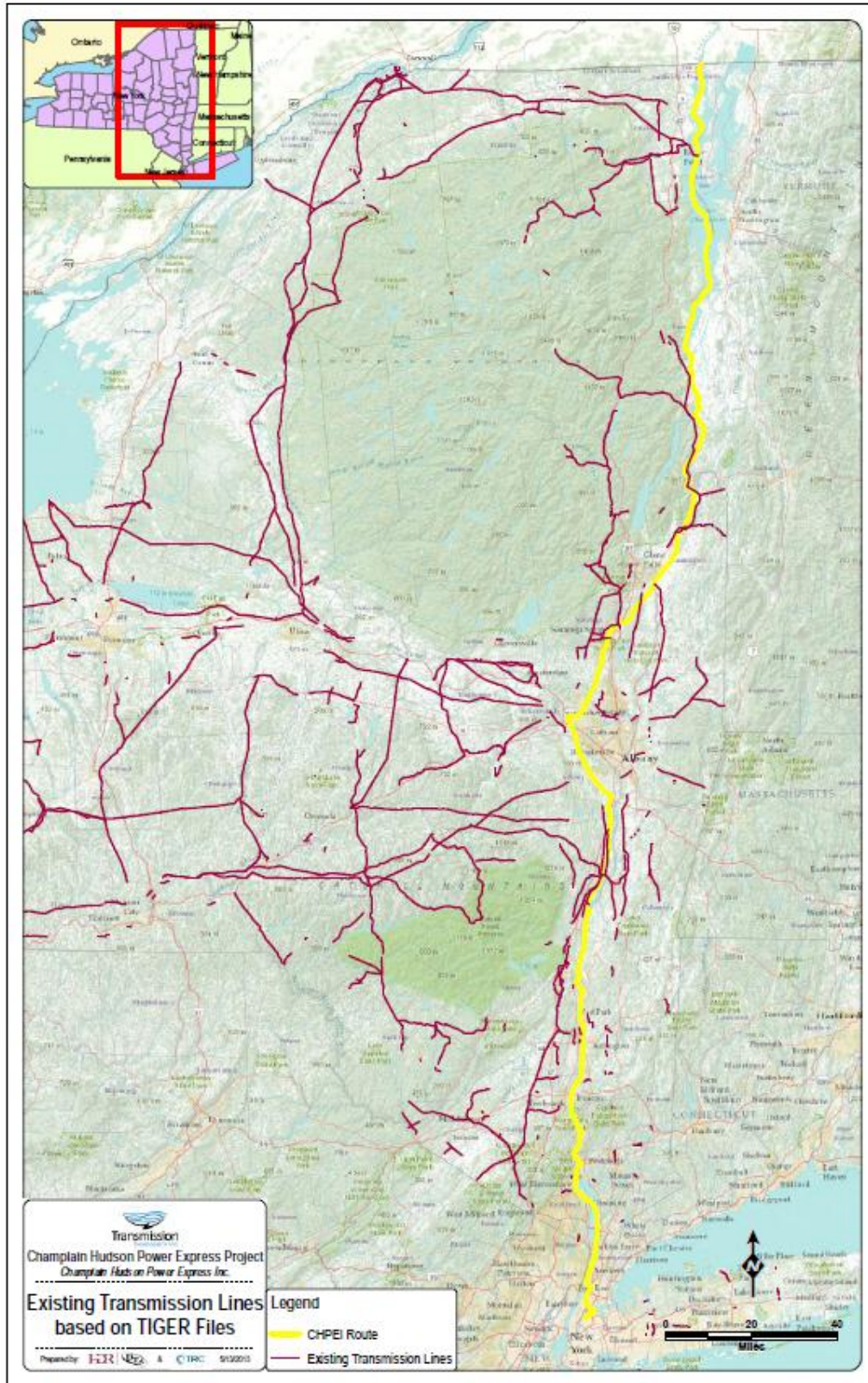
need to be cleared of vegetation (i.e. shrubs and trees), and additional material may be deposited to ensure that access roads remain passable throughout construction. Trenching may also be necessary along the margins of access roads to avoid rutting.

Each transmission tower location would require a concrete foundation to ensure structural stability of the towers. The specific foundation requirements would be dependent on the geotechnical conditions at each tower location. Foundation size and depth would be decided based on the type of tower structure, load bearing capacity of soils, and other factors. For installation in areas of rock outcroppings, anchor bolts may be installed and a concrete pad poured over and around these anchors. At other locations, steel caissons may be necessary to create a dry work area that would allow concrete to be poured. Combinations of these techniques may be utilized to install foundations in areas where rock is encountered below grade.

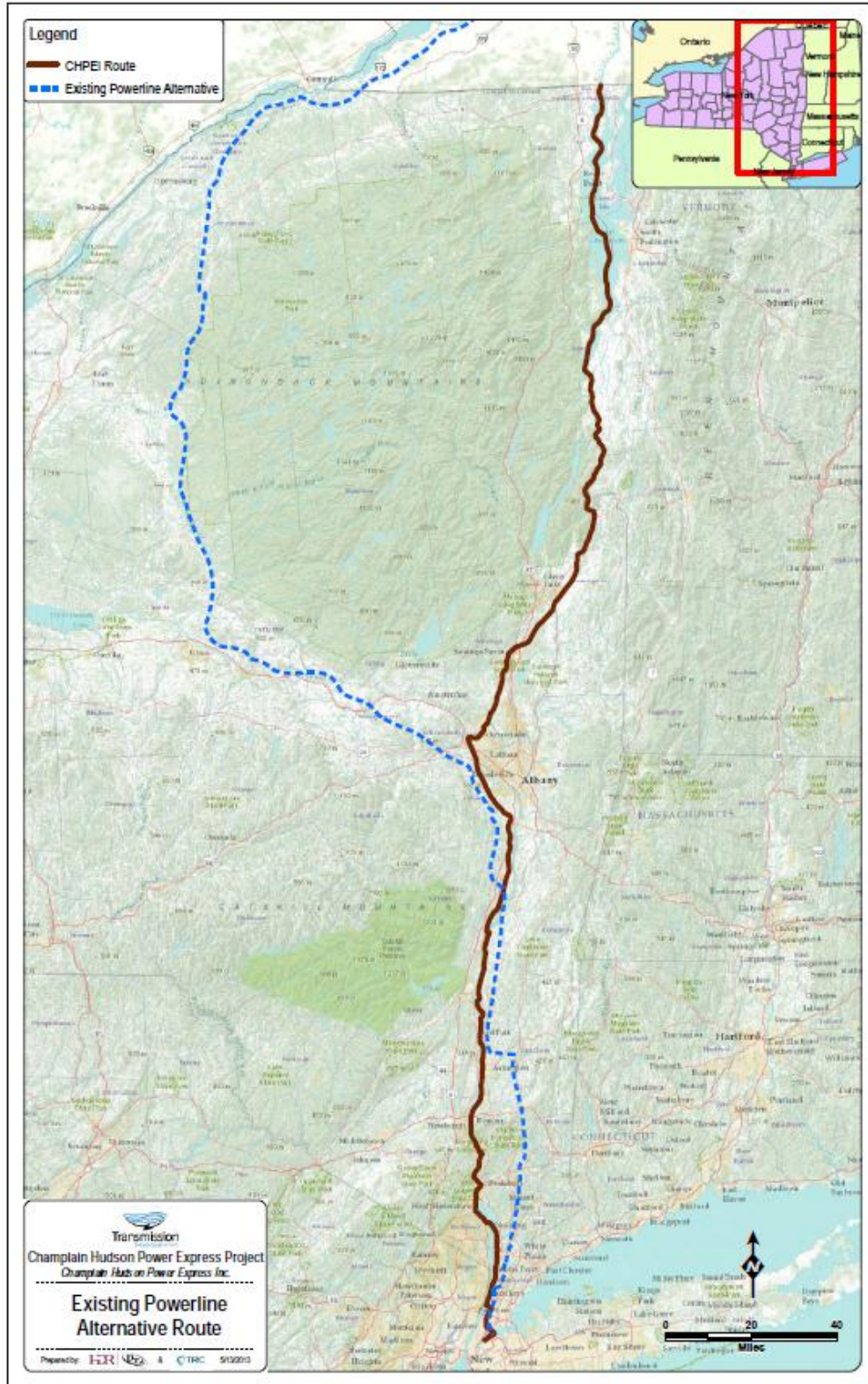
### **6.1.2 Overland Using Existing Power Line Routes Alternatives**

An alternative using existing power line ROWs was considered. Based on the U.S. Census Bureau's TIGER (Topologically Integrated Geographic Encoding and Referencing) data files (see Figure 6-1), there is an existing utility ROW network which circumvents the Adirondack Park to the west. From Montreal, an existing 765-kV transmission line travels southwest toward a substation in Massena, New York. The New York Power Authority (NYPA) owns a 765-kV transmission line corridor that extends from Massena to a substation in Marcy, New York. A 345-kV transmission corridor owned by National Grid continues toward the Pleasant Valley substation in Dutchess County, New York. South past the Pleasant Valley substation, a 345-kV transmission line owned by Con Edison connects into the greater Manhattan area. The total length of these connecting ROWs is approximately 430 miles from the Hertel substation near Montreal, Canada to Manhattan, New York and it is shown on Figure 6-2.

**FIGURE 6-1  
EXISTING TRANSMISSION LINES AS SHOWN ON TIGER FILES**



**FIGURE 6-2  
ALTERNATIVE USING EXISTING TRANSMISSION LINES**



## **Logistics**

As part of an alternatives analysis requested by the NYSDOS,<sup>162</sup> the Applicants spoke with the three utilities who own the ROWs under discussion. NYPA stated that it did not believe it would have the ability to grant the necessary long term land interests. Under the New York State Public Accountability Act of 2005 (“PAAA”), any public authority seeking to dispose of real property (i.e. transfer title or any other beneficial interest including a long-term lease) must conduct a public auction unless certain limited exceptions apply.<sup>163</sup> As part of the auction process, an explanatory statement detailing why the property is unneeded or unwanted must be transmitted to the State Comptroller, the Director of the Budget, the Commissioner of General Services, and the State Legislature not less than 90 days in advance of such disposal.<sup>164</sup> PAAA permits a private disposition if “the purpose of the transfer is within the purpose, mission, or governing statute” of the authority, if the Governor and the two houses of the legislature all sign off on the transfer, and if the private disposition is “otherwise authorized by law.”<sup>165</sup> Seeking approval of the Governor and the two houses of the legislature is impractical, and no party has attempted to utilize this exception since the PAAA was enacted.

In addition, in the NYRI proceeding a NYPA representative provided testimony that, “the Power Authority would not grant any permit or permission to conduct activities on its permanent easement that the Power Authority determined would or potentially could adversely impact the Power Authority’s present facilities and operations or future development options on the Marcy South Line right-of-way.”<sup>166</sup>

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<sup>162</sup> See Article VII Updated Alternatives Analysis.

<sup>163</sup> New York State Public Authorities Law Section 2897(3). See <http://public.leginfo.state.ny.us/LAWSSEAF.cgi?QUERYTYPE=LAWS+&QUERYDATA=@LLPBA+&LIST=LAW+&BROWSER=EXPLORER+&TOKEN=50318073+&TARGET=VIEW>.

<sup>164</sup> New York Power Authority, Guidelines and Procedures for the Disposal of Real Property at § 5.4, 5.5 (Mar. 21, 2013), <http://www.nypa.gov/doingbusiness/RealProperty2013/2013%20Disposal%20Guidelines%20-Clean.pdf>.

<sup>165</sup> New York State Public Authorities Law Sections 2897(7) (ii) and (iii) and 2896(6)(c)(vi). See <http://public.leginfo.state.ny.us/LAWSSEAF.cgi?QUERYTYPE=LAWS+&QUERYDATA=@LLPBA+&LIST=LAW+&BROWSER=EXPLORER+&TOKEN=50318073+&TARGET=VIEW>.

<sup>166</sup> Direct Testimony of Witnesses for the Power Authority of the State of New York at 3, *Application of New York Regional Interconnect, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII for a high voltage direct current electric transmission line running between National Grid’s Edic Substation in the Town of Marcy, and Central Hudson Gas & Electric’s Rock Tavern Substation located in the Town of New Windsor*, Case No. 06-T-0650 (N.Y. P.S.C. Jan. 9, 2009). Accessed on-line on April 18, 2013 at: <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={EF6A91DC-A71A-44F5-A1DC-B2855A9DDFE4}>.



NYRI further testified that because the Power Authority's permanent easements for its Marcy South Line were taken by appropriation by the People of the State of New York, the Power Authority may be precluded from transferring or conveying any rights to its Marcy South right-of-way to a private party.<sup>167</sup> Presuming that the Power Authority had such a legal right, the representative stated, the Power Authority Trustees could not convey a real property interest that would adversely impact the Power Authority's ability to maximize the benefits of its transmission assets.<sup>168</sup>

National Grid also expressed concern regarding the impact the proposed Project would have on their system reliability and potential expansion of their own facilities within the ROW.<sup>169</sup> A representative of Con Edison stated that for safety and reliability reasons they would not want the cables installed in near proximity to their tower foundations.<sup>170</sup> In addition, Con Edison's transmission lines within Westchester County are buried and its representative did not believe Con Edison could grant the right to use their ROW to a separate private entity.<sup>171</sup>

### **Cost**

While this assessment was not completed under the Article VII process, the Applicants did develop costing information for the purposes of understanding the cost differential between the Project route and an overhead transmission system. The New Power Line alternative discussed in Section 5.3 was modified to assume overhead installation, with concept-level estimated costs assuming routing where 80% of the line is overhead and 20% is buried within heavily developed areas. Lattice structural steel towers were assumed, as the costs for monopoles are typically 20-25% higher. The comparative costs are shown in Table 6-1.

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<sup>167</sup> *Id.* at 4.

<sup>168</sup> *Id.*

<sup>169</sup> Article VII Updated Alternatives Analysis at 3, *Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City*, Case No. 10-T-0139 (N.Y. P.S.C. Feb. 24, 2012), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={1376106E-8A60-4BC8-B601-EA7C43ECC0BB}>.

<sup>170</sup> *Id.*

<sup>171</sup> *Id.*

**TABLE 6-1  
PROPOSED PROJECT AND NEW POWER LINE TRANSMISSION ROUTE**

Section	Upland or Marine	Distance (Miles)	Cost per mile (\$million)	Project Cost (\$million)	New Power Route Cost 80% Overhead/ 20% Buried (\$million)
International Border to Dresden	Marine	101.5	2.9	\$ 290.7	
International Border to Greenbush	Upland	256	3.2		\$ 819.2
Greenbush to Poughkeepsie	Upland	64	4.2		\$ 268.8
Dresden to Catskill	Upland	126.8	5.3	\$ 666.12	
Catskill to Stony Point	Marine	67.4	3.5	\$ 237.4	
Stony Point to Clarkstown	Upland	7.9	12.7	\$ 100.4	
Clarkstown to Bronx	Marine	27.6	4.4	\$ 122.6	
Poughkeepsie to Bronx	Upland	64	10.0		\$ 640.0
Bronx to Astoria Converter site	Upland	2.3	15.0	\$ 34.5	\$ 35.5

	Project	New Power Route Cost Buried
Marine Distance (miles)	196.5	0
Upland Distance - Buried (miles)	135.5	385.8
Total Distance (miles)	332.1	385.8
Total Cost (\$millions)	\$ 1,451.72	\$ 1,762.5
Cost Variance from Project (\$millions)		\$ 310.77
Cost Variance from Project (%)		21.4%

**Notes:**

1. Baseline pricing based on estimate provided by reliable contractor in August 2012.
2. Distances based on segment lengths.
3. Marine costs/mile vary due to sub-bottom conditions, turbidity, installation methods, navigation and other considerations.
4. Estimate assumes that engineering solutions and CSX concurrence can be secured for challenging conditions.
5. Engineering solutions to some challenges may not be obtainable.

**Analysis**

For the purpose of exploring an overhead option, the Applicants applied a route which was “efficient” in terms of the total distance and avoiding developed areas. The estimated costs of this conceptual alternative would raise the overall construction costs by an estimated 21%. However, as with the discussion of the buried construction line, the full increase in cost would also include establishing individual landowner agreements with the multiple property owners along the line. In addition, as discussed in the New Power Line alternative (Section 5.3) it is reasonable to assume that the engineering challenges will be similar to those associated with the alternatives west of Adirondack Park and east of the Hudson River. The NYRI experience suggests that the logistical issues would be considerable, particularly as this alternative represents an overhead installation that would require use of eminent domain and would likely generate significant opposition.. Therefore, this routing is not a practical alternative. Moreover,

as it represents an almost directly southern route to the west of the Adirondack and the east of the Hudson River, it demonstrates that other routes of this type would be similarly impracticable.

## 6.2 Demand Side Management

With increased concern over greenhouse gas emissions, energy prices, and energy security, energy conservation has received increased attention. The federal government has enacted several pieces of legislation to promote more efficient use of energy, including the Energy Policy Act of 2005, the Energy Independence and Security Act of 2007, and the American Recovery and Reinvestment Act of 2009.<sup>172</sup> The New York State Energy Plan's goal of "Increasing Reliance on Renewables" includes "expanding the State's purchases of hydropower."<sup>173</sup> New York City's PlaNYC 2030 targeted a 30% reduction of greenhouse gases by 2030.<sup>174</sup>

However, demand side management is not a practical alternative inasmuch as it is difficult to predict how its implementation would affect overall energy use. In its discussion of the aforementioned 15 percent goal of energy efficiency, the New York State Energy Plan notes that, even with the considerable achievements made to date in the state's end-user efficiency programs, meeting the 15 percent objective would require nearly a five-fold increase in annual energy savings by 2015.<sup>175</sup> An evaluation of energy efficiency potential conducted by Con Edison for its downstate markets of New York City and Westchester County concluded that the realistic achievable potential ("RAP") improvements in energy efficiency for electricity ranged from 8 to 10%.<sup>176</sup> The RAP savings for gas, steam, and fuel oil ranged from 3 to 7%.<sup>177</sup> Furthermore, in a report advising Governor Cuomo on how to bring New York's aging infrastructure into the future, none of the recommendations provided by the New York State

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<sup>172</sup> U.S. Department of Energy, *Alternatives Fuels Data Center: Key Federal Legislation* (May 2013), [http://www.afdc.energy.gov/laws/key\\_legislation](http://www.afdc.energy.gov/laws/key_legislation).

<sup>173</sup> State Energy Plan at 93.

<sup>174</sup> City of New York, *PlaNYC: A Greener, Greater New York* at 150 (Apr. 2011), [http://nytelecom.vo.llnwd.net/o15/agencies/planyc2030/pdf/planyc\\_2011\\_planyc\\_full\\_report.pdf](http://nytelecom.vo.llnwd.net/o15/agencies/planyc2030/pdf/planyc_2011_planyc_full_report.pdf).

<sup>175</sup> State Energy Plan at 23.

<sup>176</sup> Global Energy Partners, LLC, *Energy Efficiency Potential Study for Consolidated Edison Company of New York, Inc.* (June 2010), [http://www.coned.com/documents/Volume\\_1\\_Executive\\_Summary.pdf](http://www.coned.com/documents/Volume_1_Executive_Summary.pdf).

<sup>177</sup> *Id.* at 13.

Energy Highway Task Force addressed additional demand side management or energy efficiency as part of the plan to modernize New York's infrastructure.<sup>178</sup>

Demand side management would not meet the Project's overall goal of providing clean energy to New York, or state goals which call for an increase in clean energy in addition to energy efficiency.<sup>179</sup> In the Joint Proposal for Settlement, the Signatory Parties concluded that "conservation and distributed generation cannot be considered to be effective alternatives to the Facility"<sup>180</sup> and that the Project "should be viewed as a complement to the Commission's public policy objectives to promote renewable generation facilities, reduce environmental impacts, such as air pollution, and increase fuel diversity."<sup>181</sup> Therefore, this alternative was eliminated from further consideration.

### 6.3 Other New Generation Sources

From 2000 to 2013 in New York City and Long Island, approximately 4,800 MW of new capacity has been added, of which over 90% are natural gas-fired generating facilities.<sup>182</sup> During this same timeframe, nearly 1,900 MW of generation has been retired, therefore the incremental increase in capacity is about 2,900 MW.<sup>183</sup> Currently, all of the generation in New York City is fossil fuel fired (natural gas or oil).<sup>184</sup> In the NYISO interconnection queue, there is 2,300 MW of summer capacity to be added to New York City; other than the 660 MW Hudson Transmission Partners DC-based transmission line, all additions are also fired by fossil fuel<sup>185</sup> (and the HTP project is bringing energy into New York City from Eastern PJM, which has predominately fossil fuel fired generation).<sup>186</sup>

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<sup>178</sup> New York Energy Highway Task Force, New York Energy Highway Blueprint, <http://www.nyenergyhighway.com/PDFs/BluePrint/EHBPPT/> (last visited Apr. 22, 2013).

<sup>179</sup> See Governor Andrew M. Cuomo, Building a New NY...With You, 2012 State of the State Address (2012), <http://www.nyenergyhighway.com/Content/pdf/Building-a-New-New-York-Book.pdf>.

<sup>180</sup> Joint Proposal at 53.

<sup>181</sup> *Id.*

<sup>182</sup> Ventyx Velocity Suite. Generating Unit Capacity Dataset. Data Version 2013-03.

<sup>183</sup> *Id.*

<sup>184</sup> See 2012 Gold Book.

<sup>185</sup> NYISO, NYISO Interconnection Queue, [http://www.nyiso.com/public/webdocs/markets\\_operations/services/planning/Documents\\_and\\_Resources/Interconnection\\_Studies/NYISO\\_Interconnection\\_Queue/NYISO\\_Interconnection\\_Queue.xls](http://www.nyiso.com/public/webdocs/markets_operations/services/planning/Documents_and_Resources/Interconnection_Studies/NYISO_Interconnection_Queue/NYISO_Interconnection_Queue.xls).

<sup>186</sup> PJM, *Regional Transmission Expansion Plan – Book 2* (2012), [http://www.pjm.com/sitecore%20modules/web/~/\\_/media/documents/reports/2012-rtep/2012-rtep-book-2.ashx](http://www.pjm.com/sitecore%20modules/web/~/_/media/documents/reports/2012-rtep/2012-rtep-book-2.ashx).

In 2012, the NYISO identified resource adequacy gaps and reliability concerns as part of Reliability Needs Assessment (“RNA”) for the NYC area. The “market solution” proposed in the NYISO’s Comprehensive Reliability Plan is one that involves repowering of existing generation with gas fired generators.<sup>187</sup> Although the market solution would be more efficient than the steam turbines they would displace, they would still be CO<sub>2</sub>, NO<sub>x</sub>, and SO<sub>2</sub> emitting resources. In the NYISO interconnection queue, currently there are 42 proposed renewable energy projects, representing nearly 2,600 MW of potential generation from wind, solar, hydro, pumped storage, wood, solid waste, methane, and energy storage (NYISO 2013).<sup>188</sup> However, many of the projects in the queues will likely be withdrawn, will not be constructed by the proposed timeline, or will change the proposed generating capacity, as evidenced by the 64 renewable energy projects, equaling over 13,000 MW, withdrawn from the NYISO queue since 2007 (NYISO 2013).<sup>189</sup>

There are currently no proposed renewable energy projects in the interconnection queue in the vicinity of southern New York City – in fact, over 3,500 MW has been withdrawn from the queue since 2007 (NYISO 2013).<sup>190</sup> Therefore, other new generation sources in the New York City region are not anticipated to provide the clean and renewable energy capacity, increased grid reliability, or transmission congestion solutions comparable to the Project. Accordingly, this set of alternatives is eliminated from further consideration.

## 6.4 No Build

Under the No Build Alternative, the Project would not be constructed. Therefore, to meet projected electricity needs in New York City, a) existing generation facilities would need to increase their power output, b) transmission facilities would need to be constructed or upgraded and/ or c) new generating facilities would need to be brought on line. This alternative would be inconsistent with the Project’s purpose and need (see Section 1.2 and 1.3).

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<sup>187</sup> NYISO, *2012 Comprehensive Reliability Plan – Final Report* (Mar. 19, 2013), [http://www.nyiso.com/public/webdocs/markets\\_operations/services/planning/Planning\\_Studies/Reliability\\_Plan ning\\_Studies/Reliability\\_Assessment\\_Documents/2012\\_Comprehensive\\_Reliability\\_Plan\\_Final\\_Report.pdf](http://www.nyiso.com/public/webdocs/markets_operations/services/planning/Planning_Studies/Reliability_Plan ning_Studies/Reliability_Assessment_Documents/2012_Comprehensive_Reliability_Plan_Final_Report.pdf).

<sup>188</sup> NYISO, NYISO Interconnection Queue, [http://www.nyiso.com/public/webdocs/markets\\_operations/services/planning/Documents\\_and\\_Resources/Interc onnection\\_Studies/NYISO\\_Interconnection\\_Queue/NYISO\\_Interconnection\\_Queue.xls](http://www.nyiso.com/public/webdocs/markets_operations/services/planning/Documents_and_Resources/Interc onnection_Studies/NYISO_Interconnection_Queue/NYISO_Interconnection_Queue.xls).

<sup>189</sup> *Id.*

<sup>190</sup> *Id.*

Moreover, in terms of existing generation, summer operating capacity in New York State totals 38,902 MW, with 9,466 MW of the generating capacity located in New York City. The majority of New York's existing generation portfolio is composed of gas- and/or oil-fueled facilities, which accounts for approximately 61% of the total installed capacity in the state.<sup>191</sup> The vast majority of these gas and oil facilities tend to be older; about 65% of them were built before 1980, and therefore are relatively inefficient<sup>192</sup> (NYISO 2012 Load and Capacity Data, 2012).

The No Build Alternative, which relies on increased generation from existing sources, would result in higher energy costs and higher GHG emissions and was therefore considered inconsistent with the Project's purpose and eliminated from further consideration.

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<sup>191</sup> See 2012 Gold Book.

<sup>192</sup> *Id.*

## Section 7

# Conclusion

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Prior to undertaking this LEDPA analysis, practical alternatives for the Project were comprehensively investigated and analyzed during the New York State Public Service Law Article VII proceeding. As part of that proceeding, Settlement Parties undertook an intensive review of Project routing, with a specific focus on locating the cables out of the water to the extent practical and feasible. Based on consultation prior to the state proceeding, the state alternatives analysis, and the ensuing settlement discussions and resultant Joint Proposal settlement, the Project incorporated a number of design and route changes. While these changes resulted in significant cost increases to the Project, the changes also ensured that the Project route was the least environmentally damaging practicable alternative consistent with the Project purpose (*i.e.*, to deliver clean sources of generation from Canada into New York City in an economically efficient manner).

As part of its LEDPA analysis, the Applicants reviewed three routes provided by the New York State Department of Public Service as part of the Article VII proceedings and three additional routes requested by the USACE. One of these alternatives, the Hell Gate Bypass, was accepted by the Applicants during the Article VII proceedings while segments of the Hudson River Western Rail Line Route were also incorporated into the Project. Each of the remaining alternatives were assessed for their overall practicability based on existing technology, logistics and costs. As summarized in the table below, when evaluated in terms of logistics and costs, the alternatives presented various logistical hurdles including engineering complexity, site access, and adverse affects to existing development, as well the potential for political and public opposition. All of the alternatives had projected costs, when coupled with the additional costs associated with the route designs accepted during the Article VII process, which would result in substantially greater costs than are normally associated with the particular type of project.

### Evaluation of Practicality of Alternatives to Project

	<b>Logistics</b>	<b>Cost</b>
Hudson River Western Rail Line Route	<ul style="list-style-type: none"> <li>• Long HDD installations</li> <li>• Narrow work spaces</li> <li>• Installation in close proximity to residences/businesses</li> <li>• Access restrictions</li> <li>• Increased construction duration</li> <li>• Four tunnel segments</li> <li>• Potential for public and political opposition</li> </ul>	Increase in Project costs of ~\$620 million or 42% over Article VII baseline route.
Harlem River Rail Route	<ul style="list-style-type: none"> <li>• Busy passenger and rail usage</li> <li>• Geotechnical challenges</li> <li>• Access restrictions on rail trestle by NYSDOT and MTA</li> <li>• Increased risk of cable damage</li> <li>• Increased construction duration</li> <li>• High uncertainty as to engineering feasibility</li> </ul>	Increase in costs from ~\$81 million (305% of segment cost, 6% of Project cost) to \$189 million (15%) over Article VII baseline route.
Existing ROW – West of Adirondack Park	<ul style="list-style-type: none"> <li>• Difficult HDD installations</li> <li>• Narrow work spaces</li> <li>• Installation in close proximity to residences/businesses</li> <li>• Density of aboveground utilities and other features</li> <li>• Underground utility avoidance</li> <li>• Increased construction duration</li> <li>• Potential for public and political opposition</li> </ul>	Increase in project costs of ~\$512 million or 35% over Article VII baseline route.
Existing ROW – East of Hudson River	<ul style="list-style-type: none"> <li>• Long HDD installations</li> <li>• Narrow work spaces</li> <li>• Installation in close proximity to residences/businesses</li> <li>• Density of aboveground utilities and other features</li> <li>• Underground utility avoidance</li> <li>• Increased construction duration</li> <li>• Potential for public and political opposition</li> </ul>	Increase in project costs of ~\$508 million or 35% over Article VII baseline route.
Overland Using New Power Line Route	<ul style="list-style-type: none"> <li>• Potential long and difficult HDD installations</li> <li>• Increased construction duration</li> <li>• Potential for public and political opposition</li> </ul>	Increase in project costs of ~\$1.14 billion or 79% over Article VII baseline route.

The further analysis undertaken here, pursuant to the Guidelines, confirms that the Project is the least environmentally damaging practicable alternative when other alternatives are considered based on factors of logistics, technology, and cost.



## **Appendices**

Note: The appendices included in the Alternatives Analysis report are available in the full version of the report provided in the CHPE EIS website Document Library.

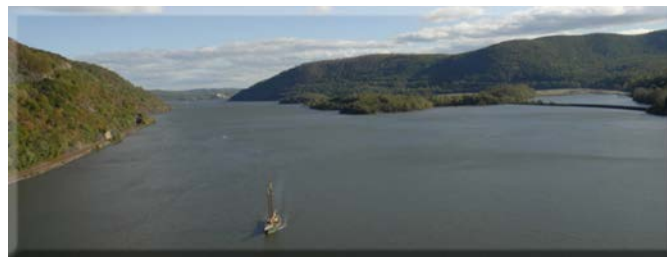
The library is accessible at the following link: <http://www.chpexpresseis.org>

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## APPENDIX C

# NYSPSC Order Granting Certificate of Environmental Compatibility and Public Need for the Proposed CHPE Project





## **Appendix C**

# **NYSPSC Order Granting Certificate of Environmental Compatibility and Public Need for the Proposed CHPE Project**

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This appendix contains the Order Granting the Certificate of Environmental Compatibility and Public Need (Certificate) for the proposed CHPE Project issued by the New York State Public Service Commission (NYSPSC) to the Applicant on April 18, 2013 (NYSPSC 2013).

This appendix contains the full text of the Certificate itself. The attachments to the Certificate are not included in this appendix, but might be valuable to the reader. The full version of the Certificate (including attachments) is available at the CHPE EIS Web site Document Library found at the following link: [http://www.chpexpresseis.org/docs/NYSPSC\\_Order.pdf](http://www.chpexpresseis.org/docs/NYSPSC_Order.pdf). The attachments to the Certificate and the page number at which each attachment starts in the full version of the Certificate are provided below.

- The main text of the Joint Proposal (starting at page 108)
- Revised Certificate Conditions (January 2013) (starting at page 197)
- Five attachments to the Revised Certificate Conditions:
  - Attachment 1: Champlain Hudson Power Express Suspended Sediment/Water Quality Monitoring Plan Scope of Study (starting at page 309)
  - Attachment 2: Champlain Hudson Power Express Benthic and Sediment Monitoring Scope of Study (starting at page 315)
  - Attachment 3: Champlain Hudson Power Express Bathymetry, Sediment Temperature, and Magnetic Field Scope of Study (starting at page 320)
  - Attachment 4: Champlain Hudson Power Express Atlantic Sturgeon Pre- and Post-Energizing Scope of Study (starting at page 323)
  - Attachment 5: List of Approved Projects for the Champlain Hudson Environmental Research and Development Trust (starting at page 328)
- Draft EM&CP (starting at page 339)
- Best Management Practices (starting at page 356)
- Other selected Joint Proposal exhibits (starting at page 513).

The Joint Proposal was attached to the Certificate. The Joint Proposal itself included nearly 200 attachments, called appendices and exhibits. These appendices and exhibits are available for download from the NYSPSC's Document Matter Master (DMM) Web site for the CHPE Project at:

<http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?Mattercaseno=10-T-0139>

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STATE OF NEW YORK  
PUBLIC SERVICE COMMISSION

CASE 10-T-0139 - Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City.

ORDER GRANTING CERTIFICATE OF  
ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED





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STATE OF NEW YORK  
PUBLIC SERVICE COMMISSION

At a session of the Public Service  
Commission held in the City of  
Albany on April 18, 2013

COMMISSIONERS PRESENT:

Garry A. Brown, Chairman  
Patricia L. Acampora  
Maureen F. Harris  
James L. Larocca  
Gregg C. Sayre

CASE 10-T-0139 - Application of Champlain Hudson Power Express, Inc. for a Certificate of Environmental Compatibility and Public Need Pursuant to Article VII of the PSL for the Construction, Operation and Maintenance of a High Voltage Direct Current Circuit from the Canadian Border to New York City.

ORDER GRANTING CERTIFICATE OF  
ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED

(Issued and Effective April 18, 2013)

BY THE COMMISSION:

INTRODUCTION

By this Order, we grant to Champlain Hudson Power Express, Inc. (CHPEI) and CHPE Properties, Inc. (CHPE; collectively, Applicants), pursuant to Article VII of the Public Service Law (PSL), a Certificate of Environmental Compatibility and Public Need to construct and operate a transmission project known as the Champlain Hudson Power Express Project (Project or Facility). The certificate will adopt most of the terms and conditions presented to us in a Joint Proposal (JP) and in stipulations that have the full or partial support of a wide range of parties to this case.

The principal portion of the Project is a High Voltage, Direct Current (HVDC) transmission line extending

approximately 330 miles from the New York/Canada border to a converter station in Astoria, Queens. The HVDC transmission line will be underwater in Lake Champlain and the Hudson River, with underground upland segments. The line consists of two solid dielectric (i.e., no fluids) HVDC electric cables, each approximately six inches in diameter. The cables will be installed either underwater or underground along the entire length of the route, minimizing visual and other potential environmental impacts.

Applicants propose to install the converter station on properties currently owned by Consolidated Edison Company of New York, Inc. (Con Edison) in an industrial zone in Astoria. From there, one High Voltage, Alternating Current (HVAC) circuit will connect, via underground conduit, to the nearby substation of the New York Power Authority (NYPA). From the NYPA substation, another set of HVAC cables will be installed beneath the streets of New York City for approximately three miles to the Rainey Substation.

The Project will have the capacity to transmit 1,000 MWs of electricity into the New York City load pocket. It is anticipated that the electricity transmitted by the Project will be primarily hydroelectric power.

The parties have worked collaboratively for over a year to resolve the many complex technical details that have culminated in the Joint Proposal before us. As described in the Joint Proposal, the route has been constructed to minimize potential adverse environmental impacts. Although extensive portions of the route are located under the waters of Lake Champlain and the Hudson River, the line will transition to upland underground segments in order to avoid portions of the Hudson River designated by the US Environmental Protection Agency (USEPA) as contaminated with polychlorinated biphenyls

(PCBs) and to avoid environmentally sensitive River areas, including Haverstraw Bay, an important breeding and spawning habitat for various species. In addition, the Applicants have agreed to donate \$117.15 million over time to establish and maintain a Hudson River and Lake Champlain Habitat Enhancement, Restoration, and Research/Habitat Improvement Project Trust, to be used to study and to mitigate possible impacts of the underwater cables on water quality or aquatic habitat in the Hudson, Harlem and East Rivers, Lake Champlain, and their tributaries. Other provisions of the JP would limit the times or locations of construction to further protect the Lake and River environments.

With the addition of the Astoria-Rainey Cable portion of the Project, the parties have solved problems of deliverability identified in this case. And, Applicants' commitment to assume the financial risk of this Project has been significantly strengthened in post-JP stipulations.

This proposal was filed over 3 years ago. Over 20 parties participated in lengthy, intensive, detailed settlement negotiations that spanned almost 16 months. These parties reached an accord on a proposal that they believe permits us to make the requisite PSL §126(1) findings and determinations. The fact that so many parties, representing myriad interests and advocating a broad spectrum of concerns, could reach agreement on so many detailed, technical and policy-based issues is a remarkable achievement and is consistent with our settlement rules.

Based on our review of the record, including the JP, we find that this proposal satisfies the requirements of Article VII of the PSL. Construction of the Project would offer significant benefits, among them: creating a new transmission entry into the New York City load pocket and enabling a

substantial increase in the State's utilization of renewable resources. Further, the adverse environmental impacts of construction and operation, relatively modest to begin with, have been further mitigated by route modifications and a commitment to follow best practices during construction. Finally, construction and operation of the line will impose minimal financial risk on ratepayers. As further discussed below, we find that the grant of the certificate here is in the public interest.

PROCEDURAL BACKGROUND

On March 30, 2010, CHPEI filed an application pursuant to Article VII of PSL for a Certificate of Environmental Compatibility and Public Need to construct and operate a transmission line it calls the Champlain Hudson Power Express Project. On April 30, 2010, the Secretary issued a deficiency letter identifying seven deficiencies and containing 83 requests for further information. Four supplements were provided on July 22 and 29, and August 6 and 11, 2010. The cover letter accompanying the July 22<sup>nd</sup> supplement noted that CHPE had been added as a co-applicant;<sup>1</sup> the proposal had been revised to eliminate the HVDC circuit from Rouses Point, to Bridgeport, Connecticut; and the proposed end point of the New York State HVDC circuit had been changed from a substation in Sherman Creek to a substation in Astoria, Queens.

On August 12, 2010, the Secretary issued a compliance letter informing Applicants that, as of August 11, 2010, their Article VII application, as supplemented, was in compliance with

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<sup>1</sup> In order to ensure that one of the certificate holders will be a transportation corporation, CHPEI formed CHPE as a wholly-owned subsidiary pursuant to the Transportation Corporations Law (July 22<sup>nd</sup> cover letter at 1, note 1).

PSL §122. A prehearing conference was held before the Administrative Law Judges (ALJs or Judges) on Tuesday, September 21, 2010, in Albany,<sup>2</sup> to discuss, among other things, requests for intervenor funding.<sup>3</sup> In accordance with PSL §123(1), a public statement hearing was held on Monday, October 25, 2010, in Yonkers. Additional public statement hearings were held in Kingston on Thursday, October 28; Schenectady on Wednesday, November 3; Whitehall on Thursday, November 4; and Plattsburgh on Tuesday, November 9, 2010.

By letter dated November 2, 2010, Applicants filed a notice of intent to enter into settlement negotiations. They noted that the topics to be addressed as part of the discussions included need, environmental issues, alternatives, best management practices, construction techniques, and ordering clauses.<sup>4</sup> Settlement discussions ensued and continued for approximately 16 months, culminating in the February 2012 filing of a JP purporting to resolve all issues in this proceeding among the Signatory Parties. The JP has the following signatories: Applicants; Department of Public Service Staff (Staff); Department of Environmental Conservation (DEC); Department of State (DOS); Department of Transportation (DOT); Department of Agriculture and Markets; Office of Parks, Recreation, and Historic Preservation (OPRHP); the Adirondack Park Agency (APA); the Cities of New York (NYC) and Yonkers; the Palisades Interstate Park Commission; Riverkeeper, Inc. (Riverkeeper); Scenic Hudson, Inc. (Scenic Hudson); the N.Y.S.

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<sup>2</sup> A video conference link to the Commission's New York City offices was provided.

<sup>3</sup> Pursuant to PSL §122(5), an intervenor fund of \$450,000 was established for this proceeding.

<sup>4</sup> In accordance with 16 NYCRR 3.9, the notice was reported to the Commission on November 4, 2010.

Council of Trout Unlimited; and Vermont Electric Power Company, Inc. (VELCO). VELCO and DOT support the JP only with respect to Certificate Conditions that address their specific concerns, which are, respectively, the requirements and restrictions governing work activities and infrastructure co-location, and the provisions addressing the use and protection of highways, roads, streets or avenues and other transportation facilities owned or operated by DOT or under DOT's jurisdiction. The Department of Agriculture and Markets in its supporting statement also indicates that it limits its endorsement of the JP to the terms and conditions designed to identify, protect, mitigate, and, if need be, remediate agricultural resources impacted by construction.

The JP addresses, *inter alia*, the findings we must make pursuant to PSL §126(1). It contains proposed Certificate Conditions, Environmental Management and Construction Plan (EM&CP) guidelines, and a proposed Water Quality Certification (WQC). It also contains a list of the testimony and the JP exhibits and JP appendices proffered by the signatories in support of the terms of the JP and Applicants' requested Article VII certificate.

After the JP was filed, there followed another procedural conference; public statement hearings in Washington, Schenectady, Albany, Greene, Rockland, and Queens Counties; and site visits in Rockland and Queens Counties.<sup>5</sup> Additional stipulations, two signed by Applicants, Staff and Con Edison and one signed by Applicants and Con Edison were filed in June and July 2012. The first two stipulations further addressed

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<sup>5</sup> In total, the ALJs conducted four site visits, three on November 17 and 18 and December 1, 2010, and one on May 1, 2012.



merchant status and Certification Condition 15 (June 4<sup>th</sup> Stipulation, Hearing Exhibit 150) and deliverability and Certification Condition 133 (June 26<sup>th</sup> Stipulation, Hearing Exhibit 151). The third stipulation resolved issues surrounding the location of the converter station and use of the Luyster Creek property owned by Con Edison, and proposed changes to Certificate Conditions 21 and 22(f) (July 11<sup>th</sup> Stipulation, Hearing Exhibits 129 and 130). In addition, Applicants and Con Edison agreed to revise the proposed routing through the Astoria site in order to avoid an existing liquefied natural gas facility (Hearing Exhibit 152).

Evidentiary hearings were held on July 18, 19, and 20, 2012. At the evidentiary hearings, testimony and exhibits were proffered by witnesses for Applicants, Staff, and the Independent Power Producers of New York, Inc. (IPPNY). The evidentiary hearing record consists of 219 hearing exhibits<sup>6</sup> and over 700 transcript pages. In addition, parties submitted initial and reply statements on March 16 and 30, 2012, and initial and reply briefs on August 22 and September 7, 2012.

Except as noted above, the signatories recommend adoption of all of the terms of the JP, along with the proposed Certificate Conditions as modified by the stipulations filed on June 4 and 26, July 11, and October 19, 2012.<sup>7</sup> NYPA neither supports nor opposes the Project but it requests approval of several proposed Certificate Conditions that address its concerns. Con Edison originally opposed the Project; however, in July 2012, it reached a resolution of its objections to the

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<sup>6</sup> The hearing exhibits include, *inter alia*, the 125 exhibits that accompanied the JP.

<sup>7</sup> The October 19<sup>th</sup> stipulation, filed by Applicants, revised Certificate Condition 165 to extend the time for submission of the Trust Agreement.

Project, and now requests approval of the JP provisions that address its concerns.<sup>8</sup> Entergy Nuclear Marketing, LLC and Entergy Nuclear Fitzpatrick, LLC (collectively Entergy), IPPNY, Central Hudson Gas & Electric Corporation (Central Hudson), and International Brotherhood of Electrical Workers Local 97 (IBEW) oppose the Project and the JP.

By notice dated December 27, 2012, the Acting Secretary issued the Judges' Recommended Decision (RD) and established January 17 and February 1, 2013, respectively, as the due dates for the filing of briefs on and opposing exceptions. In their RD, the Judges recommended that we (1) adopt most of the terms and conditions of the JP as revised in this proceeding and in their RD; and (2) grant a Certificate of Environmental Compatibility and Public Need. They further recommended that the proposed WQC for the Project be issued by the Director of the Office of Energy Efficiency and the Environment (OEEE) in the Department of Public Service prior to the expiration of the U.S. Army Corps of Engineers (USACE) February 24, 2013 waiver deadline.

The WQC was issued on January 18, 2013. On that day, Applicants submitted a revised, final version of the Proposed Certificate Conditions designed to reflect all changes that were made to the proposed Certificate Conditions in one document (JP Appendix C). Briefs on exceptions were filed by IPPNY, Entergy, IBEW, Central Hudson, the Business Council of New York State (the Business Council), Applicants, Staff, Con Edison, and DEC. IPPNY's brief included a motion requesting official notice or incorporation into the record of a U.S. Dept. of Energy

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<sup>8</sup> As a result of the stipulations, Con Edison and NYPA did not introduce their pre-filed testimony and/or exhibits into the record at the evidentiary hearing.

document; the motion was opposed by Applicants and Staff and was denied by ruling issued on January 30, 2013. On January 18, 2013, Applicants moved to strike the briefs of Entergy and the Business Council on the grounds that they were filed after the 4:00 p.m. deadline; Entergy responded to the motion on January 28, 2013, and the motion was denied by ruling issued January 30, 2013.

Briefs opposing exceptions were filed by VELCO, Con Edison, Riverkeeper/Scenic Hudson, DEC, Applicants, NYC, and Staff.

#### JOINT PROPOSAL

The JP provides the bases upon which the signatories assert that the Commission may make its required PSL §126 findings regarding need, minimizing environmental impacts, undergrounding, conformance to state and local laws and regulations, and whether the project conforms to a long-range plan and is in the public interest. The JP includes a request that the Commission not apply local laws and regulations identified in Hearing Exhibit 115 because, as applied to the Facility, such local legal provisions are unreasonably restrictive in view of existing technology, cost, and the needs of consumers. Except for such identified local laws, Applicants will comply with, and the location of the Facility as proposed conforms to, all substantive State and local legal provisions applicable thereto.<sup>9</sup> The JP proposes that all of the proposed line be underwater or underground;<sup>10</sup> these requests are unopposed.

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<sup>9</sup> JP ¶¶128-133.

<sup>10</sup> JP ¶124.

The JP lists the Project's emission benefits, its ability to help mitigate the potential adverse impacts that may be associated with risk factors identified by the New York Independent System Operator (NYISO) in its planning processes and its ability to significantly increase supply capability into and fuel diversity in New York City as factors supporting the required need finding.<sup>11</sup>

Regarding the Facility's environmental impacts, the JP indicates that the environmental impacts associated with the Facility are expected to be avoided, minimized or mitigated, provided that the Best Management Practices (BMPs) and Guidelines for the preparation of the Environmental Management and Construction Plan agreed to by the signatories are adhered to in the preparation of the Environmental Management and Construction Plan (EM&CP) and are strictly complied with during construction, operation, and maintenance.<sup>12</sup> The JP adds that, as located and configured therein, the Facility represents the minimum adverse environmental impact considering the state of available technology and the nature and economics of the various alternatives and other pertinent considerations.<sup>13</sup> In addition, under the JP, Applicants have agreed to fund the Hudson River and Lake Champlain Habitat Enhancement, Restoration, and Research/Habitat Improvement Project Trust (Trust). This Trust will be used to study and mitigate any possible impacts of the Facility's underwater cables on habitat in the Hudson River Estuary, the Harlem and East Rivers, Lake Champlain, and their

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<sup>11</sup> JP ¶¶19-21.

<sup>12</sup> JP ¶¶24, 152; see also sections D and E, and JP appendices E and F.

<sup>13</sup> Id.

tributaries.<sup>14</sup> The JP also contains terms specifying Applicants' other obligations, including limitations on construction periods in both Lake Champlain and the Hudson River; establishment of "Exclusion Areas" within the Hudson River where construction may occur only as agreed to by DEC or as determined by the Commission.<sup>15</sup>

With respect to the Project's conformance with a long-range plan, the JP states that the Facility is consistent with the most recent State Energy Plan and with New York City's goal of providing its residents with increased access to renewable energy supplies, as described in the City's *PlaNYC*.<sup>16</sup>

The benefits identified in the JP as bases supporting the required finding that the Project would serve the public interest, convenience and necessity include its ability to increase the reliability of the Bulk Power System in New York City, reduce wholesale market prices and reduce air emissions in New York City, Long Island and the lower Hudson Valley.<sup>17</sup>

JP Appendices set forth detailed and comprehensive Certificate Conditions (Appendix C, dated January 18, 2013, revised and updated to reflect changes to conditions as set forth in the stipulations submitted subsequent to the filing of the JP), EM&CP guidelines (Appendix E) and BMPs (Appendix F) that were crafted and agreed to by the signatories.

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<sup>14</sup> JP ¶¶144-147.

<sup>15</sup> See, JP Appendix C, Certificate Condition 156(b).

<sup>16</sup> JP ¶¶125-127.

<sup>17</sup> JP ¶¶134-149.

PROPOSED ROUTE

The proposed route of the Facility (the Route) is shown on a series of maps, included as JP Appendix B,<sup>18</sup> depicting a nominal centerline (the Centerline) and an Allowed Deviation Zone. Those portions of the Allowed Deviation Zone ultimately determined to be actually affected by construction of the Facility (a process encompassed in the EM&CP phase of this case), as well as certain areas outside the Allowed Deviation Zone that are needed temporarily for site investigation, access, and construction, are referred to as the Construction Zone.

The HVDC portion of the proposed transmission system would originate underwater at the international border between the United States and Canada in the Town of Champlain, New York and continue south under Lake Champlain. Two cables would extend south through Lake Champlain for approximately 101 miles entirely within the jurisdictional waters of New York State. At the southern end of Lake Champlain, the cables would exit the water in the Town of Dresden, New York.

From Dresden, the cables would be buried along an overland, underground route for approximately 11 miles primarily within the right-of-way (ROW) of NYS Route 22, to the Village of Whitehall. In the Village of Whitehall, the cables would transition from the Route 22 ROW to enter the existing railroad ROW owned by Canadian Pacific Railway (CP) and remain buried for approximately 65 miles in and along the railroad ROW from Whitehall to Schenectady.

In Schenectady, the proposed cable route would enter Erie Boulevard just north of the railroad crossing at Nott Street and continue along Erie Boulevard to a point south of

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<sup>18</sup> See also Hearing Exhibit 152.

State Street where it would again enter the railroad ROW.<sup>19</sup> The route would follow the railroad ROW for a short distance, and would then deviate west of the railroad property, pass under Interstate 890, then turn south along the eastern edge of the General Electric property, approximately parallel with the CSX railroad (CSX), re-entering the CP railroad ROW just north of Delaware Avenue. From this point in Schenectady, the line would follow the CP railroad ROW to the Town of Rotterdam. In Rotterdam, the route would transfer from the CP ROW to the CSX ROW and proceed southeast for approximately 24 miles before entering the Town of Selkirk. The cables would then travel south for approximately 29 miles generally in and along the CSX ROW through Ravena, New Baltimore, Coxsackie, the Town of Athens, and the Village and Town of Catskill, before entering the Hudson River in the Town of Catskill (Hamlet of Cementon).<sup>20</sup>

Upon entering the Hudson River via a tunnel excavated by means of horizontal directional drilling (HDD), the HVDC underwater cables would be located within the Hudson River for approximately 67 miles until reaching a point north of Haverstraw Bay. The cables would leave the water via HDD and enter the CSX ROW in the Town of Stony Point, Rockland County.

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<sup>19</sup> Along this portion of the route there are several alternative routings that include both the railroad ROW and various public ways for transitioning from the railroad to the city streets. The public ways include Nott Street, North Jay Street, Green Street, North Center Street, Pine Street, Union Street, Liberty Street and State Street as well as private property (Parking Lot) at or near 160 Erie Boulevard. (The precise route will be determined in the EM&CP phase.)

<sup>20</sup> The overland route from Dresden to Cementown is proposed primarily to avoid installing HVDC cables within the Hudson River polychlorinated biphenyl (PCB) site designated by the U.S. Environmental Protection Agency, which stretches from Hudson Falls, New York, to the Federal Dam at Troy, New York.

The cables would bypass Haverstraw Bay for approximately 7.66 miles, via a combination of trenching and three HDD excavations under the Stony Point State Historic Park Site and Rockland Lake State Park.<sup>21</sup>

The cables would then re-enter the Hudson River via HDD, and be buried in the river for approximately 20.7 miles to the Spuyten Duyvil, which leads to the Harlem River. The cables would extend south-easterly within the Harlem River for approximately 6.6 miles, exiting the water to a location along an existing railway ROW in the Bronx and continuing along that ROW for approximately 1.1 miles. At this point, the line would enter the East River via HDD, cross the East River and make landfall at Astoria.

At Astoria, the cables would terminate at a converter station to be located near Luyster Creek, north of 20th Avenue. From the converter station, a 345 kV underground circuit would connect to the existing 345 kV substation owned by NYPA. The circuits would interconnect with the NYPA substation near the site of the Charles Poletti Power Project in Queens. From NYPA's substation, another set of HVAC cables will be located within the City streets for approximately three miles to the Rainey Substation.

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<sup>21</sup> The JP notes that the parties considered but rejected the alternative of diverting the line along the east side of the Hudson River. JP ¶ 103. They relied on Exhibit 86, which noted that the railroad ROW on the eastern bank is heavily travelled with passenger trains and that, due to its close proximity to the water and existing infrastructure, there would be numerous engineering constraints to the eastern alternative.



PROJECT OPERATION

Under the JP, Applicants would build and operate the HVDC portion of the Facility without relying on cost-of-service rates to recover their costs. Applicants state they will recover the majority of the Project's costs from users of the HVDC Facility.<sup>22</sup> The Facility has received authorization from FERC to charge negotiated rates and to enter into negotiated pre-subscription agreements with one or more "anchor" customers for up to 75% of the Facility's throughput, with the remaining 25% of the line's capacity to be available to all bidders in an open season.<sup>23</sup> Under the JP, there would be a Certificate Condition requiring Applicants to have 75% percent of their service under binding contract for a period of at least 25 years before commencing construction in New York State.<sup>24</sup>

As of the close of the record, Applicants did not have any contracts with shippers. However, Applicants and Hydro-Québec (HQ)<sup>25</sup> are exploring the possibility of HQ becoming an "anchor tenant" for the Project.<sup>26</sup> If HQ becomes the anchor tenant, it may commit to up to a 40-year purchase of 75% of the

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<sup>22</sup> Applicants have reserved the right to recover the costs associated with the use of the Astoria Rainey cable to deliver energy and capacity not transmitted over the HVDC transmission system pursuant to cost-based rates set by the Federal Energy Regulatory Commission (FERC). Tr. 65 and 76.

<sup>23</sup> Champlain Hudson Power Express, Inc., 132 FERC ¶61,006 (2010); see also Hearing Exhibits 197 (at 7) and 198 (at 11).

<sup>24</sup> Tr. 65, Hearing Exhibit 150.

<sup>25</sup> HQ is a Crown corporation wholly owned by the province of Québec. It has been developing and operating Québec's hydropower resources for over 50 years. HQ generates, transmits and distributes electricity. Hearing Exhibit 197 at 1.

<sup>26</sup> Hearing Exhibit 197 at 3.

transmission rights and would invest in new transmission in Québec needed to support the Project's 1,000 MW capacity.<sup>27</sup>

Applicants expect to ship mostly hydroelectric power through the proposed HVDC cables, with the most likely source being the four-station, 1500 MW Romaine hydro complex that is currently under construction by HQ in Canada, and expected to be put in service in 2015.<sup>28</sup>

POST-RD PUBLIC COMMENT AND PROCEEDINGS

After issuance of the RD on December 27, 2012, seven letters were received from elected officials and citizens of Rockland County who requested a 60-day extension of the exceptions schedule, to allow members of the public additional time to express their concerns.

In addition, by letter dated March 28, 2013, Honorable Congressman Brian Higgins expressed his opposition to the Project, making two points. Congressman Higgins contends that the Facility would cause higher electricity prices in Upstate New York and he also questions whether providing hydroelectric generating capacity from Quebec to New York City would result in greater reliance within Quebec on its nuclear and fossil fuel generating resources, thus having no net environmental benefit on an international level.

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<sup>27</sup> Id. Applicants have not finalized interconnection plans and details, but studies show that the project can be connected to the New York State Bulk Power System without adversely affecting reliability. JP ¶127. Exploration is underway to determine the feasibility of an interconnection on the Canadian side of the border. See Comments filed on March 30, 2012, by H.Q. Energy Services (U.S.), Inc. (HQUS). HQUS is the U.S. power marketing subsidiary of Hydro-Québec Production, the power generating division of HQ.

<sup>28</sup> Hearing Exhibit 197 at 1.

Also on April 9, 2013, Sierra Club, Atlantic Chapter, filed approximately 2,020 identical form letters, on behalf of its members, in opposition to the Project. The letters identify five points in opposition: that the Project contradicts the objectives of the Energy Highway, threatens in-state renewable energy and energy efficiency programs, violates Article XIV of the New York Constitution, adversely impacts Canadian indigenous peoples, and exaggerates claims of job creation. These issues have been identified by various other commenters in opposition to the Project, as described in the RD.

State Assemblyman James Skoufis (99<sup>th</sup> District) wrote twice in January 2013 to inform us that many constituents have contacted him about this application. He requested a 60-day extension of the exceptions schedule to allow constituents additional time to express their concerns. Assemblyman Skoufis noted that he has observed overwhelming opposition to this Project among Rockland County residents in his District, and he requested that a Commission representative hold a meeting in Stony Point to meet with concerned residents.

Two Rockland County legislators, Ilan S. Schoenberger and Douglas J. Jobson, jointly, sent a letter dated January 16, 2013, in which they requested a 60-day extension of the public comment period to allow the public to respond to the RD. This request was supported by other similar requests from Town of Stony Point Supervisor Geoffrey Finn, Town of Haverstraw Supervisor Howard T. Phillips, Jr., three Rockland citizens identified as the "Just Say No! to the Champlain Hudson Power Express" Committee (Just Say No!), and Susan Wright, a Stony Point resident. Enclosed with Supervisor Finn's letter was a copy of the letter from Just Say No!

Those requesting an extension were advised that the requests to extend the schedule for filing exceptions were

denied, because the schedule for exceptions to the Judges' Recommended Decision applied only to parties in the proceeding, and those requesting the extension were not parties in this proceeding. The Secretary had issued a notice in May 2012 indicating that there was no firm deadline for public comments and that comments would be accepted throughout the pendency of this proceeding.

PARTIES' POSITIONS ON EXCEPTIONS<sup>29</sup>

IPPNY, Entergy, IBEW, and the Business Council oppose the ALJs' recommendation that we grant Applicants an Article VII certificate. Central Hudson also opposes the ALJs' recommendation, but in the event a certificate is granted, Central Hudson asks that several other recommendations by the ALJs be revised. The opponents generally argue that the Project is not needed; does not minimize adverse environmental impacts nor conform to a long-range plan that will serve the interests of electric system economy and reliability; and will not serve the public interest, convenience and necessity.

IPPNY and Entergy claim that the ALJs erroneously: relied on the 2012 Reliability Needs Assessment (RNA) performed by NYISO; concluded that the Project would not require out-of-

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<sup>29</sup> Applicants, Staff, Con Edison, and DEC also filed briefs on exceptions, but for limited purposes. Applicants and Staff offered limited factual corrections to the RD. DEC "clarified" its jurisdictional role and urged us to accept the ALJs' conclusion that this proceeding is not the appropriate forum for determining the Office of General Services' authority to grant leases for or other property rights to land under Lake Champlain, but otherwise ignore their "dicta" on the topic; and Con Edison recounted the procedural developments that resolved its concerns and reiterated that it otherwise has no position on the project. In this section, we will limit the summary to briefs on exceptions filed by parties that oppose all or some of the ALJs' recommendations or findings.

market subsidies; credited Staff's "production cost" analysis; and failed to prohibit Project shippers from indirectly recovering "extra-market" subsidies. IPPNY also contends that the ALJs relied on "flawed and inconsistent conclusions" concerning the Project's alleged capacity market benefits, wholesale energy price savings and job-inducing benefits. Entergy argues that the ALJs ignored or marginalized arguments against finding that environmental impacts had been avoided or minimized and accepted standards that are at odds with USACE pronouncements.

IBEW contends, among other things, that "insufficient weight" was given to claims that this Project would reduce wholesale energy prices in upstate New York and harm generators in northern and western New York.

Central Hudson asserts that the ALJs did not correctly resolve its issues with proposed Certificate Conditions 5 and 27-29. Central Hudson also requests that, as a matter of policy, we require transmission corridor developers, including merchants, to propose a project that improves known grid constraints and problems, rather than a point-to-point delivery project.

Finally, the Business Council argues that: the Project does not expand transmission to carry excess power from upstate to downstate; its costs "warrant significant review"; Applicants should be required to accept the incremental costs to Central Hudson that result from placing CHPE facilities on top of Central Hudson's facilities; and the need determination cannot be made in this proceeding until after the Commission concludes several proceedings it instituted last year.

STATUTORY REQUIREMENTS

The PSL provides that we may not grant a certificate for the construction or operation of a major utility transmission facility unless we shall find and determine:

- (a) the basis of the need for the facility;
- (b) the nature of the probable environmental impact;
- (c) that the facility represents the minimum adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives, and other pertinent considerations including but not limited to, the effect on agricultural lands, wetlands, parklands, and river corridors traversed;
- (d) ... (1) what part, if any, of the line shall be located underground; (2) that such facility conforms to a long-range plan for expansion of the electric power grid of the electric systems serving this state and interconnected utility systems, which will serve the interests of electric system economy and reliability;
- (e) [not applicable]<sup>30</sup>
- (f) that the location of the facility as proposed conforms to applicable state and local laws and regulations ..., all of which shall be binding upon the commission, except that the commission may refuse to apply any local ordinance, law, resolution or other action or any regulations ... or any local standard or requirement which would be otherwise applicable if it finds that as applied to the proposed facility such is unreasonably restrictive in view of the existing technology, or of factors of cost or economics, or of the needs of consumers whether located inside or outside of such municipality;

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<sup>30</sup> PSL §126(e) applies to gas transmission lines.

(g) that the facility will serve the public interest, convenience, and necessity ...<sup>31</sup>

We generally have used the statute as our guide for the sequence in which we will discuss the contested issues. Therefore, we will start with need, followed by the extent to which adverse environmental impacts have been avoided or minimized, then undergrounding and the Project's conformance to applicable laws and to a long-range plan, and, lastly, public interest, convenience and necessity.

NEED

In recent major Article VII cases we have set forth grounds on which we base our statutory finding of need. Thus, when Bayonne Energy Center (Bayonne) proposed to build a submarine electric cable to provide a dedicated connection between a new natural gas-fired generator in Bayonne, New Jersey and the Con Edison substation in Brooklyn, we found that the facility would provide system reliability benefits and economic benefits for customers and New York State, and would achieve public policy goals.<sup>32</sup> With respect to reliability, we found that Bayonne would provide an additional source of supply in the event that other, expected generation and transmission projects were not completed as projected, generation retired or was unavailable as a result of relicensing disapproval, emissions control requirements, or for any other reason. We also found that Bayonne's direct interconnection with Con Edison's system allowed it to be considered in-city generation that would count

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<sup>31</sup> PSL §126(1).

<sup>32</sup> Case 08-T-1245, Bayonne Energy Center, LLC, Order Adopting the Terms of a Joint Proposal and Granting Certificate of Environmental Compatibility and Public Need, With Conditions, and Clean Water Act §401 Water Quality Certification (issued November 12, 2009) (Bayonne Order).

towards the City's Locational Capacity Requirement.<sup>33</sup> From an environmental perspective, we found that the addition of Bayonne would allow the City's electricity needs to be met with a cleaner generation mix and should reduce present annual NO<sub>x</sub>, SO<sub>2</sub>, and CO<sub>2</sub> emissions in New York City.<sup>34</sup> We also found that Bayonne's economic benefit's included reducing prices and that all of its favorable impacts would benefit New York without imposing additional costs on electric ratepayers.<sup>35</sup> When Hudson Transmission Partners (HTP) proposed to build and operate a 345 kV electric transmission link between midtown Manhattan and the neighboring regional electric system located in Pennsylvania, New Jersey and Maryland (PJM), we grounded our statutory need determination on findings that the facility would provide a useful bulk transmission connection to another region; alleviate existing transmission constraints; be used as an additional in-city capacity reserve; offer network security attributes that would help protect the security of the transmission network; help enhance and maintain system reliability in the event of plant closings or in response to air quality or climate change initiatives; and provide economic benefits by importing lower cost power, providing production cost savings and by not imposing the economic project risks on public utility ratepayers.<sup>36</sup> Applying the same reasoning to this case, and, as discussed more fully below, we determine that there is more than ample basis to find that this Project is needed.

Initially, it is important to reiterate the aspects of need that are not contested. They are:

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<sup>33</sup> Bayonne Order at 13.

<sup>34</sup> Bayonne Order at 13-14.

<sup>35</sup> Id.

<sup>36</sup> HTP Order at 42-47.



- the Project will offer additional transmission capacity into the New York City load pocket;
- by providing a link to abundant hydropower resources, the Project will significantly reduce harmful emissions and will enhance fuel diversity; and,
- due to these and other characteristics, it will help achieve public policy objectives expressed in the 2009 State Energy Plan and New York City's *PlaNYC*, among other documents expressing State policy.

As did the Judges in the RD, we accept these uncontested propositions as supported by the record and demonstrative of need. These, standing alone, are ample bases for our finding and determination that this Project is needed. However, as noted above, IPPNY, Entergy, IBEW, and the Business Council contest other factors that also could support a finding of need for this Project. We discuss their objections, below.

#### Reliability

The question of whether this Facility is "needed" for reliability purposes was the subject of extensive litigation. In finding a basis of need for the Facility, the ALJs did not rely on a finding that this Facility was being proposed to remedy a forecast system deficiency as of a certain date. Instead, they noted that the RNA was "not automatically dispositive" of the need issue, and found that this case presented an opportunity to authorize an investment in a merchant electrical infrastructure project not tied tightly to any forecast reliability need.<sup>37</sup> The ALJs listed a series of bases for a need finding: (i) the addition of a transmission interface into the New York City Control Area; (ii) likely long-

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<sup>37</sup> RD at 29-30.

term economic benefits; (iii) short-term reductions in the wholesale price of energy; (iv) enhanced fuel diversity, and (v) consistency with public policy goals of increased use of renewable energy and reduction in emissions of various pollutants.<sup>38</sup>

The 2012 RNA was issued after post-hearing briefs were submitted in the case. Prior to that time, the parties referred instead to the NYISO's 2010 RNA and its 2010 Comprehensive Reliability Plan (CRP), which found that no new supply resources were needed over the 10-year planning horizon through 2020. Nevertheless, the JP proponents had relied on certain "risk factors" articulated in the RNA that might trigger a supply need, such as higher than expected load growth, environmental initiatives, and the closing of the Indian Point nuclear power plants, to argue that the Project could mitigate adverse impacts that could result if any of those risk factors came to pass.

The 2012 RNA differed from the 2010 version. The 2012 RNA found a potential increased need for installed capacity in New York City beginning in 2020, due to factors such as higher load growth, the recent mothballing or proposed mothballing of generating plants, the possible retirement of the Indian Point nuclear plants, a reduction in the forecast of customers' willingness to positively respond to requests to curtail their electric power demands (Special Case Resources or SCRs), and the possibility of further retirements of plants in the face of stricter air quality requirements. Following the issuance of the 2012 RNA, the parties were afforded an opportunity to submit

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<sup>38</sup> The RD considers "reliability need" and "fuel diversity" as two separate issues in separate sections. As we discuss below, we consider fuel diversity to be an important reliability benefit and therefore we have collapsed the two issues here.

supplemental briefs to address its implications. The ALJs relied on these supplemental materials as well as the record materials addressing the 2010 RNA in reaching the conclusions in the RD.

IPPNY and Entergy claim that the ALJs erroneously relied on the 2012 RNA. They assert that the need found in the 2012 RNA may not materialize because: mothballed generators may not actually retire; the 2012 RNA's Zones at Risk analysis found that one could eliminate up to 1,000 MW of capacity from various downstate zones before reliability violations would occur; and the prospect that the Indian Point units would retire is highly speculative. Entergy argues that it is irrational to conclude (as did the RD) that the 2010 and 2012 RNAs examined similar scenarios because the 2012 RNA is not the end of the NYISO's planning process.

IPPNY argues that the 2012 RNA's assumption that SCRs might decline over time is not supported. IPPNY also contends that the State's energy efficiency and renewable resources programs are likely to further reduce or eliminate any future reliability needs.

Applicants respond that the ALJs correctly concluded that the 2012 RNA shows that the additional capacity provided by the Facility may be needed by 2020, and perhaps sooner.<sup>39</sup> They say that IPPNY and Entergy are in effect, asserting that mothballed facilities should have a guaranteed right to reenter the market before new competitors are allowed to serve consumers in New York City, an assertion they say belies IPPNY's oft-repeated support for a fully competitive electric market in New York.

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<sup>39</sup> Applicants Brief Opposing Exceptions at 3-8.

They note our Order Instituting Proceeding and Soliciting Indian Point Contingency Plan in Case 12-E-0503, contending that we expressly rejected IPPNY's claim that due to the retirement of Indian Point (IP) nuclear facilities a reliability violation in 2016 is "highly speculative." They also highlight our statement that the potential retirement of such a significant electric generating facility "requires significant advanced planning" and the development of a contingency plan "now."<sup>40</sup> Applicants contend that the institution of the IP proceeding provides powerful evidence of the need for additional capacity to serve New York City and the lower Hudson Valley.

NYC argues that IPPNY's contention that the State's efficiency and renewables programs may eliminate any potential reliability need is "not persuasive," asserting there are "recognized implementation challenges and other circumstances" that render uncertain the achievement of those policy goals. Further, New York City observes that, as a general proposition, year-to-year need determinations are subject to a wide variety of changing circumstances<sup>41</sup>

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<sup>40</sup> Applicants Brief Opposing Exceptions at 6, quoting Order at 4.

<sup>41</sup> NYC Brief Opposing Exceptions at 13. NYC notes recent developments (i.e., the December 7, 2012, decision of the New York State Reliability Council's Executive Committee increasing the current 16% Installed Reserve Margin for the New York Control Area to 17%, effective May 1, 2013, and a January 17, 2013, NYISO's Operating Committee vote that increased the City's Locational Capacity Requirement (which establishes the percentage of capacity to meet the needs of customers within the New York City capacity market that must be purchased from supply resources located within the New York City market) from 83% to 86%) that it says demonstrate that the need determination is fluid and the ALJs properly accounted for that fluidity by analyzing all of the factors identified in the RD. NYC at 11-12.

Staff asserts that because Applicants are not requesting rate-based treatment to recover the cost of the Project, there is no need to address whether the Project satisfies a "reliability need" pursuant to the RNA.<sup>42</sup> Instead, says Staff, this proposal represents a merchant investment, which would help to avoid the need for potential regulated investments -- exactly as the RD concludes.<sup>43</sup>

The Business Council argues that we should await the outcome of a number of recently instituted cases<sup>44</sup> before deciding to advance this Project now. Applicants oppose the Business Council's suggestion, arguing that outcome "would cast a pall on all siting applications in the State."<sup>45</sup>

Discussion

We do not approach a need determination under Article VII as a narrowly-defined exercise, exclusively based on elective supply/demand forecasting -- forecasts that as New York City notes can change significantly from year-to-year based on a myriad of factors. In that regard, contrary to the arguments of Project opponents, the most recent RNA is not dispositive on the issue of need. In both the HTP and Bayonne cases, the then-current RNA found no reliability need during the next 10-year

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<sup>42</sup> Staff Brief Opposing Exceptions at 11-12.

<sup>43</sup> Staff Brief Opposing Exceptions at 12, citing RD at 30.

<sup>44</sup> Case 12-T-0502, Proceeding on Motion of the Commission to Examine Alternating Current Transmission Upgrades; Case 12-E-0503, Proceeding on Motion of the Commission to Review Generation Retirement Contingency Plans; Case 12-G-0297, Proceeding on Motion of the Commission To Examine Policies Regarding the Expansion of Natural Gas Service; and Case 12-E-0577, Proceeding on Motion of the Commission to Examine Repowering Alternatives to Utility Transmission Reinforcements.

<sup>45</sup> Applicants Brief Opposing Exceptions at 60.

planning period, yet we found those projects were needed for reliability. Specifically in the case of HTP, we found that the facility would provide a useful bulk transmission connection to another region; alleviate existing transmission constraints; be used as an additional in-city capacity reserve; offer network security attributes that would help protect the security of the transmission network; and help enhance and maintain system reliability in the event of plant closings or in response to air quality or climate change initiatives.<sup>46</sup> With Bayonne, we found that the facility would provide additional in-city generation; reduce transmission constraints for New York City; and contribute to ensuring system reliability in the event a range of possible regulatory and legal changes or events might transpire and reduce available generation.<sup>47</sup>

In this case, we find and determine need, in part, because, as an additional transmission interface into the City of New York, the Project will (1) alleviate existing transmission constraints, (2) protect the security of the transmission network, (3) enhance system reliability,<sup>48</sup> and (4) enhance fuel diversity. The Project opponents have failed on exceptions to undercut the ALJs' findings regarding the system reliability benefits that would flow therefrom.

The claims that too much reliance has been placed on the 2012 RNA and its underlying assumptions are misplaced, since other uncontested bases properly support a finding of need pursuant to PSL §126(1)(a). In any event, it is indisputable that if load increases, or Indian Point retires, or SCRs decrease, or, in short, if any adverse reliability events

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<sup>46</sup> HTP Order at 42-47.

<sup>47</sup> Bayonne Order at 12-16.

<sup>48</sup> Id.

materialize in the next 10 years, then a Project like this one would be beneficial as a means to help alleviate such adverse impacts.

Arguments about the various risk factors and events that have and may yet affect "need" and the information highlighted on exceptions by parties on both sides of the dispute merely serve to confirm that the State's generation and capacity markets are fluid, and often change in ways that are unexpected - the Danskammer retirement being a prime example.<sup>49</sup> In fact, the NYISO's 2012 CRP, approved and published subsequent to its 2012 RNA, advanced the year of need to 2019, based mainly on the Danskammer retirement announcement.<sup>50</sup> Finally, we reject the requests of the Business Council to consider transmission and generation proposals sequentially and to delay addressing this Project. By issuing this Article VII Certificate, we are merely allowing the Applicant to evaluate other generation and transmission projects in deciding whether to move ahead to construction. Delaying this decision will only add to market uncertainty, and that would be inconsistent with allowing market actors to do their own sorting of possible futures.

#### Installed Capacity

The RD states that the Project will provide installed capacity benefits. IPPNY excepts.<sup>51</sup>

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<sup>49</sup> On January 3, 2013, Dynegy Danskammer, L.L.C. (Danskammer) filed a written notice of intention to permanently retire (and then demolish) its 495 MW Danskammer Generating Station in Newburg, New York. See Case 13-E-0012, Petition of Dynegy Danskammer, LLC For Waiver of the Generation Facility Retirement Notice Period and Requesting Other Related Relief.

<sup>50</sup> See 2012 CRP at 8.

<sup>51</sup> IPPNY Brief on Exceptions at 18-19.

IPPNY cites Mr. Younger's testimony that the NYISO's buyer-side mitigation rules will prohibit the Project from selling its installed capacity into the markets for many years. IPPNY states that the ALJs seemingly acknowledged this prohibition but then appeared to confuse "additional transmission capacity on the one hand, and increased installed capacity on the other."<sup>52</sup> To the extent that the ALJs confused these two, IPPNY says we must reject any reliance on installed capacity benefits.

Applicants observe that IPPNY does not deny that the Facility will add an additional 1,000 MW of transmission capacity into the New York City load pocket, or that 1,000 MW of generating capacity in Québec will be able to serve load in the New York City load pocket over the proposed transmission line.<sup>53</sup> Applicants contend that, in the unlikely event that any of the installed capacity provided by the Facility is excluded from participating in the NYISO's capacity markets under the NYISO rules, that capacity would remain physically available to NYISO in its operation of the State Transmission System and would benefit consumers by enhancing the reliability of electricity supply.<sup>54</sup>

#### Discussion

Regardless of whether the ALJs relied on the Project's "installed capacity" benefits, we do not rely upon the Project's

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<sup>52</sup> IPPNY Brief on Exceptions at 19. IPPNY explains that transmission capacity refers to the ability of a transmission system to import and export energy, whereas installed capacity refers to a reliability product purchased by load serving entities to ensure they have sufficient supply, plus a reserve, to meet their load obligations. Id.

<sup>53</sup> Applicants Brief Opposing Exceptions at 27-28.

<sup>54</sup> Id.



potential ability to provide additional installed capacity as support for our decision. Our conclusion, however, does not mean that we find the potential for the Project to provide installed capacity benefits in the future to be non-existent. It simply means that our need finding is supported on other grounds.

Economics

The ALJs reviewed a number of economic analyses advanced by the parties in support of and opposition to the Project. They rejected two separate analyses proffered by Mr. Younger, one a cash-flow analysis and one a production cost savings analysis, in favor of Staff's long-term production cost savings analysis.<sup>55</sup> They determined that "the most meaningful economic analysis of this project is one that focuses on the long-term and gauges whether the proposal will provide net benefits to society as a whole." They then concluded that "Staff's long-term analysis is the one that is best suited to determining whether the proposed Facility will provide overall net societal benefits" because it "was performed in such a way that it reasonably balanced the competing assumptions and views advocated by the Project's opponents, on the one hand, and Applicants, on the other."<sup>56</sup>

In the analysis credited by the ALJs, Staff compared the cost of 1,000 MW of Canadian hydropower delivered to New York City via the Project to the cost of a combined cycle gas-fired turbine (CCGT) of similar capacity located in New York

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<sup>55</sup> Applicants' witness Frayer estimated annual average "production cost savings" of \$606 million, or \$6.1 billion in total over the 10-year period from 2018 to 2027. The RD did not credit her analysis and no party excepts, so we will not discuss it further.

<sup>56</sup> RD at 47.

City. Staff reasoned that because the Project would alleviate the need to construct the CCGT, the CCGT costs represented the savings attributable to the Project. Staff estimated the net present value of production cost savings over a 35-year period in a range from \$0.4 billion to \$2.6 billion (in 2015 dollars).<sup>57</sup> In other words, Staff found that the Project was economically beneficial and that the economic benefit constituted a basis for a need finding.

IPPNY's witness Younger testified that the Project would be uneconomic. Employing the same General Electric Multi-Area Production Simulation (GE MAPS) model J database that Staff used for its economic analysis of wholesale market benefits in the JP, Mr. Younger used Staff's representation of the physical and economic characteristics of the Project to model the first ten years of the Project's expected operation. Mr. Younger then made limited updates to Staff's MAPS database to account for the most recent available data on gas prices, generator retirements and full deliveries of 1,550 MW out of the Astoria Annex. Using the methodology the NYISO employs to conduct its Congestion Assessment and Resource Integration Study (CARIS) to determine whether a transmission project is economic, Mr. Younger compared the first ten years of the annualized cost of the Project to its production cost savings over the same period. He concluded that, over the first ten years of Project operation, it would cost a total of over \$2 billion but create only \$590 million in benefits, thus producing a benefit/cost ratio of only 0.29, substantially below the minimum threshold used by the NYISO to determine whether a proposed transmission project is economic.

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<sup>57</sup> Tr. 198-199; see also Hearing Exhibit 202. Staff initially estimated these benefits as ranging between \$1.2 billion and \$3.2 billion dollars over a 35-year period (net present value in 2015 dollars). Tr. 165.

A second production cost analysis produced by Mr. Younger consisted of proposed corrections to the Staff analysis and also came to the conclusion that the Project was uneconomic.

In rejecting IPPNY's position, the ALJs found, *inter alia*, that IPPNY's overarching views on economic need were informed by the outdated 2010 RNA and by the incorrect assumption that the generation would not be needed for reliability purposes until 2026.

Production Cost Analyses

On exceptions, IPPNY asserts that Staff's analysis did not calculate the production cost savings that would result from the Project. According to IPPNY, by comparing the cost of the Project to the cost of a CCGT in New York City, Staff did not actually measure the long-term net benefits to society as a whole, but instead measured the amount of savings that, if realized, inure to the benefit of only the Project developer. Entergy argues that the RD claims Dr. Paynter's rebuttal savings estimate as a "societal" benefit even though such a finding is at odds with the JP's statement that such savings "should not be interpreted as ratepayer benefits" as they will be "captured by the Applicants, their financial backers and/or users of the Facility."<sup>58</sup>

In response, Staff argues that by comparing total economic costs, while ignoring transfer payments (due to price impacts), it has, in fact, measured economic benefits to society, rather than ratepayer benefits or profits to one party, as claimed by IPPNY.<sup>59</sup>

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<sup>58</sup> Entergy Brief on Exceptions at 19-20.

<sup>59</sup> Staff at 4.

Applicants argue that documented savings to a developer are indeed a benefit to "society." They cite an IPPNY statement in support of this view:

[C]ompetitive market structures motivate power producers to undertake investments and improvements that lead to productivity gains, and many of the nation's generating facilities now are operated much more efficiently than in the past. Just as in any competitive market, market signals embedded in the competitive wholesale markets in New York have created incentives for producers to undertake needed investments and creative improvements in operating practices to achieve such cost savings.<sup>60</sup>

Applicants observe that the Commission has recognized in other contexts that, over time, competition will force producers to share cost reductions with consumers as other suppliers achieve similar cost reductions.

IPPNY reiterates its arguments that Staff significantly understated the combined costs of the Project and the HQ hydro facility while at the same time substantially overstating the CCGT costs that would otherwise be avoided. According to IPPNY, Staff understated Project costs by using the costs of a hydro facility with unique permitting and operating circumstances, failing to include all the costs of the new hydro facility in the calculation, understating the losses associated with delivering power from the hydro facility to the injection point for the Project and using an "abnormally long, 35-year amortization period" for the Project, which, according to the IPPNY witness, proved that any benefits are not likely to occur for decades, long after substantial, required expenditures.

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<sup>60</sup> Applicants at 9, citing Hearing Exhibit 165 (IPPNY White Paper "The Policies of Power: Energy Planning for New York's Future Recommendations from the IPPNY," November 2008, at 15).

IPPNY adds that Staff overstated the CCGT costs by calculating them as if they would be incurred in 2016, the year that Staff expected CHPE to bring the Project into service, instead of using 2026 (IPPNY's asserted need date). IPPNY reiterates its conclusion that the Project's costs are more than \$5 billion more expensive than waiting to build CCGTs in New York City when they are needed.

Both Applicants and Staff urge us to affirm the ALJs' adoption of Dr. Paynter's analysis<sup>61</sup> because (1) Dr. Paynter properly dismissed Mr. Younger's concerns with respect to his use of Canadian hydro facilities and addressed Younger's concerns with respect to the facilities needed to transmit electricity from the Canadian hydro facilities to interconnect with the Facility;<sup>62</sup> (2) Dr. Paynter explained that transmission from hydroelectric facilities in Québec to the Facility will occur on lines with a documented history of line losses that vary from "4.5% to 8%, depending on operating conditions and temperatures";<sup>63</sup> and (3) IPPNY's reliance on 2026 as the date on which the proposed combined cycle plant would commence operations, instead of 2016, the date used by Dr. Paynter, relied on the outdated 2010 RNA and improperly introduces short-term market conditions into a long-term economic analysis.<sup>64</sup>

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<sup>61</sup> Applicants at 10; Staff at 5.

<sup>62</sup> Applicants at 10-12.

<sup>63</sup> Applicants at 12, citing Paynter rebuttal at 178; Staff at 5.

<sup>64</sup> Applicants at 13; Tr. 179-180. Applicants add that Dr. Paynter also explained that if he corrected his analysis to recognize short-term market conditions affecting the Facility in Canada, the total costs of the Facility would be reduced to less than one-third of the costs of Mr. Younger's CCGT facility. Applicants at 14, with recitation of testimony at Tr. 180-181 omitted.

Opponents argue that the RD misconstrues Mr. Younger's purpose in conducting a CARIS-type cost-benefit analysis, asserting that the CARIS model was appropriately applied because: (1) the Project failed the cash flow test by such a wide margin that it further supports the conclusion that a subsidy will be required; and (2) there is no other generally accepted benefit-cost methodology.<sup>65</sup>

With respect to IPPNY's CARIS analysis, Staff argues that the RD correctly dismissed it because it applies to regulated projects rather than merchant projects, and it fails to account for HQ's legitimate financial interests in the Project, including, *inter alia*, meeting the needs of HQ's financial backers; consideration of HQ's actual financing costs, which may be very different than CARIS' 16% rate; finding a market for HQ's new hydroelectric supplies; and considering the potential impacts of HQ's new hydro electric supplies on market prices and congestion. Staff notes that witness Paynter listed these "valid considerations," noting that they "are all outside the narrow scope of the CARIS analysis."<sup>66</sup>

Applicants argue that Mr. Younger's analysis also was properly rejected on the basis that it improperly assumed that the full output of the hydroelectric generating facilities now under development in Québec could simply be sold into New York State across existing, already constrained transmission lines.<sup>67</sup> Applicants argue that Ms. Frayer pointed out in rebuttal testimony that Mr. Younger's "production cost" analysis was flawed by this assumption, and that, in reality, differences in market design between control areas, sometimes referred to as

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<sup>65</sup> Entergy at 12-13.

<sup>66</sup> Staff at 7, citing Tr. 192-193 and referring to Tr. 190-193.

<sup>67</sup> Applicants at 20-21.

"seams," limit the extent to which energy can flow between control areas in response to differences in market prices, as FERC recognized in a recent Order.<sup>68</sup> Applicants state that Ms. Frayer explained that the effect of this erroneous assumption is that Mr. Younger's GE MAPS model substantially overstates actual trading opportunities<sup>69</sup> and his production cost analysis understates the Facility's true impacts on total production costs.

#### Revenue/Cash Flow Analysis

The ALJs also rejected a revenue/cash flow analysis proffered by IPPNY witness Younger. In that analysis, Mr. Younger calculated an annual cost, based on the Applicants' estimated construction costs and 90% capacity factor and the costs to connect with the transmission system in Québec. He then estimated annual revenues based on the historic price differential between the New York-Canada border and New York City. He concluded that it would cost a shipper, per MWh, over \$50 to receive an \$8 benefit and that therefore the Project was not economic pursuant to this analysis. On exceptions, IPPNY asserts that the Commission should credit this analysis.

IPPNY states that Applicants improperly refused to introduce affirmative evidence of their business plan or potential income stream. IPPNY reiterates its claim that no rational investor, including HQ, would risk its assets by participating in this Project absent some assurance of extra-market funding. It argues that this "undeniable need" for such funding means that subsidization by ratepayers in regulated

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<sup>68</sup> Applicants at 21, citing *Blumenthal v. ISO New England, Inc.*, 135 FERC ¶ 61,117 at P 44 (2011).

<sup>69</sup> Applicants at 21-22.

rates will be necessary to enable the Applicants to recoup their costs.

Applicants point to the rebuttal testimonies of Dr. Paynter and Ms. Frayer, saying both made clear that Mr. Younger "stacked the deck against the Facility in several important ways," including using today's historically low energy prices, and failing to demonstrate that existing interconnections between New York and Québec would be sufficient to accept the full output of the massive hydroelectric generating facilities now under development in Québec. Applicants and Staff note that the record shows that those existing interconnections are already constrained during periods of peak demand, leaving little opportunity for HQ to sell additional hydroelectric power into New York over those existing interties. For this reason, among others, Staff asserts that IPPNY's "Cash Flow" analysis is fundamentally flawed, and the RD was correct to dismiss it.

#### Discussion

First, it must be emphasized that no one can make any definitive statements about the future economics of the Facility. One can only talk about the future in terms of forecasts that are made at this point in time and the likelihood that the economics of the Facility may actually turn out to be better than forecasted or worse than forecasted. We must therefore recognize the role that uncertainty plays in the investment decisions of potential developers.

Staff, IPPNY, and Entergy agree that the primary economic analysis is the comparison of the overall societal benefits and costs of the Facility, which is sometimes called a production cost savings analysis. While undoubtedly important, the results of a production cost savings analysis are but one factor we consider.



Analyses of production cost savings were performed by IPPNY witness, Mr. Younger and Staff witness, Dr. Paynter. Mr. Younger's production cost savings analysis, using G.E.'s MAPS model, while subject to several weaknesses that were identified by the parties, must be given some weight. The analysis supports a conclusion that the Facility may not be economic on a forecast basis using low gas price forecasts, which lead, in turn, to forecasts of low wholesale electric prices for New York City. At low New York City electric prices, the Facility may not produce enough production cost savings to cover its costs.

We also give weight to Staff's long-run production cost savings analysis. Contrary to IPPNY's allegation, Staff's long-run production cost savings analysis is proper: it properly compares the cost of the added project to the cost savings that will result from it, in the form of an alternative project (a combined cycle gas facility located in New York City) that will be avoided. This analysis should be given the most weight. Its results are highly instructive because they show how sensitive the economics of the Facility are to gas price forecasts. Using its "low" and "high" gas price forecasts,

Staff estimated a net benefit of \$0.4 billion and \$2.6 billion, respectively.<sup>70</sup>

We acknowledge IPPNY's criticism that Staff's method overstated the net benefit of the Facility by assuming that its in-service date, originally forecasted to be 2016, exactly matched the date that a new CCGT would otherwise need to be built in New York City. According to IPPNY, excess supply in New York City means that a new CCGT would not be needed until substantially later than 2016. This criticism is valid. We recognize, however, that more recent analyses of supply and demand suggest that the need for new supply will likely occur much earlier than 2026. This recognition, combined with delays in the Facility's schedule that puts its in-service date out beyond 2016 by one or two years, brings the expected in-service dates of the Facility and the CCGT much closer into alignment with each other. Nevertheless, there would remain a slight

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<sup>70</sup> In its Brief on Exceptions, IPPNY attempted to introduce into the record, the U.S. Energy Information Administration's Annual Energy Outlook (2013 AEO) Early Release Overview, for the purpose of bringing to our attention gas forecasts lower than those previously used by the parties in their production costs analyses. By Ruling Denying Motion to Incorporate or Take Official Notice (issued January 30, 2013) and Errata Notice (issued February 1, 2013), the Acting Secretary determined that the draft document would not be introduced into the record because the forecasts were preliminary in nature (subject to future revision). We agree that the ruling was proper at the time made. On April 15, the EIA issued the final 2013 AEO, which retains the gas price forecasts contained in the Early Release Overview. We recognize that incorporating these gas forecasts at issue into Staff's analysis (holding all other inputs constant), Staff's estimate of production cost savings would turn negative. Such a result, however, would only change one element in our overall analysis and would not change our conclusion that there is more than ample basis to conclude that the granting the Certificate is warranted.

mismatch in the two dates and therefore a slight overstatement by Staff of the Facility's production cost savings.

Based on the information available to us, we find the production cost savings estimates to be inconclusive, as the results of such an analysis depend very heavily on, among other things, the trajectory of actual gas prices. As was clear from the record and is well understood within this Commission's experience, gas price forecasts can change dramatically in a very short time. However, by granting the Facility a certificate, we are providing its investors with the option to move forward with construction of the Facility if circumstances such as a revised gas price forecast lead its investors to believe that it will be an economic project. As we explain below, the Project is in the public interest because its non-monetary benefits outweigh its environmental harm. This weighing of the Project's non-monetary aspects holds irrespective of any conclusion we make on the economics of the Project. If the economics are positive and the Project is built, then society will be better off for it, because of the important non-monetary benefits. If the economics become worse and the Project never gets underway, then no harm will come of our decision to grant the Facility a certificate.<sup>71</sup>

As an alternative to a production cost savings analysis, IPPNY's witness, Mr. Younger, performed a revenue/cash flow analysis. The analysis looked at the economics of the project from the perspective of the project owner: is the project likely to be reasonably profitable? We find that

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<sup>71</sup> We note that, pursuant to Certificate Condition 13, the Applicants do not have unlimited time in which to go forward with the Project. Rather, Condition 13 allows us to vacate the Certificate if Applicants have not filed their EM&CP or commenced construction by certain specified deadlines.

IPPNY's revenue/cash flow analysis cannot be relied upon because it keyed on historical bus prices instead of forecasted bus prices. Historical bus prices fail to capture key future factors such as gas price forecasts, and, as Staff points out, the historical bus prices used by IPPNY were artificially depressed by the recent recession.

Wholesale Price Impacts

The ALJs observed that "[n]o party disagrees that this facility will (or is likely to) reduce wholesale electricity prices; parties disagree on whether these reductions should be viewed as a benefit, whether the estimates are accurate, and whether the metric should be relied on by the Commission in this proceeding."<sup>72</sup> The RD summarizes the various estimates put forward by the parties, noting Applicants' figure of \$503 million for 2018 and \$3.4 billion for the ten years starting with 2017, and Staff's estimate of \$492 million in 2018.<sup>73</sup> According to the RD, IPPNY witness Younger argued that the 2018 numbers were overstated by \$211 million.<sup>74</sup> The ALJs found that, "even after accounting for opponents' criticisms and proposed offsets, the proponents have successfully demonstrated that the Project will have sizable benefits in the form of reductions in the wholesale price of electricity" and that these particular benefits, though likely short-term, should be considered as evidence supporting both the required need and public interest findings.<sup>75</sup> IPPNY, Entergy, IBEW and the Business Council take exception to this recommendation, arguing that the wholesale price reductions should not be viewed as benefits nor be

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<sup>72</sup> RD at 48.

<sup>73</sup> Id.

<sup>74</sup> RD at 49.

<sup>75</sup> RD at 54, 72-73.

considered as evidence supporting the need or public interest findings.

IPPNY and Entergy say any claimed benefits from wholesale energy price reductions produced by this Project must be disregarded entirely because they are temporary transfer payments between generators and consumers, rather than sustainable benefits to society as a whole. They also assert that any wholesale price reductions caused by this Project's "uneconomic entry" would be the result of anti-competitive price suppression and thus cannot be considered a benefit. IPPNY adds that the RD's conclusion that wholesale energy price savings will "nonetheless be realized" is erroneous and it is "pure speculation" whether such savings would have a perceptible impact on consumers. Entergy reiterates, and cites Dr. Paynter's testimony as support, that "[wholesale energy] price reductions benefit consumers at the expense of the suppliers; but the reduction in prices does not represent an economic (or societal) benefit, just a transfer payment from suppliers to consumers." Entergy argues that the RD's finding that such transfer payments somehow support both need and public interest is misplaced.

IBEW also disagrees with viewing wholesale price impacts as a benefit, especially in Upstate New York, while the Business Council states that if the projected wholesale energy market savings cannot be delivered, the Project simply cannot be in the public interest.

Applicants and Staff contest IPPNY's claim that wholesale price savings are "inherently unreliable because, *inter alia*, they do not account for market responses."<sup>76</sup> Applicants contend that it is unsupported by any citation to the

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<sup>76</sup> Applicants at 25, citing Brief on Exceptions at 20.

record and cannot be reconciled with the testimony of DPS Staff witnesses Gjonaj and Wheat that "the Commission should be aware of these [wholesale price] benefits when considering whether this project is in the public interest."<sup>77</sup>

Applicants argue that the ALJs clearly considered and rejected IPPNY and Entergy's claim that the lower wholesale electricity prices resulting from the Facility should be ignored simply because they are likely to be transitory.<sup>78</sup> Applicants argue that IPPNY and Entergy have provided no explanation why this "obviously correct conclusion" should be rejected by the Commission.

#### Discussion

The Project will create significant benefits to consumers in the form of lowered wholesale prices. Even allowing for adjustments proposed by IPPNY, the wholesale price reductions for 2018 alone are forecast to be \$281 million. We do not rely on these consumer benefits to find need. Instead, as discussed elsewhere in this Order, we find other bases for granting the certificate.

#### Price Impacts at U.S.-Canada Border

In response to claims that the Project could raise wholesale electricity prices at the U.S.-Canada border, the ALJs stated that:

This potential scenario, however, is premised on the assumption that all other circumstances would remain constant. In fact, no basis for that assumption is substantiated on this record, where we have credible testimony that markets tend to

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<sup>77</sup> Applicants at 25, citing Tr. 245.

<sup>78</sup> Applicants at 25-26, citing RD at 53.

respond to such price differentials, eventually offsetting them over time.<sup>79</sup>

IPPNY and Entergy contest this conclusion, arguing that the RD's rationale for rejecting the border price information is inconsistent with the RD's rationale for crediting wholesale energy price savings. They argue that either all price impacts are relevant regardless of certainty and expected duration, or none of them are. Entergy argues that it demonstrated that we must take into account the higher energy prices that the Project will cause in the already struggling regions of Upstate New York, claiming this Project would increase Upstate power prices without providing any other tangible benefits. Entergy asserts that this scenario was suggested by Dr. Paynter.

Applicants assert that the ALJs correctly rejected IPPNY and Entergy's contention that the Facility will harm consumers in Upstate New York by increasing prices at the Canadian border because that contention was unsupported by record evidence.<sup>80</sup> Staff asserts that the contention is simply false.

Specifically, Applicants note that Entergy quotes from Dr. Paynter's testimony on cross-examination, but fails to include the very narrow question to which he was responding or the last fifteen words of Dr. Paynter's answer, both of which, Applicants state, make clear that Dr. Paynter is answering a purely hypothetical question posed by Entergy's counsel. Applicants argue that when the complete question and answer is viewed in context, the quotation presented by Entergy provides it no support.

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<sup>79</sup> RD at 65, citing as an example Tr. 172.

<sup>80</sup> Applicants at 34.

Staff says that Dr. Paynter, in fact, determined that the Project would reduce prices across New York State, including Upstate. Staff adds that IPPNY's claim is based, not on Staff's testimony, but on a hypothetical, presented on cross-examination, which assumes that HQ would invest in 1,000 MW of additional hydroelectric supply and sell this at the New York border, without any transmission upgrades in New York. Referring to its Reply Brief (p. 11), Staff states that the "increase" in border prices is only in comparison to the depressed prices in the hypothetical and that compared to current market prices, the impact of the additional hydroelectric resources delivered by the Facility is to reduce prices statewide, including at the Canadian border. Applicant makes a similar argument.

Applicants state that the only record evidence directly addressing the impact of the Facility on power prices in upstate New York is the testimony of Ms. Frayer, whose testimony included a chart clearly showing that the Facility will have no significant impacts on the price of electricity in upstate markets (Tr. 279, lines 1-7).

#### Discussion

Staff witness Paynter testified that when large supplies enter a market, they naturally tend to depress prices.<sup>81</sup> Based on this testimony, and on the arguments provided by Staff on exceptions, we reject claims that the Project will increase wholesale electric prices at the U.S.-Canada border.

#### Competitive Markets and Existing Generation

The ALJs rejected arguments that this Facility will harm competitive markets if it is granted a certificate, instead concluding that its addition should improve the competitiveness

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<sup>81</sup> Tr. 171.



of the market in New York City and is consistent with State, Commission, and City policies encouraging competitive markets. Their reasons were: (1) short-term price decreases should not harm existing generators who are able to adapt to an evolving competitive market; (2) the entry of additional energy and capacity supply could help consumers, particularly in the City load pocket, since it could reduce the potential for market manipulation; (3) the "persuasive" record evidence rebutting the claims that the Project will be an uneconomic entrant; and (4) if some of the Project's costs prove uneconomic, Certificate Conditions should protect captive ratepayers from a significant portion of any such costs and the buyer-side mitigation rules should protect incumbent generators.<sup>82</sup>

The ALJs rejected claims that the Project would hasten the exodus of fossil or renewable generation because they found "far too many variables at play that could influence or explain a generator's decision to exit the competitive market, including changes in environmental regulations or tax laws" and "no credible basis for concluding that any generator's decision to exit the market can be definitively and exclusively linked to the entry of this Project."<sup>83</sup> IPPNY, Entergy and IBEW except to the ALJs' conclusion and renew arguments that certification of this Project will harm competitive markets and cause existing generators to exit the market.

IBEW contends that existing fossil or renewable generators' lack of usable transmission facilities denies them the opportunity to compete. IBEW also argues that, with 1,000 MW being delivered from Canada to downstate, (1) there would be no immediate need for renewable or fossil power generated in-

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<sup>82</sup> RD at 66-67.

<sup>83</sup> RD at 66.

State to be transmitted downstate and (2) the upstate renewable and fossil generators' financing ability would be curtailed.<sup>84</sup>

IPPNY reiterates its claims that the "fact" that this Project is uneconomic and "likely to be financed by above-market, subsidized contracts," would turn the bases underlying the Commission's determination to implement competitive markets on their head and significantly harm the very competitive market the Commission sought to produce. These same arguments form the bases for IPPNY's claims this Project would hasten the exodus of existing generators.

IPPNY asserts that the policy implications of building uneconomic capacity are clear and were recognized long ago by FERC in its Order approving the NYISO's proposed measures to mitigate the impact of market power. IPPNY claims that our issuance of a certificate to the Applicants will allow the Project to satisfy a significant milestone and will encourage uneconomic entry and the suppression of energy prices, which will chill market-based entry and ultimately cause New York's consumers to pay higher electricity prices.

IPPNY concedes that it is not always possible to identify or isolate the one factor that led to a generator's retirement but contends that simple economics demonstrates that existing economic generators are dependent on market revenues and cannot survive long-term when those revenues are "artificially depressed in a significant manner by uneconomic entry." IPPNY claims that this Project's costs are higher than the costs of new entrants that legitimately lower costs, and those higher costs will be foisted on consumers through indirect subsidies for this "anticompetitive" Project.

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<sup>84</sup> IBEW Exceptions at 3.

Applicants respond that IPPNY and Entergy ignored the portion of the RD expressly rejecting their claims. They say that when addressing claims that the Facility will harm competitive wholesale power markets, the ALJs make clear that rejection was due, in part, to rejecting IPPNY and Entergy's views of the Facility's economics and, in part, on their finding that the buyer-side mitigation provisions of the NYISO Services Tariff will protect competitive wholesale power markets in the unlikely event that IPPNY and Entergy's economic arguments prove correct.

Applicants assert that FERC has made clear its intention and obligation to adopt measures designed to prevent any such competitive harm, reflected by its decision to protect New York's markets from competitive injury due to uneconomic entry by directing NYISO to impose "net buyer mitigation."<sup>85</sup> As a result, Applicants assert that FERC has taken the regulatory actions required to ensure that uneconomic entry will not pose a threat to New York's wholesale power markets.

Applicants urge rejection of IBEW's exceptions because (1) generators in upstate New York are already free to compete to serve customers in New York City using transmission capacity between upstate New York and downstate New York on existing facilities; (2) the record reveals that the Facility will actually reduce congestion on New York's constrained Total-East Interface, making more transmission capacity available to generators in New York State; and (3) IBEW has failed to identify any concrete transmission expansion projects that will not go forward if the Facility is approved.

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<sup>85</sup> Applicants at 30-31, citing FERC's March 7, 2008 Order in Docket No. EL07-39-000, New York Independent System Operator, Inc., 122 FERC ¶61,211 at P 105 (2008).

Staff argues that IPPNY's claim of harm to competitive markets is unsupported because it is based on IPPNY's "discredited" assertion that the Project is uneconomic and would be financed by contracts subsidized by New York consumers. Staff further asserts that IPPNY's "professed concern about 'chilling new investment' is not credible; indeed, it is difficult to imagine a more serious threat to competitive markets than to deny siting, thereby preventing a developer from even attempting to enter the market."<sup>86</sup>

Discussion

The single most important characteristic of a competitive market is ease of entry by new suppliers. One potential entry barrier is the siting process itself and the requirement that a potential new entrant, such as the Facility, obtain a certificate. One way to truly harm competitive markets is to deny potential suppliers the certificates they need without having a strong basis for doing so.

Opponents in this case ask us to deny the Facility a certificate because of the alleged possibility that the Facility will become part of a buyer market power scheme to artificially drive down New York City wholesale electric prices. Buyer market power problems tend to be rare and therefore do not need entry-blocking actions that cause more harm than good. Moreover, even if we were concerned about buyer market power in this case, we need not act now, at the siting stage of the process, to prevent hypothetical exercise of future buyer market power, since we can act later. Specifically, the single largest buyer of market-based electricity in New York City, Con Edison, would have to pass muster with us in the form of a prudence review, were it to later enter into a contract with a shipper

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<sup>86</sup> Staff Brief Opposing Exceptions at 10.

such as HQ. Were Con Edison to pay above-market prices in such a contract, we have the authority to find the overpayments to be imprudent.<sup>87</sup> This regulatory power enables us to protect the market from buyer overpayments by Con Edison.

Furthermore, as the Applicants have noted, the NYISO has buyer market power mitigation measures in place, approved by FERC, and fully tested, whose sole purpose is to protect markets from buyer market power. Therefore, if the future entry of the Facility were to occur in the form of an alleged instance of buyer market power, the FERC-approved mitigation measures will be available to prevent damage to the market.<sup>88</sup>

An additional important factor that weighs in favor of a better functioning New York City competitive market is the benefit of the addition of a new supplier to New York City's existing mix. The reduced concentration of ownership of supply in New York City that occurs when a new supplier enters the market helps make for a more competitive market.

As for any impact of the Facility on incumbent generators, be they New York City generators or upstate generators, we acknowledge that the Facility will result in lower wholesale market prices, albeit for only a temporary

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<sup>87</sup> Of course, the payment of a reasonable premium above the regular market price for renewable power, or other desirable attributes, is common and could be prudent. We will carefully examine any future power purchase agreement entered into by a New York utility for power transmitted over this line, and we will not hesitate to disallow any amounts that are in any way imprudent.

<sup>88</sup> NYPA, for example, is a buying entity in New York City which we do not regulate, and therefore we cannot ourselves prevent it from exercising buyer market power. While we believe it is unlikely that the NYPA will overpay as part of a buyer market power scheme, the FERC-approved mitigation measures will be available to mitigate any such attempt to exercise buyer market power.

period. Therefore, as in any well functioning market, the entry of a new supplier will likely impact incumbent suppliers. This is an effect that is more than tolerable as a consequence of the proper workings of a competitive market.

In summary, the goal to have markets in New York that are more competitive rather than less competitive is well served by granting the Facility a certificate that is a prerequisite to entering the market. It would be folly to raise entry barriers by barring the entry of this new competitor, especially at the siting stage, out of a concern that doing so is needed to prevent the speculative potential for future buyer market power.

Public Policy

Emission Reductions

For the period 2017 to 2026, the Applicants' estimated reductions in total New York State emissions of SO<sub>2</sub>, NO<sub>x</sub>, and CO<sub>2</sub> are 1,329 tons, 5,612 tons and 35,434,166 tons, respectively.<sup>89</sup> The comparable estimates for 2018 are reductions in SO<sub>2</sub>, NO<sub>x</sub> and CO<sub>2</sub>, of 243 tons, 1,026 tons and 3,801,502 tons, respectively. Staff estimates for annual (2018) New York City air emission reductions were 40 tons of SO<sub>2</sub>, 320 tons of NO<sub>x</sub>, and 1,037,062 tons of CO<sub>2</sub>.<sup>90</sup> For the State as a whole, the Staff estimate of expected annual (2018) air pollutant emission reductions of SO<sub>2</sub>, NO<sub>x</sub>, and CO<sub>2</sub> were 751, 641, and about 1,500,000 tons per year, respectively.<sup>91</sup> By any of these measures, the Facility's expected emission reductions are a substantial environmental benefit, a benefit that is expected to be enduring.

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<sup>89</sup> Tr. 304.

<sup>90</sup> Tr. 248.

<sup>91</sup> Tr. 246-247; Hearing Exhibit 204. In the first full paragraph on page 31 of the RD, the word "million" should be inserted after the number "1.5" and before the word "tons."

Fuel Diversity

The Facility will increase fuel diversity, consistent with Commission and State policies encouraging diversification of the generation resource mix of energy sold in the State and increased reliance on renewable energy sources. The Project is also consistent with our policies of reducing dependence on natural gas as a fuel for electric generation.<sup>92</sup> These fuel diversity benefits are unique, having no recent precedent in terms of the source of supply -- mostly hydroelectric -- and the extent to which such supplies can enhance the diversity of generation sources and reduce dependence on natural gas as a fuel for electric generation.

Policies of the State, the PSC, and NYC

As noted above, the Judges found need for the Project based on its demonstrated ability to achieve public policy objectives expressed the 2009 State Energy Plan and New York City's *PlaNYC*, among other State policy documents,<sup>93</sup> and we adopt these uncontested findings. The 2009 State Energy Plan expresses support for the development of investments in energy infrastructure, especially infrastructure investments that support the State's transition to a clean energy economy, reduce greenhouse gas emissions, and "allow the State to fully exploit the potential benefits of ... additional Canadian imports."<sup>94</sup> Various Commission policies encourage diversifying the generation resource mix of energy sold in New York State as a means to improve energy security, while ensuring protection of system reliability and promoting and encouraging the development

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<sup>92</sup> Tr. 307-308.

<sup>93</sup> RD at 30-34, 64-65, and 72-73.

<sup>94</sup> 2009 State Energy Plan, Executive Summary at xv.

of competitive markets. We find that this Project advances these goals, thus further demonstrating need for this Facility.

Conclusion

The Project satisfies a need by providing additional transmission capacity into the New York City load pocket and an additional source of supply - hydroelectric power -- that is both renewable and relatively stable in price, enhancing the fuel diversity in the City. Moreover, by allowing a new entrant into the New York City market, approval of the Project would advance our policy favoring competition. Finally, the Project advances State policies by enabling access to a source of clean energy supply.

THE NATURE OF THE PROBABLE ENVIRONMENTAL IMPACT AND  
MINIMIZATION OF ADVERSE ENVIRONMENTAL IMPACT

The RD found that the facility route is preferred because it would avoid or minimize the disturbance of natural habitat, and would use some existing and previously disturbed ROW (e.g., railroad ROW). The Judges recommend finding that the nature of probable environmental impacts have been identified, and that the facility, located and configured as conditioned by the JP's terms and conditions, and related stipulations, represents the minimum adverse environmental impact considering the state of available technology and the nature and economics of the various alternatives and other pertinent considerations.

In its Brief on Exceptions, Entergy reiterates the arguments made in its initial post-hearing brief, that Applicants have not adequately characterized and minimized potential environmental impacts, including potential impacts on shortnose and Atlantic sturgeon, species listed under the



federal Endangered Species Act (federal ESA)<sup>95</sup> and the New York Environmental Conservation Law (state ESA).<sup>96</sup> Entergy argues that the RD's conclusions regarding nature and minimization of impacts are in error. Entergy also objects to the RD's conclusions regarding the JP's Hudson River Navigation Channel Cable Burial Provisions.

The ALJs concluded that the USACE has not made a determination to grant, modify, or deny Applicants' federal application for a USACE permit, including a determination on minimization regarding this facility. Certificate Condition 11 requires that Applicants obtain the necessary USACE permit. The Judges recommended that the Commission should allow USACE to complete its permit review and render its determination. The Judges found that that the JP's Certificate conditions regarding cable placement and burial depth are consistent with Commission practice in previous cases, and will minimize potential adverse impacts related to cable burial depth and the location of cables in federal navigation channels.

#### Sturgeon Habitat

Entergy raises four issues regarding potential impacts on ESA sturgeon: potential loss of habitat due to proposed installation of concrete mats or rip-rap (concrete mats) in limited areas of the Hudson River subaquatic route, lack of characterization of impacts outside sensitive habitat areas, improper deferral of minimization of impacts to the EM&CP phase of the project, and nature and potential magnetic field impacts.

#### Use of Concrete Mats

In Hudson River areas where it is necessary to protect utility crossings or where the river bottom is solid rock,

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<sup>95</sup> 16 U.S.C. §1531.

<sup>96</sup> Environmental Conservation Law (ECL) §11-0535.

preventing burial of the cable, Applicants propose to cover the cables with concrete mats. Entergy contends that concrete mats will be installed for approximately 6.41 miles of river bottom, and that the record does not address the potential loss of those areas as sturgeon habitat.

Applicants respond that Entergy has overstated the use and effect of concrete matting, relying upon information that was developed using the Applicants' original routing<sup>97</sup> and is no longer accurate. Applicants contend that the revised routing described in the JP proposes the use of concrete matting for only 4.45 miles, approximately 25% less than Entergy contends.

In addition, it is uncontroverted that approximately 17% of this concrete matting would be installed over existing hard substrate. Applicants assert that Entergy offers no explanation as to how use of concrete matting over hard substrate, or any other proposed use of the concrete mat surface, would function differently from the existing substrate in terms of habitat. To the contrary, Applicants cite evidence in the record that, "[i]n areas of hard bottom, the mats will create similar habitat, and in soft bottom areas the mats will, in essence, create small artificial patch reefs. The surface of the mats may develop an epibenthic community over time as well as provide structure that is important for some benthic species and fish."<sup>98</sup>

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<sup>97</sup> Hearing Exhibit 2 at 4 (Location of Facilities (Exhibit 2 to the Application)) (describing the original routing); Hearing Exhibit 92 at 3 (Letter to New York State Department of State dated February 18, 2011).

<sup>98</sup> See Hearing Exhibit 121 at 193 ("The mats will have an insignificant effect on near bottom hydrodynamics, which may be similar to the conditions found in rocky bottom areas.").

Further, Applicants state that the February 18, 2011, letter from Applicants' consultant to DOS states that the final design will "optimize the placement of protection to minimize the area of the bottom covered by concrete mattresses or other protective devices" so that "[t]he actual area of additional protection is likely to be substantially less than the total width of the cable/pipeline area as depicted on the NOAA charts."<sup>99</sup>

Lastly, Applicants contend that Entergy's arguments ignore the beneficial effects of the \$117.15 million trust for the enhancement of water quality in the Hudson River and Lake Champlain. The Hudson River and Lake Champlain Habitat Enhancement, Restoration, and Research/Habitat Improvement Project Trust (the "Trust") resulted from collaborative discussions among the Signatory Parties and provides exclusively for in-water mitigation studies and projects that have a direct nexus to the construction and operation of the Facility. These studies and projects will minimize, mitigate, study or compensate for the short-term adverse aquatic impacts and potential long-term aquatic impacts and risks to these water bodies from construction and operation of the Facility.<sup>100</sup>

Applicants conclude that Entergy has failed to demonstrate any factual basis for its argument that the proposed limited use of concrete mats will have a negative effect upon state ESA sturgeon habitat.

#### Discussion

With respect to the Project's potential impacts to state ESA sturgeon, we observe that the relevant portions of the JP ensure benthic habitat is not lost and that environmental

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<sup>99</sup> Hearing Exhibit 92 at 3.

<sup>100</sup> JP ¶144.

impacts are minimized. The record includes an extensive analysis of river bottom bathymetry, fisheries data, acoustic fish tracking, annual Hudson River surveys of fish distribution, adult and juvenile sturgeon monitoring, submerged aquatic vegetation maps, tidal wetland maps, and existing Significant Habitats.<sup>101</sup>

The record shows that Entergy has overstated the extent of concrete matting by at least 25%. Moreover, Entergy has failed to present any evidence or legal authority to support its claim that the Applicants' installation of concrete mats will result in the adverse modification of sturgeon habitat amounting to a state ESA "take."

A "take" under the state ESA includes the killing of an endangered species and lesser acts including "disturbing, harrying or worrying" of the species.<sup>102</sup> A "take" also includes an interference with or impairment of an "essential behavior" of an endangered species.<sup>103</sup> Essential behavior means any of the behaviors exhibited by a species listed under the state ESA as endangered or threatened that are a part of its normal or traditional life cycle and that are essential to its survival and perpetuation. Essential behavior includes behaviors associated with breeding, hibernation, reproduction, feeding, sheltering, migration and overwintering.<sup>104</sup>

The Facility has been routed to avoid, to the maximum extent practicable, environmentally sensitive DOS Significant

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<sup>101</sup> Hearing Exhibit 102 (Description of Protected Areas within Hudson River); JP, Appendix C, Final Revised Proposed Certificate Conditions (January 18, 2013), ¶156(b)(1).

<sup>102</sup> See, 6 NYCRR 182.2(x).

<sup>103</sup> 6 NYCRR 182.2(f).

<sup>104</sup> Id.

Habitats and DEC Exclusion Areas. The Significant Habitats and Exclusion Areas were designated specifically because they contain sensitive habitat, including sensitive state ESA sturgeon habitat, relative to other areas of the Hudson River. By avoiding areas recognized as sensitive aquatic habitat areas, including sensitive habitat areas for sturgeon, Applicants will avoid potential adverse impacts to sturgeon.

The Environmental Impact Assessment (EIA) provides Applicant's comprehensive assessment of the nature of potential environmental impacts of the proposed facility and proposals for minimization of potential impacts. The EIA addressed the habitat impacts of use of concrete mats specifically, concluding that:

The mats will alter local hydraulic conditions such that some sediment deposition or scouring may occur around the irregularity in the bottom formed by the mats. However, the overall change in bottom topography will be insignificant because the mats will extend only a short height above the bottom and functional benthic habitat will develop. The volume of the cable is extremely small relative to the sediment layer and bottom hydrography of the water bodies involved, and the effect of the cable on bathymetry will be insignificant relative to natural levels of fluctuation due to currents, storms, navigational traffic, and other pre-existing factors.<sup>105</sup>

The EIA further states that "[a]fter the cable is energized, the benthic community is expected to be similar to that from adjacent benthic [areas]."<sup>106</sup> Therefore, for the small

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<sup>105</sup> Hearing Exhibit 121, p. 168. The benthic zone is the ecological region at the riverbed or lakebed; bathymetry describes the contours of a riverbed or lakebed.

<sup>106</sup> Id., p. 206.

sections of the riverbed where concrete mats will be installed, the benthic community is anticipated to redevelop on or around the concrete mats, so that the benthic zone will include the concrete matted areas. Entergy provided no evidence to the contrary.

In the RD, the Judges correctly identified the nature of the potential habitat impact and found that the Facility conforms with the substantive requirements of the state ESA. The Judges reasonably concluded, based upon the record, that the proposed limited installation of concrete mats would not degrade state ESA sturgeon habitat or harm sturgeon. The record supports the RD finding, that the Project satisfies the applicable standards of the PSL concerning nature and minimization of potential habitat impacts of the limited use of concrete mats. In considering the RD and EIA sections discussed above, we reject Entergy's contention that the RD does not consider potential habitat impacts attributable to the permanent installation of concrete mats that could displace sturgeon habitat after the construction phase is completed.

DEC Exclusion Areas and DOS Coastal Zone Program  
Significant Coastal Fish and Wildlife Habitats

The RD concludes that the JP provides seasonal construction windows to prohibit construction during times when the Exclusion Areas and Significant Habitats are likely to be occupied by sensitive species. Entergy takes exception to this conclusion as facially insufficient because it addresses only the period of construction.

In addition, Entergy asserts that any final Facility design that minimizes impacts only to particular defined areas -- Exclusion Areas and Significant Habitats -- cannot ensure that impacts to sturgeon habitat outside those defined areas will not adversely affect sturgeon.

Applicants respond that Entergy has not identified any specific potential adverse impact to state ESA sturgeon habitat. Instead, Applicants contend, Entergy argues that omissions exist in the record regarding the nature of potential impacts to state ESA sturgeon.

Applicants and Staff respond, as discussed above, that the JP reflects lengthy, detailed consultation with DEC and other environmental parties concerning nature and minimization of environmental impacts. They state that the record shows that Applicants are largely avoiding routing the Facility within sensitive habitat areas identified by the Signatory Parties, the DEC Exclusion Areas and DOS Significant Habitats. In addition, the JP provides for designated seasonal construction windows for construction within Exclusion Areas and Significant Habitats, to the limited extent that these areas cannot be avoided. Further, in the EM&CP phase, the JP provides that Applicants will develop a final Facility design that minimizes potential impacts.

#### Discussion

The record shows that the installation of the cable is designed to avoid or minimize environmental impacts. As explained in the previous discussion section, for the limited areas of the river bed where concrete mats will be installed, the benthic community is anticipated to redevelop. Therefore, we conclude that permanent habitat loss is not anticipated to occur and that any permanent habitat loss that may occur due to the limited use of concrete mats on the Hudson River segment of the facility has been minimized.

In its Conditional Concurrence with Consistency Certification, the DOS noted: "The most certain way to minimize the impact on benthic habitats is by siting the cable route to

avoid particularly sensitive habitats.”<sup>107</sup> Applicants, in collaboration with the JP’s Signatory Parties, including the DEC, DOS, DPS Staff, Riverkeeper, Scenic Hudson and Trout Unlimited, have developed a Facility route based upon existing habitat information, including state ESA habitat, that avoids to the maximum extent possible, areas recognized as sensitive habitat for aquatic species.<sup>108</sup>

The DOS Significant Habitats and DEC Exclusion Areas were designated specifically because they contain sensitive habitat relative to other areas of the river, including sensitive state ESA sturgeon habitat. The record shows that Applicants’ negotiations with the Signatory Parties resulted in the designation of fifteen Exclusion Areas, to be avoided to the maximum extent possible. DEC Staff developed the Exclusion Areas based on an extensive analysis of river bottom bathymetry, fisheries data, acoustic fish tracking, annual Hudson River surveys of fish distribution, adult and juvenile sturgeon monitoring, submerged aquatic vegetation maps, tidal wetland maps, and existing Significant Habitats.<sup>109</sup>

The Exclusion Areas go above and beyond identifying legally protected habitats to include other areas considered to be high quality habitat, including state ESA sturgeon habitat. The record shows that DEC identified the state ESA as its authority for development of the Exclusion Areas and stated that

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<sup>107</sup> Letter from the New York State Department of State to Applicants regarding Conditional Concurrence with Consistency Certification (June 8, 2011) at 6, available at [http://docs.dos.ny.gov/coastal/cd/F-2010-1162%20CondCCR\\_web.pdf](http://docs.dos.ny.gov/coastal/cd/F-2010-1162%20CondCCR_web.pdf).

<sup>108</sup> See, JP Paragraphs 51 and 54.

<sup>109</sup> Hearing Exhibit 102 (Description of Protected Areas within Hudson River); JP, Appendix C, Final Revised Proposed Certificate Conditions (January 18, 2013), ¶156(b)(1).



"[r]outing of the Project outside of the Exclusion Areas, to the maximum extent possible, will help avoid a taking of endangered or threatened species."<sup>110</sup>

The Facility will also avoid Significant Habitats to the maximum extent possible. The Significant Habitats are designated by the DOS under its Coastal Zone program because the designated habitat areas are essential to the survival of a large portion of a particular fish or wildlife population, support populations of rare and endangered species, are found in low frequency, support fish and wildlife that have significant commercial or recreational value, or would be difficult or impossible to replace.<sup>111</sup>

In addition, to the extent that the Facility is located within a Significant Habitat or Exclusion Area, construction windows will be used to avoid times when these areas are more likely to contain sensitive species, including state ESA sturgeon.<sup>112</sup> Furthermore, in the EM&CP project phase, Applicants will develop a final Facility design for five nearby Significant Habitats to minimize adverse environmental impacts to those areas.<sup>113</sup>

Next, Entergy argues that segments of state ESA sturgeon habitat outside Exclusion Areas and Significant Habitats have gone unstudied and unprotected. However, this argument ignores the substantial record in this proceeding

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<sup>110</sup> Id.

<sup>111</sup> Id.

<sup>112</sup> Revised, Final JP Appendix C, ¶156(b)(1); Hearing Exhibit 121 at 250-52 (Revised Environmental Impacts Assessment).

<sup>113</sup> Applicants state that all of these efforts were premised on the existing information from the other agencies primarily responsible for protecting these endangered species.

evaluating potential Hudson River impacts.<sup>114</sup> We conclude that the JP's provisions regarding the avoidance of Exclusion Areas and Significant Habitats were specifically designed to minimize potential adverse impacts and avoid the possibility of a state ESA sturgeon "take". Therefore, we reject Entergy's contention that additional assessment of potential impacts to state ESA sturgeon outside the Exclusion Areas and Significant Habitats is required.

In sum, by largely avoiding Significant Habitats and Exclusion Areas, including the river areas where state ESA sturgeon are believed more likely to occur, Applicants will avoid or minimize any potential impacts to sturgeon habitat, in accordance with the PSL §126(1) and the state ESA.

Minimizing Impacts in EM&CP Phase

As noted in the RD, during the EM&CP phase, the JP "provides that Applicants must develop a final Facility design that minimizes impacts to the five nearby DOS Significant Coastal Fish and Wildlife Habitats (SCFWH)."<sup>115</sup> Entergy argues that this provision improperly relegates the obligation to address impacts to state ESA sturgeon to a future time, and fails to establish that the state ESA is satisfied.

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<sup>114</sup> For example, Hearing Exhibit 121, EIA, at 149, §6, Physical and Chemical Characteristics of Major Aquatic Systems, assesses Hudson River water quality; water quality monitoring; bathymetry; sediment physical and chemical characteristics; marine disposal areas, dumping grounds, disposal sites, and spoil areas; use of concrete mat and rip-rap protection; and avoidance or minimization of adverse impacts. EIA §7, Fisheries, assesses Hudson River existing shellfish and benthic resources; existing finfish; existing essential fish habitat. EIA §9 addresses Hudson River existing conditions of threatened and endangered species; and avoidance or minimization of potential impact to these Hudson River resources.

<sup>115</sup> RD at 94.

Discussion

As noted above, we find that the Project has avoided or minimized potential environmental impacts in satisfaction of PSL §126, without reference to any further avoidance or minimization that may be achieved from the EM&CP Plan. In acknowledging that the Facility design would be finalized during the EM&CP project phase, when all final construction details are determined, the Judges merely recognized that there would be a further opportunity, after issuance of a Certificate, for Applicants to ensure that any potential risk to state ESA sturgeon habitat, or other potential adverse environmental impacts, are minimized to the greatest extent practicable. In sum, Entergy's argument regarding minimization during the EM&CP phase is inapposite.

Magnetic Field and Electromagnetic Field Impacts

The RD concludes that the magnetic field generated by the operation of the facility's HVDC cables will be localized and insignificant.<sup>116</sup> Entergy asserts that the HVDC cables may emit a magnetic field that may affect state ESA sturgeon.

In rejecting Entergy's arguments regarding potential magnetic field impacts on State ESA sturgeon, the Judges noted that modern DC cables are designed with sheathing to substantially reduce or eliminate direct electric field. It is

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<sup>116</sup> In the RD, the Judges used the term electromagnetic field (EMF) generally, to apply to potential EMF and magnetic field impacts. On exceptions, Applicants clarify the distinction between EMF and magnetic field. We accept Applicants' clarification distinguishing the EMF and magnetic fields and agree that these terms were somewhat confused in the RD.

undisputed that magnetic field impacts diminish exponentially with distance from the cables.

Entergy asserts that the record demonstrates that the energized cables are expected to generate a magnetic field of 526.5 milligauss (mG). Entergy further asserts that Applicants, in the Environmental Impact Assessment (EIA), filed with their Application concede that the energized cables would create a deviation from the background magnetic field of up to 26.2 mG at 10 feet from the centerline at one foot above the riverbed. Consequently, Entergy concludes that the design and installation of the cables will not eliminate the magnetic field emanating from the Facility, nor does burial of the cables cancel out the magnetic field. Entergy contends that some fish species can detect and use the background magnetic field for navigation.

Entergy also contends that Applicants have not characterized the nature of magnetic field impacts for areas where concrete mats would be installed. For these areas, Entergy states that potential navigation impacts to ESA sturgeon may result in a "take" of ESA sturgeon. However, Entergy does not argue that the potential magnetic field will result in a violation of the state ESA, but only that potential magnetic field impacts could possibly adversely affect navigation of state ESA sturgeon, to an extent resulting in such a violation. Entergy asserts that, absent analysis comparing the magnitude and extent of the magnetic field generated by the cables to the sensory threshold and behavioral responses of state ESA sturgeon, it cannot be concluded that the magnetic field generated by the Facility will minimize impacts on state ESA sturgeon.

Applicants respond that the record includes uncontroverted expert testimony that "research studies on a variety of fish and other marine species have not reported

adverse effects of exposure to magnetic fields."<sup>117</sup> Regarding potential magnetic field impact on migratory behavior, the research shows that no single environmental stimulus such as current flow, light, smell, taste, magnetic field, temperature, or salinity dominates migratory behavior; instead, marine organisms have the means to coordinate and make use of multiple cues and resolve discrepancies.<sup>118</sup> In addition, Applicants note that the expert made these statements regarding the proposed Facility with the knowledge that certain limited portions of the cables would be installed under protective concrete mats.

Further, regarding the potential magnetic field impact on eggs and larvae, the data suggest "that much greater magnetic fields are required than the proposed cable will produce, in order to create deleterious effects on eggs and larvae" and that "as a percentage of the overall spawning numbers, the area of potential effect is small and extremely weak."<sup>119</sup>

Applicants also state that the Facility's cables will be buried in the ground or installed in a trench at the bottom of the waterways, and when installed in this manner, electric field levels are reduced to inconsequential levels because of the earth cover over the cables. Applicants state that the record shows that the Facility will not actually produce an EMF, but only a magnetic field.

#### Discussion

Entergy's principal argument, that state ESA sturgeon will respond to the magnetic field that the Facility is anticipated to induce, is contradicted and rebutted by expert record evidence.

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<sup>117</sup> Hearing Exhibit 64 at 57.

<sup>118</sup> Id. at 57.

<sup>119</sup> Id. at 59.

The magnetic field induced by operation of the Facility would be *de minimis* or non-existent throughout most of the Hudson River. The cables will be buried in a single trench, vertically on top of one another. This configuration also should result in the EMF and magnetic field from each cable essentially cancelling out the other, thereby further minimizing magnetic field impacts. Very little change in total geomagnetic field would be expected, if the cables were to be buried at a depth of six feet.

Moreover, the record shows that cables will be buried to a depth of at least 15 feet, for portions of the cable located in the Hudson River's federal navigation channel, and at least six feet below the sediment floor, for portions of the cable located in the Hudson River outside the federal navigation channel. The zone of influence in which the magnetic field may be detectable above background levels will be focused directly above the facility centerline. Any magnetic field emanations will be reduced further, in proportion to the cable burial depth.

Indeed, migrating fish could potentially travel the full length of the Hudson without encountering the zone of influence. Moreover, because the magnetic field weakens rapidly with increasing distance from its source, the induced magnetic field would be strongest only within a small portion of the zone of influence. The record shows that burial of the cable as proposed would yield the least change in the background geomagnetic field.<sup>120</sup>

Furthermore, the analyses underlying the EIA considered the impact of the magnetic field on the migration, spawning, feeding, and development of aquatic species, including

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<sup>120</sup> Hearing Exhibit 92, p. 8.

limited areas covering the cables with concrete mats.<sup>121</sup> The record supports the conclusion that no single environmental stimulus, such as magnetic field, dominates migratory behavior. To the extent that the magnetic field may affect navigation abilities of State ESA sturgeon, any such impact would be minimal, including avoidance of the waters nearest the cables. State ESA sturgeon and other marine organisms have the means to coordinate and make use of multiple cues and resolve discrepancies. In all instances, both expert testimony and the EIA conclude that the Facility's magnetic field would have no significant impact.<sup>122</sup> Nonetheless, as an additional protective measure, the JP provides that Applicants will be obligated to conduct a study of sturgeon movement patterns before and after the Facility is energized.<sup>123</sup>

We find no basis for Entergy's argument that low level magnetic field created by the Facility cables, including in areas where concrete mats will be installed, will adversely impact essential behaviors of ESA sturgeon. We find that the record supports a finding that the magnetic field induced by the Facility will have minimal impact, if any, on migratory species, including state ESA sturgeon, in the Hudson River. The Facility represents the minimum adverse environmental impact

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<sup>121</sup> Hearing Exhibit 24 at 10-16, 36-37 (Appendix B: Requests for Additional Information (Appendix B to the Supplement)), Hearing Exhibit 64 (NYSDEC-1 through NYSDEC-6), Hearing Exhibit 87 (Applicants' Letter to New York State Department of State regarding Updated Alternatives Analysis (January 18, 2011)), Hearing Exhibit 92, Hearing Exhibit 100 (Applicants' Letter to New York State Department of State, dated March 18, 2011).

<sup>122</sup> Hearing Exhibit 121 at 203 - 207.

<sup>123</sup> Revised, Final JP Appendix C, ¶163, and Attachment 4 (Atlantic Sturgeon Pre-Installation and Post-Energizing Hydrophone Scope of Study).

regarding magnetic field and EMF impacts, and further, the Facility conforms with the state ESA.

Hudson River Navigation Channel

The USACE has jurisdiction over dredge and fill activities in the waters of the United States and construction activities in federally-maintained navigation channels, including the federally-maintained navigation channel in the Hudson River.

Entergy cites a July 5, 2011 USACE letter to Applicants that states:

The Corps of Engineers does not permit permanent structures within the length of the right of way, including side slopes, of a Federal navigation channel (perpendicular crossings are permitted) ... Laying the cables on lake/river bed in limited areas with protective coverings would not be acceptable ...

As the Corps of Engineers does not permit permanent structures within the length of the right of way of a Federal navigation channel (crossings are permitted), the cables must be moved outside the NLC Federal navigation channel limits.<sup>124</sup>

Entergy interprets the USACE letter to be an absolute prohibition on locating permanent structures within the length of the right of way of a Federal navigation channel. Further, Entergy asserts that the letter precludes making a finding that the Facility represents the minimum adverse environmental impact.

However, as described in the RD, Applicants and Staff assert that USACE has not yet established parameters for this project or made a determination upon Applicants' USACE permit application. They contend that USACE establishes individual

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<sup>124</sup> Hearing Exhibit 215.



permit conditions regarding the longitudinal installation or burial depth of submarine cables within federally maintained navigation channels on a case-by-case basis. Applicants and Staff cite the Bayonne Energy Center project as an example where the USACE issued a permit authorizing Bayonne to install its cables across and along several federal navigation channels.

Applicants, Staff, Scenic Hudson, and Riverkeeper emphasize that pursuant to revised Certificate Condition 95(a)(i), Applicants will bury the cable proposed in this proceeding at a depth of at least 15 feet below the authorized depth of the federally maintained navigation channel. Lastly, the Signatory Parties contend, and the Judges recommend, that we should not substitute our judgment for that of the USACE.

Discussion

The USACE's review of Applicant's project is ongoing, Entergy relies upon Hearing Exhibit 215 as if it were USACE's final determination on the USACE permit, and argues that we should not issue a Certificate which includes conditions conflicts with USACE policy, as set forth in Hearing Exhibit 215.

It is simply premature to guess the outcome of USACE's review. We decline to adopt Entergy's view that the USACE's July 5, 2011 letter is dispositive, particularly in light of the USACE permitting of Bayonne. Proposed Certificate Condition 9 provides Applicants cannot commence site preparation or construction until all the necessary permits and consents are received. In the event USACE imposes conditions conflicting with the Article VII Certificate, such conflicting conditions must be reconciled either with USACE or this Commission.<sup>125</sup>

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<sup>125</sup> In the event USACE denies Applicants' federal application, the project could not go forward.

UNDERGROUNDING

The ALJs found ample support for the proposal that the transmission line should be underground (or underwater) given that:

Undergrounding provides beneficial visual and land use impacts that would not be achieved if the transmission lines were above ground. In addition, undergrounding is the proposed method, supported by the signatories.<sup>126</sup>

The Judges' finding on this uncontested issue is well-supported on the record and reasonable, and we adopt it.

LONG-RANGE PLAN

The ALJs stated that the main challenges to our ability to find that the Facility "conforms to a long-range plan for expansion of the electric power grid of the electric systems serving this state and interconnected utility systems, which will serve the interests of electric system economy and reliability" are claims by Entergy, IBEW and Central Hudson that the Facility would in effect be an "extension cord" with no NYS "on-ramps" providing access to existing in-State generation sources and would not address existing transmission constraints, especially in western and upstate portions of New York State.

The ALJs rejected such arguments for two reasons. First, they found that the challengers failed to point to any policy, rule, law or precedent that prohibits approval of a direct current transmission line. Second, they found that the 2009 State Energy Plan encourages facilities that, like this one, would provide infrastructure investments that support the State's transition to a clean energy economy, reduce greenhouse gas emissions, and allow the State to fully exploit the

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<sup>126</sup> RD at 106.

potential benefits of additional Canadian imports. The ALJs further observed that the Facility would advance NYC's *PlaNYC* long-range goal of increasing NYC's clean energy supply by increasing the amount of clean energy that can be imported into the City.

The ALJs credited Staff's argument that the Facility would expand the State's electrical grid by providing an additional tie to Québec and to Québec's hydroelectric power, thus indirectly help relieve congestion on the existing HVAC electric transmission system.<sup>127</sup>

IPPNY claims that the Commission cannot find that the Project "conforms to a long-range plan for expansion of the electric power grid ... which will serve the interests of the electric system economy and reliability" because the Project is uneconomic.<sup>128</sup> The ALJs rejected IPPNY's claim because the record did not demonstrate the Project was uneconomic.

Central Hudson, IBEW, the Business Council and IPPNY challenge the RD's conclusion that we have sufficient record bases to find that the Project conforms to a long-range plan for the State's electric grid. Central Hudson claims that the RD applied "policies developed in the context of short electric lines near New York City to the very different case of a long 'extension cord' electric line running virtually the length of the State from North to South." Central Hudson, IBEW and the Business Council assert that the need for grid improvements "to

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<sup>127</sup> RD at 106-108. The ALJs also noted that a System Reliability Impact Study for the interconnection of the HVDC Transmission System at NYPA's 345 kV bus located at Astoria has been completed by the NYISO, showing that the HVDC Transmission System can be connected to the New York State Bulk Power System without adversely affecting reliability.

<sup>128</sup> RD at 106-108. IPPNY renews this argument on exceptions.

the deliverability of bottled renewable and other upstate generation was simply not relevant to those earlier, near-NYC lines, but is very germane" in this proceeding. Opponents argue that the provision of some electric system benefits is insufficient and does no more than meet the "most narrow" of definitions of "expanding" the grid. Central Hudson asserts that we should establish, as a matter of policy in applying Article VII, that transmission corridor developers, including merchants, must propose a project that improves known grid constraints and problems, rather than a point to point delivery project.

IBEW also argues that approval of the Facility would provide foreign electric energy to a significant but relatively small congested area of the State with high demand and allow for the use of New York State land and waterways with no contribution to the economic well-being of the vast majority of communities and the power needs of constituents in Upstate and Western New York. IBEW asserts that, given the economic condition of northern and western New York, these vast areas with substantial populations should have been accorded greater consideration.<sup>129</sup>

Applicants argue that adoption of Central Hudson's argument would prevent the development of any future merchant transmission line. According to Applicants, merchant transmission lines can only be successful when the developer is able to exclude nonpaying customers, as is possible on HVDC lines and on radial generator leads, but not on the networked HVAC lines that would be required to meet Central Hudson's proposal. They add that Central Hudson and IBEW failed to identify any concrete transmission alternative to the Facility

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<sup>129</sup> IBEW Brief on Exceptions at 2.

that would be frustrated if the Facility is approved. Applicants therefore conclude that, in the absence of any such competent evidence, Central Hudson's and IBEW's speculative concerns about the impacts the Facility might have on unidentified future projects at some unknown future date provide no basis for overturning the ALJs' finding that the Facility is consistent with long-range plans for the expansion of New York's electric power grid.

Staff argues that the Facility is consistent with long-range plans identified in the most recent State Energy Plan, which establishes as a policy objective, supporting the increased use of renewable energy and energy systems that enable the State to significantly reduce greenhouse gas emissions. Staff observes that the State Energy Plan recognizes that an increase in renewable energy will require additional transmission in-State.

Staff contends that the Facility provides the State with greater access to Québec's hydroelectric power without consuming capacity on New York's existing HVAC transmission system. Moreover, by increasing supply downstream of the congested interfaces, the Facility would reduce congestion on New York's HVAC transmission interfaces. Staff adds that the Facility is also consistent with long-range plans established in *PlaNYC*, which recognizes that providing New York City residents with increased access to renewable energy supplies will simultaneously reduce electricity prices, local air pollution, and greenhouse gas emissions in the City of New York.

Staff states that the ability of the Facility to advance these important public policy objectives of the State and New York City should be explicitly recognized by the

Commission in issuing a certificate, and provide the rationale for rejecting Central Hudson's arguments.<sup>130</sup>

Discussion

The exceptions on this issue merely repeat allegations that were raised and rejected by the ALJs below. As the RD states, the Project is consistent with express provisions of the 2009 State Energy Plan and New York City's *PlaNYC*, among other documents setting forth State planning goals. We therefore adopt the ALJs' recommendation, consistent with the arguments of Staff and Applicants in opposing exceptions, to find that this Facility "conforms to a long-range plan for expansion of the electric power grid of the electric systems serving this state and interconnected utility systems, which will serve the interests of electric system economy and reliability." We rely, in particular, on the policy and planning objectives of the 2009 State Energy Plan that support projects, such as this Facility, which will enable increased State reliance on renewable energy and which will enhance transmission capacity into the New York City load pocket. In making this finding, however, we are not closing our eyes to the need to strengthen the State's AC transmission backbone. We have already initiated a major proceeding to do so.<sup>131</sup>

LOCAL LAWS AND REGULATIONS

The ALJs found *prima facie* justifications for the request made by Applicants and reflected in the JP that we waive the substantive requirements of the local laws and regulations listed in Hearing Exhibit 115. The Judges' finding on this uncontested issue is supported on the record and reasonable, and

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<sup>130</sup> Staff at 16-17.

<sup>131</sup> Case 12-T-0502.

we adopt it. We further find that the Facility conforms to all applicable State and all other applicable local laws not set forth in Hearing Exhibit 115. We further find that the Project conforms to all applicable State laws and all other local laws not set forth on Hearing Exhibit 115.

PUBLIC INTEREST, CONVENIENCE AND NECESSITY

Emission Reductions and Fuel Diversity

The Facility's expected emission reduction and fuel diversity benefits and its ability to provide additional transmission capacity into New York City - features of the Facility that are uncontested - more than amply support our finding that the Facility will serve the public interest.<sup>132</sup>

Adequacy of Ratepayer Protection (Condition 15)

The ALJs noted that Applicants had proposed to build and operate the HVDC portion of the Facility without relying on cost-of-service rates<sup>133</sup> to recover the majority of the Project's costs.<sup>134</sup> The ALJs declined to focus on whether the Project would be merchant,<sup>135</sup> and instead focused on determining if there were sufficient bases to conclude that the majority of the Project's costs would not be funded by captive ratepayers. They found, *inter alia*, that proposed Certificate Condition 15

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<sup>132</sup> RD at 30-34, 64-65, and 72-73.

<sup>133</sup> RD at 69. The ALJs observed that, here, "cost-of-service rates" include any charges established by NYPA or a utility operating under cost-based regulation, including without limitation base rates, surcharges, adjustments, or any other recovery mechanism.

<sup>134</sup> RD at 10. Thus, they recognized that Applicants had reserved the right to recover the costs associated with the use of the Astoria Rainey cable to deliver energy and capacity not transmitted over the HVDC transmission system not as a merchant but rather pursuant to cost-based rates set by the FERC. RD at 10, footnote 15, citing Tr. 65, 76.

<sup>135</sup> RD at 67-72.

assigns the majority of the risk associated with the financing and recovery of Project costs to private investors and that a "demonstration that at least 75% of the [P]roject's output is under contract prior to commencing construction is consistent with Commission precedent in the HTP case (where the fact that approximately 76% of HTP's anticipated 660 MW output was already committed was sufficient for the Commission to find that it was merchant) and the Bayonne case (where the fact that 50% of its output was subject to identified and firm commitments was a sufficient basis for the Commission to find that it was a merchant project)."<sup>136</sup>

IPPNY and Entergy contend that the RD applies a far too narrow definition of a merchant project, asserting that such projects cannot rely on government or ratepayer dollars, directly (which they concede is not the issue here) or indirectly. They argue that indirect subsidization by the government will, of necessity, occur because the Project is uneconomic. Based on their shared view of the Project's economics, they renew claims that proposed Condition 15(b) must also prohibit any indirect subsidy, including, for example, prohibiting one or more of the Project's shippers from entering into an agreement with a New York State agency or authority to provide electricity to New York City at above-market prices. Indirect subsidies are the reason Entergy says it recommended additional conditions.<sup>137</sup>

Entergy and IPPNY also argue that we cannot rely on the 75% pre-subscription requirement because it does not prevent

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<sup>136</sup> RD at 71, citing HTP Order at 4 and Bayonne Order at 3.

<sup>137</sup> In the interest of brevity the proposed conditions are not recited here; see Entergy's Brief on Exceptions at 14-15 and/or the RD at 64 to review the additional conditions proposed by Entergy.



indirect subsidies and thus will not protect New York consumers against the adverse consequences that they opine are likely to be caused by indirect subsidies. IPPNY adds that, if existing resources are not able to meaningfully participate in the procurement process, perhaps due to its "discriminatory nature," the resulting contract will yield above-market prices. Entergy says that there will be significant adverse impacts if consumers are forced to fund the Project's costs, and therefore we cannot make the requisite public interest finding unless we expressly proscribe indirect subsidization. Entergy also asserts that the ALJs give "unreasonably short shrift" to whether a future change in business model by Applicants or future contractual arrangements by Applicants might result in costs of the Facility, in whole or in part, being recovered in cost-based rates.<sup>138</sup> Finally, Entergy asserts that the Project is "unquestionably non-merchant as to the Astoria-Rainey Cable" and, on that basis alone, is distinguishable from HTP and Bayonne and unworthy of review as a merchant.

IPPNY and Entergy concede that Condition 15(b) prohibits a direct subsidy."<sup>139</sup> For this reason, and because the commitments made by Applicants in Certificate Condition 15(b) go far beyond the commitments made by other merchant transmission

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<sup>138</sup> Entergy Brief on Exceptions at 8-9. Entergy also contends the RD applies the broader standard of need and benefit as established by the Commission in the Bayonne proceeding but did not consider (1) whether Applicants have carried their burden of proving that this project would actually be merchant or (2) whether the Facility's costs will be recovered exclusively through rates set by the competitive market. Because these contentions are belied by the RD's discussion at 67-72, we reject these claims.

<sup>139</sup> Briefs Opposing Exceptions by Applicants (at 32) and NYC (at 17), citing Briefs on Exceptions by IPPNY (at 28) and Entergy (at 14).

facilities approved by the Commission, Applicants argue that the ALJs correctly concluded that Condition 15(b) adequately protects captive ratepayers from being forced to bear the costs of the Facility in cost-based rates.

NYC asserts that IPPNY and Entergy presented no rationale to explain why a State agency or authority would elect to enter into a 25-year contract for 750 MW of transmission capacity at an above-market rate. Con Edison also argues that IPPNY and Entergy hypothesize a "speculative and highly unlikely scenario" and then fail to explain why someone would volunteer to pay above-market energy prices."<sup>140</sup>

NYC argues that the record supporting the ALJs' conclusions that "the risks associated with the financing and recovery of project costs will be borne, in large part, by private investors and that project revenues will be recovered from wholesale power transactions" is extensive and compelling.<sup>141</sup> NYC asserts that the ALJs properly evaluated whether the JP sufficiently ensures that the costs and risks of Facility development and operation would be borne by investors and also properly concluded that the "cost risk" associated with the Astoria-Rainey Cable is limited.

NYC contends that the record similarly supports the ALJs' decision to reject the argument that the pre-subscription requirement would compel, not prevent, indirect subsidies to the Facility. NYC notes that, under Condition 15(b), the Commission

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<sup>140</sup> Con Edison at 2.

<sup>141</sup> NYC Brief Opposing Exceptions at 14-16.

retains the authority to review the subject contract before accepting Applicants' report if it so elects.<sup>142</sup>

Con Edison reiterates that one of its major concerns was the potential for the Project's risks and costs to be shifted from investors to utility ratepayers; and, to address this concern, it spent months negotiating with Applicants, ultimately obtaining changes that provide the strongest possible protections to customers from any subsidization of this Project.

Con Edison asserts that the 75% pre-subscription requirement will ensure that the Project does not go forward without a substantial portion of the capacity under contract. It adds that, if a willing buyer of that capacity establishes a price that is acceptable to the developer, that result is consistent with a competitive market.

Staff responds that those seeking conditions against indirect subsidization have not explained why consumers are at risk and how proposed Condition 15 fails to minimize that risk. Staff contends that allegations of "a phantom subsidy (the origin and form of which are never fully explained)" must be rejected as "baseless" and recognized as "fear of additional market competition."<sup>143</sup>

#### Discussion

The protections embodied in Condition 15 are adequate to protect consumers. The protections clearly prohibit the Facility from receiving cost-of-service rates, and that protection is sufficient to satisfy us that consumers are adequately protected from overpaying.

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<sup>142</sup> NYC states that it "assumes that the Commission may desire to review the contract underlying the report before it decides whether to 'accept' the report." NYC Brief Opposing Exceptions at 19.

<sup>143</sup> Staff Brief Opposing Exceptions at 20-21.

IPPNY and Entergy have focused much attention on the related question of whether the certificate should include a condition that prohibits the Facility from being financed indirectly via an agreement between a shipper, presumably HQ, and a utility we regulate, such as Con Edison, or a New York agency or authority. IPPNY and Entergy believe that such a condition is needed to protect consumers from a buyer that might in the future overpay for the electricity delivered by the Facility to New York City. As we noted above, through our regulation of the rates of Con Edison, we already have the authority to protect consumers from such an event, so we need not use the siting process to provide such protection. As for New York State authorities, we can presume that they can protect their own interests.

Moreover, we consider it important to maintain the possibility of a future power purchase agreement between a New York City buyer and a shipper. It is quite possible that the price offered by the shipper for Canadian hydroelectric power delivered to New York City could prove to be a good one, given the valuable characteristics of such power, and it may also be true that the whole enterprise could depend on a shipper obtaining a long-term power purchase agreement from a buyer. Therefore, the fact that the Certificate Conditions don't prohibit such an agreement is seen by us to be a positive element.

We presume that an important force behind IPPNY's and Entergy's views on this subject is their desire to prevent a possible future exercise of buyer market power. We have discussed above why it would be unwise to use the denial of a Certificate in a siting case for that purpose.

As for the issue of the definition of a merchant project, we reject IPPNY and Entergy's contention that the RD

applies a far too narrow definition of what it means to be a merchant project. The ALJs properly relied on our precedent to find that a project is non-merchant if its investors are seeking cost recovery through regulated cost-of-service rates and merchant when they are seeking to recover their costs through wholesale power transactions.

We furthermore reject Entergy's claims that any recovery of any portion of the costs associated with the HVAC cable should alter our conclusion that ratepayers are adequately protected from the majority of the Project's costs. The record establishes that the costs of the HVAC cable constitute about 10% of the overall Project cost, and not all of that small portion would be subject to recovery through cost-based FERC rates. Entergy makes no attempt to explain how provisions that prevent free ridership on the HVAC Astoria-Rainey Cable by virtue of cost-based FERC rates and that avoid constraining the existing capacity of Astoria Energy II can have any possible adverse consequences for the public interest; nor does it explain how ratepayer subsidy of the Astoria-Rainey cable is possible, given that the costs of the cable will be subject to regulatory scrutiny by us (via the filing provision of Condition 15) and also by FERC.

#### Job Creation

In the RD, the ALJs noted that "the evidence regarding the number of direct construction jobs that would be created if the Project is constructed is unopposed."<sup>144</sup> They therefore found that "Applicants' evidence regarding the number of direct construction jobs that would be created if the Project is

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<sup>144</sup> RD at 120-121.

constructed provides support for the public interest finding that is required by PSL §126(1)(g)."<sup>145</sup>

The ALJs questioned the accuracy of Applicants' estimates of the indirect and induced jobs resulting from the construction and operation of the Facility. They noted opponents' assertion that jobs created by the Project must be offset by the loss of jobs it will cause but they found a lack of evidence substantiating this assertion. They ultimately recommended that the Project's potential for creating indirect and induced jobs, though imprecise and not a decisive decisional factor, should be viewed as additional support for the public interest finding required by PSL §126(1)(g).<sup>146</sup>

IPPNY asserts that the RD's conclusions about the Project's job-inducing effects rest on "flawed and internally-inconsistent conclusions concerning the Project's alleged capacity market benefits and wholesale energy savings."

Discussion

The Applicants' evidence on job creation was incomplete in a fundamental way. While evidence was proffered on the number of direct jobs created by the 1,000 MW Facility, the record is void on the critical question of whether those jobs would be offset, or more than offset, by the jobs displaced at the conventional generation facilities that would not be built as a consequence. IPPNY cited this important shortcoming and no party rectified it.

As was demonstrated in our discussion of the economics of the Facility, a reasonable way to analyze the Applicants' proposal to build the Facility is to compare the Facility to the resource that would otherwise have been built in the absence of

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<sup>145</sup> Id.

<sup>146</sup> RD at 121-122.

the Facility. Staff's economic analysis followed this approach when it used a 1,000 MW combined cycle gas turbine located in New York City as the resource for which the Facility substitutes in New York's resource mix. Accordingly, for us to give any credit to an assertion of job creation, we need, at a minimum, a comparison of the Facility's job creation to the job creation of a combined cycle gas turbine. No such comparison was performed by any party.

IPPNY asserts that the Facility will be accompanied by a massive subsidy, and that the subsidy will cause lost jobs by taking money out of the hands of the source of the subsidy, presumably consumers. We find elsewhere that no such subsidy should be assumed to occur. Therefore, we reject IPPNY's assertion about subsidy-induced job losses.

Applicants cite wholesale price reductions caused by the Facility and estimates that substantial jobs will be created by the improved financial position of the retail buyers of electricity as a result of lowered electricity prices. As was found by the Judges, the number of jobs created by the wholesale price effect was heavily contested. We agree with the validity of this component of the overall accounting for job impacts.<sup>147</sup> Nevertheless, as just one component of an overall analysis, it cannot overcome the important failure of the Applicants to quantify the number of displaced jobs.

In conclusion, we will not give any weight, positive or negative, to the impact on jobs in our determination in this case.

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<sup>147</sup> A proper analysis would also account for the reduced profits of New York's existing generation owners and the resultant effect on New York jobs of reduced spending by the owners of New York generators.

NON-STATUTORY FINDINGS

CONTESTED

Co-Located Infrastructure

Proposed Certificate Conditions 27 through 29

Central Hudson objects to proposed Certificate Conditions 27 through 29, regarding co-located infrastructure.<sup>148</sup> Certificate Condition 27 sets a basic standard governing the Applicants' work in connection with co-located infrastructure: Applicants have committed to ensure that their project will be fully compatible with existing co-located infrastructure. Proposed Certificate Condition 28 imposes specific obligations on Applicants to consult with infrastructure owners or operators prior to finalizing designs and beginning construction. Proposed Certificate Condition 29 imposes upon Applicants certain cost reimbursement and indemnification obligations, and establishes a process by which any other infrastructure owners or operators (not limited to JP Signatory Parties) may secure cost reimbursement from the Applicants. Analyzing this issue below, the Judges found that there is no basis to conclude that Proposed Certificate Conditions 27 through 29 are designed to affect or displace laws governing existing rights and obligations of owners or operators of co-located infrastructure. The RD, at page 128, states:

[i]n Article VII proceedings, the exact location of proposed facilities often is determined in the EM&CP process because that is when a certificate holder will have conducted the in-field inspections that will permit it and the staff of relevant agencies to ascertain whether there are any conditions that warrant a deviation that is

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<sup>148</sup> JP, Appendix C, Final Revised Proposed Certificate Conditions (January 18, 2013), Proposed Certificate Conditions ¶¶27 through 29).



still within the approved ROW but that may vary from the proposed centerline ... It is not yet clear where the proposed transmission line would be placed relative to existing infrastructure, but it is clear that the JP provisions at issue are designed to protect existing CI [Co-located Infrastructure] to the maximum extent practicable and to provide for reimbursement on reasonable terms. Finally, there is no basis for concluding that the provisions are designed to affect or displace laws governing parties' existing rights and obligations. Accordingly, we recommend that Central Hudson's opposition to the CI provisions be rejected [footnote omitted].

It is Central Hudson's view that in the event its co-located infrastructure is damaged by Applicants, Proposed Certificate Conditions 27 through 29 improperly would require Central Hudson to exhaust administrative remedies as a condition precedent to pursuing judicial remedies, by requiring Central Hudson to submit any disagreement to the Commission. Central Hudson contends that these Certificate Conditions may bind the JP Signatory Parties, but should not limit the rights of non-signatories, including Central Hudson, from pursuing judicial remedies.

Applicants respond that they accepted Conditions 27 through 29 in negotiations, in order to obtain an agreement by certain parties to the JP not to contest the grant of the Article VII Certificate. Applicants contend that although these Proposed Certificate Conditions address matters that are also governed by other laws -- both statutory and common law -- the conditions do not limit, restrict, replace, or modify such other laws. Applicants conclude that, to the extent that Proposed Certificate Conditions 27 through 29 create rights and impose liabilities, they can only be interpreted as creating rights and liabilities that are in addition to those created by such other laws.

VELCO states that Central Hudson asserts these arguments notwithstanding its acknowledgement that the Commission lacks the authority to restrict Central Hudson's access to the courts. VELCO further disputes Central Hudson's suggestion that the JP Signatory Parties have waived their rights to pursue other remedies and have agreed that the requirements of Condition 29 are prerequisites to pursuing other avenues available for seeking cost reimbursement. VELCO contends that none of Central Hudson's arguments regarding Proposed Certificate Conditions 27 through 29 have merit.

Staff emphasizes that the RD clearly states that "there is no basis for concluding that the provisions [Certificate Conditions 27 through 29] are designed to affect or displace laws governing parties' existing rights and obligations."<sup>149</sup> In addition, both Staff and Applicants have made affirmative statements that the proposed Certificate Conditions are not intended to, nor can they, impair Central Hudson's legal rights.

#### Discussion

A Certificate granted pursuant to PSL Article VII only places obligations and limitations upon the Certificate Holder. The provisions of the JP, including Proposed Certificate Conditions 27 through 29, do not purport to limit owners or operators of co-located infrastructure from seeking cost reimbursement through other available avenues, or to require such owners or operators seeking indemnification to employ the Condition 29 procedures.

To the extent that Central Hudson, or another owner or operator of co-located infrastructure, wishes to benefit from the cost reimbursement process created by Proposed Certificate

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<sup>149</sup> RD at 128.

Condition 29, it must follow the procedures laid out in subparagraph (c). However, there is no basis for concluding that Proposed Certificate Conditions 27 through 29 are designed to affect or displace laws governing parties' existing rights and obligations regarding co-located infrastructure (except in the case of local municipal laws that the Commission explicitly overrides for being unreasonably restrictive).

We conclude that Central Hudson's exceptions regarding Proposed Certificate Conditions 27 through 29 are without merit.

Proposed Certificate Condition 5

Proposed Certificate Condition 5 provides:

The portions of the Allowed Deviation Zone to be occupied by the Facility once construction is complete are referred to herein as the Facility ROW. The Certificate Holders shall also acquire and maintain the continuing right to enter onto and use certain additional lands immediately adjacent to the Facility ROW needed for repair and maintenance purposes, including preclusion of vegetative encroachment, on terms prohibiting the owners of such land from taking any action on that land that would interfere with such repair and maintenance activities.

Central Hudson objects to Proposed Certificate Condition 5. Central Hudson claims that Condition 5 is overbroad, mandating greater acquisitions of property rights by Applicants than actually may be required. Central Hudson also claims that Condition 5 provides Applicants with paramount authority over property rights of utility owners or operators of pre-existing co-located infrastructure. The RD rejected both arguments.

Central Hudson excepts, asserting that Proposed Certificate Condition 5 should be revised to authorize the Certificate Holders to acquire such lands and/or land rights to the extent consistent with all applicable requirements of law

and necessary for project construction, but should not mandate that the Certificate Holders make such acquisitions. Condition 5 should be further revised, Central Hudson contends, by striking the following phrase: "terms prohibiting the owners of such land from taking any action on that land that would interfere with such repair and maintenance activities." Central Hudson argues that this phrase would improperly establish superior property rights in the Applicants over Central Hudson's pre-existing facilities (or property of other owners or operators of co-located infrastructure), and concludes that Article VII provides no authority for such a Certificate Condition.

Staff asserts that Proposed Certificate Condition 5, considered in its entirety, is appropriate and will not interfere with Central Hudson's ability to maintain its existing infrastructure. Staff states that the requirement to obtain the right to enter and use certain lands is limited by Condition 5 to "certain additional lands immediately adjacent to the Facility ROW needed for repair and maintenance purposes." These provisions of Conditions, Staff asserts, are not universal as Central Hudson posits; rather, these provisions are limited to the property rights that the Certificate Holders will need in order to maintain and repair their Facility in the future.

Staff explains that the requirement that the property rights be sufficient to avoid interference with the Certificate Holders' ability to maintain and repair their Facility will ensure that Certificate Holders will not be prevented from performing necessary maintenance and repair of the Facility by adjacent or underlying landowners. Further, Staff contends that Condition 5 is limited by Conditions 27 through 29. Staff asserts that Condition 27 requires that the Facility must be fully compatible with co-located infrastructure. Therefore,

reading Conditions 27 and 5 together, Staff reasons that these Conditions preclude Certificate Holders from interfering with Central Hudson's existing co-located infrastructure (or the existing co-located infrastructure of any other owner or operator).

Discussion

Central Hudson's exceptions to Proposed Certificate Condition 5 are rejected. Condition 5 would not prevent Central Hudson (or any other owner or operator of co-located infrastructure) from repairing or maintaining its own infrastructure. We adopt Staff's view that Conditions 27 and 5, read together, preclude Certificate Holders from interfering with Central Hudson's co-located infrastructure (or the co-located infrastructure of any other owner or operator).

UNCONTESTED

Litigation of Rights to State-Owned Land

The ALJs stated that this proceeding is not the appropriate venue for litigating land rights given that, even with an Article VII certificate, Applicants will have to acquire any necessary land rights through other applicable means.<sup>150</sup> With the exception of DEC urging us to accept the conclusion that this proceeding is not the appropriate forum for determining the Office of General Services' authority to grant leases for or other property rights to land under Lake Champlain, but otherwise ignore the ALJs "dicta" on this issue, no party addressed this topic in their briefs on exceptions.

EM&CP Guidelines

The ALJs noted that the proposed BMPs and EM&CP Guidelines (JP ¶¶24, 152; Appendices E & F) were unopposed and are consistent with similar practices and guidelines adopted in

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<sup>150</sup> RD at 113.

other Article VII proceedings.<sup>151</sup> No party takes exception to their resulting recommendation to adopt and apply the proposed practices and guidelines to the Facility.

Water Quality Certification

The ALJs recommended that the proposed WQC be issued by the Director of OEEE prior to the expiration of the USACE's February 24, 2013 waiver deadline.<sup>152</sup> As noted above, the WQC was issued by OEEE's Director on January 18, 2013. No party took exception.

Other Issues

JP ¶5 - deletion of "directly"

JP ¶5 begins by stating:

Nothing in this Joint Proposal or any appendix thereto is intended: (a) to directly impose any obligations on or limit any pre-existing rights of any party other than Applicants;

In response to concerns expressed by Central Hudson, the ALJs recommended that the word "directly" be deleted from JP ¶5(a).<sup>153</sup> No party excepted.

Certificate Condition 15(a)

Certificate Condition 15(a) states in relevant part that the Certificate is granted and the required determinations of need and public interest are explicitly contingent on Certificate Holders delivering a minimum of 1,550 MW of energy out of NYPA's Astoria substation. Central Hudson opposed Certificate Condition 15(a), claiming it is unknown whether the deliverability criterion can be met. The ALJs observed that Central Hudson's position in this regard had been refuted by (1)

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<sup>151</sup> RD at 136-137.

<sup>152</sup> RD at 139.

<sup>153</sup> RD at 129.

Hearing Exhibit 151, a stipulation between Applicants and Con Edison, in which Con Edison agreed that the deliverability target had been met, and (2) Applicants' Deliverability Panel testimony<sup>154</sup> that the Astoria Annex Phase Angle Regulator, together with NYPA's two existing lines and the Astoria-Rainey Cable, would be able to deliver more than 1,550 MW of electric energy out of the Astoria substation.<sup>155</sup> Central Hudson did not reiterate its position on exceptions.

Certificate Conditions, Section S, ¶¶138-144<sup>156</sup>

Central Hudson asserted that Certificate Conditions in Section S, entitled "Mapping, Land Acquisition, and as-built Drawings for the Facility," should be modified to assure that Central Hudson is provided with as-built drawings for any new facility or acquisition of any interest in land within 50 feet of existing Central Hudson property and for the full length of the route in the Hudson River within Central Hudson's service territory. Applicants responded that proposed certificate Condition 139 requires them to provide DPS Staff with as-built design drawings for each Facility segment following final completion of construction of that segment and that they would also provide copies of such drawings to Central Hudson for portions of the Facility in Central Hudson's service territory, so long as Central Hudson agrees to maintain the confidentiality of any Critical Infrastructure Information contained in those drawings. The ALJs found that there was no obvious dispute on this issue and opined that Applicants and Central Hudson should

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<sup>154</sup> Tr. 577-578.

<sup>155</sup> RD at 132.

<sup>156</sup> Provisions concerning mapping, land acquisition and "as-built" drawings for the facility. See JP Appendix C, dated January 18, 2013.

be able to agree to a process for sharing such information.<sup>157</sup>  
Neither party excepted.

Non-adoption of Specified JP Paragraphs

The ALJs recommended that the general terms governing the behavior and rights of the JP signatories, including paragraphs 1, 2, 3, 4, 6, 7, 8 and 9, not be adopted as terms of the Commission Order if a certificate is granted. They observed that if and to the extent the Commission adopts the terms of the JP, Central Hudson will have the same rights as any other party with respect to filing a petition with the Commission regarding the correct interpretation of one or more of the Order's terms or requesting dispute resolution assistance or services.<sup>158</sup>  
There were no exceptions.

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<sup>157</sup> RD at 134.

<sup>158</sup> RD at 134-135.



Other Central Hudson Concerns

Non-specific Claims

Central Hudson expressed confusion about JP paragraphs 11, (and maybe 12), 107-119, 122, 132, 136-138 and 140 and opposed all or portions of JP ¶¶11, 20, 107-119, 122, 132, 136-138, and 140, and proposed Certificate Condition 5. The ALJs found there was insufficient explanation of the bases for confusion or opposition to these provisions to provide a response and therefore recommended that Central Hudson's opposition to these provisions be rejected.<sup>159</sup> Central Hudson did not pursue these issues on exceptions.

Discrimination Claims

Section §28-105.1 of the New York Administrative Code (N.Y. Adm. Code) makes it unlawful to construct a building in New York City without first obtaining a written permit. This permit, in turn, implicates N.Y. Adm. Code §28-105.12.7.1, a section that requires Applicants to procure insurance to, *inter alia*, insure adjacent property owners from loss, property damage and personal injury. Central Hudson claimed that the JP was discriminatory because "[t]he City Administrative Code requires essentially the indemnification protections to property affected by the proposed facilities in New York City that Central Hudson requested Applicants provide to Central Hudson's pre-existing property and operations that would be similarly affected by the proposed facility." The ALJs rejected Central Hudson's claim for being untimely (i.e., it was raised for the first time in reply brief).<sup>160</sup> They also rejected the claim because Central Hudson asserted that it was "similarly situated" to NYC when, in fact, it was not; the ALJs reasoned that the Administrative Code

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<sup>159</sup> RD at 135.

<sup>160</sup> RD at 136.

section cited by Central Hudson applies because Applicants plan to build the converter station in New York City, not because they plan to lay cable there.<sup>161</sup> In addition, the ALJ noted that, with regard to plans to lay cable, Central Hudson has the same protections as any other owner or operator of co-located infrastructure.<sup>162</sup>

Central Hudson also claimed that discrimination was evidenced by the presence of the proposed environmental Trust because it will be pre-funded while the CI provisions do not provide for pre-funding. The ALJs recommended rejection of Central Hudson's assertion.<sup>163</sup> Central Hudson no longer pursues these issues on exceptions.

#### Conclusion Regarding Uncontested Matters

We find the Judges' conclusions on the foregoing, uncontested issues to be well-supported on the record and reasonable, and we adopt them.

#### CONCLUSION

PSL §126 requires that we find and determine need for a proposed facility; whether a facility will achieve the minimum imposition of adverse environmental impacts, considering the state of available technology and the nature and economics of various alternatives; what portion of the line should be underground; that the facility conforms to a long-range plan for expanding the State grid; and that the location of the facility conforms to applicable State and local laws and regulations, except for those local laws we refuse to apply because they are

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<sup>161</sup> Id.

<sup>162</sup> Id.

<sup>163</sup> Id.

unreasonably restrictive in view of the existing technology, factors of cost or economics, or the needs of consumers; and that the facility will serve the public interest, convenience, and necessity. After considering all of the relevant factors, we find and determine that the record in this proceeding enables us to make the findings that are set forth in PSL §126(1)(a), (b), (c), (d)(1) and(2), (f) and (g).

This 1,000 MW Facility would allow imports of energy, nearly year round, into one of the most congested load pockets in the State. The energy imported could amount to over 10% of the energy consumption in New York City. This is a significant amount of additional capability that would enhance energy security to the City by providing another source of power into the City.

New York City relies significantly on gas- and oil-fired generation, thus raising fuel diversity concerns and electric reliability concerns. The addition of this Facility would allow renewable energy imports, thus increasing diversity of the City electricity supply sources and improving electric reliability. Providing this magnitude of renewable energy from local resources would be extremely difficult and would take a long time, even if possible.

Demand for natural gas use is increasing in New York City due to increased use of gas for electric generation and the gas conversion needs resulting from NYC rules to phase out use of #4 and #6 oils for home and business heating purposes. The increase in gas demand is putting a strain on the gas transportation system into and within the City. This Facility would help reduce the strain by allowing imports of electricity from outside the City.

The City is a load pocket with in which pivotal suppliers have the ability to exercise market power through

restrained by market rules enforced by FERC. Addition of a major new supplier into the pocket would help reduce the ability of various players to exercise market power.

We are recognizing the price stability benefits that flow from using energy generated by hydro resources and according weight to such a benefit as additional support for finding economic need for this Project.

Lastly, the need for this Project has been demonstrated by the Project's ability to advance important public policies set forth in the State Energy Plan and *PlaNYC*, among other documents expressing State policy.

Based on the foregoing, we conclude that there are sufficient bases in the record to find and determine need for this Project.

In addressing the nature and minimization of potential environmental impacts, it is significant that, because the Facility is subaquatic and underground, potential adverse visual impacts have been largely avoided. At the same time, the detailed provisions of the JP protect the State's valuable natural resources by ensuring that Lake Champlain and riverine benthic habitat is not lost and that environmental impacts are minimized. The subaquatic Facility segments have been routed to avoid, to the maximum extent practicable, areas deemed environmentally sensitive by DOS and DEC. Where the Facility would be located within a significant habitat or exclusion area, construction will be restricted to avoid times when these areas are more likely to contain sensitive species, thereby avoiding impacts during important life cycle periods. We find that any magnetic field induced by the Facility will have de minimus impact, if any, on migratory species, in the Hudson River.

The upland Facility segments primarily are located in existing railroad or State highway rights-of-way. Selective use

of horizontal directional drilling for upland segments and for land to water transitions, as proposed, will serve to avoid or minimize potential adverse environmental impacts.

We find that the nature of the probable environmental impacts have been identified, and further, that the facility represents the minimum adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives, and other pertinent considerations, including but not limited to, the effect on agricultural lands, wetlands, parklands, and river corridors.

We find that the Facility's transmission lines should be underground or underwater, as proposed.

We find that the Facility conforms to a long-range plan for expansion of the electric power grid serving this state and interconnected utility systems, which will serve the interests of electric system economy and reliability, in particular the planning objectives contained in the State's 2009 Energy Plan. The Champlain Hudson Power Express Facility can be constructed and operated consistent with the achievement of the State's long-range energy planning objectives. In allowing development of this New York interconnection with the regional transmission system of Quebec, Canada, we continue the State's efforts to increase use of renewable energy resources and to bring such resources to the State's major urban areas. As we have observed in other recent Article VII proceedings, there is a continuing need in the downstate area to establish better interconnections with our neighboring regional transmission systems, to provide citizens better access to diverse, renewable generation resources and stronger transmission ties than those currently existing.

We grant Applicants' request that we waive the substantive requirements of the local laws and regulations

listed in Hearing Exhibit 115 and find that the Project otherwise conforms to applicable State and local laws.

Finally, we conclude that the Project will serve the public interest, convenience and necessity. That this Project will serve New York City load while displacing more-polluting generation sources, advance major energy and policy goals as set forth in the City's *PlaNYC 2030: A Greener, Greater New York* and in Commission and State documents, and rely almost entirely on private investment are significant Project benefits, which can be realized without substantial negative environmental impacts. A decision not to permit the Project the opportunity to proceed will, in all likelihood, mean that these unique and substantial benefits will not be realized. Ratepayers are not assuming the risks associated with the investment in the project. The Certificate Conditions and stipulations effectively shield ratepayers from the project's construction and operation risks. This is precisely what the competitive markets envisioned: project developers taking calculated risks and investing in resources that ultimately provide benefits to consumers.

RD CORRECTIONS:

We adopt the following corrections to the RD:

1. On page 3, the second full sentence, reads, in relevant part as follows: "The JP, attached as Appendix 2, has the following signatories: ...." The JP was not attached to the RD so the sentence should read "The JP has the following signatories: ...."
2. On page 7, the second sentence of the second full paragraph lacks the words "converter station" after "HVDC." The sentence should read: "The HVDC converter station would be a "compact type" with a total footprint (i.e., building and

associated areas and equipment) of approximately 4.5 acres."

3. On page 31, in the last sentence of the first full paragraph the word "million" should be inserted between "1.5" and "tons" so that the sentence reads: "For the State as a whole, Staff witnesses Gjonaj and Wheat calculated expected annual air pollutant emissions reductions of SO<sub>2</sub>, NO<sub>x</sub>, and CO<sub>2</sub> to be 751, 641, and about 1.5 million tons per year, respectively, in 2018 (footnote omitted)."
4. On page 80, in discussing Certificate Condition 99, the second full paragraph states "The dredged material will be placed in scows and either replaced in the trench or pits (if determined by the appropriate permitting authority to be suitable for replacement), or removed for disposition at an authorized location...Placement of imported backfill when dredge spoil is not used would create some additional increases in suspended sediment." In fact, Certificate Condition 99 prohibits the use of dredge materials for backfill.
5. On page 105, the RD recites Staff's statement that the Facility's underground configuration "requires a 35-foot ROW to protect the cables." We note that Certificate Condition 140, however, states that "[e]ach edge of the permanent overland Facility ROW shall be no closer than (a) when located entirely within lands owned or controlled by a railroad company or a public highway, six (6) feet to the outer surface of the nearest installed cable and (b), in all other areas, eight (8) feet to the outer surface of the nearest installed cable."

The Commission orders:

1. Except as here modified, the Recommended Decision of Administrative Law Judges Michelle L. Phillips and Kevin J. Casutto is adopted as part of this Order. Except as here granted, all exceptions to the Recommended Decision are denied.

2. Except as modified in the RD and to the extent consistent with the discussion in this Order, the terms and provisions of the February 24, 2012 Joint Proposal submitted by Champlain Hudson Power Express, Inc., and CHPE Properties, Inc. on behalf of the Signatory Parties to the Joint Proposal, and stipulations dated July 11, 2012 (Luyster Creek), June 4, 2012 (Certificate Condition 15), June 26, 2012 (Deliverability), and October 19, 2012 (Trust), and attached to this Order, are adopted and made a part of this Order.

3. Subject to the conditions adopted in this Order, Champlain Hudson Power Express, Inc., and CHPE Properties, Inc. (Certificate Holders) are granted a Certificate of Environmental Compatibility and Public Need (Certificate) authorizing construction and operation of a 1,000 MW, High Voltage Direct Current (HVDC) sub-aquatic and underground electric transmission line, approximately 332 miles, from the Canadian border to a Converter Station to be located in the Astoria Annex of Con Edison, and a 345 kV AC transmission line, approximately 3 miles, from Con Edison's Astoria Annex to Con Edison's Rainey Substation in Astoria, within New York State along the project route depicted as Joint Proposal Appendix B, and Hearing Exhibit 152 attached hereto (Certified Route), and associated equipment comprising the Facility. The Facility is the New York State portion of a sub-aquatic high voltage direct current transmission line linking the Facility with the Province of Quebec, Canada, HVDC Interconnection.



4. The terms of the Certificate Conditions included as Joint Proposal, Appendix C, attached to this Order are hereby approved and incorporated into this Order, including the requirement that the Certificate Holder shall, within 30 days after the issuance of the Certificate, submit to the Public Service Commission either a petition for rehearing or a verified statement that it accepts and shall comply with the Certificate and the conditions placed upon the Certificate.

5. A Water Quality Certification pursuant to §401 of the Clean Water Act (33 U.S.C. §1341(a)(1)) and PSL Article VII having previously been issued, it is hereby certified that, if the Certificate Holders submit an acceptable Environmental Management and Construction Plan (EM&CP) and comply with all conditions contained in this Order, construction of the facility will comply with the applicable requirements of §§301, 302, 306 and 307 of the Clean Water Act, as amended, and will not violate New York State Water Quality standards and requirements.

6. The Certificate Holders shall file one or more Environmental Management and Construction Plans for the Project, either as a single filing or as a sequence of filings each pertaining to a segment of the Project, as provided in the Certificate Conditions. Certificate Holders shall not commence construction on any segment of the Project until the Commission has, by written Order, approved an EM&CP pertaining to that segment. Consistent with the Proposed Certificate Conditions, Certificate Holders shall provide notice to all landowners adjoining the Project or adjoining the Project segment, as may be appropriate, for each EM&CP filing.

7. Prior to the commencement of construction, the Certificate Holders shall comply with those requirements of Public Service Law §68 that do not relate to the construction

and operation of the facility by obtaining Commission permission and approval as an electric corporation.

8. This Certificate may be vacated if the Certificate Holders fail to file an EM&CP or to commence construction consistent with the milestones set forth in Certificate Condition 13.

9. This proceeding is continued.

By the Commission,

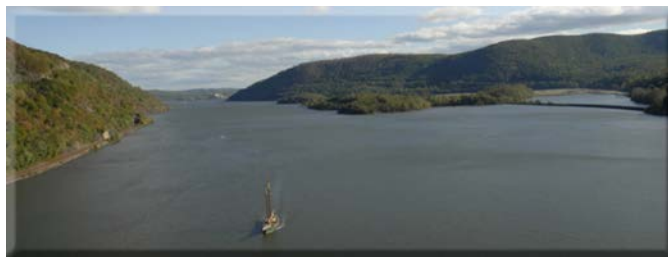
(SIGNED)

JEFFREY C. COHEN  
Acting Secretary



## APPENDIX D

# Scoping Summary Report





***APPENDIX D.1 – 2010 SCOPING REPORT***



# **SCOPING SUMMARY REPORT**

## **CHAMPLAIN HUDSON POWER EXPRESS TRANSMISSION LINE PROJECT ENVIRONMENTAL IMPACT STATEMENT**



**U.S. Department of Energy  
Office of Electricity Delivery and Energy Reliability  
Washington, DC 20585**

**Cooperating Agencies:  
U.S. Environmental Protection Agency  
U.S. Army Corps of Engineers  
U.S. Fish and Wildlife Service  
New York Department of State  
New York Department of Environmental Conservation**

**DECEMBER 2010**

## ACRONYMS AND ABBREVIATIONS

AC	Alternating Current	NOAA	National Oceanic and Atmospheric Administration
CFR	Code of Federal Regulations	NOI	Notice of Intent
CHPEI	Champlain Hudson Power Express, Incorporated	NYISO	New York Independent Systems Operator
CP	Canadian Pacific Railway	NYSPSC	New York State Public Service Commission
CSX	CSX Railroad	NYSCC	New York State Conservation Council
CZMA	Coastal Zone Management Act	NYSDEC	New York State Department of Environmental Conservation
DC	Direct Current	NYSDPS	New York State Department of Public Service
DOE	U.S. Department of Energy	NYSTA	New York State Thruway Authority
EIS	Environmental Impact Statement	SCFWH	Significant Coastal Fish and Wildlife Habitats
EMF	Electromagnetic Fields	USACE	U.S. Army Corps of Engineers
EO	Executive Order	USEPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act of 2005	USFWS	U.S. Fish and Wildlife Service
HVAC	High Voltage Alternating Current		
HVDC	High Voltage Direct Current		
km	kilometer		
kV	kilovolt		
MW	megawatt		
NEPA	National Environmental Policy Act		



**SCOPING SUMMARY REPORT  
CHAMPLAIN HUDSON POWER EXPRESS EIS**

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# 1. Introduction

## 1.1 Overview

On January 25, 2010, Champlain Hudson Power Express Inc.<sup>1</sup> (CHPEI) applied to the U.S. Department of Energy (DOE) for a Presidential permit in accordance with Executive Order (EO) 10485, as amended by EO 12038, and the regulations codified at 10 Code of Federal Regulations (CFR) 205.320 et seq. (2000), “Application for Presidential Permit Authorizing the Construction, Connection, Operation, and Maintenance of Facilities for Transmission of Electric Energy at International Boundaries.” The DOE Office of Policy, Siting and Analysis, in the Office of Electricity Delivery and Energy Reliability (OE-20) is responsible for issuing Presidential permits. The Presidential permit for CHPEI (OE Docket Number PP-362), if issued, would authorize CHPEI to construct, operate, maintain, and connect the U.S. portion of the project, which consists of an electric transmission line that would cross the international border between the United States and Canada, near the village of Rouses Point, New York. A project overview is provided in **Section 1.5**, and additional project details are provided in CHPEI’s January 25, 2010, application letter to DOE, as amended on August 5, 2010. All of these documents are available on the DOE Web site at <http://chpexpresseis.org>, and additional project information is also available on the Applicant’s Web site at <http://chpexpress.com>.

Pursuant to the National Environmental Policy Act of 1969 (NEPA), and in considering an application for a Presidential permit, the DOE must take into account possible environmental impacts of the proposed facility. DOE has determined that an Environmental Impact Statement (EIS) is the appropriate level of environmental review under NEPA for granting the requested Presidential permit. DOE will use the NEPA planning process to encourage agency and public involvement in the review of the proposed project, and to identify the range of reasonable alternatives. The public outreach process is designed to facilitate the public discussion of the scope of appropriate issues to be addressed in the EIS.

## 1.2 Public Outreach

On June 18, 2010, DOE published in the *Federal Register* its Notice of Intent (NOI) to Prepare an EIS and to Conduct Public Scoping Meetings; Notice of Floodplains and Wetlands Involvement; Champlain Hudson Power Express, Inc. (75 FR 34720). The Notice of Intent (NOI), provided in **Appendix A**, explained that DOE would be assessing potential environmental impacts and issues associated with the proposed project and reasonable alternatives. The NOI was sent to interested parties including Federal, state, and local officials; agency representatives; stakeholder organizations; local libraries, newspapers, and radio and TV stations; and private individuals in the vicinity of the proposed transmission line. Issuance of the NOI commenced a 45-day public scoping period that ended on August 2, 2010. However, the NOI did note that comments submitted after the deadline “would be considered to the extent practicable.”

DOE placed advertisements in 32 local and regional newspapers along the proposed project corridor to invite the public to local scoping meetings, and to announce their times and locations. Copies of newspaper tear sheets and affidavits are included in **Appendix B**. In addition, press releases were

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<sup>1</sup> CHPEI is a joint venture of TDI-USA Holdings Corporation (TUHC), a Delaware corporation, and National Resources Energy, LLC (NRE). TUHC is owned by Transmission Developers, Inc. (TDI), a Canadian Corporation and by Sithe Global TDI LLC (Sithe Global TDI). Sithe Global TDI is a wholly owned subsidiary of the Blackstone Group L.P. NRE is a wholly owned subsidiary of National RE/sources Group, a limited liability corporation duly organized under the laws of the State of Connecticut.

sent out to 10 local radio and 17 television stations and to 26 newspapers prior to the meetings. **Appendix C** contains an example of the press releases and a list of media outlets to which they were sent.

During the public scoping period, DOE conducted seven scoping meetings: one in Connecticut and six within the Hudson River Valley corridor of New York State. **Figure 1** provides an overview of the route of the proposed transmission line along with an identification of the locations where scoping meetings were held. The meetings occurred between July 8 and July 16, 2010, as noted in **Table 1**.

**Table 1. Dates and Locations of the Public Scoping Meetings**

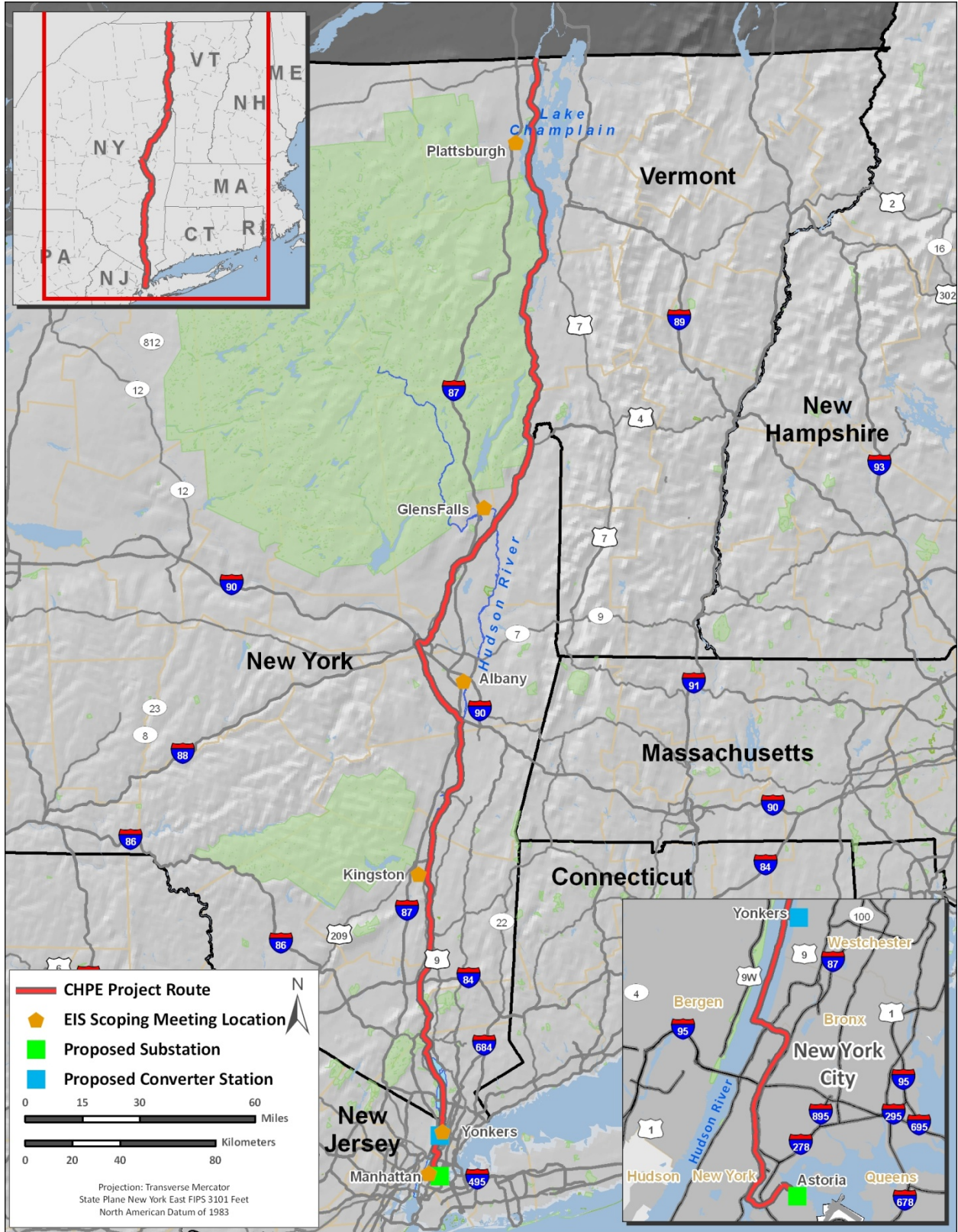
Meeting Date	Location	Number of Attendees
July 8, 2010	City Hall, Bridgeport, CT	10
July 9, 2010	Federal Building, Manhattan, New York City	25
July 12, 2010	Royal Regency Hotel, Yonkers, NY	27
July 13, 2010	Holiday Inn, Kingston, NY	28
July 14, 2010	Holiday Inn, Albany, NY	31
July 15, 2010	Ramada Inn, Glens Falls, NY	18
July 16, 2010	North Country Chamber of Commerce, Plattsburgh, NY	28

The meetings provided the public with the opportunity to learn more about the proposed project and to provide comments on potential environmental issues associated with the project. A total of 33 people gave verbal comments at the meetings, and their comments were transcribed by court stenographers. Transcripts of the scoping meetings along with materials submitted at the meetings are provided in **Appendix D**. In addition, DOE received scoping comments in the form of 22 written letters or emails from private citizens, government agencies, and nongovernmental organizations. A copy of the comment letters received during the scoping period and written materials submitted for the record at the scoping meetings are included in **Appendix E** to this report and are also available at <http://chpexpress.org>.

DOE's Draft EIS will also contain a subsection that summarizes the comments received during the scoping period.

### 1.3 Cooperating Agencies

DOE has invited several Federal and state agencies to participate in the preparation of the EIS to ensure that it satisfies the environmental requirements of those agencies to make their respective determinations regarding their permitting processes and to engage their specialized expertise. Region 2 of the U.S. Environmental Protection Agency (USEPA), the New York District of the U.S. Army Corps of Engineers (USACE), and the New York Field Office (Region 5) of the U.S. Fish and Wildlife Service (USFWS) are Federal cooperating agencies. In addition, the New York State Department of Public Service (NYSDPS) and the New York State Department of Environmental Conservation (NYSDEC) are cooperating agencies in the development of the CHPE Project EIS.



**Figure 1. Project Regional Map**

The following outlines each agency’s requirements for the EIS:

**USEPA.** The USEPA does not have a direct regulatory role in the permitting process for the CHPE Project. However, Federal law provides for USEPA review of draft and final EISs. Specifically, the USEPA’s Office of Federal Activities has the following responsibilities:

1. Review and prepare written comments on NEPA documents prepared by Federal agencies.
2. Review all major proposed Federal actions subject to NEPA and work with Federal agencies to avoid, minimize, and mitigate adverse environmental impacts.
3. Coordinate with Federal agencies to maximize environmental protection of proposed projects
4. Foster interagency partnerships to promote environmental stewardship in planning and implementing Federal actions.

**USACE.** The USACE will use the EIS in their decisionmaking for the permits that would be required under Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. In accordance with 33 CFR Part 325 Appendix B (8)(c), the USACE will coordinate with DOE to ensure that the CHPE Project EIS can be adopted by USACE in support of its decisionmaking requirements on the Section 10 and Section 404 permit application by CHPEI.

**USFWS.** The USFWS role as a cooperating agency will include evaluation of environmental impacts on fish and wildlife, in general. They will also evaluate potential environmental impacts on federally listed threatened and endangered species and designated critical habitat and might issue a Biological Opinion based on a potential Biological Assessment prepared for the project.

**NYS DPS.** Construction and operation of the CHPE Project would require that the New York State Public Service Commission (NYSPSC) issue a Certificate of Environmental Compatibility and Public Need (Certificate) and a Federal Clean Water Act of 1972 (CWA) Section 401 Water Quality Certification. The NYSDPS, who serve as staff to the Commission, has requested Cooperating Agency status to coordinate its review with that of DOE.

**NYSDEC.** NYSDEC has responsibility for the review and approval of projects that would affect water quality, wetlands, and air quality within the state and has promulgated a number of regulations that would affect the development of the CHPE Project. NYSDEC has requested cooperating agency status in the NEPA process to participate in reviewing the scope and the analysis included in the EIS. NYSDEC will review the EIS, evaluate impacts and mitigation measures in accordance with the State Environmental Quality Review Act, and provide comments on the EIS to DOE.

## 1.4 Project Chronology to Date

The following timeline summarizes the scoping process events previously described:

January 25, 2010	DOE received CHPEI application for Presidential permit.
June 18, 2010	DOE issued <i>Federal Register</i> NOI (75 FR 34720) to Prepare an EIS.
July 8 to 16, 2010	Seven public scoping meetings held in Connecticut and New York State.
August 2, 2010	Scoping period ended.
August 5, 2010	CHPEI submitted addendum to Presidential permit application eliminating the Connecticut portion of the project, changing the proposal from two parallel cables to one cable, and moving a portion of

the transmission line from the Champlain Canal to a railroad right-of-way.

## 1.5 Project Overview

The CHPE project is described in the January 25, 2010, application letter to DOE as amended by additional correspondence on August 5, 2010, both of which are available on the DOE project Web site at <http://chpexpressEIS.org>.

According to the Applicant's Presidential permit application, the proposed transmission system comprises a 1,000- megawatt (MW) Voltage-Sourced Converter controllable High Voltage Direct Current (HVDC) bipole. A bipole consists of two connected submarine or underground cables, one of which is positively charged (+), and the other negatively charged (-). This two-cable bipole would be laid between Quebec, Canada, and a converter station in Yonkers, New York (see **Figure 1**). The CHPEI stated purpose of and need for the proposed transmission line is that it would connect sources of renewable power generation in Canada with load centers in and around New York City.

Detailed maps showing the entire proposed project route are included in **Appendix F** and posted on DOE's Web site at <http://chpexpressEIS.org>. The Project's precise final route is subject to a number of factors, including resource issues, permitting, land acquisition, and stakeholder agreement. As noted in Section 1.4, since the publication of the NOI, the Applicant's proposal was revised to eliminate the Connecticut portion of the project, reduce the project's total transmission capacity, and change the location of one segment of the transmission line route from the Champlain Canal to a nearby railroad right-of-way.

The project would originate at an HVDC converter station near Hydro-Québec TransÉnergie's 765/315-kilovolt (kV) Hertel substation, located southeast of Montreal, and travel approximately 35 miles (56.3 kilometers [km]) to the international border between the United States and Canada, crossing the border to the east of the village of Rouses Point, New York, within the town of Champlain, New York. South of the international boundary, the bipole would travel south under Lake Champlain for approximately 111 miles (178.6 km) entirely within the jurisdictional waters of the State of New York. At the southern end of Lake Champlain, the bipole would exit the water just north of Lock C12 of the Champlain Canal in the town of Whitehall, New York, and would be buried within an existing railroad right-of-way owned by Canadian Pacific Railway (CP) for approximately 65.7 miles (105.7 km) through the municipalities of Comstock, Fort Ann, Kingsbury, Fort Edward, Moreau, Northumberland, Wilton, Greenfield, Saratoga Springs, Milton, Ballston, Clifton Park, Glenville, and Schenectady, New York. In the town of Rotterdam, New York, the buried route would transfer to the CSX Railroad (CSX) right-of-way and proceed south for approximately 23.7 miles (38.1 km) through the municipalities of Guilderland, New Scotland, Voorheesville, and Bethlehem, New York. The proposed project route would exit the railroad right-of-way (ROW) and enter the Hudson River south of Albany at the town of Coeymans, New York.

Upon entering the Hudson River, the bipole would be buried in the river bottom for 118 miles (189.9 km) until it reaches the City of Yonkers, New York. The HVDC bipole cables would terminate at the converter station near Wells Avenue in Yonkers, New York, for a total length of approximately 319 miles (513.4 km) from the U.S. border with Canada to Yonkers, New York. From the Yonkers Converter Station, double-circuit 345-kV High Voltage Alternating Current (HVAC) cables would enter the Hudson River and travel south through the Hudson and Harlem rivers for a distance of approximately 14.3 miles (23 km). The HVAC cables would terminate in a spare bay at a new electric substation being constructed by the New York Power Authority on Consolidated Edison

Power Park property near the site of the former Charles Poletti Power Plant in Astoria, Queens, New York.

In addition, Champlain Hudson applied to DOE on September 12, 2009, for a Federal loan guarantee for the proposed project in response to a DOE competitive solicitation, “Federal Loan Guarantees for Electric Power Transmission Infrastructure Investment Projects,” issued under Section 1705, Title XVII, of the Energy Policy Act of 2005 (EPAAct). Section 406 of the American Recovery and Reinvestment Act of 2009 amended EPAAct by adding Section 1705. This section is designed to address the current economic conditions of the nation, in part by facilitating the development of eligible renewable energy and transmission projects that commence construction no later than September 30, 2011. The Loan Programs Office of DOE is carrying out an evaluation of the application submitted by Champlain Hudson. Should DOE decide to enter into the negotiation of a possible loan guarantee with Champlain Hudson, DOE would use the CHPE EIS to meet its NEPA requirements in making a determination associated with the funding. Additional information on the Loan Program Office is available at <http://lpo.energy.gov/>.



## 2. Scoping Comments

A variety of issues and concerns were raised during the public scoping period. DOE considered the content of all comments in determining the scope of the EIS and identified the following representative issues and concerns:

- Many commenters questioned the purpose of and need for the project, noting that the EIS needs to establish the evidence that the necessary electricity demand exists (or will exist) for the proposed project.
- Many commenters expressed concerns about the proposed Yonkers location for the Converter Station. Commenters noted potential visual impacts, land use issues, impacts on cultural resources, health and safety concerns, potential air quality impacts, and concerns about the converter station having disproportionate impacts on the low-income and minority populations in Yonkers.
- Commenters noted the potential environmental impacts from burying the transmission line in Lake Champlain and the Hudson River. Commenters expressed concerns regarding sediment disturbance and the impacts that sediment would have on wildlife, fish habitat, endangered species, and benthic habitat. Commenters also noted that the sediment disturbance could churn up PCBs and other contaminants into the water column and have an adverse impact on drinking water quality and human health and safety.
- Commenters requested that the EIS contain an analysis of the effects of Electromagnetic Fields (EMFs) and thermal effects produced by both Direct Current (DC) and Alternating Current (AC) transmission lines on aquatic ecosystems, including behavior and reproduction of fish and other animals.
- Many commenters expressed concerns about the impacts of the transmission line and Yonkers Converter Station on existing infrastructure. Commenters noted the presence of pipelines, power cables, outfalls, and other electricity lines that the proposed transmission line could impact.
- Commenters noted that the transmission line route contains many visually important resources and that the EIS should analyze the impact that construction of the transmission line would have on these resources.
- Many commenters also identified additional alternatives that they believed should be analyzed in the EIS. Based on scoping comments, the following alternatives have been included in the analysis:
  - Substation siting alternatives. Several commenters requested DOE discuss a siting alternative to the CHPE interconnection at ConEd Power Park.
  - Several commenters requested that alternative converter station sites in the City of Yonkers be examined, including the possible re-use of the former Glenwood Power Plant building.
  - Alternative transmission line routing alternatives that would follow upland rights-of-way, such as highways and rail lines.
- Commenters requested information on the potential for impacts associated with the use of HVDC technology.

A summary of the comments received during the scoping period is provided in **Table 2**, which identifies the major issues raised, arranged by general topic. Each issue that is within the scope of the

EIS will be addressed in the Draft EIS. **Table 3** presents a list of the individuals or organizations who submitted scoping comments along with the date each comment was received by DOE.

Transcripts of the scoping meetings along with materials submitted at the meetings are provided in **Appendix D**. Copies of the complete comments are included in **Appendix E** and are also available on the DOE project EIS Web site at <http://chpexpresseis.org>. **Appendix G** presents a summary compilation of all of the comments received, arranged by the date the comments were received. The Draft EIS will also contain a subsection that summarizes the comments received during scoping. For the purposes of this Scoping Report, the comments are paraphrased and condensed from the actual comments; however, the environmental analysis included in the EIS will rely on the full text of the comments as submitted.

**Table 2. Summary of Scoping Comments Received by DOE**

Subject Area	Comment Summary
<p><b>NEPA Process</b></p>	<p><i>Purpose and Need.</i> Nine commenters noted that the purpose and need statement should establish the evidence that the need for electricity exists in the area, or will exist if projected population and planned land use growth are realized.</p> <p><i>Cooperating Agencies.</i> One commenter noted that the National Oceanic and Atmospheric Association (NOAA) should be included as a cooperating agency, because of the agency’s expertise in evaluating impacts on fisheries and aquatic biota. In addition, the New York State Hudson Valley Greenway Council should also be included as a cooperating agency to evaluate potential project impacts and consistency with the criteria established by New York State during the creation of this organization (see New York Environmental Conservation Law Article 44, Hudson River Valley Greenway).</p> <p><i>Public Involvement.</i> One commenter noted that the development of the EIS should proceed with a perspective of incorporating transparency during the review process and post-approval (if approved). The alternatives that are evaluated should include a consideration of opportunity for public scrutiny of impacts, such as thorough review of monitoring data. Accordingly, the alternatives design should incorporate facilities or options that promote public assessment during the project lifetime. These might be metering abilities, equipment locations, or other facilities that aid in sampling and reviewing project impacts and success of mitigation measures.</p> <p><i>Worst-Case Analysis.</i> One commenter noted that the EIS should analyze the possible worst-case scenarios if any of the infrastructure or equipment used in its installation fails in any way.</p> <p><i>Precautionary Principle.</i> One commenter noted that the precautionary principle should be used to frame the analysis in the EIS.</p> <p><i>Permits.</i> One commenter noted that the EIS should include a discussion of all potential permits, including Section 404 permits from the USACE that might be required for this project.</p>

Subject Area	Comment Summary
<p><b>Proposed Action and Alternatives</b></p>	<p><i>Project Description.</i> Four commenters noted that the EIS should describe the construction, operation, and maintenance of the transmission line, convertor station, and other components of the Proposed Project. The description of construction should include a discussion of the locations of staging areas; the installation method, exact location, and depth of underwater transmission lines; and any facilities, maintenance, or other activities needed to ensure project compliance with North American Electric Reliability Corporation standards. One commenter noted that the EIS should discuss the feasibility of installing an underwater cable for distances greater than 50 miles. The EIS should include a discussion of operations in relation to the New York Independent System Operator (NYISO), regional entities (e.g., New England Independent System Operator, PJM Interconnection, and Northeast Power Coordinating Council), and non-discriminatory open access. One commenter noted that the EIS should include a discussion of anticipated project life and a description of decommissioning and abandonment of facilities.</p> <p><i>Yonkers Converter Station.</i> Four commenters noted that the EIS should describe the siting of the Yonkers Converter Station and the risks of flashovers. The area surrounding the proposed converter station, particularly the Alexander Street area, is made land that did not exist 100 years ago. The cable landfall might have to be supported on piles and the impacts of that activity should be investigated in the EIS. Alternatives to the proposed location of the Yonkers Converter Station should be considered, including the Glenwood Power Plant site and property on the south side of the American Sugar Refinery site.</p>
<p><b>Proposed Action and Alternatives (continued)</b></p>	<p><i>Alternatives Analysis.</i> Fourteen commenters noted that the EIS should include an evaluation of alternatives to the Proposed Action, including reasonable alternatives not within the jurisdiction of the lead agency, and the No Action Alternative. The alternatives analysis should include discussion of diversified generation, and upgrading existing transmission infrastructure to meet the purpose of meeting existing and future electricity demands in New York City. Alternative locations for the transmission line should be evaluated, including construction in existing utility corridors, highway rights-of-way (e.g., the I-87 corridor), and railroad rights-of-way. The EIS should consider the potential of extending the proposed transmission line or expanding capacity if market conditions should become favorable to such enhancements in future years, including expansion east into Long Island Sound.</p> <p>In the event that renewable resources are not used for power generation or are discontinued, then the environmental impact of the project would vary from the proposal. Therefore, the EIS should consider alternative power generation sources, for example fossil fuel sources, that can be used with the new CHPEI facilities and evaluate environmental impacts. In addition, it is possible that the CHPEI facilities would be used to transmit New York-generated electricity for export to Canada. Under this scenario, fossil-fuel sources, rather than renewable sources, might be used. Alternative transmission and generation scenarios should thus be considered in the evaluation of environmental impacts.</p> <p><i>Connected Actions.</i> Nine commenters noted that implementation of the Proposed Project would result in development of hydroelectric power sources, which should be evaluated in the EIS. If the Applicant is exploring the use of upstate wind or other U.S. energy sources, the DOE should include those sources in the EIS, as well.</p>
<p><b>Biological Resources</b></p>	<p><i>Impacts on Flora and Fauna.</i> Eight commenters noted that the EIS should evaluate the impacts of construction and operation of the CHPE project on biological resources, including threatened and endangered terrestrial and aquatic species. The</p>

Subject Area	Comment Summary
	<p>analysis should include evaluation of impacts on sensitive wetlands, aquatic and terrestrial wildlife and habitat, and spawning periods. One comment noted that impacts on biological resources can occur from increased turbidity in the water column, resuspension of contaminants, electromagnetic fields, storm water discharges into terrestrial environments, thermal resistivity, and shoreline disturbance.</p> <p><i>Impacts of Burying Underwater Pipelines.</i> One comment noted that burying the transmission line beneath Lake Champlain and the Hudson River might be unnecessarily disruptive ecologically and hydrologically. The EIS should include an analysis of the projected underwater sediment disturbance caused by the dredging and trenching techniques along the Richelieu River, Lake Champlain, and the Hudson River onto wildlife, fish habitat, endangered species, micro-organisms, vegetation, and human activities such as swimming and fishing. In addition, the EIS should describe the area and quality of benthic habitat (e.g., oyster beds and submerged aquatic vegetation) that will be disturbed due to the placement of cables. The EIS should also discuss the area and quality of benthic habitat that will be permanently lost due to the placement of concrete mats on the cables if it is laid on the surface of the sediment. This EIS should evaluate different methods (e.g., water jet trenching, mechanical plowing, or dredging) that will be used in different areas and the varying environmental impacts of each of these methods, and the potential for resuspension of contaminants and ways that risks can be minimized.</p>

Subject Area	Comment Summary
<p><b>Biological Resources (continued)</b></p>	<p><i>Impacts of Electromagnetic Fields.</i> Four commenters noted that the EIS should include a rigorous and independent analysis of the effects of EMFs and thermal effects produced by both DC and AC transmission lines on aquatic ecosystems, including behavior and reproduction of fish and other animals. One comment noted that EMF could affect aquatic species that use the Earth’s magnetic field for orientation during navigation. Electra-sensitive species could be attracted or repelled by the electrical fields generated by the transmission cables. Areas of breeding, feeding, or nursing are particularly prone to these effects because of the congregation or dispersion of sensitive individuals in the benthic community.</p> <p><i>Special Status Species.</i> One commenter noted that the EIS should assess the impacts on the federally listed endangered Karner blue butterfly, the species that has the greatest potential for impacts from the proposed project (<i>Lycaeides melissa sarnuelis</i>). Suitable habitat occurs in several portions of the project, and there are some known occurrences. One comment noted that the NOI discussed federally listed species under NOAA jurisdiction, but omitted species under USFWS jurisdiction.</p> <p><i>Protected Areas.</i> One commenter noted that the EIS should also consider the effects on Essential Fish Habitat designated under the Magnuson-Stevens Act; Haverstraw Bay has some other designations that should be considered. The transmission line would pass through the Hudson River National Estuarine Research Reserve, a marine protected area. Two commenters noted that the EIS should analyze all Significant Coastal Fish and Wildlife Habitats (SCFWHs) that would be affected by the installation, operation, or maintenance of the proposed transmission line and determine if they would affect the viability of the SCFWHs. Any difference in effects between installations in disturbed versus undisturbed areas of applicable SCFWHs should be discussed.</p> <p><i>Invasive Species.</i> Two commenters noted that the EIS should evaluate the potential of the project to spread aquatic invasive species, including the zebra mussel, Chinese mitten crab, and the purple loosestrife.</p> <p><i>Coastal Zone Management.</i> One commenter noted that the EIS should include an analysis of all applicable Coastal Management Program and Local Waterfront Revitalization Programs (LWRP) policies. The New York State Department of State requires all applicants seeking concurrence with a consistency certification to provide an analysis of all applicable Coastal Management Program or applicable LWRP policies. The proposed action would traverse multiple communities with federally approved LWRPs and, as such, where the proposed action would have an effect on such a community, an analysis of applicable LWRP policies for each LWRP community should be provided.</p>
<p><b>Geology and Soils</b></p>	<p><i>Seismic Activity.</i> One commenter noted that the EIS should evaluate the impact of seismic activity on power cable integrity.</p> <p><i>Geology and Soils.</i> One commenter noted that the EIS should characterize sediment size and soil type along the entire transmission line route and characterize the suitability of each area to use the proposed installation method.</p>

Subject Area	Comment Summary
<p><b>Visual Resources</b></p>	<p><i>Aesthetic and Visual Resources.</i> Two commenters noted that the EIS should characterize all visually important resources affected by construction and operation of the Proposed Project, including below-ground construction of the transmission line. Visually important resources include Scenic Areas of Statewide Significance, and areas that have been specially designated as scenic districts by New York State under New York Environmental Conservation Law Article 49, Protection of Natural and Man-Made Beauty (e.g., the Tappan Zee East Scenic District, Olana Scenic District). One comment noted that extended construction and maintenance of facilities, including below-ground facilities, can produce visual and aesthetic impacts. As such, these impacts should be identified and evaluated. Presently, the NOI only states that aboveground components will be evaluated. Another comment indicated that the EIS should consider temporary visual impacts of nighttime lighting and equipment near the Hudson River.</p> <p><i>Visual Impacts from the Yonkers Converter Station.</i> Three commenters noted that the EIS should assess the visual impact of the converter station and discuss mitigation strategies. A thorough visual analysis determining places from which the converted station would be seen should be prepared. The analysis should include computer-generated visual simulations in order to understand how the converter station would look from important vantage points. These should include the Library, Yonkers Station, Hudson River, upland neighborhoods, adjacent sidewalks, and nearby intersections. At a minimum the visual impacts from the Yonkers Train Station Platform should be shown. Views from Palisades Interstate Park (National Natural Landmark), located across the river in New Jersey and in Rockland County, New York; and from the Bell Place National Register Historic District, the Old Croton Aqueduct State Park, and Philips Manor Hall, listed on the National Register of Historic Places and a State Historic Site, must be assessed. Other locations should be identified in consultation with City officials.</p>
<p><b>Land Use and Infrastructure</b></p>	<p><i>Transmission Line Land Use.</i> One commenter suggested proposed signage to alert river users to the presence of the buried power cables to avoid disturbance and damage. Another comment suggested that the EIS should identify and characterize all agricultural land that might be affected by the proposed transmission line.</p> <p><i>Yonkers Converter Station Land Use.</i> One commenter noted that the EIS should characterize land use around the proposed Yonkers Converter Station and analyze the potential impacts of constructing the converter station on surrounding land uses. The analysis should discuss future land values, impacts on the Alexander Street Master Plan, impacts on future redevelopment by the City of Yonkers near the converter station, impacts on commuter parking, impacts on marina development and harbor management by the City of Yonkers, impacts on continued use of the Yonkers Recreation Pier as a ferry point and embarkation point for other boats, impacts on the Beczak Environmental Education Program and on the Yonkers Canoe Club, and impacts on the City of Yonkers Jail.</p>

Subject Area	Comment Summary
<p><b>Land Use and Infrastructure (continued)</b></p>	<p><i>Infrastructure.</i> One commenter noted that the development of the EIS should consider the impacts on existing infrastructure in the vicinity of the proposed transmission line route and the proposed Yonkers Converter Station. Specifically, commenters noted the presence of Rip Van Winkle Bridge piers, pipelines, power cables, outfalls, and the high-voltage electrified lines along the Metro-North Railroad. The analysis in the EIS should also consider the operation of existing infrastructure on the proposed project. One commenter noted that electrical or magnetic interference with the proposed transmission line could occur with existing infrastructure. With respect to the upland placement of the cables, the General Accounting Office briefing on “Issues Associated with High-Voltage Direct-Current Transmission Lines along Transportation Rights of Way” dated February 2008, stated that electromagnetic fields and stray current could interfere with railroad signaling systems and highway traffic operations, and accelerate pipeline corrosion. The Hudson River Federal Navigation Channel is authorized at 32-foot depth. The EIS should analyze how to avoid damage to the power cables due to periodic maintenance dredging to maintain that depth.</p> <p>One commenter asked the questions: Would the converter station require service from City of Yonkers infrastructure including water, storm, or sanitary sewer? What volume of water will be required at the converter station? Will potable water be used for any reason other than human consumption and sanitary needs? Where will connections for city infrastructure be made? Does sufficient capacity exist for the need of the converter station or will new connections be required to be made?</p> <p>One commenter suggested that the EIS determine if the Hudson River navigation channel’s maximum depth is practicable to support existing and future commercial navigation given existing, authorized depths, topography, necessary channel side slopes, port infrastructure, and aerial clearances.</p>
<p><b>Cultural Resources</b></p>	<p><i>Transmission Line Cultural Resources.</i> Five commenters noted that the EIS should evaluate the impacts of construction on historic resources along the transmission line route, including the Glenwood Power Station, historic shipwrecks within Lake Champlain, and the Champlain Canal (part of the Erie Canal National Heritage Corridor).</p> <p><i>Yonkers Converter Station Cultural Resources.</i> One commenter noted that the EIS should evaluate the impacts of construction and operation of the converter station on surrounding National Register of Historic Places-eligible resources, including the Otis Elevator Plant, the Philips Manor Hall, the Habishaw Club site (the Beczak Environmental Education Center), and the North Yonkers Pump Station. The EIS should discuss means to blend the proposed converter station into the surroundings.</p> <p><i>Impacts on the Champlain Canal.</i> One commenter noted that the EIS should evaluate the impacts on the Champlain Canal (a National Heritage Corridor). The potential impacts on the canal include evaluating underground utility depth requirements in order to minimize potential impacts on vessel operations and channel maintenance operations; placement of cables within the official canal channel, which would not be permitted (alternatives to effective crossing of the canal that do not impact maintenance and use of the channel should be discussed); impacts on New York State Conservation Council (NYSCC) corporate operations; impacts on commercial boating traffic due to delays during construction; impacts on NYSCC employee safety; impacts on the canal from electromagnetism; and impacts associated with turbidity within the canal system. The EIS should also discuss that real property rights or a permit must be acquired from the NYSCC to use the Champlain Canal.</p>



Subject Area	Comment Summary
<p><b>Health and Safety</b></p>	<p><i>Public Health and Safety near the Yonkers Converter Station.</i> One commenter noted that the EIS should consider the impacts on public health and safety from electrical and magnetic fields generated near the proposed Yonkers Converter Station. The EIS should also consider the potential impacts on the public from fires and explosions at the convertor station.</p> <p><i>Occupational Health and Safety.</i> Three commenters noted that the EIS should discuss the potential for explosions and fire from electrical equipment contained in the Yonkers Converter Station. The EIS should discuss mitigation measures to be taken to reduce the probability and reduce the impacts of fires and explosions, such as deluge and fire suppression systems. As the Consolidated Edison substations near the proposed converter station site have had major transformer fires, the EIS should discuss the potential for impacts from similar fires at the convertor station. The EIS should discuss whether workers would be more likely to be injured given the increased safety risk of close proximity of the transmission lines to transportation rights-of-way. One comment asked if there would be any human health impacts upon workers in adjacent buildings in the I-Park/Otis Elevator Plant complex near the Yonkers Converter Station. Are there any potential impacts upon equipment or manufacturing or research activities that might take place in the buildings surrounding the proposed converter station or adjacent to the cables serving the station?</p>
<p><b>Air Quality</b></p>	<p><i>Air Quality Analysis.</i> One commenter noted that the air quality analysis in the EIS should include a General Conformity Applicability Analysis and a carbon footprint analysis. One commenter suggested using diesel particulate filters on construction equipment to reduce impacts from particulate matter.</p> <p><i>Air Quality near the Yonkers Converter Station.</i> One commenter noted that the EIS should discuss air quality impacts of operation of the converter station. Will there be ozone creation from the electrical equipment? Will there be any public health issues to area residents from the operation of the plant? What mitigation can be instituted to deal with air quality issues to area residents? One comment noted that Southwest Yonkers is an asthma problem area and suggested that the EIS discuss any impact that might add to the asthma problem stemming from the proposed converter station.</p> <p><i>Ozone Standards.</i> One comment noted that the USEPA is on the verge of finalizing a revised National Ambient Air Quality Standard for ozone. The new standard will be 20 to 40 percent more stringent than the current standard and will require significant emissions reductions, possibly by 70 percent or more, within the eastern United States. DOE should work with the NYISO and the New York State Public Service Commission (NYSPSC) to assess the air quality impacts associated with importing an additional 1,000 MW of clean new capacity to the greater New York City metropolitan area. This effort should assess ozone precursor reductions, toxic air pollutant emissions reductions, and any environmental justice benefits associated with reduced emissions from older, less-efficient electric generating units in the area to be served by this new capacity. One commenter noted that DOE should also work with NYISO to identify those electrical generating units likely to become uneconomic as a result of an influx of significant new capacity so that USEPA can develop appropriate air quality modeling assumptions for the implementation of the revised ozone standard.</p>

Subject Area	Comment Summary
<p><b>Water Resources</b></p>	<p><i>Water Quality.</i> One commenter noted that the EIS should address the potential impacts of sediment disturbances in the Superfund Area along the transmission line route on drinking water quality supplied by the Hudson River to the residents of Rhinebeck, Port Ewen, Lloyd, Poughkeepsie, Stillwater, Halfmoon, Waterford, and Green Island. The commenter suggests assessing sediment contamination before working in these areas to minimize disturbance. Six commenters noted that the EIS should identify and characterize all pollutants along the route and analyze the likelihood of resuspension or release. Where specific pollutants are identified, adequate preventative measures, including applicable alternatives, should be analyzed and their anticipated coastal effects should be included in the EIS. One commenter noted that the EIS should investigate the potential in Lake Champlain for impacts from fuel leaks from the wrecked tugboat McAllister.</p> <p><i>Surface Water and Wetlands.</i> Four commenters noted that the EIS should characterize the potential effects of construction, operation, and maintenance of the proposed transmission line on the surface water regime along all buried portions of the route including freshwater and tidal wetlands. Further, the impacts of Horizontal Directional Drilling, which is proposed for transition points where the cables enter and exit the water, on wetlands must be investigated.</p> <p><i>Floodplains.</i> One commenter noted that the portions of the proposed route using the railroad right-of-way would cross Federal Emergency Management Agency-mapped floodplains associated with the Hudson River, as would the underground connection to the Yonkers converter station. Any potential impacts from construction equipment and activities on wetlands should be evaluated in the draft EIS.</p> <p><i>Resuspension of PCBs.</i> Four commenters noted that the EIS should address the potential for resuspension of PCBs and other contaminants in the Mid- and Lower-Hudson River due to the burying of cable in contaminated sediment. While the concentration of PCBs is greatest in the Upper Hudson, it is undisputed that PCBs contaminate the Mid- and Lower-Hudson River as well. The resuspension of PCBs would impact wildlife and aquatic species, and human health.</p>
<p><b>Environmental Justice</b></p>	<p><i>Environmental Justice Analysis for the Proposed Yonkers Converter Station.</i> Three commenters noted that the EIS should include a detailed environmental justice analysis of the siting of the proposed Yonkers Converter Station. The City of Yonkers contains a number of utility and transportation land uses that serve the greater New York City area. These utility and transportation land uses could have a disproportionate impact upon area residents. Additionally, the City of Yonkers has a higher share of the county's low- income and minority populations than would be proportionate to its share of the county's overall population. The area around the proposed converter station is overwhelmingly low-income and minority.</p> <p><i>Socioeconomic Impacts.</i> One commenter noted that since the proposed project will pass through but provide no benefits to the communities along the route of the cable, the EIS should consider mitigation opportunities for these communities.</p>

Subject Area	Comment Summary
<b>Socioeconomics</b>	<p><i>Economic Benefits.</i> One commenter noted that the EIS should evaluate the economic benefits of the additional 1,000 MW of additional electricity capacity and its impact on marginal electric supply costs, including the potential for these benefits to accrue beyond the immediate New York City metropolitan area.</p> <p><i>Economic Impacts of the Yonkers Converter Station.</i> One commenter noted that the EIS should examine the impacts upon the planned changes to the Yonkers downtown area around the site of the proposed converter station. The comment asks what socioeconomic changes are likely with and without the converter station? The analysis should include employment at the site, income tax implications of employment at the site, sales tax spin-off impacts of employment at the site, and the impacts upon the surrounding downtown with the converter, with other planned uses and without the converter station. One comment requested that the EIS investigate and discuss area businesses that would be negatively impacted by construction period air quality impacts. Another comment requested that the EIS discuss the property tax implications of the proposed converter station in Yonkers and any other real property installations that are a part of the proposed action. An additional comment suggested that the EIS examine and analyze the occupancy impacts of the converter station upon nearby properties. The comment asked if the converter station would cause a change in the quality of occupancy in the commercial buildings to the east of the proposed site and if the converter station would have any impacts upon the residential community to the north of the I-Park/Otis Elevator Plant Site?</p>
<b>Hazardous Materials and Waste</b>	<p><i>Hazardous Materials at the Yonkers Converter Site.</i> One commenter noted that the EIS should discuss the presence of any toxic materials used at the facility. Are there nontoxic materials used at the facility that when combined with other nontoxic materials at the facility might become toxic?</p> <p><i>PCBs.</i> One commenter noted that there are known or likely accumulations of paper-processing waste including PCBs in the areas of Cumberland Bay and near the mouth of the LaChute River. The area around the existing International Paper Plant in Ticonderoga should also be considered a potential area of contamination.</p>
<b>Recreation</b>	<p><i>Recreation.</i> Six commenters noted that the EIS should contain an analysis of the impacts on recreational river traffic, including impacts on public access to recreational opportunities along the transmission line route. One commenter noted that the EIS should analyze the impacts of the proposed project and alternatives on anchoring boats in Lake Champlain. The issue would be particularly relevant in the shallow and narrow southern part of the lake. If there are any risks to swimmers, divers, or snorkelers, these should also be addressed in the EIS.</p>
<b>Cumulative Impacts</b>	<p><i>Cumulative Impacts Analysis.</i> Seven commenters noted that the EIS should consider the following projects in the cumulative impacts analysis: New York State Thruway Authority (NYSTA) ongoing maintenance and capital improvements projects for the Tappan Zee Bridge, demolition and replacement of the Crown Point Bridge, previous and future dredging projects along the transmission line route, and projects in the downtown Yonkers area.</p>
<b>Mitigation</b>	<p><i>Mitigation Measures.</i> One commenter noted that the EIS should consider all appropriate mitigation measures to avoid sensitive aquatic and terrestrial habitats; cable installation during mating, spawning, and migration seasons; resuspension of contaminants; and permanent alternation of lake and river bed substrates.</p>

Subject Area	Comment Summary
<b>Other Issues</b>	<p><i>Impacts in Canada.</i> Three commenters noted that the EIS should consider impacts on the Canadian environment and the social and economic impacts upon native people affected by new power development in Canada as a result of the CHPE transmission line.</p> <p><i>Balance of Payments.</i> Three commenters noted that from an economic perspective, purchasing of energy from outside New York State is bad for the state's balance of payments, and for national balance of payments. The public interest would not be served by the project from this perspective, and the comment requests that this be considered in the EIS.</p> <p><i>Energy Efficiency and Conservation Measures.</i> Three commenters noted that the EIS should include an evaluation of alternatives to the Proposed Project that includes energy efficiency and conservation measures in lieu of construction of the transmission line.</p>

**Table 3. Directory of Stakeholder Comments**

<b>Stakeholder Name and Affiliation</b>	<b>Comment Date and Source</b>
<b>Federal Agencies</b>	
Grace Musumeci, Chief Environmental Review Section, U.S. Environmental Protection Agency Region 2	July 28, 2010, letter to DOE
David Stilwell, Field Supervisor, U.S. Department of the Interior, U.S. Fish and Wildlife Service, Cortland, NY Office	August 2, 2010, letter to DOE
<b>Native American Tribes and Canadian First Nations</b>	
Patrycja Ochman, O'Reilly & Associates Avocats, stated as on behalf of the Uashannuat, Innu of Uashat mak Mani-Utenam First Nation	August 2, 2010, letter to DOE
<b>State and Provincial Agencies</b>	
Alain Olivier, Government of Quebec	July 9, 2010, public scoping meeting July 14, 2010, public scoping meeting
Peter Casper, Assistant Counsel, New York State Thruway Authority, New York State Canal Corporation	July 29, 2010, letter to DOE
M. Jodi Rell, Governor, State of Connecticut	July 30, 2010, letter to DOE
Jeffrey Zappieri, Supervisor, Consistency Review Unit, Office of Coastal, Local Government and Community Sustainability, New York State Department of State	August 2, 2010, letter to DOE
<b>Local Government Agencies</b>	
Chuck Lesnik, City Council President, City of Yonkers	July 12, 2010, public scoping meeting August 2, 2010, letter to DOE
Lee Ellman, Planning Director, Planning Bureau, City of Yonkers	July 12, 2010, public scoping meeting July 30, 2010, letter to DOE
Frank Stilo, Yonkers 1 <sup>st</sup> Precinct Community Council	July 12, 2010, public scoping meeting
John Bowacic, New York Senate, 42nd District	July 13, 2010, public scoping meeting
Ronald Miller, Trustee, Village of Menands	July 14, 2010, public scoping meeting
Roland R. Vosburgh, Principal Planner, Columbia County	July 28, 2010, letter to DOE
Christopher Crane, Legislative Counsel, Westchester County Board of Legislators	August 1, 2010, letter to DOE
Philip A. Amicone, Mayor, City of Yonkers	August 2, 2010, letter to DOE
<b>Non-Governmental Organizations and Individuals</b>	
Angela Pernice, private citizen	July 8, 2010, email to DOE
Scott Lorey, Legislative Director, Adirondack Council	July 12, 2010, public scoping meeting
James Frakes, Adirondack Council	July 16, 2010, public scoping meeting
Steve Davis, private citizen	July 29, 2010, email to DOE
Mike Winslow, Staff Scientist, Lake Champlain Committee	August 1, 2010, letter to DOE
John Davis, Conservation Director, Adirondack Council	August 2, 2010, letter to DOE

Stakeholder Name and Affiliation	Comment Date and Source
<b>Non-Governmental Organizations and Individuals (continued)</b>	
Rose Van Guilder, Alliance for Independent Long Island; Long Island Rockaway Ratepayers Alliances	July 9, 2010, public scoping meeting
Frank Eadie, private citizen	July 9, 2010, public scoping meeting
Joel R. Kupferman, NY Environmental Law and Justice Organization	July 9, 2010, public scoping meeting
Demosthenes Matsis, private citizen	July 9, 2010, public scoping meeting
Annie Wilson, Energy Committee Chair, Sierra Club Atlantic Chapter	July 9, 2010, public scoping meeting August 2, 2010, letter to DOE
Susan Leifer, private citizen	July 12, 2010, public scoping meeting
Richard S. Tarantelli, private citizen	July 12, 2010, public scoping meeting
Clifford Schneider, Beczak Environmental Education	July 12, 2010, public scoping meeting
Philip Musegaas, Hudson River Program Director, Riverkeeper	July 12, 2010, public scoping meeting July 13, 2010, public scoping meeting August 2, 2010, letter to DOE
Hayley Mauskapf, Environmental Advocacy Associate, Scenic Hudson, Inc.	July 12, 2010, public scoping meeting July 13, 2010, public scoping meeting August 2, 2010, letter to DOE
George Klein, Chairman, Sierra Club Lower Hudson Group	July 12, 2010, public scoping meeting August 2, 2010, letter to DOE
William Overstone, private citizen	July 13, 2010, public scoping meeting
David Ladenheim, private citizen	July 13, 2010, public scoping meeting
Jurgen Wekerle, Sierra Club - Ramapo/Catskill Group	July 13, 2010, public scoping meeting
Randolph Horner, Solar Evolution, LLC	July 13, 2010, public scoping meeting
Geddy Sveikauskas, Ulster Publishing Company	July 13, 2010, public scoping meeting
Tom Ellis, Citizens' Environmental Coalition	July 14, 2010, public scoping meeting
Julia Stokes, Saratoga Plan	July 15, 2010, public scoping meeting
Gordon Boyd, Energy Next, Inc.	July 15, 2010, public scoping meeting
Skip Stranahan, private citizen	July 15, 2010, public scoping meeting
David Manwell, private citizen	July 16, 2010, public scoping meeting
Peter D'Elia, private citizen	July 16, 2010, public scoping meeting
Lori Fisher, Lake Champlain Committee	July 16, 2010, public scoping meeting
Jack Hills, private citizen	July 16, 2010, public scoping meeting
Jean Public, private citizen	July 21, 2010, email to DOE
Roger L. Jennings, President, RJennings Company	August 2, 2010, letter to DOE
Doris Delaney, PROTECT	Undated letter to DOE, received August 2, 2010

**Note**

A full version of the 2010 Scoping Report, including appendices, is available in the CHPE EIS website document library at <http://www.chpexpresseis.org>.

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***APPENDIX D.2 – 2012 SCOPING REPORT ADDENDUM***



# **SCOPING SUMMARY REPORT ADDENDUM**

## **CHAMPLAIN HUDSON POWER EXPRESS TRANSMISSION LINE PROJECT ENVIRONMENTAL IMPACT STATEMENT**



**U.S. Department of Energy  
Office of Electricity Delivery and Energy Reliability  
Washington, DC 20585**

**Cooperating Agencies:**

**New York State Department of Environmental Conservation  
New York State Department of Public Service  
U.S. Army Corps of Engineers  
U.S. Coast Guard  
U.S. Environmental Protection Agency  
U.S. Fish and Wildlife Service**

**SEPTEMBER 2012**

## ACRONYMS AND ABBREVIATIONS

BMP	best management practice
CHPE	Champlain Hudson Power Express
CHPEI	Champlain Hudson Power Express, Incorporated
CSX	CSX Transportation
DOE	U.S. Department of Energy
EIS	Environmental Impact Statement
EMF	electromagnetic field
HDD	horizontal directional drilling
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NYSPSC	New York State Public Service Commission
NYSDEC	New York State Department of Environmental Conservation
NYSDOT	New York State Department of Transportation
RCRA	Resource Conservation and Recovery Act
ROW	right-of-way
TDI	Transmission Developers, Inc.

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**SCOPING SUMMARY REPORT ADDENDUM  
CHAMPLAIN HUDSON POWER EXPRESS TRANSMISSION LINE PROJECT EIS**

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# 1. Introduction

## 1.1 Overview

On January 25, 2010, Transmission Developers Inc. (TDI) submitted an application to the U.S. Department of Energy (DOE) for a Presidential permit for the Champlain Hudson Power Express (CHPE) project (proposed project).<sup>1</sup> On June 18, 2010, DOE issued the *Notice of Intent to Prepare an Environmental Impact Statement and to Conduct Public Scoping Meetings, and Notice of Floodplains and Wetlands Involvement; Champlain Hudson Power Express, Inc.* (75 FR 34720), and conducted public scoping from June 18, 2010 to August 2, 2010. The Champlain Hudson Power Express Scoping Report (December 2010) (2010 Scoping Report) summarizes comments received during that DOE public scoping period.

On February 28, 2012, TDI submitted an amendment to the Presidential permit application that reflected changes to the proposed transmission line route. The proposed changes are the result of settlement negotiations among New York State agencies, Champlain Hudson Power Express, Inc. (CHPEI), CHPE Properties, Inc. and other stakeholders as part of the project review under Article VII of the New York State Public Service Law. The amendment is referred to as the Joint Proposal. In response to submission of the Joint Proposal DOE published an *Amended Notice of Intent to Modify the Scope of the Environmental Impact Statement for the Champlain Hudson Power Express Transmission Line Project in New York State* (77 Federal Register 25472) (Amended NOI) on April 30, 2012, and accepted public comments from April 30, 2012 to June 14, 2012. DOE also stated that it will consider comments submitted after June 14<sup>th</sup> to the extent practicable. In the Amended NOI, DOE stated that it did not intend to hold further public scoping meetings, but recognized that comments provided by the public during the New York State Public Service Commission's (NYSPSC's) April 2012 public statement hearings might be relevant to the National Environmental Policy Act (NEPA) scoping process. Therefore, DOE explained that it "intends to review the Commission's April public hearing statement transcripts and consider them, to the extent matters relevant to the federal environmental review process arise, as scoping comments for the purposes of the EIS." This 2012 Scoping Summary Report Addendum summarizes scoping comments related to the Joint Proposal.

The 2010 Scoping Report, this 2012 Scoping Summary Report Addendum, comments submitted directly to DOE, and copies of the April 2012 NYSPSC public statement hearings are available on the Champlain Hudson Power Express Project Environmental Impact Statement (EIS) Website at <http://chpexpresseis.org>. Comments submitted to the Commission are available at <http://documents.dps.ny.gov>.

## 1.2 Summary of Project Changes

The Joint Proposal Route (see **Figure 1**) is essentially the same as the original proposed route, as amended in August 2010, for major portions of the transmission line route, except for adjustments in the route alignment at five primary locations and minor route adjustments in other areas along the route. The proposed primary route adjustments are as follows:

- A relocated 10-mile stretch of route between Dresden, New York, and Whitehall, New York, underground along New York State Route 22 to avoid installing the cables in the southern end of Lake Champlain. This change is being proposed to remove the transmission line from the environmentally sensitive southern portion of Lake Champlain.

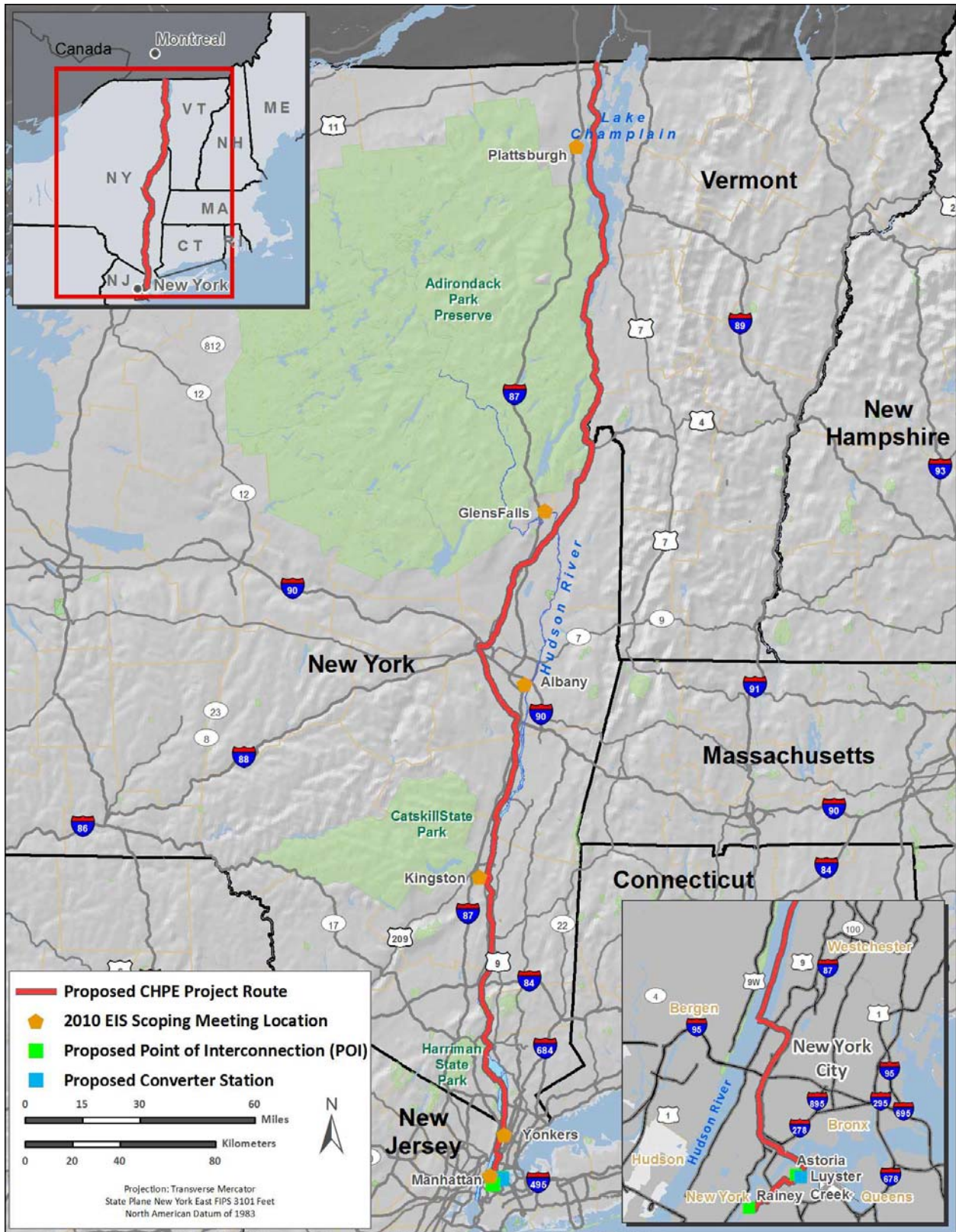
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<sup>1</sup> TDI submitted amendments to the proposed route in its original application on August 5, 2010 and July 7, 2011.

- 
- The routing of the transmission line underground off the railroad right-of-way (ROW) for more than 1 mile through city streets in the City of Schenectady to avoid engineering constraints.
  - Relocation of a portion of the transmission line into the Hudson River. As originally proposed the transmission line would have entered the Hudson River at the Town of Coeymans, New York. Under the Joint Proposal, the line would enter the Hudson River at the Town of Catskill via horizontal directional drilling (HDD). From Selkirk to Catskill, the transmission line would primarily be in the CSX Transportation (CSX) railroad ROW for approximately 30 miles instead of in the Hudson River.
  - Removal of the transmission line from the Hudson River at Haverstraw Bay where the segment would instead run along the railroad ROW through the community of Stony Point for approximately 7 miles. The transmission line would be installed underground here to avoid impacts on aquatic resources in Haverstraw Bay.
  - Relocation of the transmission line from a portion of the Harlem and East rivers to the Hell Gate Bypass Route, north of the Willis Avenue Bridge, and proceeding east approximately 1 mile through the New York State Department of Transportation (NYSDOT) railroad corridor and rail yards. From there, the transmission line would follow the rail corridor along the northern side of the Bronx Kill and then enter the East River.

Additionally, the proposed location of the converter station would be constructed in Astoria, Queens County, New York (Luyster Creek Converter Station) under the Joint Proposal, rather than as previously proposed in Yonkers, New York. Additional details about the Joint Proposal can be found on the DOE Champlain Hudson Power Express Project EIS Website at <http://chpexpressEIS.org>.





**Figure 1. Joint Proposal Route**

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## 2. Scoping Comments

An overview of comments received during the 2012 public scoping period, catalogued by general topic, is provided in **Table 2-1** below. Issues potentially relevant to the scope of the EIS will be considered by DOE during development of the Draft EIS.

**Table 2-1. Summary of 2012 Public Scoping Comments**

Subject Area	Comment Summary
NEPA Process	<p><b>Public Involvement.</b> Comments requested an extension of the public comment period.</p>
Proposed Project	<p><b>Project Life Cycle.</b> Comments stated that they EIS should examine the lifespan of the proposed project, potential failure scenarios, how well the proposed project would withstand being under water for many years, and eventual removal of the cable following decommissioning.</p> <p><b>Project Description.</b> Comments stated that the analysis should include potential operational issues that could arise for other power entities operating in New York, including the New York Independent Systems Operator, Central Hudson Gas and Electric, Consolidated Edison, Entergy Nuclear Power, and the New York Power Authority. Comments also requested further explanation of the purpose and need from CHPE for the proposed project.</p> <p><b>Alternatives.</b> Comments stated that the purpose of and need for the proposed project would be met by constructing renewable energy sources, building new power generation sources in the United States, or refurbishing existing power plants, rather than importing power from Canada. Comments sought evaluation of an overland transmission route using highway corridors; a railroad ROW underground route; any New York State Department of Public Service proposed alternative; any combination of route alternatives that would have less impact to the aquatic environment. Comments stated that it would be preferable to invest in weatherization and conservation projects.</p> <p><b>Alternative Transmission Line Locations.</b> Comments stated that constructing the proposed project along the Old Champlain Canal should be evaluated as an alternative in the EIS. Other comments stated that the transmission line from the Astoria substation to the Consolidated Edison Rainey Substation should be placed in the East River rather than through neighborhoods in Queens.</p> <p><b>Luyster Creek Converter Station Location.</b> Comments stated that the environmental impacts from the Luyster Creek Converter Station location should be addressed in the review of the proposed transmission line project.</p> <p><b>Alternative Converter Station Locations.</b> Comments stated that additional locations for the converter station should be evaluated, including a site in Brooklyn near the Gowanus Substation, the Harlem River Rail Yards, and an area near the Consolidated Edison Rainey Substation.</p> <p><b>System Reliability.</b> Comments stated that the potential impacts of the proposed transmission line project on electric reliability, system redundancy, and bulk power systems, both within and adjacent to New York, should be considered.</p> <p><b>Permitting Requirements.</b> Comments stated that the Joint Proposal would be in conflict with the parameters established by the U.S. Army Corps of Engineers for the Clean Water Act Section 404 permitting process for this project.</p>

Subject Area	Comment Summary
<b>Land Use</b>	<p><b>Potential Use of Forest Preserves.</b> Comments stated that the proposed project could be a violation of Article 14 of the state constitution, which states that lands constituting a forest preserve cannot be sold to a private entity. Comments stated that the Attorney General of New York has stated that underwater lands adjacent to Adirondack Park were considered forest preserve lands.</p> <p><b>Impacts on Residential Areas.</b> Comments stated that the EIS needs to address potential impacts on future land use in residential areas.</p> <p><b>Luyster Creek Converter Station Land Use Consistency.</b> Comments stated that the Luyster Creek Converter Station would be consistent with the existing land use at the site and would be appropriate for construction of a converter station. Other comments stated that the construction of the Luyster Creek Converter Station would not be consistent with Consolidated Edison’s proposed use of the site for utility purposes.</p> <p><b>Encroachment Outside of Right-of-Way.</b> Comments stated that the proposed project would encroach on additional lands outside of the existing right-of-way and that these impacts should be considered.</p> <p><b>ROWs.</b> Comments expressed concern that the use of ROWs and approval of the proposed project could create a competitive monopoly for CHPE and lead to lawsuits related to access to land.</p>
<b>Infrastructure</b>	<p><b>Water Utilities.</b> Comments stated that the proposed project needs to address potential impacts on workers and a new main water line that is being repaired in the Town of Whitehall.</p>
<b>Water Resources</b>	<p><b>Lovett Plant.</b> Comments stated that the closure of the Lovett Plant left a coal ash plume in the groundwater table and requested that the impacts of the proposed transmission line on that plume be evaluated.</p> <p><b>Sludge Bed.</b> Comments stated concern about the potential for the proposed project to resuspend pollutants found in the sludge bed at the mouth of the LaChute River, noting that when the paper mill on site was closed in the 1960s, approximately 945,000 cubic meters of waste were left behind covering approximately 98 hectares.</p> <p><b>Resuspension of Phosphorus.</b> Comments stated that the proposed project would disturb sediments and increase the concentration of phosphorus in the water column within Lake Champlain, and the EIS should address any potential impacts and prescribe mitigation measures, as appropriate.</p>
<b>Cultural Resources</b>	<p><b>Luyster Creek Converter Station Cultural Resources.</b> Comments stated that the Luyster Creek Converter Station site in Astoria has been identified by the State Historic Preservation Office as an archaeologically sensitive area.</p>
<b>Geology and Soils</b>	<p><b>Impacts on Agricultural Lands.</b> Comments expressed concern that the proposed project would result in potential impacts on agricultural lands through the construction of temporary access roads and work areas, and from any deviations from the centerline.</p>
<b>Wildlife and Fish</b>	<p><b>Electromagnetic Fields (EMF).</b> Comments stated concerns about EMF on fish and birds.</p>

Subject Area	Comment Summary
<b>Visual Resources</b>	<p><b>Visual Impacts on Lake Champlain.</b> Comments stated that construction on Lake Champlain would lead to potential visual impacts from the visibility of the construction equipment at the surface of the lake.</p> <p><b>Visual Impacts along Route 9W.</b> Comments requested evaluation of the removal of trees on the eastern side of Route 9W in Rockland County, which currently provides screening from the roadway and existing residential areas.</p>
<b>Transportation and Traffic</b>	<p><b>Local Traffic.</b> Comments asked how the proposed project would impact local traffic during construction.</p>
<b>Recreation</b>	<p><b>Recreation Areas.</b> Comments stated that the proposed project would disturb park lands including the Tompkins Cove and Waldron Revolutionary War Cemetery historic areas, Rockland Lake State Park, Stony Point Park, and the Haverstraw Little League Fields.</p>
<b>Public Health and Safety</b>	<p><b>Public Safety.</b> Comments stated that the proposed transmission line would pose a public health threat by being located too close to residential areas. Comments requested analysis of the effects of EMF in proximity to residential areas and public spaces.</p> <p><b>Navigation Safety.</b> Comments stated that the placement of the transmission line 6 feet below the river bottom and plan to lay the cable over rock areas could result in a potential safety hazard for ships attempting to anchor in the Hudson River and could disrupt marine traffic and use of the cables. Comments stated that if the cables occupy any federally maintained navigation channels, they should be buried at least 15 feet below the authorized depth within those channels. Comments also expressed concern about impacts the proposed project could have on future navigational improvements (e.g. dredging) in the Hudson River.</p>
<b>Hazardous Materials and Wastes</b>	<p><b>Contamination of Luyster Creek Site.</b> Comments stated that the Luyster Creek Converter Station site in Astoria is the site of a former manufactured gas plant, has ongoing contamination issues, and is included in the New York State Department of Environmental Conservation's (NYSDEC's) Resource Conservation and Recovery Act (RCRA) Corrective Action program.</p>
<b>Air Quality</b>	<p><b>Reduction in Air Pollution.</b> Comments stated that the proposed project would result in a reduction of air pollution. Other comments stated that constructing the proposed transmission line would mean fewer power plants in New York City, which would reduce air quality issues in the city.</p>
<b>Socioeconomics</b>	<p><b>Socioeconomic Impacts.</b> Comments stated that the EIS should evaluate the potential for real estate values to drop in areas where the proposed transmission line is constructed.</p>
<b>Environmental Justice</b>	<p><b>Environmental Justice.</b> Comments stated that the proposed project would increase the cost of electricity, which would place an unfair burden on the low-income residents of New York.</p>

Subject Area	Comment Summary
<p><b>Mitigation/Best Management Practices</b></p>	<p><b>Champlain Canal.</b> Comments stated that, as part of mitigation, the project proponent should invest in the construction of a portion of the proposed Champlain Canalway Trail. The trail could be used by the contractors as a means of accessing the project site during construction. Following construction, the trail would become a long-term tourist attraction.</p> <p><b>Mitigation Fund.</b> Comments stated that the mitigation fund created to account for unanticipated effects of the proposed project would be insufficient and fail to address the unanticipated impacts on water quality and other resources along the proposed transmission line route. Comments also stated that the Commission needs to evaluate the fairness of the process for determining which projects receive funding from the mitigation fund, including ensuring that there is an appropriate balance of projects along upland areas, Lake Champlain, and the Hudson River. Other comments praised the creation of the mitigation fund, noting that the creation of the fund would result in a net benefit to the Hudson River and Lake Champlain.</p> <p><b>Best Management Practices.</b> Comments stated that the EIS needs to disclose best management practices (BMPs) for erosion and sediment control, vegetation clearing and disposal, activities in streams and wetlands, access road construction, invasive species control, protection of threatened and endangered species, and inspection and monitoring.</p>
<p><b>Cumulative Impacts</b></p>	<p><b>Cumulative Impacts.</b> Comments requested that the cumulative impacts analysis for the proposed project consider the construction of the United Waters Desalination Plant and potential closure of the Indian Point nuclear facility. Comments stated that other entities have proposed similar projects within portions of the Hudson River and asked how many other lines could be located along the same route. Other comments expressed concern that approval of the proposed project could lead to construction of additional transmission lines from Canada.</p>

Subject Area	Comment Summary
Other Issues	<p><b>Economic Opposition.</b> Comments stated that the proposed project would not lower electricity rates, improve the electricity grid, alleviate congestion, grow or improve New York State’s electricity infrastructure, or provide local or long-term jobs to the communities along the proposed transmission line. Comments also stated the proposed project would mean higher energy bills and create more reliability problems. Comments also stated that the project would send jobs and economic development to Canada rather than generating new jobs in New York.</p> <p><b>Economic Support.</b> Comments expressed support for more electricity and lower costs.</p> <p><b>Energy Highway.</b> Comments expressed concern that development of the proposed project was inconsistent with and/or would undercut Governor Cuomo’s “energy highway” initiative that seeks to invest in New York State resources to upgrade the State’s energy infrastructure. Comments stated that the proposed project will bypass the existing grid and existing New York generators who will not be able to access the line and could lead to the shuttering of upstate power generators.</p> <p><b>Article X.</b> Comments stated that the proposed project is inconsistent with Article X legislation designed to expedite construction of new power generation in New York State.</p> <p><b>Local Government Authority.</b> Comments stated that Public Service Law Section 126 (1)(f) allows local government to enact substantive requirements on transmission facilities that are not unreasonably restrictive. Comments note that these guidelines should be clarified to identify the scope of the authority that local governments have to enact these requirements.</p> <p><b>Renewable Energy.</b> Comments raised questions about how the use of “green power” would be guaranteed. Other comments stated support for the use of “clean energy.” Other comments stated that the proposed project would impede the development of renewable energy as well as New York’s ability to meet the Renewable Portfolio Standard goal of 30 percent renewable resources by 2015 and shut out New York State’s growing renewable energy market.</p> <p><b>Eminent Domain.</b> Comments raised questions about the potential use of eminent domain.</p> <p><b>Hydroelectricity.</b> Comments stated that hydroelectricity generation in Canada would have impacts in Canada, including: damming miles of dikes, impounding large amounts of water, flooding river valleys, increasing levels of methylmercury in water, fish, birds and humans, destroying wildlife habitat, nesting and spawning grounds, social and dietary impacts to Native people, and increasing methane gas release from decaying vegetation.</p>

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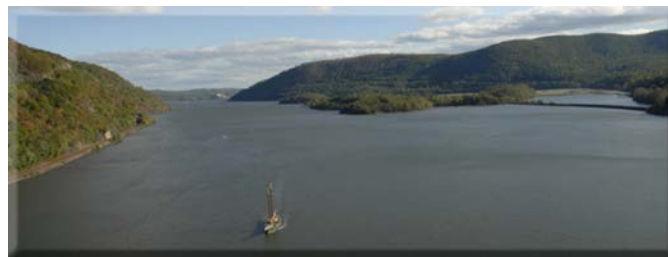
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## APPENDIX E

### EIS Distribution List





## **Appendix E**

### **EIS Distribution List**

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**Appendix E** lists individuals and organizations who have received varying forms of media related to the development of the CHPE EIS.

#### **Federally Elected Officials**

The Honorable Timothy Bishop  
1st Congressional District of New York  
306 Cannon HOB  
Washington, DC 20515

The Honorable Yvette Clarke  
9th Congressional District of New York  
2351 Rayburn HOB  
Washington, DC 20515

The Honorable Eliot L. Engel  
16th Congressional District of New York  
2161 Rayburn HOB  
Washington, DC 20515

The Honorable Chris Gibson  
19th Congressional District of New York  
1708 Longworth HOB  
Washington, DC 20515

The Honorable Kirsten Gillibrand  
United States Senate  
478 Russell  
Washington, DC 20510

The Honorable Michael Grimm  
11th Congressional District of New York  
512 Cannon HOB  
Washington, DC 20515

The Honorable Brian Higgins  
26th Congressional District of New York  
2459 Rayburn HOB  
Washington, DC 20515

The Honorable Steve Israel  
3rd Congressional District of New York  
2457 Rayburn HOB  
Washington, DC 20515

The Honorable Hakeem Jeffries  
8th Congressional District of New York  
1339 Longworth HOB  
Washington, DC 20515

The Honorable Peter King  
2nd Congressional District of New York  
339 Cannon HOB  
Washington, DC 20515

The Honorable Nita Lowey  
17th Congressional District of New York  
2365 Rayburn HOB  
Washington, DC 20515

The Honorable Carolyn Maloney  
12th Congressional District of New York  
2308 Rayburn HOB  
Washington, DC 20515

The Honorable Sean Patrick Maloney  
18th Congressional District of New York  
1529 Longworth HOB  
Washington, DC 20515

The Honorable Carolyn McCarthy  
4th Congressional District of New York  
2346 Rayburn HOB  
Washington, DC 20515

The Honorable Gregory Meeks  
5th Congressional District of New York  
2234 Rayburn HOB  
Washington, DC 20515

The Honorable Grace Meng  
6th Congressional District of New York  
1317 Longworth HOB  
Washington, DC 20515

The Honorable Lisa Murkowski  
Ranking Member, Senate Committee on Energy  
and Natural Resources  
709 Hart Senate Building  
Washington, DC 20510

The Honorable Jerrold Nadler  
10th Congressional District of New York  
2110 Rayburn HOB  
Washington, DC 20515

The Honorable Bill Owens  
21th Congressional District of New York  
405 Cannon HOB  
Washington, DC 20515

The Honorable Nick Rahall  
Ranking Member, House Committee on  
Transportation and Infrastructure  
2307 Rayburn HOB  
Washington, DC 20515

The Honorable Charles Rangel  
13th Congressional District of New York  
2354 Rayburn HOB  
Washington, DC 20515

The Honorable Charles E. Schumer  
United States Senate  
322 Hart Senate Office Building  
Washington, DC 20510

The Honorable Bill Shuster  
Chairman, House Committee on Transportation  
and Infrastructure  
2209 Rayburn HOB  
Washington, DC 20515

The Honorable Paul Tonko  
20th Congressional District of New York  
2463 Rayburn HOB  
Washington, DC 20515

The Honorable Fred Upton  
Chairman, House Committee on Energy and  
Commerce  
2183 Rayburn HOB  
Washington, DC 20515

The Honorable Nydia Velázquez  
7th Congressional District of New York  
2302 Rayburn HOB  
Washington, DC 20515

The Honorable Henry Waxman  
Ranking Member, House Committee on Energy  
and Commerce  
2204 Rayburn HOB  
Washington, DC 20515

The Honorable Ron Wyden  
Chairman, Senate Committee on Energy and  
Natural Resources  
221 Dirksen Senate Office Building  
Washington, DC 20510

### **Tribes**

President  
Delaware Nation  
P.O. Box 825  
Anadarko, OK 73005

Delaware Tribe of Indians  
170 Northeast Barbara  
Bartlesville, OK 74006

Robert Chicks  
President  
Stockbridge Munsee Community of Wisconsin  
N8476 Moh He Con Nuck Road  
P.O. Box 70  
Bowler, WI 54416

Chairperson Randy King  
Shinnecock Indian Nation  
P.O. Box 5006  
Southampton, NY 11969

Arnold Printup  
Saint Regis Mohawk Tribe  
Tribal Historic Preservation Office  
412 State Route 37  
Akwesasne, NY 13655

## **Federal Agencies**

Chris Boelke  
National Marine Fisheries Service - NE  
Fisheries Science Center  
Milford Laboratory  
212 Rogers Avenue  
Milford, CT 06460

Dan Deerinwater  
Regional Director  
U.S. Bureau of Indian Affairs  
Southern Plains Region Office  
WCD Office Complex, P.O. Box 368  
Anadarko, OK 73005

Duncan Hay  
National Park Service  
15 State Street  
Boston, MA 02109

Daniel L. Hubbard  
Maritime Energy Specialist  
U.S. Coast Guard District, First District  
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Boston, MA 02110

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Assembly District 86  
Legislative Office Building 744  
Albany, NY 12248

Assemblymember Thomas J. Abinanti  
New York State Assembly  
Assembly District 92  
Legislative Office Building 631  
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Assemblymember Carmen E. Arroyo  
New York State Assembly  
Assembly District 84  
Legislative Office Building 734  
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Senator Greg Ball  
New York State Senate  
40th Senate District  
817 Legislative Office Building Empire State  
Plaza  
Albany, NY 12247

Assemblymember Didi Barrett  
New York State Assembly  
Assembly District 106  
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Senator John J. Bonacic  
New York State Senate  
42nd Senate District  
188 State Street  
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Albany, NY 12247

Senator Neil D. Breslin  
New York State Senate  
44th Senate District  
172 State Street  
Room 414, The Capitol  
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Assemblymember Kevin A. Cahill  
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Assembly District 103  
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Senator David Carlucci  
New York State Senate  
38th Senate District  
181 State Street  
815 Legislative Office Building  
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Assemblymember Marcos A. Crespo  
New York State Assembly  
Assembly District 85  
Legislative Office Building 454  
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The Honorable Andrew M. Cuomo  
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State of New York  
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Albany, NY 12224

Assemblymember Jeffrey Dinowitz  
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Assemblymember Janet L. Duprey  
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Senator Adriano Espaillat  
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31st Senate District  
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Assemblymember Patricia Fahy  
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Assembly District 109  
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Assemblymember Sandy Galef  
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Senator Michael Gianaris  
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Senator Terry Gipson  
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Senator Jeffrey D. Klein  
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Assemblymember Peter D. Lopez  
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Assembly District 68  
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Assembly District 72  
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Assemblymember Angelo Santabarbara  
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Assemblymember Frank Skartados  
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Local Union No. 97  
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National Grid  
Metropolitan New York Area  
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Spring Valley, NY 10977

Vermont Electric Power Company Inc.  
Vermont Transco, LLC  
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76 Lawrence Street  
Glens Falls, NY 12801

John Tuller  
New York Affordable Reliable Electricity  
Alliance  
707 Westchester Avenue  
White Plains, NY 10604

Luther Turmelle  
New Haven Register  
40 Sargent Drive  
New Haven, CT 06511

Rose Van Guilder  
Alliance for Independent Long Island  
Long Island Rockaway Ratepayers Alliances  
P.O. Box 145  
West Sayville, NY 11796

Annette Vizzini  
Gramatan Hills Homeowners Association  
125 Gramatan Drive  
Yonkers, NY 10701

Kenneth J. Vogel  
HydroCoil  
488 New Unionville Road  
Wallkill, NY 12589

Jürgen Wekerle  
Chair, Sterling Forest/Highlands Committee  
Sierra Club-Ramapo/Catskill Group  
P.O. Box 287  
Walden, NY 12586

Bill Wellman  
New York State Council of Trout Unlimited  
7 Helen Street  
Plattsburgh, NY 12904

Stephen Williams  
Daily Gazette  
2345 Maxon Road Extension  
Schenectady, NY 12308

Mike Winslow  
Staff Scientist  
Lake Champlain Committee  
208 Flynn Avenue  
Building 3, Studio 3F  
Burlington, VT 05401

Annie Wilson  
Energy Committee Chair  
Sierra Club  
P.O. Box 2430  
New York City, NY 10009

Scott Zoltan  
WMHT Educational Telecommunications  
35 Ableman Avenue  
Albany, NY 12203

**Private Citizens**

Torben Aabo  
Ballston Spa, NY

Nora Bailin  
Brooklyn, NY

Matthew Booth  
Morrisonville, NY

Katherine Brezler  
Yonkers, NY

Ken Capolino  
White Plains, NY

Wellington and Rebecca Casscles  
Stony Point, NY

Nancy Clarke  
West Sand Lake, NY

Jeff and Elisabeth Clock  
Willsboro, NY

Brian Connasheton  
Pittsford, VT

Russell Corigliano  
Springfield, VA

Laurie Cozza  
Stony Point, NY

Robert Cuneo  
Yonkers, NY

Gerald A. Davison  
Ulster Park, NY

Peter D'Elia  
Schuyler Falls, NY

Lou Domanico  
Altamont, NY

Roger and Anne Donevan  
Hinesburg, VT

Michael Doyle  
Hartford, CT

Frank Eadie  
New York, NY

Susan Filgueras  
Tomkins Cove, NY

James C. Fox  
Chazy, NY

Kari Gathen  
Albany, NY

George A. Hagerty  
Queensbury, NY

John B. Hamor  
Schenectady, NY

Gus Hang  
Spring House, PA

Captain Jack E. Hills, USAF  
Plattsburgh, NY

Mark Hutchins  
Bedford, NH

Jack Joyce  
Clifton Park, NY

Bobbi Katz  
Port Ewen, NY

Richard Keil  
Schenectady, NY

Jeremy Kergel  
Scotia, NY

David S. Ladenhein  
West Hurley, NY

W.G. Lawson  
Clifton Park, NY

Susan Leifer  
Pleasantville, NY

John L. Lenney  
Rensselaer, NY

Hope Luhman  
Mount Tremper, NY

Aaron Ma  
Kingston, NY

Judith Maculan  
Hinesburg, VT

David E. Manwell  
Plattsburgh, NY

Demosthenes Matsis  
New York, NY

Michael McCabe  
Kingston, NY

Bruce McDermott  
New Haven, CT

Kevai McGrath  
Plattsburgh, NY

Dori Michener  
Port Henry, NY

Tony Moscatiello  
Troy, NY

Terench Mosley  
Highland, NY

Dan Murphy  
Yonkers, NY

R. Jay Murphy  
Clifton Park, NY

Mary Beth Mylott  
Briarcliff Manor, NY

Don Nahumck  
South Burlington, VT

William Overstone  
Tivoli, NY

John Penoyer  
Hinesburg, VT

Bert G. Rothing  
Yonkers, NY

Chris Round  
Glens Falls, NY

Bryan Sanderson  
Charleston, MA

George and June Sanderson  
Staatsburg, NY

Walter Schatz  
Hartford, CT

Casey A. Schewarz  
Kingston, NY

Jose Sebastiao  
Killington, VT

J. Shapiro  
Yonkers, NY

Robert Silvestri  
Hamden, CT

Allison Smith  
Somerville, MA

Peter R. Smith  
New York, NY

Rich Speidel  
Warrensburg, NY

Sara Stamos  
Monrovia, MD

Frank Stilo  
Yonkers, NY

Sheldon Stowe  
New Windsor, NY

Skip Stranahan  
Lake Forge, NY

Richard S. Tiarantelli  
Yonkers, NY

Sondra Tillou  
Kingston, NY

Ellen Vermilyea  
Pennbroke, NH

William Wasilauski  
Queensbury, NY

Jay Williams  
Ballston Lake, NY

Susan Wright  
Stony Point, NY

**Libraries**

Crandall Public Library  
251 Glen Street  
Glens Falls, NY 12801

Kingston Public Library  
55 Franklin Street  
Kingston, NY 12401

Plattsburgh Public Library  
19 Oak Street  
Plattsburgh, NY 12901

Rose Memorial Library  
79 East Main Street  
Stony Point, NY 10980

Schenectady County Public Library  
99 Clinton Street  
Schenectady, NY 12305

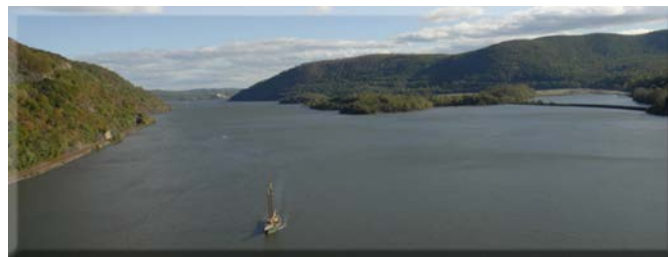
Queens Library – Steinway  
21-45 31st Street  
Long Island City, NY 11105

Yonkers Public Library – Riverfront Library  
1 Larkin Plaza  
Yonkers, NY 10701



## APPENDIX F

# Coastal Zone Consistency Documentation and Land Use Tables





*APPENDIX F.1 – COASTAL ZONE CONSISTENCY DOCUMENTATION*





## **Appendix F.1**

### **Coastal Zone Consistency Documentation**

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**Appendix F.1** consists of documents relating to the coastal zone consistency determination for the proposed CHPE Project.

**Appendix F.1** contains the following documentation:

- **F.1-1.** Correspondence from New York State Department of State (NYS DOS) to Mr. Sean Murphy on behalf of Champlain Hudson Power Express, Inc. (CHPE), The Applicant, June 25, 2010
- **F.1-2.** Correspondence from NYSDOS to Mr. Keith Silliman (c/o TRC) on behalf of the Applicant, November 22, 2010
- **F.1-3.** Appendix B of the Clean Water Act Section 404 Application (Attachment to F.1-2)
- **F.1-4.** Correspondence from NYSDOS to Mr. Sean Murphy on behalf of the Applicant, January 5, 2011
- **F.1-5.** Correspondence from Mr. Sean Murphy on behalf of the Applicant to Mr. Jeffrey Zappieri (NYSDOS), January 18, 2011
- **F.1-6.** Correspondence from Mr. Sean Murphy on behalf of the Applicant to Mr. Jeffrey Zappieri (NYSDOS), February 4, 2011
- **F.1-7.** Correspondence from Mr. Sean Murphy on behalf of the Applicant to Mr. Jeffrey Zappieri (NYSDOS), February 18, 2011
- **F.1-8.** Correspondence from NYSDOS to Mr. Sean Murphy on behalf of the Applicant, March 8, 2011
- **F.1-9.** Correspondence from NYSDOS to Mr. Donald Jessome (c/o CHPE), June 8, 2011
- **F.1-10.** Correspondence from Transmission Developers, Inc. (TDI)/CHPE to Mr. Anthony J. Como (U.S. Department of Energy), July 7, 2011
- **F.1-11.** Correspondence from NYSDOS to Mr. Sean Murphy on behalf of the Applicant, May 29, 2012

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STATE OF NEW YORK  
**DEPARTMENT OF STATE**  
ONE COMMERCE PLAZA  
99 WASHINGTON AVENUE  
ALBANY, NY 12231-0001

DAVID A. PATERSON  
GOVERNOR

LORRAINE A. CORTÉS-VÁZQUEZ  
SECRETARY OF STATE

June 25, 2010

Mr. Sean Murphy  
C/O HDR/DTA  
970 Baxter Boulevard  
Portland, ME 04103

Re: O-2010-0025  
Champlain Hudson Power Express  
Hudson River, Harlem River, East River,  
Long Island Sound  
**General Correspondence**

Dear Mr. Murphy:

Pursuant to our meeting of June 15, 2010 the Department of State (DOS) is providing a list of the following questions regarding the proposed installation of a High Voltage Direct Current electric transmission line from Canada to New York City and Connecticut. This does not constitute a formal request for information, does not indicate that a consistency certification has been submitted, and does not indicate that formal federal consistency review pursuant to 15 CFR part 930 has begun. This information is provided solely as guidance at the request of HDR/DTA and TRC to aid in their submittal of a complete application.

The alternative analysis provided with TDI's article VII application and provided to the DOS appears to fail to provide sufficient detail to allow for adequate review and comparison of potentially feasible alternatives to the transmission line as currently proposed. Generally, DOS encourages activities or development within or adjacent to water only when it is infeasible to conduct that activity or development in upland areas. Before specific future considerations can be given to siting the proposed transmission line within the Hudson River, an expanded alternative analysis will be needed that specifically outlines and analyzes viable upland alternatives and demonstrates why such alternatives can be deemed infeasible to meet the stated project goals. Should TDI be able to demonstrate this, DOS foresees the following questions arising regarding the currently proposed underwater route. These questions are based on information received to date and meetings with HDR, TRC and TDI staff.

- 1) What capabilities exist to place the cable 15 plus feet below the river bottom?
- 2) What percentage of the route, as currently proposed, will be within the existing federal navigation channel?
- 3) Would the capacity exist for future transmission cables to be placed in the waterways or would the project's four cables occupy all usable space for the lifetime of the project? What capabilities exist, following installation, to bury the line deeper?
- 4) Will the DOE have any regulatory authority beyond the transmission cable?
- 5) What is plan for avoiding impacts to Haverstraw Bay? If proposed to occupy the federal navigation channel, please characterize discussions with other applicable regulatory agencies

regarding this route. Additionally, please characterize alternative upland routes around Haverstraw Bay.

- 6) Will the transmission cable follow a previously dredged navigation channel or otherwise disturbed area in Long Island Sound/East River/Harlem River?
- 7) Are the 2000 mw of power the maximum amount of electricity that the cable can transmit?
- 8) What research is being conducted regarding the anticipated turbidity associated with cable installation?
- 9) How much would the turbidity levels increase in relation to the depth of cable placement?
- 10) Does your alternative analysis examine the possibility of siting the cable along existing right-of-ways, such as the NYS Thruway, railroad beds, or existing transmission corridors?
- 11) Why does the project propose to split the transmitted electricity to two different markets?
- 12) What is the reasonably foreseeable maximum depth of the Hudson River Federal Navigation Channel if it were to be deepened during the design life of this project?
- 13) From Selkirk south, how much of the cable will be buried in the Hudson River and how much will be laid and protected?
- 14) What are the soil chemistries along the proposed route?
- 15) What are the potential effects of heat or EMF at the sediment/water interface? How does this change when the line transitions to an HVAC line in Manhattan?
- 16) What are the anticipated residual effects following decommissioning?
- 17) What is the anticipated effect of long term exposure to EMF, such as an individual transiting up or down the Hudson, parallel to the proposed line, as compared to an individual transiting a similar cable crossing of the river?

These questions have arisen based on a cursory review of material provided to date. DOS understands that the material submitted in support of the pending NYS Article VII proceeding was deficient in several regards and that additional information will be submitted in the coming months to supplement the Article VII application and to develop an environmental impact statement pursuant to NEPA.

If further information or clarification is required, please contact Matthew Maraglio at 518-474-5290 (email: [matthew.maraglio@dcs.state.ny.us](mailto:matthew.maraglio@dcs.state.ny.us)) and reference our file number O-2010-0025.

Sincerely



Jeffrey Zappieri

Supervisor, Consistency Review Unit  
Office of Coastal, Local Government and  
Community Sustainability

CC

US DOE: Dr. Jerry Pell  
US ACOE/NY: Naomi Handell  
NYS DEC Central Office: William Little  
NYS DPS: Andrew Davis



STATE OF NEW YORK  
**DEPARTMENT OF STATE**  
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99 WASHINGTON AVENUE  
ALBANY, NY 12231-0001

DAVID A. PATERSON  
GOVERNOR

RUTH NOÉMI-COLÓN  
ACTING SECRETARY OF STATE

November 22, 2010

Mr. Keith Silliman  
C/O TRC  
10 Maxwell Drive  
Clifton Park, NY 12065

Re: S-2010-0025  
DOE Docket #: PP-362  
NYS PSC Case: 10-T-0139  
Champlain Hudson Power Express  
**Request for additional information and  
Preliminary comments on updated alternatives  
analysis**

Dear Mr. Silliman:

The Department of State (DOS) has reviewed the Updated Alternative Analysis prepared for Champlain Hudson Power Express, Inc. (CHPE) dated November 05, 2010 and submitted during the above referenced Public Service Commission (PSC) Article 7 proceeding. DOS is currently acting in an advisory capacity to the PSC and will also be reviewing the CHPE project for its consistency with the New York State Coastal Management Program (NYSCMP) in separate proceedings pursuant to 19 CFR part 930 following receipt of a consistency certification from CHPE.

Beginning with our initial meeting with Transmission Developers Inc (TDI) and CHPE, and in each subsequent meeting, DOS has provided extensive pre-application comments regarding potentially applicable coastal policies, as well as identifying additional information that DOS anticipates will likely be necessary to complete its review of CHPE's forthcoming consistency certification. During our past discussions, DOS has routinely and consistently identified four potential areas of concern:

- Need for a complete and in-depth analysis of potential route alternatives that avoid or minimize impacts on coastal resources. Some of this information has been provided as part of the Updated Alternatives Analysis, but additional information and analysis (as identified in previous meetings and detailed in this letter) will be necessary;
- Operational and installation related affects of the proposed transmission line on *Significant Coastal Fish and Wildlife Habitats* (SCFWH). The need to avoid certain of these sensitive areas has been requested since our initial meeting and may be partially addressed by utilizing a western railroad corridor above Catskill; DOS is still awaiting confirmation of alternative route identification that will avoid impacts to Haverstraw Bay SCFWH.
- Operation and installation related affects of the proposed transmission line on commercial and recreational navigation. This has been sought since our initial meetings. Information on potential utilization and impacts of using channel side slopes is still needed.
- Assessment of impacts to commercial and recreational fisheries due to the operation of the proposed transmission line. DOS is still expecting detailed analysis of impacts on these resources, particularly in areas outside of designated SCFWH areas. As discussed previously, this analysis needs to identify measures for reducing impacts, where possible.

Once submitted, review of the applicant's consistency certification and accompanying necessary data and information may result in identification of additional policy concerns and information needs.

#### *Alternative Analysis:*

In response to requests by DOS and parties participating in the PSC proceeding to provide a full and complete analysis of potentially feasible alternatives to the proposed transmission line, TRC provided the above referenced document for review and comment by staff. TRC has requested comments from DOS and others in response to this document and as such DOS provides the following comments on those route alternatives that are sited south of Albany, NY.

Mid Hudson Rail Alternative (North of Kingston): The analysis did not identify any constraints to the western railroad route identified by the Department of Public Service (DPS) for the portion between Albany and Kingston. As such, the analysis should be expanded to include siting the proposed transmission line within this rail corridor to a point in the vicinity of Kingston. As discussed previously, utilizing this rail corridor alternative avoids impacts to several SCFWH sites.

Mid Hudson Rail Alternative (South of Kingston): The analysis identified multiple constraints to the western railroad route identified by DPS for the portion of the route south of Kingston. Many of the identified constraints appear to be linked to a strict focus on the rail corridor and lacked analysis of potential alternate non-rail route segments that could avoid these constraints.

In general, the identified constraints occur primarily in the vicinity of bridges, tunnels, in-water railroad fills, steep rock cuts, utility lines within the rail corridor, and proximity to existing structures.

- a. Where bridges are identified as constraints, the analysis should be expanded to include an evaluation of the potential to attach the proposed transmission line to the bridge structure and provide for protection of the line through a conduit or other mechanism as well as an evaluation of alternative segments.
- b. Where tunnels are identified as constraints, the analysis should be expanded to include siting the proposed line in the tunnel within a conduit or recessed into the sides or ceiling of the tunnel as well as alternative route segments that would avoid the tunnel.
- c. Where in-water rock fills and steep rock cuts constrain the route, the analysis should identify alternative upland or in-water route segments that could allow the proposed line to avoid these constraints. In addition, the individual and total length of the identified fill and steep rock cut constraints should be presented to provide reviewers with perspective regarding their magnitude.
- d. Where co-located utility lines were identified as constraints, it is unclear why existing above ground utility lines would be considered a constraint for a buried electric transmission line. The analysis should include a specific discussion regarding cable burial methods proximate to utility corridors within railroad corridors. In areas where existing structures constrain the route, the analysis should be expanded to include alternative route segments along existing road networks, parking facilities or short new right of way segments.

Existing Utility Corridors: An existing utility corridor was identified and evaluated. Many of the identified constraints were not substantiated with data, field visits or interviews and as such, it does not appear that there is enough information to eliminate this route as a viable alternative, especially since there is a lack of identification of the property interest within these utility corridors as well as a lack of communication between applicable property interests and the project sponsors. The several constraints that were identified and a response to these constraints follow:

- a. Property acquisition may be required: The analysis does not identify where or why property acquisition outside of the existing utility corridor may be required or why property acquisition would make the alternative infeasible.
- b. Access road reinforcement may be required: It is unclear why access road reinforcement is necessary, or if necessary, why such an action constitutes a development constraint. The access roads in question were constructed to support the installation and maintenance of large transmission towers, their associated foundations and miles of electrical transmission lines. As such, it is unclear how these same roads would not be able to support similar equipment to that required to establish the existing transmission line. Even if such reinforcement was deemed necessary, given modern application of best management practices for sediment and erosion control as well as stormwater infiltration and retention techniques, it is unclear why access road reinforcement should be viewed as development constraint rather than a requirement for construction.
- c. Existing Business Impact: The analysis presented one business that would be impacted along the utility corridor route that would be impacted for approximately one month. The analysis should be expanded to indicate how this situation could be addressed.
- d. Catskill Aqueduct: The analysis concludes that the New York City water supply aqueduct is “in the immediate vicinity” of the utility corridor route. It is unclear whether the installation of the proposed underground transmission cable would affect the aqueduct or if alternative route segments could alleviate any sitting difficulties associated with the aqueduct.
- e. Waterbody Crossing: The analysis identifies several waterbody crossings that would be required along the utility corridor route, the longest of which does not exceed 1,700 feet. This 1,700 foot long crossing is identified as a constraint because a horizontal directional drill (HDD) in this location may be infeasible. However, given that a majority of the currently proposed underwater route would be installed via methods other than HDD and that HDD lengths are known to exceed 2,000 feet, it is unclear why such a waterbody crossing would be identified as a development constraint prior to site specific analysis.
- f. Hudson River Crossing: A crossing of the Hudson River in the vicinity of Athens, NY would need to occur for the proposed transmission line to be sited within the identified utility corridor. The analysis states that the river could not be crossed at this point via HDD. Given that the currently proposed underwater route transitions from underwater to upland configurations via HDD and that a substantial length of the proposed route is to be installed via jet plow, it is unclear why an inability to utilize HDD to cross the entire river would be considered to be a development constraint.
- g. Road Crossings: The analysis identifies road crossings perpendicular to the utility corridor as development constraints, However, it is unclear why road crossings along the currently proposed upland portion of the transmission line north of Albany, NY, would not also be considered as development constraints. The analysis should be expanded to include the justification for identifying road crossings along the utility corridor as development constraints.

Haverstraw Bay alternative: The analysis should be updated when the applicant completes their analysis. It is noted that the potential upland route to the west of Haverstraw Bay appears to be a viable route. Of particular importance, using this alternate route avoids the ecologically sensitive Haverstraw Bay SCFWH. The sensitive and significant nature of this habitat has been discussed by DOS on numerous occasions.

The analyzed alternatives should be reassessed prior to submitting your consistency application. Overall, the Updated Alternatives Analysis appears to take a very narrow view of identified alternatives to the currently proposed route and fails to adequately identify potential solutions to the constraints. There appear to be many broad statements relating to project feasibility that are not substantiated by research and fact and several of the identified constraints along the alternative routes south of Albany appear to be minor impediments along the currently proposed route north of Albany. Greater attention is to be paid to providing a comprehensive look at alternative routes and justifying identified route constraints as well as including alternative route segments should a justification to any constraints be identified.

#### *Information Needs:*

As previously discussed during many past meetings, both prior to and during the aforementioned Article 7 proceedings, the following information is necessary in order for DOS to provide substantive comments regarding potential coastal effects of the proposed project, assuming that the above referenced alternative analysis can be expanded to justify the currently proposed route. This information will also be required for DOS to complete its review of CHPE's forthcoming consistency certification

#### Commercial and Recreational Fisheries and SCFWHs:

Electro-magnetic fields - The proposed transmission cable is purported to utilize various technologies that would prevent the establishment of electric fields proximate to the cable. However, such technologies would not prevent the creation of magnetic fields surrounding the cables. The physical extents and relative intensities of these fields are unclear. As such, a cross-sectional representation of applicable electro-magnetic fields surrounding the proposed cable should be provided that characterizes all areas where artificial electro-magnetic fields are expected to be outside of natural ranges. Should alternate installation techniques, such as installation of the entire bi-pole within one trench, result in dissimilar electro-magnetic fields to the currently proposed installation technique, such information should be presented. Additionally, a consolidated summary, with references, of your mentioned extensive literature search relating to effects of electro-magnetic fields on commercial and recreational fisheries, should be provided. The in-water area exposed to the electro-magnetic fields proximate to the proposed cable is likely to be directly correlated to the depth that it is buried. As such, the expected achievable installation depths throughout all portions of the underwater route should be provided. This should include all areas where target depth is not attainable, thus necessitating non-native fill. As discussed extensively during pre-application conversations, DOS has concerns that the proposed line may, if sited within the Hudson River or other confined riverine systems, adversely affect commercial and recreational fisheries as well as habitat areas essential for their growth and development, especially those incorporated into the NYSCMP as SCFWHs.

SCFWHs are identified areas within New York State that are afforded special protections within the NYSCMP due to their uniqueness, species composition, human and wildlife levels of use, and degree of irreplaceability. DOS has routinely identified and discussed SCFWHs along the proposed transmission line's route and has repeatedly advised that SCFWHs should be avoided; if avoidance proved impracticable, the proposed line should be sited, subject to justification by applicable data, within previously disturbed areas such as dredged navigation channels or other dredged areas.

#### Navigation:

The proposed transmission line's potential effects on commercial and recreation navigation have routinely been identified as a concern of paramount importance to the NYSCMP. It will be necessary for the applicant to show their ability to attain appropriate burial depths within the side slopes of the federally maintained navigation channel and areas of the river typified by large "sand



waves.” Repeated inquiry to CHPE regarding attainable depths in these areas has generally been deferred to an as yet unidentified Environmental Management and Control Plan (EMCP) contractor. Such information would be necessary to adequately assess the proposed project’s potential effects on navigation. The project sponsors should recognize that, given the worldwide trend of increased vessel draft, possible future federal navigation channel expansion should not be precluded by the installation and operation of the proposed transmission line.

Please address the alternative analysis comments iterated above and provide responses and information to the identified data gaps as soon as possible. Given your desired timeframes, your prompt response is necessary for DOS’s continual consultation and forthcoming timely review to result in an outcome amenable to TDI, CHPE Inc., and DOS.

If further information or clarification is required please contact Matthew Maraglio at 518-474-5290 (email: [matthew.maraglio@dos.state.ny.us](mailto:matthew.maraglio@dos.state.ny.us)) and reference our file number S-2010-0025.

Sincerely,

Jeffrey Zappieri  
Supervisor, Consistency Review  
Office of Coastal, Local Government  
and Community Sustainability

JZ/mm

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## **APPENDIX B**

- **NEW YORK STATE DEPARTMENT OF STATE COASTAL MANAGEMENT PROGRAM - FEDERAL CONSISTENCY ASSESSMENT FORM**
- **NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM - CONSISTENCY ASSESSMENT FORM**
- **COASTAL CONSISTENCY ASSESSMENT SUPPLEMENT**

NEW YORK STATE DEPARTMENT OF STATE  
COASTAL MANAGEMENT PROGRAM

Federal Consistency Assessment Form

An applicant, seeking a permit, license, waiver, certification or similar type of approval from a federal agency which is subject to the New York State Coastal Management Program (CMP), shall complete this assessment form for any proposed activity that will occur within and/or directly affect the State's Coastal Area. This form is intended to assist an applicant in certifying that the proposed activity is consistent with New York State's CMP as required by U.S. Department of Commerce regulations (15 CFR 930.57). It should be completed at the time when the federal application is prepared. The Department of State will use the completed form and accompanying information in its review of the applicant's certification of consistency.

A. APPLICANT (please print)

1. Name: Champlain Hudson Power Express, Inc. & CHPE Properties
2. Address: Pieter Schuyler Building, 600 Broadway, Albany, NY 12207-2283
3. Telephone: Area Code (518) 465-0710

B. PROPOSED ACTIVITY

1. Brief description of activity:

The Project consists of a 1,000 megawatt (MW) underwater/underground HVDC electric transmission system extending from the international border between Canada and the United States to New York City. The Applicants propose to develop the CHPE Project to deliver clean and renewable sources of power to New York City.

2. Purpose of activity:

The stated purpose of the CHPE Project is to supply clean and renewable sources of power to the NY ISO load center in New York City without contributing to transmission congestion on the electric grid.

3. Location of activity:

<u>See Attachments</u>	<u>See Attachments</u>	<u>See Attachments</u>
County	City, Town, or Village	Street or Site Description

4. Type of federal permit/license required: USACE Section 404/10; USDOE Presidential Permit

5. Federal application number, if known: USACE File 2009-01089-EHA; PP-362

6. If a state permit/license was issued or is required for the proposed activity, identify the state agency and provide the application or permit number, if known:

New York State Public Service Commission, Case 10-T-0139

C. COASTAL ASSESSMENT Check either "YES" or "NO" for each of these questions. The numbers following each question refer to the policies described in the CMP document (see footnote on page 2) which may be affected by the proposed activity.

1. Will the proposed activity result in any of the following: YES / NO

- |  |                                     |                                     |
|--|-------------------------------------|-------------------------------------|
| a. Large physical change to a site within the coastal area which will require the preparation of an environmental impact statement? (11, 22, 25, 32, 37, 38, 41, 43) . . . . . | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| b. Physical alteration of more than two acres of land along the shoreline, land under water or coastal waters? (2, 11, 12, 20, 28, 35, 44) . . . . .                           | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| c. Revitalization/redevelopment of a deteriorated or underutilized waterfront site? (1) . . . . .  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| d. Reduction of existing or potential public access to or along coastal waters? (19, 20) . . . . .   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| e. Adverse effect upon the commercial or recreational use of coastal fish resources? (9,10) . . . . .  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| f. Siting of a facility essential to the exploration, development and production of energy resources in coastal waters or on the Outer Continental Shelf? (29) . . . . .       | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| g. Siting of a facility essential to the generation or transmission of energy? (27) . . . . .  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| h. Mining, excavation, or dredging activities, or the placement of dredged or fill material in coastal waters? (15, 35) . . . . .  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| i. Discharge of toxics, hazardous substances or other pollutants into coastal waters? (8, 15, 35) . . . . .  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| j. Draining of stormwater runoff or sewer overflows into coastal waters? (33) . . . . .  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| k. Transport, storage, treatment, or disposal of solid wastes or hazardous materials? (36, 39) . . . . .   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| l. Adverse effect upon land or water uses within the State's small harbors? (4) . . . . .  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

2. Will the proposed activity affect or be located in, on, or adjacent to any of the following: YES / NO

- |  |                                     |                                     |
|--|-------------------------------------|-------------------------------------|
| a. State designated freshwater or tidal wetland? (44) . . . . .                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| b. Federally designated flood and/or state designated erosion hazard area? (11, 12, 17,) . . . . . | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| c. State designated significant fish and/or wildlife habitat? (7) . . . . .                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| d. State designated significant scenic resource or area? (24) . . . . .                            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| e. State designated important agricultural lands? (26) . . . . .                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| f. Beach, dune or barrier island? (12) . . . . .   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| g. Major ports of Albany, Buffalo, Ogdensburg, Oswego or New York? (3) . . . . .                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| h. State, county, or local park? (19, 20) . . . . .  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| i. Historic resource listed on the National or State Register of Historic Places? (23) . . . . .   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |

3. Will the proposed activity require any of the following: YES / NO

- |  |                                     |                                     |
|--|-------------------------------------|-------------------------------------|
| a. Waterfront site? (2, 21, 22) . . . . .  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| b. Provision of new public services or infrastructure in undeveloped or sparsely populated sections of the coastal area? (5) . . . . . | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c. Construction or reconstruction of a flood or erosion control structure? (13, 14, 16) . . . . .                                      | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| d. State water quality permit or certification? (30, 38, 40) . . . . .   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| e. State air quality permit or certification? (41, 43) . . . . .   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

4. Will the proposed activity occur within and/or affect an area covered by a State approved local waterfront revitalization program? (see policies in local program document) . . . . .

D. ADDITIONAL STEPS

1. If all of the questions in Section C are answered "NO", then the applicant or agency shall complete Section E and submit the documentation required by Section F.
2. If any of the questions in Section C are answered "YES", then the applicant or agent is advised to consult the CMP, or where appropriate, the local waterfront revitalization program document\*. The proposed activity must be analyzed in more detail with respect to the applicable state or local coastal policies. On a separate page(s), the applicant or agent shall: (a) identify, by their policy numbers, which coastal policies are affected by the activity, (b) briefly assess the effects of the activity upon the policy; and, (c) state how the activity is consistent with each policy. Following the completion of this written assessment, the applicant or agency shall complete Section E and submit the documentation required by Section F.

E. CERTIFICATION

The applicant or agent must certify that the proposed activity is consistent with the State's CMP or the approved local waterfront revitalization program, as appropriate. If this certification cannot be made, the proposed activity shall not be undertaken. If this certification can be made, complete this Section.

"The proposed activity complies with New York State's approved Coastal Management Program, or with the applicable approved local waterfront revitalization program, and will be conducted in a manner consistent with such program."

Applicant/Agent's Name: Champlain Hudson Power Express, Inc. & CHPE Properties

Address: Pieter Schuyler Building, 600 Broadway, Albany, NY 12207-2283

Telephone: Area Code (518) 465-0710

Applicant/Agent's Signature:  Date: December 6, 2010

F. SUBMISSION REQUIREMENTS

1. The applicant or agent shall submit the following documents to the **New York State Department of State, Office of Coastal, Local Government and Community Sustainability, Attn: Consistency Review Unit, 1 Commerce Plaza, 99 Washington Avenue - Suite 1010, Albany, New York 12231.**

- a. Copy of original signed form.
- b. Copy of the completed federal agency application.
- c. Other available information which would support the certification of consistency.

2. The applicant or agent shall also submit a copy of this completed form along with his/her application to the federal agency.

3. If there are any questions regarding the submission of this form, contact the Department of State at (518) 474-6000.

\*These state and local documents are available for inspection at the offices of many federal agencies, Department of environmental Conservation and Department of State regional offices, and the appropriate regional and county planning agencies. Local program documents are also available for inspection at the offices of the appropriate local government.

For Internal Use Only:

WRP no. \_\_\_\_\_

Date Received: \_\_\_\_\_

DOS no. \_\_\_\_\_

## NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM Consistency Assessment Form

Proposed actions that are subject to CEQR, ULURP or other local, state or federal discretionary review procedures, and that are within New York City's designated coastal zone, must be reviewed and assessed for their consistency with the New York City Waterfront Revitalization Program (WRP). The WRP was adopted as a 197-a Plan by the Council of the City of New York on October 13, 1999, and subsequently approved by the New York State Department of State with the concurrence of the United States Department of Commerce pursuant to applicable state and federal law, including the Waterfront Revitalization of Coastal Areas and Inland Waterways Act. As a result of these approvals, state and federal discretionary actions within the city's coastal zone must be consistent to the maximum extent practicable with the WRP policies and the city must be given the opportunity to comment on all state and federal projects within its coastal zone.

This form is intended to assist an applicant in certifying that the proposed activity is consistent with the WRP. It should be completed when the local, state, or federal application is prepared. The completed form and accompanying information will be used by the New York State Department of State, other state agencies or the New York City Department of City Planning in their review of the applicant's certification of consistency.

### A. APPLICANT

1. Name: Champlain Hudson Power Express Inc. and CHPE Properties, Inc.
2. Address: Pieter Schuyler Building, 600 Broadway, Albany, NY 12207-2283
3. Telephone: 518-465-0710 Fax: \_\_\_\_\_ E-mail: bill.helmer@transmissiondevelopers.com
4. Project site owner: \_\_\_\_\_

### B. PROPOSED ACTIVITY

1. Brief description of activity:

The CHPE Project consists of a 1,000 MW HVDC transmission system extending from the International border between Canada and the U.S. and New York City, NY. The HVDC transmission system consists of two approximately 6-inch diameter HVDC submarine cables buried beneath the bed of Lake Champlain and the Hudson River. To bypass the Champlain Canal and a portion of the upper Hudson River, two 6-inch diameter HVDC land cables will be buried underground within a railroad right-of-way from Whitehall, NY to Coeymans, NY. The HVDC cables will terminate at an HVDC converter station located in Yonkers, NY. From Yonkers, NY, two bundles of three AC cables will continue south through the Hudson River, Harlem River, and East River and terminate at the planned Poletti Substation in Astoria, Queens NY.

2. Purpose of activity:

The stated purpose of the CHPE Project is to supply clean and renewable sources of power to the NY ISO load center in New York City without contributing to transmission congestion on the electric grid.

3. Location of activity: (street address/borough or site description):

The submarine and land cables will be located in the following counties: Clinton, Essex, Washington, Saratoga, Schenectady, Albany, Rensselaer, Greene, Columbia, Ulster, Dutchess, Orange, Putnam, Rockland, Westchester, Bronx, New York, and Queens.

The converter station will be located at multiple properties at the intersection of Wells Avenue and Atherton Street in Yonkers, NY.

The interconnection point will be located to the north of the intersection of 20th Avenue and 31st Street in Queens, NY.

**Proposed Activity Cont'd**

- 4. If a federal or state permit or license was issued or is required for the proposed activity, identify the permit type(s), the authorizing agency and provide the application or permit number(s), if known:  
 U.S. Department of Energy - Presidential Permit (PP-362);  
 U.S. Army Corps of Engineers - Section 10/404 Permit (2009-01089-EHA);  
 New York PSC - Article VII Certificate of Environmental Compatibility and Public Need (Case 10-T-0139)
  
- 5. Is federal or state funding being used to finance the project? If so, please identify the funding source(s).  
 The Applicants have applied to the U.S. Department of Energy for a Federal loan guarantee in response to a DOE competitive solicitation "Federal Loan Guarantees for Electric Power Transmission Infrastructure Investment Projects," issued under Section 1705, Title XVII, of the Energy Policy Act of 2005.
  
- 6. Will the proposed project require the preparation of an environmental impact statement?  
 Yes  No  If yes, identify Lead Agency:  
 U.S. Department of Energy
  
- 7. Identify **city** discretionary actions, such as a zoning amendment or adoption of an urban renewal plan, required for the proposed project.  
 The Applicants are unaware of any required discretionary actions at this point.

**C. COASTAL ASSESSMENT**

Location Questions:	Yes	No
1. Is the project site on the waterfront or at the water's edge?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Does the proposed project require a waterfront site?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Would the action result in a physical alteration to a waterfront site, including land along the shoreline, land underwater, or coastal waters?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Policy Questions	Yes	No
------------------	-----	----

The following questions represent, in a broad sense, the policies of the WRP. Numbers in parentheses after each question indicate the policy or policies addressed by the question. The new Waterfront Revitalization Program offers detailed explanations of the policies, including criteria for consistency determinations.

Check either "Yes" or "No" for each of the following questions. For all "yes" responses, provide an attachment assessing the effects of the proposed activity on the relevant policies or standards. Explain how the action would be consistent with the goals of those policies and standards.

4. Will the proposed project result in revitalization or redevelopment of a deteriorated or under-used waterfront site? (1)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Is the project site appropriate for residential or commercial redevelopment? (1.1)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Will the action result in a change in scale or character of a neighborhood? (1.2)	<input type="checkbox"/>	<input checked="" type="checkbox"/>



**Policy Questions cont'd**

**Yes No**

7. Will the proposed activity require provision of new public services or infrastructure in undeveloped or sparsely populated sections of the coastal area? (1.3)		✓
8. Is the action located in one of the designated Significant Maritime and Industrial Areas (SMIA): South Bronx, Newtown Creek, Brooklyn Navy Yard, Red Hook, Sunset Park, or Staten Island? (2)		✓
9. Are there any waterfront structures, such as piers, docks, bulkheads or wharves, located on the project sites? (2)		✓
10. Would the action involve the siting or construction of a facility essential to the generation or transmission of energy, or a natural gas facility, or would it develop new energy resources? (2.1)	✓	
11. Does the action involve the siting of a working waterfront use outside of a SMIA? (2.2)		✓
12. Does the proposed project involve infrastructure improvement, such as construction or repair of piers, docks, or bulkheads? (2.3, 3.2)		✓
13. Would the action involve mining, dredging, or dredge disposal, or placement of dredged or fill materials in coastal waters? (2.3, 3.1, 4, 5.3, 6.3)	✓	
14. Would the action be located in a commercial or recreational boating center, such as City Island, Sheepshead Bay or Great Kills or an area devoted to water-dependent transportation? (3)		✓
15. Would the proposed project have an adverse effect upon the land or water uses within a commercial or recreation boating center or water-dependent transportation center? (3.1)		✓
16. Would the proposed project create any conflicts between commercial and recreational boating? (3.2)		✓
17. Does the proposed project involve any boating activity that would have an impact on the aquatic environment or surrounding land and water uses? (3.3)	✓	
18. Is the action located in one of the designated Special Natural Waterfront Areas (SNWA): Long Island Sound- East River, Jamaica Bay, or Northwest Staten Island? (4 and 9.2)		✓
19. Is the project site in or adjacent to a Significant Coastal Fish and Wildlife Habitat? (4.1)	✓	
20. Is the site located within or adjacent to a Recognized Ecological Complex: South Shore of Staten Island or Riverdale Natural Area District? (4.1and 9.2)		✓
21. Would the action involve any activity in or near a tidal or freshwater wetland? (4.2)	✓	
22. Does the project site contain a rare ecological community or would the proposed project affect a vulnerable plant, fish, or wildlife species? (4.3)	✓	
23. Would the action have any effects on commercial or recreational use of fish resources? (4.4)		✓
24. Would the proposed project in any way affect the water quality classification of nearby waters or be unable to be consistent with that classification? (5)		✓
25. Would the action result in any direct or indirect discharges, including toxins, hazardous substances, or other pollutants, effluent, or waste, into any waterbody? (5.1)		✓
26. Would the action result in the draining of stormwater runoff or sewer overflows into coastal waters? (5.1)		✓
27. Will any activity associated with the project generate nonpoint source pollution? (5.2)		✓
28. Would the action cause violations of the National or State air quality standards? (5.2)		✓

**Policy Questions cont'd**

	Yes	No
29. Would the action result in significant amounts of acid rain precursors (nitrates and sulfates)? (5.2C)	_____	✓ _____
30. Will the project involve the excavation or placing of fill in or near navigable waters, marshes, estuaries, tidal marshes or other wetlands? (5.3)	✓ _____	_____
31. Would the proposed action have any effects on surface or ground water supplies? (5.4)	_____	✓ _____
32. Would the action result in any activities within a federally designated flood hazard area or state-designated erosion hazards area? (6)	✓ _____	_____
33. Would the action result in any construction activities that would lead to erosion? (6)	_____	✓ _____
34. Would the action involve construction or reconstruction of a flood or erosion control structure? (6.1)	_____	✓ _____
35. Would the action involve any new or increased activity on or near any beach, dune, barrier island, or bluff? (6.1)	_____	✓ _____
36. Does the proposed project involve use of public funds for flood prevention or erosion control? (6.2)	_____	✓ _____
37. Would the proposed project affect a non-renewable source of sand ? (6.3)	_____	✓ _____
38. Would the action result in shipping, handling, or storing of solid wastes, hazardous materials, or other pollutants? (7)	✓ _____	_____
39. Would the action affect any sites that have been used as landfills? (7.1)	_____	✓ _____
40. Would the action result in development of a site that may contain contamination or that has a history of underground fuel tanks, oil spills, or other form or petroleum product use or storage? (7.2)	✓ _____	_____
41. Will the proposed activity result in any transport, storage, treatment, or disposal of solid wastes or hazardous materials, or the siting of a solid or hazardous waste facility? (7.3)	✓ _____	_____
42. Would the action result in a reduction of existing or required access to or along coastal waters, public access areas, or public parks or open spaces? (8)	_____	✓ _____
43. Will the proposed project affect or be located in, on, or adjacent to any federal, state, or city park or other land in public ownership protected for open space preservation? (8)	✓ _____	_____
44. Would the action result in the provision of open space without provision for its maintenance? (8.1)	_____	✓ _____
45. Would the action result in any development along the shoreline but NOT include new water-enhanced or water-dependent recreational space? (8.2)	_____	✓ _____
46. Will the proposed project impede visual access to coastal lands, waters and open space? (8.3)	_____	✓ _____
47. Does the proposed project involve publicly owned or acquired land that could accommodate waterfront open space or recreation? (8.4)	_____	✓ _____
48. Does the project site involve lands or waters held in public trust by the state or city? (8.5)	✓ _____	_____
49. Would the action affect natural or built resources that contribute to the scenic quality of a coastal area? (9)	_____	✓ _____
50. Does the site currently include elements that degrade the area's scenic quality or block views to the water? (9.1)	_____	✓ _____

**Policy Questions cont'd**

**Yes      No**

51. Would the proposed action have a significant adverse impact on historic, archeological, or cultural resources? (10)

\_\_\_\_\_

52. Will the proposed activity affect or be located in, on, or adjacent to an historic resource listed on the National or State Register of Historic Places, or designated as a landmark by the City of New York? (10)

\_\_\_\_\_

**D. CERTIFICATION**

The applicant or agent must certify that the proposed activity is consistent with New York City's Waterfront Revitalization Program, pursuant to the New York State Coastal Management Program. If this certification cannot be made, the proposed activity shall not be undertaken. If the certification can be made, complete this section.

"The proposed activity complies with New York State's Coastal Management Program as expressed in New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program, and will be conducted in a manner consistent with such program."

Applicant/Agent Name: Champlain Hudson Power Express Inc. & CHPE Properties, Inc.

Address: Pieter Schuyler Building, 600 Broadway, Albany, New York, 12207

\_\_\_\_\_ Telephone 518-465-0710

Applicant/Agent Signature:  Date: December 6, 2010

CHAMPLAIN HUDSON POWER EXPRESS PROJECT  
COASTAL ZONE CONSISTENCY ASSESSMENT  
SUPPLEMENTAL INFORMATION

**CHAMPLAIN HUDSON POWER EXPRESS PROJECT  
COASTAL ZONE CONSISTENCY ASSESSMENT  
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## 1.0 COASTAL ZONE CONSISTENCY ASSESSMENT

The Federal Coastal Zone Management Act and the New York State Waterfront Revitalization of Coastal Areas and Inland Waterways Act established direction for the appropriate use and protection of the nation's and New York State's coastal areas and waterways. As part of the New York State Coastal Management Program, 44 state coastal policies were developed. In some parts of the State, the coastal policies have been refined to take into account regional and local considerations. In New York City, the state coastal policies have been refined in the City's Waterfront Revitalization Program. Additionally, throughout the state, certain local municipalities have approved Local Waterfront Revitalization Programs (LWRPs) to address their specific local issues and concerns.

The Federal regulations that implement the consistency provisions of the Coastal Zone Management Act (CZMA) are found at 15 CFR Part 930, which establish the procedures to be followed in order to assure that federal agency activities are consistent with the enforceable policies of the New York State Coastal Management Program.

Any applicant for a federal agency license or permit is required to submit a certification that the proposed activity is consistent with all applicable state coastal policies. The consistency certification must include the following: a completed Federal Consistency Assessment Form; an identification of coastal policies affected by an applicant's proposed activity; a brief assessment of the effects of the activity on the applicable policies; and a statement indicating how the activity is consistent with each applicable policy.

A Coastal Management Plan Federal Consistency Assessment Form (FCAF) and a New York City Waterfront Revitalization Program Consistency Assessment Form (LWRP CAF) have been completed. The FCAF and the LWRP CAF identify those policies from their respective programs that are applicable or potentially applicable to the Project based on a review of the components of the Project located within the Coastal Area. Additionally, the Applicants performed a review of all other LWRPs that pertain to the territory within the Project area.

The CHPE Project has been sited and designed, and will be constructed and operated, in a manner that is consistent with the applicable New York State Department of State (NYSDOS) Coastal Management Program (CMP) State Coastal Policies, the New York City Local Waterfront Revitalization Program (LWRP) Coastal Policies, and all other applicable LWRPs within the Project area. The specific policies that are relevant to the Project are listed below and are accompanied by a brief description of the manner in which the Project is consistent.

## 2.0 NEW YORK STATE DEPARTMENT OF STATE COASTAL MANAGEMENT PROGRAM STATE COASTAL POLICIES

*State Policy 2 - Facilitate the siting of water-dependent uses and facilities on or adjacent to coastal waters.*

The CHPE Project will involve solid state transmission cables buried and laid within waterways of the state (Lake Champlain, Hudson River, Harlem River, and East River).

The transmission cables will be sited, designed, and installed to avoid impacts to current and/or future water-dependent projects. The cables will make landfall and extend inland to a converter station in Yonkers, NY and a substation in Queens, NY. The cable landfall will be buried via HDD and will not affect the current and/or future siting of water-dependent uses at the waters edge with the exception of the required narrow utility easement (approximately 30 feet) for the buried cable. Additionally, the Yonkers converter station and the Queens substation are not located on waterfront properties.

***State Policy 7 - Significant Coastal Fish and Wildlife Habitats will be protected, preserved, and where practical, restored so as to maintain their viability as habitats.***

Where the transmission cables transition from land to water (i.e., Hudson River in Coeymans, NY) the Project will utilize HDD methods to install the cable. This method will be utilized to minimize disturbance to shoreline and nearshore coastal fish and wildlife habitats. The HDD entry/exit point is designed to enter/exit the water at a depth sufficient to avoid impacts to shoreline, intertidal and nearshore areas.

The proposed underwater cable route intersects with six Significant Coastal Fish and Wildlife Habitats (SCFWH): Esopus Estuary, Kingston Deepwater Habitat, Poughkeepsie Deepwater Habitat, Hudson rivermile 44-56, Haverstraw Bay, and the Lower Hudson Reach.

The deepwater area near the mouth of Esopus Creek is recognized as post-spawning and wintering habitat for shortnose sturgeon. The deepwater areas at Kingston and Poughkeepsie are recognized as spawning and wintering habitat for shortnose sturgeon. The deepwater area of Hudson Rivermile 44-56 is recognized as a spawning area for striped bass and wintering habitat for shortnose sturgeon. The deepwater area in Haverstraw Bay is recognized as wintering habitat for shortnose sturgeon. Atlantic sturgeon can also be expected to use this area, as well as overwintering striped bass. Shortnose sturgeon favor the channel areas of the Hudson and have been shown to use both naturally deep and dredged channels.

The Applicants will work cooperatively with agencies to determine appropriate work windows for cable installation in order to avoid Project activities during seasonal use of the aforementioned Significant Coastal Habitats. Where the Project route cannot avoid designated Significant Coastal Habitat, the cables will be installed within previously disturbed areas, such as the side slope of the federal navigation channel, which will also avoid the deep areas of the navigation channel favored by shortnose sturgeon.

***State Policy 11 - Buildings and other structures will be sited in the coastal area so as to minimize damage to property and the endangering of human lives caused by flooding and erosion.***

Structures associated with the Project will be developed on a previously disturbed property in an urban/industrial zone and will not affect potential flooding or erosion in coastal areas. The cables associated with the Project will be buried underwater or

underground and the surface vegetation/topography will be restored to its original state. HDD methods will be utilized to install the cables at landfall locations in order to avoid impacts to the nearshore and shoreline areas.

*State Policy 12 - Activities or development in the coastal area will be undertaken so as to minimize damage to natural resources and property from flooding and erosion by protecting natural protective features including beaches, dunes, barrier islands and bluffs.*

See response to State Policy 11.

*State Policy 15 - Mining, excavation, or dredging in coastal waters shall not significantly interfere with the natural coastal processes which supply beach materials to land adjacent to such waters and shall be undertaken in a manner which will not cause an increase in erosion of such land.*

Along the majority of the Project's submarine cable route, cables will be buried approximately 3 to 4 ft beneath the lake/river bed utilizing a water-jetting machine. For these portions of the route, sediment will not be removed from the trench; instead, sediment fluidized during water-jetting will be allowed to naturally backfill the trench. Where the Project's submarine cable route crosses or is located within federal navigation channels, cable will be buried to the required depths utilizing water jetting techniques and where necessary, conventional dredging techniques. In the event that conventional dredging is required for cable installation and sediment removed from the trench cannot be re-used as backfill, such dredging will be kept to a minimum and the sediments will be appropriately re-used or disposed of pursuant to permit requirements. All portions of the submarine cable route will then be allowed to return to their pre-installation condition. Therefore, installation of the underwater portions of the transmission cable is not expected to interfere with natural coastal processes or increase erosion of adjacent lands.

*State Policy 17 - Non-structural measures to minimize damage to natural resources and property from flooding and erosion shall be used whenever possible.*

At cable landfall locations, the cables will be installed via HDD methods to avoid impacts to the nearshore and shoreline areas.

*State Policy 19 - Protect, maintain, and increase the level and types of access to public water-related recreation resources and facilities.*

The Yonkers converter station site will be constructed on a private industrial site that is already disturbed and will not affect public access to the water.

Cables installation at shoreline crossings will be installed using HDD methods which will not result in impacts to public access to the waterbodies. Underwater cable burial will not result in impacts to public access. During construction, to protect the safety of the public, access will be restricted around active in-water construction locations. This work



will only occur on a small area of the overall waterbody and will be temporary in any one location, so impacts will be minor during the construction period.

***State Policy 20 - Access to publicly-owned foreshore and to lands immediately adjacent to the foreshore or the water's edge that are publicly-owned shall be provided and it shall be provided in a manner compatible with adjoining uses.***

The Project will not affect access to publicly-owned foreshore lands or lands adjacent to the foreshore or the water's edge. See above response to State Policies 11 and 19.

***State Policy 22 - Development, when located adjacent to the shore, will provide for water-related recreation, whenever such use is compatible with reasonably anticipated demand for such activities, and is compatible with the primary purpose of the development.***

The Project will not affect current or future development for water-related recreation at properties located adjacent to the shore.

***State Policy 23 - Protect, enhance and restore structures, districts, areas and sites that are of significance in the history, architecture, archaeology or culture of the state, its communities, or the nation.***

In general, the Project is unlikely to have a significant effect on standing historic structures, districts, areas or sites of significance within the Project's vicinity. With the exception of the newly constructed Yonkers converter station on a previously disturbed, industrial zoned area, the Project's infrastructure will be buried and will not have an effect on the viewshed. The converter station will be designed to match the character of the surrounding area, and is not expected to have an adverse impact on any historic properties in the vicinity.

The Applicants are in the process of conducting a detailed analysis of archaeological sites, historic properties, and shipwrecks along the Project route, including those resources listed in or eligible for inclusion in the National Register of Historic Places. The Project will avoid archaeological, historical and cultural resources to the greatest extent feasible. It is anticipated that, with appropriate avoidance and mitigation, no adverse impacts on these resources will occur.

***State Policy 24 - Prevent impairment of scenic resources of statewide significance.***

With the exception of the Yonkers converter station, the Project's principal components will be buried and will not have an effect on any viewsheds. The Yonkers converter station will be designed to match the character of the surrounding area, which includes existing industrial land use, and is not expected to have an adverse impact on any scenic resources.

***State Policy 25*** - Protect, restore or enhance natural and man-made resources which are not identified as being of statewide significant, but which contribute to the overall scenic quality of the coastal area.

The transmission cables associated with the Project will be buried; there will be no overhead transmission cables. The Yonkers converter station will be built on an inland property in an existing industrial zoned area on a previously disturbed property. The converter station will be located within a building, which will be designed to blend with the architecture of the surrounding development. The Project will connect to an existing substation (currently under construction) on an inland property in Queens, NY. Therefore, the Project will not affect the overall scenic quality of the coastal area.

***State Policy 27*** - Decisions on the siting and construction of major energy facilities in the coastal area will be based on public energy needs, compatibility of such facilities with the environment, and the facility's need for a shorefront location.

The Project has filed an application for a Certificate of Environmental Compatibility and Public Need (CECPN) under Article VII of the New York State Public Service Law. The Project will provide needed electricity to load centers in the NYISO via an HVDC transmission cable system that is primarily buried in the riverbed of coastal area waterways (Hudson River, Harlem River, and East River). The Project has been designed to utilize construction techniques to avoid or minimize environmental impacts. For example, the majority of the submarine cable will be installed using water-jetting methods, which minimize sediment transport and impacts to water quality. HDD methods will be used at cable landfall locations (i.e., Yonkers and Queens) in order to avoid potential impacts to nearshore and shoreline resource areas. Additionally, the Project's converter station and substation interconnections will be located on inland properties and will not require shorefront properties, other than narrow easements.

***State Policy 28*** - Ice management practices shall not interfere with the production of hydroelectric power, damage significant fish and wildlife and their habitats, or increase shoreline erosion or flooding.

Not applicable.

***State Policy 30*** - Municipal, industrial, and commercial discharge of pollutants, including but not limited to toxic and hazardous substances, into coastal waters will conform to state and national water quality standards.

A three-dimensional hydrodynamic and time-variable water quality model was developed by the Applicants to assess water quality impacts and compliance with applicable water quality standards in the Hudson, Harlem and East Rivers. The model was used to simulate ten contaminants that were found in sediment cores collected during the Spring 2010 Marine Route Survey. The maximum model-computed concentrations of contaminants along the cable route were graphically presented and compared to New York State's water quality standards.

The effects of the proposed cable installation are projected to comply with state and national water quality standards that are based on protecting aquatic life from acute toxicity. These standards are the most appropriate criteria for the assessment of the proposed Project given the non-chronic (i.e., short-term) and incremental nature of the potential exposure to sediment contaminants resulting from the cable installation.

Effects of the proposed cable installation in portions of the Upper Hudson River PCB Superfund Site were also modeled. The model indicated that the projected maximum total PCB concentration during cable installation would be below the EPA's Engineering Performance Standard water quality criteria for dredging resuspension at the Hudson River PCBs Superfund Site (EPA 2003).

***State Policy 32 - Encourage the use of alternative or innovative sanitary waste systems in small communities where the costs of conventional facilities are unreasonably high, given the size of the existing tax base of these communities.***

Not applicable.

***State Policy 35 - Dredging and filling in coastal waters and disposal of dredged material will be undertaken in a manner that meets existing state permit requirements, and protects significant fish and wildlife habitats, scenic resources, natural protective features, important agricultural lands, and wetlands.***

During installation of the Project transmission cables, dredging and/or filling in coastal waters may be necessary in certain, limited areas. These areas may include limited areas of dredging within federal navigation channels or limited areas characterized as fill locations due to the use of rip rap or other protective cable coverings. However, subsequent to the installation of the Project, the area will be allowed to return to its original state.

The Applicants have conducted sediment sampling and analyses to characterize the sediment type and quality and has also conducted water quality modeling to ensure that the Project will be able to comply with applicable water quality standards. The Project will comply with all applicable federal and state laws and regulations regarding water quality, fish and wildlife habitats, wetlands, scenic resources, natural protective features, important agricultural lands, and important coastal resources in order to avoid or minimize potential affects to these resources by the Project. The Project will obtain all necessary permits associated with dredging or filling activities prior to commencement of work.

***State Policy 36*** - *Activities related to the shipment and storage of petroleum and other hazardous materials will be conducted in a manner that will prevent or at least minimize spills into coastal waters; all practicable efforts will be undertaken to expedite the cleanup of such discharges; and restitution for damages will be required when these spills occur.*

The Project transmission cables are solid state, i.e. they do not contain fluids. The cable installation equipment will likely include petroleum powered equipment; therefore, a spill prevention control and countermeasure (SPCC) plan will be developed and implemented, pursuant to state and federal regulations, during the use and/or storage of petroleum-containing equipment. The Project's converter station and substation interconnection may include the use or storage of petroleum or hazardous materials. An SPCC plan or its equivalent will be developed for these facilities.

Surface and groundwater resources, significant fish and wildlife habitats, recreation areas, important agricultural land, and scenic resources will be protected by implementing diligent management of any petroleum and hazardous materials during all construction and operation activities.

***State Policy 37*** - *Best Management Practices will be utilized to minimize the non-point discharge of excess nutrients, organics, and eroded soils into coastal waters.*

Soil erosion and sediment movement will be minimized during construction and operation via erosion control measures and soil stabilization protocols, which will be implemented as necessary to protect the aquatic resources in the area. The Applicants are developing standard Best Management Practices (BMPs) for construction that are currently under review by state agencies.

***State Policy 38*** - *The quality and quantity of surface water and groundwater supplies will be conserved and protected, particularly where such waters constitute the primary or sole source of water supply.*

The Project is comprised of solid state transmission cable; therefore, the cables do not contain any potentially polluting fluids. Equipment located at the converter station and interconnection site may contain petroleum or hazardous substances; SPCC plans or their equivalent will be developed to ensure that appropriate spill prevention, countermeasure, and contingency measures are implemented wherever Project features present a risk of spill or discharge to waters of the United States.

The Project is required to obtain a water quality certification pursuant to Section 401 of the Clean Water Act. The Project will comply with all requirements of the water quality certification.

Surface and groundwater resources will be protected by implementing diligent management of any hazardous substances on the sites and erosion control measures to prevent sediment transport to the waterway. Applicants have made Freedom of Information Requests for information on drinking water intake systems to four

municipalities who rely upon the Hudson River for water supply. The Applicants will employ Best Management Practices and other protocols so that potential impacts from the Project are commensurate with other natural processes and routine activities in the Hudson River (i.e., storm events, boat traffic, maintenance dredging of navigation channels, etc.)

***State Policy 39*** - *The transport, storage, treatment and disposal of solid wastes, particularly hazardous wastes, within coastal areas will be conducted in such a manner so as to protect groundwater and surface water supplies, Significant Fish and Wildlife Habitats, recreation areas, important agricultural land, and scenic resources.*

Surface and groundwater resources, significant fish and wildlife habitats, recreation areas, important agricultural land, and scenic resources will be protected by implementing diligent management of any solid wastes during all construction activities. Best Management Practices will be used to protect the aforementioned resources.

***State Policy 40*** - *Effluent discharges from major steam electric generating and industrial facilities into coastal waters will not be unduly injurious to fish and wildlife and shall conform to state water quality standards.*

Not applicable.

***State Policy 41*** - *Land use or development in the coastal area will not cause national or state air quality standards to be violated.*

The Project will obtain all applicable air quality permits; therefore, no violations of national or state air quality standards during its construction or operation stages.

***State Policy 43*** - *Land use or development in the coastal area must not cause the generation of significant amounts of acid rain precursors: nitrates and sulfates.*

The Project will not generate emissions that release nitrates or sulfates to the atmosphere during operation.

***State Policy 44*** - *Preserve and protect tidal and freshwater wetland and preserve the benefits derived from these areas.*

Subsequent to cable installation, the area will be restored to its original condition. Therefore, any wetlands crossed by the land or submarine cables will remain wetlands after construction. At the Project's landfall locations (i.e., Yonkers and Queens), HDD methods will be used to install the cables in order to avoid potential impacts to nearshore and shoreline resource areas (i.e., wetlands). The HDD is expected to exit the water at a depth sufficient to avoid impacts to intertidal and foreshore areas.

The Yonkers converter station and the Queens interconnection point are located in industrial zones. No wetlands are located at these sites; therefore, construction at these sites will not result in any direct or indirect impacts to wetlands.

### **3.0 NEW YORK CITY LOCAL WATERFRONT REVITALIZATION PROGRAM COASTAL POLICIES**

The CHPE Project is a HVDC transmission system extending from the international border between Canada and the United States to New York City. The Project's HVDC transmission cables will be buried either underground or underwater for the entire route. In New York City, the Project's transmission cables will be buried beneath the riverbed of the Hudson River, Harlem River, and East River before making landfall in Queens, New York where the cables will extend inland for approximately 1 mile to terminate at a spare bay at the 345-kV substation currently under construction by the New York Power Authority on land owned by Con Edison. HDD methods will be utilized at the landfall location in Queens, New York to transition the cables from water to land while avoiding impacts to the shoreline or nearshore areas. Because the cables will be located beneath the waters edge, no waterfront property in New York City is needed to develop this Project, with the exception of a narrow (approximately 30 ft) easement.

*Local Policy 2.1 - Promote water-dependent and industrial uses in Significant Maritime and Industrial Areas.*

The Project is not located in a designated Significant Maritime and Industrial Area (SMIA). The interconnection point at a substation currently under construction (land owned by Con Edison) in Queens, New York is located in a commercial/industrial zone and is not located on a waterfront site. The Project will be designed so as not to affect potential maintenance dredging activities within the navigation channels, which support and promote the development and operation of working waterfront uses. Therefore, the Project will not affect the promotion of water-dependent and industrial uses in SMIA's.

*Local Policy 2.3 - Provide infrastructure improvements necessary to support working waterfront uses.*

The Project's transmission cables will be sited outside the designated navigation channels wherever possible. In areas where a designated navigation channel cannot be avoided, the cables will either be buried within the side slopes associated with the navigation channel or buried within the navigation channel to the depth required by applicable federal and state agencies to avoid impacts to current or future dredging activities located within these navigation channels. The Project will have no other effects on infrastructure supporting the working waterfront uses.

In the event that dredging is required to install the Project's cables, dredge material will be characterized to determine the most appropriate/beneficial reuse or disposal for the material that will not interfere with working waterfront uses.

***Local Policy 3.1 - Support and encourage recreational and commercial boating in New York City's maritime centers.***

The Project is designed to have no long-term impacts to recreational and commercial boating in New York City's maritime centers. During the short-term construction phase of the Project, a cable-laying vessel will be utilized to transport and lay the cable on the riverbed, and a remote operated vehicle (ROV) will be utilized to bury the transmission cable beneath the riverbed. During the construction phase, notifications will be released to alert commercial and recreational boaters to avoid the areas where cable installation is underway, but such avoidance will be highly localized and of temporary duration. Subsequent to construction, there will be no impacts to recreational or commercial boating caused by the Project.

***Local Policy 3.3 - Minimize impact of commercial and recreational boating activities on the aquatic environment and surrounding land and water uses.***

During construction, the cable laying vessel is likely to have petroleum containing equipment on-board. The vessel will utilize best management practices to prevent potential spillage of petroleum products. The vessel will also be equipped and trained to control and respond to a spill in the unlikely event one occurs. The vessel will comply with all applicable laws and regulations related to discharges of waste from the vessel; no waste discharges are anticipated from the vessel. The Project's transmission cables are solid-state cables which contain no liquid, thereby eliminating the potential for a discharge from the cable.

***Local Policy 4 - Protect and restore the quality and function of ecological systems within the New York City coastal area.***

The Project will utilize specific construction windows and techniques designed to avoid or minimize potential impacts to important ecological systems. The Applicants will continue to work with the appropriate federal, state, and local agencies and stakeholders to incorporate best management practices to avoid and minimize any potential impacts to important ecological systems. Operation of the Project is not expected to result in any impacts to any important ecological systems, including those within the New York City coastal areas.

***Local Policy 4.1 - Protect and restore the ecological quality and component habitats and resources within the Special Natural Waterfront Areas, Recognized Ecological Complexes, and Significant Coastal Fish and Wildlife Habitats.***

The Project consists of the burial of HVDC and HVAC transmission cables within waterways of New York City. The cables will be installed primarily via water-jetting techniques, which are designed to minimize impacts to the riverbed and surrounding water quality. For short sections of the Project route, cable burial may not be feasible due to riverbed conditions (i.e., bedrock). In these locations, the cables will be laid on the riverbed with protective coverings (i.e., concrete mattresses or rip-rap). In these

instances, the protective coverings are not anticipated to represent a change in the ecological habitats because the rip-rap will be consistent with the pre-existing hard bottom habitat. Subsequent to installation, the ecological habitats will be allowed to return to their pre-existing condition through natural processes

***Local Policy 4.2 - Protect and restore tidal and freshwater wetlands.***

The Project has been designed to avoid or minimize impacts to tidal and freshwater wetlands. The transmission cables will be buried beneath the riverbed, which will subsequently be allowed to return to its pre-existing condition through natural processes.

***Local Policy 4.3 - Protect vulnerable plant, fish and wildlife species, and rare ecological communities. Design and develop land and water uses to maximize their integration or compatibility with the identified ecological community.***

The Applicants are consulting with federal, state, and local agencies, as applicable, regarding Endangered Species, Threatened Species, Exploitably Vulnerable Species, and Rare Species that may be located within the Project area. The Project will be designed to avoid or minimize impacts to these species to the greatest extent possible.

***Local Policy 5.3 - Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, tidal marshes, and wetlands.***

Installation of the Project has been designed to comply with federal and state dredging permit requirements, where applicable. Construction windows and best management practices will be utilized to avoid or minimize impacts to water quality and associated aquatic life.

***Local Policy 6 - Minimize loss of life, structures, and natural resources caused by flooding and erosion.***

The Project will not affect flooding or erosion.

***Local Policy 6.3 - Protect and preserve non-renewable sources of sand for beach nourishment.***

The Project will not affect non-renewable sources of sand for beach nourishment.

***Local Policy 8 - Provide public access to and along New York City's coastal waters.***

The Project is a buried transmission cable and will not affect public access to or along New York City's coastal waters.



***Local Policy 8.5 - Preserve the public interest in and use of lands and waters held in public trust by the state and city.***

The Project will require a permitted corridor / easement for the transmission cables buried beneath the riverbed of the Hudson, Harlem, and East Rivers. However, the required easement will be narrow (~30 ft) and will not affect the public interest and use of lands and waters held in public trust by the state and city.

***Local Policy 10 - Protect, preserve and enhance resources significant to the historical, archaeological, and cultural legacy of the New York City coastal area.***

In the spring of 2010, a detailed marine route survey was completed along the Project's entire submarine route, which included the collection of data related to historical, archaeological, and cultural resources along the route. The Project route is being sited and designed based on the results of the spring 2010 survey (and additional surveys, where necessary) in order to avoid impacts to the resources identified.

#### **4.0 LOCAL WATERFRONT REVITALIZATION PLAN (LWRP) ASSESSMENT**

Municipalities that border coastal areas and inland waterways prepare LWRPs, in conjunction with the NYSDOS, for the preservation, enhancement, protection, development and use of the state's coastal and inland waterways. Projects which may impact coastal areas or inland waterways must be reviewed for consistency with those LWRPs that pertain to territory within the Project area. The information below includes a review of consistency with LWRPs for both the underwater portions of the Project and the terrestrial portions of the Project potentially located in close proximity to coastal or waterfront areas.

There are 24 municipalities with LWRPs along the cable route, which are listed below in order from the Canadian border south to New York City:

- Town of Essex
- Village of Whitehall
- Town of Schodack/Village of Castleton-On-The-Hudson
- Village of Athens
- Village of Tivoli
- Village of Saugerties
- Town of Redhook
- City of Kingston
- Town of Rhinebeck
- Town of Esopus
- Town of Poughkeepsie
- Town of Lloyd
- City of Beacon

- City of Newburgh
- City of Peekskill
- Town of Stony Point
- Village Haverstraw
- Village of Croton on the Hudson
- Village of Ossining
- Village of Nyack
- Village of Sleepy Hollow
- Village of Piermont
- Village of Dobbs Ferry
- New York City

The Applicants conducted an evaluation of all 24 LWRPs, which consist of state waterfront policies refined to reflect local conditions and circumstances as well as local policies. Additional local policies that relate to the Project are evaluated on a case-by-case basis below. Overall, the LWRP evaluation indicates that the Project is consistent with all of the LWRPs within the Project's proximity.

Additional supporting information has been previously submitted to numerous federal agencies (USACE) and New York State agencies (NYS DOS, NYSDPS, NYSDEC, etc) as part of the March 30, 2010 application to the New York State Public Service Commission for Certificate of Environmental Compatibility and Public Need pursuant to Article VII of the Public Service Law ("Article VII Application"). In particular, Exhibit 4 of the March 2010 Article VII Application includes a comprehensive analysis of the affected environment along the proposed Project route. Additional supporting information was submitted in a supplemental filing in July 2010 ("July 2010 Article VII Supplement")

#### **4.1 Town of Essex**

The Town of Essex has identified Split Rock Mountain, Webb Royce Swamp, Essex "Station" and the Boquet River as significant fish and wildlife habitats. Split Rock Mountain, Webb Royce Swamp and Essex "Station" are adjacent to the coastal zone area and will not be affected by this project. The Boquet River discharges into Lake Champlain and will not be affected by this project.

*Policy 5 - Protect and restore ecological resources, including significant fish and wildlife habitats, wetlands and rare ecological communities (similar to State Policy 7).*

This Project's component in the Town of Essex involves the placement of HVDC cables in the bed of Lake Champlain using water jetting and/or trenching to open up the benthic substrate, lay the cable and re-contour the bottom. The Applicants have and will continue to work cooperatively to ensure that the Project is designed, sited, installed, and operated in a manner that protects and restores important ecological resources.

Additional information regarding fish and wildlife habitats, wetlands, and rare ecological communities was submitted within Exhibit 4 of the March 2010 Article Application. Also, see above response to State Policy 7.

***Policy 6 - Protect and improve water resources (similar to State Policy 38).***

The March 2010 Application (Exhibit 4) included an evaluation of existing water quality along the submarine portions of the Project route. Subsequently, a marine route survey (July 2010 Supplement to Article VII Application) was performed, which sampled sediments for the presence of contaminants. Sediment chemistry and water quality are linked because cable installation will disturb sediments and have the potential to suspend contaminants.

The Applicants conducted a water quality modeling study to predict the distribution and movement of suspended sediment generated by water jetting for cable installation. The study provides a basis for estimating water quality effects and for developing a water quality monitoring plan. Additional sediment chemistry data will be collected to refine observed contaminant distribution and to provide current sediment chemistry data for specific locations for purposes of HDD and conventional dredging.

Water quality is assessed through limits on selected water quality parameters that are conditions of the Project permits. Compliance with these limits will be established through monitoring of installation process and adjustments to cable installation operations when needed to avoid non-compliance.

A suspended sediment and water quality monitoring plan will be developed in consultation with federal and state authorities and agencies, which will outline the mitigation measures to eliminate or minimize impacts to water resources along the route.

For additional information, see above response to State Policies 30 and 38.

***Policy 6.3 - "Protect water quality when excavating or placing fill in navigable waters and in or near marshes, estuaries, and wetlands" (State Policies 34 and 35).***

The boundaries of any wetlands, streams and other water resources along the Project route have been identified in the field during development of the Article VII Application and supplemental filings. All delineated wetlands, streams and water resources will be mapped and prior to construction all field identified sensitive resources will be flagged to ensure resource protection. Protective measures will be implemented to ensure minimization of impacts to wetlands and other water resources potentially resulting from sedimentation, erosion, turbidity, unanticipated spills or leaks of fuel, and/or hazardous materials.

In general, impacts to marshes, estuaries, and wetlands in the Project area are expected to be temporary and limited to the construction-phase of the Project. The Project has been designed to avoid marshes, estuaries, and wetlands, wherever possible. Where wetlands

cannot be avoided, the Applicants will implement appropriate protection measures during construction to minimize and/or mitigate for any impacts to benefits derived from these resources. Draft protection measures are currently under review by state agencies but the final protocols are likely to include the following:

- a) Applicants will minimize work within and across streams, wetlands, or other water resources to the extent possible during preconstruction, construction, operation, and maintenance activities.
- b) Applicants will notify appropriate agencies at least five (5) business days prior to construction involving federal and/or state-regulated wetland crossings.
- c) Sediment and erosion control devices will be installed across the right-of-way on any slopes leading into wetlands and along the edge of the construction right-of-way, as necessary, to prevent spoil from flowing off the right-of-way into a wetland.
- d) To the extent possible, work which must be in a wetland shall be scheduled to be started and completed in the dry or when the ground is frozen.
- e) To expedite revegetation of wetlands, the top one (1) foot of soil will be stripped from over the trench. The exception to this includes areas with standing water or saturated soils, areas where no topsoil layer is evident or areas where the topsoil layer exceeds the depth of the trench.
- f) Construction vehicles and equipment will be limited to established access roads and construction work spaces.
- g) Construction equipment operating within wetlands will be limited primarily to those needed to dig the trench, install the cable, backfill, and restore the right-of-way. All other construction equipment will use access roads in upland areas to the extent practicable.
- h) To minimize disturbance and compaction in wetlands with saturated soils or standing water, either wide-tracked or balloon-tired equipment operating from timber corduroy or timber mats will be used. Imported rock, stumps, brush, or off-site soil as temporary or permanent fill will be prohibited. Following construction, all materials used to stabilize the right-of-way will be removed.
- i) Construction materials, including fuels, will not be stored within one hundred (100) feet of any surface water or wetland system, unless no alternative is available.
- j) Construction equipment will not be refueled within one hundred (100) feet of any surface water or wetland system.

- k) Spill response and mitigation procedures will be implemented in the case of any accidental spills of chemical, fuel, or other hazardous materials.
- l) Construction equipment will not be washed in wetlands or within one hundred (100) feet of any wetland unless specified to minimize the spread of invasive species. Run-off resulting from washing operation shall not be permitted to directly enter any watercourses or wetlands.
- m) Any temporary access routes or parking areas adjacent to wetlands and waterbodies will be graded to direct runoff away from water resources.
- n) Spoil or excavated materials will be stored outside of wetlands and wetland adjacent areas. All stockpiled material will be stored at a sufficient distance to prevent sedimentation into any stream, wetland, wetland adjacent area, or other waterbody. If no storage area is available, spoil will be adequately protected and erosion and sedimentation control measures will be installed to prevent materials from entering adjacent areas. All excess material will be disposed of in approved upland locations.
- o) Unless work activities will resume within fourteen (14) days, Applicants will stabilize disturbed soils as soon as possible and no more than seven (7) days upon temporary or permanent completion of ground-disturbing activities. If soil stabilization measures are not possible within seven (7) days due to snow cover, frozen ground or other weather conditions, soils will be stabilized as soon as practicable.
- p) The construction right-of-way will be inspected periodically during and after construction until final restoration is complete. Erosion control or restoration features will be repaired as needed in a timely manner until permanent revegetation is successful.

## **4.2 Village of Whitehall**

*Policy 5.1 - Protect significant coastal fish and wildlife habitats.*

The Applicants will work closely with NYSDOS, NYSDEC, the New York Natural Heritage Program (NYNHP) and local municipalities to avoid or minimize disturbance to these areas.

Additional information was provided in Exhibit 4 of the Article VII Application. Also, see above response to State Policy 7.

## **4.3 Town of Schodack and Village of Castleton-on-the-Hudson**

*Policy 7 - The Town of Schodack and Village of Castleton-on-the-Hudson note that habitat protection is vital to ensuring the survival of fish and wildlife populations. The town has*

*adopted the Significant Fish and Wildlife habitat “habitat impairment test” and defines “habitat destruction”, “significant impairment” and “tolerance range.”*

See above response to State Policy 7.

***Policy 7A - The Papscanee Marsh and Creek habitat shall be protected, preserved and restored where practicable so as to maintain its viability as a habitat.***

Papscanee Marsh and Creek are listed as a Significant Fish and Wildlife Habitat with a significance rating of 48. This area will be avoided by the Project.

The Project will not destroy or cause significant impairment to any habitats in the Town of Schodack or Village of Castleton-on-the-Hudson.

See above response to State Policy 7.

***Policy 7B - The Schodack and Houghtaling Islands and Schodack Creek habitat shall be protected, preserved and restored where practicable so as to maintain its viability as a habitat.***

The Schodack and Houghtaling Islands and Schodack Creek habitat are listed as Significant Fish and Wildlife Habitat by the NYSDOS, with a significance rating of 77. A portion of this 1,800 acre parcel is an undeveloped state park.

This area will be avoided by the Project.

#### **4.4 Village of Athens**

All of the Village of Athens’ policies were reviewed and found to be consistent with the assessment of State Policies described above.

#### **4.5 Village of Tivoli**

***Policy 7 - Significant coastal fish and wildlife habitats will be protected, preserved, and where practical, restored so as to maintain their viability as habitats.***

See above response to State Policy 7.

Sections of North and South Tivoli Bay are within the Village of Tivoli. This is a Significant Coastal Fish and Wildlife Habitat recognized by DOS with a significance rating of 162.

This area will be avoided by the Project.

**Policy 7A** - *The locally significant habitats of Stony Creek and the Hudson River along Tivoli's waterfront will be protected, preserved and improved. The Hudson River Bluffs, Tivoli Bay, and Stony Creek should be protected from overdevelopment.*

This Project will avoid Tivoli Bay and Stony Creek and will not induce development in the area.

#### **4.6 Village of Saugerties**

**Policy 7** - *Significant coastal fish and wildlife habitats will be protected, preserved, and where practical, restored so as to maintain their viability as habitats.*

See above response to State Policy 7.

The Esopus Estuary has been designated a Significant Coastal Fish and Wildlife Habitat by the NYSDOS. It has a significance rating of 98. The boundary of the Esopus Estuary extends across the Hudson River. It is impossible to avoid the boundary area of the Esopus Estuary.

The proposed cable route will be sited on the east side of the Hudson River and will minimize impacts and would not result in a direct loss of habitat.

**Policy 44A** - *Preserve wetlands from development and pollution and encourage wildlife activity through enforcement of existing state regulations, establishment of wetland zones and undertaking measures to eliminate pollution sources.*

This is a local policy related to NYSDOS Policy 44.

See above response to Town of Essex Policy 6.3.

#### **4.7 Town of Red Hook**

**Policy 7** - *Significant Coastal Fish and Wildlife Habitats will be protected, preserved, and where practical, restored so as to maintain their viability as habitats.*

See above response to State Policy 7.

**Policy 7A** - *Protect the areas identified as significant habitat areas by the NYSDOS as well as the creeks, kills, wetland and cove areas draining into and adjacent to the Hudson River from alteration and/or pollutant discharge by residential, commercial, agricultural or industrial uses in order to maintain their viability as habitat areas.*

There are three significant habitats in the Red Hook LWRP area: The Esopus Estuary, the Flats and North and South Tivoli Bays. Impacts to these areas will be avoided or minimized as described in the above response to State Policy 7.

*Policy 23A - Conserve, protect, preserve and, if appropriate, promote the adaptive reuse of places, sites, structures, views and features in the coastal area of the Town of Red Hook of special historic, cultural or archaeological significance or which by reason of association with notable people or events, or of the antiquity or uniqueness of architectural and landscape design particular significance to the heritage of the town.*

The construction of the buried cables will have no adverse impact on these resources.

*Policy 38A - Work to re-establish and maintain the Saw Killwater quality surveillance program.*

This local policy is not applicable as the Project is not in proximity to this resource nor will it affect it.

## **4.8 City of Kingston**

*Policy 7 - Significant coastal fish and wildlife habitats will be protected, preserved, and where practical, restored so as to maintain their viability as habitats.*

See above response to State Policy 7.

*Policy 7A - The Rondout Creek habitat shall be protected, preserved and, where practical, restored so as to maintain its viability as a habitat.*

Rondout Creek is a Significant Coastal Fish and Wildlife Habitat recognized by NYSDOS with a significance value of 70.

This SCFWH will be avoided by the Project.

*Policy 7B - The locally important habitat at Kingston Point Park, also known as K.E.4, shall be protected, preserved and, where practicable, restored so as to maintain its viability as a habitat.*

This mudflat freshwater wetland area will be avoided by the Project.

Another Significant Coastal Fish and Wildlife Habitat recognized by NYSDOS is the Kingston Deep Water habitat with a significance rating of 110. This six mile long habitat extends from the City of Kingston to Rhinecliff and varies in depth from 30 to 50 feet.

A detailed discussion of potential impacts and mitigation for the Kingston Deepwater habitat is provided in Exhibit 4 of the March 2010 Article VII Application. Cable installation is not expected to result in a change in overall depths in the Kingston Deepwater Habitat, and sediment deposition beyond the trench is expected to be negligible. BMPs will be employed during cable installation to mitigate any potential adverse impacts.

See above response to State Policy 7.



## 4.9 Town of Rhinebeck

**Policy 7** - *Significant coastal fish and wildlife habitats will be protected, preserved and, where practical, restored so as to maintain their viability as habitats.*

See above response to State Policy 7.

**Policy 7A** - *The Vanderburgh Cove and Shallows Habitat shall be protected, preserved and, where practical, restored so as to maintain its viability as a habitat.*

Vanderburgh Cove and Shallows Habitat is a Significant Coastal Fish and Wildlife Habitat recognized by NYSDOS with a significance rating of 20.

These areas will be avoided by the Project.

**Policy 7B** - *The Kingston Deepwater Habitat shall be protected, preserved and, where practical, restored so as to maintain its viability as a habitat.*

The Kingston Deep Water Habitat is recognized by NYSDOS and has a significance rating of 110. This six mile long habitat extends from the City of Kingston to Rhinecliff and varies in depth from 30 to 50 feet.

A detailed discussion of potential impacts and mitigation for the Kingston Deepwater habitat is provided in Exhibit 4 of the Article VII Application. Cable installation is not expected to result in a change in overall depths in the Kingston Deepwater Habitat, and sediment deposition beyond the trench is expected to be negligible. BMPs will be employed during cable installation to mitigate any potential adverse impacts.

**Policy 7C** - *The Flats Habitat shall be protected, preserved and where practical, restored so as to maintain its viability as a habitat.*

The Flats Habitat is a Significant Coastal Fish and Wildlife Habitat recognized by NYSDOS with a significance rating of 118. This area is a four and one half mile long ridge running down the middle of the Hudson River. It is less than 10 feet deep at mean low water. The navigational channel runs down the Hudson River to the west of this area.

The Project is not expected to cross this SCFWH.

**Policy 7D** - *Support efforts to protect and enhance the natural resources of Ferncliff Forest, Snyder Swamp and the Mudder Kill.*

These areas will not be affected by this Project.

**Policy 7E** - *Protect the creeks, freshwater tidal wetlands, and freshwater tidal cove areas draining into and adjacent to the Hudson River from alteration and/or pollutant discharge by residential, commercial, agricultural or industrial uses.*

These areas will not be affected by this Project.

#### **4.10 Town of Esopus**

**Policy 7** - *Significant coastal fish and wildlife habitats will be protected, preserved, and where practical, restored so as to maintain their viability as habitats.*

See above response to State Policy 7.

**Policy 7A** - *The locally important Kingston and Poughkeepsie deepwater habitats shall be protected and preserved so as to maintain their viability as habitats.*

Since this LWRP was adopted, these two areas have been recognized as Significant Coastal Fish and Wildlife Habitats.

The Kingston Deep Water Habitat is recognized by NYSDOS and has a significance rating of 110. This six mile long habitat extends from the City of Kingston to Rhinecliff and varies in depth from 30 to 50 feet.

The Poughkeepsie Deep Water Habitat is recognized by NYSDOS and has a significance rating of 110. This habitat extends 14 miles from the Village of West Park to the Hamlet of Marlboro. Depths range from 30 to 50 feet with one area, Crum Elbow, having depths exceeding 125 feet.

A detailed discussion of potential impacts and mitigation for these SCFWHs is provided in Exhibit 4 of the Article VII Application. Cable installation is not expected to result in a change in overall depths in either the Kingston or Poughkeepsie Deep Water Habitats, and sediment deposition beyond the trench is expected to be negligible. BMPs will be employed during cable installation to minimize any potential adverse impacts.

**Policy 7B** - *The locally important Rondout Creek Habitat shall be protected and preserved so as to maintain its viability as habitat.*

Since the adoption of this LWRP, the Rondout Creek has been designated a Significant Coastal Fish and Wildlife Habitat by NYSDOS with a significance value of 70.

This significant habitat will be avoided by the Project.

***Policy 7C - The locally important Esopus Meadows Habitat shall be protected and preserved so as to maintain its viability as habitat.***

Since the adoption of this LWRP, Esopus Meadows Habitat has been recognized by the NYSDOS as a Significant Coastal Fish and Wildlife Habitat with a significance rating of 71. Esopus Meadows is a shoal of approximately 350 acres.

This area will be avoided by the Project.

***Policy 7D - The other identified local habitat “the map turtle basking rocks” shall also be protected from the adverse impacts of use or development.***

This area will be avoided by the Project.

#### **4.11 Town of Poughkeepsie**

***Policy 7 - Significant coastal fish and wildlife habitats will be protected, preserved and, where practical, restored so as to maintain their viability as habitats.***

See above response to State Policy 7.

There are two Significant Coastal Fish and Wildlife Habitats in the Town of Poughkeepsie, the Poughkeepsie Deepwater Habitat and Wappinger Creek.

The Poughkeepsie Deep Water Habitat is recognized by NYSDOS and has a significance rating of 110. This habitat extends 14 miles from the Village of West Park to the Hamlet of Marlboro. Depths range from 30 to 50 feet with one area, Crum Elbow, having depths exceeding 125 feet.

Wappinger Creek is on the east side of the Hudson River between Poughkeepsie and Wappinger. It has a significance rating of 54.

This area will be avoided by the Project.

#### **4.12 Town of Lloyd**

***Policy 7 - Significant coastal fish and wildlife habitats will be protected, preserved and, where practical, restored so as to maintain their viability as habitats.***

See above response to State Policy 7.

***Policy 7A - To preserve and protect the viability of the Poughkeepsie Deep Water Habitat and the Shortnose Sturgeon, which is considered an endangered species.***

The Poughkeepsie Deep Water Habitat is recognized by NYSDOS and has a significance rating of 110. This habitat extends 14 miles from the Village of West Park to the Hamlet

of Marlboro. Depths range from 30 to 50 feet with one area, Crum Elbow, having depths exceeding 125 feet.

A detailed discussion of potential impacts and mitigation for these SCFWHs is provided in Exhibit 4 of the Article VII Application. Cable installation is not expected to result in a change in overall depths in the Poughkeepsie Deep Water Habitat, and sediment deposition beyond the trench is expected to be negligible. BMPs will be employed during cable installation to minimize any potential adverse impacts. Potential impacts and mitigation for shortnose sturgeon is described in the Article VII Application.

***Policy 7B - Protect, preserve and enhance the wooded bluffs of the Hudson River shore, which is habitat to the bald eagle (an endangered species), the osprey (threatened) and peregrine falcon as well as many other bird species.***

The Project will avoid these areas.

***Policy 8A - Protect fish and wildlife resources in the waterfront area from any possible hazardous wastes and other pollutants which may be present anywhere within the waterfront area, including the Costantino Landfill.***

This Project is designed to avoid disturbance of any hazardous wastes or other pollutants which may be present anywhere within the waterfront area, it will not generate hazardous wastes, and it incorporates protections to avoid introduction of other pollutants to that area.

***Policy 18A - Safeguard the vital economic, social and environmental interests of the Town of Lloyd and its citizens in the evaluation of any proposal for an additional Hudson River crossing - either a new bridge or second deck - which would impact the town***

This local policy is not applicable to this Project.

***Policy 35A - Spoils from dredging of the navigational channel of the Hudson River, or of any areas of the river or the coastline which may require it, shall not be disposed of in the Poughkeepsie Deepwater Habitat.***

If any dredge spoil results from this Project, it will be disposed of in accordance with all state, federal and local requirements, and will not be disposed of in the Poughkeepsie Deepwater Habitat.

#### **4.13 City of Beacon**

***Policy 7A - The Fishkill Creek Estuary and marsh shall be protected, preserved, and where practical, restored so as to maintain its viability as a habitat. This Significant Coastal Fish and Wildlife Habitat has a significance rating of 54 and consists of an 80 acre estuary. (West Point North map)***

This area will be avoided by the Project.

***Policy 8A - Prohibit the discharge of untreated effluent and pollutants from commercial and industrial facilities along Fishkill Creek.***

This local policy does not apply to this Project.

***Policy 23A - Encourage the restoration and adaptive reuse of large historic estates, such as the mill buildings on Fishkill Creek.***

The Project does not involve the opportunity to restore or reuse large historic estates.

***Policy 35A - Dredging shall not occur during fish spawning season and will not be carried out without a U. S. Army Corps of Engineers Section 10 and/or 404 permit, and /or DEC Part 608 and 663 permits.***

The Project will abide by specific conditions of issued USACE Section 10/404 and/or DEC Part 608 and 663 permits, which include fish spawning timing issues. In addition, construction activity will be timed to minimize impacts to fish spawning as described in Exhibit 4 of the Article VII Application.

***Policy 35B - Spoils should not be deposited in wetlands or significant fish and wildlife habitats as identified in the LWRP inventory.***

Dredge spoil as a result of this Project will be disposed of in accordance with all state, federal and local requirements.

***Policy 35C - Reclamation of spoils sites, including landscaping, shall be conducted where it is practical to do so.***

This Project does not involve the use of spoil sites, so reclamation is not appropriate.

***Policy 35D - Groundwater contamination shall be avoided.***

The installation of the cables along the bottom of the Hudson River is designed to avoid groundwater contamination.

***Policy 35E - Spoils site design will incorporate considerations for natural features, viewsheds, and shall, where feasible, conform to existing land form.***

Spoil site development is not a component of this Project; therefore, this policy does not apply.

***Policy 35F - No deposition shall occur without testing of sample soils for toxicity.***

If dredging occurs within the limits of Beacon, dredge spoil will most likely be removed for proper disposal rather than deposited back in the trench.

***Policy 35G*** - Toxic or hazardous dredge spoils shall not be deposited within the waterfront boundary. The potential of worked out mines as dredge spoil sites will be investigated.

Any dredge spoil generated, as a result of this Project will be disposed of in accordance with all state, federal and local requirements.

***Policy 44A*** - Preserve and protect the Fishkill Creek Marsh to maintain its many intrinsic values.

Fish Creek Marsh Significant Coastal Fish and Wildlife Habitat has a significance rating of 54 and consists of an 80 acre estuary.

This area will be avoided by the Project.

#### **4.14 City of Newburgh**

***Policy 7A*** - Activities that would adversely affect fish resident in or migrating through waters adjacent to Newburgh will be avoided.

The Applicants will comply with this local policy by avoiding, minimizing or mitigating impacts to fisheries, as described in the above response to State Policy 7 and in Exhibit 4 of the Article VII Application.

***Policy 8A*** - New developments or expansion of existing facilities will not be permitted if such facilities introduce hazardous wastes or other pollutants into the environment or if they are unable to acquire the necessary state, federal, and local permits.

This Project does not anticipate introducing hazardous wastes or other pollutants into the environment since the cables do not contain these substances and cables are the only project feature proposed for placement within the City of Newburgh.

***Policy 18A*** - Maintain and improve existing low and moderate income housing.

This local policy is not applicable to this Project.

***Policy 23A*** - No changes in any exterior architectural feature, including, but not limited to, construction, alteration, restoration, removal, demolition, or painting, shall be made to identified resources except as hereinafter provided.

This local policy is not applicable to this Project.

***Policy 44*** - Preserve and protect tidal and freshwater wetlands and preserve the benefits derived from these areas.

In addition to generally avoiding most tidal wetland habitats as described in Exhibit 4 of the Article VII Application, this Project will specifically avoid Quassaick Creek tidal wetland, which is noted as locally important.

#### **4.15 City of Peekskill**

***Policy 7A*** - Fish and wildlife habitats of local importance are of value to the city and its natural resource inventory and shall be protected, preserved and, where practical, restored so as to maintain their viability.

This local policy refers to Camp Smith Marsh, Annsville Creek, Peekskill Hollow Brook and the McGregory Brook, as well as Nose and Bald Mountains north of the city.

These habitats of local significance are not in proximity to the Project and will not be impacted by this Project.

#### **4.16 Town of Stony Point**

***Policy 7A*** - The Iona Island Marsh shall be protected, preserved and, where practical, restored so as to maintain its viability as a habitat.

The Iona Island Marsh has a significance value of 71. It is comprised of approximately 270 acres of freshwater, tidal and brackish wetlands.

This area is along the west side of the Hudson River and will be avoided by this Project.

***Policy 7B*** - The Haverstraw Bay habitat shall be protected, preserved and, where practical, restored so as to maintain its viability as a habitat.

Haverstraw Bay is a significant habitat with a significance value of 166. The bay encompasses a six mile stretch of the Hudson River from Stony Point to Croton Point. Average depth at mean low water is approximately 15 feet. Salinity in the area varies by year, but Haverstraw Bay is an important habitat for fish nurseries. The navigational channel is located on the west side of the bay and maintained at approximately 35 feet in depth.

The Applicants will move its cable into the previously and periodically disturbed side slope of the navigational channel so as to minimize impacts to Haverstraw Bay.

***Policy 7C - The Hudson River Mile 44 - 56 habitat shall be protected, preserved and, where practical, restored so as to maintain its viability as a habitat.***

This significant habitat runs from Cornwall Bay to Peekskill Bay. It is a 12 mile long deep water habitat reaching depths of up to 200 feet. The bay has strong currents and a rocky substrate. It is considered the southernmost extent of freshwater in the Hudson River and is an important spawning area.

Detailed information on potential impacts and mitigation are provided in Section 4.8.4.3 of the Application. Cable installation is not expected to result in a change in overall depths, and sediment deposition beyond the trench is expected to be negligible. BMPs will be employed during cable installation to minimize any potential adverse impacts.

***Policy 23A - Stabilize and revitalize the historic residences and neighborhoods on River Road, Munn Avenue and Grassy Point Road.***

This Project is not located in or near these areas and will have no impact on these resources, and so this policy is not applicable.

#### **4.17 Village of Haverstraw**

***Policy 7A - The Haverstraw Bay Habitat shall be protected, preserved and where practical, restored so as to maintain its viability as habitat.***

Haverstraw Bay is a significant habitat with a significance value of 166. The bay encompasses a six mile stretch of the Hudson River from Stony Point to Croton Point. Average depth at mean low water is approximately 15 feet. Salinity in the area varies by year, but Haverstraw Bay is an important habitat for fish nurseries. The navigational channel is located on the west side of the bay and is maintained at approximately 35 feet in depth.

The Applicants will move its cable into the previously and periodically disturbed side slope of the navigational channel so as to minimize impacts to Haverstraw Bay.

***Policy 8A - Control the introduction of new industries or technology which could increase the presence of hazardous materials within the Haverstraw coastal area.***

This Project's scope within the Village boundaries only involves the installation of HVDC cables, which do not contain any hazardous materials.

***Policy 8B - Encourage existing industrial productions or storage facilities to utilize the most current technologies available to minimize the potential threat from hazardous wastes or pollutants to the surrounding environment.***

This Project does not involve industrial or storage facilities.



***Policy 23A - Stabilize and revitalize the historic residences and neighborhoods on First Street and Hudson Avenue as well as other selected areas.***

This Project is not located in or near these areas and will have no impact on these resources; therefore, this policy is not applicable.

***Policy 23B - Preserve and protect underwater historic, archaeological and cultural resources in Haverstraw Bay.***

The Applicants proposes to place the underwater transmission cables within the existing navigational channel in Haverstraw Bay, which should minimize any potential impacts to underwater resources since these areas have been previously disturbed. Exhibit 4 of the Article VII Application provides a detailed discussion of underwater historic, archaeological and cultural resources in the vicinity of the Project.

#### **4.18 Village of Croton on the Hudson**

***Policy 7A - The quality of the Croton River and Bay Significant Fish and Wildlife Habitat and Haverstraw Bay Significant Fish and Wildlife Habitat shall be protected and improved for conservation, economic, aesthetic, recreational, and other public uses and values. Its resources shall be protected from the threat of pollution, misuse, and mismanagement.***

Croton River and Bay is a significant habitat with a significance value of 24. The bay is comprised of approximately 1,200 acres of submerged aquatic vegetation and mudflats and is located at the south eastern edge of Haverstraw Bay. Most of the Croton River has been diverted for public water supplies.

This area will be avoided by the Project.

Haverstraw Bay is a significant habitat with a significance value of 166. The bay encompasses a six mile stretch of the Hudson River from Stony Point to Croton Point. Average depth at mean low water is approximately 15 feet. Salinity in the area varies by year, but Haverstraw Bay is an important habitat for fish nurseries. The navigational channel is located on the west side of the bay and maintained at approximately 35 feet in depth.

The Applicants will move its cable into the previously and periodically disturbed side slope of the navigational channel so as to minimize impacts to Haverstraw Bay.

***Policy 7B - Materials that can degrade water quality and degrade or destroy the ecological system of the Croton River and Bay Significant Fish and Wildlife Habitat and the Haverstraw Bay Significant Fish and Wildlife Habitat shall not be disposed of or allowed to drain in or on land within the area of influence in the Significant Fish and Wildlife Habitats.***

No materials will be disposed of or allowed to drain into the Croton River and Bay SCFWH or the Haverstraw Bay SCFWH. The Project will be constructed with a Spill

Prevention, Control, and Countermeasure (SPCC) plan, which will be provided in the Environmental Management and Control Plans developed for in-water construction.

***Policy 7C - Storage of materials that can degrade water quality and degrade or destroy the ecological system of the Croton River and Bay Significant Fish and Wildlife Habitat or Haverstraw Bay Significant Fish and Wildlife Habitat shall not be permitted within the area of influence of the habitat unless best available technology is used to prevent adverse impacts to the habitat.***

This Project will not require the storage of materials that could degrade water quality or degrade or destroy the ecological system of the Croton River and Haverstraw Bay SCFWHs.

***Policy 7D - Restoration of degraded ecological elements of the Croton River and Bay and Haverstraw Bay Significant Fish and Wildlife Habitat and shorelands shall be included in any programs for cleanup of any adjacent toxic and hazardous waste sites.***

This local policy does not apply to the Project.

***Policy 7E - Runoff from public and private parking lots and from storm sewer overflows shall be effectively channeled so as to prevent oil, grease, and other contaminants from polluting surface and ground water and impact the Significant Fish and Wildlife Habitat.***

This local policy does not apply to the Project.

***Policy 7F - Construction activity of any kind must not cause a measurable increase in erosion or flooding at the site of such activity, or impact other locations. Construction activity shall be timed so that spawning of anadromous fish species and shellfish will not be adversely affected.***

Sediment and erosion control BMPs will be employed to minimize impacts outside of the construction area from erosion or stormwater. The buried cables will not measurably alter the riverbed elevation, thereby avoiding any possibility of increasing flooding or erosion. Construction activity will be timed to minimize impacts to fish spawning as described in Exhibit 4 of the Article VII Application.

***Policy 7G - Such activities must not cause degradation of water quality or impact identified Significant Fish and Wildlife Habitats.***

This Project will be constructed with BMPs in place that will minimize the potential for water quality degradation, other than localized and temporary increases in suspended sediment concentrations around the water jetting device. Impacts to identified SCFWHs have either been avoided through cable routing or will be minimized through the selection of jetting as the preferred burial method (Exhibit 4 of the Article VII Application).

***Policy 44A - Wetlands, waterbodies and watercourses shall be protected by preventing damage from erosion or siltation, minimizing disturbance, preserving natural habitats and protecting against flood and pollution.***

The Applicants expect to avoid any direct impacts to wetlands along the underwater portions of the transmission cable corridor (Exhibit 4 of the Article VII Application) and will minimize siltation and other disturbances associated with the Project. The Project Description of this Joint Application provides additional details on the proposed construction methods, which allow for rapid cable laying and burial with the least sediment disturbing methods possible.

#### **4.19 Village of Ossining**

***Policy 7A - The designated coastal habitat at the Croton River and Bay shall be protected, preserved and where practicable, restored so as to maintain its viability as habitat.***

Croton River and Bay is a significant habitat with a significance value of 24. The bay is comprised of approximately 1,200 acres of submerged aquatic vegetation and mudflats and is located at the southeastern edge of Haverstraw Bay. Most of the Croton River has been diverted for public water supplies.

This Project will avoid Croton Bay significant habitat.

***Policy 7B - The locally important coastal wildlife habitat at Crawbuckie Nature Area shall be protected and preserved so as to maintain its viability as a habitat.***

The Crawbuckie Nature Area is east of the Croton Bay significant habitat and will be avoided by this Project.

#### **4.20 Village of Nyack**

***Policy 7A - Protect the physical characteristics of the Hudson River along Nyack that support the varied fish populations found there. Nyack's LWRP notes that numerous species of fish are found in this area and implemented this local policy to protect them.***

This Project will not alter the physical characteristics of the Hudson River, other than generating minor and temporary increases in suspended sediments and a linear trench of fluidized sediments that will require some time to re-compact (Exhibit 4 of the Article VII Application).

## 4.21 Village of Sleepy Hollow

**Policy 7A** - *Fremont Lake and associated wetlands/watercourses and adjacent upland areas shall be protected, preserved, and, where practical, restored so as to maintain its viability as a locally significant habitat.*

Fremont Lake and its associated wetlands/watercourses and adjacent upland areas are not near nor will they be affected by this Project.

**Policy 7B** - *The Philipsburg Manor and Devries Field wetland/watercourse areas of the Pocantico River shall be protected, preserved, and, where practical, restored so as to maintain its viability as a locally significant habitat.*

These areas are not near nor will they be affected by this Project.

**Policy 7C** - *The Upper Pocantico River and Gorey Brook watercourse areas shall be protected, preserved, and, where practical, restored so as to maintain its viability as a locally significant habitat.*

These areas are not near nor will they be affected by this Project.

**Policy 7D** - *The Hudson River immediately adjacent and within 1000 feet of the village's shoreline shall be protected, preserved, and, where practical, restored so as to maintain its viability as a locally significant habitat.*

Installation of the cables will either occur at a distance of greater than 1,000 feet from the village's shoreline at this location or will involve only temporary disturbance to the riverbed, which will return to its pre-installation condition over time.

**Policy 7E** - *The lands in state ownership associated with the Rockefeller State Park Preserve and Old Croton Aqueduct Trail shall be protected, preserved, and, where practical, restored so as to maintain its viability as a locally significant habitat.*

These areas are not near nor will they be affected by this Project.

**Policy 8A** - *Control the introduction of new industries or technology which could increase the presence of hazardous materials within the Sleepy Hollow waterfront area.*

This Project's scope within the Village boundaries only involves the installation of HVDC cables, which do not contain any hazardous materials.

**Policy 8B** - *Encourage existing industrial production or storage facilities to utilize the most current technologies available to minimize the potential threat from hazardous wastes or pollutants to the surrounding environment.*

This Project does not involve industrial or storage facilities.

**Policy 18A** - *Protect the vital economic, social, cultural, and environmental interests of the village in the evaluation of any proposal for new roads, road widening or infrastructure.*

This local environmental policy is not applicable to this Project.

**Policy 18B** - *To protect the social interests of the village, proposed actions must give full consideration to the impacts of such actions on the community and cultural resources of the village and the quality of life such resources support.*

With the cables being buried in the bottom of the Hudson River, this Project will not impact the cultural resources of the village or the quality of life such resources support.

**Policy 18C** - *To protect the environmental interests of the village, proposed actions must give full consideration to the impacts of such actions on valuable and sensitive natural resources of the village.*

This Project will have negligible to minor impacts to certain resources (e.g. water quality, fisheries, benthos) of the Hudson River due to the temporary nature of the cable installation disturbance to the riverbed. Since the native sediments backfill the trench, the disturbed area represents a small fraction of the total area of the riverbed, and the increased suspended sediments are localized and disperse quickly so the impacted resources will return to its pre-installation condition quickly.

**Policy 23A** - *Preserve and enhance the structures, areas, or sites within the Village of Sleepy Hollow that are currently listed on the state and/or national register of historic places.*

This local policy does not pertain to the Project, since none of these resources will be altered or disturbed during cable installation.

**Policy 23B** - *Preserve and enhance the structures, areas, or sites within the Village of Sleepy Hollow that have been identified as being eligible for listing on the state and/or national register of historic places.*

This local policy does not pertain to the Project, since none of these resources will be altered or disturbed during cable installation.

**Policy 23C** - *Encourage the restoration and adaptive reuse of historic buildings such as the Philipse Manor Train Station.*

This local policy does not pertain to the Project, since none of these resources will be altered or disturbed during cable installation.

## 4.22 Village of Piermont

**Policy 7A** - *Protect the Piermont Marsh south of the pier and the Sparkill Creek by severely restricting it to passive recreational uses.*

Piermont Marsh is a Significant Coastal Fish and Wildlife Habitat with a significance value of 74. It is a 725 acre tidal wetland located along the west side of the Hudson River. The Sparkill Creek empties into this wetland area.

This area will be avoided by the Project.

**Policy 8A** - *The intentional dumping of oil or other pollutants into waterways and catch basins can be harmful to fish and wildlife resources, and such actions will be prosecuted.*

The Applicants and/or its contractors will not intentionally dump oil or other pollutants into the Hudson River.

**Policy 8B** - *The Rockland County sewer outfall line should be extended to deeper, faster flowing water. The outfall line should be rebuilt to maintain its integrity.*

This local policy is not applicable to this Project since the Project does not involve activities which would require the use of the Rockland County sewer or otherwise warrant the Applicants' involvement in this endeavor.

**Policy 18A** - *New development shall be designed to minimize impact on the availability of affordable housing and on the existing character and cultural resources of Piermont.*

The buried cables of this Project are consistent with this local policy.

**Policy 23A** - *The architectural review board shall review applications for building permits involving structures identified as being architecturally significant or structures adjacent to buildings or sites identified as historically or architecturally significant.*

This local policy is not applicable to this Project.

**Policy 23B** - *Place monuments and markers on structures and at sites important to the history of the Village of Piermont.*

This local policy is not applicable to this Project.

**Policy 44A** - *The Piermont Marsh should be protected from pollutants that would adversely affect the ecology of the marsh.*

Piermont Marsh will be avoided by this Project and any indirect effects will be minimized by the construction methods selected and the environmental protection

measures to be employed during construction, such as the implementation of SPCC plans for vessels installing the cables.

#### **4.23 Village of Dobbs Ferry**

The numbering of the policies for Dobbs Ferry differ from the numbering of these policies by NYSDOS. All policies have been reviewed and it has been determined that this Project will be consistent with the policies that might impact it. Specific policies are as follows:

***Policy 6.1 - Protect locally significant coastal fish and wildlife habitats.***

See above response to State Policy 7.

This Project will avoid or minimize impacts to SCFWHs to the greatest extent possible, both by the location of the cable corridor within the deeper waters of the Hudson River and the use of water jetting to bury the cable, which allows for faster burial than conventional dredging so that the duration and extent of suspended sediments are reduced. This installation method also allows for the initiation of riverbed recovery to occur sooner.

***Policy 6.2 - Support the restoration of Significant Coastal Fish and Wildlife Habitats wherever possible so as to foster their continued existence as natural, self-regulating systems.***

While not directly related to this Project, this Project will not interfere with or prevent restoration activities by others.

***Policy 10.5 - Promote the efficient management of surface waters and underwater lands.***

This Project will conform to this policy because of the selected location and proposed construction methods are designed to avoid more ecologically sensitive areas and minimize impacts to those lands and waters that cannot be avoided, as compared to other types of cable installation procedures.

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STATE OF NEW YORK  
**DEPARTMENT OF STATE**  
ONE COMMERCE PLAZA  
99 WASHINGTON AVENUE  
ALBANY, NY 12231-0001

ANDREW M. CUOMO  
GOVERNOR

RUTH NOEMÍ COLÓN  
ACTING SECRETARY OF STATE

January 5, 2011

Mr. Sean Murphy for Champlain Hudson  
Power Express, Inc. and CHPE Properties  
C/O HDR/DTA HDR Engineering Inc  
970 Baxter Blvd  
Suite 301  
Portland, ME 04103-5346

Re: F-2010 -1162 (formerly S-2010-0025)  
U.S. Army Corps of Engineers/NY District Permit  
Application #: 2009-01089-EHA  
DOE Docket #: PP-362  
NYS PSC Case: 10-T-0139  
NYS DEC Regions 2, 3, 4 and 5  
Champlain Hudson Power Express, construct/operate 1,000  
MW underwater/underground HVDC electric transmission  
system extending between Canada and NYC.  
**Received Federal Consistency Assessment Form -  
Request for Additional Information**

Dear Mr. Murphy:

The Department of State (DOS) received your Federal Consistency Assessment Form, consistency certification and supporting information regarding the above proposed project on December 08, 2010 and began its review pursuant to 15 CFR Part 930, Subpart D on that date. A full review of your consistency certification will be conducted as it does not appear that the above referenced activity meets the criteria for a General Concurrence.

Based on the information provided during the extensive pre-application consultation involving DOS and the applicant, as well as other state and federal agencies, DOS has elected to waive the requirement that a Final Environmental Impact Statement (FEIS) be submitted as necessary data and information to initiate federal consistency review. However, pursuant to 15 CFR 930.58(a)(2) and in accordance with New York State's Coastal Management Program (CMP), as amended in 2001, an FEIS is considered additional data and information necessary for DOS to complete its review. If the applicant fails to provide the FEIS, DOS may object to your consistency certification on the grounds of insufficient information. However, if during the six month review period, DOS determines that the FEIS is not necessary to complete the review process, DOS will notify you accordingly.

Pursuant to 15 CFR 930.58, the following additional information and data is necessary to enable the Department of State to adequately assess the consistency of the proposed activity with the New York Coastal Management Program:

1. Please provide a written response to all information requested by DOS in the letter to Keith Silliman of TRC Companies, Inc. dated November 22, 2010 (enclosed). To date, verbal responses provided to DOS from TRC Companies, Inc. and HDR have been inadequate and reflect the need to submit written responses that includes information as to the ability of TDI to site the proposed line within existing utility corridors and in the right-of-way of state and county roads.
2. The information provided in the application envisions burying the cable along the proposed submarine route in the Hudson River at depths of 3 to 4 feet, in conjunction with the use of concrete mattresses in yet to be identified areas where burial would be prohibitive because of the presence of bedrock. In some instances, a greater depth may be required to avoid either environmental or magnetic field impacts or navigational deepening. Please provide a technical analysis of the maximum attainable cable burial depth for the entire submarine portions of the proposed route and identify where the use of concrete mattresses would be necessary.
3. Please provide information pertaining to the suitability and feasibility of siting the proposed cables within areas of the Hudson, East and Harlem Rivers that were previously mechanically dredged.
4. Please provide scientifically verifiable estimates for magnetic field levels and ambient temperature increases in soil and water for cable burial depths of 4, 8, 12 and 15 feet and a scientific analysis of the impacts of the magnetic fields and temperature increases on aquatic species in the Hudson River, including impacts on migratory routes, feeding, spawning, and all life development stages for each burial depth.
5. Please state the design life of the proposed project.
6. Analyzing existing Hudson River dredging and navigational use data, and recognizing the trend in the use of deeper draft vessels in the Hudson River, please explain how TDI will adjust the depth of the buried cable in the riverbed to accommodate any future federal dredging and navigation projects over the design life of the proposed project. Please include a discussion as to whether or not the burial of the proposed cables would interfere with such anticipated navigational improvements to the Hudson River.

The information requested is necessary for DOS to assess the consistency of your consistency certification with CMP policy numbers 2, 5, 7, 8, 9, 10, 11, 19, 20, 21, 22, 23, 27, 33, 35, 37, 38, and 44. This list of potentially applicable policies should not be viewed as exhaustive as the applicability of additional coastal policies may become apparent during our review.

If this additional information and data is not provided within thirty days of the date of this letter, the Department of State may, pursuant to 15 CFR Part 930.63(c), object to the consistency certification for this proposed activity on the grounds of insufficient information.

If the Department objects to the consistency certification for this proposed activity, the consistency provisions of the federal Coastal Zone Management Act prohibit federal agency authorization of the activity, unless the Department's objection is overridden on appeal to the U.S. Secretary of Commerce. Such an appeal must be based on one or both of the grounds that the proposed activity is consistent with the objectives or purposes of the Federal Coastal Zone Management Act, or is necessary in the interest of national security.

As DOS will be soliciting comments from all applicable Local Waterfront Revitalization Program communities regarding the consistency of the proposed action with their programs, it may be beneficial for TDI to provide these communities with copies of all information, or a link to where the information can be retrieved electronically, pertaining to the above referenced consistency certification. When communicating with us regarding this matter, please contact Matthew Maraglio at 518-474-5290 (email: [matthew.maraglio@dos.state.ny.us](mailto:matthew.maraglio@dos.state.ny.us)) and refer to our file #F-2010-1162.

Sincerely,



Jeffrey Zappieri  
Supervisor, Consistency Review Unit  
Office of Coastal, Local Government  
and Community Sustainability

JZ/mm

c: COE/ NY District – Naomi Handell  
U.S. DOE – Dr. Jeffrey Pell  
NYSDEC/ Central Office – Chris Hogan  
NYS DPS – Steve Blow

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January 18, 2011

Mr. Jeffrey Zappieri  
Supervisor, Consistency Review  
Department of State  
Office of Coastal, Local Government and Community Sustainability  
99 Washington Avenue, Suite 1010  
Albany, NY 12231-0001

Subject: **Updated Alternatives Analysis  
Champlain Hudson Power Express Project**

Dear Mr. Zappieri:

On behalf of the Applicants, please consider this letter to be the response to your letter of November 22, 2010 which provided comments from the New York State Department of State (DOS) on the Updated Alternatives Analysis developed for the Champlain Hudson Power Express Project (Project) as well as requested additional information. We appreciate the comprehensive nature of your response.

The Applicants are in receipt of your letter of January 5, 2011 and expect to provide a formal supplement to our request for coastal consistency review of the Project at some point in the near future. Thank you again for your interest in the Project and, as always, our staff can be available at your convenience to discuss any questions or concerns arising from this document.

Sincerely,

A handwritten signature in black ink, appearing to read 'Sean Murphy', written in a cursive style.

Sean Murphy  
Senior Regulatory Specialist

cc: D. Jessome, CHPEI (electronically)  
F. Bifera, Hiscock and Barclay (electronically)

# **Champlain Hudson Power Express, Inc.**

## **Case 10-T-0139**

In a letter of November 22, 2010, the DOS requested additional information related to four topics:

- Analysis of alternate routes;
- Impacts associated with installation and operation of Project on commercial and recreational navigation;
- Impacts associated with installation and operation of Project on Significant Coastal Fish and Wildlife Habitats (SCFWH); and
- Impacts associated with installation and operation of Project on commercial and recreational fisheries.

Each of these areas of concern is discussed below.

### **1. Alternatives Analysis**

As your letter notes, the Applicants have previously presented route alternatives as part of federal and state permitting processes. The Updated Alternatives Analysis report which was submitted to settlement parties on November 5, 2010 describes the routes. This document also provides an initial analysis of the three alternative routes presented by the New York State Department of Public Service (DPS) in late October.

In response to your letter, as well as to similar lines of questioning raised by other parties, the Applicants have endeavored to provide a detailed analysis of routing constraints and alternatives along the DPS' "Western Hudson Alternative". In order to allow for ease of analysis, the Western Hudson Alternative has been divided into segments with reference to the corresponding Route Mile marker to better aid in identifying the end points.

Segments of the route which were identified as being reasonable, as well as feasible, based on known concerns (e.g. engineering, land ownership, environmental constraints) have been accepted by the Applicants. In completing this analysis, the Applicants adopted the following principles:

- a. The minimization of in-water route length is not equivalent to minimizing environmental and societal impacts. Greater use of land-based corridors in these areas requires the crossing of a significant number of streams and wetlands, presenting the risk of greater cumulative impacts to resources. Available information indicates that the preferred in-water route will only have temporary impacts to the water bodies.
- b. Existing land corridors often involve construction complexities such as buried utilities and other existing infrastructure, the overcoming of which can be

economically infeasible. Even if economically feasible, these routes would significantly delay the Project's in-service date, impose significant inconvenience to vehicle and/or rail traffic for commuters, and leave the cables less reliable and more subject to outages and disruptions due to accidents, rail and highway repairs and maintenance, and terrorism risks.

- c. The multiple use of existing utility and transportation corridors has been a longstanding siting policy that now must be reconsidered in light of heightened concerns about terrorism. Increased security is required when installing new utility infrastructure in any new Right-of-Way (ROW). Submarine routes inherently offer enhanced security due to the absence of readily visible identification. Constructing a transmission line in its own ROW, rather than concentrating utility infrastructure in multiple use corridors, increases reliability by decreasing the chances that accidents and maintenance and repair work on other facilities will result in disruptions.
- d. When considering overland alternatives the preference is to utilize state highways rather than local roads due to the generally more expansive width of available rights-of-way, which allows for greater construction flexibility, increased worker safety, and decreased disruption of normal traffic flow. The Applicants also strongly preferred utilizing public lands for the cable corridor rather than establishing a permanent easement on private lands, although temporary easements may be necessary on private lands for construction purposes.

In terms of overland alternatives, parties have questioned in the past why existing utility corridors have not been utilized. In the Alternatives Analysis submitted with the July Supplement, a buried utility line extending from the U.S. / Canada border to the New York region was evaluated but ultimately eliminated from consideration. Since that time, the Applicants spoke with the three utilities who own the ROWs under discussion and each voiced opposition to collocation with their facilities. The New York Power Authority noted that they were under the same statutory restrictions as the New York State Canal Corporation in terms of their ability to dispose of public lands and that they do not believe they would have the ability to grant the necessary long term land interests. National Grid expressed concern regarding the impact this Project would have on their system reliability and potential expansion of their own facilities within the ROW. A representative of Con Edison stated that for safety and reliability reasons they would not want the cables installed in near proximity to their tower foundations. In addition, their transmission lines within Westchester County are buried and their representative did not believe Con Edison could grant the right to use their ROW to a separate private entity. These conversations have confirmed the Applicants' previous position that any attempt to collocate the Project with an existing utility ROW would require the acquisition of land rights adjacent to the ROW either through purchase or eminent domain due to concerns by the ROW owners over the safety of their system and their desire to preserve the ROW for potential future expansion.

### Route Mile 202 to 223 (Coeymans to Catskill)

The Project route as originally proposed would enter the Hudson River in Coeymans, New York by following the CSX Transportation (CSX) ROW. The Applicants have reviewed the CSX

ROW from Selkirk south to north of Catskill and identified no significant engineering constraints. From Catskill, the Applicants would propose laying the cables within the Route 23 ROW to enter the river at approximately Mile 223.5 of the original route. This alternative bypassed several SCFWH areas, including Stockport Creek and Flats, Vosburg Swamp and Middle Ground Flats.

### Route Mile 223 to 233 (Catskill to Malden-on-Hudson)

From Catskill to Malden-on-Hudson (north of Saugerties), the Applicants note only one potential engineering issue, the Catskill Trestle which crosses Catskill Creek and Route 9. Previous conversations with CSX suggest that the cables could be attached to this structure. Following the railroad ROW until it intersects with Route 34, the cables could be laid in the roadway ROW to the east to connect with Riverside Road and then Riverside Drive. While the Project in general seeks to avoid local roads due to the more narrow rights-of-way and potential for local opposition, the relative shortness of this usage seems justified given the length of overland that would be enabled. The parking lot for the boat launch at the termination of this road will allow for a horizontal directional drill (HDD) into the Hudson River.

The Applicants believe that this portion of the Western Hudson Alternative is a feasible alternative but that it is not possible to install the cables upland south of this point to Kingston for the reasons discussed below. Based on this analysis, the Applicants are including this segment in their overall settlement proposal.

### Route Mile 233 to 245 (Malden-on-Hudson to Kingston)

Siting in this segment is complicated by the dense development within the Ulster / Kingston area. As the CSX railroad travels beneath Route 209 in Ulster, the railroad corridor is bound on either side by existing transmission lines. Typically when collocating in a common ROW, the utility companies must maintain a specified separation from other facilities, which would not be possible along this segment. This is one of the concerns raised by utility companies about collocating with existing transmission lines (see above for a more extended discussion). The route in this area would have to collocate in the ROW of John M. Clark Drive, which runs parallel to the tracks until they both intersect with Route 157, at which point the transmission lines no longer run on both sides of the railroad ROW. The utilization of the roadway does not represent an obstacle but is presented so as to be clear that the Applicants would need to leave the railroad ROW in this area.

After passing through the Kingston railyard and over Route 32/Flatbush Avenue, the railroad corridor traverses the middle of St. Mary's Cemetery with an overhead transmission line on the western side of the railroad corridor. There is insufficient room between the cemetery (actual gravestones) and the railroad tracks along the eastern side of the railroad corridor to install the Project's cables. A roadway bypass would require utilizing the Route 32 ROW to access Farrelly Street to the east or Foxhall Avenue to the west. Utilizing either of these roadways would require traveling through residential neighborhoods where the houses are tightly packed and close to the roads, making installation extremely difficult and disruptive.



Immediately south of the cemetery, the railroad corridor extends through a heavily developed urban area where large buildings are located immediately adjacent to the railroad corridor (within ~10 feet), resulting in insufficient horizontal clearance to install the Project cables within this section of ROW. This level of development is intermittent until the railroad crosses a small bridge over Broadway. As with the roads proximal to the cemetery, the roadways that might be utilized as an alternative to this segment (e.g. Foxhall Avenue, Cornell Street, Ten Broeck Avenue, and Grand Street) also have buildings immediately adjacent to the roadway as well as residential houses where construction would be disruptive.

The Applicants also reviewed roadway alternatives that would bypass the city of Kingston. Route 9W could be accessed by following Route 157 east at the terminus of John M. Clark Drive. While Route 9W has a low density of development north of Route 32, it becomes a limited access highway (controlled-access road) once it crosses Route 32. The New York State Department of Transportation (NYSDOT) has indicated that the Federal Highway Administration would need to review installation in this segment and that the last review required 18 months. Route 32 becomes Flatbush Road and Flatbush Avenue as it passes within the city center and experiences the same high level of development as other roadways within the city.

Based on this analysis, the Applicants were unable to identify any reasonable alternative that traversed the municipalities of Ulster and Kingston and therefore the cables will need to enter the water prior to this point. Moving north along the railroad ROW, the track runs parallel to the Hudson River until it intersects with Route 31, at which point it veers to the northeast towards Saugerties. As the Esopus Estuary SCFWH stretches along the riverbank north from where Esopus Creek empties into the Hudson River, the entry point would need to be in or north of Malden-on-Hudson. From the ROW, Route 34 could be followed to the east into Malden-on-Hudson and private land accessed to allow for an HDD into the Hudson at approximately Mile 233 of the original route.

In terms of roadway alternatives, the only road that travels in relatively close proximity to the Hudson River is Route 32 with a separation distance of approximately one-half mile. However, this roadway, as well as Route 9W, traverses the Esopus Creek Bridge to cross the Esopus Creek. To date, the New York State Department of Transportation has indicated that they would not permit hanging cables on structures owned and operated by the agency. An HDD would be complicated by the depth of the gorge (approximately 75 feet), the gravity dam downstream of the bridge, and existing buildings at both ends of the bridge. There are no existing launch /exit sites that meet the necessary spacing criteria for a safe drill under these constraints. Therefore, Routes 9W and 32 south of Esopus Creek are considered inaccessible to the northern portion of the cable route and therefore not a feasible alternative.

### Route Mile 245 to 254 (Kingston to West Park)

South of Kingston, the access point to the railroad will require that the cables be installed within Rondout Creek, which is a SCFWH. Rondout Creek is one of the largest freshwater tributaries

of the Hudson River Estuary and the concentrations of anadromous and resident freshwater fish are considered unusual in Ulster County. In addition, the Applicants are aware of significant issues associated with a now defunct gasification plant at the mouth of the creek currently undergoing remediation. If installation of the cables were to occur in this water body, it should be done outside of the fish spawning and incubation periods (March through July for most warm water species). The railroad ROW does not appear to have any significant engineering constraints until it intersects with Route 9W in West Park.

The Applicants note that the ROW of Route 9W could also be utilized to travel north of Kingston. However, given that accessing the roadway would also require installation within the Rondout Creek SCFWH and that installation on a well-travelled road would be more disruptive than on a railroad line, the Applicants would recommend adopting the ROW alternative if it is determined that installation within the Rondout Creek is acceptable. The Applicants also considered utilizing Routes 81 /24 (River Road), which run parallel to the Hudson River but connecting to these roadways would require installing a significant length of the cable on privately-held land.

### Route Mile 254 to 261 (West Park to Highland)

South of the intersection with Route 9W, the railroad line runs adjacent to the Hudson River and often the railroad lines are sited in a narrow opening between the edge of the Hudson River and large rock outcroppings or very steep terrain to the west. Installation in these areas will require either blasting of the bedrock to create a sufficient degree of separation from the railroad or an expensive HDD installation (assuming that there is available space for this technique). Using an internet mapping site that provided aerial photography, the Applicants identified sixteen distinct outcrops with an estimated average length 490 feet and a range of 230 to 1,020 feet. However, it should be noted that the desktop analysis only accounts for exposed outcroppings, so the actual extent of bedrock material may be far more extensive. In Highland, Oakes Road runs immediately adjacent to the railroad ROW for approximately 3,200 feet, so there is insufficient room to install the cables for much of this stretch. The Applicants consider installation in this section of railroad ROW to be at least impractical and likely infeasible.

The Applicants also considered the use of Route 9W, which initially travels through largely undeveloped countryside. Transmission poles border the western side of the road for less than 2 miles until it intersects with Upper North Road in Highland, so installation in this area would be on the eastern side. A short distance after the intersection with Upper North Road, Route 9W expands to four lanes. Over the next approximately 4 miles, the transmission system switches sides eight times. In order to maintain the required separation, the cables would need to cross underneath the roadway. As Routes 44 and 55 overlap with Route 9W in Highland, the transmission system poles occupy both sides of the roadway. In addition, the density of businesses with access points on the roadway increases. Route 9W also has two bridges before its connection with Route 44/55 for which there are no readily identifiable bypasses. The NYSDOT has indicated that there is no precedent for installation of a high voltage cable on a roadway bridge. The intensity of development as the highway enters Highland and high traffic volume would make utilization of Route 9W would make installation infeasible.

## Route Mile 261 to 277 (Highland to Newburgh)

Immediately south of the intersection of the ROW with the Route 44 bridge, a maintenance road to the west of the tracks appears to have been built. The width of this road appears insufficient to meet CSX's minimum separation distance from the tracks. Between the Route 44 bridge and U.S. Highway 84 bridge in Newburgh, the Applicants identified eighteen rock outcrops that would significantly complicate installation if the railroad companies even allowed for the necessary construction activities. The average length of each outcrop is approximately 770 feet with a range of 160 to 2,950 feet. This segment also has seven instances where the railroad has water on both sides of the tracks for an average distance of 1250 feet. As was noted earlier, the desktop analysis only accounts for visible bedrock and so the actual length of ROW where upland construction is essentially infeasible may be far longer. A short distance south of the U.S. Highway 84 bridge the railroad occupies a raised berm. The cables would either need to be laid at the foot of the berm with HDDs for the road crossings or, in congested sections, the ROW of an alternate roadway such as Water Street would need to be accessed. The Applicants consider installation in this section of railroad ROW to be impractical.

In terms of roadway alternatives, Oakes Road passes under the Route 44 bridge but reaches a dead end within a mile. Other roadway route alternatives would need to be accessed through Highland and, as has been previously discussed; the level of development in the vicinity of the intersection of Routes 9W and 44 would prevent cable installation in a reasonable manner.

Following the Hudson River south from Highland, the first roadway to come in close proximity to the river is Old Indian Trail Road in Milton at approximately Route Mile 266. At its closest point, the road is adjacent to the railroad ROW and is less than a mile away from connecting to Route 9W. As Route 9W travels south, it traverses lightly to moderately developed areas. However, as was observed in a northern segment, the transmission poles cross the roadway multiple times which would require HDD drillings or open cut trenching at each location. The transmission line crossings are often to avoid natural and anthropogenic obstacles, thereby making installation of the Project's cables more problematic since cables would not only need to avoid the transmission lines but also these features.

As the road approaches Marlboro, development becomes more pronounced with the hamlet buildings directly adjacent to the roadway. South of the hamlet's center, the road has transmission poles on one side and a cemetery on the other for approximately 500 feet. Bypassing this section would require utilizing residential roads for approximately one-half mile. Continuing south, Route 9W continues to travel through low to moderate density developments, with transmission poles that cross the highway at infrequent intervals. The Applicants did not identify any engineering "fatal flaws" with this segment, but the high per-mile cost as well as the disruption to homes and businesses does not appear justified given the length of the bypass. In addition, as is discussed below, there are significant engineering constraints as the road passes beneath the Route 84 with no readily available bypass options.

## Route Mile 277 to 280 (Newburgh to Cornwall-on-Hudson)

South of Newburgh, the Applicants did not identify any significant engineering constraints until the railroad reaches Cornwall-on-Hudson where Shore Road is proximal to the railroad tracks.

Within a one-half-mile distance of the Route 84 bridge, Route 9W experiences significant industrial development. In the center of Newburgh, the road is bordered by tightly packed residential homes, as well as occasional park and recreational facilities. South of Newburgh proper, Route 9W becomes a divided four lane highway for approximately 2 miles with transmission poles on the eastern side of the road. Once the divided highway ends, there is a bridge crossing of Moodna Creek which, based on previous conversations with NYSDOT about the use of their bridges, will require that the Project utilize an HDD drill as Route 9W crosses Route 107 in Cornwall, it transitions to a limited access highway and collocation of transmission cables in the ROW of limited access highways is highly restricted and discouraged by NYSDOT.

## Route Mile 280 to 284 (Cornwall-on-Hudson to West Point)

As the railroad reaches Cornwall-on-Hudson, Shore Road runs parallel to the tracks for approximately 1 mile and for more than half that distance the Hudson River lies along the eastern side. The Applicants identified five rock outcroppings with an average length of 960 feet (range of 380 to 1,920 feet) and a berm through a water way extending approximately 300 feet. In West Point, River Road and the Upton Road run parallel to the railroad tracks with the Hudson River to the east for approximately 4,060 feet before entering the tunnel beneath West Point Military Academy. Given the engineering constraints presented over this relatively short segment, the Applicants do not consider it reasonable to utilize his route.

As previously discussed, Route 9W becomes a limited access highway in Cornwall and NYSDOT has indicated that it would likely restrict the collocation in the ROW of limited access highways. As an alternate route, the Applicants considered Route 218 which intersects the highway prior to the transition to a limited access roadway. Route 218, however, travels through the center of Cornwall-on-Hudson through tightly packed residential and commercial districts. Trees line both sides of road through the town, so that any installation would either require their removal or risk damage. Outside the town proper, Route 218 enters Storm King State Park and climbs up Storm King Mountain along a steep and windy roadway. As the road crosses the front of the mountain, there is an approximately one-half-mile stretch where the road has been carved out of the cliff face. Based on this engineering constraint, the Applicants do not consider this roadway to be a feasible alternative.

## Route Mile 284 to 285 (West Point)

The tunnel beneath West Point extends for approximately 3,500 feet. The Applicants' insurance company has stated the cables must be fully protected to secure coverage. Installation of the cables within the tunnel ceiling would present a serious liability should any type of failure occur. Similarly, the railroad company has specified safety setbacks which could not be met within this

tunnel. Rock cuts into the sides of the wall are theoretically possible, although a geophysical analysis would be required to ensure there was no impact on the integrity of the tunnel. Past conversations with representatives of the railroad line suggest they would not allow this approach as it would require work within the tunnel for months, significantly impacting railway use. As the railroad leaves the tunnel, there is a short stretch (approximately 500 feet) where an Academy parking lot lies to the east and Williams Road to the west. The parking lot would need to be torn up to install the cables or an HDD enacted. The Applicants consider installation in this section of railroad ROW to be impractical.

There are no state roads in close proximity to either entrance to the tunnel. Both River Road and Upton Road are in close proximity to the water and connect into existing local roads; however, these roads are built perpendicular to the slope of the foothills of Storm King Mountain and the rights-of-way are narrow. In addition, the most likely alternatives are under the control of the Academy, which may not permit installation on a military facility. The Applicants believe that an in-water route is the most practical approach considering the short reach necessary to bypass this tunnel.

### Route Mile 285 to 290 (West Point to Fort Montgomery)

As with earlier segments, the railroad runs parallel to the Hudson River. The Applicants identified ten rock outcroppings with an average length of 720 feet (range of 265 to 1,606 feet) and four water crossings with an average length of approximately 490 feet (range of 402 to 644 feet). In addition, the ROW travels through the Bear Mountain tunnel, which extends for approximately 800 feet. The Applicants consider installation in this section of railroad ROW to be impractical.

There are no state roads or local roads in close proximity to the water for this segment. Mine Dock Road in Fort Montgomery could be accessed if the cables came out of the water into the railroad ROW and were laid a short distance before entering the road; however, Mine Dock Road runs underneath Route 9W and private homes are located on either side of the bridge abutments. Therefore, the Applicants did not identify any overland alternative to this segment or specifically the Bear Mountain tunnel.

### Route Mile 290 to 296 (Fort Montgomery to Haverstraw)

The Applicants identified six rock outcroppings with an average length of 490 feet (range of 190 to 860 feet) and seven water crossings with an average length of 1,080 feet (range 391 to 2,373 feet). In addition, north of Stony Point Lighthouse is an approximately 2,020-foot stretch of railroad where water is to the east and utility grade transmission lines are to the west. As the railroad curves around Dunderberg Mountain past Jones Point, River Road runs parallel to the tracks for approximately 1,400 feet. Further along the tracks, West Shore Drive in Tomkins Cove runs in close proximity to the railway for approximately 1,600 feet. The Applicants consider installation in this section of railroad ROW to be impractical due to the constrained ROW.

A steep rock embankment lies beneath the bridge that connects Route 6/202 into a round-about with Routes 9W/202 and the Palisades Interstate Parkway. The Applicants are unsure if this feature is considered part of the parkway and therefore unusable by a transmission system. Assuming Route 9W/202 is available, the roadway travels south through Bear Mountain State Park. Trees line both sides of the road, which is kept in a natural setting. The roadway passes a boat launch near Iona Island, whose bay is a SCFWH. The Applicants identified six rock outcroppings for an average length of 850 feet (range of 141 to 2,556 feet). The Applicants consider installation in this section of road to be impractical due to the extent of clearing, blasting and/or other activities that would be required within a state park for a relatively short overland segment.

## Route Mile 296 to 303 (Haverstraw Bay)

The Applicants recently submitted a settlement proposal which would site the Project outside of Haverstraw Bay.

## **2. Commercial and Recreational Navigation**

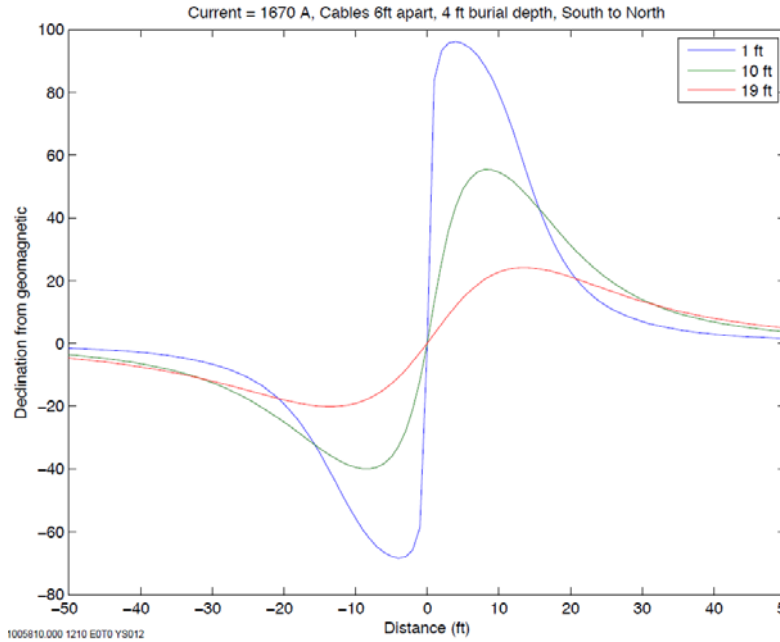
Impacts to commercial and recreational use of the waterways during the construction phase are expected to be minor and temporary. During Project construction, the presence and operation of the cable installation barges/vessels will create elevated noise levels and additional vessel traffic on these waterways. All Project work activities will be closely coordinated with the United States Army Corps of Engineers (USACE), the United States Coast Guard (USCG), local pilot associations and other local, state, and federal agencies as determined to be necessary to minimize or avoid impacts. A Notice to Mariners or similar notification will be issued prior to any in-water work.

Cables would be buried in a manner consistent with conditions and requirements imposed by the regulatory agencies; these conditions would include reasonably foreseeable maintenance and expansion activities associated with navigation channels. The presence of the cables will result in additional areas within these waterways where restrictions would be imposed on vessel anchorage. However, the proposed route avoids designated anchorage areas, so the overall impact is expected to be minor. The Applicants are not proposing to utilize the side slopes of the Federal navigation channel, as the overland routes proposed as part of settlement bypass those SCFWH where the DOS had previously identified it would be necessary to be in a disturbed area (e.g. Haverstraw Bay).

The DC magnetic field of the cables will not induce voltages or currents into communications equipment, including but not limited to marine radios, remote telephones, and cell phones. The only expected effect is a small effect on mechanical compasses when over the cables. An analysis by Exponent determined that, for cables buried at 4 feet and separated by a distance of 6 feet, the maximum deviance from magnetic north at 19 feet above the water would be an estimated 20 degrees at approximately 20 feet east or west from the cables (see Figure 1). The

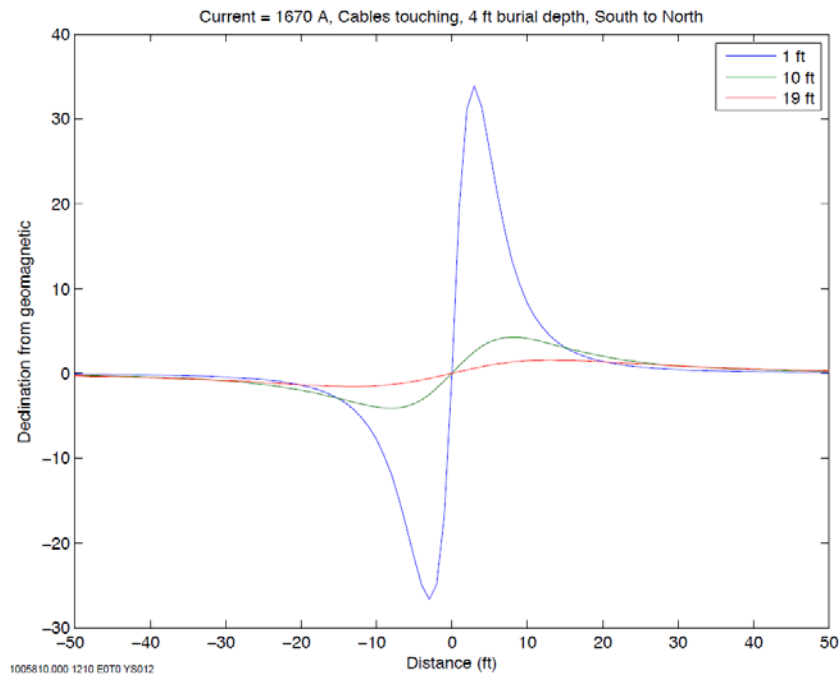
deviance from magnetic north is reduced to zero directly over the cables and at a distance of 50 feet from the cables.

**Figure 1: Deviation of a compass from magnetic north in degrees at 1, 10, and 19 feet above the sediment when cables are separated by 6 feet**



The deviation of a compass from magnetic north was also estimated when the cables were in close proximity, as the Applicants are currently proposing. Under this scenario the expected declination from magnetic north would be less than 3 degrees at 19 feet above the cables and only within 10 to 20 feet of the cables (see Figure 2). As the cables are outside of the navigation channel (where vessel traffic will be heaviest) and the Hudson River is not open water, the impact of this deviance is expected to be minimal. Deeper burial of the cables would result in lowered effects.

**Figure2: Deviation of a compass from magnetic north in degrees at 1, 10, and 19 feet above the sediment when cables are touching**



In addition, there are no expected long term EMF exposure issues for individuals traveling along the Hudson River. The calculated magnetic field values at the surface of the Hudson River range from 38.7 to 57.3 milligauss (mG) [Appendix B, Request 14 of the supplemental document submitted to the New York State Public Service Commission on July 22, 2010]. This range is comparable to the expected magnetic field of a household appliance and considerably less than the earth’s magnetic field (~470 to 590 mG). Current New York standards limit the maximum magnetic field at the end of a ROW of a major transmission line at 200 mG. None of the projected magnetic field exposures to commercial or recreational boaters would even remotely approach the limits recommended to protect human health by the International Commission on Non-ionizing Radiation Projection (NRPB, 2009).

### **3. Significant Coastal Fish and Wildlife Habitats**

The potential impact of cable installation is addressed through an impairment test which evaluates the effects of the proposed action on a range of parameters that may be important in the ecological functioning of the designated habitat. The impairment test is used to determine if the proposed action would “destroy the habitat” or “significantly impair the viability of a habitat.” The parameters used in the test involve physical processes, chemical characteristics, including pollutants and biological assemblages and processes. The installation of the cables requires a temporary physical alteration to a small portion of the designated habitat, but the evaluation of habitat destruction or impairment can only be addressed in the long term because natural habitats have the documented capacity to recover from disturbances, both natural and man-induced. An evaluation of the potential impacts to the designated habitat is provided below.



## Physical Parameters

The major physical parameters influencing habitat in the designated areas are the dynamic tidal character of the Estuary and the geological setting of the habitat. These factors interact to shape the river channel and control the substrate, which, in turn, are major determinants of the biological community and biological activity in each of the designated significant habitats. The burial of the cables will temporarily disturb a small portion of the substrates in these areas, but because no Project structures will remain above bottom after installation, the tidal dynamics and geological processes (erosion and sedimentation) would be unaltered by the installation work. The physical processes would act on the disturbed area and reshape the substrate material into the same general configuration as existed before the cables were installed.

The only instances where there would be a change in the topography of a habitat area would be in places where rock outcroppings required that the use of grout filled mattresses. These coverings would remain as a permanent feature on the bottom, extending several feet above the existing substrate, and would modify river currents in a very small area. While these structures could induce sedimentation and scour in the near vicinity, their overall effect on river currents, sedimentation and scour would be negligible as they would be located in deep, swift water that would continue to dominate the hydrodynamics of the reach. The Applicants anticipate providing information regarding potential installation depths throughout the entire underwater route as part of their response to the DOS letter of January 5, 2011.

## Biological Parameters

The use of water jetting to bury the cables in the substrate would temporarily impact the benthic community and organisms in the path of the cables and those adjacent to the pathway may be buried by sediment that settles along the trench. Cable installation and burial equipment (e.g., jet plow, shear plow or similar equipment) moves at variable speeds across the bottom but slowly enough (generally less than 0.5 feet/second) so that fish and mobile invertebrates can move away and avoid direct effects. Adverse effects on benthic community structure, food chain relationships, species diversity and predator/prey relationships among benthic organisms and between the fish and benthic trophic levels would be restricted to the area of disturbance and would not occur throughout these trophic levels in the undisturbed deepwater portion of the designated habitat, nor would they occur beyond the area of disturbance in the Hudson Estuary as a whole. The limited spatial distribution of effects ensures that the adjacent undisturbed benthic habitat can provide a source of recruitment of reproductive stages that can recolonize the disturbed areas.

If it is necessary to cross the Federal navigation channel, conventional dredging may be required for cable installation below the channel's authorized depth. Because dredging would take place at the bottom of the existing deep channel, there would be very limited spread of dredged material turbidity laterally across the shallow habitat adjacent to the channel. Dredged material would be brought to the surface for placement in scows for transport to the selected disposal location. Conventional dredging would employ best management practices (BMPs). These

BMPs would limit the spread of a surface turbidity plume, minimizing turbidity and sedimentation effects on the adjacent shallow water. Dredging proceeds slowly across the bottom so that fish and mobile invertebrates can move away and generally avoid direct effects. The limited spatial distribution of effects ensures that the adjacent undisturbed benthic habitat can provide a source of recruitment of reproductive stages that can recolonize the disturbed area.

The recovery of the benthic community and the re-establishment of its ecological relationships with other trophic levels after cable installation is contingent upon the re-establishment of the benthic substrate which supports the benthic community. Installation of the cables disturbs the sediment in a very small area of any cable segment, but does not remove the substrate material except in cases where dredging is required. Much of the existing sediment remains in the trench created for the cables.

The availability of organic and inorganic suspended sediment and the action of the tidal current regime are the primary factors influencing the configuration of the substrate surface. These factors would be unchanged by cable installation and would begin to reshape the disturbed sediments immediately. The disturbed sediments would compact over time and the surface sediment particles would be re-sorted by current action and the trench area would be comprised of similar grain size distribution to surrounding substrates. Benthic substrates are a dynamic habitat in that they are changing in response to the variability in the forces that are constantly acting on them. Cable installation would have no influence on the variability of these factors, thus the substrate will retain its natural dynamic characteristics.

The population characteristics of the benthic organisms, such as reproductive rates, mortality rates and population size are the results of habitat and biological interactions occurring on a spatial scale much greater than the area affected by cable installation. The substrate disturbance would have a direct, temporary effect on the localized community in the path of the cables. However, with recovery of the habitat and re-colonization of the area, the populations of benthic species would return to pre-installation levels because the factors influencing the reproductive and mortality rates would be the same as the rates prevailing over the entire distribution of these species in the Estuary. The cable installation would not alter the factors controlling these rates.

Where grouted filled mattresses are employed, they would represent a new substrate material. However, as they would be used only where rocky substrate is exposed or close to the surface, in many cases the existing hard surface substrate would be replaced by an alternative hard surface material. The concrete of the mattresses would be colonized by aquatic life that prefers hard surfaces, thereby the net change in aquatic life using the substrate would be minimal. The presence of the mattresses would have no effect on biological activity occurring above the bottom, such as spawning of striped bass or migratory movements of fish. Overwintering of fish in these deep channels would continue to take place as it does under existing conditions.

## Chemical Parameters

The chemical characteristics of the water in the designated habitat areas are determined by the water mass movements in the Estuary. The levels of chemical constituents change continually throughout tidal cycling. The Hudson Estuary is well mixed, thus the magnitude of changes over

a tidal cycle are generally relatively small. The installation process does not introduce or extract any chemical constituents from the water, which limits the potential for a change to the water chemistry to the disturbance of the substrate during cable installation.

The sediment chemistry for the designated habitat areas shows that the sediments have generally low and variable levels of chemical contaminants. These contaminants are widespread in the Estuary, thus existing aquatic life are exposed to them throughout their lifecycles. Water jetting would resuspend the existing substrate along the cable route, but as discussed above, the vast majority of the sediment would remain within the trench. In areas where dredging may be conducted when crossing through navigation channels, the dredge material would be tested and placed at an approved disposal site. The concentrations and distribution of the existing contaminants may be slightly altered by the sediment disturbance, but average concentrations of these constituents would remain the same throughout the designated habitat areas. Some contaminants that are in the surface layer would probably be buried as the disturbed sediment settles into the trench. Because the aquatic life exposure to existing contaminants is not significantly altered by the installation process, there will be no impairment of ecological processes.

During the Project planning phase, the Applicants are using existing sediment quality data to site the cable route and, where possible, avoid known areas of high concentrations of contaminants. In addition, water quality modeling is being conducted to assess the potential impacts to water quality standards. If, based on model results, there are potential impacts to water quality standards. The Applicants will develop methods to minimize the impact to the maximum extent practicable during installation. In addition, during cable installation, CHPEI will perform water quality monitoring to assure water quality standards are met.

A three-dimensional hydrodynamic and time-variable water quality model was developed to assess water quality impacts and compliance with water quality standards in the Hudson, Harlem and East Rivers. The model was used to simulate ten contaminants that were found in sediment cores collected during the Spring 2010 Marine Route Survey. The maximum model-computed concentrations of contaminants along the cable route were graphically presented and compared to New York State's water quality standards. The effects of the proposed cable installation are projected to comply with water quality standards that are based on protecting aquatic life from acute toxicity, which are the most appropriate criteria for the assessment of the proposed Project given the non-chronic (i.e., short-term) and incremental nature of the potential exposure to sediment contaminants resulting from the cable installation. The projected maximum total PCB concentration is below the EPA's Engineering Performance Standard water quality criteria for dredging resuspension at the Hudson River PCBs Superfund Site (EPA 2003).

## Project Impacts

The submarine cable route presented in the July 2010 Supplement to the Application for Certificate of Environmental Compatibility and Public Need was developed using the following criteria selected to minimize potential impacts on aquatic resources:

- Cable route sited in moderately deep to deep water to avoid shallow vegetated habitats;
- Avoid maintained navigation channels to the extent possible;

- Avoid Significant Coastal Fish and Wildlife Habitats to the extent possible; and
- Use cable installation and burial equipment that minimizes disturbance of the benthic substrate.

Originally presented to state and federal agencies as almost an exclusively submarine project, early consultation indicated significant concerns with cable installation in the Hudson River north of the Federal Dam at Troy due to significantly elevated levels of PCB and the uncertainties surrounding the schedule for the Hudson River Dredging Project dredging activities initiated in 2010. The Applicants accepted the admonitions of these agencies and non-governmental organizations that an overland route for this portion of the route should be adopted to reduce potential water quality impacts despite the increased construction costs.

Recently, the Applicants have also proposed an additional 40 miles of upland routing as a replacement for approximately the same number of miles of in-water construction. In order to minimize water quality impacts and reduce the number of navigation channel crossings. This proposal, if adopted, would bypass the following SCFWH which were in proximity to the route presented in the July 2010 Supplement to the Application for Certificate of Environmental Compatibility and Public Need:

- Shad and Schermerhorn Islands
- Schodack and Houghtaling Islands
- Coeymans Creek
- Hannacroix Creek
- Mill Creek Wetlands
- Cocksackie Creek
- Cocksackie Island Backwater
- Stockport Creek and Flats
- Vosburg Swamp and Middle Ground Flats
- Haverstraw Bay
- Croton River and Bay

As discussed above, in their analysis of alternative routes the Applicants noted that there were no significant engineering constraints along the railroad ROW from Catskill to Malden-on-Hudson and have agreed to adopt this as part of their overall settlement proposal. The inclusion of this segment would mean the Project will bypass the following SCFWH:

- Rogers Island
- Catskill Creek
- Ramshorn Marsh
- Roeliff Jansen Kill
- Inbocht Bay and Duck Cove
- Germantown – Clermont Flat

Of the remaining SCFWH, the Applicants' route is adjacent to with nine resource areas and cross into six SCFWHs. In some cases the cable route passes close to the boundary of a SCFWH in the horizontal plane, but because of the criteria to place the cable in moderately deep to

deepwater, there is a substantial vertical separation of the installation corridor from the nearest SCFWH boundary. As discussed in the draft Best Management Practices (BMP) document submitted as part of the settlement process, the Applicants propose to use the following BMPs when installing the cable in and adjacent to SCFWH:

- **Seasonal Constraints:** It is anticipated that construction windows associated with in-water construction activities (i.e., dredging, cable laying, splicing, and burial activities) will be required by federal and state regulatory agencies. Regulatory agencies develop construction work windows in order to protect and minimize the potential impact on different species and on certain life stages. Within the Hudson River, the Department of State (DOS) has identified recommended work windows associated with SCFWHs. Table 1 identifies the expected work windows where the Project traverses the SCFWH areas. However, the Applicants recognize that seasonal construction windows may be imposed for areas where the Project comes in close proximity to other SCFWHs.
- **Limited Duration of cable installation:** The estimated duration of cable installation is relatively short in each SCFWH. Table 1 provides estimates of this time for each of the SCFWH where the Project traverse the habitat area.
- **Water Quality Monitoring:** The Applicants have proposed as part of settlement that jet plow trials with water quality monitoring in typical sediment conditions prior to installation to confirm BMPs for minimizing re-suspended sediment. In addition, water quality monitoring will be conducted during cable installation.
- **Water jetting operation parameter modifications:** If pre-installation water quality modeling indicates that there may be exceedances of water quality standards, modifications to the water jetting operation (including a reduction in water jetting pressure and a reduction in water jetting rate of installation) will be implemented. In addition, operational modifications may occur in the field based on water quality monitoring results.
- **Silt Curtains:** Silt curtains may be utilized in locations where proximal resources are considered particularly sensitive. The use of silt curtains and their location will depend on local hydrodynamics and navigation traffic.

**Table 1: Agency Recommended Work Windows and Estimate Cable Installation Duration**

Name	Recommended Closed Work Window	Estimated Cable Installation Duration (# days)
The Flats	Spring and Fall	5
Kingston Deepwater Habitat	N/A	9
Esopus Estuary	April-July (Warmwater fish spawning)	2
Poughkeepsie Deepwater Habitat	N/A	20
Hudson River Mile 44-56	May - July (striped bass spawning)	17
Lower Hudson Reach	Mid-November - Mid-April (Striped bass)	11

## Route Refinements to Minimize Impacts

The Applicants' route crosses the following SCFWH because the habitat boundaries for one or more SCFWH extend from shore to shore or the SCFWH is located in the deep water portions of the Hudson River where the cables should be installed:

- Esopus Estuary
- The Flats
- Kingston Deepwater, Vanderburg Cove and Shallows, and Esopus Meadows Habitats
- Poughkeepsie Deepwater Habitat
- Hudson River Mile 44-56
- Lower Hudson Reach

The SCFWHs intersected by the cable contain similar physical conditions and similar important biological resources. Specific ecological values for these designated habitats include wintering and spawning habitat for shortnose sturgeon and important habitat for juvenile sturgeon. At Kingston and Poughkeepsie, the deepwater contains higher salinity water during the summer that provides the habitat for marine species that penetrate up the estuary. All SCFWHs would be important for migration during spring and fall. Spring migration could include adults of river herrings, American shad, and striped bass, in addition to shortnose sturgeon. Atlantic sturgeon also utilizes the estuary and would occur in these habitats or would migrate through them. American shad and striped bass spawn in these deepwater habitat or the adjacent shoals but their eggs and larvae are planktonic. A general description of expected impacts to these resource areas is provided below, followed by specific measures taken for each SCFWH.

### Esopus Estuary

The Esopus Estuary SCFWH contains a complex of natural estuarine communities at the mouth of a major freshwater tributary of the Hudson River. The deepwater area is recognized as a post-spawning and wintering habitat for shortnose sturgeon. The littoral zone of the Hudson River adjacent to the creek mouth is also an important spawning ground for shad and serves as a spawning, nursery and feeding area for striped bass, white perch, herring, smelt, and most of the resident freshwater species.

Esopus Estuary also contains a number of shallow water habitats, but the proposed cable route avoids the Esopus river mouth and associated fresh-tidal wetlands and littoral zone areas. In the deepwater portion of the habitat, the original route spanned 1.24 miles. Recently the Applicants modified the route from Mile 235 to Mile 237 so that the centerline of the installation corridor was moved to the east when possible in order to further reduce the intersection with the habitat. This refinement not only shifts the centerline further from the mouth of Esopus Creek, it also reduces the length of cable route within the SCFWH to 0.31 miles in the deepwater portion of this SCFWH.

The utilization of the area by fish species can be protected by limiting installation work to existing work windows designed to protect these seasonal uses. Shortnose sturgeon favors the channel areas of the Hudson and has been shown to use both naturally deep and dredged channels. Cable installation would not alter channel depths or existing current regimes, and

following re-establishment of the benthic substrate the conditions that make this an important habitat for sturgeon would be unimpaired.

#### The Flats

The Flats is a large contiguous area of shallow, freshwater tidal flats. It serves as a spawning ground for American shad, with spawning occurring primarily on the extensive flats, shoals, sandbars and shallow areas near the mouths of tributary streams. The Flats also serve as spawning, nursery, and feeding habitat for striped bass, white perch, and various resident freshwater species. Shortnose sturgeon and Atlantic sturgeon may also use the area to feed (especially during slack water in late spring and summer).

For Route Miles 240.5 to 245.5, the route was modified so that the cables run along the western side of The Flats rather than the eastern. The western side is more heavily utilized as the maintained navigation channel occupies this portion of the river, so the cables will be sited along the maintained channel segment and the boundary of The Flats over a distance of approximately 0.5 miles at the northern end of the habitat. The Applicants would consider siting a silt curtain in this location, with the understanding that vessel traffic and hydrodynamics may present constraints. The silt curtain, if employed, would be in addition to BMPs such as seasonal restrictions and cable operational measures. Cable installation would not alter channel depths or existing current regimes, and following re-establishment of the benthic substrate the habitat value would be restored.

#### Kingston Deepwater, Vanderburg Cove and Shallows, and Esopus Meadows Habitats

The Kingston Deepwater SCFWH area contains six miles of continuous deep water from 30 feet deep to in excess of 50 feet deep. This deep water provides wintering habitat for shortnose sturgeon and supports spawning of sturgeon as well. With spawning occurring in this area, juveniles would also likely make use of this habitat. In addition, the higher salinity water in this deep section of the Estuary during summer low flows supports the upstream penetration of marine species in the Estuary.

For Route Miles 247 to 249, the centerline of the cable route was shifted slightly to the west to place it in deeper water between the Kingston Deepwater SCFWH and an area of shallow water. This refinement eliminates the only area in the original alignment where the cable route was in water less than 15 feet deep. In addition, a small reach of cable (Route Miles 252 to 252.75) was shifted to the east in order to remove it from the lower end of the Kingston Deepwater SCFWH.

The utilization of the area by fish species can be protected by limiting installation work to existing work windows designed to protect these seasonal uses. Shortnose sturgeon favors the channel areas of the Hudson and has been shown to use both naturally deep and dredged channels. Cable installation would not alter channel depths or existing current regimes, and following re-establishment of the benthic substrate the conditions that make this an important habitat for sturgeon would be unimpaired.

#### Poughkeepsie Deepwater Habitat

The Poughkeepsie Deepwater SCFWH area is a 14-mile reach of the Estuary containing a river bottom trench ranging from 30 feet deep to 50 feet deep over most of the area. A maximum

depth in excess of 125 feet occurs at Crum Elbow. This reach is spawning and wintering habitat for shortnose sturgeon, and marine fish species take advantage of the higher salinity water in the depths during low summer flows. The occurrence of larval shortnose sturgeon in this reach suggests that it may be important for juveniles of this species.

The Applicants are proposing three modifications to the original alignment in order to reduce the length of the Project within this habitat. For Route Miles 255 to 257.5, the cable route centerline was shifted to the east to place it between the boundary of the Poughkeepsie Deepwater SCFWH and shallow water along the east side of the river, thereby eliminating 1.9 miles of cable route within the SCFWH. Furthermore, the cable route was shifted to the east in Route Miles 264.5 to 265 to take advantage of relatively deep water outside the Poughkeepsie Deepwater Habitat. Finally, at the lower end of the Poughkeepsie Deepwater Habitat (Route Miles 267.5 to 268.5), the cables were shifted to the east so that the route was outside the SCFWH boundary for an additional approximately 1 mile.

The Poughkeepsie Deepwater is recognized as spawning and wintering habitat for shortnose sturgeon, an endangered species in the Hudson Estuary. Because sturgeon may be using this reach much of the year, installation would be scheduled when abundance in the area is low. The Applicants would consult with resource agencies on the best time to install cables in this reach. Shortnose sturgeon favors the channel areas of the Hudson and has been shown to use both naturally deep and dredged channels. Cable installation would not alter channel depths or existing current regimes, and following re-establishment of the benthic substrate the conditions that make this an important habitat for sturgeon would be unimpaired.

#### Hudson River Mile 44-56

Hudson River Mile 44-56 SCFWH is an approximate 12-mile reach of the Estuary where it passes through the Hudson Highlands. This is a narrow reach with very deep water, strong currents and extensive rocky bottom substrate. This reach is biologically significant because it remains freshwater through early summer and is a spawning area for striped bass and other anadromous species. The early juveniles of these species are carried through this reach to the productive shallows of Haverstraw Bay, Croton Bay and the Tappan Zee. In addition, this is a migration corridor for species moving upstream to the upper Estuary.

The recent survey of the cable route, including sub-bottom profiling, suggests that rock outcroppings are present in this reach of Estuary which may prevent burial of the cables. More refined profiling of the bottom would likely be undertaken before final placement of the cables. Where the cables cannot be buried, they would be laid across the bottom and covered with grout filled mattresses to protect them.

This deepwater area is recognized as a spawning area for striped bass and wintering habitat for shortnose sturgeon, an endangered species in the Hudson Estuary. These seasonal uses of the area can be protected by limiting installation work to existing work windows designed to protect these seasonal uses. Shortnose sturgeon favors the channel areas of the Hudson and has been shown to use both naturally deep and dredged channels. Cable installation would alter channel depths slightly where mattresses are used to protect the cables, but existing current regimes would remain as an important feature of this habitat area. These currents and recovery of the



substrate where the cable is buried would provide the conditions that make this an important habitat for striped bass and sturgeon.

#### Lower Hudson Reach

While this segment of the river has been heavily impacted by filling and development activities, it continues to support benthic, planktonic, and pelagic species. Striped bass in various life stages utilize the area for wintering between mid-November through mid-April. Yearling winter flounder can also be found wintering in this area during the same time period. In addition, several other fish species have been observed in surveys.

The utilization of the area by fish species can be protected by limiting installation work to existing work windows designed to protect these seasonal uses. The highest use of the habitat is during the winter season. Cable installation would not alter channel depths or existing current regimes, and following re-establishment of the benthic substrate the conditions that make this an important habitat for sturgeon would be unimpaired.

The installation of the Champlain-Hudson Power Express cables will not destroy SCFWH because the cables are buried and there will be no structures that could modify the natural processes that maintain the existing estuarine habitat community. A small portion of the deepwater habitat in the designated area will be temporarily impacted during and for a variable recovery time following the cable installation. Throughout installation and immediately after, the deepwater habitat will remain functional and will regain full ecological functionality through the action of unimpaired natural processes. In those small areas where concrete mattresses are used the change to habitat would be negligible and highly localized.

## **4. Commercial and Recreational Fisheries**

The DOS has requested an assessment of the operational impacts of the Project on commercial and recreational fisheries. Once the cables are in place at the proper burial depth, the expectation based on numerous similar projects is that the in-water portion of the cables will be maintenance free. The only operational aspects of the cables with the potential to impact commercial and recreational fisheries are heat loss and electro-magnetic fields (EMF).

### **Heat Loss Effects**

In its March application, the Applicants stated that there would be a negligible increase in the top 6 inches of sediment where the majority of benthic organisms reside. In response to a request from the DPS, the Applicants provided a coarse estimate of temperature rise at 0.2 meters below the seafloor assuming the cables were buried ~3 feet. The estimated average temperature rise associated with the HVDC cables would range from 1.20 degrees Celsius (°C) (gravel) to 1.50°C (sand) to 2.40°C (clay/silt) [Appendix B, Request 12 of the supplemental document submitted to the New York State Public Service Commission on July 22, 2010]. In response to an informal information request from the DOS, the Applicants applied the same formula for the HVAC cables resulting in a range of 0.70°C (gravel) to 2.30°C (clay/silt). For both cable systems, the

majority of heat was projected to be primarily dissipated through the sediments, below the sediment/water interface which is the biologically productive zone in the sediments.

In response to a further request made by the New York State Department of Environmental Conservation (NYSDEC), the Applicants contracted with Dr. William Bailey of Exponent to develop a more rigorous model of heat loss. This analysis examined the expected impacts on water temperature as well as sediment temperature and expected impacts on the biological community.

### Water temperature

The average flow rate of water in the Hudson River is 13,600 cubic feet per second, but it can flow as slowly as 882 cubic feet per second<sup>1</sup>. The energy loss from the cable in the form of heat that would be required to heat water moving at the average flow rate of the Hudson River by just 1°C is 6,000 Watts/meter (W/m) assuming a 150-mile cable length. Even at the minimum water flow of 882 cubic feet per second, a 1°C temperature increase would require a cable loss of 430 W/m<sup>2</sup>. The typical anticipated cable loss when the transmission line is in operation is 86.2 W/m (43.1 W/m per cable for two cables). Thus, the heat from the cable will have a negligible perhaps even immeasurable effect on water temperature anywhere along the length of the proposed cable installation and any water quality or biological effects in the water column would similarly be negligible.

Further, one can compare the water heating due to the cable heat loss to the heating of the river by the energy from the sun. Solar energy deposited on the surface of the earth is approximately 3.7 kW-h/m<sup>2</sup> per day, with daily variation (standard deviation) of 2.2 kW-h/m<sup>2</sup>.<sup>3</sup> In the narrowest section of the Hudson River (992 feet), this produces average heating of 46,614 W/m with daily variation of 27,716 W/m; wider sections of the river will have a higher equivalent heating. The daily variation in the sun's heating is 321 times higher than the heating due to the proposed buried cables. The fluctuation in the sun's heat to the Hudson River over just one day is almost equivalent to a whole-year of heat loss from the installed cables. Hence, in any one day the heat input from the cable would be lost in the natural variability due to seasonal changes in length of daylight, meteorological conditions, and turbidity levels, and hence would have no water quality or biological effects within the water column.

### Sediment temperature

Exponent performed a finite volume calculation of the temperature rise in the sediment below the seafloor surface. The model included two cables with heat losses of 43.1 W/m each, separated by 1.8 meters. The simulations were performed at cable burial depths of 3 feet (nominal burial depth), 6 feet (areas requiring additional protection), and 15 feet (crossing navigation channel).

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<sup>1</sup> National Water Quality Assessment Program - The Hudson River Basin, <http://ny.water.usgs.gov/projects/hdsn/fctsht/su.html> .

<sup>2</sup> All the calculations assume that water had a chance to mix at least once in its travel along 150 miles of the river.

<sup>3</sup> Based on the data of the closest U.S. Department of Energy National Renewable Energy Laboratory monitoring station at Bluefield, West VA; <http://www.nrel.gov/midc/bsc/>

Simulations were performed for three common sediment types: sand, clay, and gravel. The simulation was conservative in that it assumed that moving water provides no forced convection cooling of the seafloor sediment, only natural (i.e. standing water) convection and conduction of the sediment was included. In reality, moving water increases convection by assisting in the movement of heat out of the soil into the overlying water layer, which then passes away from the heat source by flow induced by the river gradient as well as tides or density changes.

Many different authorities use 2°K increase at 0.2 and 0.3 meter burial depth as a measure of cable induced heating (see Worzyk, 2009). For all burial depth and sediment types, the width of sediment which exceeds 2°K increase in temperature is less than 6 meters (18 feet) at depth of 0.2 and 0.3 meters below the seafloor surface. The seafloor surface temperature calculated in Tables 2 through 4 greatly overestimates the actual temperature rise due to the conservative assumptions of the model. Actual temperature rise on the seafloor surface is going to be by a far lower amount given the conservative assumption of non-flowing water. This model is more accurate, however, for the 0.2-and 0.3-meter depth calculations because the conservative assumption has less influence on the heat movement in the shallow subsurface sediment than at the sediment-water interface.

**Table 2: Three Feet Cable Burial Depth**

Soil Type	Thermal Resistivity (K-m/W)	Peak temperature rise (°K) @ 0.2 m Depth	Width of Sediment Above 2°K (m) @ 0.2m Depth	Peak temperature rise (°K) @ 0.3 m Depth	Width of Sediment Above 2°K (m) @ 0.3m Depth	Peak temperature rise (°K) @ seafloor surface	Width of Sediment Above 2°K (m) @ seafloor surface
Gravel	0.55	3.3	3.2	4.4	4	1.3	0
Sand	0.67	4.02	3.75	5.36	4.5	1.6	0
Clay/Silt	1	6	4	8	5	2.32	2.9

**Table 3: Six Feet Cable Burial Depth**

Soil Type	Thermal Resistivity (K-m/W)	Peak temperature rise (°K) @ 0.2 m Depth	Width of Sediment Above 2°K (m) @ 0.2m Depth	Peak temperature rise (°K) @ 0.3 m Depth	Width of Sediment Above 2°K (m) @ 0.3m Depth	Peak temperature rise (°K) @ seafloor surface	Width of Sediment Above 2°K (m) @ seafloor surface
Gravel	0.55	2.26	2.36	2.89	4.5	0.9	0
Sand	0.67	2.75	3	3.52	5	1.1	0
Clay/Silt	1	4.1	6	5.25	6	1.7	0

**Table 4: Fifteen Feet Cable Burial Depth**

Soil Type	Thermal Resistivity (K-m/W)	Peak temperature rise (°K) @ 0.2 m Depth	Width of Sediment Above 2°K (m) @ 0.2m Depth	Peak temperature rise (°K) @ 0.3 m Depth	Width of Sediment Above 2°K (m) @ 0.3m Depth	Peak temperature rise (°K) @ seafloor surface	Width of Sediment Above 2°K (m) @ seafloor surface
Gravel	0.55	1.18	0	1.45	0	0.5	0
Sand	0.67	1.44	0	1.77	0	0.67	0
Clay/Silt	1	2.15	2.86	2.65	5	0.96	0

More recently, Exponent considered the likely effect of both the cables touching (i.e. within the same trench) and being separated by 6 feet. The results are shown in the table below. As can be seen, the maximum temperature when the cables touch is higher than when there is a separation distance of 6 feet at the 0.2 and 0.3 meter depth. However, this delta becomes minimal at the seafloor surface.

**Table 5: Maximum Temperature Change in Celsius for Two Cable Configurations**

	6 Foot Separation	Cables Touching
Water	0.00021	0.0038
Surface	1.2	1.0
0.2 meter depth	3.4	5.2
0.3 meter depth	4.3	6.7

## Impacts from Heat

Published calculations of the temperature effects of operating cables are consistent in their predictions of elevated temperatures in the near vicinity of the cables (OSPAR Commission 2009). The underwater cable buried below the seabed would not pose a physical barrier to fish passage, and would allow benthic organisms to colonize and demersal fish species (including demersal eggs and larvae) to utilize surface sediments without being affected by the cable operation (Mineral Management Service 2008). The small increase in seabed temperature is considered to be within normal ranges of variation and no residual effects are predicted. The potential for increases in seawater temperature above these areas is negligible and no significant effects are predicted (Shetland HVDC Connection 2009).

Specifically, the temperature requirement of river herring (alewife and blueback herring) eggs is between 7 to 29.5°C, with the optimum temperature preference at 18°C. In the Hudson River, the upper lethal temperature limit for eggs is 29.7°C. The upper lethal temperature in the Hudson River acclimated to 14°C was 31°C (Mullen et al. 1986).

Atlantic sturgeon eggs are highly adhesive and are deposited on the bottom substrate, usually on hard surfaces (e.g., cobble). Hatching occurs approximately 94-140 hours after egg deposition at temperatures of 20°C and 18°C, respectively, and larvae assume a demersal existence (Gilbert 1989; Atlantic Sturgeon Status Review Team 2007). There is no information on survival of eggs

or early life stages of shortnose sturgeon in the wild. Many eggs reared in captivity die of fungus infections. However, spawning in freshwater typically occurs when water temperature increase to 8-9°C and ceases when water temperature reach 12-15°C. Spawning in the Connecticut River has been observed to occur at 18°C (National Marine Fisheries Service 1998).

Hatching of white perch occurs in 24 hours at 16°C to 20°C and in 144 hours at 11 to 16°C. Optimum hatching temperature was 14°C at a salinity of zero parts per thousand (ppt). The size of newly hatched larvae was related to temperature; the maximum length occurred at 16 to 18°C at all salinities (0 to 10 ppt) (Stanley and Danie 1983).

The estimated peak temperature rise at the seafloor surface for the cables separated by 6 feet at the 3 feet cable burial depth ranges between 1.30 to 2.32°C, the 6 feet cable burial ranges between 0.9 to 1.7°C, and the 15 feet cable burial ranges between 0.5 to 0.96°C. However, these estimated rise in seafloor surface temperature are an overestimation of the natural condition as it does not taken into account the cooling effect from the natural flowing of the Hudson River. The potential rise in temperature of the seafloor surface will be within the preferred temperature limits of the demeral eggs and larvae species that utilizes the bottom habitat of the Hudson River Estuary.

## EMF Effects

By way of background information, electric (E) fields can be blocked by conducting materials, such as the sheathing and insulation that is typically used in underwater power cables. Therefore, there is no direct exposure of marine species to E fields. In its EIS for the array of subsea cables for the proposed Cape Wind Energy Project, MMS (2009) reached the same conclusions as the USACE (2004), finding that E fields from cables would be eliminated by the shielding and that there would not negative effects to the aquatic community.

Emission of magnetic (B) fields is not prevented by cable sheathing, sediment, or other materials, and therefore a weak induced electric (iE) field will be generated within close proximity to a transmission cable. B and iE fields resulting from both direct and alternating currents decrease quickly to background levels with distance from the cable. Using an EPRI model, the USACE (2004), estimated the peak intensities of B fields anticipated from the proposed Cape Wind Energy Project in Massachusetts would be strongest at the seabed directly over the buried cables and would quickly attenuate to approximately 10 percent of the peak intensity within 10 to 20 feet directly above the seafloor and 20 to 30 percent of the peak intensity within 10 feet horizontally from the AC cables. While burying the cable does not prevent the emission of these fields, it does result in an added buffer, putting distance between the cable and the marine biota over which the emissions will decrease (Exponent and Hatch 2009).

The “EMF emissions” of the cables do not vary between the marine and freshwater aquatic environments as they are a function of the cable, not the surrounding environmental conditions. The electric field of the proposed cables is totally shielded from the aquatic environment by the grounded metallic and ferromagnetic sheaths surrounding the cables. The metallic and

ferromagnetic sheaths will slightly attenuate the magnetic field of the cables but the magnetic field measured outside the cables in the lake or riverbed or water column would not be affected by the salinity of the water (fresh, brackish, salt water).

The Applicants provided a discussion of EMF in the Exhibit 4 of the March 30, 2010 Application for Certificate of Environmental Compatibility and Public Need (Application). In this same document, an Electric and Magnetic Fields report was provided in Appendix H. In the supplement to the Application, the Applicants supplied a revised Electric and Magnetic Fields report that include the expected field levels for the HVAC cables [Response 14, Appendix B and Attachment M, Request 12 of the supplemental document submitted to the New York State Public Service Commission on July 22, 2010]. As discussed in Section 2 above, Exponent has also calculated expected magnetic fields at depths of 1, 10, and 19 feet above the sediment for cables that are buried six feet apart and touching. The Applicants also anticipate providing additional data in response to the DOS letter of January 5, 2011.

Concern over the EMF effects has focused on the potential for influencing migration patterns and exposure to the fields. In order to better understand the best available information on these two issues, the Applicants are providing a literature review below.

## Migration

Previous studies have indicated that the weak iE field generated by a transmission cable is within the range of detectability of electrosensitive species (Normandeau and Exponent 2010, Exponent and Hatch 2009, Centre for Marine and Coastal Studies at the University of Liverpool 2003). In a controlled experiment, Gill et al. (2009) evaluated the response of three species of electro-sensitive fish (two shark species and one ray species) to a buried subsea cable. They found that while some of the elasmobranchs responded to the EMF emitted in terms of both the general spatial distribution of one of the species tested, and at the finer scale level of individual fish of different species, they stated that this response varied within the species and also during times the cable being energized and not energized, day and night (Gill et al. 2009). While electro-sensitive species may detect the EMF, the effects do not appear to be significant (Centre for Marine and Coastal Studies at the University of Liverpool 2005; Scott Wilson Ltd. and Downie 2003; Sound & Sea 2002; USACE 2004; MMS 2009; Scottish Executive 2007; World Health Organization 2005; Exponent and Hatch 2010). The Scottish Marine Renewables Strategic Environmental Assessment reported that “Current research indicates that certain species of elasmobranchs are likely to be able to detect the level of electric field that will be generated by a typical export cable but the field would not cause an avoidance reaction. Furthermore, there is no evidence to indicate that existing cables have caused any significant impact on elasmobranch migration patterns” (Scottish Executive 2007).

Studies have also investigated the effect of electric and magnetic fields on fish movement and migration. Some migratory animals, including sea turtles, Pacific salmon, Japanese eel (*Anguilla* species), and spiny lobster, are thought to detect and orient to the earth’s geomagnetic field during their travel (Lohmann et al. 2004, Hatch Acres 2006, Nishi et al. 2004, Karlsson 1985, Tesch et al. 1992), though it is thought that this is one of several potential mechanisms used for navigation (Groot and Maragolis 1998; Quinn et al. 1981). Crystals of magnetite have been

found in four species of Pacific salmon (Mann et al. 1988; Walker et al. 1988), and these crystals are thought to serve as a compass that orients to the earth's magnetic field (Valberg 2005, Scottish Executive 2007). In a study of chum salmon (*Oncorhynchus keta*) Yano et al. (1997) fit a tag that generated a 600  $\mu$ T artificial B field around the head of the fish; there was no observable effect on the horizontal and vertical movements of the salmon when the tag's magnetic field was varied. Quinn and Brannon (1982) found that while salmon are thought to detect B fields, their behavior is probably governed by various stimuli as evidenced by the lack of effect of changing artificial B fields. Similar results were found in studies of Atlantic salmon: research of EMF effects showed that navigation and migration of Atlantic salmon was not expected to be affected by the B field produced by an underwater cable (Scottish Executive 2007).

Within the Project area, potential aquatic species of concern include shortnose sturgeon, Atlantic sturgeon. Sturgeon are weakly electric fish and can use electroreceptor senses, along with other senses, to locate prey. In the one report related to Sterlet sturgeon (*A. ruthenus*) and Russian sturgeon (*A. gueldenstaedtii*) behavior in the presence of anthropogenic EMF, Basov (1999) found differing behavior at various E field frequencies and intensities:

- At 1.0 to 4.0 Hz at 0.2 to 3.0 millivolts/cm (mV/cm), responses were searching for source and active foraging,
- At 50 Hz at 0.2 to 0.5 mV/cm, response was searching for source, and
- At 50 Hz at 0.6 mV/cm or greater, response was avoidance.
- A study completed a year after the installation of submarine HVDC cables (1,300 A) in the Baltic Sea between Sweden and Poland detected no changes in the species composition, abundance or biomass of the area's invertebrate community (Andrulewicz et al. 2003).

For the Project area, a model of the expected declination from magnetic north expected from the cables (see Figures 1 and 2 above). For cables installed six feet apart at a four foot burial depth, at one foot above the riverbed there would be a maximum deviation of approximately 95 degrees within 10 feet of the cable, with no impact within approximately 40 feet from the cables. However, for cables installed next to each other (as the Applicants recently proposed), at one foot above the riverbed there is only a 35-degree declination within ten feet of the cable and the magnetic fields at all depths returns to background levels within 20 feet of the cables.

## Exposure

A number of studies have investigated the effect of very strong magnetic fields on fish egg and larval development. Strand et al. (1983) reported that exposure of rainbow trout eggs, sperm, or fertilized eggs to a 1 Tesla (10,000 Gauss [G] or 1,000,000 milligauss [mG]) direct current (DC) magnetic field had only the slightest effect on the fertilization rate. Formicki and Winnicki (1998) reported that trout and rainbow trout embryos and larvae exposed to DC magnetic fields above 4 millitesla (mT) (40 G or 40,000 mG), exhibited incubation delays and longer and heavier bodies than controls exposed at levels up to 5.5 mT.

A weak increase in the permeability of egg shells of trout, rainbow trout, and sea trout to water was reported from ultrastructural observations of the shells after exposure to a 2 mT (20 Gauss or

20,000 mG) DC magnetic field in vitro (Sadowski et al., 2007). Sea urchins exposed to 30 mT (30 G or 30,000 mG) but not 15 mT (15 G or 15,000 mG) DC magnetic fields delayed development in early embryos and caused an increase in abnormalities of gut development (Levin and Ernst, 1997). Sudden exposure of carp embryos and larvae to DC magnetic fields of 50-70 mT (500-700 G or 500,000 mG-700,000 mG) is reported to increase heart rate by 5%, which then declined to resting levels in 15 minutes (Formicki and Winnicki, 1996). Trout larvae and fry tended to be attracted to magnets placed in experimental mazes that produced magnetic fields of 0.15-0.42 mT (1.5-4.2 Gauss or 1,500-4,200 mG).

## Impacts from EMF

The Applicants have found no studies that demonstrated negative effects to aquatic life resulting from EMF (Bochert and Zettler 2006; Centre for Marine and Coastal Studies at the University of Liverpool 2005; Scott Wilson Ltd. and Downie 2003; Sound & Sea 2002; USACE 2004; Scottish Executive 2007; World Health Organization 2005; Hatch Acres 2006, Exponent and Hatch 2009). The USACE (2004) concluded that there would be no negative effects to fish species or the marine environment as a result of the 60 Hz B fields because the magnitude of the B fields proximal to the transmission cable would be limited to an extremely small space and decrease rapidly within a few feet of the cable.

In terms of migration, available information indicates that no single environmental stimulus, e.g., current flow, light, smell, taste, magnetic field, temperature, salinity, etc., dominates migratory behavior. Magnetic field stimuli seem ideal for navigating between distant regions, but locations for spawning and reproduction likely are determined by local, non-magnetic cues (Lohmann et al., 2008). Migratory species thus have the means to coordinate and make use of multiple cues and resolve discrepancies. For example, the orientation of salmon towards natal lakes in tanks without olfactory, taste, or current cues is not affected by a 90-degree shift in the horizontal component of the magnetic field during the day but is observed to change at night (Quinn, 1980).

Moreover, the magnetic field of the cable will accentuate or attenuate the magnetic field of the earth in a constant fashion along a narrow band of river bottom the length of the Hudson River as it will be aligned throughout this portion of the route in a constant relationship to the north-south pole magnetic of the earth. Other alterations to the geomagnetic field that fish and other fauna encounter in aquatic environments include magnetic anomalies in geologic sediments beneath sea and river beds, and numerous perturbations of the geomagnetic field by ferromagnetic objects on the bottom, e.g. sunken ships, gas and oil pipelines, communication cables with ferromagnetic armoring. Steel surface vessels will also significantly perturb the geomagnetic field as they sit at moorings or move through the water. Studies conducted in laboratories of prolonged exposure of marine fish and invertebrates to DC-produced B fields have not detected effects to orientation or movement compared to control organisms (Bochert and Zettler 2004, 2006).

Another important consideration is that, by and large, migrating fish species will not travel in the part of the water column closest to the buried cable. The strength of the field is greatest closest to the cable and diminishes quickly with distance. As migrating fish species tend to be in the



upper part of the water column (see Xie, 2002) and the average depth of the Hudson River varies between 40 feet in the southern section and 6 to 12 feet in the northern section (but with a 40-foot deep channel), the additional distance above the buried cables brings them into a region where the magnetic field characteristics will be closer to that of the earth's background geomagnetic field than at the river bottom. This separation distance diminishes the potential for negative effects on fish migration.

In evaluating the potential impacts due to exposure, the available literature indicates that there would be no adverse effect on egg and larval development. The Applicants' modeling predicted a DC magnetic field for 3652.7 mG at the river bed [Appendix B, Request 14 of the supplemental document submitted to the New York State Public Service Commission on July 22, 2010]. In contrast to DC magnetic fields that are reported to affect development at high intensities, delays in development are reported at lower intensities of 60-Hertz, alternating current magnetic fields (1,000 mG) in Japanese rice fish by Cameron et al. (1985) and sea urchins by Zimmerman et al. (1990). This data suggests that much greater magnetic fields are required than the proposed cable will produce, in order to create deleterious effects on eggs and larvae. In addition, as a percentage of the overall spawning numbers, the area of potential effect is small and extremely weak and would therefore represent a negligible effect of any kind on the number of eggs and larvae present during spawning.

It has been suggested that the research developed with respect to open marine systems may not be applicable to a river channel environment. However, a substantive change in the ambient geomagnetic field produced by the cables is confined to a limited distance around the cables. The DC magnetic field only will vary from a background level of 527 mG in the Hudson River by more than 20 percent within  $\pm 16$  feet on either side of a single cable and  $\pm 4$  feet on either side of cables laid 1.8 m apart at 20 - 40 feet above the river bed. In the lower estuary of the Hudson River where it is narrowest, this zone around the cable is a small fraction of the width of the river (about 5,000 feet) and as such is not likely to create a meaningful potential behavioral restriction within the cross sectional area of the river that fish would move through.

In summation, research studies on a variety of fish and other marine species have not reported adverse effects either in open marine systems or in small experimental tanks. The MMS has concluded that the B fields produced by the cables would not negatively affect marine life (MMS 2009). The World Health Organization (2005) reports that "none of the studies performed to date to assess the impact of undersea cables on migratory fish (e.g., salmon and eels) and all the relatively immobile fauna inhabiting the sea floor (e.g., mollusks), have found any substantial behavioral or biological impact." While it is not possible to "prove the negative", i.e. provide absolute assurance there will be no deleterious effect, repeated tests by multiple investigators have not shown any adverse effects at the relevant levels of exposure.

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February 4, 2011

Jeffrey Zappieri  
Supervisor, Consistency Review Unit  
New York State Department of State  
Office of Coastal, Local Government, and Community Sustainability  
99 Washington Avenue, Suite 1010  
Albany, NY 12231-0001

**RE: Champlain Hudson Power Express  
F-2010-1162 (S-2010-0025)**

Dear Mr. Zappieri:

On December 6, 2010, Champlain Hudson Power Express, Inc. and CHPE Properties, Inc. (collectively the “Applicants”) submitted their application for coastal zone consistency review to the New York State Department of State (“NYSDOS”) for the Champlain Hudson Power Express project (Project). On January 5, 2011, your office submitted a request for additional information. Please consider this letter to be the initial response to that request.

Your letter identified six areas where supplementary information was necessary. We are providing a response to each of these below or, where the information is not available at this time, providing a schedule for submittal of these materials. The Applicants also note that, as the NYSDOS is aware, confidential settlement discussions pursuant to the Public Service Commission's Settlement Guidelines have been on-going since the submission of the request for a coastal consistency determination. In mid-January 2011, the Applicants and 14 parties to the settlement process were able to report to the presiding Administrative Law Judges (“ALJs”) that there has been substantial progress on issues of concern, including the Project route. Based on the outcome of this process, the Applicants may be submitting a supplement to their application outlining not only any routing changes but also any other conditions or requirements that may be of interest to your agency.

- 1. Please provide a written response to all information requested by the DOS in the letter to Keith Silliman of TRC Companies, Inc. dated November 22, 2010 (enclosed). To date, verbal responses provided to DOS by TRC Companies, Inc. and HDR have been inadequate and reflect the need to submit written responses that includes information as to the ability of TDI to site the proposed line within existing utility corridors and in the rights-of-way of state and county roads.**

The Applicants submitted this response on January 18, 2011. The Applicants are available to discuss this document at your convenience.

- 2. The information provided in the application envisions burying the cables along the proposed submarine route in the Hudson River at depths of 3 to 4 feet, in conjunction with the use of concrete mattresses in yet-to-be-identified areas where burial would be prohibitive because of the presence of bedrock. In some instances, a greater depth may be required to avoid either environmental or magnetic field impacts or navigation deepening. Please provide a technical analysis of the maximum attainable cable burial depths for the entire submarine portions of the proposed route and identify where the use of concrete mattresses would be necessary.**

In response to this question, the Applicants are reviewing sediment core data from the marine route survey completed in the Spring of 2010 in order to estimate the likely depth restrictions along the route. Additional cable protection (i.e., concrete mattresses) would likely be required where the minimum depth for adequate protection of the cables cannot be achieved.

The Applicants propose to provide this analysis by February 18, 2011. However, this analysis is preliminary and will likely be more “coarse” in scale. A more fine level of analysis will be available once the Engineering, Procurement, and Construction (“EPC”) contractor is selected and completes the construction marine route survey. The Applicants are available to discuss these limitations at your convenience.

- 3. Please provide information pertaining to the suitability and feasibility of siting the proposed cables within areas of the Hudson, East, and Harlem rivers that were previously mechanically dredged.**

The Applicants’ assumption is that this question is related to the potential use of the federal navigation channel or its side slopes, as this is the only dredged area that follows the Project route. On September 30, 2010, the Applicants participated in a conference call that included Randall Hintz, Chief of Operations Support at the U.S. Army Corps of Engineers (“USACE”) for the greater New York City area, and Gerlyn Perlas, Chief of the Technical Support Section for the USACE, as well as representatives of the NYSDOS and U.S. Department of Energy. At this meeting, Mr. Hintz stated that installation of transmission cables within federal navigation channels was an issue at the national level. While the USACE had not gone as far as to prohibit installation along the length of the navigation channel, it was noted that the USACE would prefer for the cable to be installed outside of the channel.

Over the course of the conversation, Mr. Hintz did state that installation of the cables within the side slope of the navigation channel could be acceptable, although certain depth requirements would need to be met. In order to understand the feasibility of this option, the Applicants contacted three nationally recognized cable installation companies to determine if installation within the side slope was feasible up to a depth of 12 feet. Two companies provided brief statements that it would not be possible to install the HVDC cables in the slope of the navigation channel, which is typically 30 degrees to the depth proposed, due to concerns about operating heavy jet plow machinery in rough riverbed terrain. The third

company suggested that, while they generally like to see less than a 10-degree slope for a standard jetting plow, under the right conditions it could be possible to install cable for short segments (less than 1 kilometer) with up to a 30-degree slope. Installation in a steep slope would require that there is sufficient water at the top of the slope, as well as adequate horizontal clearance from existing features (e.g., river banks, piers, piling) to allow for a vessel that is at least 20 meters wide and drafts 6 meters of water. If these conditions are not met, then it would not be possible for the vessel to complete the considerable maneuvering necessary to prevent the plow from running down the slope. This company was unaware of any existing burial equipment that might be able to cope with the steeper side slopes at the required depth and noted that, while a purpose built plow could be discussed, the installation would be complicated if the cables were bundled. Their conclusion was that significant detail would be necessary to select the right burial equipment (including water depth, slope angle, seabed properties, and the shoreline, including abandoned and dilapidated structures) and even then there would be segments where side slope burial was not possible.

At the same time, the Applicants also provided mapping of the location of the federal navigation channel in Haverstraw Bay along with available bathymetric data (see Attachment), as this was an area of concern at the time. Company 1 and 2 were unwilling to offer an opinion based on the level of information provided. Company 3 felt that the installation could occur near the top of the slope, although additional information on issues such as water depth would be necessary. As noted in the report to the ALJs in January, an overland bypass of Haverstraw Bay is currently under discussion as part of settlement negotiations so this issue may be rendered moot.

Based on the information provided by the installation firms, the Applicants do not believe it is feasible to install the cables within the side slopes of the federal navigation channel for the entire Project. There may be short segments where burial within the side slopes could be reasonably achieved, but existing conditions must meet the restrictions previously described.

- 4. Please provide scientifically verifiable estimates for magnetic field levels and ambient temperature increases in soil and water for cable burial depths of 4, 8, 12, and 15 feet and a scientific analysis of the impacts of the magnetic fields and temperature increases on aquatic species in the Hudson River, including impacts on migratory routes, feeding, spawning, and all life development stages for each burial depth.**

The Applicants have retained Exponent to produce the estimates requested and expect the results next week. HDR staff will then review this information and provided an analysis of impacts. The Applicants propose to provide this information no later than February 18, 2011 and hope to provide it earlier if possible.

**5. Please state the design life of the proposed project.**

The design life for HVDC cables is assumed to be thirty (30) years, although there are systems currently in place that have been shown to operate for longer periods.

**6. Analyzing existing Hudson River dredging and navigation use data, and recognizing the trend in the use of deeper draft vessels in the Hudson River, please explain how TDI will adjust the depth of the buried cable in the riverbed to accommodate any future federal dredging and navigation projects over the design life of the proposed project. Please include a discussion as to whether or not burial of the proposed cables would interfere with such anticipated navigation improvements to the Hudson River.**

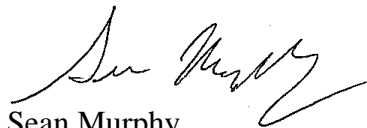
The Applicants are not aware of any anticipated navigation deepening projects in the Hudson River for which the Project would interfere and believes that the proposed Project burial depths can avoid impacts to future projects. However, if the NYSDOS has specific projects in mind for this question, the Applicants request that these be identified so that a directed analysis can be completed.

The only intersection with the federal navigation channel would be where a crossing is necessary to avoid an environmentally sensitive area or other features. In these situations, the cables will be buried fifteen (15) feet below the Project authorized depths as required by USACE regulations. The Applicants have stated in other forums that additional burial depths are possible in these circumstances.

In addition, permit conditions for submarine cable projects routinely include a condition that the cable owner could be required to install the existing cable to a deeper depth at their expense should such measures be required. If these measures were required, a survey would be conducted to confirm that there is sufficient slack in the cables where the increased burial depth is required. If not, an additional length(s) of cable would be spliced onto the existing cables. Water jetting, hydraulic dredges, or, under worst case conditions, hand jetting would be employed to achieve the desired deeper depth.

We look forward to hearing your thoughts on the issues discussed in this letter. Please feel free to contact me at any time if you have any questions about the materials presented.

Regards,



Sean Murphy  
Project Manager

Attachment

cc: Dr. Jerry Pell, U.S. Department of Energy  
Don Jessome, Transmission Developers Inc.



February 18, 2011

Jeffrey Zappieri  
Supervisor, Consistency Review Unit  
New York State Department of State  
Office of Coastal, Local Government, and Community Sustainability  
99 Washington Avenue, Suite 1010  
Albany, NY 12231-0001

**RE: Champlain Hudson Power Express  
F-2010-1162 (S-2010-0025)**

Dear Mr. Zappieri:

On December 6, 2010, Champlain Hudson Power Express, Inc. and CHPE Properties, Inc. (collectively the “Applicants”) submitted their application for coastal zone consistency review to the New York State Department of State (NYSDOS) for the Champlain Hudson Power Express Project (Project). On January 5, 2011, your office submitted a request for additional information. On February 4, 2011, the Applicants provided a response to four of the six areas where supplementary information was necessary and this letter completes the Applicants’ response.

- 2. The information provided in the application envisions burying the cables along the proposed submarine route in the Hudson River at depths of 3 to 4 feet, in conjunction with the use of concrete mattresses in yet-to-be-identified areas where burial would be prohibitive because of the presence of bedrock. In some instances, a greater depth may be required to avoid either environmental or magnetic field impacts or navigation deepening. Please provide a technical analysis of the maximum attainable cable burial depths for the entire submarine portions of the proposed route and identify where the use of concrete mattresses would be necessary.**

In the Spring of 2010, the Applicants conducted a Marine Route Survey for a 300’ wide corridor, using the centerline proposed in the Application for Certificate of Environmental Capacity and Public Need (Application) filed on March 30, 2010 with the New York State Public Service Commission (NYSPSC) on behalf of the Champlain Hudson Power Express project (Project). The Marine Route Survey included geophysical, sediment and benthic surveys:

- Geophysical surveys were conducted to investigate existing bottom features in the lakes, rivers and canals along the proposed route. Surveys were conducted using multi-beam bathymetry, side-scan sonar, magnetometer and sub-bottom profile.

- The sediment survey was conducted to collect information on the existing sediment type and quality along the proposed route.
- The benthic survey was conducted to augment existing benthic community data and will be used to assess potential impacts associated with the installation of the underwater transmission cable.

The Marine Route Survey followed the Aquatic Sampling and Analysis Plan and Sediment Sampling and Analysis Plan that was based on existing databases of sediment type and quality with the Hudson River and reviewed by the New York State Department of Environmental Conservation and the U.S. Army Corps of Engineers. These plans can be found in Attachment P of the Supplement to Application submitted to the NYSPCS in July of 2010.

Sediment sampling provided two basic types of information, the physical characteristics of sediments and chemical characteristics of sediment. A total of fifty-eight (58) samples (including landfall locations) were collected from the Town of Coeymans to Spuyten Duyvil or Project Mile 202 to 324. In the Harlem and East Rivers, seven sampling locations were identified from Project Mile 324 to 333, which is the current extent of the Project.

The proposed depth for the Champlain Hudson Power Express HVDC cables within the Hudson River is four (4) feet, except when the cables cross federally authorized navigation channels. The proposed burial depth is fifteen (15) feet below the authorized depth within federally authorized navigation channels. In order to characterize the sediments for cable installation, the core sample target depth was 1 foot below the proposed cable installation depth. In the Hudson River, core penetration depth ranged from 8 to 10 feet along the proposed route outside navigation channels. Within navigation channels, core penetration ranged generally from 18 to 19.5 feet. In the Harlem River, core penetration ranged from 1 to 18 feet, with multiple core attempts being made at three locations due to limited penetration and limited recovery.

Our analysis of likely cable burial depths achievable using hydro plowing was based on data collected during the Spring 2010 survey, including core penetration, sub bottom profiles, side scan sonar and bathymetry. Table 1 below provides a summary of the description of the results of the sub-bottom profiler provided in the Marine Route Survey Report (Attachment E of Supplement). In some locations there was little to no sub-bottom penetration but correlating core data to these locations indicated that cable installation using hydroplowing would be possible. Based on the information provided by the sub-bottom profile survey and the core data, the Applicants believe it is reasonable to assume that cable burial depths of up to six feet are obtainable for most of the Project route. However, this will be verified during the construction marine route survey.



**TABLE 1**  
**DESCRIPTION OF SUB-BOTTOM PROFILER RESULTS**

<b>Location</b>	<b>Description</b>
Albany / Troy	Little to no sub-bottom penetration, although where penetration is obtained is generally 5 ft or greater.
Northern Catskills	Little to no sub-bottom penetration, although where penetration is obtained is generally 5 ft or greater.
Southern Catskills	Sub-bottom penetration generally below or approximately 5 feet.
Poughkeepsie	Sub-bottom penetration limited.
Newburgh Bay	Sub-bottom penetration to depths of 5 feet or more.
Hudson Highlands	Sub-bottom penetration achieved but sometimes limited to depth of less than 5 feet.
Tappan Zee / Haverstraw	Deep penetration throughout section.
Palisades	Sub-bottom approximately 15 feet below surface for majority of route.
Harlem River	Sub-bottom penetration typically to depth of 5 feet or greater, broken up by apparent rock outcrops.

Based on the project route presented in the Supplement, areas which the Marine Route Survey indicated are not likely suitable for cable burial (e.g., near rock outcroppings or existing utility areas) are presented in Table 2. The majority of these areas are associated with existing infrastructure or cable areas. Other areas not suitable for cable burial are generally associated with rock outcroppings that do not extend the full width of the waterbody. Re-routing of the cables at these locations is likely to avoid the need for installing additional cable protection. In the case of the Harlem River, designated cable and pipeline areas extend over substantial areas or occur frequently along the length of the river, so that the placement of protection over exposed cable may be continuous over several adjacent infrastructure elements. The detailed design developed as part of the Environmental Management and Construction Plan will optimize the placement of protection to minimize the area of the bottom covered by concrete mattresses or other protective devices.

An additional, more detailed analysis further refining maximum cable burial depths and need for additional cable protection will be available once the Engineering, Procurement, and Construction (“EPC”) contractor is selected and completes the construction marine route survey. During detailed design, the location of existing infrastructure will be confirmed and the length of non-burial and the arrangement of protection will be developed. The actual area of additional protection is likely to be substantially less than the total width of the cable/pipeline area as depicted on the NOAA charts. The design of each infrastructure crossing will be coordinated with the owner to meet their needs

As NYSDOS is aware, route modifications are being discussed during the confidential settlement discussions pursuant to the Public Service Commission's settlement guidelines. Any changes in the location of the transmission cables as a result of these discussions could impact the potential maximum burial depth. For example, if the centerline of the Project was shifted to shallower waters to avoid deep-water habitat, there could be a corresponding decrease in how deeply the cables could be installed. The Applicants therefore recommend that the analysis

presented here be considered tentative until a final routing has been agreed upon by some or all of the settlement parties.

**TABLE 2  
 CABLE NON-BURIAL AREAS REQUIRING PROTECTION OVER CABLES**

Cable Segment	Obstruction Type	Approx MP Begin	Approx MP End	Approx Length (ft)
Hudson River	Infrastructure Locations	219.8	220	1000
		220	220.3	1250
		220.5	220.7	1000
		220.8	221	1000
		245.2	245.6	2000
		260.8	261.6	3900
		267.2	267.4	1000
		271	271.4	2200
		275.8	276.7	4600
		286	286.3	1900
		294.9	295.1	1300
		297.5	297.8	1500
		309	309.3	1600
	313.9	314.1	1000	
	Natural Barrier	208.8	209.0	1000
		209.9	210.1	1000
		211	211.3	1600
		220.8	221	1000
		267.2	267.4	1000
284.1		284.5	2100	
Harlem River	Infrastructure Locations	287.6	287.8	900
		324.1	324.2	600
		324.9	325.0	900
		325.2	325.3	840
		325.4	325.7	1500
		326.1	326.2	840
		326.3	326.5	1050
		328.3	328.5	930
East River	Infrastructure	328.8	330.4	8450
		330.5	330.9	1950
		334	334	1955ft-cable runs N-S

<sup>1</sup> Milepoint zero at Canadian border on Lake Champlain.

<sup>2</sup> Distances based on NOAA chart not survey data.

4. Please provide scientifically verifiable estimates for magnetic field levels and ambient temperature increases in soil and water for cable burial depths of 4, 8, 12, and 15 feet and a scientific analysis of the impacts of the magnetic fields and temperature increases on aquatic species in the Hudson River, including impacts on migratory routes, feeding, spawning, and all life development stages for each burial depth.

The Applicants retained Exponent Inc. to provide the estimates of magnetic field levels and ambient temperature increases associated with the depths provided. This report is provided in Attachment A of this document.

The potential effects of perturbations in water temperature and magnetic fields induced by the operation of the Champlain Hudson Power Express project (Project) are localized effects in the sediment at or below the surface of the river bed. Moreover, the sediment where the temperature rise is greatest is only a small portion of the cross section of the waterbody at any given location. The modeling of the distribution of temperature increase and change in magnetic field for burial depths of 4, 8, 12, and 15 ft. define the area and volume in which a potential change in exposure on aquatic life could occur, assuming that the organisms are sensitive to small changes in these factors. The modeling shows that the magnitude of changes diminishes with depth of burial starting at a level of minimal change for the 4 ft. burial depth.

The spatial relationship of the zone of influence of the cables to the overall habitat available is an important factor in assessing the potential for impacts. The location of the zone of influence on the bottom prevents the potential exposure of many species that utilize shoreline and shallow water habitats. The cable centerline was intentionally sited in moderately deep to deep water to avoid shallows. Those species which utilize bottom habitats in deep water would potentially have greater exposure to the zone of influence than other species. Among these species are sturgeon and catfishes, which are in close contact with and are feeding along the bottom. Many other species utilize the bottom for feeding, particularly in juvenile life stages, but this occurs primarily in shallow water. The eggs of many species are spawned on the bottom or deposited on the bottom after spawning in the water column but many of these species spawn over shallow water depths. The following sections address the specific activities of migration, spawning, feeding, and early developmental stages of fish.

## **Migration**

Migration generally refers to the movement of large numbers of individuals moving in unison to a selected, preferred location, often for spawning. For this assessment many types of movements by large segments of the fish populations are included because any significant movement patterns could bring individuals within the zone of influence of the cables. Migrations and major movements follow a seasonal pattern thus the individuals involved would not be exposed to the influence of the cables at all times unless they lived year round in the Hudson and their preferred habitat was on the bottom in deep water. The concern for cables effects on migrations is that the change in magnetic field induced by the cables would confuse the migrating fish and divert them or perhaps delay their arrival at the spawning location at the proper time.

Based on the spatial distribution of the magnetic fields, it is apparent that only a small portion of any migrating fish population would come in contact with the zone of influence of the cables. The cables are aligned generally, parallel to the axis of the river, thus migrating fish could travel the full length of the Hudson without encountering the influence of the cables, even where the cables cross federal maintained navigation channels. Fish would encounter the

cables' influence only if they were migrating near the bottom and then only if they were aligned with the small zone of influence and stayed within the cable's influence. The model analyses show that there is very little change in total magnetic field (5.9%) 1 ft. above the river bottom beyond a distance of 10 ft. from the centerline of the cables buried at a depth of 4 ft. This zone of influence also extends 10 ft. above the centerline in the water column. For burial depths from 8 ft. to 15ft., the zone of influence diminished substantially. The magnetic deflection caused by the cables at a burial depth of 4 ft was  $\geq 7.9$  degrees within the same 10 ft. zone of influence around the cable centerline and diminished substantially at an 8 ft. burial depth, but only slightly more at greater depths.

For fish that enter the zone of influence around the cables, the potential for impact depends on whether or not the individuals could detect the induced changes and how they respond to the changes. There is technical literature that shows that some fish species can detect and use magnetic fields for navigation. This has been reported and studied with respect to Pacific and Atlantic salmon (Mann *et al.* 1988; Walker *et al.* 1988; Scottish Executive 2007; Yano *et al.* 1997; and Quinn and Brannon 1982). These studies did not detect an effect on fish behavior when magnetic fields around the fish were artificially altered. The lack of an effect may be due to the low level of induced change and the fact that the migrating fish are responding to a variety of stimuli. As there are no apparent impacts on individual fish this eliminates the potential for population level effects. The Hudson River is a highly developed estuary which contains many stimuli that could potentially direct or impact fish migration. There is no evidence that fish migrations in the Hudson have been or would be impaired by magnetic fields.

## **Spawning**

As there are no apparent impacts on fish migrations, species utilizing the Hudson for spawning, including resident species, can access their preferred areas for spawning. The majority of fish species spawn in tributaries, shallow shoreline areas, and in open water in the pelagic zone. All of these areas are beyond the influence of the operating cables. The narrow zone of influence from cable operation provides a very large area of bottom habitat that is not influenced by the cables. See section on early life history development below.

## **Feeding**

As with other aspects of potential cable effects, feeding behavior could be disrupted only in the area of river bottom influenced by the operating cables. Fishes feeding in shallow, shoreline areas of the river or in the pelagic zone would not be influenced by cable operation. Bottom feeding fish could move into and out of the zone of influence as they move in the search for food. It is also possible that the increase in water temperature could increase the production of food, in which case the cables could possibly stimulate feeding.

Sturgeon may use AC electronic signals emitted by prey to guide them to the prey (Basov 1999), but such electric fields will not be produced by the proposed cables. Altered magnetic

fields will be present in a small area as described above, but there is no evidence that these fields are a factor in the feeding behavior of sturgeon.

A study of the invertebrate community in the Baltic Sea in the vicinity of a new submarine cable and at control stations found no changes in the species composition, abundance, or biomass of invertebrates (Andrulewicz *et al.* 2003). In addition, based on the post-installation benthic survey conducted for the Neptune Regional transmission project the benthic community re-colonized the cable installation areas within several months of installation (Neptune 2005). At this location there would have been no loss of feeding opportunities for fishes. For the Project, the small increase in temperature of the sediment surface estimated by modeling (1°C) would be expected to have a minimal effect on the production of benthic invertebrates that could be a food source of fishes. The increase in sediment temperature would be well within the temperature tolerances of the organism in the existing community, and the natural variability that these organisms are exposed to, thus, it would not depress or stimulate biological activity. The increase in sediment temperature would not impact feeding by fishes.

## **Life Stage Development**

The potential exposure of early life stages to the cables will vary depending on their habitat preferences and movement patterns. The life stage with the greatest potential for exposure would be fish eggs and newly hatched larvae that settle to the bottom habitat that is within the zone of influence of the operating cables. At this time they are undergoing rapid physiological and anatomical changes.

A number of studies have investigated the effect of strong magnetic fields on fish egg and larval development. The magnetic fields in these studies were much greater than the changes in natural magnetic fields anticipated by the operation of the proposed transmission cables. Strand *et al.* (1983) reported that exposure of rainbow trout eggs, sperm, or fertilized eggs to a 1 Tesla (10,000 Gauss [G] or 1,000,000 milligauss [mG]) direct current (DC) magnetic field had only the slightest effect of the fertilization rate. Formicki and Winnicki (1998) reported that rainbow trout embryos and larvae exposed to DC magnetic fields above 4 millitesla (mT) (40 G or 40,000 mG) exhibited incubation delays and longer heavier bodies than controls exposed at levels up to 5.5 mT.

A weak increase in the permeability of egg shells in trout, rainbow trout, and sea trout to water was reported from ultrastructural observations of the shells after exposure to a 2 mT (20 G or 20,000 mG) DC magnetic field *in vitro* (Sadowski *et al.* 2007). Sea urchins exposure to 30 mT (30 G or 30,000 mG) but not 15 mT (15 G or 15,000 mG) DC magnetic fields delayed development in early embryos and caused increase in abnormalities of gut development (Levin and Ernst 1997). Sudden exposure of carp embryos and larvae to DC magnetic fields of 50-70 mT (500-700 G or 500,000-700,000 mG) is reported to increase heart rate by 5 %, which then declined to resting levels in 15 minutes (Formicki and Winnicki 1996). Trout larvae and fry tended to be attracted to magnets placed in experimental mazes that produced magnetic fields of 0.15-0.42 mT (1.5-4.2 G or 1,500-4,200 mG).

These studies show that much stronger magnetic fields than will be produced by the proposed Project are needed to impact the early life stages of aquatic organisms. As shown in the model, the change in magnetic field produced by the proposed cables are equal to or less than 30.3 mG, which is about 10-100 times lower than the magnetic field levels that are reported to produce adverse effects in the early life stages of fish that remain in the zone of influence for an extended period of time.

Older, mobile life stages of fish from early juveniles to adults would not be exposed to these low levels of magnetic fields for extended periods. After cable installation is completed the disturbed area of the bottom is expected to recover its benthic invertebrate community. After the cable is energized, the benthic community is not expected to differ significantly from adjacent benthic area, thus there will be no unique features that would attract or concentrate fish in the vicinity of the cable. Sturgeon and other species are expected to distribute themselves throughout the Hudson Estuary as they did prior to cable installation and have incidental contact with the zone of influence of the cables.

### **Summary of Potential Effects on Aquatic Life**

Modeling analysis shows that the increase in sediment temperature, as well as changes in the natural magnetic fields (total magnetic field and compass deflection) is limited to a small area of influence confined to the river bottom and the water column directly above the cable centerline. The magnitude of induced change in water temperature is extremely small, probably not detectable, while the sediment surface temperature is elevated slightly more than 1°C for all burial depths. These analyses are conservative in that they are based on an assumption of a clay/silt substrate. Because the water temperature change is negligible with a 4 ft. burial depth and sediment temperature varies little among the four burial depths assessed, placing the cable deeper than 4 ft. would have no benefit in terms of reducing potential temperature impacts on aquatic life.

With regard to magnetic field, the model analyses show that a 4 ft. burial depth produces a change in total magnetic field extended up to 30 ft. from the cable centerline depending on the arrangement of the two cables. The magnitude of the change diminishes rapidly beyond 10 ft. from the centerline. Greater burial depths reduce the magnitude of change and deflection and reduce the area influenced by the cable. For a biological 'compass' that responds to the horizontal component of the geomagnetic field, the least change in the background geomagnetic field would occur for a cable burial depth between 4 and 8 ft. of burial. Beyond 8 ft. the reduction in the change in deflection is small.

The available information on the effects of alterations in water and sediment temperature, and changes in the magnetic field on aquatic life shows no significant adverse effects on individual organisms for various biological functions. The technical literature is not specific to species in the Hudson, but it does cover a range of related organisms. Both species-specific studies as well as reviews of literature do not reveal any significant short or long-term effects from the operation of submarine electric cables. Given this lack of evidence of significant impacts, the low level of induced changes by the proposed cables and the small spatial extent of these

Mr. Jeffrey Zappieri  
February 18, 2011  
Page 9

changes, the depth of burial does not appear to be a significant factor in the assessment of impacts on aquatic life in the Hudson. Placing the cable deeper than 4 ft. over most of its length may increase the area of the bottom disturbed during installation without providing any additional protection for aquatic life during project operation. On balance a burial depth of 4 ft. may represent the best arrangement to minimize overall effects from installation and operation of the cable.

We look forward to hearing your thoughts on the issues discussed in this letter. Please feel free to contact me at any time if you have any questions about the materials presented.

Regards,  
HDR/DTA

A black rectangular box containing a white handwritten signature that appears to read "Sean Murphy".

Sean Murphy  
Project Manager

Attachment

cc: Dr. Jerry Pell, U.S. Department of Energy  
Don Jessome, Transmission Developers Inc.

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STATE OF NEW YORK  
**DEPARTMENT OF STATE**  
 ONE COMMERCE PLAZA  
 99 WASHINGTON AVENUE  
 ALBANY, NY 12231-0001

ANDREW M. CUOMO  
 GOVERNOR

RUTH NOEMÍ COLÓN  
 ACTING SECRETARY OF STATE

March 08, 2011

Mr. Sean Murphy for Champlain Hudson  
 Power Express, Inc. and CHPE Properties  
 C/O HDR/DTA HDR Engineering Inc  
 970 Baxter Blvd  
 Suite 301  
 Portland, ME 04103-5346

Re: F-2010-1162 (formerly S-2010-0025)  
 U.S. Army Corps of Engineers/NY District Permit  
 Application #: 2009-01089-EHA  
 DOE Docket #: PP-362  
 NYS PSC Case: 10-T-0139  
 NYS DEC Regions 2, 3, 4 and 5  
 Champlain Hudson Power Express, construct/operate 1,000  
 MW underwater/underground HVDC electric transmission  
 system extending between Canada and NYC.  
Status of Consistency Review

Dear Mr. Murphy:

The Department of State is required to notify you of the status of our review of this project for its consistency with the New York State Coastal Management Program if a decision has not been issued within three months following commencement of our consistency review.

The completion of the consistency review for this project will require further coordination with the involved Federal, State, and local agencies.

A copy of this letter has been sent to the Department of Energy and the Army Corps of Engineers.

Please call Matthew Maraglio at (518) 474-5290 if you have any questions.

Sincerely,

Jeffrey Zappi  
 Supervisor, Consistency Review Unit  
 Office of Coastal, Local Government  
 and Community Sustainability

- c: COE/ NY District – Naomi Handell
- DOE – Jerry Pell
- NYSDEC/ Central Office - Christopher Hogan
- NYS DPS – Steven Blow

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STATE OF NEW YORK  
**DEPARTMENT OF STATE**  
ONE COMMERCE PLAZA  
99 WASHINGTON AVENUE  
ALBANY, NY 12231-0001

ANDREW M. CUOMO  
GOVERNOR

CESAR A. PERALES  
SECRETARY OF STATE

June 8, 2011

Mr. Donald Jessome, President/CEO  
Champlain Hudson  
Power Express Inc. and  
CHPE Properties, Inc.  
Pieter Schuyler Building  
600 Broadway  
Albany, NY 12207-2283

Re: F-2010-1162  
U.S. Dept. of Energy #: PP-362  
U.S. Army Corps of Engineers Application #: 2009-01089-EHA  
NYS Public Service Commission Application #: 10-T-0139  
Champlain-Hudson Power Express  
1,000 megawatt HVDC electric transmission system  
from Canada to New York City  
**Conditional Concurrence with Consistency  
Certification**

Dear Mr. Jessome:

The Department of State (DOS) has completed its review of the consistency certification and data and information for the above referenced project in accordance with the federal Coastal Zone Management Act (CZMA). Pursuant to 15 CFR 930.4 and 930.62, DOS conditionally concurs with the consistency certification for the project under the enforceable policies of the New York State Coastal Management Program (CMP).

This transmission project promises to deliver a tremendous supply of clean, renewable hydropower from Canada to the New York City Metropolitan Area, one of the nation's largest energy markets. If constructed as proposed and conditioned, the project can provide several important energy benefits. The electricity will serve the New York Independent Systems Operator (NYISO) load center in Zone J and adjacent zones, a high need area. Hydro-power, a renewable energy source, diversifies the State's energy portfolio. Because the electricity is predominantly generated by hydropower, it will improve air quality by displacing less clean generators and will not contribute to greenhouse gas emissions. Importantly, the project improves the State's ability to meet future market demand for low-cost electricity should current power sources go off-line or become obsolete.

The siting of the transmission project in State navigable waters and adjacent areas requires great care to ensure that commercial navigation is not adversely impacted, Significant Coastal Fish and

Wildlife Habitats (SCFWH) are not affected, recreational fishing activities are not substantially altered, migratory patterns of aquatic species are not permanently altered, re-suspension of estuarine sediments and associated contaminants is minimized and all other environmental impacts are minimized. The conditions attached to this concurrence ensure that the project can proceed in a manner that is both consistent with the enforceable policies of the CMP and achievable by the project applicant.

## I. STATUTORY FRAMEWORK FOR CONSISTENCY REVIEW

The Coastal Zone Management Act (CZMA) authorizes a coastal state to review federal agency activities in or outside of the coastal zone affecting any land or water use or natural resource of the coastal zone for their consistency with the enforceable policies of the CMP.<sup>1</sup> Under this regulatory framework, the state coastal agency can concur with, conditionally concur with, or object to the consistency certification for a project. In this matter, DOS has conditionally concurred with the certification. If the conditions are met, the federal agencies can proceed to make decisions on the applications once amended.

Within 30 days of receipt of the conditional concurrence pursuant to 15 CFR 930.4 and 930.62, the applicant must amend its federal applications to include the State's conditions. The Federal agency or the applicant shall immediately notify the DOS if the conditions are not acceptable. If the application is not amended or either the Federal agency or the applicant notifies DOS that the conditions are not accepted, the conditional concurrence automatically becomes an objection.

Pursuant to § 930.63(e), the applicant has the opportunity to appeal the objection to the Secretary of the US Department of Commerce within 30 days after receipt of the conditional concurrence. Also, if either federal agency does not approve the application as amended by the State's conditions, then the applicant will have 30 days after receiving such notice from the federal agency to file an appeal.

In order to grant an override request, the Commerce Secretary must find that the activity is consistent with the objectives or purposes of the Coastal Zone Management Act, or is necessary in the interest of national security. A copy of the request and supporting information must be sent to the New York State DOS Division of Coastal Resources and the federal permitting or licensing agency. The Commerce Secretary may collect fees from you for administering and processing your request.

## II. SUBJECT OF THE REVIEW

The applicant, Champlain Hudson Power Express, Inc. and CHPE Properties Inc, (hereafter CHPE),<sup>2</sup> proposes to construct, operate and maintain a 1,000 megawatt (MW) underground and submarine high-voltage, direct current (HVDC) electric transmission system. The transmission project will primarily transport hydropower generated electricity from sources in central and eastern Canada to provide a reliable supply of clean, renewable energy to meet future demand for electric power in the New York City Metropolitan Area and the lower Hudson Valley.

The project consists of two (2) approximately 6-inch diameter HVDC transmission cables connected as a single bi-pole originating at a point beneath the Richelieu River in the southern portion of

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<sup>1</sup> 16 U.S.C., Sec. 1456(c)(3)(A).

<sup>2</sup> The Applicant is a joint venture of TDI-USA Holdings Corporation (TUHC), a Delaware corporation, and National Resources Energy, LLC (NRE), a Delaware limited liability company. TUHC, the majority (75%) shareholder in the Applicant, is a subsidiary of Transmission Developers Inc. (TDI), a Canadian Corporation. NRE is a wholly owned subsidiary of National RE/sources Group, a limited liability corporation duly organized under the laws of the State of Connecticut.

the province of Quebec<sup>3</sup> and crossing the international border into New York. The cables will be buried beneath the beds of Lake Champlain and the Hudson River. To bypass the Champlain Canal and a portion of the upper Hudson River, two 6-inch diameter HVDC land cables will be buried underground within a railroad right-of-way from Whitehall, New York to Coeymans, New York. The cables enter the Hudson River at Coeymans and then continue generally south within the Hudson River bed terminating at a new alternating current (AC) converter station at Yonkers, New York.<sup>4</sup> After exiting the converter station, six (6) 345-kV AC cables enter the water and continue south under the Hudson, Harlem and East Rivers to the existing Poletti substation in Astoria, Queens.<sup>5</sup> The project will interconnect with the northeast regional grid in Zone J of the NYISO.

### III. APPLICATIONS FOR REGULATORY APPROVALS

On January 27, 2010, the applicant filed an application with the Office of Electricity Delivery and Energy Reliability of the U.S. Department of Energy (DOE) requesting "Presidential Permit" authorization to construct and operate a two bi-pole, 2000 MW high-voltage direct current (HVDC) transmission system crossing the United States- Canada border to deliver electricity to markets in New York City, New York and Bridgeport, Connecticut.<sup>6</sup> This application was amended on August 5, 2010 by removing the 1000 MW bi-pole that terminated in Bridgeport, CT from the application. On June 18, 2010, DOE issued a public notice announcing its intention to prepare an Environmental Impact Statement to assess potential environmental impacts associated with granting a Presidential Permit for the project. On December 6, 2010, CHPE submitted an application to the U.S. Army Corps of Engineers (Corps) requesting authorization for the project pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899.

On December 8, 2010, the applicant provided to DOS a CZMA consistency certification for the project as a part of a joint application to New York State and the Corps certifying that "The proposed activity complies with New York State's approved Coastal Management Program, or with the applicable approved local waterfront revitalization program, and will be conducted in a manner consistent with such program." On January 5, 2011, DOS acknowledged receipt of this certification and notified the applicant that a Final Environmental Impact Statement (FEIS) would be considered as data and information necessary for DOS to complete its review of the consistency certification unless specifically waived. DOS has chosen to waive the FEIS requirement for purposes of commencing and conducting consistency review as the necessary information was obtained in submissions from the applicant, consultations with various New York State agencies and subject matter experts and participation in the New York State Public Service Law's Article VII<sup>7</sup> process in an advisory capacity. DOS has engaged in a constant effort to gather the data and information necessary to adequately consider the applicant's certification.

On March 30, 2010, CHPE filed an application for a Certificate of Environmental Compatibility and Public Need, a 401 Water Quality Certificate and other environmental permits with the New York State Public Service Commission (PSC)<sup>8</sup> in accordance with Article VII of the New York State Public

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<sup>3</sup> Submarine HVDC cables are currently proposed to begin within the Richelieu River, proximate to converter stations in southern Quebec.

<sup>4</sup> A convertor station is a required component of the project as the HVDC current needs to be converted to an HVAC current prior to entering the Poletti substation.

<sup>5</sup> The project's precise final route would be subject to a number of factors, including resource issues, permitting, land acquisition, and stakeholder agreement. All portions of the project located within the United States would be owned and operated by the applicant.

<sup>6</sup> Since the cable crosses an international border, the applicant is required to obtain a Department of Energy issued Presidential Permit. (See Federal Power Act § 202(e); 10 C.F.R. Part 205).

<sup>7</sup> Public Service Law Article VII governs the siting of major utility transmission facilities within New York State.

<sup>8</sup> New York State Public Service Commission, Rate Case 10-T-0139.

Service Law. Article VII establishes the review process for consideration of any application to construct and operate an electric transmission line with a design capacity of 100 kilovolts or more, extending for at least ten miles, or with a capacity of 125 kilovolts and over, extending for a distance of one mile or more. The applicant will also require authorization from the New York State Department of Environmental Conservation (DEC) under a State Pollution Discharge Elimination System General Permit for Stormwater Discharges from Construction Activity and from the New York State Office of General Services for easements to use and occupy State-owned underwater lands.

#### IV. OTHER FACTORS RELEVANT TO THE REVIEW

The New York City market for electricity consumes great amounts of energy in terms of kilowatt hours and pays some of the highest prices in the nation. In 2010, the average price of electricity paid by residential customers in New York City was estimated at 22.82 cents per kilowatt hour.<sup>9</sup> New York City is also an under-serviced market and hence an attractive market for major suppliers of electricity. The CHPE project helps to meet the increasing energy demand in this important market.

Governor Cuomo set forth an ambitious agenda for transitioning New York to a more environmentally sustainable energy economy through increased energy efficiency and a commitment to developing renewable energy technologies. In the *Cleaner, Greener NY: The New NY Agenda*,<sup>10</sup> the Governor stated "we can develop synergies between economic development and environmental improvement through the development of clean energy—we will create jobs while simultaneously reducing harmful emissions." The Governor has recognized that the provision of reasonably priced hydropower from Canada to serve New York City markets advances this goal.

During the 21st century, the energy "landscape" in New York changed in direct response to national and State energy objectives. A new generation of energy proposals are now emerging which pioneer newer, cleaner technologies and promote sustainable use and diversification of energy resources. The CPHE project offers the opportunity to meet future energy needs, while balancing reliability, cost, environmental and public health impacts, and economic growth. It would be the first sub-benthic electric transmission system of its scope and scale sited within the Hudson River and would be the first transmission system of this type and scale worldwide to be constructed in a confined, linear estuarine ecosystem.

As a navigable waterway, the Hudson River has served as a vital transportation link in the nation's and the State's commercial network. Since 1834, Hudson River navigational improvements have been a cooperative state/federal effort. Energy transmission facilities serving New York City have historically been routed overland, often parallel to the Hudson River shoreline and have been available to shippers with facilities along the river. Today the Hudson River serves an important group of water-dependant industries which operate at an economic advantage due to their direct access to and reliance on, as an integral part of such industry, the use of the river and nearby energy resources. The cost savings of water transportation (as compared to land and air transport) and access to reasonably priced energy resources are directly responsible for the location of certain industries along the Hudson River.

The Hudson River estuary serves as a spawning and/or nursery ground for important fish and shellfish species, such as striped bass, American shad, Atlantic and shortnose sturgeon, river herring and blue crab. More than 200 species of fish are found in the Hudson and its tributaries. The estuary contains

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<sup>9</sup> "Comparison of Electric Prices in Major North American Cities" (2010) Hydro Quebec.  
[http://www.hydroquebec.com/publications/en/comparison\\_prices/pdf/comp\\_2010\\_en.pdf](http://www.hydroquebec.com/publications/en/comparison_prices/pdf/comp_2010_en.pdf)

<sup>10</sup> *Cleaner, Greener NY, The New NY Agenda* Andrew Cuomo, 8<sup>th</sup> in a Series, p. 15, available at  
[http://d2srrmjar534jf.cloudfront.net/6/d4/3/1266/andrew\\_cuomo\\_cleaner\\_greener\\_ny.pdf](http://d2srrmjar534jf.cloudfront.net/6/d4/3/1266/andrew_cuomo_cleaner_greener_ny.pdf).

the only significant acreage of tidal freshwater wetlands within the state. These wetlands, along with the river's brackish tidal wetlands and stands of submerged aquatic vegetation, constitute essential habitat that support the Hudson River's rich and biologically diverse web of life.<sup>11</sup> More than 16,500 acres of river habitat from Troy to the southern Rockland-Westchester County border are within designated SCFWHs.<sup>12</sup>

A rich biodiversity is evident within the Hudson River Estuary and across the Hudson River Valley and constitutes a disproportionate share of New York State's plant and animal species.<sup>13</sup> The Hudson River component of the National Estuarine Research Reserve System (NERRS), which focuses its research and monitoring programs on all of the Hudson River estuarine habitats, encompasses over 5,000 acres of freshwater and brackish tidal wetlands and uplands distributed at four distinct sites that span the middle 100 miles of the Hudson River estuary.<sup>14</sup> The coastal impacts of any proposed federal activity or project subject to federal approval proposed in this estuary must necessarily be reviewed for consistency with the State's CMP to ensure the continued viability of such habitats, while promoting economic growth and development.

## V. COASTAL POLICY ANALYSIS

The CHPE project is likely to cause direct and/or indirect physical and biological impacts to coastal resources and uses in the coastal area throughout the construction phase and through its operation. Several impacts directly applicable to the installation and operation of the transmission system are applicable to several coastal policies.

### Policy Analysis

#### ***State Policy 2 - Facilitate the siting of water-dependent uses and facilities on or adjacent to coastal waters.***

The CHPE project will bury transmission cables within Lake Champlain, the Hudson River, the Harlem River, and the East River. While the project does not itself constitute a "water-dependent" use, several conditions ensure that the transmission cables will be sited and installed in a manner that facilitates water dependent economic uses and avoids interference with other important water dependent uses such as navigation and fishing.

This concurrence is conditioned upon the applicant's installation of the transmission lines in coastal waters at the maximum depth achievable that would allow each pole of the bi-pole to be buried in a single trench using a jet-plow. Separation from the water column is necessary to ensure that the risk of impacting existing water dependant uses, such as commercial and recreational fishing and boating, and potential future navigation channel improvements, will be minimized. These potential impacts are minimized by removing the transmission cables, the source of the impact, as far away as possible from the potential coastal conflict and placing them in close proximity to each other, while considering the effects of such an action on other water-dependant uses. Given the state of the available information, the cables can be expected to be at least six (6) feet below the sediment water interface for the majority of the route. Should the bi-pole occupy any federally maintained navigation channels it will be buried at least 15 feet below the authorized depth in a single trench within those channels. In this matter, the siting

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<sup>11</sup> New York State Coastal Management Program (CMP) Final Environmental Impact Statement (EIS). pp. II-2-8 to II-2-10.

<sup>12</sup> [http://www.nyswaterfronts.com/consistency\\_habitats.asp](http://www.nyswaterfronts.com/consistency_habitats.asp)

<sup>13</sup> Hudson River NERRS, Revised Management Plan. 2009-20014.

<sup>14</sup> From north to south the sites are: Stockport Flats (Columbia County), Tivoli Bays (Dutchess County), Iona Island and Piermont Marsh (Rockland County). See Hudson River NERRS, Revised Management Plan. 2009-20014.

of the cable at these depths will minimize conflicts with water based navigation by substantially avoiding anchor strikes and potential future navigational improvements.

Additionally, as proposed, the submarine cables will make landfall and extend inland to a converter station in Yonkers, NY and a substation in Queens, NY. This concurrence includes a condition that the cable landfall will be buried using horizontal directional drilling and will not affect the current and/or future siting of water dependent uses at the water's edge with the exception of the required narrow utility easement for the buried cable.

***State Policy 3 – Further develop the State's major ports of Albany, Buffalo, New York, Ogdensburg and Oswego as centers of commerce and industry, and encourage the siting in these port areas, including those under the jurisdiction of state public authorities, of land use and development which is essential to, or in support of, the waterborne transportation of cargo and people.***

The installation and operation of the transmission cables may affect navigation or future dredging activities which may, in turn, affect the operation of port facilities in New York City and Albany. However, the applicant has consulted with appropriate port facility operators and agreed to site the project in a manner that would not hamper or interfere with port activities.

This concurrence includes the previously stated condition regarding burial depth. Another condition requires that the applicant verify the transmission cables' burial depth on a periodic basis so that they do not become a hazard to navigation or marine resources.

***State Policy 7 - Significant Coastal Fish and Wildlife Habitats will be protected, preserved, and where practical, restored so as to maintain their viability as habitats.***

The applications pending before the federal agencies describe the transmission lines as being constructed within several SCFWHs, which are special management areas designated by DOS on the recommendation of the DEC. These habitats are provided important protections under State Policy 7 of the CMP.<sup>15</sup> Each SCFWH has been inventoried and a general assessment of potential impacts has been developed. As the project is currently designed, SCFWH areas will be affected through: a) disturbance-related impacts associated with the installation of the cables including increased turbidity, re-suspension of pollutants, direct physical disturbance to bottom substrates, and b) operational impacts associated with ongoing use and maintenance of the transmission system including magnetic fields surrounding the cables.

The direct effects on habitats resulting from the installation of project structures can be readily estimated based on the surface area disturbed and the densities and composition of the benthic community in that area. Operational effects are more difficult to predict and any predicted effects should be verified by monitoring. Installation of the project could also permanently alter benthic habitats over the longer term if the trenches containing electrical cables are backfilled with sediments of different size or composition than the previous substrate. The most certain way to minimize the impact on benthic habitats is by siting the cable route to avoid particularly sensitive habitats.

A substantial number of designated SCFWHs are located north of the Inbocht Bay and Duck Cove SCFWH (7.5' Quadrangle: Cementon, New York). These upper Hudson River habitats would be vulnerable to impacts from this type of project and therefore must be avoided. Additionally, by avoiding

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<sup>15</sup> The SCFWH assessments are available at [www.nyswaterfronts.com](http://www.nyswaterfronts.com) and are fully incorporated into the CMP.



these portions of the Hudson River, potential conflict with water related commercial navigation using the federally maintained navigation channel can be avoided.

Several conditions are imposed to ensure consistency with State Policy 7. The applicant must amend its pending federal applications to display a new route which avoids these northern Hudson River habitats. The transmission cable must not occupy any segment within the Hudson River north of the southerly boundary of the Inbocht Bay and Duck Cove Significant Coastal Fish and Wildlife Habitats. Additionally, all transitions from upland to submarine configurations within the coastal area must be accomplished by horizontal directional drilling. Thus, where the transmission cables transition from land to water south of this habitat, the applicant must utilize horizontal directional drilling methods to install the cable to minimize disturbance to shoreline and nearshore coastal fish and wildlife habitats. The horizontal directional drilling entry/exit point will be designed to enter/exit the water at a depth sufficient to avoid impacts to shoreline, intertidal and nearshore areas.

The transmission cable must entirely avoid entering Haverstraw Bay. As proposed, the transmission cable would traverse the State designated Haverstraw Bay SCFWH. The habitat documentation for Haverstraw Bay states that "...the Bay possesses a combination of physical and biological characteristics that make it one of the most important fish and wildlife habitat in the Hudson River estuary. The regular occurrence of brackish water over extensive shallow bottom creates highly favorable conditions for biological productivity within the estuary, including submerged vegetation, phytoplankton and zooplankton, aquatic invertebrates, and many fish species." (Emphasis added).<sup>16</sup>

The habitat documentation indicates that in terms of ecosystem rarity, "[the bay is] the most extensive area of shallow estuarine habitat in the lower Hudson River."<sup>17</sup> The documentation also indicates that: Shortnose sturgeon, an endangered species, regularly occur in the bay; the habitat contributes to recreational and commercial fisheries throughout the northeastern United States; the bay is a major spawning, nursery, and wintering area for various estuarine fish species (e.g. striped bass, American shad, white perch, Atlantic sturgeon, blue claw crab) and that their population levels are unusual in the northeastern United States; and the habitat is irreplaceable. Haverstraw Bay also serves as a foraging area for the threatened bald eagle. The documentation further indicates that "Haverstraw Bay is a critical habitat for most estuarine-dependent fisheries originating from the Hudson River and contributes directly to the production of in-river and ocean populations of food, game, and forage fish species. Consequently, commercial and recreational fisheries throughout the North Atlantic, therefore, depend on or benefit from these biological inputs from the [bay]."<sup>18</sup>

The narrative describing the Haverstraw Bay SCFWH specifically states "[A]ny physical modification of the habitat or adjacent wetlands, through dredging, filling, or bulkheading, would result in a direct loss of valuable habitat area."<sup>19</sup> Hence, in the past, DOS has carefully guarded the resources of the Bay from all projects that would cause impacts. The physical presence of the transmission system within Haverstraw Bay and the proposed installation methodology would result in a direct loss of habitat within the SCFWH. There are no conditions that can be developed that would avoid habitat loss within Haverstraw Bay except for avoidance of the habitat. For that reason, the bi-pole will be in an upland, buried configuration around the Haverstraw Bay SCFWH. This concurrence is conditioned on a requirement that work within identified SCFWHs will be conducted during the timeframes provided in the narrative describing the SCFWH.

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<sup>16</sup> [http://www.nyswaterfronts.com/downloads/pdfs/sig\\_hab/hudsonriver/Haverstraw\\_Bay.pdf](http://www.nyswaterfronts.com/downloads/pdfs/sig_hab/hudsonriver/Haverstraw_Bay.pdf)

<sup>17</sup> Id.

<sup>18</sup> Id.

<sup>19</sup> Id.

***State Policy 8 – Protect fish and wildlife resources in the coastal area from the introduction of hazardous wastes and other pollutants which bio-accumulate in the food chain or which cause significant sub lethal effects on those resources.***

The project installation will mechanically disturb over 95 linear miles of estuarine sediments and benthic habitat and will result in the temporary re-suspension of these sediments and any adsorbed contaminants into the water column. Potentially, contaminants may then be released to the surrounding water body, causing direct harm to resident species and/ or bio-accumulating in the food chain.

The installation and operation of the transmission cables can directly displace benthic (i.e., bottom-dwelling) plants and animals or change their habitats by altering water flows, sediment wave structures, or substrate composition. During installation, bottom disturbances will result from the temporary anchoring of construction vessels; trenching using water jetting techniques and dredging for cable installation; and installation of concrete mattresses in certain locations where bedrock and utility infrastructure crossings preclude the burial of the cable at the optimal depth. The jet-plow technology to be used is anticipated to be relatively efficient in minimizing disturbance. In any case, motile organisms will be displaced and sessile organisms will be destroyed in limited areas affected by these activities. Displaced organisms may be able to relocate assuming the availability of suitable habitat nearby. Species with benthic-associated spawning or whose offspring settle into and inhabit benthic habitats are likely to be most vulnerable to disruption during project installation. When construction is completed, disturbed areas are likely to be re-colonized by these same organisms, because the substrate will, in most places, be restored to a similar state.<sup>20</sup> It should be noted that juvenile sturgeon may be particularly impacted by disturbance of benthic communities if similar foraging habitat is not immediately available to them in the vicinity.

Water jetting and cable installation activities in the Hudson, Harlem and East Rivers and Lake Champlain will disturb and suspend bottom sediments and may release any contaminants attached to such sediments. As this occurs, there is also a risk of bioaccumulation in the tissues of animal species up the food chain. Avoidance of known areas of contamination is the most effective method to minimize re-suspension of contaminants and known contaminant areas should be avoided in routing the project. In addition, an assessment of contaminated soils in the lower Hudson River estuary will likely be conducted during subsequent regulatory approval phases of this project (such as the PSC's Environmental Management and Construction Plan) and compared to the precise cable route.

***State Policy 9 – Expand recreational use of fish and wildlife resources in coastal areas by increasing access to existing resources, supplementing existing stocks, and developing new resources.***

***State Policy 10 – Further Develop commercial finfish, shellfish, and crustacean resources in the coastal area by encouraging the construction of new, or improvement of existing on-shore commercial fishing facilities, increasing marketing of the state's seafood products, maintain adequate stocks, and expanding aquaculture facilities.***

The project installation, operation and maintenance has the potential to affect recreational and commercial fish and wildlife resources by exposing said resources to magnetic fields in excess of the normal range, disturbing habitat, increasing turbidity and allowing temporary re-suspension of hazardous wastes, pollutants, or materials, hence increasing the risk to resources and uses of the Hudson River.

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<sup>20</sup> U.S. Department of Energy, Report to Congress on the Potential Environmental Effects of Marine and Hydrokinetic Energy Technologies. December 2009.

Electric current traveling through HVDC cables induce magnetic fields in the immediate vicinity. Certain aquatic species may be particularly sensitive to magnetic fields generated by the transmission cables including cartilaginous fishes (elasmobranches) and sturgeons. Electro-magnetic fields may change animals' foraging and feeding behaviors, alter migration patterns or cues, reproduction, and may increase susceptibility to predation. Impacts on other species, if any, are unknown at this time due to a lack of published research.

Modeling has indicated that when both poles of the HVDC cables are located within close proximity of each other, the opposing magnetic fields substantially cancel each other out, resulting in a diminished magnetic deviation from the ambient magnetic field. This deviation's potential effects on marine resources can be further minimized by providing as much physical distance as possible between the cables and the coastal resources that may be affected by it.

Given the existing state of marine cable burial technology, the specific configuration of HVDC cable currently available and the underlying geology of the Hudson, Harlem and East Rivers, a full six (6) feet or more of separation can be maintained for the majority of the sub aquatic route within the coastal area. The six (6) feet of separation and co-location of each cable within the same trench, will result in diminished magnetic field deviations within the water columns of these water bodies, thus minimizing the potential effects of magnetic fields on marine resources. Additional monitoring and reporting is expected to occur following cable installation which will supplement the existing knowledge base and guide future siting decisions for similar projects that may be proposed in the future.

The commercial and recreation fishery resources within the Hudson, Harlem and East Rivers are extremely valuable to the State and the nation. Various fish species, during various life stages, may be significantly present or absent from various locations within these water bodies. The SCFWH narratives provide time frames when habitat disturbance would be less detrimental to the SCFWH and subsequently, less injurious to the commercial and recreational fish populations that utilize them. Additionally, the ongoing PSC Article VII process may develop work windows and siting provisions describing when and where in-water work would be least detrimental to commercial and recreational fisheries outside of SCFWHs. These work windows and siting provisions, when combined with the work windows discussed in the applicable SCFWH narratives, will minimize habitat disturbance in the SCFWHs and minimize risks to commercial and recreational fisheries.

This concurrence is therefore conditioned on a requirement that when work is conducted in identified SCFWHs, it will be conducted during the timeframes provided in the narrative describing the SCFWH. Outside of SCFWHs all in-water work will be conducted in accordance with the provisions developed during the Article VII proceedings.

***State Policy 19 - Protect, maintain, and increase the level and types of access to public water related recreation resources and facilities.***

The project will utilize resources held in the public trust, which are traditionally used by the public for water related recreation activities including recreational fishing and boating. Substantial use of public resources will be required for the project to be installed as proposed; the use of said resources must serve a public need and alienate the least amount of public resources as possible. Generally, the project should minimize alienating public trust resources by utilizing a buried cable configuration and by sharing waterways with existing user groups during installation.

The cables will be buried at a depth within the Hudson, Harlem, and East Rivers that is not anticipated to affect current or future recreational navigation. The proposed project's impacts on

recreational fisheries are anticipated to be minimal and temporary given the analysis of policy 9 and 10 above. Temporary impacts to the public's use of existing water resources will be limited to short-term exclusion from areas temporarily occupied by installation equipment. As conditioned, the project would be consistent with this policy.

***State Policy 27 - Decisions on the siting and construction of major energy facilities in the coastal area will be based on public energy needs, compatibility of such facilities with the environment, and the facility's need for a shorefront location.***

The CHPE project has the potential to be incompatible with the environment and will utilize shorefront locations. The need for the electricity that the project would transmit will be evaluated and considered by the PSC. The PSC's decision regarding public energy need should be entirely consistent with this policy and will be further analyzed pursuant to a complete state coastal consistency review of the state action. The potential impacts on coastal uses and resources have already been discussed in connection with other policy assessments. All of the conditions imposed with this determination are necessary to allow the project to be consistent with this policy.

***State Policy 37 - Best Management Practices will be utilized to minimize the non-point discharge of excess nutrients, organics, and eroded soils into coastal waters.***

The CHPE project will require excavation of soils within the coastal area as well as the re-suspension of marine sediments which may affect coastal resources. The applicant has developed a substantial best management practices (BMP) in conjunction with its Article VII process and the document outlines various BMPs that will be utilized during the installation of the proposed cable including the development of a stormwater pollution prevention plan as per the terms of the general permit for construction stormwater discharges. When finalized through the Article VII process, consistent implementation of proposed BMPs can be expected to minimize non-point discharge of nutrients, organics, and soils by first controlling erosion in disturbed areas and then containing sediment on site.

***State Policy 44 - Preserve and protect tidal and freshwater wetland and preserve the benefits derived from these areas.***

As originally proposed, the project will occupy existing wetlands. However, the upland portions of the proposed route have been sited within previously disturbed railroad and highway corridors and will largely avoid adjacent wetlands. For those portions of the proposed route that would traverse tidal or freshwater wetlands, the impacts will be temporary in nature and will be minimized by the use of best management practices that have been developed in support of the project.

## **VI. Summary of Conditions**

As described in the applicant's U.S. Department of Energy Delegated Presidential permit application and the Corps CWA § 404/Rivers and Harbors § 10 Permit application, the project would not be consistent with the enforceable policies contained within the CMP. DOS has developed conditions, that if adopted by the applicant, pursuant to 15 CFR Part 930.4, that would allow the project to be found consistent if adopted. These conditions are summarized below.

- 1.) The transmission cables will be buried at the maximum depth achievable that would allow each pole of the bi-pole to be buried in a single trench using a jet-plow. Given the state of the available information, this is expected to be at least six (6) feet below the sediment water interface. Should the bi-pole occupy any federally maintained navigation channels it will be

buried at least 15 feet below the authorized depth in a single trench within those channels. The cable will be maintained at these depths and depth of burial will be verified on a periodic basis so as to not become a hazard to navigation or marine resources.

- 2.) All transitions from upland to submarine configurations within the coastal area will be accomplished by horizontal directional drilling and will be at a depth sufficient so as to not interfere with any current or future water dependant uses.
- 3.) The transmission cable will not occupy any area within the Hudson River north of the southerly boundary of the Inbocht Bay and Duck Cove SCFWH.
- 4.) The transmission cable will be in an upland, buried configuration around the Haverstraw Bay SCFWH.
- 5.) When work will be conducted in identified SCFWHs, it will be conducted during the timeframes provided in the narrative describing the SCFWH. Outside of SCFWHs all in water work will be conducted in accordance with the recommendations developed during the Article VII proceedings.

## CONCLUSION

The project is found consistent with the enforceable policies contained within the New York State Coastal Management Plan subject to the five conditions presented in this document. Should the presented conditions not be acceptable, this conditional concurrence shall be treated as an objection as the proposed activity would not be consistent with State Policies 2, 3, 7, 9, 10, 19, 27, 37 and 44 of the New York State Coastal Management Program.

Sincerely

  
Daniel E. Shapiro  
First Deputy Secretary of State

cc: U.S. DOE: Dr. Jerry Pell, Principal NEPA Document Manager  
Corps NY: Naomi Handell, Project Manager  
OCRM: Joelle Gore, Acting Chief for Coastal Programs  
David Kaiser, Senior Policy Analyst  
Kerry Kehoe, Federal Consistency Specialist  
HDR/DTA: Dr. Sean Murphy,  
CHPE Inc.: William Helmer Esq.  
Hiscock & Barclay, LLP:  
George Pond, Esq.  
Frank Bifera, Esq.  
PSC: Jeffrey Cohen, Deputy for Policy and Legal Affairs  
Steve Blow Esq.  
DEC: Steve Russo, Esq. General Counsel  
William Little Esq.  
Patricia Desnoyers Esq.

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July 7, 2011

Mr. Anthony J. Como  
Director, Permitting and Siting  
Office of Electricity Delivery and  
Energy Reliability (OE-20)  
U.S. Department of Energy  
1000 Independence Avenue SW, Room 8G-024  
Washington, D.C. 20585

**Subject: Champlain Hudson Power Express Project  
U.S. Department of Energy Presidential Permit Application PP-362**

Dear Mr. Como:

On January 25, 2010, Transmission Developers, Inc. ("TDI" or "Applicants") submitted on behalf of Champlain Hudson Power Express, Inc. ("CHPEI") an application to the U.S. Department of Energy ("DOE") for a Presidential Permit and an amendment on August 5, 2010 (collectively, the "Application") in connection with the Champlain Hudson Power Express project ("Project"). On December 6, 2010, in connection with their submission of an application to the U.S. Army Corps of Engineers to obtain construction permits pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899, a coastal zone consistency certification assessment and accompanying forms were submitted to the New York State Department of State ("NYS DOS"). NYSDOS received this submission on December 8, 2010.

On June 8, 2011, NYSDOS issued its conditional concurrence for the Project which contained five conditions. To demonstrate their acceptance of these conditions, the Applicants are amending their Application as follows:

- 1) The transmission cables will be buried at the maximum depth achievable that would allow each pole of the bi-pole to be buried in a single trench using a jet-plow. Given the state of the available information, this is expected to be at least six (6) feet below the sediment water interface. Should the bi-pole occupy any federally maintained navigation channels it will be buried at least 15 feet below the authorized depth in a single trench within those channels. The cable will be maintained at these depths and depth of burial will be verified on a periodic basis so as to not become a hazard to navigation or marine resources.**

The original Application stated that the submarine cable generally would be buried to a depth of approximately three (3) to four (4) feet beneath the bed surface and separated by a distance of three (3) feet. The Applicants will now install the underwater cables in the State's coastal waters, which for this project would be the Hudson, Harlem and East Rivers, to the maximum depth achievable that allows each pole of the bi-pole to be buried side-by-side in a single trench

using the jet plow installation technology. Based on available information, the Applicants believe the burial depth in such situations will be six (6) feet below the sediment-water interface and that the trench will be approximately 2 feet wide. Where the bi-pole occupies any federally maintained navigation channel in the State's coastal waters, the cables will be buried at least fifteen (15) feet below the U.S. Army Corp of Engineer's authorized navigation channel depth in a single trench. The Applicants will maintain the cables at these depths and depth of burial will be verified on a periodic basis, in accordance with the Applicant's New York State Public Service Commission Article VII Certificate, so as to not become a hazard to navigation or marine resources.

- 2) All transitions from upland to submarine configurations within the coastal area will be accomplished by horizontal directional drilling and will be at a depth sufficient so as to not interfere with any current or future water dependent uses.**

The original Application stated that, in intertidal and shoreline areas, horizontal directional drilling ("HDD") is preferred to open trenching because it does not expose the surface to wave action. The Applicants have agreed to complete all transitions from upland to submarine configurations by HDD. The HDD installations will be at a depth sufficient so as to not interfere with any known current or foreseeable future water dependent uses.

- 3) The transmission cable will not occupy any area within the Hudson River north of the southerly boundary of the Inbocht Bay and Duck Cove SCFWH.**

The original Application stated that the cables would enter the Hudson River in the town of Coeymans, New York. The Applicants will now route the cables so they enter the Hudson River further south in the Town of Catskill, New York. This placement would locate the cables south of both the Inbocht Bay and the Duck Cove Significant Coastal Fish and Wildlife Habitat ("SCFWH").

- 4) The transmission cable will be in an upland, buried configuration around the Haverstraw Bay SCFWH.**

The original Application stated that, once in the Hudson, the underwater cables would be buried in the bed of the River south to the New York City metropolitan area. The Applicants will now route the cables so they will be buried in a western-shore upland bypass configuration that would avoid the Haverstraw Bay SCFWH.

- 5) When work will be conducted in identified SCFWHs, it will be conducted during the timeframes provided in the narrative describing the SCFWH. Outside of SCFWHs all in water work will be conducted in accordance with the recommendations developed during the Article VII proceedings.**

The Applicants will adhere to all SCFWH narrative timeframes when conducting work in an identified SCFWH. Outside of SCFWHs, the Applicants have, in consultation with state regulatory agencies, developed a schedule of construction windows (see Table 1) which the Applicants anticipate will be included in its Article VII certificate.



**Table 1: Proposed Construction Windows**

River Mile	Project Route Mile	Location	Construction Windows
<b>Lake Champlain</b>			
	0 to 73	U.S./Canada Border to Crown Point	May 1 - August 31
	73 to 103	Crown Point to Dresden	September 1 - December 31
<b>Hudson River, Harlem River, East River</b>			
107-103	230 to 234	Cementon - Malden	August 1 - October 15
103-97	234 to 239	Malden - Turkey Point	August 1 - October 15
97-91	239 to 246	Turkey Point - Kingston Point	August 1 - October 15
91-87	246 to 250	Kingston Point - Esopus Meadows	August 1 - October 15
87-80	250 to 257	Esopus Meadows - Crum Elbow	August 1 - October 15
80-76	257 to 261	Crum Elbow - Poughkeepsie	August 1 - October 15
76-68	261 to 269	Poughkeepsie - New Hamburg	August 1 - October 15
68-56	269 to 280	New Hamurg - Pollepel Island	September 15 - November 30
56-41	280 to 296	Pollepel Island - Verplanck	September 15 - November 30
41-33	296 to 305	Verplanck - Croton Point	OVERLAND
33-18	305 to 320	Croton point - Yonkers	July 1 - October 31
18-14	320 to 324	Yonkers - Harlem River	July 1 - October 31
all		Harlem River - East River	May 15 - November 30

The Applicants note that confidential settlement discussions regarding its application to the New York State Public Service Commission (“NYSPSC”) for siting approval are still on-going. These negotiations have covered a wide variety of topics that may be relevant to the DOE’s review of the Project and may affect the preferred routing. Therefore, the Applicants are proposing to submit revised sections of the Application after July 8, 2011 that will incorporate or reflect the five DOS conditional concurrence requirements as well as any conditions that come out of the Article VII process. The June 24<sup>th</sup>, 2011 report to the Administrative Law Judges called for settlement talks to be concluded by August 12, 2011. The Applicants believe and the NYSDOS has agreed this is the most efficient approach, as it would avoid having to submit and potentially resubmit sections of the Application in a relatively short period of time.

Please feel free to contact me at (518) 465-0710 or by e-mail at [bill.helmer@transmissiondevelopers.com](mailto:bill.helmer@transmissiondevelopers.com) with any questions or concerns. We look forward to continuing to work with your office on this Project.

Sincerely,

TRANSMISSION DEVELOPERS INC.



William S. Helmer  
Senior Vice President and General Counsel

cc: Donald Jessome, TDI  
Sean Murphy, HDR|DTA  
Jay Ryan, Van Ness Feldman  
Kari Gathen, DOS  
Jeffrey Zappieri, DOS

## Murphy, Sean (Portland)

---

**From:** Maraglio, Matthew (DOS) [Matthew.Maraglio@dos.ny.gov]  
**Sent:** Tuesday, May 29, 2012 1:47 PM  
**To:** Murphy, Sean (Portland)  
**Cc:** Zappieri, Jeffrey (DOS)  
**Subject:** RE: Champlain Hudson Power Express  
**Attachments:** COASTAL-#18447-v1-07-07-11\_CHPE\_USACE\_Amendment\_Ltr\_pdf.pdf; COASTAL-#18449-v1-07-07-11\_CHPE\_USDOE\_Amendment\_Ltr\_pdf.pdf

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Sean

You are required to resubmit to us if changes have occurred since DOS completed its review that would result in substantially different coastal effects or if there is new and substantial information. An applicant would generally make that determination on their own or DOS could notify an applicant if substantially different coastal effects were anticipated. Many applicants submit project modifications as a matter of caution.

In this case, it does not appear that there have been modifications to the project, (beyond the modifications described in the attached letters which reflect DOS's conditions), that would result in substantially different coastal effects than what DOS originally reviewed or conditioned. As such, at this time, it does not appear that you would need to resubmit to us. If, during the ongoing NEPA or other processes, modifications to the project occur that would result in substantially different coastal effects than what DOS reviewed or conditioned, DOS may need to review those modifications. Please feel free to have staff completing the NEPA EIS analysis contact me if needed.

-Matt

*Matthew P. Maraglio, CPESC*  
Coastal Review Specialist  
NYS Department of State  
Division of Coastal Resources  
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---

**From:** Murphy, Sean (Portland) [<mailto:Sean.F.Murphy@hdrinc.com>]  
**Sent:** Tuesday, May 29, 2012 10:21 AM  
**To:** Maraglio, Matthew (DOS); Gathen, Kari (DOS)  
**Subject:** Champlain Hudson Power Express

Good morning,

I hope this email finds you well. We recently received the following question from the staff completing the NEPA EIS analysis:

“JP Exhibit 121 (Environmental Impact Assessment) has a CZMA consistency evaluation for the JP route. Has a revised evaluation and request for consistency been sent to NYSDOS?”

We would be happy to submit a revised request for consistency if needed, but had been under the assumption that the project as proposed in the Joint Proposal for Settlement was consistent with the Conditional Concurrence issued by the NYSDOS in June of 2011 as the NYSDOS had signed onto the Joint Proposal. Could I ask you to confirm that there is no need to file a revised request for consistency?

Please let me know if you need any additional information. Thank you in advance for your consideration.

Regards,

**SEAN MURPHY**  
Ph.D

**HDR Engineering, Inc.**  
Manager, Regulatory Services - Renewable Energy

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***APPENDIX F.2 – LAND USE TABLES***



## **Appendix F.2 Land Use Tables**

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**Appendix F.2** was prepared to support the EIS analysis and identifies the approximate area of various land uses and land cover types within the proposed CHPE Project region of influence (ROI) for the Land Use resource area. The ROI for land use is defined as the land and water 50 feet on either side of the centerline of the transmission cables and within the deviation areas, when present.

**Appendix F.2** contains the following tables:

- **Table F.2-1.** Land Use/Land Cover Within the Proposed CHPE Project ROI
- **Table F.2-2.** Land Use Within the Overland Segment of the Proposed CHPE Project
- **Table F.2-3.** Land Use Within the Hudson River Segment of the Proposed CHPE Project
- **Table F.2-4.** Land Use Within the New York City Metropolitan Area Segment of the Proposed CHPE Project
- **Table F.2-5.** Local Waterfront Revitalization Programs/Plans Relevant to the Proposed CHPE Project
- **Table F.2-6.** Local Municipal Land Use Plans Relevant to the Proposed CHPE Project

**Table F.2-1. Land Use/Land Cover Within the Proposed CHPE Project ROI**

<b>Land Use/Land Cover</b>	<b>Approximate Acres</b>	<b>Percent</b>
<b>Lake Champlain Segment</b>	<b>1,231</b>	<b>100.0</b>
Open Water	1,231	100.0
<b>Overland Segment</b>	<b>2,536</b>	<b>100.0</b>
Commercial/Industrial/Transportation	1,049	41.4
Forested	810	31.9
Open Land/Pasture/Hay/Scrub/Shrub	476	18.8
Residential	79	3.1
Agriculture	46	1.8
Open Water	45	1.8
N/A *	25	1.0
Parks/Open Space/Recreation	6	0.2
<b>Hudson River Segment</b>	<b>1,244</b>	<b>100.0</b>
Open Water	1,089	87.5
Commercial/Industrial/Transportation	61	4.9
Forested	44	3.5
Open Land/Pasture/Hay/Scrub/Shrub	28	2.3
Residential	21	1.7
Parks/Open Space/Recreation	1	0.1
<b>New York City Metropolitan Area Segment</b>	<b>196</b>	<b>100.0</b>
Commercial/Industrial/Transportation	96	49.0
Open Water	71	36.2
Residential	16	8.2
Forested	6	3.1
Open Land/Pasture/Hay/Scrub/Shrub	4	2.0
Parks/Open Space/Recreation	3	1.5

Source: CHPEI 2012i. General land use categories, or land cover, have been classified along the proposed CHPE Project route based on review of aerial photographs, site visits to selected locations along the transmission line route, and resource data from the New York State Geographic Information System (GIS) Clearinghouse.

Note: \* N/A = Not Available. Land use GIS data were available for 600 feet on either side of the centerline of the transmission cables for all but 1 percent of the proposed CHPE Project transmission line route.



**Table F.2-2. Land Use Within the Overland Segment of the Proposed CHPE Project**

<b>Jurisdiction <sup>a</sup></b>	<b>MP Range</b>	<b>General Land Use/Land Cover (Within/Adjacent to ROI)</b>	<b>Specific Land Use (Within/Adjacent to ROI)</b>	<b>Zoning District</b>	<b>Agricultural District</b>	<b>Deviation Area (Land Use in Deviation Area)</b>
<b>Washington County</b>						
Dresden	101–110	A, C/I/T, F, OL, R	State Bicycle Route 9, South Bay State Boat Launch and South Bay Pier, Adirondack Park and Forest Preserve (Lake George Wild Forest)	Rural Use, Resource Management, Moderate Intensity <sup>b</sup>	No	Yes (undeveloped/residential, railroad, road, South Bay Boat Launch and pier, South Bay)
Whitehall	110	C/I/T, OW	County Route 7A pier	N/A	No	Yes (South Bay)
Village of Whitehall	110–113	A, C/I/T, F, OL, R	State Bicycle Route 9, unnamed park, Trinity Episcopal Church, Whitehall Amtrak Station, residences	Viewshed, Residential B, Commercial, Planned Residential, Light Industrial	No	Yes (undeveloped, roads)
Whitehall	113–118	A, F, OL, R	Champlain Canal, commercial (Adirondack Natural Stone)	N/A	Yes	Yes (undeveloped)
Fort Ann	118–123	C/I/T, F, OL	North Old Route 4, Dewey’s Bridge Quarry, Champlain Canal and Lock C11	Industrial Mixed Use, Town Commercial Mixed Use, Rural <sup>c</sup>	No	Yes (streets, undeveloped)
Village of Fort Ann	123	C/I/T, F	Fort Ann wastewater treatment facility, Champlain Canal	Downtown, Village Residential <sup>c</sup>	No	Yes (roads)
Fort Ann	123–124	A, F	None	Town Commercial Mixed Use <sup>c</sup>	Yes	No
Hartford	124	A, F, OL	None	N/A	Yes	No
Fort Ann	124	A, F, OL	None	Town Commercial Mixed Use <sup>c</sup>	No	No
Kingsbury	124–132	A, C/I/T, F, OL, R	New York State Thruway Authority building, Champlain Canal/Towpath Road	N/A	Yes	Yes (roads)
Fort Edward	132–134	A, C/I/T, OL	Hudson River Dredging Project processing/treatment facility	Light Industrial (including Prime Farmland soils) <sup>d</sup>	Yes	No

Jurisdiction <sup>a</sup>	MP Range	General Land Use/Land Cover (Within/Adjacent to ROI)	Specific Land Use (Within/Adjacent to ROI)	Zoning District	Agricultural District	Deviation Area (Land Use in Deviation Area)
<b>Washington County (continued)</b>						
Village of Fort Edward	134–135	C/I/T, P/O/R, R	Fort Edward/Glens Falls Amtrak Station, Rodgers Island Visitors Center, Hudson River Dredging Project processing/treatment facility, residences, railroad maintenance, and commercial business	Industrial (I), Commercial (C-1 and New C-3), Residential (R-1) <sup>e</sup>	No	Yes (undeveloped, industrial, residential, roads, bridges)
<b>Saratoga County</b>						
Moreau	135–140	A, F, OL, R	Agricultural	Manufacturing 1, Agricultural and Residential (R-5)	Yes	Yes (bridge, undeveloped/residential)
Northumberland (including Hamlet of Gansevoort)	140–143	C/I/T, F, OL, R	Gansevoort Town Park, Bertha E. Smith Park	Hamlet, Residential 1-Acre, Agricultural Protection District, Industrial, Residential 3-Acre	Yes	No
Wilton	143–150	A, C/I/T, F, OL, R	Wilton Wildlife Preserve and Park, Smith subdivision, Paddocks of Saratoga, Gavin Park, light industrial storage yard, Exits 15 and 16 Study Areas (Wilton economic development plan)	Business/Light Industrial, Residential 1 and 2, Commercial/Residential 1, Residential Business 1 and 2, New York State Lands	Yes	Yes (industrial, undeveloped, residential, street)
Greenfield	150–152	F, OL, R	Maple Avenue Middle School (athletic fields), residences, City of Saratoga Springs (including residential areas of Skidmore College)	Office Residential, Agricultural/Residential 4	No	Yes (streets)

Jurisdiction <sup>a</sup>	MP Range	General Land Use/Land Cover (Within/Adjacent to ROI)	Specific Land Use (Within/Adjacent to ROI)	Zoning District	Agricultural District	Deviation Area (Land Use in Deviation Area)
<b>Saratoga County (continued)</b>						
City of Saratoga Springs	152–158	C/I/T, F, OL, R	Saratoga Golf and Polo Club, commercial (Sunnyside Gardens), Care Lane commercial development (including Orthopedic Associates-Saratoga and North Country Academy), Saratoga Springs Amtrak Station, U-Stor-It Self Storage, Saratoga Nursery, Saratoga Spa State Park, W.J. Grande Industrial Park, railroad yard, residences	Institutional Parkland/Recreation, Transect Zone 4 Urban Neighborhood, Transect Zone 5 Neighborhood Center, Rural Residential-1, Urban Residential-2, General Industrial,	No	Yes (roads, undeveloped)
Milton	158–159	F, P/O/R, R	Ballston Spa Abner Doubleday Baseball Fields, residences, business, Kayaderosseras Creek	Residential District	No	Yes (undeveloped, creek, roads, residential, commercial)
Ballston (including Hamlet of Ballston Lake)	159–166	C/I/T, F, OL, R	Oak Street, Zim Smith County Trail, Curtis Industrial Park, Ballston Veterans Bicycle Path, residences, industrial, businesses	Rural, Industrial, Mixed Use Centers, Hamlet Residential, Planned Unit Development District, Watershed Protection Overlay District	Yes	Yes (roads)
Clifton Park	166–168	C/I/T, F, OL	Trail/unimproved road, residences	Conservation Residential, Hamlet Mixed Use, Planned Unit Development, Business Non Retail, Neighborhood Business, Light Industrial 1 and 2, Land Conservation Zone and Adult Use Business Overlay Districts	No	Yes (road)

<b>Jurisdiction <sup>a</sup></b>	<b>MP Range</b>	<b>General Land Use/Land Cover (Within/Adjacent to ROI)</b>	<b>Specific Land Use (Within/Adjacent to ROI)</b>	<b>Zoning District</b>	<b>Agricultural District</b>	<b>Deviation Area (Land Use in Deviation Area)</b>
<b>Schenectady County</b>						
Glenville	168–172	C/I/T, F, OL, R	Mohawk River, St John's Lutheran Church, residences, businesses	Suburban Residential, Land Conservation	No	Yes (road, railroad, undeveloped/residential, bridge)
City of Schenectady	172–176	C/I/T, F, OL, R	Mohawk River, various commercial/industrial businesses, residences, Erie Canalway Trail (Union Street), TA Predel & Company (scrap yard and recycling)	Light Manufacturing/Warehousing, Manufacturing/Warehousing, Downtown	No	Yes (Mohawk River bridge, streets, railroad, Erie Boulevard, parking lot, industrial use, trail)
Rotterdam	176–181	C/I/T, F, OL, R	Von Roll Isola USA Inc./GE facility, Tri City BMX, industrial, Rotterdam Industrial Park	Light Industrial, Heavy Industrial, Retail Business, General Business, Multiple Family Residential, One- and Two Family Residential, Planned Residential Development, Rural	No	Yes (roads, commercial/industrial businesses, railroad)
<b>Albany County</b>						
Guilderland	181–187	A, C/I/T, F, OL	Residences, 84 Lumber, Watervilet Reservoir, Roger Keenholts Park, Northeastern Industrial Park	Rural, Industrial	No	Yes (undeveloped, roads, residential, railroad)
New Scotland	187–188	F	None	Medium-Density Residential	No	No
Village of Voorheesville	188–189	A, C/I/T, F, OL, R	Residences, commercial/industrial businesses, Jim Nichols Park, retail development	Residential B and C-1, Business A and B	No	Yes (roads)
New Scotland	189–194	A, C/I/T, F, OL, R	Five Rivers Environmental Education center	Commercial, Industrial, Residential Hamlet	Yes	Yes (undeveloped, road)

Jurisdiction <sup>a</sup>	MP Range	General Land Use/Land Cover (Within/Adjacent to ROI)	Specific Land Use (Within/Adjacent to ROI)	Zoning District	Agricultural District	Deviation Area (Land Use in Deviation Area)
<b>Albany County (continued)</b>						
Bethlehem (including Hamlet of Selkirk)	194–200	C/I/T, F, OL	Owens Corning facility, commercial/industrial businesses, Bethlehem Energy Center, CSX Selkirk railroad yard and buildings	Rural Light Industrial, Industrial	No	Yes (road, railroad)
Coeymans	200–203	C/I/T, F, OL, R	Residences, industrial facilities, Lafarge Cement Plant	Planned Industrial, Planned Commercial, Planned Residential	No	No
Village of Ravena	203–204	C/I/T, F, OL, R	Residences, Mosher Park	N/A	No	Yes (roadway)
Coeymans	204	R, OL	None	Industrial	No	No
<b>Greene County</b>						
New Baltimore	204–210	A, C/I/T, F, OL, R	Residences	ROW not zoned; Developmental Multi-Family, Rural Residential/ Agricultural, Developmental	No	Yes (roadways, undeveloped, residential)
Coxsackie	210–211	F, OL	None	Unknown <sup>f</sup>	No	Yes (undeveloped)
Village of Coxsackie	211–212	C/I/T, F, OL, R	Residences, Firemen's Memorial Park	Medium-Density Residential 2, Neighborhood, Commercial, Community Commercial, Industrial	No	Yes (undeveloped/ residential, roadway)
Coxsackie	212–215	A, C/I/T, F, OL, R	Greene Correctional Facility	Unknown <sup>f</sup>	No	Yes (undeveloped, agriculture)
Athens	215–220	A, C/I/T, F, OL	Railroad yard/industrial, aboveground transmission lines	Rural Residential, Light Industrial	No	Yes (undeveloped)

Jurisdiction <sup>a</sup>	MP Range	General Land Use/Land Cover (Within/Adjacent to ROI)	Specific Land Use (Within/Adjacent to ROI)	Zoning District	Agricultural District	Deviation Area (Land Use in Deviation Area)
<b>Greene County (continued)</b>						
Catskill	220–221	F, C/I/T, OL	Industrial businesses	Industrial, Highway Commercial	No	Yes (roadway, commercial)
Village of Catskill	221–223	C/I/T, OL, R	Residences, industrial businesses, Catskill Creek	Waterfront, General Commercial, Commercial Residence, One Family Residence, CH	No	Yes (residences, roadways, parking lot)
Catskill (including Hamlet of Cementon)	223–228	A, C/I/T, OL	Industrial businesses, Holcim Fields (Catskill Soccer Club), Alpha Road	General Commercial, Rural Residential/Agriculture, Industrial	No	Yes (undeveloped, industrial [cement plant], roadways, railroad)

Sources: CHPEI 2012i, CHPEI 2012yy, CHPEI 2012zz, NYSDOT 2012c

Notes:

- Jurisdictions are towns unless otherwise noted.
- The Town of Dresden has not adopted a Comprehensive Plan or zoning ordinance; therefore, Adirondack Park Agency private land use classifications from the Adirondack Park Land Use and Development Plan are applicable.
- The zoning districts for the Town and Village of Fort Ann planning are draft planning area recommendations (CHPEI 2012zz).
- The zoning district for the Town of Fort Edward is a draft zoning district (CHPEI 2012zz).
- The zoning districts for the Village of Fort Edward are proposed zoning districts (CHPEI 2012zz).
- The zoning districts for the Town of Coxsackie were not able to be identified due to the poor quality of zoning maps.

Key:

N/A = Not applicable.

A = Agriculture

C/I/T = Commercial/Industrial/Transportation

F = Forested

OL = Open Land/Pasture/Hay/Scrub/Shrub

OW = Open Water

P/O/R = Parks/Open Space/Recreation

R = Residential

**Table F.2-3. Land Use Within the Hudson River Segment of the Proposed CHPE Project**

Jurisdiction <sup>a</sup>	MP Range	General Land Use/Land Cover (Within/Adjacent to ROI)	Specific Land Use (Within/Adjacent to ROI)	Zoning District	Agricultural District	Deviation Area (Land Use in Deviation Area)
<b>Rockland County</b>						
Stony Point	295–298	C/I/T, OL, R	Stony Point Battlefield State Historic Site, marinas, residences, electrical utility substation, Stony Point Industrial Park, Stony Point Marsh	Unknown <sup>b</sup>	No	Yes (undeveloped/residential, State Historic Site, commercial [marinas], roadways, residences, undeveloped, water)
Haverstraw	298	C/I/T, OL	Residences, former Haverstraw Landfill	Unknown <sup>b</sup>	No	No
Village of West Haverstraw	298–299	C/I/T, OL, R	Commercial/industrial businesses (including West Haverstraw Business Park), residences	Unknown <sup>b</sup>	No	Yes (commercial, roadways, undeveloped)
Village of Haverstraw	299–301	C/I/T, OL, P/O/R, R	Haverstraw Beach State Park, residences, Haverstraw little league baseball fields, Mt. Repose Cemetery, commercial/industrial businesses, industrial facility, Hook Mountain/Nyack Beach Bikeway	Unknown <sup>b</sup>	No	Yes (recreation, residential, roadways, commercial, undeveloped)
Clarkstown	301–303	C/I/T, F, P/O/R, R	Hook Mountain State Park, Rockland Lake State Park, residences, commercial businesses, State Bicycle Route 9	Unknown <sup>b</sup>	No	Yes (roadways, state parks, undeveloped, residential)

Sources: CHPEI 2012i, CHPEI 2012yy, CHPEI 2012zz, NYSDOT 2012c

Note:

<sup>a</sup> Jurisdictions are towns unless otherwise noted.

<sup>b</sup> The zoning districts were not able to be identified due to the poor quality of zoning maps.

Key:

C/I/T = Commercial/Industrial/Transportation

F = Forested

OL = Open Land/Pasture/Hay/Scrub/Shrub

P/O/R = Parks/Open Space/Recreation

R = Residential

**Table F.2-4. Land Use Within the New York City Metropolitan Area Segment of the Proposed CHPE Project**

Jurisdiction	MP Range	General Land Use/Land Cover (Within/Adjacent to ROI)	Specific Land Use (Within/Adjacent to ROI)	Zoning District	Agricultural District	Deviation Area (Land Use in Deviation Area)
<b>Bronx County</b>						
New York City (Borough of The Bronx)	330–332	C/I/T, OL	Railroad, BFI of New York	Manufacturing Districts (M3-1 and M2-1)	No	Yes (industrial areas, railroad yard, parking lot)
<b>Queens County</b>						
New York City (Borough of Queens)	333–336	C/I/T, F (at Luyster Creek HVDC Converter Station site), OL, R	Ravenswood Houses, other residences, designated Class I and II bicycle routes, land uses in <b>Table 3.4.1-1</b> in the EIS	Manufacturing Districts (M1-1, M3-1) and Residential Districts (4, R-5, R5B, R5D, R6A, R6B, R7A, R7B)	No	Yes (water, roads, utility facility)

Sources: CHPEI 2012i, CHPEI 2012yy, CHPEI 2012zz, NYC 2012a, NYCDP 2011b

Key:

C/I/T = Commercial/Industrial/Transportation

F = Forested

OL = Open Land/Pasture/Hay/Scrub/Shrub

R = Residential



**Table F.2-5. Local Waterfront Revitalization Programs/  
Plans Relevant to the Proposed CHPE Project**

<b>Lake Champlain Segment</b>
<ul style="list-style-type: none"> <li>• Town of Essex LWRP (includes a Harbor Management Plan)</li> </ul>
<b>Overland Segment</b>
<ul style="list-style-type: none"> <li>• Village of Whitehall LWRP</li> </ul>
<b>Hudson River Segment</b>
<ul style="list-style-type: none"> <li>• Village of Tivoli LWRP</li> <li>• Village of Saugerties LWRP</li> <li>• Town of Redhook LWRP</li> <li>• City of Kingston LWRP</li> <li>• Town of Rhinebeck LWRP</li> <li>• Town of Esopus LWRP</li> <li>• Town of Poughkeepsie LWRP</li> <li>• Town of Lloyd LWRP</li> <li>• City of Beacon LWRP</li> <li>• City of Newburgh LWRP</li> <li>• City of Peekskill LWRP</li> <li>• Town of Stony Point LWRP</li> <li>• Village of Haverstraw LWRP</li> <li>• Village of Croton-on-Hudson LWRP</li> <li>• Village of Ossining LWRP</li> <li>• Village of Nyack LWRP</li> <li>• Village of Sleepy Hollow LWRP (includes Harbor Management Plan)</li> <li>• Village of Piermont LWRP (includes Harbor Management Needs section)</li> <li>• Village of Dobbs Ferry LWRP (includes Harbor Management Plan)</li> </ul>
<b>New York City Metropolitan Area Segment</b>
<ul style="list-style-type: none"> <li>• New York City Waterfront Revitalization Program (i.e., New York City LWRP)</li> </ul>

Source: CHPEI 2012i

**Table F.2-6. Local Municipal Land Use Plans Relevant to the Proposed CHPE Project**

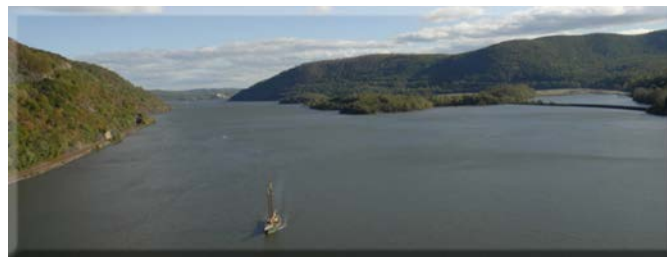
<b>Lake Champlain Segment</b>
None
<b>Overland Segment</b>
<ul style="list-style-type: none"> <li>• Washington County, New York Economic Development Strategic Plan</li> <li>• Fort Ann: A Beautiful Place at the Crossroads of a Beautiful Region (Town and Village of Fort Ann, New York Joint Community Plan) (Public Hearing Draft)</li> <li>• The Fort Ann Streetscape and Waterfront Revitalization Plan (Draft Master Plan Report)</li> <li>• Hartford, New York Comprehensive Plan</li> <li>• Town of Fort Edward Master Plan</li> <li>• Village of Fort Edward Master Plan</li> <li>• Green Infrastructure Plan for Saratoga County</li> <li>• Town of Moreau Comprehensive Land Use Plan</li> <li>• Town of Northumberland 2003 Comprehensive Land Use Plan (Final Draft)</li> <li>• Town of Wilton Comprehensive Plan</li> <li>• Town of Wilton Open Space, Recreation and Pathways Plan</li> <li>• Town of Greenfield Comprehensive Plan</li> <li>• The Saratoga Springs Comprehensive Plan</li> <li>• Town of Milton Comprehensive Plan 2001</li> <li>• Town of Ballston Final Draft Comprehensive Plan</li> <li>• Town of Clifton Park Comprehensive Plan</li> <li>• Town of Clifton Park Open Space Plan</li> <li>• Schenectady County Agricultural and Farmland Protection Plan</li> <li>• The Town of Glenville Open Space Plan</li> <li>• City of Schenectady Comprehensive Plan 2020</li> <li>• The Town of Rotterdam Comprehensive Plan and Final Generic EIS</li> <li>• Albany County Agricultural and Farmland Protection Plan</li> <li>• Town of Guilderland Comprehensive Plan 2000</li> <li>• The Rural Guilderland: Open Space and Farmland Protection Plan</li> <li>• Route 20 Land Use and Transportation Study-Towns of Guilderland and Princeton, New York</li> <li>• Town of New Scotland Comprehensive Land Use Plan and Generic EIS</li> <li>• Town of Bethlehem Comprehensive Plan and Generic EIS</li> <li>• Greene County Plans: Open Space and Recreation Plan, Agricultural Development and Farmland Protection Plan, Comprehensive Economic Development Plan, and Hudson River Corridor Study</li> <li>• Town of New Baltimore Comprehensive Plan</li> <li>• Town of Coeymans Comprehensive Plan</li> <li>• Town and Village of Coxsackie Joint Community Plan</li> <li>• Town and Village of Athens Comprehensive Plan</li> <li>• Town and Village of Catskill Joint Comprehensive Plan</li> <li>• Village of Catskill Downtown and Waterfront Revitalization Strategy</li> </ul>
<b>Hudson River Segment</b>
<ul style="list-style-type: none"> <li>• Rockland Tomorrow: Rockland County Comprehensive Plan</li> <li>• Village of Haverstraw Master Plan and Zoning Plan</li> <li>• Town of Clarkstown Comprehensive Plan</li> </ul>
<b>New York City Metropolitan Area Segment</b>
<ul style="list-style-type: none"> <li>• Vision 2020: New York City Comprehensive Waterfront Plan</li> </ul>

Source: CHPEI 2012i



## APPENDIX G

# Applicant-Proposed Impact Avoidance and Minimization Measures





# Appendix G

## Applicant-Proposed Impact Avoidance and Minimization Measures

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The Applicant-proposed impact avoidance and minimization measures applicable to the proposed CHPE Project that were incorporated into the EIS analysis are presented in this appendix. These include selected best management practices (BMPs) that were proposed by the Applicant for use during construction and operation to protect environmental, agricultural, cultural, and other potentially sensitive resources along the proposed CHPE Project route. These BMPs have been incorporated into the Certificate of Environmental Compatibility and Public Need issued by the New York State Public Service Commission (NYSPSC) to the Applicant and are therefore requirements that must be followed. The complete listing of BMPs proposed by the Applicant, dated February 10, 2012, is an attachment to the Certificate (CHPEI 2012q), and is available on page 356 in the full version of the Certificate that can be found at the CHPE EIS Web site Document Library at the following link: [http://www.chpexpresseis.org/docs/NYSPSC\\_Order.pdf](http://www.chpexpresseis.org/docs/NYSPSC_Order.pdf). The organization of the following subsections is intended to parallel the organization of the resource area impacts analyses provided in **Chapter 5** of the EIS.

### G.1 Land Use

The Applicant-proposed impact avoidance and minimization measures, including BMPs, which are applicable to land use, are as follows:

- A qualified Agricultural Inspector would be engaged during each phase of the proposed CHPE Project, including development, construction, initial restoration, post-construction monitoring, and follow-up restoration. The fundamental duty of the Agricultural Inspector is to ensure that all aspects of the proposed CHPE Project that affect farmland either fully meet (comply with) or exceed the standards of New York State Department of Agriculture and Markets including the recommendations in the Pipeline Right-of-Way Construction Project guidance document, and proposed CHPE Project transmission system-specific permit conditions or orders of certification, relevant to agricultural resources.
- The Applicant would reconfirm land use categories within 600 feet of the proposed CHPE Project, as appropriate, with special interest given to areas with sensitive land uses, including schools, health care facilities, churches, scenic areas and parks, and residences. Residential landowners with property adjacent to the proposed CHPE Project would be identified, including contact information, and contacted to discuss the proposed CHPE Project, construction schedule, and any potential concerns. Additional inquiry for other sensitive land uses would include notification of construction activities, consultation regarding special events, and consultation regarding special concerns and schedules.
- Restoration of all areas disturbed by construction activity would occur promptly. The final stage of construction would consist of restoring the construction corridor and work areas to their original condition and character as much as possible, compatible with the operation and maintenance of the proposed CHPE Project.

### G.2 Transportation and Traffic

The Applicant-proposed impact avoidance and minimization measures, including BMPs, that are applicable to transportation resources, are as follows:

- Work activities in Lake Champlain would be coordinated with the U.S. Coast Guard (USCG) so that work areas are marked properly to ensure safety, and so that current information about the location of work zones can be broadcast to recreational users. A “Local Notice to Mariners” would be distributed electronically by the USCG to alert local commercial and recreational boating communities of any construction-related limitations in Lake Champlain. The notice would allow all potentially affected vessels time to relocate temporarily to prevent being blocked during the construction period. When possible, construction activities would be timed to avoid disruption of seasonal recreational events occurring in Lake Champlain.
- In Lake Champlain, cable installation would be coordinated with ferry operators to avoid effects on ferry schedules and operations. It is anticipated that additional coordination with the cable-guided Ticonderoga ferry would be necessary during cable installation activities to facilitate laying the high-voltage direct current (HVDC) cables beneath the existing ferry cables on the lake bottom.
- Construction vessel movements and material transport would be coordinated with the New York State Canal Corporation to avoid or minimize impacts on commercial and recreational users of the canal system and seasonal events occurring in the canal.
- In instances where environmental or engineering circumstances suggest that the cables should be laid within or across the navigational channel, coordination would be conducted with the U.S. Army Corps of Engineers (USACE), USCG, and other agencies as necessary to minimize the impact on normal navigation activities and ensure cables are installed at the proper depth.
- When possible, construction activities would be timed to avoid disruption of seasonal events occurring on Lake Champlain.
- If necessary, the transmission line would be buried below the authorized depth of federally maintained navigation channels as required by the USACE. Depth of burial would be verified on a periodic basis so as not to become a hazard to navigation or marine resources. The Applicant would conduct pre- and post-transmission line installation bathymetric monitoring of the route. Monitoring plans would be developed in consultation with New York State Department of Public Service (NYSDPS), New York State Department of Environmental Conservation (NYSDEC), and New York State Department of State.
- All transitions from upland to aquatic configurations would be accomplished by horizontal directional drilling (HDD) and would be at a depth sufficient so as not to interfere with any current or future water-dependent uses.
- The Applicant would provide timely information to adjacent property owners or tenants regarding the planned construction activities and schedule, and would coordinate with New York State Department of Transportation (NYSDOT), officials in counties traversed by the route, and local municipalities and police departments, as applicable, to develop and implement traffic-control measures that ensure safe and adequate traffic operations along roadways used by construction vehicles. Restoration of roadways would be designed in consultation with the appropriate jurisdictional agency. Any restoration on NYSDOT highway rights-of-way (ROWs) would be in strict compliance with the specifications of a NYSDOT highway work permit.
- Permits for oversized or overweight construction or other vehicles that exceed the legal dimensions and weights for vehicles on state highways would be obtained from NYSDOT.
- All work would be performed in accordance with applicable NYSDOT highway regulations and design standards, including the following:

- 17 New York State Codes, Rules, and Regulations (NYCRR) §131 of the Highway Law describing *Accommodation of Utilities within State Highway ROW* and the applicable design standards of the American Association of State Highway Transportation Officials (AASHTO)
  - Guidance in the NYSDOT 2007 *Requirements for the Design and Construction of Underground Utility Installations within the State Highway Right-of-Way*
  - NYSDOT 17 NYCRR §131, the *Manual of Uniform Traffic Control Devices* (MUTCD) issued by NYSDOT in 2008, and the Federal version by the U.S. Department of Transportation (USDOT) in 2009
  - NYSDOT *Highway Design Manual*
  - NYSDOT *Policy and Standards for Entrances to State Highways*
  - NYSDOT 2007 *Requirements for the Design and Construction of Underground Utility Installations with the State Highway ROW*
  - NYSDOT 1995 *Accommodation Plan*
  - NYSDOT 2008 *Standard Specifications*.
- A Maintenance and Protection of Traffic (MPT) Plan would be completed in consultation with all affected agencies prior to the start of construction.
  - Detailed traffic control plans would be provided for HDD installation areas in urban and residential areas and at road crossings.
  - Signage and public notice would be posted no later than 24 hours prior to the initiation of construction.
  - Traffic flow would be provided in at least one lane of the road at all times or a detour would be provided.
  - Transmission line construction material delivery activities, equipment storage, and the timing of construction activities would be coordinated with the railroads so as not to affect current operations.
  - Cables would be installed in accordance with railroad-specific engineering standards using the prescribed minimum separation distances from track to trench to minimize impacts on the integrity of the track system.
  - In areas where HVDC cables cross existing infrastructure such as roads and utility lines, cables would be installed via HDD methodology to avoid disturbance of the existing systems.
  - In the Hudson River, the project would be outside of the existing designated navigation channels. The installation of cables via water jetting technology would be closely coordinated with the USCG and adjacent terminals.
  - In the Hudson, Harlem, and East rivers, a “Local Notice to Mariners” would be distributed electronically by the USCG to alert local commercial and recreational boating communities of any construction-related limitations.
  - When the proposed CHPE Project must extend into designated safety and security areas along the project route, the appropriate state and Federal agencies would be contacted as required by existing regulations.
  - An anchor snag manual would be developed to address a potential situation where a ship’s anchor snags the proposed CHPE cables. The anchor snag manual would include a navigation risk

assessment that incorporates a river bottom assessment of the entire cable route within the Hudson, Harlem, and East rivers.

### **G.3 Water Resources and Quality**

The Applicant-proposed impact avoidance and minimization measures, including BMPs, that are applicable to water resources with respect to avoidance of water quality impacts, are as follows:

- At least one Environmental Inspector would be employed full-time during construction and restoration. Additional Environmental Inspectors may be utilized as required to meet environmental inspection requirements set out in the Environmental Management and Construction Plan (EM&CP) and any relevant permit conditions. The lead Environmental Inspector would be responsible for determining when additional inspectors are needed to meet inspection requirements.
- At least one Aquatic Inspector would be employed full time per spread for all underwater installation procedures for the transmission system. They would be on site at the start-up of each field operation and during environmentally sensitive phases of installation. If in-water installation operations are to occur continuously (24 hours a day) a minimum of two Aquatic inspectors would be employed. At least one inspector must be on duty during underwater installation operations.
- The proposed CHPE Project would be required to obtain coverage under the State Pollutant Discharge Elimination System (SPDES) Storm Water General permit. This coverage would require a site-specific Storm Water Pollution Prevention Plan (SWPPP) for storm water discharges. Detailed maps depicting contours, slopes, drainage patterns, and locations of erosion-control structures would be included in the EM&CP, which would serve as the SWPPP. New York State Standards and Specifications for Erosion and Sediment Control specify BMPs for addressing erosion and sediment control. Storm water management features and strategies (e.g., French drains, inlet protection, dewatering, and site stabilization) would be implemented where and when necessary.
- From the U.S./Canada border to Crown Point, New York (mileposts [MPs] 0 to 73), a jet plow would be used to install the cables in the Lake Champlain lakebed. From Crown Point to Dresden (MPs 73 to 101), a shear plow would be used to install the cables to reduce sediment disturbance and resulting water quality impacts.
- The Environmental Inspector(s) would perform inspections of all erosion and sediment controls in accordance with the SPDES Storm Water General Permit. The Environmental Inspector would also establish a protocol with the construction contractor for the identification and repair of all erosion- and sediment-control measures deemed to be in need of repair or reinstallation. The Environmental Inspector is also responsible for record-keeping required by the EM&CP and the SPDES Storm Water General Permit.
- Effective erosion-control measures would be installed on the downslope of all disturbed areas and maintain them in fully functional condition. These erosion-control measures are to be installed before commencing any other activities involving soil disturbance.
- Upon completion of construction activities, initial restoration activities, including soil stabilization and temporary seeding of disturbed areas, would be conducted and would result in vegetation cover similar to the preconstruction habitat, although vegetation in the transmission line ROW would be managed within and adjacent to the cables to preclude reforestation.



- Vegetation buffers adjacent to sensitive areas such as wetlands and streams would be maintained to the greatest extent practicable. To prevent soil erosion along streams, vegetation (e.g., ground cover, shrubs, and tree stumps) would be left in place along a minimum 25-foot- (8-meter-) wide zone on each bank until the crossing point. Existing vegetation buffers would be maintained at stream crossings. Inspection and maintenance frequencies and requirements for permanent storm water management features would be identified in the EM&CP.
- A (clamshell) bucket dredge would be used at mechanical dredging sites to minimize suspension of fine-grained unconsolidated (silty) sediments.

#### **G.4 Aquatic Habitats and Species**

The Applicant-proposed impact avoidance and minimization measures, including BMPs, that are applicable to aquatic resources and habitats, are as follows:

- In Lake Champlain, all in-water work would be conducted within applicable time windows recommended by NYSDEC, New York Natural Heritage Program (NYNHP), and U.S. Fish and Wildlife Service (USFWS), (if applicable) for the protection of aquatic resources along the transmission line route. From U.S./Canada border to Crown Point, New York (MPs 0 to 73), in-water construction would only occur from May 1 to August 31. From Crown Point to Dresden (MPs 73 to 101), in-water construction would only occur from September 1 to December 31.
- HDD would be used where the lines enter and exit waterbodies to avoid or minimize effects on shoreline and shallow water habitats.
- A sheet pile cofferdam would be placed at the HDD exit point in the waterbody prior to excavation of the exit point pit. The cofferdam would remain in place and functional during all phases of the dredging operations and would be removed upon completion of dredging activities.
- Weighted silt curtains suspended on floats would be positioned to enclose the work site before commencing any mechanical dredging. The curtain would remain in place and functional during all phases of the dredging operations and remain in place for 2 hours after dredging termination.
- An Environmental Inspector or Aquatic Inspector would have the authority to modify or suspend construction if any aquatic resources are impacted in any way by construction activities.
- Construction equipment and materials, fuels, and other related items would not be stored within wetlands or within 100 feet (30 meters) of any stream or wetland system.
- Construction equipment would not be refueled within wetlands or within 100 feet (30 meters) of any stream or wetland system.
- Along the railroad ROWs, construction equipment crossings would be installed across all waterbodies to gain continuous access for construction operations where reasonable alternative access is not available.
- HDD would be used to install the transmission lines under streams in as many locations as possible to minimize impacts on aquatic resources. In those instances where the HDD method is used to install the cables to cross a waterbody there would be no time of year restrictions because the method does not require a disturbance to the bed or bank of the stream.
- If a dry crossing (flume or pump method) is proposed for any NYSDEC-designated coldwater stream, the Applicant would adhere to the proposed timing restrictions of October 1 through May 31.

- During construction, vegetated buffers at all waterbody crossings would be maintained. Where the vegetation exists along the railroad ROWs, a minimum 15-foot (5-meter) buffer would be maintained with existing trees and shrubs except for that portion of the bank that has been cleared for the construction path.
- A Frac-out Contingency Plan would be developed and implemented that would allow for timely cleanup of any bentonite leaks that could occur and ensure minimal impacts on the environment.

## **G.5 Aquatic Protected and Sensitive Species**

The Applicant-proposed impact avoidance and minimization measures, including BMPs, that are applicable to aquatic threatened and endangered species and their occupied habitats, are as follows:

- The Applicant would work closely with Federal and state agencies to establish measures prior to construction commencement to avoid or minimize impacts on aquatic threatened and endangered species along the proposed CHPE Project route.
- HDD would be used where the cables enter and exit waterbodies to avoid or minimize effects on shoreline and shallow water habitats.
- A closed environmental (clamshell) bucket dredge would be used to minimize sediment suspension at mechanical dredging sites (i.e., exit pits for water-to-land HDD transitions) for fine-grained (silty) sediments.
- A sheet pile cofferdam would be positioned to enclose the work site for exit pits for water-to-land HDD transitions before commencing mechanical dredging. The cofferdam would remain in place and functional during all phases of the dredging operations and would be removed upon completion of dredging activities.
- The Environmental Inspector would have the authority to modify or suspend construction if any aquatic threatened and endangered species would be impacted in any way by construction activities.
- Most designated trout streams are anticipated to be crossed using the HDD method thereby avoiding disturbance of these streams.
- In the event that the Applicant unexpectedly encounters any rare, threatened, or endangered species during the preconstruction, construction, or operation and maintenance phases of the proposed CHPE Project, the following measures would be implemented:
  - The Applicant would temporarily halt construction activities, excepting any activity required for immediate stabilization of the area, to avoid or minimize the impacts on the species or habitat.
  - The Environmental Inspector would identify the area of the sighting or encounter and record GPS locations of the likely habitat boundary or the sighting location of any aquatic threatened and endangered species.
  - Any unanticipated sightings of threatened and endangered species or observation of rare, threatened, or endangered plants would be reported as soon as possible to NYSDPS Staff, NYSDEC, or USFWS. The Applicant would consult with applicable resource agencies for measures to avoid or minimize impacts on aquatic threatened and endangered species and their occupied habitat. Construction activities in the area would resume once protective measures, developed in consultation with NYSDPS Staff, NYSDEC, or USFWS, are implemented.

- If new aquatic threatened and endangered species occupied habitats are identified, the EM&CP would be updated to show the new occupied habitats.
- Construction personnel would be updated on the locations of any new aquatic threatened and endangered species or occupied habitats that are identified. These areas would be reported to the applicable resource agencies.
- All in-water work would be conducted within applicable time windows as agreed to by applicable Federal and state agencies, including location-specific dredging windows in the Hudson River estuary for the protection of aquatic threatened and endangered species.
- Construction modifications to water jetting would occur when crossing sensitive habitats including Significant Coastal Fish and Wildlife Habitats (SCFWHs) in the Hudson River, which contain important breeding habitat for protected and sensitive species. The primary operational modifications during water jetting are a reduction in water jetting pressure and a reduction in water jetting speed. Proposed areas where construction modifications could occur would be identified in plan and cross-sectional profile drawings included in the EM&CP.
- Commencement of in-river work south of the Haverstraw Bay SCFWH would occur during the high, or flood, tide condition to avoid or minimize impacts of re-suspended sediments on Haverstraw Bay which contains important habitat for protected and sensitive species.
- Any sightings of sturgeon would be reported to the NYNHP, USFWS, and National Marine Fisheries Service (NMFS) as soon as possible. A Standard Operating Procedures Manual would be prepared to outline the monitoring and reporting methods to be implemented during proposed CHPE Project construction.
- All personnel associated with the proposed CHPE Project would be advised of the potential presence of aquatic threatened and endangered species and the need to avoid collisions.
- All vessel crewmembers and contractors would participate in a fisheries training for aquatic protected species presence and emergency procedures in the unlikely event an animal is struck by a vessel.
- All construction personnel would be responsible for observing water-related activities for the presence of these species.
- All construction personnel would be advised that there are civil and criminal penalties for harming, harassing, or killing aquatic species that are protected under the Endangered Species Act.
- All vessels associated with the construction of the proposed CHPE Project would operate at “no wake/idle” speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a 4-foot (1.2-meter) clearance from the bottom. All vessels would preferentially follow deepwater routes (e.g., marked channels) whenever possible.
- Any collision with or injury to a protected species would be required to be reported immediately to the NMFS Protected Resources Division.
- The Applicant would train and educate transmission system contractors and subcontractors to identify aquatic invasive species and site-specific prescriptions for preventing or controlling their transport throughout or off of the proposed CHPE Project site.
- Require that vessels, equipment, and materials be inspected for, and cleaned of, any visible vegetation, algae, organisms, and debris before bringing them to the proposed CHPE Project area.

- Train transmission system contractors and subcontractors on the various cleaning or decontamination methods to be used on a site-by-site basis for the proposed CHPE Project.
- Require that vessels, equipment, and materials be inspected for, and cleaned of, any visible vegetation, algae, organisms and debris before leaving the waterbody for another.

## **G.6 Terrestrial Habitats and Species**

The Applicant-proposed impact avoidance and minimization measures, including BMPs, that are applicable to terrestrial species and habitats, are as follows:

- The transmission cable centerline, construction corridor edges, access roads, extra workspace boundaries, and marshaling yards would be surveyed and marked with stakes and colored flagging to avoid out-of-corridor impacts.
- Areas designated as “no vehicular access” would be clearly marked in the field with a silt fence or construction fence to avoid inadvertent intrusion by construction equipment.
- Clearing needed in wooded areas to facilitate surveying would be minimized to the extent possible.
- The EM&CP plan and profile drawings would be provided to the NYSDEC, NYNHP, and NYSDPS Staff for review of significant natural community mapping prior to the start of construction.
- Significant natural communities are identified during preconstruction surveys within or adjacent to the construction corridor would be clearly flagged in the field prior to the start of construction activities. Access through or impact on any significant natural communities would be avoided or minimized, to the extent practicable. If access through a significant natural community is unavoidable, the Applicant would develop additional measures, in consultation with appropriate agencies as applicable, to avoid and minimize any potential impacts.
- All flags and staking would be checked by the Environmental Inspector or Facility Construction Inspector before construction to ensure proper alignment.
- During construction activities, measures would be implemented to prevent or control the transport of invasive plant species; including development and implementation of an Invasive Species Management Plan approved by applicable state agencies.
- A vegetation management plan for the operational period of the proposed CHPE Project transmission system would be developed and supplied in the EM&CP. The goal of the vegetation management plan would be to establish stable low-growing vegetation with shallow root systems that would not interfere with the cables. Vegetation along the transmission line ROW would primarily be managed by mechanical means. This would include such mechanisms as brush hogging/mowing or hand cutting.
- During construction, the objective of vegetation clearing is to remove the vegetation from the work area that is necessary for safe and proper installation of the cables. Vegetation-clearing methods would be selected to avoid and minimize impacts on rare, threatened, and endangered plants and sensitive areas (e.g., forested areas). This would be accomplished through site-specific prescriptions for clearing and disposal of woody vegetation and selective retention of vegetative buffer zones.

- The temporary construction workspace would be kept to the minimum that would allow for spoil storage, staging, assembly of materials, construction vehicle passage, and all other activities required to install the cables safely.
- During clearing operations, crews, in coordination with the Environmental Inspector, would scout the terrain ahead for unexpected conditions, check construction corridor and transmission line ROW boundaries, and review property-specific conditions or restrictions. One of the following methods would be used for vegetation clearing, to minimize impacts:
  - *Hand Cutting* – This method employs a hand-held chain saw. It is selective, but is slower and more expensive than motorized mechanical devices. Residential areas, buffer zones, wetlands, and highway screens are areas where hand cutting is typically prescribed.
  - *Mechanical Clearing Machine* – This term usually refers to a machine known as the Hydro-axe or Kershaw mower. This machine can cut trees up to 10 inches (25.4 centimeters) in diameter at the rate of several acres a day, depending on stem density and terrain. It is essentially nonselective and designed for clearing construction corridors and ROWs composed of young, undesirable species in a relatively uniform stand.
  - *Mowing* – This technique is primarily used in areas of herbaceous vegetation. Terrain must be relatively flat with no gullies or rocks.
  - *Mechanical Whole-tree Felling Equipment* – This method allows controlled felling and loading of whole trees while minimizing damage to adjacent trees. Trees would be felled into the construction corridor to avoid damage outside the corridor.
- Any vegetation removal within a road ROW would be conducted pursuant to a highway work permit issued by NYSDOT. Within the Adirondack Park, any vegetation removal in a road ROW would be conducted in accordance with the Adirondack Park State Land Master Plan and NYSDOT Guidelines for the Adirondack Park to maintain a park-like atmosphere that complements the total Adirondack environment.
- The Asian longhorned beetle (*Anoplophora glabripennis*) and the emerald ash borer (*Agrilus planipennis*) are two insects that the NYSDEC has identified as a potential problem to native trees and vegetation. If these insects are identified during construction, they would be reported to the NYSDEC regional forester. In addition, prior to construction, the contractors would be trained to identify invasive insect species and the projectwide protocol for reporting to the NYSDEC regional forester. Unmerchantable timber would be provided as firewood to interested parties pursuant to the substantive requirements of NYSDEC's firewood restrictions to protect forests from invasive species, found in six NYCRR §192.5.

## G.7 Terrestrial Protected and Sensitive Species

The Applicant-proposed impact avoidance and minimization measures, including BMPs, that are applicable to terrestrial threatened and endangered species and their habitats, are as follows:

- All known threatened and endangered species, occupied habitats, and locations where rare, threatened, and endangered plants have been observed would be identified on the EM&CP maps and in the field where protected plants have been observed based on available data. The construction drawings would be provided to the NYSDEC, NYNHP, and NYSDPS for review of mapped occupied habitat areas and locations where rare, threatened, and endangered plants have been observed.

- Locations of threatened and endangered species or their habitat and rare, threatened, and endangered plants would be treated as confidential. All documents or plans containing specific location information would be marked as such. Appropriate training would be provided to employees and contractors regarding the confidential nature of this information.
- Construction personnel would be trained to identify known and potential threatened and endangered species; rare, threatened, and endangered plants; and significant natural communities that could be encountered, and the identification and protection measures that are included in the construction plan.
- The Environmental Inspector would be responsible for ensuring that prescribed protection measures are appropriately used during construction.
- The Applicant would avoid construction within or immediately adjacent to occupied Karner blue butterfly and frosted elfin habitats during the adult flight periods (approximately May to August) to avoid or minimize potential mortality of adults that might be nectaring or traveling between habitat areas. Because adult flight periods vary from year to year, the Applicant would contact NYSDEC prior to starting construction within any identified habitat areas to confirm that adults have not emerged.
- Prior to construction, a qualified biologist would conduct surveys for the presence of Karner blue and frosted elfin butterflies, in accordance with the USFWS and NYSDEC guidance document *Karner blue butterfly (Lycaeides melissa samuelis) Survey Protocols Within the State of New York*. These protocols include guidance on the following:
  - Prior to construction, the boundaries of any identified occupied habitat for Karner blue butterfly and frosted elfin butterfly within or immediately adjacent to construction workspaces or access routes would be clearly flagged in the field, and the Applicant would conduct a walk-through to discuss and review measures to avoid and minimize impacts.
  - Disturbance or access through any flagged occupied habitat for Karner blue butterfly and frosted elfin butterfly would be avoided.
  - Contractors and construction crews would be trained on the locations and identification of the host plant, wild blue lupine, and for the Karner blue butterfly and frosted elfin butterfly. Construction personnel would be trained and instructed to avoid trampling or destruction of wild blue lupine plants.
  - If any previously unknown or unflagged areas containing wild blue lupine are encountered during preconstruction environmental inspection, construction, or restoration, the Environmental Inspector would delineate the boundary of the habitat with flagging in the field, and would collect global positioning system (GPS) data mapping its location.
  - The Applicant would notify NYSDPS, NYSDEC, and USFWS as soon as possible (within 48 hours) if any previously unidentified habitats containing wild blue lupine are discovered during preconstruction environmental inspection, construction, or restoration. If additional protective measures are necessary to protect the Karner blue butterfly, frosted elfin butterfly, or occupied habitat for these species, the Applicant would temporarily cease any vegetation clearing, construction, ground-disturbing, or vegetation management activities in the area, excepting any activities that could be necessary for immediate stabilization of the work site, until protective measures can be implemented. Work would only resume once NYSDEC and USFWS have been notified

and recommended protective measures to avoid or minimize impacts on threatened and endangered species and occupied habitat have been implemented.

- During operation of the transmission line, any vegetation management, emergency repairs, or other operational maintenance activities required within Karner blue butterfly and frosted elfin butterfly habitats would be implemented in accordance with a mitigation plan for these species being developed by the Applicant in consultation with USFWS and NYSDEC.
- No herbicides or pesticides would be used within occupied Karner blue butterfly and frosted elfin butterfly habitat, except as approved by the USFWS and NYSDEC.
- During the preconstruction survey, the contractors would identify and avoid impacts on large specimens of shagbark hickory, which could serve as maternity or roost trees for Indiana bats.
- In the event that the Applicant unexpectedly encounters any rare, threatened, or endangered species during the preconstruction, construction, or operation and maintenance phases of the proposed CHPE Project, the following measures would be implemented:
  - Areas of threatened and endangered species occupied habitat and locations of rare, threatened, and endangered plants along the terrestrial portions of the proposed CHPE Project route would be flagged in the field.
  - The Environmental Inspector would identify the area of the sighting or encounter; flag the boundaries of the newly identified occupied habitat or locations where the threatened or endangered species or rare, threatened, or endangered plant were observed; and record GPS locations of the likely habitat boundary or the sighting.
  - Any unanticipated sightings of threatened or endangered species or observations of rare, threatened, or endangered plants would be reported as soon as possible to NYSDPS, NYSDEC, or USFWS. The Applicant would consult with applicable resource agencies for measures to avoid or minimize impacts on plants or animals.
  - If threatened or endangered species or threatened or endangered plants are discovered during construction activities, the Applicant would temporarily halt construction activities in the vicinity of the discovery, excepting any activity required for immediate stabilization of the area, to avoid or minimize the impacts on the species or habitat. Construction activities in the area would resume once protective measures, developed in consultation with NYSDPS, NYSDEC, and USFWS, are implemented.
  - If new threatened or endangered species and occupied habitat are identified or threatened or endangered plants are observed and verified, construction plans would be updated to show the new threatened or endangered species, occupied habitat, or threatened or endangered plant species. These newly occupied areas would also be flagged in the field.
  - Construction personnel would be updated on the locations of any new threatened and endangered species or occupied habitats or locations of threatened or endangered plants that are identified. These areas would be reported to the applicable resource agencies.
- The Applicant has developed the following measures to avoid impacts on the state-listed bald eagle, which is also protected under the Bald and Golden Eagle Protection Act (BGPA) and their habitat:
  - Prior to construction, the Applicant would identify all bald eagle nest locations within 0.5 miles (0.8 kilometers [km]) of construction, based on data provided by the NYNHP.

- If any blasting activities are necessary within 0.5 miles (0.8 km) of active bald eagle nests, the Applicant would contact USFWS and NYSDEC for guidance to avoid or minimize the potential for noise-related disturbance.
- If construction would occur within 660 feet (201 meters) of an active nest during the nest-building or breeding season (December to August) per USFWS guidelines, the Applicant would contact USFWS and NYSDEC for guidance to avoid and minimize the potential for noise-related disturbance.
- Environmental training for contractors and construction crews would include training on the identification of bald eagles and location of nests. Construction personnel would be instructed to report any sightings of potential eagle nests that were not previously identified by the NYNHP.
- If any previously unidentified eagle nests are discovered, the Applicant would report findings to the NYNHP as soon as possible, and consult with the NYSDEC and USFWS for guidance to avoid or minimize the potential for disturbance, if required.
- On a project-wide basis, the Applicant would perform the following measures to prevent or control the transport of invasive plant species:
  - Prior to construction, training would be conducted to educate transmission system contractors and subcontractors on identifying invasive plant species and the site-specific protocol for preventing or controlling their transport throughout or off of the proposed CHPE Project site. These protocols include the various cleaning or decontamination methods to be used for the proposed CHPE Project. In addition, the contractors would be instructed to stay within access paths and work areas that are designated on the EM&CP plan and profile drawings to minimize ground disturbance.
  - Sediment- and erosion-control devices would be installed across the construction corridor on slopes leading into wetlands and along the edge of the corridor to prevent spoil from migrating into these areas. This would also help to prevent the dispersion of seeds from invasive plant species into uninfested wetlands during construction.
  - Vehicles, equipment, and materials (including swamp mats) would be inspected for, and cleaned of, any visible soils, vegetation, and debris before bringing them to the proposed CHPE Project area or moving them to the next wetland along the construction corridor as specified under NYSDEC's General Permit for Routine ROW Maintenance Activities, DEC No. 0-0000-01147/00001.
  - The restored corridor would be seeded with an invasive species-free seed mix immediately after final regrading to quickly create vegetative cover over the disturbed corridor and help to prevent establishment of invasive species which typically colonize disturbed sites.
  - Revegetation of disturbed areas would use seed and other plant materials that have been checked and certified as noxious-weed-free.

## **G.8 Wetlands**

The Applicant-proposed impact avoidance and minimization measures, including BMPs, that are applicable to wetlands, are as follows:

- Prior to construction, the Applicant would obtain permits from the USACE under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Mitigation measures and



BMPs for impacts on wetlands, if required, would be determined during the permit application process in consultation with the USACE. The proposed CHPE Project would be constructed, operated, and maintained in accordance with Federal and state permits. The Applicant would also adhere to stipulations in the Certificate of Environmental Compatibility and Public Need, which is administered by the NYSPSC.

- All wetlands occurring within the project area would be delineated and flagged prior to initiation of construction activities to ensure resource protection. Wetland and stream adjacent areas would be clearly marked in the field to avoid inadvertent disturbance of wetlands and streams by construction equipment. During construction activities, spoil would be stored within the construction corridor immediately adjacent to the trench or within designated extra work areas. To the extent possible, the Applicant would avoid storing spoil within wetlands; however, due to the space constraints along the roadway and railroad ROWs, it is anticipated that some spoil storage in wetland areas could occur. In these areas, soil excavated from the wetland would be temporarily stockpiled on construction matting or geo-textile fabric to be used to backfill the trench. Any excess spoil would be removed from the ROWs and disposed of off site in accordance with Federal and state laws and regulations.
- Sediment- and erosion-control devices would be installed across the construction corridor on any slopes leading into wetlands and along the edge of the corridor, as necessary, to prevent spoil from flowing off the corridor into a wetland. Locations of sediment- and erosion-control devices would be identified on the EM&CP plan and profile drawings.
- Erosion- and sediment-laden storm water runoff from disturbed areas or spoil piles in immediately adjacent uplands have the potential to affect water quality in wetlands. Therefore, temporary and permanent erosion and sediment controls would be installed prior to construction activities to avoid increases in erosion and sedimentation into waterbodies from land disturbance. Construction storm water would be managed in accordance with the SWPPP for the proposed CHPE Project to prevent increased storm water runoff volume and velocity and prevent introduction of sediments and pollutants. An SWPPP would be prepared prior to construction as part of permitting and compliance under the SPDES.
- The Applicant would segregate topsoil in wetlands, except when standing water or saturated soils are present, to prevent the mixing of topsoil with subsoil. To expedite revegetation of wetlands, the top 1 foot (0.3 meters) of surface soil would be stripped from over the trench, retained, and later replaced. This would facilitate wetland revegetation by maintaining physical and chemical characteristics of the surface soil and preserving the native seed bank. The exception to this requirement includes areas with standing water or saturated soils, areas where no topsoil layer is evident, or areas where the topsoil layer exceeds the depth of the trench.
- The HDD method would be employed to construct landfalls from the proposed transmission cables. This would be expected to avoid impacts on freshwater tidal wetlands. In addition, the HDD method would exit the water at a depth sufficient to avoid impacts on the intertidal and foreshore areas.
- In wetland areas where trenching would occur, trench plugs or other methods to prevent draining of wetlands down into the trench would be employed. In areas where wetland topsoil would be disturbed, the organic surface layer would be backfilled over the subsoil backfill to reestablish an adequate soil profile for wetland restoration objectives.
- If any construction equipment would operate within saturated wetlands that would be likely to be affected by soil compaction or rutting based on conditions at the time of construction, the Applicant would use equipment mats or low-ground-pressure tracked vehicles to minimize impacts on wetland soils. If dewatering is required within the excavated trench, water would be

discharged to a well-vegetated upland area, a properly constructed dewatering structure, or a filter bag. Original surface hydrology in disturbed wetland areas would be reestablished by backfilling the trench and grading the surface to original contours, as needed.

- To minimize impacts from accidental leaks and spills, a Spill Prevention, Control, and Countermeasure (SPCC) Plan would be developed that would contain BMPs to limit potential water quality impacts. Construction crews would have sufficient supplies of absorbent and barrier materials on site to contain and clean up hazardous materials in the event of a spill. To reduce the likelihood of a spill entering wetland habitat, the Applicant would avoid storing hazardous materials, chemicals or lubricating oils, refueling vehicles and equipment, or parking vehicles overnight within 100 feet (30 meters) of the edge of a wetland, unless no reasonable alternative was available. If no alternative is available, the Applicant's Environmental Inspector would ensure that appropriate protection measures for spill prevention and controls would be implemented.
- Following construction, the Applicant would conduct final grading to restore original contours, as needed, and would seed disturbed areas with a temporary seed mixture to stabilize soils and establish vegetation cover. Emergent wetland vegetation would be expected to reestablish quickly following construction, and woody species would return more slowly. Forested wetlands, where not maintained, would be expected to go through several stages of successional vegetation before returning to the pre-construction vegetation cover type. To assist in the recovery of woody species, the Applicant would avoid removing roots and stumps in cleared areas outside of the cable trench, unless required for safety, to allow resprouting of woody species.
- During the initial restoration phase, all construction debris would be removed from the construction corridor. Segregated topsoil would be replaced, and wetland contours and drainage patterns would be restored to approximate original conditions by matching adjacent undisturbed areas. Restoring the grade, drainage patterns, and topsoil would promote the reestablishment of native hydrophytic vegetation (i.e., plant life that thrives in wet conditions). Restoration of wetlands would be completed within 24 hours after backfilling is completed. Restoration of the wetland would include final grading, seeding with an appropriate seed mix, fertilizing, and mulching. High organic soils (as determined by NYSDEC, NYSDPS, or the Environmental Inspector) would be graded back to original contours and left unmulched and unseeded to facilitate the germination of native seeds and sprouting of rhizomes from the seed bank.
- The Applicant would establish and implement a program to monitor the success of restoration upon completion of construction and restoration activities. The success of wetland revegetation would be monitored and recorded annually for the first 2 years (or as required by permit) after construction, or longer, until wetland revegetation is successful. Wetland revegetation would be considered successful when the vegetative cover is at least 80 percent of the type, density, and distribution of the vegetation in adjacent wetland areas that were not disturbed by construction. If revegetation is not successful at the end of 2 years, the Applicant would develop and implement (in consultation with a professional wetland ecologist) a plan to actively revegetate the wetland with native wetland herbaceous plant species.

In addition, during construction activities within and adjacent to wetlands, protection measures would include the following:

- Minimize amount of work within and across wetlands.
- Schedule work to be conducted in wetlands to start and finish in the dry season or when the ground is frozen, to the extent practicable.

- Limit construction vehicles and equipment to established access roads and construction workspaces depicted on EM&CP plan and profile drawings.
- Limit construction equipment within wetlands primarily to what is needed to dig the trench, install the cables, backfill, and restore the construction corridor. All other construction equipment would use access roads in upland areas to the extent practicable.
- Minimize disturbance and compaction in wetlands with saturated soils or standing water, either by using wide-tracked or balloon-tired equipment operating from timber corduroy or timber mats. Imported rock, stumps, brush, or offsite soil as temporary or permanent fill would be prohibited. Following construction, all materials used to stabilize the corridor would be removed.
- Construction equipment would not be washed in wetlands or within 100 feet (30 meters) of any wetland unless specified to minimize the spread of invasive species. Runoff resulting from washing operation would not be permitted to enter any wetlands directly.
- Spoil and excavated materials would be stored outside of wetlands and wetland adjacent areas. All stockpiled material would be stored at a sufficient distance to prevent sedimentation into any stream, wetland, wetland adjacent area, or other waterbody. If no storage area is available, spoil would be adequately protected and erosion- and sediment-control measures would be installed to prevent materials from entering adjacent areas. All excess material would be disposed of in approved upland locations.
- Any temporary access routes or parking areas adjacent to wetlands and waterbodies would be graded to direct runoff away from water resources. If needed, erosion-control measures would be installed adjacent to wetlands and other water resource areas.
- Unless work activities would resume within 14 days, disturbed soils would be stabilized as soon as possible and no more than 7 days upon temporary or permanent completion of ground-disturbing activities. If soil stabilization measures are not possible within 7 days due to snow cover, frozen ground, or other weather conditions, soils would be stabilized as soon as practicable.
- The construction corridor would be inspected periodically during and after construction until final restoration has been completed. Erosion-control or restoration features would be repaired as needed in a timely manner until permanent revegetation has become successful.
- Should it become necessary to remove water from the trench, it would be pumped to a stable, vegetated upland area (where practical) and filtered through a filter bag or siltation barrier.
- Clearing of existing vegetation in or near wetlands would be limited to material necessary to allow completion of construction activities and reasonable access for long-term maintenance.
- Brush and trees would be cut at ground level leaving the root systems intact.
- Tree stumps would only be removed directly over the trench and where necessary for safe access along the corridor.
- If high soil moisture content or standing water exist in a wetland prior to construction, the use of heavy equipment would be limited to prevent rutting and soil profile mixing.
- Trees would be felled by hand and cut to lay flat on the ground and left in place unless doing so would prevent safe access to the site.

## G.9 Geology and Soils

Erosion- and sediment-control measures would be developed and implemented both during and following site development to contain soil and runoff on site, and would reduce potential for adverse impacts associated with erosion, sedimentation, and transport of sediments in runoff. The following BMPs have been identified in the Applicant's EM&CP:

- *Straw Bales and Silt Fencing.* Straw bales and silt fences are used separately or together to reduce the velocity of sediment-laden runoff and affect deposition of the transported sediment load.
- *Stabilized Construction Entrances.* Stabilized construction entrances would be installed and maintained at all points where construction access roads intersect with paved surfaces, such as roads, sidewalks, or parking areas, to reduce the tracking of sediment onto roadways.
- *Water Management Devices.* The following devices would be used along terrestrial portions of the proposed CHPE Project route as necessary to reduce the velocity of storm flows and to divert storm flows away from offsite properties and environmentally sensitive areas:
  - Water Diversion Devices.
  - Waterbars
  - Drivable Berms
  - Swales and Earthen Berms
  - Side Ditches
  - Stone Check Dams
  - French Drains
  - Temporary Culverts.
- *Sediment Retention Ponds and Filtration Devices.* Catchment basins would be used where needed to intercept sediment-laden runoff and reduce the amount of sediment leaving disturbed areas. Catchment basins would be constructed in accordance with the standards in the *New York State Standards and Specifications for Erosion and Sediment Control*.
- *Concrete Washout.* After placement of concrete, wash water used to clean the concrete truck would be directed to a concrete washout structure at designated areas only. These concrete washout area(s) would be a minimum of 100 feet (30 meters) from all wetlands, waterbodies, and drainage structures.
- *Fugitive Dust Emissions.* Dust control would be used on construction roads, construction entrances, and other disturbed areas subject to surface dust movement and dust blowing. These areas would be sprinkled with water during extended dry periods to minimize dust generation. Typically only plain water would be used for dust suppression; chemical dust suppressants would only be used in situations where plain water dust suppression is not effective and where no sensitive resources (e.g., wetlands, streams, potable water supplies, organic farms) are present.
- *Clearing, Excavation, and Grading.* In general, the construction corridor would be cleared to provide safe operation of construction equipment.
- *Site Stabilization.* Non-structural controls would also be used during project construction. Mulch would be used to provide initial erosion control while seeding is established or to prevent erosion on soils with low infiltration rates.
- *Inspection and Record Keeping.* Inspections would include all disturbed areas that have not undergone final stabilization, storm water discharges from the site, material storage areas, and site entrances and exits.

In addition to erosion- and sediment-control measures, construction BMPs would be implemented to minimize soil erosion including the following:

- Non-agricultural and non-urban/residential areas
  - Grading
  - Lime Application
  - Fertilizing
  - Aerating
  - Seeding and Planting.
- *Restoration – Urban/Residential.* Construction in urban or residential areas could require a variety of restoration activities. Aboveground and underground structures (e.g., those related to water and gas services), street pavements, curbs, sidewalks, and other features could require repair or replacement as a result of construction. Curbs, sidewalks, and streets damaged by construction would be restored to pre-existing conditions. Except where replacement would inhibit or impair the safe operation of the transmission line, shade trees and ornamental shrubs disturbed or damaged by construction would be repaired or replaced, following construction.
- *Restoration – Railway Ballast.* Upon completion of the installation of the underground transmission line in the railroad ROW, the surface of the ROW disturbed by construction activities would be graded to match the original topographic contours and to be compatible with surrounding drainage patterns. Stone ballast or mulch would be used to stabilize the disturbed soil areas in the ROW.

All blasting activity would be performed by licensed professionals according to strict guidelines designed to control energy release. Charges would be kept to the minimum required to break up the rock. Where appropriate, mats composed of heavy steel mesh or other comparable material or trench spoil would be used to prevent the scattering of rock and debris. These activities would adhere strictly to all industry standards applying to control of blasting and blast vibration limits.

## **G.10 Cultural Resources**

The Applicant-proposed impact avoidance and minimization measures, including BMPs, that are applicable to the prevention of impacts on historic and cultural resources, are as discussed in the following paragraphs.

Measures would be implemented to mitigate the proposed CHPE Project's potential adverse effects on known terrestrial and underwater archaeological sites found to extend into the Area of Potential Effects (APE). These measures include minor rerouting to avoid the sites and Phase III data recoveries of terrestrial and underwater archaeological sites that are listed or eligible for listing in the National Register of Historic Places and cannot be avoided by ground-disturbing activities.

The development of a programmatic agreement (PA) is underway and additional formal surveys and evaluations must be taken before it can fully be determined in detail what cultural resources require mitigation under Section 106 of the National Historic Preservation Act. Measures identified at this time are presented in the following paragraphs.

***Proposed CHPE Project Cultural Resources Management Plan.*** To manage potential impacts on cultural resources from the proposed CHPE Project, a Cultural Resources Management Plan in consultation with certain stakeholders would be developed. This plan would identify historic properties within the APE and outline the processes for resolving adverse effects on historic properties within the

APE and determining the appropriate treatment, avoidance, or mitigation of any effects of the proposed CHPE Project on these resources. Treatment and avoidance measures would include the results of consultation between the Applicant and the New York State Historic Preservation Office (SHPO) regarding reasonable buffers between underwater sites and the cable-laying barge that would be used in Lake Champlain. In addition, cultural and heritage resource impact measures would be included in the EM&CP and facility management plans.

***Unanticipated Discoveries.*** The potential exists for the unanticipated discovery of additional cultural resources and human remains during construction and operational activities. As a result, the Applicant would develop an Inadvertent Discovery Plan that details crewmember responsibilities for reporting in the event of a discovery during underwater and underground cable installation. The plan would also include procedures to be implemented in the event of an unanticipated find. If human remains are discovered, the Applicant would stop work within 50 feet (15 meters) of the discovery. The Applicant would then contact the county coroner and a professional archaeologist (i.e., an archaeologist that meets the Secretary of the Interior's Professional Qualifications Standards in archaeology and history) to determine the significance of the discovery. If appropriate, the Applicant would also adhere to Native American Graves Protection and Repatriation Act (NAGPRA) and its implementing regulations (43 Code of Federal Regulations [CFR] §19). Depending on the recommendations of the coroner and archaeologist, the Applicant would consult with the appropriate county in New York State to establish additional measures. Potential measures for unanticipated discoveries would include avoidance, documentation, excavation, and curation.

Treatment and disposition of an inadvertent discovery of human remains would be managed in a manner consistent with NAGPRA; the Advisory Council on Historic Preservation (ACHP) Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects; and the New York SHPO's Human Remains Discovery Protocol. If human remains are encountered in the course of ground-disturbing activities, the Applicant would implement the following actions in coordination with the New York SHPO, Native American tribes, and other Consulting Parties, as applicable:

- Any human remains discovered would be treated with dignity and respect.
- Work in the general area would stop immediately; the area would be physically secured; and a barrier prohibiting vehicles, equipment, and unauthorized persons from accessing the discovery site would be installed. The site would be protected from damage and disturbance to the maximum extent practicable.
- Human remains and associated artifacts would be left *in situ* and not disturbed. No human remains or materials associated with the remains would be collected or removed until appropriate consultation has taken place.
- The Applicant would contact local law enforcement, the county coroner's office, the New York SHPO, and Native American tribes, as appropriate. Local law enforcement officials and the county coroner's office would examine the remains to determine if they are forensic.
- If the remains are determined to be Native American, they would be left *in situ* and protected from disturbance until a plan for their protection or removal is developed. The Applicant would notify the New York SHPO and appropriate Native American tribes within 24 hours (during normal business hours) or as soon as possible after the discovery has been determined to be forensic. The Applicant would consult with the New York SHPO and Native American tribes to develop a plan of action, consistent with the guidance provided in the NAGPRA, the ACHP's 2007 Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects, and the New York SHPO's Human Remains Discovery Protocol. Avoiding further disturbance of the remains would be the preferred option.

- If the human remains are determined to be non-Native American, the remains would be left *in situ* and protected from disturbance until a plan for their avoidance or removal were developed. The Applicant would consult with the New York SHPO and other appropriate parties to determine a plan of action.
- Work in the affected area would resume only after the completion of the necessary consultation and treatment was completed.

### **G.11 Visual Resources**

The Applicant-proposed impact avoidance and minimization measures, including BMPs, that are applicable to visual resources, are as follows:

- Existing vegetation buffers would be maintained to the extent possible at selected road and stream crossings and other potentially visually sensitive locations, especially at HDD sites, residential areas, or near historic sites.
- When existing vegetative buffers in visually sensitive areas cannot be avoided, the areas would be restored following construction, except where replacement would inhibit or impair the safe operation of the cables.
- Good housekeeping practices and removal of temporary storm water and erosion controls such as silt fence, straw bales, and mulch; construction debris; or blast rock during the various stages of construction would limit the visual impact.

### **G.12 Infrastructure**

The Applicant-proposed impact avoidance and minimization measures, including BMPs, that are applicable to infrastructure, are as follows:

- The Applicant would engineer, construct, and install the proposed CHPE Project so as to make it fully compatible with the continued operation and maintenance of collocated infrastructure (e.g., aboveground, below ground, and submerged electric, gas, telecommunications, water, wastewater, sewer, and steam infrastructure and appurtenant facilities and associated equipment), and affected railroads and railways; and highways, roads, streets, or avenues.
- Existing utility infrastructure owners would be contacted prior to the beginning of any preconstruction activities and throughout the proposed CHPE Project design process, and protection measures and specifications for existing utility facilities would be negotiated with the utility owners.
- In most cases, the proposed cables would be installed over the existing infrastructure using protective coverings (e.g., grout-filled mattresses, articulated concrete mattresses, Uraduct®, and rock rip-rap).
- The design of utility crossings would follow industry standards and infrastructure agreements based on owner consultations. Many of the crossing types would include the use of a protective sleeve around the transmission cables to ensure minimum separation at the crossing point. The sleeve would extend a minimum of approximately 15 feet (5 meters) from each side of the utility intersection. The installed length of protective coverings would be between 60 and 75 feet (20 and 21 meters) in length to ensure this requirement is met.

### ***Water Supply Systems***

- Consultations with the water supply infrastructure owners and operators would be conducted to get specific information on each intake (e.g., specific location, water depth, intake size, dimensions and slot size of intake screening, flow rates, and average withdrawal rates).
- Based on this information, determine the potential impact on water supply intakes due to the mobilization of sediment, including contaminated sediment.
- If adverse impacts would be possible, develop strategies to avoid or minimize the magnitude of the estimated potential impacts. Such strategies include incorporating minor route adjustments, providing intake screens, sediment filters or barriers in the vicinity of the intake, or using alternate construction methods (e.g., non-burial installation).
- If it is determined that contaminated sediments might not be able to be avoided using alternative transmission cable installation methods or minor route adjustments, the Applicant would perform water quality modeling to assess the potential adverse impacts on water supply systems from installing the transmission cables within contaminated sediments.
- In the event that aquatic transmission cable installation would result in the exceedance of Maximum Contaminant Levels (MCLs) and the NYSDPS Staff determined that the continued use of techniques to reduce impacts would be unable to avoid exceedance of MCLs; aquatic transmission cable installation would be suspended; and the Applicant would consult with NYSDPS Staff, New York State Department of Health (NYSDOH), and NYSDEC regarding alternative cable installation techniques such non-burial methods, shear plow, or additional route modification and propose such changes to the approved EM&CP.

### ***Communications***

- A minimum separation between the proposed CHPE Project's aquatic cables and the existing telecommunications cable would be provided by installing a protective sleeve on the proposed CHPE cable at each utility crossing. The protective sleeve would extend for approximately 50 to 80 feet (15 to 24 meters) on each side of the crossing point.
- In some areas of the Hudson River Segment, existing telecommunication cables are buried less than 3 feet deep. At these locations, the Applicant would propose to use protective sleeves on the aquatic transmission cables along with burial until touching the existing cables, increase the burial depth of the existing cables by water jetting at the crossing point prior to installing the submarine cables, or cut and re-splice the telecommunications cables after installing the submarine cables. The details of these crossings would be coordinated with the owners of the existing facilities.

### ***Solid Waste Management***

- Some conventional dredging could be used for HDD water-to-land transitions. The construction contractor would be required to develop a detailed Dredge Plan and obtain the necessary dredge and disposal approvals in accordance with Federal and state regulations. The Dredge Plan would follow the guidance of the U.S. Environmental Protection Agency (USEPA)/USACE *Ecological Evaluation for Dredged Material Proposed for Ocean Disposal in the Marine Environment* and the Regional Implementation Manual New York/New Jersey Harbor *Guidance for Performing Tests on Dredged Material Proposed for Ocean Disposal*. Sediment testing results would determine the resulting waste's suitability for ocean or upland disposal. Dredged waste sediment



from the Hudson River would not be returned to the river. Instead, it would be disposed of either in an upland or ocean waste disposal site in accordance with Federal and state regulations.

### **G.13 Recreation**

The Applicant-proposed impact avoidance and minimization measures, including BMPs, that are applicable to recreation, are as follows:

- Access to boat launch areas and piers would be maintained, as feasible, but could be restricted during construction for safety reasons.
- Existing vegetation buffers between parks and the railroad ROWs would be maintained near recreational areas, as appropriate, especially at HDD drilling sites.
- Following construction, impacted areas within the CHPE Project route construction area would be seeded and allowed to revegetate naturally. When vegetative buffers in recreational areas cannot be maintained, the areas would be restored following construction, except where replacement would inhibit or impair the safe operation of the cables.

### **G.14 Public Health and Safety**

The Applicant-proposed impact avoidance and minimization measures, including BMPs, that are applicable to public health and safety, are as follows:

- One Safety Inspector would work full time on the proposed CHPE Project and would be present for any higher risk procedures. The Safety Inspector would assist in the establishment and implementation of regulatory compliance and incident-prevention activities regarding the safety and health of employees, contractor and subcontractor personnel, and the public.
- Follow all guidelines established in project Health and Safety Plans and the Emergency Contingency Plan to ensure construction activities are conducted in a safe manner.
- Follow all guidelines established in the Aquatic Safety and Communication Plan when conducting project activities in waterways to ensure activities are conducted in a safe manner.
- Follow all guidelines detailed in the project Emergency Repair and Response Plan (ERRP) to be developed for the project when conducting emergency repair and maintenance activities.

### **G.15 Hazardous Materials and Wastes**

The Applicant-proposed impact avoidance and minimization measures, including BMPs, that are applicable to the management of hazardous materials and waste, are as follows:

- Visual, olfactory, and photoionization detector soil screenings and assessments are to be performed by a qualified environmental professional.
- Conduct waste characterization sampling of contaminated soil stockpiles prior to disposal.
- Use liners, covers, and other soil erosion and sediment controls to minimize the potential spread of contaminated soils.
- Transport and dispose of contaminated soils in accordance with applicable regulations and standards, fugitive dust monitoring, and dust-control measures.

- Provide health and safety training for all personnel who might be exposed to hazardous substances or health hazards on site.

## **G.16 Air Quality**

The Applicant-proposed impact avoidance and minimization measures, including BMPs, that are applicable to avoidance of impacts on air quality, are as follows:

- Keep all construction equipment in good running condition to minimize emissions from internal combustion engines and ensure that emissions and odors are kept to a minimum.
- To the degree practical, minimize equipment idling for long periods of time.
- Apply water or non-toxic soil stabilizers to all unpaved access roads, parking areas, and staging areas with sufficient frequency to control dust and maintain an effective level of soil moisture or cohesion while avoiding excessive water application.
- Clean accumulated dirt, as necessary, from roads along the construction corridor or from construction vehicles.
- Implement dust-control measures, as necessary, to limit dust releases from trucks (such as covering loads, wetting dry soil and maintaining a certain depth of freeboard).
- Seed or plant exposed areas as soon as practicable after construction, or as called for by permit, at the converter station and substation to reduce the potential for wind blown erosion.
- Keep all construction equipment in good running condition to minimize emissions from internal combustion engines and ensure that odor impacts are kept to a minimum.
- Exposed stockpiles of soil and other excavated materials would be contained within perimeter silt fencing, watered, treated with soil binders, or covered as necessary.
- To the degree practical, minimize equipment idling for longer than necessary periods of time.
- Develop a monitoring plan that includes an inventory of equipment containing SF<sub>6</sub>, include design elements to reduce energy consumption and thermal cycling of switchgear which helps reduce leakage, identify and repair leaking equipment in a timely fashion, train employees on the climate change effects of SF<sub>6</sub>, and account for the respective make-up quantities.
- Use low-emission construction equipment, minimize vehicle idling, and carpool to further reduce greenhouse gas (GHG) emissions.

## **G.17 Noise**

The Applicant-proposed impact avoidance and minimization measures, including BMPs, that are applicable to noise, are as follows:

- Measures to apply at residential areas and other noise-sensitive locations include public outreach, appropriate work hour and operation restrictions, temporary sound barriers, employment of equipment fitted with sound deadening materials, selection of low noise equipment and procedures, and other noise-reduction work methods or devices as determined appropriate for the locale and task. Construction and maintenance equipment would be equipped with appropriate sound-muffling devices (i.e. Original Equipment Manufacturer [OEM] or better), and should be maintained in good operating condition at all times.

- Should blasting be required at any location where non-blasting methods of excavation are impossible or blasting causes less impact, then noise and vibration effects on nearby land uses and structures would be managed with a blasting plan for each site prior to any blasting activities. The plan should include the blasting methods, surveys of existing structures and other built facilities, and distance calculations to estimate the area of effect of the blasting.
- Locating equipment yards and marshalling areas away from noise-sensitive receptors as practical.
- Installing improved mufflers on heavy construction equipment when used in close proximity to noise-sensitive areas.
- Utilizing low-noise technologies (e.g., vibratory pile drivers) as appropriate.
- Limiting construction of high noise level activities (e.g., wood chipping, pile driving, rock drilling, blasting, excavation, and loading) to non-overnight hours as much as possible when construction is conducted in close proximity to noise-sensitive receptors.
- In cases where a noise source would be in a fixed position for an extended period of time (such as for an HDD operation), install temporary sound barriers such as wooden sound barriers to reduce noise levels or, in extreme cases, offer temporary lodging for residents adversely affected.

### **G.18 Socioeconomics**

No measures would be necessary for socioeconomic resources.

### **G.19 Environmental Justice**

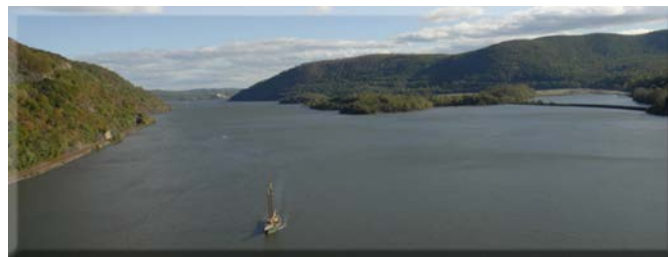
No measures would be required for environmental justice because any human health or environmental effects related to minority or low-income populations would be negligible and not considered disproportionately high or adverse.

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## APPENDIX H

# ESA Section 7 Documentation





***APPENDIX H.1 – SECTION 7 CONSULTATION DOCUMENTATION FOR THE  
PROPOSED CHPE PROJECT***







**Department of Energy**  
Washington, DC 20585

June 21, 2012

Robyn Niver  
Endangered Species Biologist  
U.S. Fish and Wildlife Service  
New York Field Office  
3817 Luker Road  
Cortland, New York 13045

**SUBJECT: Proposed Champlain Hudson Power Express Transmission Line Project**

Dear Ms. Niver:

As you are aware, Champlain Hudson Power Express, Inc. ("CHPEI" or "Applicants") has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the proposed Champlain Hudson Power Express Transmission Line Project (Project). This letter is to initiate informal consultation under Section 7(a)(2) of the Endangered Species Act (ESA) for the Project.

CHPEI's application for a Presidential Permit was submitted to the DOE on January 27, 2010. CHPEI subsequently modified its application on August 6, 2010; July 7, 2011; and February 28, 2012. The Project currently under review by the DOE would consist of a 1,000-megawatt (MW) high-voltage direct current (HVDC) Voltage Source Converter controllable transmission system extending from the Canadian Province of Quebec to New York City, as shown in the attached Figures 1 through 4. From the international border between the United States and Canada, two cables (comprising a single bipole) would extend south to an HVDC Converter Station to be located near Luyster Creek, north of 20th Avenue in Astoria, Queens. From the Converter Station, a 345-kilovolt (kV) underground alternating current (AC) circuit would connect to the existing 345-kV gas-insulated substation owned by the New York Power Authority (NYPA) and situated near NYPA's Charles Poletti Power Project in Astoria. The Applicants also propose to construct a 3-mile buried 345-kV HVAC cable circuit from the Astoria Substation to Consolidated Edison's Rainey Substation in Queens. The Applicants have proposed to install the cables within waterways, and within the rights-of-way of existing transportation infrastructure, including railroads and roadways. Sections of the transmission line installed within waterways will generally be buried beneath the lake or riverbed. Overland sections of the Project will be buried within existing ROW corridors.

The DOE has determined that an Environmental Impact Statement (EIS) is the appropriate level of review under the National Environmental Policy Act (NEPA) for the proposed project, as was documented in our Federal Register Notice of Intent to prepare an EIS on June 18, 2010 (75 FR 117). The Notice of Intent, along with background information, an opportunity to subscribe to our mailing list, and more, are available on our EIS-specific website at <http://www.chpexpresseis.org>.

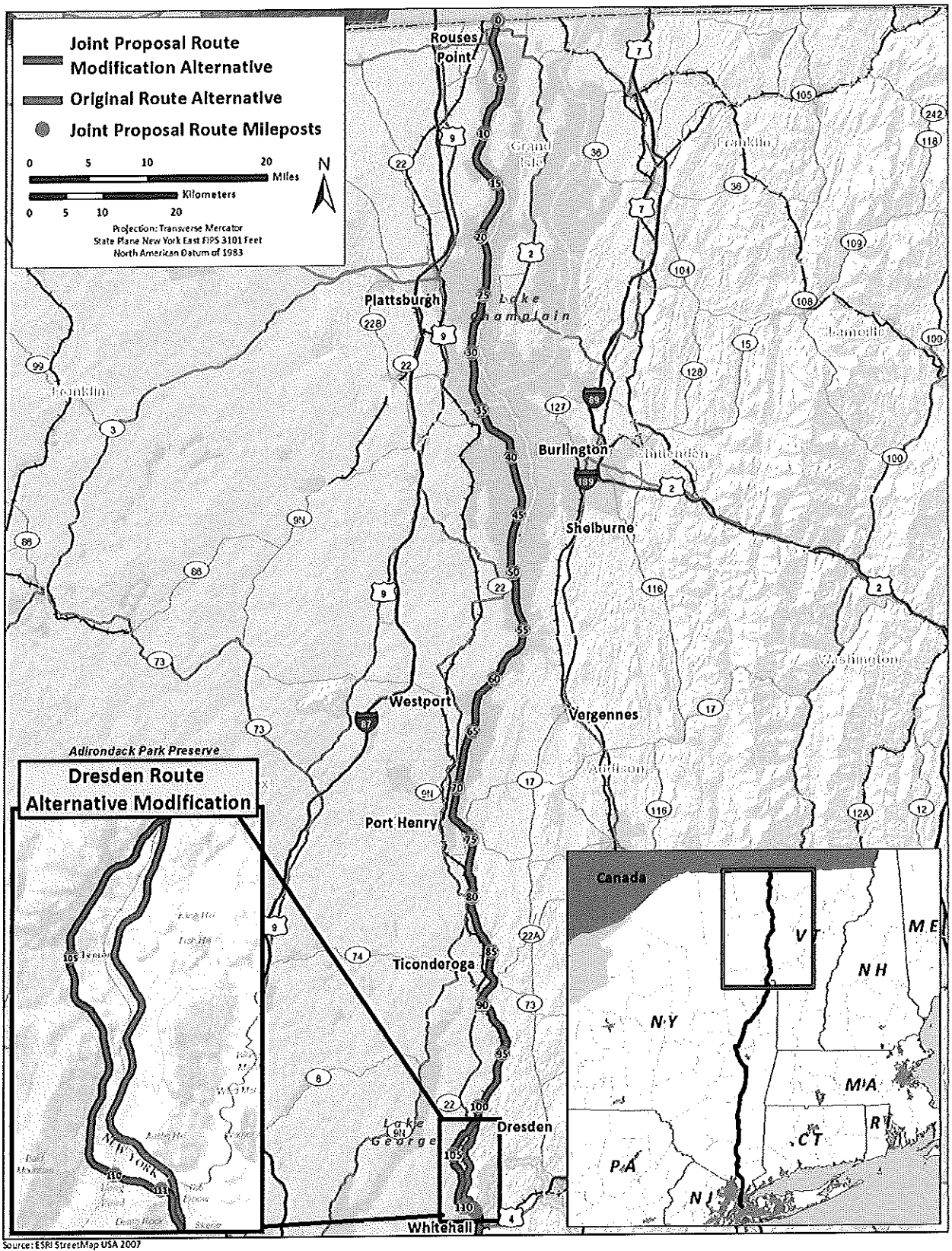
We ask that you provide a list of species that might occur in the action area. We also request a meeting to kick off informal consultation and discuss any concerns relative to impacts of the Proposed Action on federally listed species. We will also consult with the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service regarding threatened and endangered species and critical habitat under their purview and essential fish habitat that could be affected by the Proposed Action.

Please feel free to contact me directly at any time at [Brian.Mills@hq.DOE.gov](mailto:Brian.Mills@hq.DOE.gov), or by phone at (202) 586-8267.

Very truly yours,

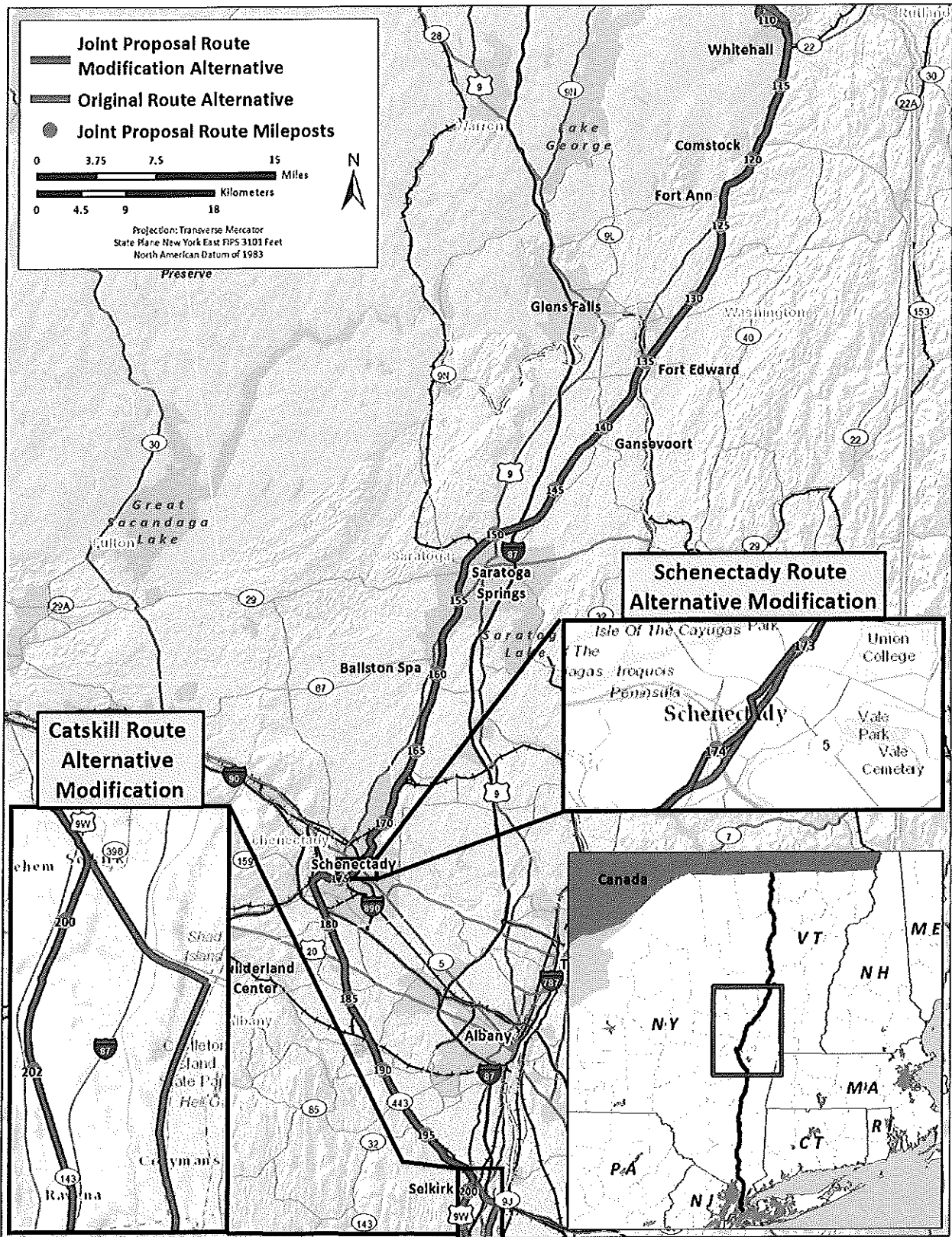
A handwritten signature in black ink, appearing to read "Brian Mills", written over a horizontal line.

Mr. Brian Mills  
Permitting, Siting, and Analysis, OE-20  
Office of Electricity Delivery and  
Energy Reliability  
U.S. Department of Energy



Source: ESRI StreetMap USA 2007

Figure 1. CHPE Lake Champlain Segment



Source: ESRI StreetMap USA 2007

Figure 2. CHPE Railroad ROW Segment

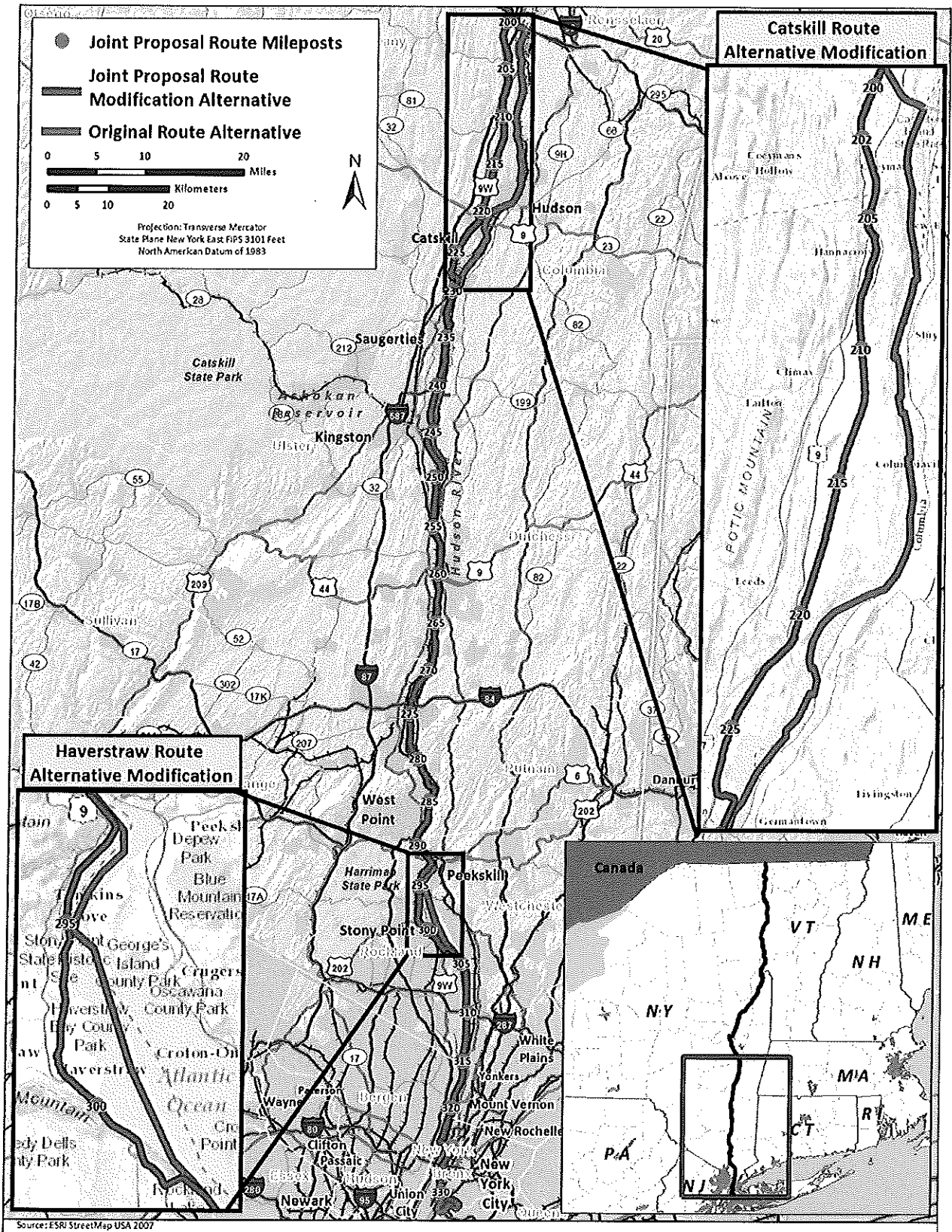


Figure 3. Hudson River Segment

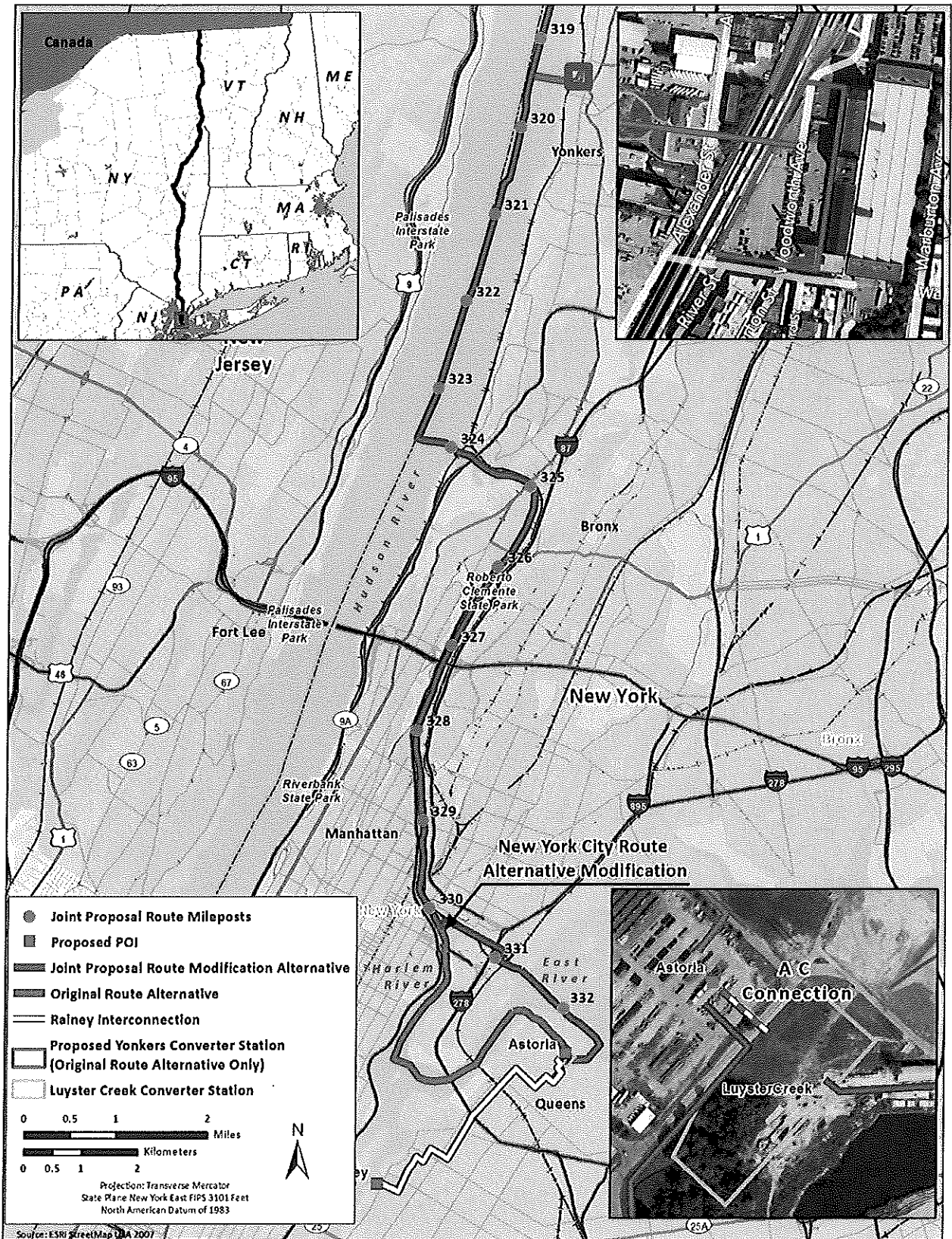


Figure 4. New York City Metropolitan Area Segment



**Department of Energy**  
**Washington, DC 20585**

June 21, 2012

Ms. Mary Colligan, Assistant Regional Administrator  
NOAA National Marine Fisheries Service Northeast Regional Office  
55 Great Republic Drive  
Gloucester, MA 01930

**SUBJECT: Proposed Champlain Hudson Power Express Transmission Line Project**

Dear Ms. Colligan:

As you are aware, Champlain Hudson Power Express, Inc. ("CHPEI" or "Applicants") has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the proposed Champlain Hudson Power Express Transmission Line Project (Project). This letter is to initiate informal consultation under Section 7(a)(2) of the Endangered Species Act (ESA) for the Project.

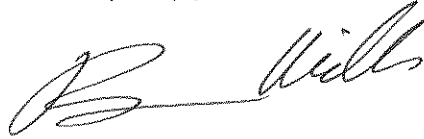
CHPEI's application for a Presidential Permit was submitted to the DOE on January 27, 2010. CHPEI subsequently modified its application on August 6, 2010; July 7, 2011; and February 28, 2012. The Project currently under review by the DOE would consist of a 1,000-megawatt (MW) high-voltage direct current (HVDC) Voltage Source Converter controllable transmission system extending from the Canadian Province of Quebec to New York City, as shown in the attached Figures 1 through 4. From the international border between the United States and Canada, two cables (comprising a single bipole) would extend south to an HVDC Converter Station to be located near Luyster Creek, north of 20th Avenue in Astoria, Queens. From the Converter Station, a 345-kilovolt (kV) underground alternating current (AC) circuit would connect to the existing 345-kV gas-insulated substation owned by the New York Power Authority (NYPA) and situated near NYPA's Charles Poletti Power Project in Astoria. The Applicants also propose to construct a 3-mile buried 345-kV HVAC cable circuit from the Astoria Substation to Consolidated Edison's Rainey Substation in Queens. The Applicants have proposed to install the cables within waterways, and within the rights-of-way of existing transportation infrastructure, including railroads and roadways. Sections of the transmission line installed within waterways will generally be buried beneath the lake or riverbed. Overland sections of the Project will be buried within existing ROW corridors.

The DOE has determined that an Environmental Impact Statement (EIS) is the appropriate level of review under the National Environmental Policy Act (NEPA) for the proposed project, as was documented in our *Federal Register* Notice of Intent to prepare an EIS on June 18, 2010 (75 FR 117). The Notice of Intent, along with background information, an opportunity to subscribe to our mailing list, and more, are available on our EIS-specific website at <http://www.chpexpresseis.org>.

Detailed figures of the project area are attached for your consideration. It is our understanding that your area of interest overlaps the Hudson River and New York City Area Metropolitan segments of the project area in Figures 3 and 4, respectively. Our current information indicates that the action area is both within the immediate vicinity of the project area and along the potential routes for a cable laying ship and associated support vessels navigating to and from port for a limited number of trips. We ask that you provide a list of species that might occur in the action area. We also request a meeting at your earliest convenience, to kick off informal consultation and discuss any concerns relative to impacts of the Proposed Action on federally listed species. We will also consult with the NOAA Habitat Conservation Division regarding essential fish habitat that could be affected by the Proposed Action, as well as the U.S. Fish and Wildlife Service regarding species and critical habitat under their purview.

Please feel free to contact me directly at any time at [Brian.Mills@hq.DOE.gov](mailto:Brian.Mills@hq.DOE.gov), or by phone at (202) 586-8267.

Very truly yours,

A handwritten signature in black ink, appearing to read "Brian Mills", written in a cursive style.

Mr. Brian Mills  
Permitting, Siting, and Analysis, OE-20  
Office of Electricity Delivery and  
Energy Reliability  
U.S. Department of Energy

Attch: Figures 1 through 4





**Department of Energy**  
Washington, DC 20585

June 21, 2012

Ms. Diane Rusanowsky  
NOAA Fisheries Science Center  
Milford Laboratory  
212 Rogers Avenue  
Milford, CT 06460-6499

**SUBJECT: Proposed Champlain Hudson Power Express Transmission Line Project**

Dear Ms. Rusanowsky:

As you are aware, Champlain Hudson Power Express, Inc. ("CHPEI" or "Applicants") has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the proposed Champlain Hudson Power Express Transmission Line Project (Project). This letter is to initiate informal consultation under Section 7(a)(2) of the Endangered Species Act (ESA), as well as to request the identification of essential fish habitat (EFH) for the Project.

CHPEI's application for a Presidential Permit was submitted to the DOE on January 27, 2010. CHPEI subsequently modified its application on August 6, 2010; July 7, 2011; and February 28, 2012. The Project currently under review by the DOE would consist of a 1,000-megawatt (MW) high-voltage direct current (HVDC) Voltage Source Converter controllable transmission system extending from the Canadian Province of Quebec to New York City, as shown in the attached Figures 1 through 4. From the international border between the United States and Canada, two cables (comprising a single bipole) would extend south to an HVDC Converter Station to be located near Luyster Creek, north of 20th Avenue in Astoria, Queens. From the Converter Station, a 345-kilovolt (kV) underground alternating current (AC) circuit would connect to the existing 345-kV gas-insulated substation owned by the New York Power Authority (NYPA) and situated near NYPA's Charles Poletti Power Project in Astoria. The Applicants also propose to construct a 3-mile buried 345-kV HVAC cable circuit from the Astoria Substation to Consolidated Edison's Rainey Substation in Queens. The Applicants have proposed to install the cables within waterways, and within the rights-of-way of existing transportation infrastructure, including railroads and roadways. Sections of the transmission line installed within waterways will generally be buried beneath the lake or riverbed. Overland sections of the Project will be buried within existing ROW corridors.

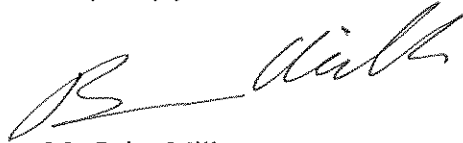
The DOE has determined that an Environmental Impact Statement (EIS) is the appropriate level of review under the National Environmental Policy Act (NEPA) for the proposed project, as was documented in our Federal Register Notice of Intent to prepare an EIS on June 18, 2010 (75 FR 117). The Notice of Intent, along with background information, an opportunity to subscribe to our mailing list, and more, are available on our EIS-specific website at <http://www.chpexpresseis.org>.

Detailed figures of the CHPEI project area are attached for your consideration. Our research indicates that EFH is only designated in the Hudson River and New York City Metropolitan Area segments of the project area in Figures 3 and 4, respectively.

We ask that you provide a list of potentially affected species with EFH in the project area. We also request a meeting to initiate consultation and discuss any concerns you might have relative to impacts of the Proposed Action on EFH. We will also consult with the NOAA Protected Resources Division and the U.S. Fish and Wildlife Service and the regarding threatened and endangered species and critical habitat under their purview that could be affected by the proposed action.

Please feel free to contact me directly at any time at [Brian.Mills@hq.DOE.gov](mailto:Brian.Mills@hq.DOE.gov), or by phone at (202) 586-8267.

Very truly yours,

A handwritten signature in black ink, appearing to read "Brian Mills", written in a cursive style.

Mr. Brian Mills  
Permitting, Siting, and Analysis, OE-20  
Office of Electricity Delivery and  
Energy Reliability  
U.S. Department of Energy

Attch: Figures 1 through 4



## United States Department of the Interior



### FISH AND WILDLIFE SERVICE

New York Field Office

3817 Luker Road

Cortland, NY 13045

Phone: (607) 753-9334 Fax: (607) 753-9699

<http://www.fws.gov/northeast/nyfo>

Project Number: 90534

To: Brian Mills

Date: Jul 17, 2012

Regarding: Champlain Hudson Power Express

Town/County: from the Canadian Province of Quebec to New York City

The U.S. Fish and Wildlife Service (Service) New York Field Office has received your request for information regarding occurrences of Federally-listed or proposed threatened and endangered species within the vicinity of the above-referenced project/property. In an effort to streamline project reviews, we have shifted our species list request responses to our website at <http://www.fws.gov/northeast/nyfo/es/section7.htm>. Please go to our website and print the appropriate portions of our county list of endangered, threatened, proposed, and candidate species, and the official list request response for your files. Step-by-step instructions are also found on our website.

As a reminder, Section 9 of the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) prohibits unauthorized taking\* of listed species and applies to Federal and non-Federal activities. Additionally, Section 7(a)(2) of the ESA requires Federal agencies, in consultation with the Service, to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. An assessment of the potential direct, indirect, and cumulative impacts is required for all Federal actions that may affect listed species. For projects not authorized, funded, or carried out by a Federal agency, consultation with the Service pursuant to Section 7(a)(2) of the ESA is not required. However, no person is authorized to "take"\* any listed species without appropriate authorizations from the Service. Therefore, we provide technical assistance to individuals and agencies to assist with project planning to avoid the potential for "take," or when appropriate, to provide assistance with their application for an incidental take permit pursuant to Section 10(a)(1)(B) of the ESA.

Project construction or implementation should not commence until all requirements of the ESA have been fulfilled. If you have any questions or require further assistance regarding threatened or endangered species, please contact the Endangered Species Program at (607) 753-9334. Please refer to the above project number in any future correspondence.

Endangered Species Biologist: Robyn A. Niver 

\*Under the Act and regulations, it is illegal for any person subject to the jurisdiction of the United States to *take* (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these), import or export, ship in interstate or foreign commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any endangered fish or wildlife species and most threatened fish and wildlife species. It is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. "Harm" includes any act which actually kills or injures fish or wildlife, and case law has clarified that such acts may include significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife.

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UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
NORTHEAST REGION  
55 Great Republic Drive  
Gloucester, MA 01930-2276

JUN 28 2012

Brian Mills  
Permitting, Siting and Analysis, OE-20  
Office of Electricity Delivery and Energy Reliability  
U.S. Department of Energy  
Washington, DC 20585

Re: Proposed Champlain Hudson Power Express

Dear Mr. Mills,

Your letter dated June 21, 2012, requests information on listed species present along the route of the proposed Champlain Hudson Power Express. Champlain Hudson Power Express, Inc. (CHPEI) has applied to the U.S. Department of Energy's Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the proposed transmission line. It is our understanding that approvals or permits will also be required from the U.S. Army Corps of Engineers and possibly the Federal Energy Regulatory Commission. The proposed project involves the installation of a new transmission cable from Quebec, Canada to New York City. The cable will be installed down the length of the Hudson River from Lake Champlain to the lower river in Manhattan.

#### **Endangered Species**

Atlantic sturgeon occur in estuarine and marine waters along the U.S. Atlantic coast, including the Hudson River. In the Hudson River, Atlantic sturgeon can occur from the Troy Dam to the confluence with the Atlantic Ocean. The New York Bight, Chesapeake Bay, South Atlantic and Carolina Distinct Population Segments (DPS) of Atlantic sturgeon are endangered; the Gulf of Maine DPS is threatened. Individuals originating from any of these DPSs could occur in the project area. A population of endangered shortnose sturgeon occurs in the Hudson River; ranging from New York Harbor to the Troy Dam. You can find more information on sturgeon species at: [http://www.nero.noaa.gov/prot\\_res/esp/index.html](http://www.nero.noaa.gov/prot_res/esp/index.html).

#### **Candidate Species**

Candidate species are those petitioned species that we are actively considering for listing as endangered or threatened under the ESA, as well as those species for which we has initiated an ESA status review that it has announced in the *Federal Register*. "Candidate" status does not carry any procedural or substantive protections under the ESA. Two candidate species, alewife and blueback herring, can occur in the project area. You can find more information on these species in the Federal Register notice that announced this decision: <http://www.nmfs.noaa.gov/pr/pdfs/fr/fr76-67652.pdf>.



### ESA Section 7 Consultation

Section 7(a)(2) of the ESA, states that each Federal agency shall, in consultation with the Secretary, insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. Any discretionary federal action that may affect a listed species must undergo Section 7 consultation. We encourage you to work with the ACOE and/or FERC to ensure that the section 7 consultation is initiated with us as appropriate. We recommend that any necessary consultation or conference with us be completed prior to issuing any final permits or authorizations. We also request that you identify a lead Federal agency for purposes of section 7 consultation and that determination be provided to us in writing in a letter that identifies all of the federal authorizations or permits necessary for the project.

As project plans are developed, we recommend that you consider the following effects of the project on NMFS listed and candidate species:

- Effects of increased suspended sediment;
- Suspension of contaminated sediments, particularly PCBs;
- Discharge of any other pollutant;
- Loss of prey; and,
- Any impacts to habitat or conditions that make affected waterbodies suitable for these species.

We encourage you to develop construction plans that avoid habitat disruption in places and at times where spawning and/or rearing of early life stages takes place. With careful planning some impacts to listed species may be able to be avoided. We look forward to working with you as project plans are developed. Should you have any questions regarding endangered species and to arrange the requested meeting, please contact Julie Crocker at (978)282-8480 or by e-mail ([Julie.Crocker@noaa.gov](mailto:Julie.Crocker@noaa.gov)). If you have not done so already, please contact Chris Boelke in our Habitat Conservation Division at (978) 281-9394 or by e-mail ([Christopher.Boelke@noaa.gov](mailto:Christopher.Boelke@noaa.gov)) regarding potential impacts of the proposed action on Essential Fish Habitat and resources considered under the Fish and Wildlife Coordination Act. Questions regarding candidate species should be directed to Kim Damon-Randall at (978)282-8485 or by e-mail ([Kimberly.Damon-Randall@noaa.gov](mailto:Kimberly.Damon-Randall@noaa.gov)).

Sincerely,



Mary A. Colligan  
Assistant Regional Administrator  
for Protected Resources

CC: Boelke, F/NER4  
Murray-Brown, Damon-Randall - F/NER3

***APPENDIX H.2 – BIOLOGICAL RESOURCES TABLES***





## **Appendix H.2**

### **Biological Resources Tables**

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**Appendix H.2** contains tables that document various species that are found along the proposed CHPE Project route. Tables are broken down by segments, with the exception of Table H.2, which includes breeding birds for the entire proposed CHPE Project route, and identifies life history characteristics that are important to species that occur within the area of the proposed CHPE Project. State-listed species are identified as such in the tables.

**Appendix H.2** contains the following tables:

- **Table H.2-1.** Life History Characteristics of Representative Fish of Lake Champlain
- **Table H.2-2.** State-Listed Species Occurring Within 0.25 Miles of the Overland Segment
- **Table H.2-3.** Life History Characteristics of Representative Fish of the Hudson River
- **Table H.2-4.** State-Listed Species Occurring within 0.25 miles of the Hudson River Segment
- **Table H.2-5.** Breeding Birds in the Vicinity of the Proposed CHPE Project

**Table H.2-1. Life History Characteristics of Representative Fish of Lake Champlain**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Temperature Preference</b>	<b>Trophic Level</b>	<b>Habitat</b>	<b>Migratory or Resident</b>	<b>Spawning Season/Habitat</b>
Sea lamprey	<i>Petromyzon marinus</i>	Cold water	Predator	Pelagic	Migratory	Spring-summer/rocky streams
Lake herring/cisco	<i>Coregonus artedii</i>	Cold water	Forage	Pelagic	Resident	Late fall/shallow water
Atlantic salmon*	<i>Salmo salar</i>	Cold water	Predator	Pelagic	Migratory	Fall/streams
Steelhead	<i>Oncorhynchus mykiss</i>	Cold water	Predator	Pelagic	Migratory	Spring/streams
Alewives	<i>Alosa pseudoharengus</i>	Warm water	Forage	Pelagic	Migratory	Spring-summer/shallow areas of lakes
Rainbow smelt	<i>Osmerus mordax</i>	Cold water	Forage	Pelagic	Migratory	Late winter/streams
Lake whitefish	<i>Coregonus clupeaformis</i>	Cool water	Forage	Pelagic	Resident	Fall/nearshore over rock, gravel, or sand
Lake trout*	<i>Salvelinus namaycush</i>	Cold water	Predator	Demersal	Migratory	Fall-early winter/rocky shoals
Walleye	<i>Sander vitreum</i>	Cool water	Predator	Littoral	Migratory	Spring/streams and shoals with current
Northern pike	<i>Esox lucius</i>	Cool water	Predator	Littoral	Migratory	Spring/shallow marshes
Yellow perch	<i>Perca flavescens</i>	Cool water	Forage	Littoral	Resident	Spring/shallows over sand, gravel, rubble, or vegetation
American eel	<i>Anguilla rostrata</i>	Warm water	Predator	Littoral	Migratory	Late summer-fall/Sargasso Sea
Largemouth bass	<i>Micropterus salmoides</i>	Warm water	Predator	Littoral	Resident	Spring-summer/nearshore near vegetation
Smallmouth bass	<i>M. dolomieu</i>	Warm water	Predator	Littoral	Resident	Spring/along shore over gravel
Brown trout*	<i>Salmo trutta</i>	Cold water	Predator	Littoral	Migratory	Fall-early winter/streams
Pumpkinseed	<i>Lepomis gibbosus</i>	Warm water	Predator	Littoral	Resident	Spring-mid-summer/nearshore near vegetation

<b>Common Name</b>	<b>Scientific Name</b>	<b>Temperature Preference</b>	<b>Trophic Level</b>	<b>Habitat</b>	<b>Migratory or Resident</b>	<b>Spawning Season/Habitat</b>
White crappie	<i>Pomoxis annularis</i>	Warm water	Predator	Littoral	Resident	Spring/turbid waters w/underwater objects over gravel, rock.
Black crappie	<i>Pomoxis nigromaculatus</i>	Warm water	Predator	Littoral	Resident	Spring-early summer/shallow, weedy water with sand
Lake sturgeon	<i>Acipenser fulvescens</i>	Cold water	Forage	Demersal	Migratory	Spring - early summer/ relatively shallow water near gravel beds

Sources: Trzaskos and Malchoff 2006, NYSDEC 1986, Fishbase 2013

Note: \* Species stocked by state or Federal agencies.

**Table H.2-2. State-Listed Species Occurring Within 0.25 Miles of the Overland Segment**

Common Name	Scientific Name	New York Status	Species Information
<b>Plants</b>			
Rock cress	<i>Draba arabisans</i>	T	Flowering plant with a range spanning much of the northeastern United States. Grows on dry cliffs, rocky ledges, talus slopes, and open woodlands, often at calcareous sites. In New York State, rock cress has been found on bedrock of limestone, shale and siltstone, and anorthosite. Occurs in calcareous cliff communities.
Smooth rock cress	<i>Draba glabella</i>	E	Flowering plant with a range spanning northeastern United States. Grows on dry cliffs, rocky ledges, talus slopes, and open woodlands, often at calcareous sites. In New York State, smooth rock cress is only known to occur along Lake Champlain. Occurs in calcareous cliff communities.
Long's bittercress	<i>Cardamine longii</i>	T	Mustard plant limited to the Hudson River and Long Island. Habit is intertidal areas within tidal estuaries and backwater areas.
Davis sedge	<i>Carex davisii</i>	T	Sedge plant found in New York. It is mainly found in areas adjacent to the Hudson River from north of Albany south to Queens in mesic limestone, rich bottomland, and floodplain forest communities.
Handsome sedge	<i>Carex Formosa</i>	T	In New York, the sedge plant can be found scattered throughout the state. It can be found in habitats such as forests, forest edges, road sides, or less frequently in open meadows. It occurs in areas where the bedrock is limestone or the soils are calcareous. Occurs in calcareous cliff communities.
Lake cress	<i>Neobeckia aquatic</i>	T	Plant of the mustard family found in New York State. Prefers shallow, still water.
Smooth cliff brake	<i>Pallaea glabellas</i> sp glabella	T	Fern with a range spanning much of eastern United States. Thrives on bare limestone. Occurs in calcareous cliff communities.
Heartleaf plantain	<i>Plantago chordate</i>	T	A high proportion of the populations are along the Hudson River, where it prefers the edges of freshwater intertidal mudflats, sandy or rocky shorelines of tidal creeks and other waterways, edges of freshwater tidal marshes, and gravel shores along freshwater tidal portions.
Douglas knotweed	<i>Polygonum douglassi</i>	T	Flowering plant with a range spanning much of New England. Prefers rocky slopes and dry soils.

Common Name	Scientific Name	New York Status	Species Information
<b>Plants (continued)</b>			
Hill's pondweed	<i>Potamogeton hilli</i>	T	Pondweed that can be found in New York State, where it prefers the calcareous wetlands and ponds of the eastern Hudson River Valley.
Slender bulrush	<i>Schoenoplectus heterochaetus</i>	E	Rare sedge that can be found scattered but mostly east and west of Adirondacks. Prefers shallow emergent marshes along slow-moving creeks or rivers, often at their mouths.
Downey lettuce	<i>Lactuca hirsute</i>	E	Herb found in the majority of the eastern United States and prefers dry, open woods, clearings.
Estuary beggar-ticks	<i>Bidens hyperborean</i> var. <i>hyperborean</i>	E	Aster reaching its southern limit in New York State. Because its tidal habitat is only available for a few hours a day during low tide, there is very little information on the distribution of the species in New York. Prefers freshwater tidal mud flats and marshes.
Spongy arrowhead	<i>Sagittaria montevidensis</i> var. <i>spongiosa</i>	T	Scattered individuals in good habitat. Intertidal brackish marsh with muddy creek. Plants submerged at high tide.
Hudson River water-nymph	<i>Najas guadalupensis</i> ssp. <i>Muenscheri</i>	E	Water-nymph endemic to New York State. Prefers shallow water or pools of tidal mud flats of the Hudson River on mucky or gravel and rock soils.
Lake-cress	<i>Rorippa aquatic</i>	T	Lake-cress is scattered throughout New York State. Prefers habitat in shallow, still water, which include many ponds and lakes.
American waterwort	<i>Elatine americana</i>	E	Water starwort known to occur from Long Island through tidally influenced Hudson River. Prefers intertidal mudflats and marshes along the Hudson River.
Stiff-leaf golden-rod	<i>Oligoneuron rigidum</i> var. <i>rigidum</i>	T	Goldenrod found in calcareous or circumneutral areas within the Hudson Valley. Habitats range from open dry, shaley slopes or limestone bedrock to woodland edges between calcareous woodlands and successional old fields, among others.
<b>Insects</b>			
Frosted elfin	<i>Callophrys irus</i>	T	Rare butterfly extirpated from Canada and some U.S. states. Can be found scattered on sandplains, mainly in the upper Hudson River Valley. The key habitat feature is an abundance of foodplants (wild blue lupine and wild indigo [ <i>Baptisia</i> spp.]), and is associated with remnant pine barrens, oak savannas, or dry oak forest.
Persius duskywing	<i>Erynnis persius persius</i>	E	Rare butterfly with only a few colonies remaining in New York State. Their range spans much of the United States and they prefer dry brushy or scrubby areas or relatively open woodlands with abundant New Jersey Tea ( <i>Ceanothus americanus</i> ).

Common Name	Scientific Name	New York Status	Species Information
<b>Birds</b>			
Peregrine falcon	<i>Falco peregrines</i>	E	Highly migratory falcon with an expansive foraging range. Arrives in northern breeding areas late April–early May; southern departure begins late August–early September. Prefers open habitat and often nests on ledges or holes on the face of rocky cliffs or crags.
Short-eared owl	<i>Asio flammeus</i>	E	Highly migratory bird that breeds in Essex County. Its preferred habitat consists of marshes and open lowland areas, and recent nests have been observed in pastures and agricultural areas in New York State.
Bald eagle*	<i>Haliaeetus leucocephalus</i>	T	Raptor that can be found in scattered areas throughout the United States. The bald eagle generally prefers areas adjacent to large bodies of water that support fish populations. Wintering areas are concentrated in four main areas: the Upper Delaware River, the Saint Lawrence River, the Lower Hudson River, and the Sacandaga River.
Least bittern	<i>Ixobrychus exilis</i>	T	Long distance migratory bird arriving at nesting areas in the northeastern United States in early to mid-April or early May and leaves northern breeding areas by September/October. Considered locally common in marshes of the Hudson River Valley, and possibly breeding in the Champlain Valley. Typically breeds in tall, emergent vegetation in marshes, primarily fresh water. When least bitterns are alarmed, instead of flying away, they often freeze.
Northern harrier	<i>Circus cyaneus</i>	T	Raptor with a very large home range, and whose breeding range includes most of New York State. The northern harrier prefers open marshy and lowland areas, similar to the short-eared owl.
Loggerhead shrike	<i>Lanius ludovicianus</i>	E	Prefers open habitats such as pastures, hayfields, and other agricultural areas. It uses the thorns of certain shrubs and trees, such as hawthorn, to impale its prey. It is not known whether hawthorn trees occur along the Overland Segment, but the Washington hawthorn is used extensively throughout New York State as an ornamental and landscape tree.

Sources: NatureServe 2012, PFAF Database 2012, NYNHP 2005c, UW 2012b, Cornell 2012, CHPEI 2012x, NYSDEC 2012k

Key:

T = threatened, E = endangered

\* = The Bald eagle is also protected under the BGEPA.

**Table H.2-3. Life History Characteristics of Representative Fish of the Hudson River**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Diet</b>	<b>Habitat</b>	<b>Migratory or Resident</b>	<b>Salinity Preference</b>	<b>Spawning Season/Habitat</b>
Alewife	<i>Alosa pseudoharengus</i>	Zooplankton, smaller fish, insects and eggs of fish, insects, and crustaceans	Pelagic	Migratory	Anadromous	March–May/shallow streams and large rivers
American eel	<i>Anguilla rostrata</i>	Insects, mollusks, fish, crustaceans	Demersal	Migratory	Catadromous (spawn in salt water, live in fresh water)	Winter and early spring/Saragosso Sea
American shad	<i>Alosa sapidissima</i>	Insects, crustaceans, mysids, copepods, small fish	Pelagic	Migratory	Anadromous	April–June/sand, silt, muck, gravel, and boulder substrates, usually in waters < 10 feet (3 meters)
Atlantic menhaden	<i>Brevoortia tyrannus</i>	Copepods, zooplankton, phytoplankton, and diatoms	Pelagic	Migratory	Marine	May–June and September–October/coastal waters < 32 feet (10 meters)
Atlantic silverside	<i>Menidia menidia</i>	Copepods, mysids, amphipods, fish eggs, worms, and insects	Pelagic	Migratory	Estuarine	March–June/ intertidal zone of estuaries and tributaries
Atlantic sturgeon	<i>Acipenser oxyrinchus</i>	Mollusks, worms, gastropods, shrimps, small fish	Demersal	Migratory	Anadromous	March–May/rock, rubble, or hard clay
Atlantic tomcod	<i>Microgadus tomcod</i>	Small crustaceans, mollusks, and fish	Demersal	Resident	Estuarine	November–February/shallow waters of estuaries or stream mouths
Banded killifish	<i>Fundulus diaphanous</i>	Flying insects, midge larvae	Pelagic	Resident	Fresh water	April–August/pools with vegetation

Common Name	Scientific Name	Diet	Habitat	Migratory or Resident	Salinity Preference	Spawning Season/Habitat
Bay anchovy	<i>Anchoa mitchilli</i>	Mysids and copepods	Pelagic	Migratory	Estuarine	May–September/estuarine waters < 12 °C
Black sea bass	<i>Centropristis striata</i>	Crustaceans, mollusks, echinoderms, crabs and fish	Pelagic	Migratory	Marine	May–October/continental shelf in vicinity of large estuaries
Blueback herring	<i>Alosa aestivalis</i>	Zooplankton, smaller fish, insects and eggs of fish, insects, and crustaceans	Pelagic	Migratory	Anadromous	May–April/ fast currents over hard substrate
Bluefish	<i>Pomatomus saltatrix</i>	Zooplankton, fish larvae, shrimp, fish, squid, crustaceans	Pelagic	Migratory	Marine	June–August/ coastal waters between 8 and 26 °C
Fourspine stickleback	<i>Apeltes quadracus</i>	Plankton, diatoms, nematodes, cyclopods	Midwater/ demersal	Resident	Marine/ Fresh water	April–August/ bottom debris and vegetation
Gizzard shad	<i>Dorosoma cepedianum</i>	Plankton and detritus	Pelagic	Resident	Fresh water	May–June/ over submerged objects like rocks or logs near shore
Hickory shad	<i>Alosa mediocris</i>	Squid, small fish, fish eggs, and small crustaceans	Pelagic	Migratory	Anadromous	April–June/ water temperate approximately 13 °C
Hogchoker	<i>Trinectes maculatus</i>	Small crustaceans and worms	Demersal	Migratory	Fresh water/ estuarine	May–August/ lower estuarine areas
Largemouth bass	<i>Micropterus salmoides</i>	Plankton, insects, and fish	Midwater/ demersal	Resident	Fresh water	May–June/ 1 to 5 feet of water near weedy vegetation
Mummichog	<i>Fundulus heteroclitus</i>	Small invertebrates on surface and in water column	Pelagic	Resident	Estuarine/ Marine	April–July/ empty shells of mussels and within dead leaves and algal mats



<b>Common Name</b>	<b>Scientific Name</b>	<b>Diet</b>	<b>Habitat</b>	<b>Migratory or Resident</b>	<b>Salinity Preference</b>	<b>Spawning Season/Habitat</b>
Sea lamprey	<i>Petromyzon marinus</i>	Parasitic; cetaceans and large fish	Demersal	Migratory	Anadromous	April–July/ rocky streams
Sheepshead minnow	<i>Cyprinodon variegatus</i>	Organic detritus and algae, microcrustaceans	Midwater/demersal	Resident	Marine/Fresh water	April–August/ warm waters
Shortnose sturgeon	<i>Acipenser brevirostrum</i>	Crustaceans, insect larvae, mollusks, small benthic fish	Demersal	Migratory	Fresh water amphidromous (live in fresh water and spawn in marine waters of natal river)	March–May/ rock, rubble or hard clay
Spotfin killifish	<i>Fundulus luciae</i>	Detritus, diatoms, ostracods, dipterans, copepods, and other small organisms	Midwater/demersal	Resident	Fresh water/ Estuarine	April–September/not specified
Striped bass	<i>Morone saxatilis</i>	Crustaceans, fish (e.g., alewives, eels, silversides), and invertebrates	Demersal	Migratory	Anadromous	May–June/ rivers and tributaries
Striped killifish	<i>Fundulus majalis</i>	Midge larvae, flying insects, mollusks, and flatworms	Pelagic	Resident	Estuarine/ marine	June–August/still, shallow water close to shore; and small ponds within substrate
Tautog	<i>Tautoga onitis</i>	Mollusks, gastropods, and crustaceans	Pelagic	Resident	Marine	April–June/coastal waters
Threespine stickleback	<i>Gasterosteus aculeatus</i>	Worms, crustaceans, aquatic insects	Midwater/demersal	Migratory	Fresh water/ estuarine	April–August/shallow water
Weakfish	<i>Cynoscion regalis</i>	Shrimp, anchovies, and clupeid fishes	Demersal	Migratory	Marine	June–August/ nearshore and estuarine areas of coast

<b>Common Name</b>	<b>Scientific Name</b>	<b>Diet</b>	<b>Habitat</b>	<b>Migratory or Resident</b>	<b>Salinity Preference</b>	<b>Spawning Season/Habitat</b>
White catfish	<i>Ameiurus catus</i>	Aquatic insects, fish, and fish eggs	Demersal	Migratory (local migrations)	Fresh water/estuarine	June and July in California/sand or gravel bars
White perch	<i>Morone americana</i>	Aquatic insects, crustaceans, fish, and zooplankton	Demersal	Resident	Anadromous	April–May/ estuaries, rivers, lakes, and marshes
Windowpane flounder	<i>Scophthalmus aquosus</i>	Small crustaceans and fish larvae	Demersal	Migratory	Marine	April–July and September to October/ sand, silt, or mud substrate
Winter flounder	<i>Pseudopleuronectes americanus</i>	Shrimp, amphipods, crabs, urchins, and snails	Demersal	Resident	Marine	December–March/coastal waters, sandy substrate at depths of 6 feet (2 meters) to 262 feet (80 meters) deep

Sources: USFWS 1989, NYSDEC 1986, NOAA 1999a, NOAA 1999b, NOAA 2006b, NOAA 2007, ADCNR 2012, Fishbase 2013, NatureServe 2012, ODNR 2012, TPW 2012, USGS 2012b, VDGIF 2012,

**Table H.2-4. State-Listed Species Occurring within 0.25 miles of the Hudson River Segment**

Common Name	Scientific Name	New York Status	Species Information
<b>Plants</b>			
Heartleaf plantain	<i>Plantago chordata</i>	T	A high proportion of the populations are along the Hudson River Valley, where it prefers the edges of freshwater intertidal mudflats, sandy or rocky shorelines of tidal creeks and other waterways, edges of freshwater tidal marshes, and gravel shores along freshwater tidal portions.
Smooth bur-marigold	<i>Bidens laevis</i>	T	A flowering aster found mostly in states east of the Mississippi River. In New York State, it is mostly found on Long Island and along the Hudson River. This species prefers freshwater and brackish tidal mud flats and tidal marshes.
Davis sedge	<i>Carex davisii</i>	T	<i>Carex davisii</i> is mainly found in areas adjacent to the Hudson River from north of Albany to Queens and prefers mesic limestone, rich bottomland, and floodplain forests.
Straw sedge	<i>Carex straminea</i>	E	A sedge predominantly found on Long Island and southeastern New York. This species prefers swamp margins and marshes.
Basil mountain-mint	<i>Pycnanthemum clinopodioides</i>	E	This mint occurs in shallow soil associated with the Palisades and Harlem Valley and prefers dry, south- or west-facing slopes on rocky soil. These sites are open oak-hickory forests, woodlands, or savannas, with lots of exposed bedrock.
Torrey's mountain-mint	<i>Pycnanthemum torrei</i>	E	This mint is found in southern New York State from New York, Rockland, and Dutchess counties. Found in dry, open habitats, including red cedar barrens, rocky summits, trails, and roadsides
Saltmarsh aster	<i>Symphotrichum subulatum</i> var. <i>subulatum</i>	T	Aster that occurs along the edges of the Hudson River to Putnam and Rockland counties. Prefers coastal areas in salt to brackish marshes, along the banks of salt-influenced tidal channels, brackish marshes, among other salt-influenced habitat.
Spongy arrowhead	<i>Sagittaria montevidensis</i> var. <i>spongiosa</i>	T	Arrowhead that is restricted to estuaries along the Hudson River. Prefers fresh water to brackish open intertidal mud flats. Occasionally found adjacent and upslope of these habitats.
<b>Birds</b>			
Peregrine falcon	<i>Falco peregrinus</i>	E	Highly migratory falcon with an expansive foraging range. Arrives in northern breeding areas in late April–early May; southern departure begins late August–early September. Prefers open habitat and often nests on ledges or holes on the face of rocky cliffs or crags.

Common Name	Scientific Name	New York Status	Species Information
<b>Birds (continued)</b>			
Short-eared owl	<i>Asio flammeus</i>	E	Highly migratory bird that breeds in Essex County. Its preferred habitat consists of marshes and open lowland areas, and recent nests have been observed in pastures and agricultural areas in New York State.
Bald eagle	<i>Haliaeetus leucocephalus</i>	T	Raptor that can be found in scattered areas throughout the United States. The bald eagle generally prefers areas adjacent to large bodies of water that support fish populations. Wintering areas are concentrated in four main areas: the Upper Delaware River, the Saint Lawrence River, the Lower Hudson River, and the Sacandaga River.
Northern harrier	<i>Circus cyaneus</i>	T	Raptor with a very large home range and whose breeding range includes most of New York State. The northern harrier prefers open marshy and lowland areas, similar to the short-eared owl.
Least bittern	<i>Ixobrychus exilis</i>	T	Long-distance migratory bird arriving at nesting areas in the northeastern United States in early to mid-April or early May and leaves northern breeding areas by September–October. Considered locally common in marshes of the Hudson River Valley, and possibly breeding in the Champlain Valley. Habitats vary throughout North America. Typically breeds in tall emergent vegetation in marshes, primarily fresh water. When least bitterns are alarmed, instead of flying away, they often freeze.

Sources: NYNHP 2005c, NYNHP 2005d, NatureServe 2012, NYNHP 2013c

Key: T = threatened, E = endangered

**Table H.2-5. Breeding Birds in the Vicinity of the Proposed CHPE Project**

Common Name	Scientific Name	Species Found in the Vicinity of the Segment		
		Lake Champlain Segment	Overland Segment	Hudson River and New York City Metropolitan Area Segments
Acadian flycatcher	<i>Empidonax virescens</i>	No	No	Yes
Alder flycatcher	<i>Empidonax alnorum</i>	Yes	Yes	Yes
American bittern	<i>Botaurus lentiginosus</i>	Yes	Yes	Yes
American black duck	<i>Anas rubripes</i>	Yes	Yes	Yes
American coot	<i>Fulica americana</i>	Yes	No	No
American crow	<i>Corvus brachyrhynchos</i>	Yes	Yes	Yes
American goldfinch	<i>Carduelis tristis</i>	Yes	Yes	Yes
American kestrel	<i>Falco sparverius</i>	Yes	Yes	Yes
American redstart	<i>Setophaga ruticilla</i>	Yes	Yes	Yes
American robin	<i>Turdus migratorius</i>	Yes	Yes	Yes
American three-toed woodpecker	<i>Picoides dorsalis</i>	Yes	No	No
American wigeon	<i>Anas americana</i>	Yes	No	Yes
American woodcock	<i>Scolopax minor</i>	Yes	Yes	Yes
Bald eagle	<i>Haliaeetus leucocephalus</i>	Yes	No	Yes
Baltimore oriole	<i>Icterus galbula</i>	Yes	Yes	Yes
Bank swallow	<i>Riparia riparia</i>	Yes	Yes	Yes
Barn owl	<i>Tyto alba</i>	Yes	Yes	Yes
Barn swallow	<i>Hirundo rustica</i>	Yes	Yes	Yes
Barred owl	<i>Strix varia</i>	Yes	Yes	Yes
Bay-breasted warbler	<i>Setophaga castanea</i>	Yes	No	No
Belted kingfisher	<i>Ceryle alcyon</i>	Yes	Yes	Yes
Bicknell's thrush	<i>Catharus bicknelli</i>	Yes	Yes	Yes
Black tern	<i>Chlidonias niger</i>	Yes	Yes	No
Black-and-white warbler	<i>Mniotilta varia</i>	Yes	Yes	Yes
Black-backed woodpecker	<i>Picoides arcticus</i>	Yes	Yes	No
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	Yes	Yes	Yes
Black-capped chickadee	<i>Poecile atricapillus</i>	Yes	Yes	Yes
Black-crowned night-heron	<i>Nycticorax nycticorax</i>	Yes	Yes	Yes
Black-throated blue warbler	<i>Setophaga caerulescens</i>	Yes	Yes	Yes
Black-throated green warbler	<i>Dendroica virens</i>	Yes	Yes	Yes

Common Name	Scientific Name	Species Found in the Vicinity of the Segment		
		Lake Champlain Segment	Overland Segment	Hudson River and New York City Metropolitan Area Segments
Blackburnian warbler	<i>Setophaga fusca</i>	Yes	Yes	Yes
Blackpoll warbler	<i>Setophaga striata</i>	Yes	Yes	Yes
Blue grosbeak	<i>Passerine caerulea</i>	No	No	Yes
Blue jay	<i>Cyanocitta cristata</i>	Yes	Yes	Yes
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>	Yes	Yes	Yes
Blue-headed vireo	<i>Vireo solitaries</i>	Yes	Yes	Yes
Blue-winged teal	<i>Anas discors</i>	Yes	Yes	Yes
Blue-winged warbler	<i>Vermivora pinus</i>	No	No	Yes
Bobolink	<i>Dolichonyx oryzivorus</i>	Yes	Yes	Yes
Brewster's warbler (golden-winged x blue-winged)*	<i>Vermivora Vermivora chrysoptera x cyanoptera</i>	No	Yes	Yes
Boreal chickadee	<i>Poecile hudsonicus</i>	Yes	No	Yes
Broad-winged hawk	<i>Buteo platypterus</i>	Yes	Yes	Yes
Brown creeper	<i>Certhia americana</i>	Yes	Yes	Yes
Brown thrasher	<i>Toxostoma rufum</i>	Yes	Yes	Yes
Brown-headed cowbird	<i>Molothrus ater</i>	Yes	Yes	Yes
Bufflehead	<i>Bucephala albeola</i>	Yes	No	No
Canada goose	<i>Branta canadensis</i>	Yes	Yes	Yes
Canada warbler	<i>Wilsonia canadensis</i>	Yes	Yes	Yes
Cape May warbler	<i>Setophaga tigrina</i>	Yes	No	No
Carolina wren	<i>Thryothorus ludovicianus</i>	Yes	Yes	Yes
Cattle egret	<i>Bubulcus ibis</i>	Yes	No	No
Cedar waxwing	<i>Bombycilla cedrorum</i>	Yes	Yes	Yes
Cerulean warbler	<i>Setophaga cerulea</i>	Yes	Yes	Yes
Chestnut-sided warbler	<i>Vermivora pinus</i>	Yes	Yes	Yes
Chimney swift	<i>Chaetura pelagica</i>	Yes	Yes	Yes
Chipping sparrow	<i>Spizella passerina</i>	Yes	Yes	Yes
Clay-colored sparrow	<i>Spizella pallida</i>	Yes	Yes	No
Cliff swallow	<i>Petrochelidon pyrrhonota</i>	Yes	Yes	Yes
Common goldeneye	<i>Bucephala clangula</i>	Yes	No	No
Common grackle	<i>Quiscalus quiscula</i>	Yes	Yes	Yes
Common loon	<i>Gavia immer</i>	Yes	Yes	No
Common merganser	<i>Mergus merganser</i>	Yes	Yes	Yes
Common moorhen	<i>Gallinula chloropus</i>	Yes	Yes	Yes
Common nighthawk	<i>Chordeiles minor</i>	Yes	Yes	Yes

Common Name	Scientific Name	Species Found in the Vicinity of the Segment		
		Lake Champlain Segment	Overland Segment	Hudson River and New York City Metropolitan Area Segments
Common raven	<i>Corvus corax</i>	Yes	Yes	Yes
Common tern	<i>Sterna hirundo</i>	Yes	No	No
Common yellowthroat	<i>Geothlypis trichas</i>	Yes	Yes	Yes
Cooper's hawk	<i>Accipiter cooperi</i>	Yes	Yes	Yes
Dark-eyed junco (slate-colored junco)	<i>Hunco hyemalis</i>	Yes	Yes	Yes
Double-crested cormorant	<i>Phalacrocorax auritus</i>	Yes	Yes	Yes
Downy woodpecker	<i>Picoides pubescens</i>	Yes	Yes	Yes
Eastern bluebird	<i>Sialia sialis</i>	Yes	Yes	Yes
Eastern kingbird	<i>Tyrannus tyrannus</i>	Yes	Yes	Yes
Eastern meadowlark	<i>Sturnella magna</i>	Yes	Yes	Yes
Eastern phoebe	<i>Sayornis phoebe</i>	Yes	Yes	Yes
Eastern screech-owl	<i>Megascops aslo</i>	Yes	Yes	Yes
Eastern towhee	<i>Pipilo erythrophthalmus</i>	Yes	Yes	Yes
Eastern wood-pewee	<i>Contopus virens</i>	Yes	Yes	Yes
European starling	<i>Sturnus vulgaris</i>	Yes	Yes	Yes
Evening grosbeak	<i>Coccothraustes vespertinus</i>	Yes	Yes	Yes
Field sparrow	<i>Spizella pusilla</i>	Yes	Yes	Yes
Fish crow	<i>Corvus ossifragus</i>	No	Yes	Yes
Gadwall	<i>Anas strepera</i>	Yes	No	Yes
Golden eagle	<i>Aquila chrysaetos</i>	Yes	No	No
Golden-crowned kinglet	<i>Regulus satrapa</i>	Yes	Yes	Yes
Golden-winged warbler	<i>Vermivora chrysoptera</i>	Yes	Yes	Yes
Grasshopper sparrow	<i>Ammodramus savannarum</i>	Yes	Yes	Yes
Gray catbird	<i>Dumetella carolinensis</i>	Yes	Yes	Yes
Gray jay	<i>Perisoreus canadensis</i>	Yes	No	No
Gray partridge	<i>Perdix perdix</i>	Yes	No	No
Great black-backed gull	<i>Larus marinus</i>	Yes	No	Yes
Great blue heron	<i>Ardea herodias</i>	Yes	Yes	Yes
Great crested flycatcher	<i>Myiarchus crinitus</i>	Yes	Yes	Yes
Great egret	<i>Ardea alba</i>	Yes	No	No
Great horned owl	<i>Bubo virginianus</i>	Yes	Yes	Yes
Greater scaup	<i>Aythya marila</i>	Yes	No	No
Green heron	<i>Butorides virescens</i>	Yes	Yes	Yes
Green-winged teal	<i>Anas crecca</i>	Yes	Yes	Yes

Common Name	Scientific Name	Species Found in the Vicinity of the Segment		
		Lake Champlain Segment	Overland Segment	Hudson River and New York City Metropolitan Area Segments
Hairy woodpecker	<i>Picoides villosus</i>	Yes	Yes	Yes
Henslow's sparrow	<i>Ammodramus henslowii</i>	No	Yes	Yes
Hermit thrush	<i>Catharus guttatus</i>	Yes	Yes	Yes
Herring gull	<i>Larus argentatus</i>	Yes	Yes	No
Hooded merganser	<i>Lophodytes cucullatus</i>	Yes	Yes	Yes
Hooded warbler	<i>Wilsonia citrina</i>	No	No	Yes
Horned lark	<i>Eremophila alpestris</i>	Yes	Yes	Yes
House finch	<i>Carpodacus mexicanus</i>	Yes	Yes	Yes
House sparrow	<i>Passer domesticus</i>	Yes	Yes	Yes
House wren	<i>Troglodytes aedon</i>	Yes	Yes	Yes
Hybrid mallard x black or mottled	<i>Anas platyrhynchos x rubripes/ x fulvigula</i>	Yes	Yes	Yes
Indigo bunting	<i>Passerina cyanea</i>	Yes	Yes	Yes
Kentucky warbler	<i>Geothlypis formosa</i>	No	No	Yes
Killdeer	<i>Charadrius vociferus</i>	Yes	Yes	Yes
King rail	<i>Rallus elegans</i>	No	Yes	Yes
Lawrence's warbler (blue-winged x golden-winged)*	<i>Vermivora cyanoptera x chrysoptera</i>	Yes	Yes	Yes
Least bittern	<i>Ixobrychus exilis</i>	Yes	Yes	Yes
Least flycatcher	<i>Empidonax minimus</i>	Yes	Yes	Yes
Lesser scaup	<i>Aythya affinis</i>	Yes	No	No
Lincoln's sparrow	<i>Melospiza lincolnii</i>	Yes	Yes	No
Loggerhead shrike	<i>Lanius ludovicianus</i>	Yes	Yes	No
Long-eared owl	<i>Asio otus</i>	Yes	Yes	No
Louisiana waterthrush	<i>Seiurus motacilla</i>	Yes	Yes	Yes
Magnolia warbler	<i>Setophaga magnolia</i>	Yes	Yes	Yes
Mallard	<i>Anas platyrhynchos</i>	Yes	Yes	Yes
Marsh wren	<i>Cistothorus palustris</i>	Yes	Yes	Yes
Mourning dove	<i>Zenaida macroura</i>	Yes	Yes	Yes
Mourning warbler	<i>Geothlypis philadelphia</i>	Yes	Yes	Yes
Mute swan	<i>Cygnus olor</i>	No	No	Yes
Nashville warbler	<i>Oreothlypis ruficapilla</i>	Yes	Yes	Yes
Northern bobwhite	<i>Colinus virginianus</i>	Yes	Yes	Yes
Northern cardinal	<i>Cardinalis cardinalis</i>	Yes	Yes	Yes
Northern flicker (yellow-shafted flicker)	<i>Colaptes auratus</i>	Yes	Yes	Yes
Northern goshawk	<i>Accipiter gentilis</i>	Yes	Yes	Yes



Common Name	Scientific Name	Species Found in the Vicinity of the Segment		
		Lake Champlain Segment	Overland Segment	Hudson River and New York City Metropolitan Area Segments
Northern harrier	<i>Circus cyaneus</i>	Yes	Yes	Yes
Northern mockingbird	<i>Mimus polyglottos</i>	Yes	Yes	Yes
Northern parula	<i>Setophaga americana</i>	Yes	Yes	Yes
Northern pintail	<i>Anas acuta</i>	Yes	Yes	No
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>	Yes	Yes	Yes
Northern saw-whet owl	<i>Aegolius acadicus</i>	Yes	Yes	Yes
Northern shoveler	<i>Anas clypeata</i>	Yes	No	No
Northern waterthrush	<i>Seiurus noveboracensis</i>	Yes	Yes	Yes
Olive-sided flycatcher	<i>Contopus cooperi</i>	Yes	Yes	Yes
Orchard oriole	<i>Icterus spurius</i>	Yes	Yes	Yes
Osprey	<i>Pandion haliaetus</i>	Yes	Yes	Yes
Ovenbird	<i>Seiurus aurocapilla</i>	Yes	Yes	Yes
Palm warbler	<i>Setophaga palmarum</i>	Yes	No	No
Peregrine falcon	<i>Falco peregrinus</i>	Yes	No	No
Philadelphia vireo	<i>Vireo philadelphicus</i>	Yes	Yes	No
Pied-billed grebe	<i>Podilymbus podiceps</i>	Yes	Yes	Yes
Pileated woodpecker	<i>Dryocopus pileatus</i>	Yes	Yes	Yes
Pine siskin	<i>Spinus pinus</i>	Yes	Yes	Yes
Pine warbler	<i>Setophaga pinus</i>	Yes	Yes	Yes
Prairie warbler	<i>Dendroica discolor</i>	Yes	Yes	Yes
Prothonotary warbler	<i>Protonotaria citrea</i>	No	Yes	No
Purple finch	<i>Haemorhous purpureus</i>	Yes	Yes	Yes
Purple martin	<i>Progne subis</i>	Yes	Yes	Yes
Red crossbill	<i>Loxia curvirostra</i>	Yes	Yes	Yes
Red-bellied woodpecker	<i>Melanerpes carolinus</i>	Yes	Yes	Yes
Red-breasted merganser	<i>Mergus serrator</i>	Yes	Yes	No
Red-breasted nuthatch	<i>Sitta canadensis</i>	Yes	Yes	Yes
Red-eyed vireo	<i>Vireo olivaceus</i>	Yes	Yes	Yes
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	Yes	Yes	Yes
Red-shouldered hawk	<i>Buteo lineatus</i>	Yes	Yes	Yes
Red-tailed hawk	<i>Buteo jamaicensis</i>	Yes	Yes	Yes
Red-winged blackbird	<i>Agelaius phoeniceus</i>	Yes	Yes	Yes
Redhead	<i>Aythya americana</i>	Yes	No	No
Ring-billed gull	<i>Larus delawarensis</i>	Yes	No	No
Ring-necked duck	<i>Aythya collaris</i>	Yes	Yes	Yes
Ring-necked pheasant	<i>Phasianus colchicus</i>	Yes	Yes	Yes

Common Name	Scientific Name	Species Found in the Vicinity of the Segment		
		Lake Champlain Segment	Overland Segment	Hudson River and New York City Metropolitan Area Segments
Rock pigeon	<i>Columba livia</i>	Yes	Yes	Yes
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	Yes	Yes	Yes
Ruby-crowned kinglet	<i>Regulus calendula</i>	Yes	No	No
Ruby-throated hummingbird	<i>Archilochus colubris</i>	Yes	Yes	Yes
Ruddy duck	<i>Oxyura jamaicensis</i>	No	No	Yes
Ruffed grouse	<i>Bonasa umbellus</i>	Yes	Yes	Yes
Rusty blackbird	<i>Euphagus carolinus</i>	Yes	Yes	No
Savannah sparrow	<i>Passerculus sandwichensis</i>	Yes	Yes	Yes
Scarlet tanager	<i>Piranga olivacea</i>	Yes	Yes	Yes
Sedge wren	<i>Cistothorus platensis</i>	Yes	Yes	No
Sharp-shinned hawk	<i>Accipiter striatus</i>	Yes	Yes	Yes
Short-eared owl	<i>Asio flammeus</i>	Yes	No	Yes
Song sparrow	<i>Melospiza melodia</i>	Yes	Yes	Yes
Sora	<i>Porzana carolina</i>	Yes	Yes	Yes
Spotted sandpiper	<i>Actitis macularia</i>	Yes	Yes	Yes
Spruce grouse	<i>Falci pennis canadensis</i>	Yes	No	No
Swainson's thrush	<i>Catharus ustulatus</i>	Yes	Yes	Yes
Swamp sparrow	<i>Melospiza georgiana</i>	Yes	Yes	Yes
Tennessee warbler	<i>Oreothlypis peregrina</i>	Yes	No	No
Tree swallow	<i>Tachycineta bicolor</i>	Yes	Yes	Yes
Tufted titmouse	<i>Baeolophus bicolor</i>	Yes	Yes	Yes
Turkey vulture	<i>Cathartes aura</i>	Yes	Yes	Yes
Upland sandpiper	<i>Bartramia longicauda</i>	Yes	Yes	Yes
Veery	<i>Catharus fuscescens</i>	Yes	Yes	Yes
Vesper sparrow	<i>Poocetes gramineus</i>	Yes	Yes	Yes
Virginia rail	<i>Rallus limicola</i>	Yes	Yes	Yes
Warbling vireo	<i>Vireo gilvus</i>	Yes	Yes	Yes
Western meadowlark	<i>Sturnella neglecta</i>	No	No	Yes
Whip-poor-will	<i>Antrostomus vociferus</i>	Yes	Yes	Yes
White-breasted nuthatch	<i>Sitta carolinensis</i>	Yes	Yes	Yes
White-eyed vireo	<i>Vireo griseus</i>	Yes	Yes	Yes
White-throated sparrow	<i>Zonotrichia albicollis</i>	Yes	Yes	Yes
White-winged crossbill	<i>Loxia leucoptera</i>	Yes	Yes	No
Wild turkey	<i>Meleagris gallopavo</i>	Yes	Yes	Yes
Willow flycatcher	<i>Empidonax traillii</i>	Yes	Yes	Yes
Wilson's snipe	<i>Gallinago delicata</i>	Yes	Yes	Yes

Common Name	Scientific Name	Species Found in the Vicinity of the Segment		
		Lake Champlain Segment	Overland Segment	Hudson River and New York City Metropolitan Area Segments
Wilson's warbler	<i>Cardellina pusilla</i>	Yes	No	No
Winter wren	<i>Troglodytes hiemalis</i>	Yes	Yes	Yes
Wood duck	<i>Aix sponsa</i>	Yes	Yes	Yes
Wood thrush	<i>Hylocichla mustelina</i>	Yes	Yes	Yes
Worm-eating warbler	<i>Helmitheros vermivorus</i>	No	Yes	Yes
Yellow warbler	<i>Dendroica petechia</i>	Yes	Yes	Yes
Yellow-bellied flycatcher	<i>Empidonax flaviventris</i>	Yes	Yes	Yes
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	Yes	Yes	Yes
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	Yes	Yes	Yes
Yellow-breasted chat	<i>Icteria virens</i>	No	Yes	Yes
Yellow-rumped warbler (unid. Myrtle/Audubon's)	<i>Setophaga coronate</i>	Yes	Yes	Yes
Yellow-throated vireo	<i>Vireo flavifrons</i>	Yes	Yes	Yes
Yellow-throated warbler	<i>Setophaga dominica</i>	Yes	Yes	No

Source: NYSDEC 2008

Note:

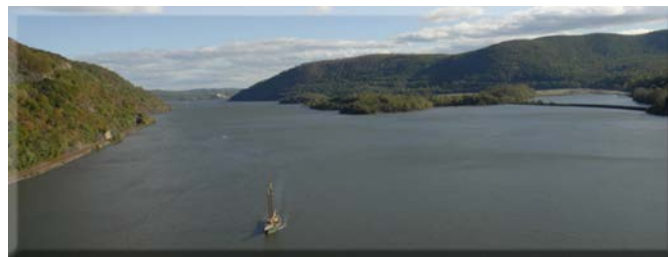
\* = Brewster's and Lawrence's warblers are two separate hybrid species from blue-winged and golden-winged warbler pairings.

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## APPENDIX I

# Summary of Wetlands and Soils along Proposed CHPE Project Route





***APPENDIX I.1 – POTENTIALLY IMPACTED WETLANDS ASSOCIATED WITH THE  
PROPOSED CHPE PROJECT***





## **Appendix I.1**

### **Potentially Impacted Wetlands Associated with the Proposed CHPE Project**

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This appendix contains a brief summary of palustrine wetlands located within the proposed CHPE Project ROI for the Wetlands resource area, and a listing of all wetlands that were delineated within the construction corridor and wetlands ROI.

**Appendix I.1** contains the following tables:

- **Table I.1-1.** Delineated Wetlands within the Proposed CHPE Project Construction Corridor
- **Table I.1-2.** Delineated Wetlands within the Proposed CHPE Project ROI
- **Table I.1-3.** NYSDEC Freshwater Wetlands within the Proposed CHPE Project ROI
- **Table I.1-4.** NYSDEC Freshwater Wetland Adjacent Areas within the Proposed CHPE Project ROI
- **Table I.1-5.** NYSDEC Tidal Wetlands within the Proposed CHPE Project ROI

## **Description of Palustrine Wetlands within the Proposed CHPE Project ROI**

**Palustrine Emergent Wetlands.** Palustrine emergent (PEM) wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens (USACE 2012a). The freshwater emergent wetlands along the proposed CHPE Project survey area primarily include shallow emergent marshes, deep emergent marshes, and reedgrass/purple loosestrife marshes (NYSDEC 2010e). PEM wetlands occur as a single dominant wetland cover type, and also as a codominant wetland type when other plant community types exist within the wetland.

**Palustrine Scrub-Shrub Wetland.** The palustrine scrub-shrub (PSS) wetland cover type includes areas that are dominated by saplings and shrubs that are less than 20 feet (6 meters) tall (USACE 2012a). Scrub-shrub wetlands along the proposed CHPE Project wetland survey area were dominated by silky dogwood (*Cornus amomum*), gray dogwood (*Cornus foemina* ssp. *racemosa*), honeysuckle (*Lonicera* spp.), and speckled alder (*Alnus incana* ssp. *rugosa*). Other vegetation observed includes meadowsweet (*Spirea latifolia*), highbush blueberry (*Vaccinium corymbosum*), winterberry (*Ilex verticillata*), spicebush (*Lindera benzoin*), elderberry (*Sambucus canadensis*), gray birch (*Betula populifolia*), and northern arrowwood (*Viburnum recognitum*). Invasive species observed within PSS wetlands include honeysuckle and buckthorn (*Frangula alnus*). PSS wetlands occur as a single dominant wetland cover type, and also as a codominant wetland type when other plant community types exist within the wetland.

**Palustrine Forested Wetland.** Palustrine forested (PFO) wetland cover types are dominated by trees and shrubs that have developed a tolerance to a seasonal high water table. To be characterized as forested, a wetland must be dominated by trees and shrubs that are at least 20 feet (6 meters) tall (USACE 2012a). PFO wetlands occur as a single dominant wetland cover type, and also as a codominant wetland type when other plant community types exist within the wetland.

Forested wetlands typically have a mature tree canopy, and depending upon the species and density, can have a broad range of understory and groundcover community components. Forested wetland communities along the proposed CHPE Project survey area include red maple (*Acer rubrum*) hardwood swamps, floodplain forest, and silver maple-ash swamps (NYSDEC 2010e).

**Palustrine Open Water.** Besides vegetated wetlands, a few scattered small ponds are within the ROI. These wetland areas are characterized by a vegetative cover of less than 30 percent, although there could often be emergent or shrubby vegetation bordering the open water areas (CHPEI 2012ee).

Wetland Impact Table														
Approx. MP	Index Map Sheet	Town	Field ID	NYSDEC Wetland ID	NYSDEC Wetland Class	Cowardin Classification	HDD Crossing Length (feet)	Direct Bury Crossing Length (feet)	Temporary Impacts a/		Permanent Impacts b/		Total Impacts c/	
									Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)
<b>Route 22 Right-of-Way</b>														
101.6	1	Dresden	A3611	N/A	N/A	PEM	16.6	-	-	-	-	-	-	-
102.2	3	Dresden	A3511	N/A	N/A	PEM	-	-	-	906.5	-	-	-	906.5
102.3	4	Dresden	A3411	N/A	N/A	PSS/RUB	-	-	-	163.4	-	-	-	163.4
103.0	5	Dresden	A3311	N/A	N/A	PEM	-	-	-	104.3	-	-	-	104.3
103.1	6	Dresden	A3211	N/A	N/A	PEM	-	-	-	935.6	-	-	-	935.6
103.2	6	Dresden	A3111	N/A	N/A	PEM/PSS	-	-	-	266.4	-	-	-	266.4
103.7	7	Dresden	A2911	N/A	N/A	PEM/PFO	-	-	1,233.5	-	-	-	1,233.5	-
103.8	7	Dresden	A2711	N/A	N/A	PEM	-	-	-	877.7	-	-	-	877.7
103.8	8	Dresden	A2811	N/A	N/A	PFO/RUB	-	-	1,435.5	-	-	-	1,435.5	-
103.9	8	Dresden	A2611	N/A	N/A	PEM/POW	-	-	-	1,048.7	-	-	-	1,048.7
104.4	9	Dresden	A2511	N/A	N/A	PFO	-	-	14.5	-	-	-	14.5	-
104.8	10	Dresden	A2411	N/A	N/A	PFO/RUB	-	-	28.7	527.2	-	-	28.7	527.2
104.9	10	Dresden	A2311	N/A	N/A	PEM	-	-	-	109.9	-	-	-	109.9
105.2	11	Dresden	A2211	N/A	N/A	PEM	-	-	-	2.5	-	-	-	2.5
105.7	13	Dresden	A2111	N/A	N/A	PEM	-	-	-	299.2	-	-	-	299.2
107.2	16	Dresden	A1811	N/A	N/A	PEM/PSS	-	-	-	293.2	-	-	-	293.2
107.3	17	Dresden	A1611	N/A	N/A	PEM	-	-	-	322	-	-	-	322
107.4	17	Dresden	A1511	N/A	N/A	PEM	-	-	-	338.2	-	-	-	338.2
108.1	19	Dresden	A1311	N/A	N/A	PEM	-	-	-	1,196.3	-	-	-	1,196.3
108.4	19	Dresden	A1111	N/A	N/A	PFO	-	-	365	-	-	-	365	-

Wetland Impact Table														
Approx. MP	Index Map Sheet	Town	Field ID	NYSDEC Wetland ID	NYSDEC Wetland Class	Cowardin Classification	HDD Crossing Length (feet)	Direct Bury Crossing Length (feet)	Temporary Impacts a/		Permanent Impacts b/		Total Impacts c/	
									Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)
108.4	20	Dresden	A1211	N/A	N/A	PSS	-	-	-	461	-	-	-	461
108.5	20	Dresden	A1011	N/A	N/A	PSS	-	-	-	1,017.1	-	-	-	1,017.1
109.2	22	Dresden	A0511	N/A	N/A	PEM/PFO	-	-	23.4	-	-	-	23.4	-
109.6	23	Dresden	A0811	N/A	N/A	PEM	-	283.5	-	6,250.1	-	4,006	-	10,256.1
110.4	25	Whitehall	A0411	N/A	N/A	PEM	-	-	-	1,306	-	-	-	1,306
110.8	26	Whitehall	A0311	N/A	N/A	PEM/PSS	-	-	-	313.4	-	-	-	313.4
111.4	27	Whitehall	A0211	WH-2	1	PEM	-	-	-	361.4	-	-	-	361.4
111.7	28	Whitehall	A0111	WH-2	1	PEM/PSS	-	-	-	1,218.3	-	16.5	-	1,234.8
<b>Route 22 Right-of-Way Subtotal:</b>							<b>16.6</b>	<b>283.5</b>	<b>3,100.6</b>	<b>18,318.4</b>	<b>-</b>	<b>4,022.5</b>	<b>3,100.6</b>	<b>22,340.9</b>
<b>Canadian Pacific (CP) Railroad Right-of-Way</b>														
113.5; 113.9; 116.4	33, 34, 40	Whitehall	B54	N/A	N/A	PEM/PSS/PFO	-	-	33,011.5	175,874	-	1,157.4	33,011.5	177,031.4
115.6	38	Whitehall	B55	N/A	N/A	PEM/PSS	-	-	-	4,396.2	-	960.6	-	5,356.8
117.5	43	Whitehall	B53	N/A	N/A	PEM	-	-	-	40,598.9	-	4	-	40,602.9
117.8	44	Whitehall	B52	N/A	N/A	PEM	-	-	-	5,002.6	-	-	-	5,002.6
118.1	45	Fort Ann	B51	N/A	N/A	PEM	-	-	-	64,340.7	-	0.5	-	64,341.2
118.6	46	Fort Ann	B50	N/A	N/A	PEM	-	-	-	433	-	-	-	433
118.9; 119.1	47/48	Fort Ann	B48	N/A	N/A	PEM/PFO	-	-	2,282.9	16,322.2	-	-	2,282.9	16,322.2
119.0	47	Fort Ann	B49	N/A	N/A	PEM	-	-	-	1,140.3	-	-	-	1,140.3
119.3	48	Fort Ann	F19	N/A	N/A	PFO	-	-	155	-	-	-	155	-
119.8; 120.4	49, 51	Fort Ann	F17	FA-13	1	PFO/POW	-	-	753.4	37,698	-	-	753.4	37,698
121.7	54	Fort Ann	F14	N/A	N/A	PFO	-	-	2,762.5	-	-	-	2,762.5	-

Wetland Impact Table														
Approx. MP	Index Map Sheet	Town	Field ID	NYSDEC Wetland ID	NYSDEC Wetland Class	Cowardin Classification	HDD Crossing Length (feet)	Direct Bury Crossing Length (feet)	Temporary Impacts a/		Permanent Impacts b/		Total Impacts c/	
									Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)
121.9	55	Fort Ann	F13	N/A	N/A	PFO	-	-	4,763.4	-	-	-	4,763.4	-
122.0; 122.4	55	Fort Ann	F12	N/A	N/A	PSS/PFO	-	-	18,939.9	-	-	-	18,939.9	-
122.8	57	Fort Ann	F11	N/A	N/A	PSS/PFO	-	-	23,480.4	-	-	-	23,480.4	-
123.2	58	Fort Ann	F10	N/A	N/A	PSS/PFO	-	-	3,336.4	-	-	-	3,336.4	-
124.2; 124.3; 124.4; 125.2; 125.3; 125.6	59, 60, 61, 62, 64, 65	Fort Ann	F8	N/A	N/A	PEM/PSS/PFO	-	0.7	64,793	58,489.2	25.8	731.5	64,818.8	59,220.7
127.2; 127.5	69	Kingsbury	F4	N/A	N/A	PEM/PSS	-	-	-	52,923.3	-	-	-	52,923.3
128.4	71	Kingsbury	F2	N/A	N/A	PEM/PSS	-	-	-	46,518.2	-	39.7	-	46,557.9
129.6; 130.2	74, 76	Kingsbury	A54	N/A	N/A	PEM/PSS	-	-	-	177,328.5	-	-	-	177,328.5
131.9; 132.3	81, 82	Kingsbury	A2	N/A	N/A	PEM/PSS	-	-	-	76,512.5	-	-	-	76,512.5
133.3	85	Fort Edward	A5	N/A	N/A	PSS	-	267	-	3,212.8	-	2,895.9	-	6,108.7
133.6	86	Fort Edward	A6	N/A	N/A	PFO	-	-	372.6	-	-	-	372.6	-
135.8	91	Moreau	A14	N/A	N/A	PEM/PSS	-	-	-	1,288.3	-	-	-	1,288.3
135.9	92	Moreau	A15	N/A	N/A	PSS	-	-	-	377.6	-	-	-	377.6
136.0	92	Moreau	A16	N/A	N/A	PFO	-	-	766.2	-	-	-	766.2	-
136.1	92	Moreau	A17	N/A	N/A	PFO	-	-	2,096.8	-	-	-	2,096.8	-
136.7	94	Moreau	A23	N/A	N/A	PEM	-	8.1	-	44.3	-	104.6	-	148.9
136.9	94	Moreau	A24	N/A	N/A	PEM/PSS	-	-	-	1,913.9	-	528.8	-	2,442.7
137.1; 137.2	95	Moreau	A26	F-20	2	PEM/PSS/PFO	-	-	1,056.2	13,007.8	-	-	1,056.2	13,007.8
137.8	96	Moreau	A28	N/A	N/A	PFO	-	-	158	-	-	-	158	-

Wetland Impact Table														
Approx. MP	Index Map Sheet	Town	Field ID	NYSDEC Wetland ID	NYSDEC Wetland Class	Cowardin Classification	HDD Crossing Length (feet)	Direct Bury Crossing Length (feet)	Temporary Impacts a/		Permanent Impacts b/		Total Impacts c/	
									Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)
137.9	97	Moreau	A30	F-7	2	PSS	-	-	-	1,034.4	-	-	-	1,034.4
138.5	98	Moreau	A36	F-7	2	PSS	-	-	-	406.7	-	-	-	406.7
138.8; 139.0	99, 100	Moreau	A38	F-7	2	PSS/PFO	-	15.4	18,915.7	28,318	272.3	1.2	19,188	28,319.2
139.8	102	Northumberland	A41	N/A	N/A	PSS	-	-	-	5,081.7	-	-	-	5,081.7
141.3	106	Northumberland	A47	N/A	N/A	PFO	-	-	4,567.5	-	-	-	4,567.5	-
141.4	106	Northumberland	A48	N/A	N/A	PFO	-	-	404	-	-	-	404	-
141.7; 141.8; 142.1	106, 107	Northumberland	A49	Q-32	1	PSS/PFO	-	-	21,734.4	1,755.7	32.6	-	21,767.1	1,755.7
142.2	108	Northumberland	A52	N/A	N/A	PFO	-	-	2,018.5	-	-	-	2,018.5	-
142.9	110	Northumberland	D7	GA-20	2	PEM	-	-	-	8,663.4	-	-	-	8,663.4
143.0	110	Northumberland	D6	N/A	N/A	PEM/PFO	-	-	1,254.2	-	-	-	1,254.2	-
143.1	111	Northumberland	D4	N/A	N/A	PFO	-	-	342.7	-	-	-	342.7	-
143.2	111	Northumberland	D3	N/A	N/A	PFO	-	-	17,230.3	-	-	-	17,230.3	-
143.4	111	Wilton	D2	N/A	N/A	PFO	-	-	732	-	-	-	732	-
145.9; 146.0	118	Wilton	B39	N/A	N/A	PEM/PFO	-	-	10,361.2	-	-	-	10,361.2	-
146.4	119	Wilton	B36	Q-11	1	PFO/PSS	10.6	-	-	-	-	-	-	-
149.5	127	Wilton	B1	S-7	2	PEM	-	-	-	124.3	-	-	-	124.3
150.5; 150.6; 150.7	130, 131	Greenfield	B3	S-19	1	PEM/PSS /PFO	-	73.3	565.7	28,510.2	-	3,001.9	565.7	31,512.1
151.4	132	Greenfield	B4	S-19	1	PEM/PSS	-	3.3	-	15,338.7	-	264.6	-	15,603.3
152.3	135	Saratoga Springs	B5	S-19	1	PEM/PSS	-	-	-	190.9	-	-	-	190.9
152.8	136	Saratoga Springs	B6	N/A	N/A	PEM/PSS	-	-	-	9,918.5	-	9.3	-	9,927.8

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									Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)
154.9	141	Saratoga Springs	D9	S-21	3	PEM	-	1,402.3	-	86,021.6	-	19,867.9	-	105,889.5
155.5	143	Saratoga Springs	B47	S-21	3	PEM/PSS/PFO	-	45.6	642.1	-	594.1	-	1,236.2	-
155.9	144	Saratoga Springs	B45	N/A	N/A	PEM	-	1,899.2	-	4,410.6	-	22,780.9	-	27,191.5
157.0	146	Saratoga Springs	B44	N/A	N/A	PEM/PFO	-	313.1	10,031	-	3,594.3	-	13,625.3	-
157.1	147	Saratoga Springs	B41	N/A	N/A	PFO	-	-	11,762.1	-	204.3	-	11,966.4	-
157.5; 158.0	148, 149	Saratoga Springs	B10	N/A	N/A	PFO	252.2	248.8	18,784	-	2,898.6	-	21,682.6	-
158.3	150	Milton	B17	N/A	N/A	PFO	-	53.8	3,739.8	-	699.6	-	4,439.4	-
158.7	151	Milton	B16	N/A	N/A	PFO	-	-	14,919	-	-	-	14,919	-
159.0	152	Ballston	B18	N/A	N/A	PEM/PSS	-	133.9	-	15,675.5	-	3,920.4	-	19,595.8
159.1	152	Ballston	B20	N/A	N/A	PEM/PSS	-	-	-	281.6	-	-	-	281.6
159.3	153	Ballston	B21	R-50	3	PEM	-	-	-	801.6	-	-	-	801.6
159.5	154	Ballston	B23	N/A	N/A	PEM	174.7	-	-	560.3	-	347.8	-	908.2
160.1; 160.4	154, 156	Ballston	B25	R-3	3	PEM/PSS/PFO	-	107.7	12,688	36,707	251.4	6,805.7	12,939.3	43,512.7
160.7	156	Ballston	B28	N/A	N/A	PEM	-	-	-	188.8	-	-	-	188.8
160.9	157	Ballston	B29	N/A	N/A	PEM/PSS	-	-	-	1,877.7	-	56.3	-	1,934
161.2	157	Ballston	B30	N/A	N/A	PEM/PSS	-	605.8	-	10,445.5	-	6,881.1	-	17,326.6
161.6	159	Ballston	B31	R-11	2	PEM	-	-	-	17,974.4	-	1,151.2	-	19,125.6
161.8	159	Ballston	B32	N/A	N/A	PEM	-	-	-	10,108.9	-	1,371.8	-	11,480.6
162.9	162	Ballston	B-C1	N/A	N/A	PEM	-	675.4	-	5,965.6	-	8,427.8	-	14,393.4
162.9; 163.0; 163.1	162, 163	Ballston	C1	N/A	N/A	PEM/PSS	-	528	-	16,485.3	-	6,229.3	-	22,714.7
163.4	163	Ballston	C2	N/A	N/A	PEM	27.4	-	-	-	-	-	-	-

Wetland Impact Table														
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									Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)
163.4	164	Ballston	C4	N/A	N/A	PEM	-	350.6	-	4,397.3	-	3,197.6	-	7,594.8
163.7	164	Ballston	C5	N/A	N/A	PEM	-	-	-	991.4	-	123.2	-	1,114.6
164.4	166	Ballston	C8	R-18	2	PEM	8	68.4	-	24,785.7	-	4,230.2	-	29,015.9
164.9	167	Ballston	C15	R-18	2	PFO	-	108.6	18,343.5	-	1,441	-	19,784.5	-
167.1	173	Clifton Park	C29	B-31	2	PEM	-	-	-	2,352.2	-	642	-	2,994.2
167.5	174	Clifton Park	C31	N/A	N/A	PEM	-	-	-	10,504.3	-	-	-	10,504.3
168.2	176	Clifton Park	C35	N/A	N/A	PEM/PSS	-	-	-	8,397.6	-	-	-	8,397.6
170.0; 170.2	181	Glenville	C42	S-107	2	PEM/PSS/PFO	67.5	867.9	10,693.4	53,073.3	1,165.3	11,082.6	11,858.7	64,155.9
170.5	182	Glenville	X01	N/A	N/A	PSS/PFO	-	1,002.2	16,039.5	16,853.2	4,022.6	8,075.2	20,062	24,928.4
171.4	185	Glenville	C44	S-112	2	PEM	-	-	-	282.7	-	-	-	282.7
174.8	193	Schenectady	C46	N/A	N/A	PEM	-	-	-	3,316.9	-	-	-	3,316.9
175.0	193	Schenectady	C48	N/A	N/A	PEM	-	100.4	-	814.4	-	1,302.5	-	2,116.8
175.3	194	Schenectady	C56	N/A	N/A	PEM	-	278.4	-	6,131.2	-	3,360.1	-	9,491.3
<b>CP Railroad Right-of-Way Subtotal:</b>							<b>540.4</b>	<b>9,157.9</b>	<b>354,496.8</b>	<b>1,216,169.4</b>	<b>15,201.9</b>	<b>119,553.6</b>	<b>369,698.6</b>	<b>1,335,722.8</b>
<b>CSX Railroad Right-of-Way – Rotterdam to Catskill, NY</b>														
178.4	202	Rotterdam	E2	N/A	N/A	PSS	-	-	-	5,568.7	-	-	-	5,568.7
178.8; 178.9	203	Rotterdam	E3	N/A	N/A	PEM/PFO	-	331.6	14,381.2	14,470.3	3,914.4	3,050.3	18,295.6	17,520.6
179.1	204	Rotterdam	E4	N/A	N/A	PEM	-	-	-	25,741.6	-	780.6	-	26,522.3
179.5	205	Rotterdam	E5	N/A	N/A	PEM/PFO	-	66.5	13,960	120.4	132.2	2,995.9	14,092.1	3,116.3
179.7; 179.8	205, 206	Rotterdam	E7	N/A	N/A	PEM/PSS	-	51.2	-	10,797.8	-	1,497.7	-	12,295.5
180.0; 180.1; 180.3	206, 207	Rotterdam	E9	S-117	2	PEM/PSS	-	-	-	61,877.8	-	4,111.6	-	65,989.3



Wetland Impact Table														
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									Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)
180.6; 180.7	208	Guilderland	E10	N/A	N/A	PEM/PSS	13.1	196.4	-	7,226.5	-	2,253.2	-	9,479.8
180.8	208	Guilderland	E12	N/A	N/A	PEM/PFO	224.2	415.6	15,303.1	-	4,161.1	199.9	19,464.2	199.9
181.2; 181.6; 181.7; 181.8	209, 210	Guilderland	E15	N/A	N/A	PEM/PSS/PFO	589	184	12,258.2	6,090.5	2,038	6,439.9	14,296.1	12,530.4
182.0	212	Guilderland	E95	N/A	N/A	PEM	-	4.9	-	411.1	-	85.6	-	496.6
182.1; 182.2	212	Guilderland	E96	N/A	N/A	PEM/PSS/PFO	-	78.9	208.5	4,141.1	-	962.4	208.5	5,103.5
182.4; 182.5	213	Guilderland	E97	N/A	N/A	PEM/PSS	-	2.3	-	964.6	-	124.9	-	1,089.5
183.3	215	Guilderland	E80	N/A	N/A	PEM/PSS	-	-	-	1,139.8	-	-	-	1,139.8
183.4	215	Guilderland	E79	N/A	N/A	PSS/PFO	-	-	6,124.8	-	-	-	6,124.8	-
183.5	215	Guilderland	E77	N/A	N/A	PSS	-	-	-	5,319.7	-	-	-	5,319.7
183.8	216	Guilderland	E75	N/A	N/A	PFO	-	-	1,079.1	-	-	-	1,079.1	-
184.2; 184.2	217	Guilderland	E17	N/A	N/A	PSS/PFO/POW	-	79.9	721.1	13,056	-	1,180.5	721.1	14,236.5
185.5; 186.2; 186.2; 186.3	221, 222	Guilderland	E21	N/A	N/A	PEM/PSS/PFO	-	20.5	8,817.3	61,995.3	-	1,076.5	8,817.3	63,071.8
186.5; 186.7; 186.9; 186.9	223, 224	Guilderland	E24	N/A	N/A	PEM/PSS/PFO	-	552.6	17,695	25,776.1	4,187.3	3,263.7	21,882.2	29,039.8
187.3	225	Guilderland	E26	N/A	N/A	PEM/PSS	-	-	-	9,838.6	-	696.9	-	10,535.5
187.5; 187.7; 187.8	226	New Scotland	E28	V-52	2	PSS/PFO	-	475.1	3,240.8	15,424.9	1,259.7	5,297	4,500.5	20,722
188.0; 188.0	227	New Scotland	E29	N/A	N/A	PSS/PFO	-	16.2	991.7	6,695.2	0.1	774.2	991.8	7,469.4
189.2	230	New Scotland	E31	N/A	N/A	PSS	-	-	-	2,013.4	-	-	-	2,013.4

Wetland Impact Table														
Approx. MP	Index Map Sheet	Town	Field ID	NYSDEC Wetland ID	NYSDEC Wetland Class	Cowardin Classification	HDD Crossing Length (feet)	Direct Bury Crossing Length (feet)	Temporary Impacts a/		Permanent Impacts b/		Total Impacts c/	
									Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)
189.8	232	New Scotland	E33	N/A	N/A	PEM/PSS/PFO	-	-	1,791.8	1,309.5	30.3	-	1,822.1	1,309.5
190.4	233	New Scotland	E35	N/A	N/A	PFO	-	-	3,111.6	-	-	-	3,111.6	-
190.7	234	New Scotland	E37	N/A	N/A	PFO	-	-	5,272.2	-	58.5	-	5,330.7	-
191.1	235	New Scotland	E39	N/A	N/A	PEM	-	345.4	-	11,289.7	-	4,377.6	-	15,667.3
191.5; 191.6	236	New Scotland	E43	N/A	N/A	PEM/PFO	-	-	4,450	1,003.1	-	-	4,450	1,003.1
194.0	243	Bethlehem	E51	N/A	N/A	PEM	-	-	-	9.8	-	-	-	9.8
194.1	243	Bethlehem	E52	N/A	N/A	PEM	-	-	-	877.8	-	94.7	-	972.5
194.1	243	Bethlehem	E59	N/A	N/A	PEM	-	17.8	-	1,386.6	-	231.8	-	1,618.4
194.2	243	Bethlehem	E58	N/A	N/A	PEM	18.5	1,962.2	-	15,570.3	-	26,527.1	-	42,097.4
197.2	250	Bethlehem	E104	N/A	N/A	PEM	-	-	-	38,523.1	-	-	-	38,523.1
199.2	253	Bethlehem	M71/ E101	N/A	N/A	PEM/PSS	36.5	161.8	-	57,844.8	-	8,899.7	-	66,744.4
199.3	256	Bethlehem	M70	N/A	N/A	PFO	-	-	1,235.9	-	-	-	1,235.9	-
199.6	257	Coeymans	M69	N/A	N/A	PEM/PFO	-	439.9	16,473.2	-	3,499.1	1,653.3	19,972.3	1,653.3
199.8	257	Coeymans	M67	N/A	N/A	PEM/PSS/PFO	-	1,592.2	67,714.2	-	19,234.4	-	86,948.6	-
200.3	259	Coeymans	M65	N/A	N/A	PEM/PSS/PFO	-	-	5,324.7	939	-	-	5,324.7	939
200.3	259	Coeymans	M66	N/A	N/A	PEM/PFO	-	58.7	1,453.7	-	574.7	-	2,028.4	-
200.8	260	Coeymans	M63	N/A	N/A	PEM/PSS/PFO	-	264.4	6,606.9	1,285	2,979.1	438.1	9,586	1,723.1
201.1	261	Coeymans	M62	N/A	N/A	PEM	-	154.3	-	7,739	-	1,954.4	-	9,693.5
201.1	261	Coeymans	Y36	N/A	N/A	PEM	-	-	-	170.2	-	-	-	170.2
201.2	261	Coeymans	M61	N/A	N/A	PEM/PSS/PFO/P OW	-	3,421	7,458.2	94,038	10.7	31,812.2	7,468.9	125,850.2
202.0	264	Coeymans	Y34	N/A	N/A	PEM/PSS	-	132.6	-	3,486.2	-	688.5	-	4,174.7

Wetland Impact Table														
Approx. MP	Index Map Sheet	Town	Field ID	NYSDEC Wetland ID	NYSDEC Wetland Class	Cowardin Classification	HDD Crossing Length (feet)	Direct Bury Crossing Length (feet)	Temporary Impacts a/		Permanent Impacts b/		Total Impacts c/	
									Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)
202.2	264	Coeymans	M60	N/A	N/A	PEM/PFO	-	677.1	32,424.8	-	9,747.5	-	42,172.3	-
202.4	265	Coeymans	M59	N/A	N/A	PEM/PSS/PFO	-	43.9	2,926.9	-	537.3	-	3,464.2	-
202.6	265	Coeymans	Y33	N/A	N/A	PEM	-	32.6	-	19,632.9	-	640.5	-	20,273.4
203.0	266	Coeymans	M58	N/A	N/A	PEM/PSS	-	-	-	3,104.4	-	501.5	-	3,605.9
203.1	266	Coeymans	M57	N/A	N/A	PEM/PFO	-	216.2	1,186.8	-	2,717.8	-	3,904.5	-
203.9	268	Coeymans	M56	N/A	N/A	PEM/PSS/PFO	-	-	368.9	-	-	-	368.9	-
204.4	270	New Baltimore	M53	N/A	N/A	PEM	-	822.4	-	10,101.7	-	6,453.7	-	16,555.4
204.6	270	New Baltimore	M52	N/A	N/A	PEM	130.8	-	-	1,663.5	-	880.3	-	2,543.7
204.9	271	New Baltimore	Y32	N/A	N/A	PEM/PSS	-	-	-	1,219.7	-	-	-	1,219.7
205.1	272	New Baltimore	Y31	N/A	N/A	PEM/PSS	-	-	-	3,409	-	-	-	3,409
205.4	272	New Baltimore	Y30	N/A	N/A	PEM	-	-	-	3,492.1	-	-	-	3,492.1
206.1	274	New Baltimore	M48	N/A	N/A	PSS	-	-	-	710.2	-	50	-	760.2
206.5	275	New Baltimore	M47	N/A	N/A	PEM/PSS	27.9	396.9	-	1,939.2	-	5,152.8	-	7,091.9
208.0	279	New Baltimore	Y27	N/A	N/A	PEM/PSS	-	14.7	-	143.4	-	196.6	-	340
208.4	280	New Baltimore	Y26	N/A	N/A	PEM	155.5	-	-	-	-	93.8	-	93.8
208.8	281	New Baltimore	M42	N/A	N/A	PEM/PSS	-	386.3	-	2,164.2	-	5,074.1	-	7,238.3
208.9	282	New Baltimore	M41	N/A	N/A	PEM/PSS/PFO	-	292.7	7,558.5	-	3,845.6	-	11,404.1	-
209.0	282	New Baltimore	M40	N/A	N/A	PSS	-	50.4	-	2,372.4	-	639.7	-	3,012.1
209.0	282	New Baltimore	Y24	N/A	N/A	PEM/PSS	-	95.9	-	3,323.5	-	1,233.4	-	4,556.9
209.8	284	New Baltimore	Y22	N/A	N/A	PEM	-	269.7	-	359.7	-	2,979.5	-	3,339.2
210.4	286	Coxsackie	M36	N/A	N/A	PFO	-	219	851.5	-	2,950.2	-	3,801.6	-

Wetland Impact Table														
Approx. MP	Index Map Sheet	Town	Field ID	NYSDEC Wetland ID	NYSDEC Wetland Class	Cowardin Classification	HDD Crossing Length (feet)	Direct Bury Crossing Length (feet)	Temporary Impacts a/		Permanent Impacts b/		Total Impacts c/	
									Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)
210.6	286	Coxsackie	M35	N/A	N/A	PSS	-	37.6	-	19.1	-	334	-	353
210.7	287	Coxsackie	M34	HN-101	1	PEM/PFO	-	138	160.7	-	718	1,000	878.8	1,000
210.9	287	Coxsackie	Y21	N/A	N/A	PEM	-	133.4	-	1,026.3	-	1,728.8	-	2,755.1
211.2	288	Coxsackie	Y20	N/A	N/A	PEM	18.5	1,262.5	-	8,738.2	-	16,996.3	-	25,734.5
211.7	289	Coxsackie	M33	N/A	N/A	PEM/PFO	4.4	179.9	11852	34.5	2286.8	187.7	14138.8	222.2
211.8	289	Coxsackie	Y19	N/A	N/A	PEM	12.5	23.8	-	266.7	-	583.7	-	850.4
212.3	290	Coxsackie	Y18	N/A	N/A	PEM	-	2,500.2	-	55,108.8	-	28,350.7	-	83,459.4
213.5	292	Coxsackie	M32	N/A	N/A	PEM/PSS/PFO	-	11.6	56,130.8	-	6,327.6	-	62,458.3	-
214.5; 216.0	296, 299	Coxsackie/Athens	Y16	HN-108	1	PEM	854.1	1,627.6	-	276,129.4	-	40,961	-	317,090.4
216.8	303	Athens	Y17	HN-108	1	PEM	-	-	-	719.2	-	-	-	719.2
220.2	311	Catskill	Y15	N/A	N/A	PEM	-	-	-	37,575.7	-	-	-	37,575.7
220.4	312	Catskill	Y14	N/A	N/A	PEM	-	-	-	2,055.3	-	-	-	2,055.3
220.8	313	Catskill	Y13	N/A	N/A	PEM	-	-	-	1,562	-	242.5	-	1,804.5
220.9	313	Catskill	M29	N/A	N/A	PEM	-	36.5	-	6,019.5	-	905.8	-	6,925.3
222.0	316	Catskill	M25	N/A	N/A	PEM/PFO	-	17	952.8	-	348.3	-	1,301.2	-
222.5	318	Catskill	M24	N/A	N/A	PEM/PFO	-	1.3	4,844.9	-	100.6	-	4,945.5	-
223.2	319	Catskill	Y11	N/A	N/A	PEM	-	627.8	-	6,158.5	-	4,535.6	-	10,694.2
223.6	321	Catskill	M21	N/A	N/A	PEM	-	-	-	11,045	-	41.6	-	11,086.6
223.8	321	Catskill	M20	N/A	N/A	PFO	-	-	242.8	-	-	-	242.8	-
224.1	322	Catskill	M19	N/A	N/A	PFO	-	-	2,133.3	-	-	-	2,133.3	-
224.3	323	Catskill	Y10	N/A	N/A	PEM	-	-	-	10,013.7	-	93.2	-	10,106.9

Wetland Impact Table														
Approx. MP	Index Map Sheet	Town	Field ID	NYSDEC Wetland ID	NYSDEC Wetland Class	Cowardin Classification	HDD Crossing Length (feet)	Direct Bury Crossing Length (feet)	Temporary Impacts a/		Permanent Impacts b/		Total Impacts c/	
									Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)	Forested Wetland (square feet) d/	Non-Forested Wetland (square feet)
224.5	323	Catskill	Y9	N/A	N/A	PEM	-	-	-	852.2	-	-	-	852.2
225.0	324	Catskill	M16	N/A	N/A	PEM	-	-	-	928.4	-	-	-	928.4
225.2	325	Catskill	M15	N/A	N/A	PEM	-	-	-	485.7	-	795.3	-	1,281
226.0	327	Catskill	M12	N/A	N/A	PEM	-	67.6	-	3,137.2	-	1,189.5	-	4,326.7
226.2	328	Catskill	M11	N/A	N/A	PEM/PFO	10.9	-	904.5	-	-	-	904.5	-
226.3	328	Catskill	M9	N/A	N/A	PSS/PFO	-	25.1	8,058.4	-	655.8	-	8,714.2	-
226.5	328	Catskill	M8	N/A	N/A	PEM/PFO	-	14.4	1,428	-	325.4	-	1,753.4	-
227.1	330	Catskill	M3	N/A	N/A	PEM/PSS	-	234.3	-	5,491.3	-	3,493.7	-	8,985
<b>CSX Railroad Right-of-Way – Haverstraw Bay Bypass, NY</b>														
296.1	335	Stony Point	Y1	HS-2	1	PEM	266.6	-	-	-	-	-	-	-
298.5	342	Haverstraw	Y4	N/A	N/A	PEM	-	-	-	1,161.6	-	62.5	-	1,224.2
<b>CSX Railroad Right-of-Way Subtotal:</b>							<b>2,362.5</b>	<b>21,482.4</b>	<b>347,698.8</b>	<b>996,305.7</b>	<b>72,640.5</b>	<b>236,866</b>	<b>420,339.9</b>	<b>1,233,171.6</b>
<b>Total Impacts</b>									<b>705,296.2</b> <b>(16.2 acres)</b>	<b>2,230,793.5</b> <b>(51.2 acres)</b>	<b>87,842.4</b> <b>(2.0 acres)</b>	<b>360,442.1</b> <b>(8.3 acres)</b>	<b>793,139.1</b> <b>(18.2 acres)</b>	<b>2,591,235.3</b> <b>(59.5 acres)</b>
<p>a/ Temporary Impacts are based on an approximate 31- to 33-foot temporary workspace encompassing activities such as trenching, access, equipment staging, and spoil storage.</p> <p>b/ Permanent Impacts are based on an approximate 13- to 17- foot permanent vegetation maintenance corridor.</p> <p>c/ Total Impacts include both temporary and permanent impacts combined.</p> <p>d/ If multiple Cowardin classifications exist for any given wetland identified as containing PFO (i.e. PFO/PSS), impacts were assigned to forested wetland.</p>														

**Table I.1-2. Delineated Wetlands within the Proposed CHPE Project ROI**

<b>Segment</b>	<b>MP</b>	<b>Wetland ID</b>	<b>Cowardin Classification</b>	<b>Acres in ROI</b>
Overland	102	A3411	PSS1B/R3UB1	0.02
Overland	102	A3511	PEM1F	0.14
Overland	102	A3611	PEM1C	0.07
Overland	103	A3011	PEM1B	0.02
Overland	103	A3111	PEM1B/PSS1B	0.10
Overland	103	A3211	PEM1B	0.04
Overland	103	A3311	PEM1B	< 0.01
Overland	104	A2511	PFO1B	0.22
Overland	104	A2611	PEM1B/OWxh	0.05
Overland	104	A2711	PEM1B	0.05
Overland	104	A2811	PFO1D/R3UB1	0.06
Overland	104	A2911	PFO1B/PEM1B	0.21
Overland	105	A2211	PEM1B	< 0.01
Overland	105	A2311	PEM1B	< 0.01
Overland	105	A2411	PFO1D/R3UB1	0.04
Overland	106	A2011	PEM1B/PSS1B	0.01
Overland	106	A2111	PEM1B	0.02
Overland	107	A1511	PEM1B	0.03
Overland	107	A1611	PEM1B	0.01
Overland	107	A1711	PFO1B/PEM1B	0.07
Overland	107	A1811	PEM1F/PSS1	0.08
Overland	108	A1111	PFO1B	0.01
Overland	108	A1211	PSS1C	0.02
Overland	108	A1311	PEM1B	0.03
Overland	108	A1411	PFO1	0.01
Overland	109	A0511	PEM1B/PFO1B	0.02
Overland	109	A0611	PEM	0.01
Overland	109	A0911	PFO/PEM	0.02
Overland	109	A1011	PSS1B-C	0.04
Overland	110	A0411	PEM1Br	0.08
Overland	110	A0711	PSS1/PEM	0.30
Overland	110	A0811	PEM1B	0.28
Overland	111	A0211	PEM1F	0.60
Overland	111	A0311	PSS1E/PEM1E	0.77
Overland	112	A0111	PSS1/PEM1C	0.17
Overland	113	B54	PFO/PSS	0.01
Overland	114	B54	PEM/PSS	0.56
Overland	114	B54	PSS	0.62

<b>Segment</b>	<b>MP</b>	<b>Wetland ID</b>	<b>Cowardin Classification</b>	<b>Acres in ROI</b>
Overland	115	B54	PEM	14.8
Overland	116	B54	PFO/PEM	4.22
Overland	116	B55	PEM/PSS	0.12
Overland	117	B53	PEM	1.61
Overland	117	B54	PFO	8.04
Overland	118	B51	PEM	4.40
Overland	118	B52	PEM	0.78
Overland	119	B48	PEM	2.27
Overland	119	B48	PFO	0.26
Overland	119	B48	PSS	0.21
Overland	119	B48-A	PEM	0.26
Overland	119	B49	PEM	0.24
Overland	119	B50	PEM	0.25
Overland	119	F19	PFO	0.04
Overland	120	F17	PEM	3.41
Overland	120	F17	PFO	0.04
Overland	120	F17	POW	2.45
Overland	120	F17	PSS	0.10
Overland	120	F20	POW	0.06
Overland	121	F16	PFO	0.84
Overland	121	F16	PFO/PEM	0.27
Overland	122	F12	PFO	0.38
Overland	122	F12	PFO/PSS	1.92
Overland	122	F13	PFO	0.51
Overland	122	F14	PFO	0.22
Overland	123	F10	PFO/PSS	0.31
Overland	123	F10	PSS	0.28
Overland	123	F11	PFO/PSS	1.65
Overland	124	F08	PFO/PSS	9.39
Overland	125	F08	PEM/PSS	1.05
Overland	125	F08	PFO/PEM	0.58
Overland	126	F08	PEM	0.04
Overland	127	F04	PEM/PSS	2.48
Overland	128	F02	PEM/PSS	6.43
Overland	128	F03	PEM	0.04
Overland	128	F03	PEM/PSS	0.13
Overland	128	F04	PSS	1.82
Overland	129	A0054	PEM	5.12
Overland	129	F02	PEM	0.02

<b>Segment</b>	<b>MP</b>	<b>Wetland ID</b>	<b>Cowardin Classification</b>	<b>Acres in ROI</b>
Overland	130	A0054	PSS	2.93
Overland	130	A0055	PSS	7.11
Overland	132	A0002	PEM	2.43
Overland	132	A0002	PSS	2.88
Overland	133	A0003	PEM	0.11
Overland	133	A0003	PSS	0.01
Overland	133	A0004	PEM	0.07
Overland	133	A0005	PSS	0.14
Overland	134	A0006	PFO	0.01
Overland	134	A0008	PFO	0.91
Overland	134	A0009	PFO	0.01
Overland	135	A0012	PFO	0.07
Overland	136	A0013	PEM/PSS	0.13
Overland	136	A0014	PEM/PSS	0.03
Overland	136	A0015	PSS	0.01
Overland	136	A0016	PFO	0.14
Overland	136	A0017	PEM	0.15
Overland	136	A0017	PFO	0.17
Overland	136	A0018	PFO	0.01
Overland	137	A0020	PEM/PSS	0.01
Overland	137	A0022	PSS	0.04
Overland	137	A0023	PEM	< 0.01
Overland	137	A0024	PEM	0.03
Overland	137	A0024	PEM/PSS	0.08
Overland	137	A0024	PFO	0.02
Overland	137	A0024	PFO/PSS	0.03
Overland	137	A0024	PSS	0.17
Overland	137	A0025	PSS	0.05
Overland	137	A0026	PEM/PSS	0.04
Overland	137	A0026	PFO	0.08
Overland	137	A0026	PSS	1.21
Overland	138	A0027	PFO	0.12
Overland	138	A0028	PFO	< 0.01
Overland	138	A0029	PFO	0.13
Overland	138	A0030	PSS	0.08
Overland	138	A0031	PSS	0.07
Overland	138	A0033	PSS	0.02
Overland	138	A0034	PSS	0.22
Overland	138	A0035	PEM	0.11



<b>Segment</b>	<b>MP</b>	<b>Wetland ID</b>	<b>Cowardin Classification</b>	<b>Acres in ROI</b>
Overland	139	A0036	PSS	0.13
Overland	139	A0037	PFO	0.08
Overland	139	A0037	PSS	1.10
Overland	139	A0038	PFO	0.49
Overland	139	A0038	PSS	0.94
Overland	140	A0041	PSS	0.13
Overland	141	A0044	PFO/PEM	0.32
Overland	141	A0046	PSS	0.05
Overland	141	A0047	PFO	0.10
Overland	141	A0047	PSS	0.12
Overland	141	A0048	PFO	0.01
Overland	141	A0050	PSS	0.06
Overland	142	A0049	PFO	0.55
Overland	142	A0049	PFO/PSS	0.01
Overland	142	A0049	PSS	0.08
Overland	142	A0051	PSS	0.20
Overland	142	A0053	PFO	1.17
Overland	142	A0053	PFO/PSS	0.01
Overland	142	A0053	PSS	0.23
Overland	142	A5211	PFO	0.07
Overland	143	D02	PFO	0.11
Overland	143	D03	PFO	0.68
Overland	143	D04	PFO	0.01
Overland	143	D05	PFO	0.03
Overland	143	D06	PFO/PEM	0.03
Overland	143	D07	PEM	0.34
Overland	143	D08	PFO	< 0.01
Overland	144	D01	PFO	0.10
Overland	145	B38	PEM	0.27
Overland	146	B36	PFO/PSS	0.47
Overland	146	B37	PFO	0.04
Overland	146	B37	PFO/PSS	0.19
Overland	146	B37	PSS	0.11
Overland	146	B39	PFO	0.20
Overland	146	B39	PFO/PEM	0.05
Overland	150	B01	PEM	0.35
Overland	150	B01	PEM/PSS	0.36
Overland	151	B03	PEM	1.31
Overland	151	B03	PSS	0.68

<b>Segment</b>	<b>MP</b>	<b>Wetland ID</b>	<b>Cowardin Classification</b>	<b>Acres in ROI</b>
Overland	151	B04	PEM	0.19
Overland	151	B04	PEM/PSS	1.42
Overland	152	B04	PSS	0.10
Overland	152	B05	PEM/PSS	0.39
Overland	152	B05	PSS	0.26
Overland	153	B06	PEM/PSS	0.35
Overland	153	B07	PFO/PSS	0.01
Overland	154	B08	PFO	0.01
Overland	155	B47	PFO/PSS	< 0.01
Overland	155	B47	PSS	0.08
Overland	155	D09	PEM	4.76
Overland	156	B45	PEM	1.22
Overland	156	B46	PEM	1.54
Overland	156	B47	PFO/PEM	0.62
Overland	157	B41	PFO	0.36
Overland	157	B42	PEM	0.50
Overland	157	B43	PEM	0.76
Overland	157	B44	PFO/PEM	1.09
Overland	158	B10	PFO	1.00
Overland	159	B16	PFO	0.59
Overland	159	B17	PFO	0.53
Overland	159	B17	PFO/PSS	0.10
Overland	159	B18	PEM/PSS	0.46
Overland	159	B19	PEM/PSS	0.31
Overland	159	B20	PEM/PSS	0.14
Overland	159	B21	PEM	0.07
Overland	160	B23	PEM	0.09
Overland	160	B24	PFO	0.02
Overland	160	B25	PEM	0.07
Overland	160	B25	PEM/PSS	1.51
Overland	160	B25	PFO	0.30
Overland	160	B26	PSS	0.03
Overland	161	B28	PEM	0.01
Overland	161	B29	PEM/PSS	0.04
Overland	161	B30	PEM/PSS	0.52
Overland	162	B31	PEM	0.44
Overland	162	B32	PEM	0.50
Overland	163	B-C1	PEM	0.33
Overland	163	C01	PEM	0.15

<b>Segment</b>	<b>MP</b>	<b>Wetland ID</b>	<b>Cowardin Classification</b>	<b>Acres in ROI</b>
Overland	163	C01	PEM/PSS	0.20
Overland	163	C01	PSS	0.17
Overland	163	C02	PEM	0.01
Overland	163	C04	PEM	0.17
Overland	164	C05	PEM	0.03
Overland	164	C08	PEM	0.85
Overland	164	C08	PFO/PEM	0.06
Overland	164	C09	PFO/PSS	0.02
Overland	164	C09	PSS	0.13
Overland	165	C12	PEM	0.09
Overland	165	C14	PEM	0.21
Overland	165	C15	PFO	1.91
Overland	166	C21	PEM	0.03
Overland	166	C23	PEM	0.28
Overland	167	C26	PEM	0.91
Overland	167	C29	PEM	0.54
Overland	167	C31	PEM	0.79
Overland	168	C31	PEM/PSS	0.10
Overland	168	C34	PEM/PSS	0.31
Overland	168	C35	PEM/PSS	0.19
Overland	168	C36	PSS	0.17
Overland	169	C37	PFO/PSS	0.10
Overland	170	C42	PEM/PSS	2.19
Overland	170	C42	PEM1E/PFO1E/PSS1E	3.87
Overland	171	C44	PEM	0.18
Overland	171	X01	PSS1E/PFO1E	2.28
Overland	175	C46	PEM	0.37
Overland	175	C48	PEM	0.26
Overland	175	C56	PEM	0.22
Overland	176	C57	PEM	0.07
Overland	176	C57	PFO/PEM	0.29
Overland	176	C57	PFO/PSS	< 0.01
Overland	178	E002	PSS	0.13
Overland	179	E003	PEM	0.92
Overland	179	E003	PFO	0.85
Overland	179	E004	PEM	1.38
Overland	179	E005	PEM	0.16
Overland	179	E005	PFO	1.42
Overland	180	E006	PFO/PSS	0.11

<b>Segment</b>	<b>MP</b>	<b>Wetland ID</b>	<b>Cowardin Classification</b>	<b>Acres in ROI</b>
Overland	180	E007	PEM	0.09
Overland	180	E007	PEM/PSS	0.02
Overland	180	E007	PFO/PSS	0.08
Overland	180	E007	PSS	0.44
Overland	180	E008	PEM	0.27
Overland	180	E009	PEM	3.44
Overland	180	E009	PEM/PSS	0.46
Overland	180	E009	PSS	0.15
Overland	181	E010	PEM	0.41
Overland	181	E010	PEM/PSS	0.28
Overland	181	E010	PSS	0.07
Overland	181	E011	PFO	0.16
Overland	181	E012	PEM/PSS	0.15
Overland	181	E012	PFO/PEM	1.44
Overland	181	E013	PEM	0.01
Overland	181	E014	PFO	0.08
Overland	181	E015	PEM	0.62
Overland	181	E015	PFO	1.02
Overland	182	E015	PEM/PSS	2.07
Overland	182	E015	PSS	0.02
Overland	182	E095	PEM	0.01
Overland	182	E095	PEM/PSS	0.29
Overland	182	E096	PEM	0.12
Overland	182	E096	PEM/PSS	< 0.01
Overland	182	E096	PFO	0.40
Overland	182	E097	PEM	0.10
Overland	182	E097	PEM/PSS	0.54
Overland	183	E079	PFO/PSS	0.28
Overland	183	E080	PEM/PSS	0.04
Overland	183	E081	PFO	0.01
Overland	183	E098	POW	0.20
Overland	184	E017	PFO	0.02
Overland	184	E017	PFO/PSS	0.03
Overland	184	E017	POW	0.62
Overland	184	E075	PFO	0.12
Overland	184	E077	PSS	0.32
Overland	186	E021	PEM	3.52
Overland	186	E021	PEM/PSS	0.12
Overland	186	E021	PFO	0.10

<b>Segment</b>	<b>MP</b>	<b>Wetland ID</b>	<b>Cowardin Classification</b>	<b>Acres in ROI</b>
Overland	186	E021	PFO/PEM	0.16
Overland	187	E024	PEM	0.11
Overland	187	E024	PEM/PSS	0.59
Overland	187	E024	PFO	0.49
Overland	187	E024	PFO/PEM	0.01
Overland	187	E026	PEM/PSS	0.28
Overland	188	E028	PEM/PSS	0.10
Overland	188	E028	PFO	0.09
Overland	188	E028	PFO/PSS	0.05
Overland	188	E028	POW/PSS	0.11
Overland	188	E028	PSS	0.49
Overland	188	E029	PEM	< 0.01
Overland	188	E029	PFO	0.02
Overland	188	E029	PSS	0.17
Overland	189	E031	PSS	0.05
Overland	190	E032	PEM	0.04
Overland	190	E033	PEM	0.24
Overland	190	E033	PFO/PEM	0.04
Overland	190	E033	PSS	0.27
Overland	190	E034	PEM	0.16
Overland	190	E034	PFO	0.05
Overland	190	E034	PSS	< 0.01
Overland	190	E035	PFO	0.60
Overland	190	E035	PFO/PSS	< 0.01
Overland	190	E036	PFO	0.12
Overland	190	E082	PEM	0.04
Overland	190	E083	PEM	0.19
Overland	191	E037	PFO	0.57
Overland	191	E037	PSS	0.66
Overland	191	E039	PEM	1.24
Overland	191	E042	PFO	0.06
Overland	191	E043	PFO/PEM	0.26
Overland	192	E042	PEM	0.16
Overland	192	E042	PEM/PSS	0.25
Overland	192	E043	PEM	0.08
Overland	192	E044	PEM	0.08
Overland	192	E046	PEM	0.13
Overland	192	E046	PEM/PSS	0.44
Overland	192	E047	PEM	0.45

<b>Segment</b>	<b>MP</b>	<b>Wetland ID</b>	<b>Cowardin Classification</b>	<b>Acres in ROI</b>
Overland	194	E048	PEM/PSS	0.65
Overland	194	E051	PEM	0.28
Overland	194	E052	PEM	0.21
Overland	194	E059	PEM	0.07
Overland	195	E058	PEM	1.93
Overland	195	E090	PEM	0.06
Overland	195	E091	PEM	0.08
Overland	195	E092	PEM	0.02
Overland	197	E103	PEM	0.20
Overland	197	E104	PEM	1.19
Overland	198	E106	PEM	0.05
Overland	198	M71/E101	PSS	0.02
Overland	199	E069	PEM	0.14
Overland	199	M70	PFO	0.20
Overland	199	M71/E101	PEM	4.34
Overland	199	M71/E101	PEM/PSS	0.16
Overland	199	M72	PEM	< 0.01
Overland	200	M65	PFO/PSS/PEM	1.09
Overland	200	M66	PFO/PEM	0.22
Overland	200	M67	PFO/PSS/PEM	2.54
Overland	200	M68	PFO/PSS/PEM	0.79
Overland	200	M69	PFO/PEM	1.73
Overland	200	Y38	PSS/PFO	0.03
Overland	200	Y39	PEM	0.69
Overland	201	M62	PEM	0.35
Overland	201	M63	PFO/PSS/PEM	0.74
Overland	201	M64	PFO/PEM	0.29
Overland	201	M64	PSS/PEM	0.06
Overland	201	Y36	PEM	0.22
Overland	202	M61	PFO/PSS/PEM/POW	3.47
Overland	202	M61	PFO/PSS/PEM/POW	0.12
Overland	202	Y35	PEM	1.19
Overland	202	Y35	PEM	0.02
Overland	202	M59	PFO/PSS/PEM	0.32
Overland	202	M60	PFO/PEM	1.51
Overland	202	M61	PFO/PSS/PEM/POW	2.38
Overland	202	M61	PFO/PSS/PEM/POW	0.13
Overland	202	Y34	PEM/PSS	< 0.01
Overland	202	Y34	PSS/PEM	0.38

<b>Segment</b>	<b>MP</b>	<b>Wetland ID</b>	<b>Cowardin Classification</b>	<b>Acres in ROI</b>
Overland	202	Y35	PEM	0.73
Overland	202	Y35	PEM	0.02
Overland	203	M57	PFO/PEM	0.10
Overland	203	M58	PSS/PEM	0.08
Overland	203	Y33	PEM	0.51
Overland	204	M53	PEM	0.38
Overland	204	M54	PSS	0.20
Overland	204	M55	PEM	0.21
Overland	204	M56	PFO/PSS/PEM	0.46
Overland	205	M52	PEM	0.10
Overland	205	Y30	PEM	0.16
Overland	205	Y31	PEM/PSS	0.08
Overland	205	Y32	PEM/PSS	1.17
Overland	206	M48	PSS	0.02
Overland	206	M49	PSS	0.05
Overland	206	M50	PSS	0.03
Overland	207	M47	PSS/PEM	0.39
Overland	207	Y29	PEM	0.82
Overland	208	M44	PFO/PEM	0.18
Overland	208	M46	PFO/PSS	0.56
Overland	208	Y26	PEM	0.46
Overland	208	Y27	PEM/PSS	0.03
Overland	208	Y28	PEM/PSS	0.08
Overland	209	M40	PSS	0.07
Overland	209	M41	PFO/PSS/PEM	0.33
Overland	209	M42	PSS/PEM	0.27
Overland	209	M43	PSS/PEM	0.36
Overland	209	Y24	PEM/PSS	0.18
Overland	210	M34	PFO/PEM	0.58
Overland	210	M36	PFO	0.12
Overland	210	M37	PFO/PSS	0.01
Overland	210	M38	PSS	0.03
Overland	210	M39	PFO/PEM	0.03
Overland	210	Y22	PEM	0.21
Overland	210	Y23	PEM/PSS	0.22
Overland	211	M35	PSS	0.01
Overland	211	Y20	PEM	0.88
Overland	211	Y21	PEM	0.08
Overland	212	M33	PFO/PEM	0.88

<b>Segment</b>	<b>MP</b>	<b>Wetland ID</b>	<b>Cowardin Classification</b>	<b>Acres in ROI</b>
Overland	212	Y18	PEM	3.47
Overland	212	Y19	PEM	0.20
Overland	213	M32	PFO/PSS/PEM	3.96
Overland	214	M30	PSS/PEM	0.02
Overland	214	M31	PEM	0.02
Overland	216	Y16	PEM	20.07
Overland	217	Y17	PEM	0.10
Overland	220	Y14	PEM	0.05
Overland	220	Y15	PEM	2.14
Overland	221	M26	PSS/PEM	< 0.01
Overland	221	M27	PSS	0.04
Overland	221	M28	PFO	0.04
Overland	221	M29	PEM	0.24
Overland	221	Y13	PEM	0.04
Overland	222	M25	PFO/PEM	0.03
Overland	222	Y12	PEM	0.01
Overland	223	M22	PFO	0.19
Overland	223	M23	PFO	0.18
Overland	223	M24	PFO/PEM	0.58
Overland	223	Y11	PEM	0.25
Overland	224	M19	PFO	0.05
Overland	224	M20	PFO	0.01
Overland	224	M21	PEM	0.56
Overland	224	Y10	PEM	0.62
Overland	225	M14	PEM	0.02
Overland	225	M15	PEM	0.03
Overland	225	M16	PEM	0.02
Overland	225	M17	PSS/PEM/POW	0.06
Overland	225	M18	PEM	0.01
Overland	225	Y08	PEM	0.25
Overland	225	Y09	PEM	0.02
Overland	226	M09	PFO/PSS	0.22
Overland	226	M11	PFO/PEM	0.08
Overland	226	M12	PEM	0.10
Overland	226	M13	PEM	0.04
Overland	227	M02	PEM	0.08
Overland	227	M03	PSS/PEM	0.48
Overland	227	M05	PFO/PEM	< 0.01
Overland	227	M06	PFO	0.25



Segment	MP	Wetland ID	Cowardin Classification	Acres in ROI
Overland	227	M07	PEM	0.09
Overland	227	M08	PFO/PEM	0.44
Hudson River	228	M01	PEM	0.08
Hudson River	296	Y01	PEM	0.53
Hudson River	296	Y02	PEM	0.02
Hudson River	297	Y03	PEM	0.07
Hudson River	299	Y04	PEM	0.06
Hudson River	299	Y05	PEM	0.03
Hudson River	300	Y06	PEM	0.04
Hudson River	302	Y07	PEM	0.02
<b>Approximate Total Acreage</b>				<b>257.51</b>

Key:

MP = milepost

OWxh = open water, excavated, diked/impounded

PEM = palustrine emergent

PEM1B = palustrine emergent, persistent, saturated

PEM1Br = palustrine emergent, persistent, saturated, artificial substrate

PEM1C = palustrine emergent, persistent, seasonally flooded

PEM1E = palustrine emergent, persistent, seasonally flooded/saturated

PEM1F = palustrine emergent, persistent, semi-permanently flooded

PFO = palustrine forested

PFO1 – palustrine forested, broad-leaved deciduous

PFO1B = palustrine forested, broad-leaved deciduous, saturated

PFO1D = palustrine forested, broad-leaved deciduous, partially drained/ditched

POW = palustrine open water

PSS = palustrine shrub-scrub

PSS1 = palustrine shrub-scrub, broad-leaved deciduous, seasonally

flooded/saturated

PSS1B = palustrine shrub-scrub, broad-leaved deciduous, saturated

PSS1B-C = palustrine shrub-scrub, broad-leaved deciduous, saturated-seasonally

flooded

PSS1E = palustrine shrub-scrub, broad-leaved deciduous, seasonally

flooded/saturated

R3UB1 = riverine-upper perennial-unconsolidated bottom-gravel

ROI = region of influence (within 100 feet on either side of the transmission line)

**Table I.1-3. NYSDEC Freshwater Wetlands within the Proposed CHPE Project ROI**

<b>Segment</b>	<b>MP</b>	<b>Wetland ID</b>	<b>NYSDEC Wetland ID</b>	<b>Cowardin Classification</b>	<b>Acres in ROI</b>
Overland	111.4	A0211	WH-2	PEM1F	0.60
Overland	111.7	A0111	WH-2	PSS1/PEM1C	0.17
Overland	119.7	F17	FA-13	PEM	3.41
Overland	136.2	A17	HF-1	PEM/PFO	0.32
Overland	137.1	A26	F-20	PEM/PSS/PFO	1.33
Overland	137.9	A29	F-7	PFO	0.13
Overland	137.9	A30	F-7	PSS	0.08
Overland	137.9	A31	F-7	PSS	0.07
Overland	138.5	A36	F-7	PSS	0.13
Overland	138.8	A38	F-7	PFO/PSS	1.43
Overland	141.7	A49	Q-32	PFO/PSS	0.64
Overland	141.9	A53	Q-32	PFO/PSS	1.41
Overland	142.9	D7	GA-20	PEM	0.34
Overland	143.6	D1	GA-20	PFO	0.10
Overland	145.1	B38	Q-11	PEM	0.27
Overland	146.4	B36	Q-11	PFO/PSS	0.47
Overland	146.4	B37	Q-11	PFO/PSS	0.34
Overland	149.5	B1	S-7	PEM/PSS	0.71
Overland	150.5	B3	S-19	PEM/PSS	1.99
Overland	151.4	B4	S-19	PEM/PSS	1.71
Overland	152.3	B5	S-19	PEM/PSS	0.65
Overland	153.7	B8	S-19	PFO	0.01
Overland	154.9	D9	S-21	PEM	0.24
Overland	155.5	B47	S-21	PFO/PSS	0.62
Overland	159.3	B21	R-50	PEM	0.07
Overland	159.5	B24	R-50	PFO	0.02
Overland	160.1	B25	R-3	PEM/PFO/PSS	1.88
Overland	161.6	B31	R-11	PEM	0.44
Overland	164.4	C8	R-18	PFO/PEM	0.91
Overland	164.9	C15	R-18	PFO	1.91
Overland	165.9	C23	B-31	PEM	0.28
Overland	167.1	C29	B-31	PEM	0.54
Overland	170	C42	S-107	PEM/PSS/PFO/PEM1E/ PFO1E/PSS1E	6.06
Overland	171.4	C44	S-112	PEM	0.18
Overland	175.4	C57	S-115	PEM/PFO/PSS	0.36
Overland	180	E9	S-117	PEM/PSS	4.05
Overland	186.5	E24	V-51	PEM/PSS/PFO	1.29

<b>Segment</b>	<b>MP</b>	<b>Wetland ID</b>	<b>NYSDEC Wetland ID</b>	<b>Cowardin Classification</b>	<b>Acres in ROI</b>
Overland	187.4	E28	V-52	PEM/PSS/PFO	1.61
Overland	210.7	M34	HN-101	PFO/PEM	0.58
Overland	214.5	Y16	HN-108	PEM	20.07
Overland	216.8	Y17	HN-108	PEM	0.10
Hudson River	296.1	Y1	HS-2	PEM	0.53
<b>Total Acreage</b>					<b>58.05</b>

Key:

MP = milepost

NYSDEC = New York State Department of Environmental Conservation

PEM = palustrine emergent

PEM1C = palustrine emergent, persistent, seasonally flooded

PEM1E = palustrine emergent, persistent, seasonally flooded/saturated

PEM1F = palustrine emergent, persistent, semi-permanently flooded

PFO = palustrine forested

PFO1E = palustrine forested, broad-leaved deciduous, seasonally flooded/saturated

PSS = palustrine shrub-scrub

PSS1E = palustrine shrub-scrub, broad-leaved deciduous, seasonally flooded/saturated

POW = palustrine open water

ROI = region of influence (within 100 feet on either side of the transmission line)

**Table I.1-4. NYSDEC Freshwater Wetland Adjacent Areas within the Proposed CHPE Project ROI**

<b>Segment</b>	<b>MP</b>	<b>NYSDEC Wetland ID</b>	<b>Acres in ROI</b>
Overland	110	WH-1	0.02
Overland	112	WH-2	2.13
Overland	120	FA-13	8.70
Overland	122	FA-12	0.32
Overland	130	HF-10	6.76
Overland	136	HF-1	3.47
Overland	137	F-20	1.06
Overland	138	F-7	4.98
Overland	140	Q-32	9.07
Overland	143	GA-20	3.66
Overland	143	Q-32	0.02
Overland	143	GA-20	0.02
Overland	143	GA-21	1.23
Overland	145	Q-11	3.79
Overland	150	S-7	1.94
Overland	151	S-19	14.30
Overland	152	S-50	0.60
Overland	152	S-48	0.01
Overland	155	S-20	3.05
Overland	155	S-21	4.30
Overland	159	R-50	7.87
Overland	160	R-3	1.90
Overland	162	R-11	8.35
Overland	164	R-18	20.14
Overland	166	B-31	17.38
Overland	169	BH-6	2.14
Overland	169	S-105	2.31
Overland	170	S-107	7.58
Overland	171	S-112	2.09
Overland	176	S-115	3.63
Overland	180	S-117	1.37
Overland	181	S-15	0.75
Overland	187	V-51	2.35
Overland	188	V-52	2.68
Overland	228	HS-101	0.18
Overland	228	C-23	1.89

<b>Segment</b>	<b>MP</b>	<b>NYSDEC Wetland ID</b>	<b>Acres in ROI</b>
Overland	228	C-23	0.19
Hudson River	228	C-23	0.19
Hudson River	229	C-23	0.39
Hudson River	229	C-25	0.03
Hudson River	296	HS-2	2.49
Hudson River	297	HS-11	1.02
<b>Total Acreage</b>			<b>156.35</b>

Key:

MP = milepost

NYSDEC = New York State Department of Environmental Conservation

ROI = region of influence (within 100 feet on either side of the  
transmission line)

**Table I.1-5. NYSDEC Tidal Wetlands within the Proposed CHPE Project ROI**

<b>Segment</b>	<b>MP</b>	<b>Tidal Wetland ID</b>	<b>Description</b>	<b>Acres in ROI</b>
Hudson River	317.4	2020	Littoral Zone	164.30 *
Hudson River	319.6	2020	Littoral Zone	270.40 *
New York City Metropolitan Area	328.5	5000	Adjacent Area	0.06
New York City Metropolitan Area	329.1	5000	Adjacent Area	0.23
New York City Metropolitan Area	329.4	5000	Adjacent Area	0.06
New York City Metropolitan Area	332.1	5000	Adjacent Area	17.66
New York City Metropolitan Area	332.3	2030	Formerly Connected	0.63
<b>Total Acreage</b>				<b>453.34</b>

Note: \* Acreage for the littoral zone wetlands includes the Hudson River itself.

Key:

MP = milepost

ROI = region of influence (within 100 feet on either side of the transmission line)

***APPENDIX I.2 – POTENTIALLY IMPACTED SOILS ASSOCIATED WITH THE  
PROPOSED CHPE PROJECT***





## Appendix I.2

### Potentially Impacted Soils Associated with the Proposed CHPE Project

**Table I.2-1** provides a description of soil types found within the proposed CHPE Project ROI for the Geology and Soils resource area. The table is sorted by segment and contains the map unit name, map unit type, acres of soil within the ROI, and the mile post at which the soil occurs.

**Table I.2-1. Soils within the Proposed CHPE Project ROI**

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Lake Champlain	Fluvaquents	Consociation	0.03	98.6
Lake Champlain	Hudson and Vergennes soils, steep and very steep	Undifferentiated group	0.47	99.9
Lake Champlain	Fluvaquents	Consociation	0.23	100.3
Lake Champlain	Fluvaquents	Consociation	0.34	100.4
Overland	Saco silt loam	Consociation	1.78	101.4
Overland	Vergennes silty clay loam, 6 to 12 percent slopes	Consociation	1.81	101.5
Overland	Oakville loamy fine sand, 5 to 15 percent slopes	Consociation	1.65	101.6
Overland	Pits, gravel, and sand	Consociation	2.91	101.6
Overland	Farmington-Rock outcrop association, nearly level through moderately steep	Association	4.44	101.8
Overland	Oakville loamy fine sand, 5 to 15 percent slopes	Consociation	8.87	102.0
Overland	Hollis-Charlton association, moderately steep and steep	Association	0.92	102.2
Overland	Limerick silt loam	Consociation	0.63	102.2
Overland	Hudson and Vergennes soils, steep and very steep	Undifferentiated group	0.40	102.4
Overland	Hudson and Vergennes soils, steep and very steep	Undifferentiated group	0.00	102.4
Overland	Pits, gravel, and sand	Consociation	0.79	102.4
Overland	Vergennes silty clay loam, 12 to 20 percent slopes	Consociation	7.49	102.4
Overland	Hollis-Rock outcrop association, gently sloping and sloping	Association	6.68	102.7

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Vergennes silty clay loam, 12 to 20 percent slopes	Consociation	0.00	102.8
Overland	Hudson and Vergennes soils, steep and very steep	Undifferentiated group	0.17	102.9
Overland	Hollis-Charlton association, moderately steep and steep	Association	1.35	103.0
Overland	Charlton soils, very stony, gently sloping and sloping	Consociation	4.24	103.1
Overland	Hollis-Rock outcrop association, gently sloping and sloping	Association	0.07	103.1
Overland	Hollis-Rock outcrop association, gently sloping and sloping	Association	7.66	103.3
Overland	Hollis-Charlton association, moderately steep and steep	Association	4.18	103.6
Overland	Vergennes silty clay loam, 12 to 20 percent slopes	Consociation	0.44	103.6
Overland	Hudson and Vergennes soils, steep and very steep	Undifferentiated group	0.03	103.7
Overland	Vergennes silty clay loam, 12 to 20 percent slopes	Consociation	4.13	103.8
Overland	Hollis-Rock outcrop association, gently sloping and sloping	Association	16.60	103.9
Overland	Hollis-Charlton association, moderately steep and steep	Association	5.76	104.6
Overland	Vergennes silty clay loam, 2 to 6 percent slopes	Consociation	0.29	104.7
Overland	Hoosic gravelly sandy loam, rolling and hilly	Consociation	0.96	104.9
Overland	Hollis-Charlton association, moderately steep and steep	Association	1.28	104.9
Overland	Vergennes silty clay loam, 2 to 6 percent slopes	Consociation	2.33	105.0
Overland	Hollis-Charlton association, moderately steep and steep	Association	10.54	105.1
Overland	Charlton soils, very stony, gently sloping and sloping	Consociation	6.94	105.5
Overland	Vergennes silty clay loam, 6 to 12 percent slopes	Consociation	4.44	105.8
Overland	Hudson and Vergennes soils, steep and very steep	Undifferentiated group	0.28	105.9
Overland	Charlton soils, very stony, moderately steep and steep	Consociation	3.94	106.0

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Hudson and Vergennes soils, steep and very steep	Undifferentiated group	0.42	106.1
Overland	Hollis-Charlton association, moderately steep and steep	Association	21.04	106.2
Overland	Rock outcrop-Hollis association, moderately steep through very steep	Association	4.37	107.0
Overland	Hollis-Charlton association, moderately steep and steep	Association	8.08	107.2
Overland	Vergennes silty clay loam, 2 to 6 percent slopes	Consociation	0.26	107.4
Overland	Rock outcrop-Hollis association, moderately steep through very steep	Association	3.59	107.5
Overland	Hollis-Charlton association, moderately steep and steep	Association	0.10	107.7
Overland	Hudson and Vergennes soils, steep and very steep	Undifferentiated group	3.41	107.7
Overland	Hollis-Charlton association, moderately steep and steep	Association	32.78	107.8
Overland	Hollis-Rock outcrop association, gently sloping and sloping	Association	1.96	108.3
Overland	Rock outcrop-Vergennes association, gently sloping through moderately steep	Association	0.57	109.1
Overland	Rock outcrop-Vergennes association, gently sloping through moderately steep	Association	3.78	109.3
Overland	Hudson and Vergennes soils, steep and very steep	Undifferentiated group	0.90	109.4
Overland	Vergennes silty clay loam, 2 to 6 percent slopes	Consociation	4.48	109.5
Overland	Vergennes silty clay loam, 12 to 20 percent slopes	Consociation	1.93	109.6
Overland	Hudson and Vergennes soils, steep and very steep	Undifferentiated group	1.36	109.7
Overland	Saprists, Aquepts, and Aquepts	Undifferentiated group	1.70	109.8
Overland	Saprists, Aquepts, and Aquepts	Undifferentiated group	1.99	110.0
Overland	Hudson and Vergennes soils, steep and very steep	Undifferentiated group	1.54	110.1
Overland	Kingsbury silty clay, 2 to 6 percent slopes	Consociation	3.20	110.2
Overland	Claverack loamy fine sand, 2 to 6 percent slopes	Consociation	0.19	110.3

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Vergennes silty clay loam, 2 to 6 percent slopes	Consociation	1.03	110.3
Overland	Vergennes silty clay loam, 12 to 20 percent slopes	Consociation	0.80	110.3
Overland	Kingsbury silty clay, 2 to 6 percent slopes	Consociation	3.18	110.4
Overland	Vergennes silty clay loam, 2 to 6 percent slopes	Consociation	0.17	110.4
Overland	Vergennes silty clay loam, 6 to 12 percent slopes	Consociation	1.25	110.5
Overland	Hollis-Charlton association, moderately steep and steep	Association	0.53	110.6
Overland	Rock outcrop-Vergennes association, gently sloping through moderately steep	Association	3.30	110.6
Overland	Kingsbury silty clay, 2 to 6 percent slopes	Consociation	1.68	110.7
Overland	Hollis-Charlton association, moderately steep and steep	Association	7.86	110.8
Overland	Vergennes silty clay loam, 6 to 12 percent slopes	Consociation	16.70	111.2
Overland	Saprists, Aquepts, and Aquepts	Undifferentiated group	0.11	111.3
Overland	Saprists, Aquepts, and Aquepts	Undifferentiated group	0.10	111.5
Overland	Saprists, Aquepts, and Aquepts	Undifferentiated group	0.72	111.8
Overland	Limerick silt loam	Consociation	0.52	111.9
Overland	Vergennes silty clay loam, 12 to 20 percent slopes	Consociation	1.70	111.9
Overland	Limerick silt loam	Consociation	3.92	111.9
Overland	Vergennes silty clay loam, 12 to 20 percent slopes	Consociation	4.01	112.0
Overland	Orthents and Psamments	Undifferentiated group	43.33	112.2
Overland	Vergennes silty clay loam, 2 to 6 percent slopes	Consociation	0.96	112.2
Overland	Kingsbury silty clay, 0 to 2 percent slopes	Consociation	0.49	112.8
Overland	Saco silt loam	Consociation	0.07	112.9
Overland	Covington silty clay loam	Consociation	0.00	113.2
Overland	Saco silt loam	Consociation	0.06	113.2
Overland	Saco silt loam	Consociation	0.00	113.5
Overland	Saco silt loam	Consociation	0.02	113.6
Overland	Saco silt loam	Consociation	0.99	113.6

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Saco silt loam	Consociation	0.99	113.7
Overland	Limerick silt loam	Consociation	13.78	114.3
Overland	Teel silt loam	Consociation	0.36	114.4
Overland	Teel silt loam	Consociation	0.09	114.6
Overland	Teel silt loam	Consociation	0.06	114.7
Overland	Saco silt loam	Consociation	4.23	114.8
Overland	Teel silt loam	Consociation	0.22	114.8
Overland	Teel silt loam	Consociation	0.18	114.9
Overland	Limerick silt loam	Consociation	1.25	115.0
Overland	Kingsbury silty clay, 0 to 2 percent slopes	Consociation	2.04	115.1
Overland	Saco silt loam	Consociation	0.68	115.1
Overland	Orthents and Psamments	Undifferentiated group	1.89	115.2
Overland	Saco silt loam	Consociation	7.76	115.3
Overland	Orthents and Psamments	Undifferentiated group	6.99	115.6
Overland	Teel silt loam	Consociation	4.31	115.8
Overland	Hartland very fine sandy loam, 0 to 2 percent slopes	Consociation	3.80	116.0
Overland	Hartland very fine sandy loam, 0 to 2 percent slopes	Consociation	0.01	116.0
Overland	Orthents and Psamments	Undifferentiated group	0.43	116.3
Overland	Vergennes silty clay loam, 2 to 6 percent slopes	Consociation	5.35	116.3
Overland	Orthents and Psamments	Undifferentiated group	0.02	116.4
Overland	Kingsbury silty clay, 0 to 2 percent slopes	Consociation	1.45	116.5
Overland	Covington silty clay loam	Consociation	1.62	116.6
Overland	Orthents and Psamments	Undifferentiated group	5.98	116.6
Overland	Covington silty clay loam	Consociation	1.73	116.9
Overland	Orthents and Psamments	Undifferentiated group	0.03	116.9
Overland	Kingsbury silty clay, 0 to 2 percent slopes	Consociation	16.63	117.0
Overland	Vergennes silty clay loam, 2 to 6 percent slopes	Consociation	0.00	117.4
Overland	Vergennes silty clay loam, 2 to 6 percent slopes	Consociation	0.06	117.5

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Orthents and Psamments	Undifferentiated group	19.20	117.7
Overland	Vergennes silty clay loam, 2 to 6 percent slopes	Consociation	0.85	117.7
Overland	Vergennes silty clay loam, 2 to 6 percent slopes	Consociation	1.00	117.9
Overland	Hudson silt loam, 6 to 12 percent slopes	Consociation	0.27	118.0
Overland	Hollis-Rock outcrop association, gently sloping and sloping	Association	1.75	118.1
Overland	Vergennes silty clay loam, 12 to 20 percent slopes	Consociation	0.02	118.3
Overland	Hollis-Charlton association, moderately steep and steep	Association	0.59	118.6
Overland	Saprists, Aquepts, and Aquepts	Undifferentiated group	9.19	118.8
Overland	Orthents and Psamments	Undifferentiated group	0.23	119.0
Overland	Vergennes silty clay loam, 12 to 20 percent slopes	Consociation	0.08	119.0
Overland	Hollis-Rock outcrop association, gently sloping and sloping	Association	2.56	119.1
Overland	Hudson and Vergennes soils, steep and very steep	Undifferentiated group	2.37	119.2
Overland	Vergennes silty clay loam, 6 to 12 percent slopes	Consociation	0.19	119.2
Overland	Hollis-Rock outcrop association, gently sloping and sloping	Association	4.41	119.3
Overland	Pits, quarry	Consociation	3.63	119.5
Overland	Hollis-Rock outcrop association, gently sloping and sloping	Association	16.29	119.7
Overland	Saprists, Aquepts, and Aquepts	Undifferentiated group	4.46	120.5
Overland	Kingsbury silty clay, 0 to 2 percent slopes	Consociation	0.01	120.6
Overland	Saco silt loam	Consociation	2.42	120.7
Overland	Hollis-Rock outcrop association, gently sloping and sloping	Association	35.83	120.8
Overland	Limerick silt loam	Consociation	1.87	122.4
Overland	Saco silt loam	Consociation	8.83	122.5
Overland	Limerick silt loam	Consociation	0.08	122.8
Overland	Limerick silt loam	Consociation	0.05	122.9
Overland	Kingsbury silty clay, 0 to 2 percent slopes	Consociation	33.60	123.0

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Saco silt loam	Consociation	0.42	123.0
Overland	Vergennes silty clay loam, 2 to 6 percent slopes	Consociation	0.01	123.0
Overland	Hartland very fine sandy loam, 2 to 6 percent slopes	Consociation	8.85	124.4
Overland	Sapristis, Aquepts, and Aquepts	Undifferentiated group	4.14	124.6
Overland	Kingsbury silty clay, 0 to 2 percent slopes	Consociation	16.85	125.0
Overland	Orthents and Psamments	Undifferentiated group	1.09	125.6
Overland	Covington silty clay loam	Consociation	7.51	125.7
Overland	Claverack loamy fine sand, 0 to 2 percent slopes	Consociation	0.97	126.0
Overland	Orthents and Psamments	Undifferentiated group	2.23	126.0
Overland	Covington silty clay loam	Consociation	12.11	126.1
Overland	Claverack loamy fine sand, 0 to 2 percent slopes	Consociation	0.20	126.5
Overland	Orthents and Psamments	Undifferentiated group	0.01	126.6
Overland	Claverack loamy fine sand, 0 to 2 percent slopes	Consociation	7.75	126.7
Overland	Orthents and Psamments	Undifferentiated group	0.02	126.7
Overland	Orthents and Psamments	Undifferentiated group	0.00	126.7
Overland	Orthents and Psamments	Undifferentiated group	0.02	126.7
Overland	Orthents and Psamments	Undifferentiated group	0.04	126.8
Overland	Covington silty clay loam	Consociation	7.97	127.0
Overland	Orthents and Psamments	Undifferentiated group	0.18	127.0
Overland	Claverack loamy fine sand, 2 to 6 percent slopes	Consociation	2.71	127.3
Overland	Orthents and Psamments	Undifferentiated group	0.24	127.3
Overland	Orthents and Psamments	Undifferentiated group	0.00	127.4
Overland	Kingsbury silty clay, 2 to 6 percent slopes	Consociation	16.12	127.5
Overland	Nassau shaly silt loam, undulating through hilly	Consociation	0.10	127.6

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Nassau shaly silt loam, undulating through hilly	Consociation	0.09	127.8
Overland	Covington silty clay loam	Consociation	0.00	127.9
Overland	Nassau shaly silt loam, undulating through hilly	Consociation	0.00	127.9
Overland	Covington silty clay loam	Consociation	11.23	128.1
Overland	Kingsbury silty clay, 0 to 2 percent slopes	Consociation	0.63	128.4
Overland	Covington silty clay loam	Consociation	0.18	128.6
Overland	Kingsbury silty clay, 0 to 2 percent slopes	Consociation	5.12	128.6
Overland	Vergennes silty clay loam, 2 to 6 percent slopes	Consociation	1.02	128.8
Overland	Orthents and Psamments	Undifferentiated group	26.94	128.9
Overland	Covington silty clay loam	Consociation	0.00	129.1
Overland	Vergennes silty clay loam, 2 to 6 percent slopes	Consociation	0.13	129.1
Overland	Covington silty clay loam	Consociation	0.63	129.2
Overland	Kingsbury silty clay, 0 to 2 percent slopes	Consociation	1.04	129.3
Overland	Kingsbury silty clay, 0 to 2 percent slopes	Consociation	1.08	129.7
Overland	Covington silty clay loam	Consociation	30.89	130.2
Overland	Kingsbury silty clay, 0 to 2 percent slopes	Consociation	4.98	131.4
Overland	Vergennes silty clay loam, 2 to 6 percent slopes	Consociation	3.32	131.6
Overland	Covington silty clay loam	Consociation	0.05	131.7
Overland	Covington silty clay loam	Consociation	0.35	131.7
Overland	Vergennes silty clay loam, 2 to 6 percent slopes	Consociation	0.49	131.7
Overland	Kingsbury silty clay, 0 to 2 percent slopes	Consociation	1.62	131.8
Overland	Carlisle muck	Consociation	21.16	131.9
Overland	Claverack loamy fine sand, 2 to 6 percent slopes	Consociation	0.00	132.5
Overland	Covington silty clay loam	Consociation	0.68	132.6
Overland	Claverack loamy fine sand, 2 to 6 percent slopes	Consociation	2.05	132.8
Overland	Covington silty clay loam	Consociation	1.51	132.8
Overland	Kingsbury silty clay, 2 to 6 percent slopes	Consociation	0.20	132.8
Overland	Claverack loamy fine sand, 0 to 2 percent slopes	Consociation	21.38	132.9
Overland	Wallington silt loam, sandy substratum	Consociation	6.85	133.8



<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Claverack loamy fine sand, 0 to 2 percent slopes	Consociation	0.03	133.9
Overland	Kingsbury silty clay, 0 to 2 percent slopes	Consociation	0.16	133.9
Overland	Claverack loamy fine sand, 0 to 2 percent slopes	Consociation	23.26	134.0
Overland	Claverack loamy fine sand, 0 to 2 percent slopes	Consociation	0.23	134.1
Overland	Oakville loamy fine sand, 0 to 5 percent slopes	Consociation	1.17	135.1
Overland	Orthents and Psamments	Undifferentiated group	2.37	135.1
Overland	Orthents and Psamments	Undifferentiated group	0.01	135.2
Overland	Limerick-Saco complex	Complex	1.54	135.3
Overland	Hudson silt loam, hilly	Consociation	3.94	135.4
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	4.85	135.5
Overland	Unadilla very fine sandy loam, 8 to 15 percent slopes	Consociation	8.08	135.8
Overland	Scio silt loam, 3 to 8 percent slopes	Consociation	3.77	136.1
Overland	Hudson silt loam, hilly	Consociation	12.47	136.3
Overland	Teel silt loam	Consociation	0.00	136.4
Overland	Teel silt loam	Consociation	0.00	136.5
Overland	Teel silt loam	Consociation	0.00	136.5
Overland	Teel silt loam	Consociation	0.01	136.6
Overland	Rhinebeck silt loam, 3 to 8 percent slopes	Consociation	5.02	136.7
Overland	Teel silt loam	Consociation	0.00	136.7
Overland	Teel silt loam	Consociation	0.00	136.7
Overland	Teel silt loam	Consociation	0.51	136.9
Overland	Hudson silt loam, hilly	Consociation	2.90	137.0
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	1.02	137.1
Overland	Rhinebeck silt loam, 0 to 3 percent slopes	Consociation	0.26	137.2
Overland	Teel silt loam	Consociation	2.15	137.2
Overland	Unadilla very fine sandy loam, 3 to 8 percent slopes	Consociation	3.96	137.3
Overland	Rhinebeck silt loam, 0 to 3 percent slopes	Consociation	0.02	137.3
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	1.96	137.4
Overland	Rhinebeck silt loam, 0 to 3 percent slopes	Consociation	2.37	137.5
Overland	Shaker very fine sandy loam	Consociation	0.01	137.5
Overland	Shaker very fine sandy loam	Consociation	0.00	137.5
Overland	Shaker very fine sandy loam	Consociation	2.82	137.6

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Hudson silt loam, hilly	Consociation	2.11	137.7
Overland	Fluvaqvents frequently flooded	Consociation	3.80	137.8
Overland	Elmridge very fine sandy loam, 3 to 8 percent slopes	Consociation	2.74	138.0
Overland	Shaker very fine sandy loam	Consociation	8.09	138.1
Overland	Elmridge very fine sandy loam, 3 to 8 percent slopes	Consociation	3.66	138.4
Overland	Fluvaqvents frequently flooded	Consociation	1.06	138.5
Overland	Wareham loamy sand	Consociation	14.87	138.6
Overland	Madalin mucky silty clay loam	Consociation	1.63	139.2
Overland	Shaker very fine sandy loam	Consociation	1.73	139.3
Overland	Elmridge very fine sandy loam, 3 to 8 percent slopes	Consociation	0.03	139.4
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	0.03	139.4
Overland	Rhinebeck silt loam, 0 to 3 percent slopes	Consociation	6.06	139.4
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	2.38	139.6
Overland	Rhinebeck silt loam, 0 to 3 percent slopes	Consociation	4.63	139.7
Overland	Oakville and Windsor soils, 25 to 35 percent slopes	Undifferentiated group	6.92	139.9
Overland	Hudson silt loam, 8 to 15 percent slopes	Consociation	0.00	140.0
Overland	Rhinebeck silt loam, 0 to 3 percent slopes	Consociation	0.11	140.0
Overland	Claverack loamy fine sand, 3 to 8 percent slopes	Consociation	2.23	140.2
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	4.97	140.3
Overland	Cosad fine sandy loam	Consociation	3.65	140.5
Overland	Oakville loamy fine sand, nearly level	Consociation	15.75	140.7
Overland	Cosad fine sandy loam	Consociation	0.01	141.1
Overland	Rhinebeck silt loam, 0 to 3 percent slopes	Consociation	3.33	141.3
Overland	Rhinebeck silt loam, 3 to 8 percent slopes	Consociation	0.30	141.3
Overland	Cosad fine sandy loam	Consociation	5.89	141.5
Overland	Rhinebeck silt loam, 0 to 3 percent slopes	Consociation	11.29	141.7
Overland	Wareham loamy sand	Consociation	0.39	142.1
Overland	Oakville loamy fine sand, nearly level	Consociation	10.69	142.2
Overland	Oakville loamy fine sand, undulating	Consociation	5.93	142.6
Overland	Wareham loamy sand	Consociation	4.72	142.9
Overland	Deerfield loamy fine sand, nearly level	Consociation	5.75	143.1
Overland	Oakville loamy fine sand, undulating	Consociation	0.08	143.2
Overland	Wareham loamy sand	Consociation	0.24	143.2

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Oakville loamy fine sand, undulating	Consociation	4.17	143.3
Overland	Wareham loamy sand	Consociation	4.18	143.4
Overland	Oakville loamy fine sand, undulating	Consociation	24.42	143.7
Overland	Deerfield loamy fine sand, nearly level	Consociation	0.00	144.5
Overland	Oakville loamy fine sand, rolling	Consociation	3.12	144.7
Overland	Oakville loamy fine sand, undulating	Consociation	1.29	144.8
Overland	Oakville loamy fine sand, undulating	Consociation	0.13	144.9
Overland	Oakville loamy fine sand, rolling	Consociation	6.05	144.9
Overland	Wareham loamy sand	Consociation	0.95	145.1
Overland	Oakville loamy fine sand, nearly level	Consociation	6.33	145.2
Overland	Oakville loamy fine sand, undulating	Consociation	4.17	145.4
Overland	Oakville loamy fine sand, nearly level	Consociation	7.75	145.6
Overland	Deerfield loamy fine sand, nearly level	Consociation	2.63	145.9
Overland	Oakville loamy fine sand, nearly level	Consociation	4.39	146.0
Overland	Wareham loamy sand	Consociation	8.23	146.2
Overland	Oakville loamy fine sand, nearly level	Consociation	5.75	146.5
Overland	Oakville loamy fine sand, undulating	Consociation	12.76	146.8
Overland	Oakville loamy fine sand, rolling	Consociation	0.06	147.0
Overland	Oakville loamy fine sand, undulating	Consociation	18.83	147.3
Overland	Oakville loamy fine sand, rolling	Consociation	0.87	147.3
Overland	Windsor loamy sand, undulating	Consociation	1.60	148.1
Overland	Deerfield loamy fine sand, nearly level	Consociation	4.66	148.2
Overland	Windsor loamy sand, undulating	Consociation	13.65	148.4
Overland	Windsor loamy sand, nearly level	Consociation	9.15	148.9
Overland	Windsor loamy sand, undulating	Consociation	5.07	149.3
Overland	Fluvaquents frequently flooded	Consociation	2.49	149.5
Overland	Oakville and Windsor soils, 25 to 35 percent slopes	Undifferentiated group	0.51	149.6
Overland	Windsor loamy sand, undulating	Consociation	14.13	149.7
Overland	Windsor loamy sand, rolling	Consociation	25.12	150.2
Overland	Chatfield-Hollis complex, hilly, very rocky	Complex	1.73	150.3
Overland	Oakville and Windsor soils, 25 to 35 percent slopes	Undifferentiated group	0.68	150.8
Overland	Rhinebeck silt loam, 0 to 3 percent slopes	Consociation	0.04	151.1
Overland	Rhinebeck silt loam, 3 to 8 percent slopes	Consociation	2.34	151.3
Overland	Rhinebeck silt loam, 0 to 3 percent slopes	Consociation	4.76	151.5
Overland	Rhinebeck silt loam, 3 to 8 percent slopes	Consociation	16.43	151.7

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Hudson silt loam, 8 to 15 percent slopes	Consociation	1.51	152.3
Overland	Deerfield loamy fine sand, undulating	Consociation	6.34	152.4
Overland	Deerfield loamy fine sand, nearly level	Consociation	5.65	152.7
Overland	Windsor loamy sand, nearly level	Consociation	0.16	152.8
Overland	Windsor loamy sand, rolling	Consociation	5.80	152.9
Overland	Windsor loamy sand, undulating	Consociation	5.11	153.2
Overland	Udorthents, smoothed	Consociation	0.55	153.3
Overland	Deerfield loamy fine sand, nearly level	Consociation	4.26	153.4
Overland	Udorthents, smoothed	Consociation	0.06	153.4
Overland	Windsor loamy sand, nearly level	Consociation	0.98	153.4
Overland	Cosad fine sandy loam	Consociation	0.29	153.6
Overland	Windsor loamy sand, undulating	Consociation	2.70	153.6
Overland	Madalin mucky silty clay loam	Consociation	3.07	153.7
Overland	Windsor loamy sand, undulating	Consociation	21.50	153.8
Overland	Scio silt loam, 3 to 8 percent slopes	Consociation	5.82	154.8
Overland	Raynham silt loam	Consociation	1.04	154.9
Overland	Hoosic gravelly sandy loam, nearly level	Consociation	0.10	155.0
Overland	Deerfield loamy fine sand, undulating	Consociation	5.60	155.0
Overland	Deerfield loamy fine sand, nearly level	Consociation	0.12	155.2
Overland	Wareham loamy sand	Consociation	0.80	155.2
Overland	Claverack loamy fine sand, 0 to 3 percent slopes	Consociation	1.55	155.3
Overland	Cosad fine sandy loam	Consociation	1.28	155.3
Overland	Wareham loamy sand	Consociation	2.21	155.4
Overland	Windsor loamy sand, undulating	Consociation	0.25	155.4
Overland	Windsor loamy sand, undulating	Consociation	49.00	155.5
Overland	Deerfield loamy fine sand, nearly level	Consociation	0.01	155.7
Overland	Windsor loamy sand, rolling	Consociation	0.15	156.1
Overland	Charlton loam, 8 to 15 percent slopes	Consociation	0.24	156.4
Overland	Deerfield loamy fine sand, nearly level	Consociation	2.02	157.4
Overland	Chenango silt loam, loamy substratum, rolling	Consociation	1.15	157.5
Overland	Limerick-Saco complex	Complex	3.33	157.7
Overland	Sun silt loam	Consociation	2.14	157.8
Overland	Fluvaquents frequently flooded	Consociation	4.26	157.9
Overland	Mosherville-Hornell complex, undulating	Complex	3.72	158.1
Overland	Broadalbin-Manlius-Nassau, complex, undulating	Complex	4.54	158.2

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Manlius-Nassau complex, undulating, rocky	Complex	19.02	158.4
Overland	Deerfield loamy fine sand, nearly level	Consociation	3.13	158.6
Overland	Allis silt loam	Consociation	11.09	159.3
Overland	Mosherville-Hornell complex, undulating	Complex	4.88	159.8
Overland	Allis silt loam	Consociation	9.05	160.0
Overland	Sun silt loam	Consociation	0.28	160.3
Overland	Mosherville-Hornell complex, undulating	Complex	4.25	160.4
Overland	Broadalbin silt loam, 3 to 8 percent slopes	Consociation	3.70	160.5
Overland	Broadalbin silt loam, 3 to 8 percent slopes	Consociation	0.00	160.7
Overland	Manlius-Nassau complex, undulating, rocky	Complex	11.63	160.7
Overland	Broadalbin-Manlius-Nassau, complex, undulating	Complex	0.56	160.8
Overland	Mosherville silt loam, 3 to 8 percent slopes	Consociation	5.32	161.2
Overland	Mosherville silt loam, 0 to 3 percent slopes	Consociation	6.47	161.4
Overland	Sun silt loam	Consociation	0.00	161.6
Overland	Mosherville silt loam, 3 to 8 percent slopes	Consociation	0.25	161.7
Overland	Sun silt loam	Consociation	6.96	161.7
Overland	Mosherville silt loam, 3 to 8 percent slopes	Consociation	1.26	161.9
Overland	Mosherville silt loam, 3 to 8 percent slopes	Consociation	5.66	162.0
Overland	Broadalbin silt loam, 3 to 8 percent slopes	Consociation	0.98	162.1
Overland	Sun silt loam	Consociation	3.90	162.3
Overland	Mosherville silt loam, 0 to 3 percent slopes	Consociation	3.74	162.4
Overland	Broadalbin-Manlius-Nassau, complex, undulating	Complex	4.39	162.6
Overland	Mosherville-Hornell complex, undulating	Complex	6.84	162.7
Overland	Oakville loamy fine sand, undulating	Consociation	0.99	163.0
Overland	Broadalbin-Manlius-Nassau, complex, undulating	Complex	0.92	163.1
Overland	Mosherville-Hornell complex, undulating	Complex	20.02	163.2
Overland	Broadalbin-Manlius-Nassau, complex, undulating	Complex	0.03	163.5
Overland	Allis silt loam	Consociation	17.24	164.0
Overland	Broadalbin-Manlius-Nassau, complex, undulating	Complex	0.10	164.3
Overland	Broadalbin-Manlius-Nassau, complex, undulating	Complex	0.11	164.4
Overland	Broadalbin-Manlius-Nassau, complex, undulating	Complex	0.35	164.5

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Broadalbin-Manlius-Nassau, complex, undulating	Complex	0.02	164.7
Overland	Palms muck	Consociation	7.09	164.8
Overland	Broadalbin-Manlius-Nassau, complex, undulating	Complex	6.74	164.9
Overland	Broadalbin-Manlius-Nassau, complex, rolling	Complex	0.00	164.9
Overland	Broadalbin-Manlius-Nassau, complex, rolling	Complex	0.01	164.9
Overland	Broadalbin-Manlius-Nassau, complex, rolling	Complex	0.00	165.0
Overland	Broadalbin-Manlius-Nassau, complex, undulating	Complex	0.15	165.3
Overland	Mosherville-Hornell complex, undulating	Complex	5.73	165.3
Overland	Palms muck	Consociation	0.04	165.3
Overland	Broadalbin-Manlius-Nassau, complex, undulating	Complex	15.98	165.7
Overland	Allis silt loam	Consociation	1.88	165.9
Overland	Broadalbin-Manlius-Nassau, complex, rolling	Complex	1.92	166.3
Overland	Broadalbin-Manlius-Nassau, complex, undulating	Complex	13.52	166.4
Overland	Mosherville-Hornell complex, undulating	Complex	1.19	166.5
Overland	Allis silt loam	Consociation	0.29	166.7
Overland	Mosherville-Hornell complex, undulating	Complex	3.01	167.0
Overland	Allis silt loam	Consociation	1.06	167.1
Overland	Broadalbin-Manlius-Nassau, complex, undulating	Complex	0.02	167.1
Overland	Manlius-Nassau complex, undulating, rocky	Complex	7.73	167.2
Overland	Burdett silt loam, 3 to 8 percent slopes	Consociation	14.72	167.5
Overland	Broadalbin-Manlius-Nassau, complex, undulating	Complex	0.08	167.8
Overland	Nunda silt loam, 3 to 8 percent slopes	Consociation	0.02	168.0
Overland	Ilion silt loam	Consociation	2.79	168.1
Overland	Nunda silt loam, 3 to 8 percent slopes	Consociation	0.70	168.1
Overland	Burdett-Scriba channery silt loams, 0 to 3 percent slopes	Complex	0.01	168.2
Overland	Ilion silt loam, 0 to 3 percent slopes	Consociation	5.63	168.3
Overland	Burdett-Scriba channery silt loams, 0 to 3 percent slopes	Complex	0.00	168.3
Overland	Fredon silt loam	Consociation	3.14	168.5
Overland	Teel silt loam	Consociation	2.45	168.6
Overland	Scio silt loam, 3 to 8 percent slopes	Consociation	2.10	168.7

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Teel silt loam	Consociation	2.38	168.8
Overland	Scio silt loam, 0 to 3 percent slopes	Consociation	3.33	168.9
Overland	Fluvaquents, loamy	Consociation	0.01	169.0
Overland	Raynham silt loam	Consociation	19.50	169.0
Overland	Colonie loamy fine sand, 3 to 15 percent slopes	Consociation	0.66	169.2
Overland	Elnora loamy fine sand	Consociation	2.43	169.5
Overland	Madalin silty clay loam	Consociation	0.01	169.6
Overland	Madalin silty clay loam	Consociation	0.01	169.7
Overland	Madalin silty clay loam	Consociation	12.10	170.0
Overland	Cut and fill land	Consociation	15.46	170.5
Overland	Scio silt loam, 0 to 3 percent slopes	Consociation	0.73	171.0
Overland	Wayland silt loam	Consociation	0.00	171.1
Overland	Scio silt loam, 0 to 3 percent slopes	Consociation	6.32	171.2
Overland	Wayland silt loam	Consociation	3.87	171.4
Overland	Cut and fill land	Consociation	2.43	171.6
Overland	Scio silt loam, 3 to 8 percent slopes	Consociation	0.54	171.6
Overland	Cut and fill land	Consociation	1.10	171.8
Overland	Nunda channery silt loam, 3 to 8 percent slopes	Consociation	0.32	171.8
Overland	Scio silt loam, 0 to 3 percent slopes	Consociation	4.95	171.8
Overland	Burdett-Scriba channery silt loams, 0 to 3 percent slopes	Complex	9.40	172.0
Overland	Nunda channery silt loam, 3 to 8 percent slopes	Consociation	1.41	172.1
Overland	Cut and fill land	Consociation	48.90	172.5
Overland	Colonie loamy fine sand, 0 to 3 percent slopes	Consociation	0.00	174.5
Overland	Colonie and Plainfield soils, steep	Undifferentiated group	44.50	174.5
Overland	Colonie loamy fine sand, 0 to 3 percent slopes	Consociation	0.40	174.6
Overland	Colonie loamy fine sand, 0 to 3 percent slopes	Consociation	0.15	175.9
Overland	Colonie loamy fine sand, 0 to 3 percent slopes	Consociation	0.01	176.0
Overland	Wayland silt loam	Consociation	0.05	176.0
Overland	Colonie loamy fine sand, 0 to 3 percent slopes	Consociation	0.03	176.1
Overland	Colonie loamy fine sand, 0 to 3 percent slopes	Consociation	2.92	176.4
Overland	Colonie and Plainfield soils, steep	Undifferentiated group	0.00	176.4
Overland	Made land	Consociation	0.12	176.5
Overland	Colonie and Plainfield soils, steep	Undifferentiated group	0.09	176.5

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Colonie and Plainfield soils, steep	Undifferentiated group	0.05	176.5
Overland	Plainfield loamy sand, 0 to 3 percent slopes	Consociation	8.59	176.5
Overland	Colonie and Plainfield soils, steep	Undifferentiated group	0.14	176.6
Overland	Gravel pits	Consociation	4.12	176.7
Overland	Colonie and Plainfield soils, steep	Undifferentiated group	0.04	176.7
Overland	Fluvaquents, loamy	Consociation	0.13	176.9
Overland	Mardin gravelly silt loam, 3 to 8 percent slopes	Consociation	3.79	177.1
Overland	Plainfield loamy sand, 0 to 3 percent slopes	Consociation	0.28	177.1
Overland	Plainfield loamy sand, 0 to 3 percent slopes	Consociation	31.73	177.3
Overland	Plainfield loamy sand, 3 to 10 percent slopes	Consociation	0.23	178.2
Overland	Granby loamy fine sand	Consociation	2.26	178.2
Overland	Junius loamy fine sand	Consociation	8.34	178.7
Overland	Wayland silt loam	Consociation	0.12	178.7
Overland	Wayland silt loam	Consociation	0.21	178.8
Overland	Cheektowaga fine sandy loam	Consociation	1.11	179.0
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	0.01	179.0
Overland	Madalin silty clay loam	Consociation	7.94	179.1
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	0.15	179.1
Overland	Claverack loamy fine sand, 3 to 8 percent slopes	Consociation	0.05	179.2
Overland	Junius loamy fine sand	Consociation	0.02	179.2
Overland	Junius loamy fine sand	Consociation	0.01	179.3
Overland	Claverack loamy fine sand, 3 to 8 percent slopes	Consociation	0.86	179.4
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	0.12	179.4
Overland	Colonie loamy fine sand, 3 to 15 percent slopes	Consociation	0.14	179.5
Overland	Elnora loamy fine sand	Consociation	3.33	179.5
Overland	Cheektowaga fine sandy loam	Consociation	1.80	179.6
Overland	Junius loamy fine sand	Consociation	0.31	179.6
Overland	Claverack loamy fine sand, 3 to 8 percent slopes	Consociation	0.77	179.7
Overland	Elnora loamy fine sand	Consociation	0.02	179.7
Overland	Junius loamy fine sand	Consociation	1.16	179.7



<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	0.37	179.7
Overland	Cheektowaga fine sandy loam	Consociation	0.12	179.8
Overland	Cheektowaga fine sandy loam	Consociation	0.07	179.8
Overland	Claverack loamy fine sand, 3 to 8 percent slopes	Consociation	0.38	179.8
Overland	Madalin silty clay loam	Consociation	0.71	179.8
Overland	Madalin silty clay loam	Consociation	0.80	179.8
Overland	Rhinebeck silty clay loam, 3 to 8 percent slopes	Consociation	0.59	179.8
Overland	Hudson silty clay loam, 3 to 8 percent slopes	Consociation	0.72	179.9
Overland	Claverack loamy fine sand, 0 to 3 percent slopes	Consociation	0.59	179.9
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	1.47	179.9
Overland	Claverack loamy fine sand, 3 to 8 percent slopes	Consociation	0.85	180.0
Overland	Cheektowaga fine sandy loam	Consociation	2.35	180.1
Overland	Claverack loamy fine sand, 0 to 3 percent slopes	Consociation	0.62	180.1
Overland	Granby loamy fine sand	Consociation	0.01	180.1
Overland	Claverack loamy fine sand, 3 to 8 percent slopes	Consociation	1.81	180.2
Overland	Cheektowaga fine sandy loam	Consociation	5.98	180.3
Overland	Cosad loamy fine sand	Consociation	3.80	180.5
Overland	Granby loamy fine sand	Consociation	0.81	180.5
Overland	Stafford loamy fine sand	Consociation	0.08	180.5
Overland	Cosad loamy fine sand	Consociation	0.56	180.7
Overland	Fluvaquents-Udifluents complex, frequently flooded	Complex	1.41	180.7
Overland	Fluvaquents-Udifluents complex, frequently flooded	Complex	0.61	180.8
Overland	Fluvaquents-Udifluents complex, frequently flooded	Complex	1.12	180.8
Overland	Stafford loamy fine sand	Consociation	0.65	180.8
Overland	Colonie loamy fine sand, rolling	Consociation	0.38	180.9
Overland	Fluvaquents-Udifluents complex, frequently flooded	Complex	1.26	180.9
Overland	Shaker fine sandy loam	Consociation	1.62	180.9
Overland	Colonie loamy fine sand, rolling	Consociation	1.07	181.0

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Shaker fine sandy loam	Consociation	0.55	181.0
Overland	Colonie loamy fine sand, 3 to 8 percent slopes	Consociation	0.04	181.1
Overland	Raynham very fine sandy loam	Consociation	3.67	181.1
Overland	Elmridge fine sandy loam, 3 to 8 percent slopes	Consociation	0.32	181.2
Overland	Shaker fine sandy loam	Consociation	0.31	181.2
Overland	Elnora loamy fine sand, 3 to 8 percent slopes	Consociation	3.45	181.3
Overland	Elmridge fine sandy loam, 3 to 8 percent slopes	Consociation	0.82	181.3
Overland	Raynham very fine sandy loam	Consociation	0.09	181.3
Overland	Stafford loamy fine sand	Consociation	1.03	181.4
Overland	Elmridge fine sandy loam, 3 to 8 percent slopes	Consociation	1.47	181.5
Overland	Raynham very fine sandy loam	Consociation	1.33	181.5
Overland	Birdsall mucky silt loam	Consociation	0.77	181.6
Overland	Raynham very fine sandy loam	Consociation	1.38	181.6
Overland	Raynham very fine sandy loam	Consociation	2.69	181.7
Overland	Shaker fine sandy loam	Consociation	0.84	181.7
Overland	Shaker fine sandy loam	Consociation	0.13	181.8
Overland	Elmridge fine sandy loam, 0 to 3 percent slopes	Consociation	0.70	181.9
Overland	Colonie loamy fine sand, 3 to 8 percent slopes	Consociation	0.09	181.9
Overland	Scio silt loam, 3 to 8 percent slopes	Consociation	1.86	181.9
Overland	Elmridge fine sandy loam, 3 to 8 percent slopes	Consociation	0.38	182.0
Overland	Raynham very fine sandy loam	Consociation	0.76	182.0
Overland	Raynham very fine sandy loam	Consociation	0.02	182.0
Overland	Scio silt loam, 3 to 8 percent slopes	Consociation	0.81	182.0
Overland	Shaker fine sandy loam	Consociation	1.05	182.0
Overland	Elmridge fine sandy loam, 3 to 8 percent slopes	Consociation	0.50	182.1
Overland	Raynham very fine sandy loam	Consociation	0.63	182.1
Overland	Scio silt loam, 0 to 3 percent slopes	Consociation	0.30	182.1
Overland	Scio silt loam, 3 to 8 percent slopes	Consociation	1.10	182.1
Overland	Scio silt loam, 0 to 3 percent slopes	Consociation	0.44	182.2
Overland	Scio silt loam, 3 to 8 percent slopes	Consociation	0.47	182.2
Overland	Shaker fine sandy loam	Consociation	1.42	182.2
Overland	Claverack loamy fine sand, 3 to 8 percent slopes	Consociation	0.92	182.3

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Scio silt loam, 0 to 3 percent slopes	Consociation	0.34	182.3
Overland	Scio silt loam, 3 to 8 percent slopes	Consociation	1.57	182.3
Overland	Claverack loamy fine sand, 3 to 8 percent slopes	Consociation	0.26	182.4
Overland	Fluvaquents-Udifluents complex, frequently flooded	Complex	0.19	182.4
Overland	Raynham very fine sandy loam	Consociation	0.35	182.4
Overland	Raynham very fine sandy loam	Consociation	0.08	182.4
Overland	Shaker fine sandy loam	Consociation	1.34	182.4
Overland	Shaker fine sandy loam	Consociation	0.29	182.4
Overland	Colonie loamy fine sand, 3 to 8 percent slopes	Consociation	0.44	182.5
Overland	Scio silt loam, 0 to 3 percent slopes	Consociation	3.72	182.5
Overland	Raynham very fine sandy loam	Consociation	0.33	182.6
Overland	Scio silt loam, 3 to 8 percent slopes	Consociation	5.71	182.7
Overland	Unadilla silt loam, 15 to 25 percent slopes	Consociation	2.24	183.0
Overland	Hudson silt loam, 25 to 45 percent slopes	Consociation	0.67	183.0
Overland	Scio silt loam, 3 to 8 percent slopes	Consociation	14.61	183.1
Overland	Hudson silt loam, 25 to 45 percent slopes	Consociation	0.79	183.2
Overland	Colonie loamy fine sand, hilly	Consociation	1.01	183.7
Overland	Colonie loamy fine sand, hilly	Consociation	0.82	183.8
Overland	Riverhead fine sandy loam, 0 to 3 percent slopes	Consociation	1.55	183.9
Overland	Riverhead fine sandy loam, 8 to 15 percent slopes	Consociation	0.71	183.9
Overland	Riverhead fine sandy loam, 3 to 8 percent slopes	Consociation	1.41	183.9
Overland	Udorthents, loamy	Undifferentiated group	9.02	184.0
Overland	Sudbury fine sandy loam, 0 to 3 percent slopes	Consociation	1.89	184.2
Overland	Scio silt loam, 0 to 3 percent slopes	Consociation	5.57	184.5
Overland	Udorthents, loamy-Urban land complex	Complex	0.03	184.6
Overland	Valois gravelly loam, 3 to 8 percent slopes	Consociation	2.00	184.7
Overland	Udorthents, loamy-Urban land complex	Complex	0.00	184.7
Overland	Udorthents, loamy-Urban land complex	Complex	5.33	184.8
Overland	Udorthents, loamy	Undifferentiated group	34.90	185.0
Overland	Burdett silt loam, 3 to 8 percent slopes	Consociation	1.30	186.5
Overland	Ilion silt loam	Consociation	5.80	186.5
Overland	Burdett silt loam, 0 to 3 percent slopes	Consociation	2.33	186.8

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Burdett silt loam, 3 to 8 percent slopes	Consociation	13.79	186.9
Overland	Raynham very fine sandy loam	Consociation	0.00	187.3
Overland	Nunda silt loam, 3 to 8 percent slopes	Consociation	0.01	187.4
Overland	Raynham very fine sandy loam	Consociation	0.00	187.4
Overland	Burdett silt loam, 0 to 3 percent slopes	Consociation	3.82	187.5
Overland	Ilion silt loam	Consociation	5.44	187.6
Overland	Chenango gravelly silt loam, loamy substratum, 3 to 8 percent slopes	Consociation	0.15	187.8
Overland	Udorthents, loamy-Urban land complex	Complex	6.76	187.8
Overland	Pits, gravel	Consociation	0.18	187.9
Overland	Udorthents, loamy	Undifferentiated group	5.04	188.1
Overland	Fluvaquents-Udifluents complex, frequently flooded	Complex	2.86	188.4
Overland	Chenango gravelly silt loam, loamy substratum, 3 to 8 percent slopes	Consociation	1.28	188.5
Overland	Nunda silt loam, 3 to 8 percent slopes	Consociation	1.03	188.5
Overland	Urban land	Consociation	2.19	188.6
Overland	Udorthents, loamy-Urban land complex	Complex	14.56	188.7
Overland	Shaker fine sandy loam	Consociation	1.49	189.2
Overland	Riverhead fine sandy loam, 3 to 8 percent slopes	Consociation	2.39	189.3
Overland	Chenango gravelly silt loam, loamy substratum, rolling	Consociation	2.04	189.4
Overland	Unadilla silt loam, 8 to 15 percent slopes	Consociation	1.08	189.5
Overland	Riverhead fine sandy loam, 3 to 8 percent slopes	Consociation	1.48	189.5
Overland	Scio silt loam, 3 to 8 percent slopes	Consociation	0.12	189.6
Overland	Sudbury fine sandy loam, 0 to 3 percent slopes	Consociation	4.59	189.6
Overland	Riverhead fine sandy loam, 3 to 8 percent slopes	Consociation	0.01	189.7
Overland	Fluvaquents-Udifluents complex, frequently flooded	Complex	1.53	189.8
Overland	Riverhead fine sandy loam, 3 to 8 percent slopes	Consociation	0.13	189.8
Overland	Teel silt loam	Consociation	1.06	189.8
Overland	Scio silt loam, 0 to 3 percent slopes	Consociation	3.05	189.9
Overland	Chenango channery silt loam, fan, 3 to 8 percent slopes	Consociation	0.94	190.0
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	0.32	190.1

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Udorthents, loamy	Undifferentiated group	6.48	190.1
Overland	Burdett silt loam, 3 to 8 percent slopes	Consociation	0.79	190.4
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	8.42	190.4
Overland	Rhinebeck silty clay loam, 3 to 8 percent slopes	Consociation	0.01	190.6
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	1.46	190.7
Overland	Madalin silt loam	Consociation	0.00	190.7
Overland	Madalin silt loam	Consociation	0.05	190.8
Overland	Rhinebeck silty clay loam, 3 to 8 percent slopes	Consociation	1.34	190.8
Overland	Chenango channery silt loam, fan, 3 to 8 percent slopes	Consociation	2.50	190.9
Overland	Castile gravelly loam, 0 to 3 percent slopes	Consociation	1.79	191.0
Overland	Nunda silt loam, 3 to 8 percent slopes	Consociation	1.91	191.0
Overland	Wayland silt loam	Consociation	1.24	191.1
Overland	Burdett silt loam, 3 to 8 percent slopes	Consociation	3.04	191.2
Overland	Burdett silt loam, 0 to 3 percent slopes	Consociation	2.14	191.3
Overland	Burdett silt loam, 3 to 8 percent slopes	Consociation	2.38	191.4
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	2.89	191.5
Overland	Elmridge fine sandy loam, 3 to 8 percent slopes	Consociation	0.16	191.6
Overland	Scio silt loam, 0 to 3 percent slopes	Consociation	2.24	191.6
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	2.02	191.7
Overland	Rhinebeck silty clay loam, 3 to 8 percent slopes	Consociation	0.31	191.7
Overland	Hudson silt loam, 25 to 45 percent slopes	Consociation	1.38	191.8
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	4.12	191.9
Overland	Rhinebeck silty clay loam, 3 to 8 percent slopes	Consociation	0.11	191.9
Overland	Rhinebeck silty clay loam, 3 to 8 percent slopes	Consociation	0.01	191.9
Overland	Madalin silt loam	Consociation	1.69	192.0
Overland	Scio silt loam, 0 to 3 percent slopes	Consociation	3.56	192.1
Overland	Raynham very fine sandy loam	Consociation	1.36	192.2
Overland	Scio silt loam, 0 to 3 percent slopes	Consociation	3.71	192.3

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Hudson silt loam, 8 to 15 percent slopes	Consociation	0.00	192.4
Overland	Hudson silt loam, 8 to 15 percent slopes	Consociation	0.77	192.5
Overland	Hudson silt loam, hilly	Consociation	1.02	192.5
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	0.71	192.5
Overland	Scio silt loam, 0 to 3 percent slopes	Consociation	0.80	192.5
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	5.11	192.6
Overland	Hudson silt loam, 25 to 45 percent slopes	Consociation	2.47	192.8
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	1.79	192.9
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	15.74	193.0
Overland	Udorthents, clayey-Urban land complex	Complex	64.80	193.6
Overland	Udorthents, clayey-Urban land complex	Complex	0.21	193.6
Overland	Hudson silt loam, 25 to 45 percent slopes	Consociation	0.00	195.9
Overland	Scio silt loam, 0 to 3 percent slopes	Consociation	1.63	196.0
Overland	Scio silt loam, 0 to 3 percent slopes	Consociation	0.66	196.2
Overland	Hudson silt loam, 25 to 45 percent slopes	Consociation	4.36	196.4
Overland	Wakeland silt loam	Consociation	0.48	196.5
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	3.75	196.6
Overland	Hudson silt loam, 25 to 45 percent slopes	Consociation	0.11	196.6
Overland	Hudson silt loam, 25 to 45 percent slopes	Consociation	1.72	196.8
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	0.33	196.8
Overland	Rhinebeck silty clay loam, 3 to 8 percent slopes	Consociation	0.77	196.8
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	6.23	196.9
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	0.23	197.0
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	3.04	197.2
Overland	Udorthents, clayey-Urban land complex	Complex	30.94	197.3
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	0.01	198.2
Overland	Colonie loamy fine sand, 3 to 8 percent slopes	Consociation	0.18	198.5
Overland	Udipsamments-Urban land complex	Complex	1.12	198.6
Overland	Stafford loamy fine sand	Consociation	1.67	198.6
Overland	Elnora loamy fine sand, 0 to 3 percent slopes	Consociation	10.06	198.7
Overland	Udipsamments, smoothed	Undifferentiated group	6.38	199.1
Overland	Elnora loamy fine sand, 0 to 3 percent slopes	Consociation	7.59	199.4

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Colonie loamy fine sand, 3 to 8 percent slopes	Consociation	0.65	199.5
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	8.92	199.7
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	2.94	199.9
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	0.55	200.1
Overland	Claverack loamy fine sand, 3 to 8 percent slopes	Consociation	0.39	200.2
Overland	Hudson silt loam, 8 to 15 percent slopes	Consociation	1.99	200.2
Overland	Urban land-Udorthents complex, 0 to 8 percent slopes	Complex	0.54	200.3
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	4.97	200.3
Overland	Hudson silt loam, hilly	Consociation	0.01	200.4
Overland	Hudson silt loam, hilly	Consociation	2.38	200.5
Overland	Raynham very fine sandy loam	Consociation	0.41	200.6
Overland	Hudson silt loam, 25 to 45 percent slopes	Consociation	0.73	200.7
Overland	Wakeland silt loam	Consociation	2.50	200.7
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	1.62	200.8
Overland	Udorthents, clayey-Urban land complex	Complex	1.86	200.8
Overland	Hudson silt loam, 25 to 45 percent slopes	Consociation	2.56	200.9
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	9.86	201.0
Overland	Rhinebeck silty clay loam, 3 to 8 percent slopes	Consociation	0.61	201.0
Overland	Madalin silt loam	Consociation	1.74	201.4
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	3.04	201.5
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	18.46	201.6
Overland	Hudson silt loam, 3 to 8 percent slopes	Consociation	0.59	202.2
Overland	Nassau channery silt loam, undulating	Consociation	0.91	202.2
Overland	Udorthents, loamy	Undifferentiated group	19.11	202.5
Overland	Urban land-Udorthents complex, 0 to 8 percent slopes	Complex	11.04	203.4
Overland	Rhinebeck silty clay loam, 0 to 3 percent slopes	Consociation	9.31	203.8
Overland	Rhinebeck silty clay loam, 3 to 8 percent slopes	Consociation	2.73	204.1

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Urban land-Udorthents complex, 0 to 8 percent slopes	Complex	0.00	204.1
Overland	Hudson and Vergennes soils, 8 to 15 percent slopes	Undifferentiated group	0.92	204.2
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	0.83	204.2
Overland	Covington and Madalin soils	Undifferentiated group	12.60	204.3
Overland	Nassau channery silt loam, steep, very rocky	Complex	0.24	204.7
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	4.80	204.8
Overland	Riverhead loam, rolling	Consociation	20.95	205.0
Overland	Valois-Nassau complex, undulating	Complex	0.22	205.0
Overland	Chenango gravelly loam, 0 to 3 percent slopes	Consociation	0.33	205.8
Overland	Tioga loam	Consociation	1.08	205.9
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	1.85	205.9
Overland	Nassau channery silt loam, rolling, very rocky	Complex	9.50	206.0
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	13.24	206.3
Overland	Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded	Undifferentiated group	12.84	206.9
Overland	Nassau channery silt loam, steep, very rocky	Complex	0.07	207.2
Overland	Valois-Nassau complex, hilly	Complex	0.22	207.2
Overland	Hudson and Vergennes soils, 3 to 8 percent slopes	Undifferentiated group	5.23	207.5
Overland	Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded	Undifferentiated group	1.64	207.7
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	3.87	207.8
Overland	Hudson and Vergennes soils, 25 to 50 percent slopes	Undifferentiated group	1.56	207.9
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	2.71	208.0
Overland	Hudson and Vergennes soils, 3 to 8 percent slopes	Undifferentiated group	1.26	208.1
Overland	Hudson and Vergennes soils, 25 to 50 percent slopes	Undifferentiated group	1.35	208.1
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	3.82	208.2
Overland	Nassau channery silt loam, rolling, very rocky	Complex	0.04	208.2



<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Hudson and Vergennes soils, 3 to 8 percent slopes	Undifferentiated group	2.34	208.3
Overland	Hudson and Vergennes soils, 25 to 50 percent slopes	Undifferentiated group	5.17	208.4
Overland	Hudson and Vergennes silty clay loams, 8 to 15 percent slopes, severely eroded	Undifferentiated group	0.04	208.4
Overland	Nassau channery silt loam, hilly, very rocky	Complex	0.51	208.6
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	4.04	208.7
Overland	Hudson and Vergennes soils, 3 to 8 percent slopes	Undifferentiated group	5.30	208.8
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	0.12	209.0
Overland	Nassau channery silt loam, rolling, very rocky	Complex	3.24	209.1
Overland	Hudson and Vergennes soils, 3 to 8 percent slopes	Undifferentiated group	12.20	209.2
Overland	Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded	Undifferentiated group	1.52	209.7
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	1.34	209.7
Overland	Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded	Undifferentiated group	0.93	209.8
Overland	Hudson and Vergennes soils, 3 to 8 percent slopes	Undifferentiated group	3.84	209.9
Overland	Hudson and Vergennes silty clay loams, 8 to 15 percent slopes, severely eroded	Undifferentiated group	2.10	210.0
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	2.65	210.1
Overland	Wayland silt loam	Consociation	0.42	210.1
Overland	Hudson and Vergennes soils, 3 to 8 percent slopes	Undifferentiated group	1.98	210.2
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	1.45	210.3
Overland	Wayland silt loam	Consociation	1.25	210.3
Overland	Hudson and Vergennes soils, 3 to 8 percent slopes	Undifferentiated group	1.62	210.4
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	11.21	210.5
Overland	Wayland silt loam	Consociation	0.00	210.5
Overland	Elmridge very fine sandy loam, 3 to 8 percent slopes	Consociation	3.77	211.0

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	0.08	211.0
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	1.85	211.1
Overland	Shaker very fine sandy loam	Consociation	0.36	211.1
Overland	Shaker very fine sandy loam	Consociation	9.28	211.2
Overland	Udorthents, loamy	Consociation	4.63	211.6
Overland	Shaker very fine sandy loam	Consociation	10.34	211.8
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	9.54	212.2
Overland	Covington and Madalin soils	Undifferentiated group	0.99	212.5
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	6.31	212.6
Overland	Nassau channery silt loam, rolling	Consociation	0.16	212.7
Overland	Covington and Madalin soils	Undifferentiated group	0.26	212.9
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	3.77	212.9
Overland	Covington and Madalin soils	Undifferentiated group	7.23	213.1
Overland	Nassau channery silt loam, rolling	Consociation	0.13	213.1
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	6.33	213.4
Overland	Covington and Madalin soils	Undifferentiated group	0.31	213.5
Overland	Covington and Madalin soils	Undifferentiated group	2.36	213.6
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	18.71	213.7
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	0.11	214.1
Overland	Wayland silt loam	Consociation	1.91	214.5
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	3.04	214.6
Overland	Covington and Madalin soils	Undifferentiated group	1.04	214.7
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	11.30	214.7
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	1.11	215.0

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	0.15	215.2
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	0.00	215.2
Overland	Covington and Madalin soils	Undifferentiated group	1.96	215.3
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	12.11	215.4
Overland	Covington and Madalin soils	Undifferentiated group	0.02	215.6
Overland	Covington and Madalin soils	Undifferentiated group	83.16	215.9
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	0.48	216.0
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	0.14	216.0
Overland	Wayland silt loam	Consociation	0.00	216.0
Overland	Wayland silt loam	Consociation	0.00	216.0
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	0.73	216.2
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	0.07	216.4
Overland	Wayland silt loam	Consociation	1.96	216.4
Overland	Valois-Nassau complex, undulating	Complex	0.49	217.0
Overland	Valois-Nassau complex, hilly	Complex	1.23	217.7
Overland	Nassau channery silt loam, hilly, very rocky	Complex	3.10	219.5
Overland	Nassau channery silt loam, rolling, very rocky	Complex	2.41	219.7
Overland	Nassau channery silt loam, hilly, very rocky	Complex	8.25	219.8
Overland	Covington and Madalin soils	Undifferentiated group	9.73	220.1
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	0.17	220.3
Overland	Nassau channery silt loam, hilly, very rocky	Complex	0.00	220.4
Overland	Nassau channery silt loam, rolling	Consociation	0.86	220.5
Overland	Nassau channery silt loam, hilly, very rocky	Complex	11.39	220.5
Overland	Nassau channery silt loam, rolling	Consociation	0.63	220.9
Overland	Udorthents, loamy	Consociation	0.10	220.9
Overland	Hudson and Vergennes soils, 3 to 8 percent slopes	Undifferentiated group	0.49	221.0
Overland	Hudson and Vergennes soils, 25 to 50 percent slopes	Undifferentiated group	0.18	221.0

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Nassau channery silt loam, steep, very rocky	Complex	5.00	221.0
Overland	Nassau channery silt loam, rolling	Consociation	1.97	221.2
Overland	Nassau channery silt loam, steep, very rocky	Complex	1.47	221.3
Overland	Hudson and Vergennes soils, 3 to 8 percent slopes	Undifferentiated group	2.82	221.4
Overland	Nassau channery silt loam, rolling, very rocky	Complex	0.01	221.4
Overland	Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded	Undifferentiated group	1.37	221.5
Overland	Nassau channery silt loam, rolling	Consociation	0.08	221.5
Overland	Riverhead loam, 0 to 3 percent slopes	Consociation	7.95	221.6
Overland	Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded	Undifferentiated group	0.02	221.7
Overland	Riverhead loam, rolling	Consociation	0.00	221.7
Overland	Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded	Undifferentiated group	1.58	221.9
Overland	Hudson and Vergennes soils, 25 to 50 percent slopes	Undifferentiated group	2.76	222.0
Overland	Hudson and Vergennes soils, 3 to 8 percent slopes	Undifferentiated group	7.53	222.1
Overland	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	Undifferentiated group	3.44	222.4
Overland	Hudson and Vergennes soils, 3 to 8 percent slopes	Undifferentiated group	1.61	222.5
Overland	Hudson and Vergennes soils, 8 to 15 percent slopes	Undifferentiated group	4.13	222.6
Overland	Hudson and Vergennes soils, 3 to 8 percent slopes	Undifferentiated group	23.79	222.8
Overland	Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded	Undifferentiated group	0.06	222.8
Overland	Farmington gravelly silt loam, rolling, rocky	Complex	0.20	223.0
Overland	Hudson and Vergennes soils, 8 to 15 percent slopes	Undifferentiated group	12.90	223.9
Overland	Hudson and Vergennes soils, 3 to 8 percent slopes	Undifferentiated group	0.00	224.2
Overland	Hudson and Vergennes soils, 3 to 8 percent slopes	Undifferentiated group	9.43	224.3
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	0.14	224.3
Overland	Covington and Madalin soils	Undifferentiated group	0.07	224.7

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	5.74	224.7
Overland	Hudson and Vergennes soils, 8 to 15 percent slopes	Undifferentiated group	1.24	224.9
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	13.55	225.0
Overland	Farmington gravelly silt loam, steep, rocky	Complex	4.46	225.4
Overland	Udorthents, loamy	Consociation	11.22	225.7
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	12.28	226.3
Overland	Covington and Madalin soils	Undifferentiated group	0.19	226.5
Overland	Udorthents, loamy	Consociation	4.09	226.7
Overland	Hudson and Vergennes soils, 3 to 8 percent slopes	Undifferentiated group	9.88	226.9
Overland	Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded	Undifferentiated group	1.75	227.0
Overland	Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded	Undifferentiated group	0.63	227.3
Overland	Farmington gravelly silt loam, steep, rocky	Complex	1.84	227.4
Overland	Hudson and Vergennes soils, 3 to 8 percent slopes	Undifferentiated group	0.02	227.4
Overland	Hudson and Vergennes soils, 8 to 15 percent slopes	Undifferentiated group	1.77	227.5
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	2.35	227.6
Overland	Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded	Undifferentiated group	0.21	227.7
Overland	Riverhead loam, 3 to 8 percent slopes	Consociation	4.95	227.7
Overland	Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded	Undifferentiated group	0.00	227.8
Overland	Fluvaquents-Udifluvents complex, frequently flooded	Complex	0.06	227.9
Overland	Covington and Madalin soils	Undifferentiated group	2.06	227.9
Overland	Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded	Undifferentiated group	1.10	227.9
Overland	Farmington gravelly silt loam, hilly, rocky	Complex	2.14	228.0
Overland	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	Undifferentiated group	0.06	228.1
Overland	Riverhead loam, 3 to 8 percent slopes	Consociation	0.06	228.1

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Overland	Udorthents, loamy	Consociation	4.51	228.1
Overland	Medisaprists-Hydraquents, tidal marsh	Complex	0.06	228.2
Overland	Medisaprists-Hydraquents, tidal marsh	Complex	0.17	228.2
Overland	Medisaprists-Hydraquents, tidal marsh	Complex	0.00	228.3
Hudson River	Rock outcrop-Hollis complex, moderately steep	Complex	0.64	288.1
Hudson River	Charlton-Paxton complex, extremely stony, moderately steep	Complex	3.27	288.2
Hudson River	Chatfield-Rock outcrop complex, hilly	Complex	2.20	295.7
Hudson River	Chatfield-Rock outcrop complex, rolling	Complex	2.06	295.8
Hudson River	Chatfield-Rock outcrop complex, hilly	Complex	1.29	295.9
Hudson River	Chatfield-Rock outcrop complex, rolling	Complex	1.60	296.0
Hudson River	Ipswich muck	Consociation	2.81	296.0
Hudson River	Yalesville sandy loam, 15 to 25 percent slopes	Consociation	1.18	296.1
Hudson River	Udorthents, wet substratum	Consociation	6.67	296.2
Hudson River	Yalesville sandy loam, 8 to 15 percent slopes	Consociation	0.00	296.3
Hudson River	Ipswich muck	Consociation	2.39	296.5
Hudson River	Urban land	Consociation	0.71	296.5
Hudson River	Hinckley gravelly loamy sand, 3 to 8 percent slopes	Consociation	6.44	296.6
Hudson River	Hinckley gravelly loamy sand, 0 to 3 percent slopes	Consociation	0.01	296.8
Hudson River	Hinckley gravelly loamy sand, 15 to 25 percent slopes	Consociation	10.43	296.9
Hudson River	Hinckley gravelly loamy sand, 3 to 8 percent slopes	Consociation	1.17	297.1
Hudson River	Ipswich muck	Consociation	0.55	297.3
Hudson River	Ipswich muck	Consociation	1.48	297.4
Hudson River	Haven loam, 3 to 8 percent slopes	Consociation	8.25	297.5
Hudson River	Wethersfield gravelly silt loam, 15 to 25 percent slopes	Consociation	1.28	297.5
Hudson River	Pits, gravel	Consociation	0.03	297.7
Hudson River	Hinckley gravelly loamy sand, 3 to 8 percent slopes	Consociation	0.07	297.9
Hudson River	Urban land	Consociation	2.06	297.9
Hudson River	Hinckley gravelly loamy sand, 0 to 3 percent slopes	Consociation	0.01	298.0
Hudson River	Hinckley gravelly loamy sand, 3 to 8 percent slopes	Consociation	0.12	298.0

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Hudson River	Udorthents, smoothed	Consociation	6.05	298.0
Hudson River	Hinckley gravelly loamy sand, 0 to 3 percent slopes	Consociation	0.25	298.1
Hudson River	Hinckley gravelly loamy sand, 3 to 8 percent slopes	Consociation	12.64	298.2
Hudson River	Hinckley-Urban land complex, 0 to 8 percent slopes	Complex	5.63	298.7
Hudson River	Urban land	Consociation	0.73	298.7
Hudson River	Hinckley gravelly loamy sand, 3 to 8 percent slopes	Consociation	8.44	298.9
Hudson River	Holyoke-Rock outcrop complex, rolling	Complex	0.49	299.0
Hudson River	Holyoke-Rock outcrop complex, rolling	Complex	4.02	299.3
Hudson River	Urban land	Consociation	0.09	299.4
Hudson River	Wethersfield gravelly silt loam, 3 to 8 percent slopes	Consociation	0.04	299.4
Hudson River	Wethersfield-Urban land complex, 2 to 8 percent slopes	Complex	6.82	299.5
Hudson River	Holyoke-Rock outcrop complex, hilly	Complex	9.18	299.8
Hudson River	Wethersfield gravelly silt loam, 3 to 8 percent slopes	Consociation	0.32	299.8
Hudson River	Wethersfield gravelly silt loam, 8 to 15 percent slopes	Consociation	2.86	300.1
Hudson River	Holyoke-Rock outcrop complex, hilly	Complex	2.47	300.2
Hudson River	Holyoke-Rock outcrop complex, very steep	Complex	9.18	300.3
Hudson River	Udorthents, smoothed	Consociation	1.19	300.6
Hudson River	Holyoke-Rock outcrop complex, hilly	Complex	26.27	300.8
Hudson River	Holyoke-Rock outcrop complex, rolling	Complex	0.00	301.1
Hudson River	Wethersfield gravelly silt loam, 8 to 15 percent slopes	Consociation	5.36	301.8
Hudson River	Wethersfield gravelly silt loam, 3 to 8 percent slopes	Consociation	14.52	301.9
Hudson River	Wethersfield gravelly silt loam, 8 to 15 percent slopes	Consociation	0.04	302.0
Hudson River	Udorthents, smoothed	Consociation	0.15	302.2
Hudson River	Udorthents, smoothed	Consociation	2.36	302.4
Hudson River	Wethersfield-Urban land complex, 2 to 8 percent slopes	Complex	0.34	302.4
Hudson River	Wethersfield gravelly silt loam, 3 to 8 percent slopes	Consociation	2.75	302.5
Hudson River	Wethersfield gravelly silt loam, 8 to 15 percent slopes	Consociation	0.80	302.5

<b>Segment</b>	<b>Map Unit Name</b>	<b>Map Unit Type</b>	<b>Acres of ROI</b>	<b>MP</b>
Hudson River	Holyoke-Rock outcrop complex, hilly	Complex	2.18	302.6
Hudson River	Holyoke-Rock outcrop complex, very steep	Complex	2.96	302.7
New York City Metropolitan Area	Water	Water	See note	324.0
New York City Metropolitan Area	Urban Land	Consociation	See note	330.3
New York City Metropolitan Area	Water	Water	See note	331.4
New York City Metropolitan Area	Urban Land	Consociation	See note	336.1

Note: Soils in the New York City Metropolitan Area Segment have not been surveyed by the Natural Resources Conservation Service, and thus acreages of soils within the ROI in this segment are not available.

Key:

MP = milepost

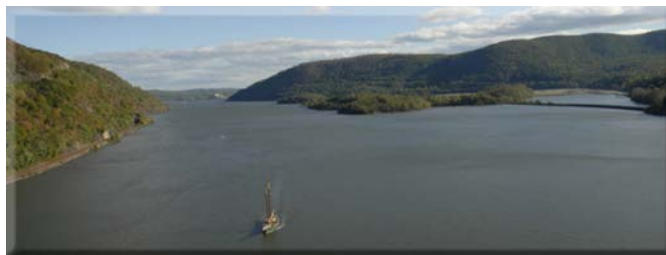
ROI = region of influence (within 100 feet on either side of the transmission line)





## APPENDIX J

# NHPA Section 106 Documentation







**Department of Energy**  
Washington, DC 20585

13 January 2011

Ms. Charlene Dwin Vaughn, Assistant Director  
Federal Permitting, Licensing, and Assistance Section  
Advisory Council on Historic Preservation  
Office of Federal Agency Programs  
Old Post Office Building  
1100 Pennsylvania Avenue NW, Suite 803  
Washington, DC 20004

**SUBJECT: Proposed Champlain Hudson Power Express Transmission Line Project**

Dear Ms. Vaughn:

The purpose of this letter is to ensure that the Advisory Council on Historic Preservation (ACHP) is aware of the subject project, and to inquire as to whether you wish to be considered, or participate, in the conduct of our ongoing analysis of potential environmental impacts of this proposed project.

On January 5, 2010, Champlain Hudson Power Express, Inc. (CHPEI) applied to the Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential permit to construct, operate, and maintain the Champlain Hudson Power Express Transmission Line Project. As described in the application, the project would comprise a high-voltage direct current (HVDC) transmission line extending south from an HVDC converter station near Montreal, Quebec, to a HVDC converter station in the New York City metropolitan area. This project would be installed within existing waterways and along railroad rights-of-way, either buried beneath the lake or riverbed, or buried within the existing railroad.

By letter dated August 5, 2010, CHPEI submitted an addendum to the Presidential permit application modifying the number of circuits and the project's proposed alignment. The project currently under review by DOE includes a single circuit extending from the U.S./Canada border to an HVDC converter station within the vicinity of Yonkers, New York. From the Yonkers converter station, above-ground alternating current (AC) cables would carry electricity to a Consolidated Edison Company of New York, Inc., substation, currently under construction near the site of the former Charles Poletti Power Plant in Astoria, Queens, New York.

We have determined that an Environmental Impact Statement (EIS) is the appropriate level of review under the National Environmental Policy Act (NEPA) for this proposed project, as was documented in our *Federal Register* Notice of Intent to prepare an EIS on June 18, 2010 (75 FR 34720). All of these documents, along with background information, an opportunity to subscribe to our mailing list, and more, are available at <http://www.chpexpresseis.org>.


The proposed project has the potential to affect historic properties either listed in, or eligible for, inclusion in the National Register of Historic Places. Resources within the project's prospective area of potential effects (APE) include historic properties designated by the Secretary of the Interior as National Historic Landmarks (NHLs). As of now, the following NHLs have been identified as potentially located within or immediately adjacent to the project's APE:

- Fort Crown Point
- Fort Ticonderoga
- Hudson River Heritage District
- U.S. Military Academy
- Old Croton Aqueduct

Accordingly, we are inviting the ACHP to participate in the ongoing environmental analysis of this proposed project. Should your office have a material interest in this project, or if you have additional information that we should consider, please contact HDR, Inc., our contractor for the preparation of the EIS; to that end, I am designating regulatory specialist Robert Quiggle of HDR to follow-up with you in the near future. He can be reached at (315) 414-2216 or by e-mail at [Robert.Quiggle@hdrinc.com](mailto:Robert.Quiggle@hdrinc.com).

I look forward to hearing from your office; please feel free to contact me at any time either by e-mail at [Jerry.Pell@hq.DOE.gov](mailto:Jerry.Pell@hq.DOE.gov) (preferred), by phone at (202) 586-3362, or by fax at (202) 318-7761.

Yours very truly,

A handwritten signature in blue ink that reads "Jerry Pell". The signature is fluid and cursive, with a long horizontal stroke at the end.

Dr. Jerry Pell  
Principal NEPA Document Manager  
Permitting, Siting, and Analysis, OE-20  
Office of Electricity Delivery and  
Energy Reliability  
U.S. Department of Energy

cc: Robert Quiggle (HDR, Inc.)



**Department of Energy**  
Washington, DC 20585

June 21, 2012

Charlene Dwin Vaughn  
Advisory Council on Historic Preservation  
Office of Federal Agency Programs  
Old Post Office Building  
1100 Pennsylvania Avenue NW, Suite 803  
Washington, DC 20004

**SUBJECT: Proposed Champlain Hudson Power Express Transmission Line Project**

Dear Ms. Vaughn:

As you are aware, Champlain Hudson Power Express, Inc. ("CHPEI" or "Applicants") has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the proposed Champlain Hudson Power Express Transmission Line Project (Project). In considering a Presidential Permit for the Project, the DOE has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA).<sup>a</sup> Section 106 of the NHPA (Section 106) directs federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment.

By letter dated January 13, 2011, the DOE formally initiated the Section 106 consultation process with the ACHP, the New York State Historic Preservation Officer (NYSHPO), the Delaware Nation, the St. Regis Mohawk Tribe, the Stockbridge-Munsee Community, and the U.S. Bureau of Indian Affairs (collectively the "Consulting Parties") regarding portions of the Project within the United States. Specifically, we invited the Consulting Parties to participate in the conduct of our ongoing analysis of potential environmental impacts of this undertaking, and to formally consult with us pursuant to Section 106 and its implementing regulations at 36 CFR Part 800.

CHPEI's application for a Presidential Permit was submitted to the DOE on January 27, 2010. CHPEI subsequently modified its application on August 6, 2010; July 7, 2011; and February 28, 2012. The Project currently under review by the DOE would consist of a 1,000-megawatt (MW) high-voltage direct current (HVDC) Voltage Source Converter controllable transmission system extending from the Canadian Province of Quebec to New York City. From the international border between the United States and Canada, two cables (comprising a single bipole) would extend south to an HVDC Converter Station to be located near Luyster Creek, north of 20th Avenue in Astoria, Queens. From the Converter Station, a 345-kilovolt (kV) underground alternating current (AC) circuit would connect to the existing 345-kV gas-insulated substation owned by the New York Power Authority (NYPA) and situated near NYPA's

---

<sup>a</sup> 16 USC 470 *et seq.*

Charles Poletti Power Project in Astoria. The Applicants also propose to construct a 3-mile buried 345-kV HVAC cable circuit from the Astoria Substation to Consolidated Edison's Rainey Substation in Queens. The Applicants have proposed to install the cables within waterways, and within the rights-of-way of existing transportation infrastructure, including railroads and roadways. Sections of the transmission line installed within waterways will generally be buried beneath the lake or riverbed. Overland sections of the Project will be buried within existing ROW corridors.

The DOE has determined that an Environmental Impact Statement (EIS) is the appropriate level of review under the National Environmental Policy Act (NEPA) for the proposed project, as was documented in our *Federal Register* Notice of Intent to prepare an EIS on June 18, 2010 (75 FR 117). The Notice of Intent, along with background information, an opportunity to subscribe to our mailing list, and more, are available on our EIS-specific website at <http://www.chpexpresseis.org>.

At this time, we wish to clarify the name and contact information for the DOE's contractor for preparation of the EIS and our representative for purposes of consultation pursuant to Section 106. In accordance with 36 CFR Part 800.2(a)(3), the DOE has authorized our contractor, HDR Environmental, Operations and Construction, Inc. (HDR EOC), to prepare the EIS. The EIS will include an analysis of the Project's potential for adverse effects on cultural resources, including historic properties as defined by Section 106 of the NHPA and its implementing regulations (36 CFR Part 800). Specifically, I am designating Dr. Greg Lockard, RPA of HDR EOC as the point-of-contact for preparing this information on behalf of the DOE. He can be reached at (571) 327-5815 or by e-mail at [Gregory.Lockard@hdrinc.com](mailto:Gregory.Lockard@hdrinc.com). Coordination of consultation activities under the Section 106 process will be completed by Mr. Robert Quiggle, RPA, of HDR Engineering, Inc., who is working on behalf of the Applicants. Mr. Quiggle can be contacted at (315) 414-2216 or by e-mail at [Robert.Quiggle@hdrinc.com](mailto:Robert.Quiggle@hdrinc.com). As provided in 36 CFR Part 800, the DOE remains legally responsible for findings and determinations and for the DOE's government-to-government relationships with Indian tribes.

As noted above, the DOE has formally initiated Section 106 consultation in accordance with 36 CFR Part 800.3. We anticipate additional consultation activities in the coming weeks regarding the ongoing identification of historic properties in the Project's area of potential effects (APE), assessment of adverse effects on these properties, and minimization and/or mitigation of these adverse effects. As described in our January 13, 2011 letters to the Consulting Parties, we intend to develop a Programmatic Agreement (PA) pursuant to 36 CFR Part 800.14(b) to address the proposed Project's potential effects on historic properties. The PA will be developed in consultation with federally recognized Indian tribes, the NYSHPO, the ACHP, the public, and other interested parties, as appropriate.

Please feel free to contact me directly at any time at [Brian.Mills@hq.DOE.gov](mailto:Brian.Mills@hq.DOE.gov), or by phone at (202) 586-8267.

Very truly yours,



Mr. Brian Mills  
Permitting, Siting, and Analysis, OE-20  
Office of Electricity Delivery and  
Energy Reliability  
U.S. Department of Energy

Cc: G. Lockard (HDR EOC)  
R. Quiggle (HDR Engineering, Inc.)

## CHPE EIS NHPA Section 106 Consultation Distribution List

### Agencies

Charlene Dwin Vaughn  
Advisory Council on Historic Preservation  
Office of Federal Agency Programs  
Old Post Office Building  
1100 Pennsylvania Avenue NW, Suite 803  
Washington, DC 20004

Franklin Keel  
Regional Director  
Bureau of Indian Affairs  
Eastern Region Office  
545 Marriott Drive, Suite 700  
Nashville, TN 37214

Diane Rosen  
Regional Director  
Bureau of Indian Affairs  
Midwest Region Office  
Norman Pointe II Building  
5600 W. American Blvd., Suite 500  
Bloomington, MN 55347

The Honorable Ken Salazar, Secretary  
U.S. Department of the Interior  
1849 C Street, N.W.  
Washington DC 20240

Mary K. (Missy) Morrison  
Resource Planning Specialist, External Review  
Coordinator  
Division of Resource Planning and Compliance  
National Park Service, Northeast Region  
200 Chestnut Street  
Philadelphia, PA 19106

Honorable Randy King, Chairperson  
Ruth Pierpont, Director  
New York State Historic Preservation Office  
Peebles Island Resource Center  
Delaware Avenue  
Cohoes, NY 12047

### Native American Tribes

Delaware Nation  
Anadarko, OK

St. Regis Mohawk Tribe  
Akwesasne, NY

Shinnecock Indian Nation  
Southampton, NY

Stockbridge-Munsee Community of Wisconsin  
Bowler, WI

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# United States Department of the Interior

BUREAU OF INDIAN AFFAIRS

Eastern Regional Office  
545 Marriott Drive, Suite 700  
Nashville, TN 37214

**JUL 18 2012**

IN REPLY REFER TO:

Trust Services

Environment, Safety, and Cultural Resources Division

Mr. Brian Mills  
Senior Planning Advisor  
Permitting, Siting, and Analysis, OE-20  
Electricity Delivery and Reliability Office  
U.S. Department of Energy  
1000 Independence Avenue, SW  
Washington DC 20585

**RE: Champlain Hudson Power Express Transmission Line Project, New York**

Dear Mr. Mills:

Thank you for contacting the Bureau of Indian Affairs (BIA), Eastern Regional Office, about tribal consultation information regarding the Champlain Hudson Power Express Transmission Line Project. Tribal consultation contact information is provided on the following page for National Historic Preservation Act compliance purposes.

Tribal consultation information is available to you on the internet. An annually updated tribal leaders directory for federally recognized tribes and nations can be found at <http://www.indianaffairs.gov/WhoWeAre/BIA/OIS/TribalGovernmentServices/TribalDirectory/index.htm>. A map titled *Indian Reservations in the Continental United States* is located at <http://www.nps.gov/history/nagpra/documents/resmap>, and a Native American Consultation Database is at <http://home.nps.gov/nagpra/onlinedb>. A current list of Tribal Historic Preservation Officers is at <http://www.nathpo.org>.

If you have questions, please contact David Saunders, Eastern Regional Archaeologist, at (615) 564-6840.

Sincerely,

Acting  
Director, Eastern Region

Enclosure

## **Tribal Consultation Information for Champlain Hudson Power Express Transmission Line Project**

Honorable Kerry Holton, President  
Delaware Nation  
P.O. Box 825  
Anadarko, OK 73005  
Telephone: (405) 247-2448  
Fax: (405) 247-6329

Honorable Paula Pechonick, Chief  
Delaware Tribe of Indians  
170 N.E. Barbara  
Bartlesville, OK 74003  
Telephone: (918) 336-5272  
Fax: (918) 337-6591

Honorable Kimberly Vele, President  
Stockbridge Munsee Community of Wisconsin  
P.O. Box 70.  
Bowler, WI 54416  
Telephone: (715) 793-4111  
Fax: (715) 793-1307

Sherry White  
Tribal Historic Preservation Officer  
Stockbridge Munsee Community of Wisconsin  
P.O. Box 70  
Bowler, WI 54416  
Telephone: (715) 793-3970  
Fax: (715) 793-4437

Honorable Mark Garrow, Chief  
Honorable Randy Hart, Chief  
Honorable Ronald La France, Chief  
St. Regis Mohawk Tribe  
412 State Route 37  
Akwesasne, NY 13655  
Telephone: (518) 358-2272  
Fax: (518) 358-4519

Arnold Printup  
Tribal Historic Preservation Officer  
St. Regis Mohawk Tribe  
412 State Route 37  
Akwesasne, NY 13655  
Telephone: (518) 358-2272 extension 164  
Fax: (518) 358-3203

Honorable Randy King, Chairperson  
Shinnecock Indian Nation  
P.O. Box 5006  
Southampton, NY 11969  
Telephone: (631) 283-6143  
Fax: (631) 204-9253

1. SMe  
2. C Stenger



**Department of Energy**  
Washington, DC 20585

June 21, 2012

Franklin Keel  
Regional Director  
Bureau of Indian Affairs  
Eastern Region Office  
545 Marriott Drive, Suite 700  
Nashville, TN 37214

**SUBJECT: Proposed Champlain Hudson Power Express Transmission Line Project**

Dear Director Keel:

As you are aware, Champlain Hudson Power Express, Inc. ("CHPEI" or "Applicants") has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the proposed Champlain Hudson Power Express Transmission Line Project (Project). In considering a Presidential Permit for the Project, the DOE has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA).<sup>a</sup> Section 106 of the NHPA (Section 106) directs federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment.

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CHPEI's application for a Presidential Permit was submitted to the DOE on January 27, 2010. CHPEI subsequently modified its application on August 6, 2010; July 7, 2011; and February 28, 2012. The Project currently under review by the DOE would consist of a 1,000-megawatt (MW) high-voltage direct current (HVDC) Voltage Source Converter controllable transmission system extending from the Canadian Province of Quebec to New York City. From the international border between the United States and Canada, two cables (comprising a single bipole) would extend south to an HVDC Converter Station to be located near Luyster Creek, north of 20th Avenue in Astoria, Queens. From the Converter Station, a 345-kilovolt (kV) underground alternating current (AC) circuit would connect to the existing 345-kV gas-insulated substation owned by the New York Power Authority (NYPA) and situated near NYPA's

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<sup>a</sup> 16 USC 470 *et seq.*

Charles Poletti Power Project in Astoria. The Applicants also propose to construct a 3-mile buried 345-kV HVAC cable circuit from the Astoria Substation to Consolidated Edison's Rainey Substation in Queens. The Applicants have proposed to install the cables within waterways, and within the rights-of-way of existing transportation infrastructure, including railroads and roadways. Sections of the transmission line installed within waterways will generally be buried beneath the lake or riverbed. Overland sections of the Project will be buried within existing ROW corridors.

The DOE has determined that an Environmental Impact Statement (EIS) is the appropriate level of review under the National Environmental Policy Act (NEPA) for the proposed project, as was documented in our *Federal Register* Notice of Intent to prepare an EIS on June 18, 2010 (75 FR 117). The Notice of Intent, along with background information, an opportunity to subscribe to our mailing list, and more, are available on our EIS-specific website at <http://www.chpexpresseis.org>.

At this time, we wish to clarify the name and contact information for the DOE's contractor for preparation of the EIS and our representative for purposes of consultation pursuant to Section 106. In accordance with 36 CFR Part 800.2(a)(3), the DOE has authorized our contractor, HDR Environmental, Operations and Construction, Inc. (HDR EOC), to prepare the EIS. The EIS will include an analysis of the Project's potential for adverse effects on cultural resources, including historic properties as defined by Section 106 of the NHPA and its implementing regulations (36 CFR Part 800). Specifically, I am designating Dr. Greg Lockard, RPA of HDR EOC as the point-of-contact for preparing this information on behalf of the DOE. He can be reached at (571) 327-5815 or by e-mail at [Gregory.Lockard@hdrinc.com](mailto:Gregory.Lockard@hdrinc.com). Coordination of consultation activities under the Section 106 process will be completed by Mr. Robert Quiggle, RPA, of HDR Engineering, Inc., who is working on behalf of the Applicants. Mr. Quiggle can be contacted at (315) 414-2216 or by e-mail at [Robert.Quiggle@hdrinc.com](mailto:Robert.Quiggle@hdrinc.com). As provided in 36 CFR Part 800, the DOE remains legally responsible for findings and determinations and for the DOE's government-to-government relationships with Indian tribes.

As noted above, the DOE has formally initiated Section 106 consultation in accordance with 36 CFR Part 800.3. We anticipate additional consultation activities in the coming weeks regarding the ongoing identification of historic properties in the Project's area of potential effects (APE), assessment of adverse effects on these properties, and minimization and/or mitigation of these adverse effects. As described in our January 13, 2011 letters to the Consulting Parties, we intend to develop a Programmatic Agreement (PA) pursuant to 36 CFR Part 800.14(b) to address the proposed Project's potential effects on historic properties. The PA will be developed in consultation with federally recognized Indian tribes, the NYSHPO, the ACHP, the public, and other interested parties, as appropriate.

Please feel free to contact me directly at any time at [Brian.Mills@hq.DOE.gov](mailto:Brian.Mills@hq.DOE.gov), or by phone at (202) 586-8267.

Very truly yours,



Mr. Brian Mills  
Permitting, Siting, and Analysis, OE-20  
Office of Electricity Delivery and  
Energy Reliability  
U.S. Department of Energy

Cc: G. Lockard (HDR EOC)  
R. Quiggle (HDR Engineering, Inc.)

November 26, 2012

## MEMORANDUM

**TO:** Bill Helmer (TDI)

**FROM:** Robert Quiggle (HDR Engineering, Inc.)

**SUBJECT:** **Champlain Hudson Power Express Transmission Line Project  
Summary of September 12, 2012 Consultation Meeting with the  
New York State Historic Preservation Office**

---

### 1.0 Introduction and Background

This memorandum provides a summary of the September 12, 2012 consultation meeting with the New York State Historic Preservation Office (NYSHPO) regarding maritime archaeological resources (e.g., shipwrecks) and anomalies of potential cultural origin identified within the prospective area of potential effects (APE) for the proposed Champlain Hudson Power Express Transmission Line Project (Project). Specifically, the purpose of this meeting was to determine appropriate avoidance measures and/or additional information needs through a review of a representative subset of maritime archaeological resources and anomalies.

The consultation meeting was held from 10:30 AM – 2:00 PM at the offices of Hartgen Archaeological Associates, Inc. (HAA, Inc.) in Rensselaer, New York. Representatives from the NYSHPO, Champlain Hudson Power Express, Inc. (CHPEI), HAA, Inc., and HDR Engineering, Inc. (HDR) participated in the consultation meeting. Specifically, meeting participants included:

- Brian Yates (NYSHPO)
- Bill Helmer (CHPEI)
- Matt Kirk (HAA, Inc.)
- Tracy Miller (HAA, Inc.)
- Robert Quiggle (HDR)

## 2.0 Meeting Summary

- CHPEI and HDR provided the NYSHPO with a status update on ongoing cultural resources studies and the overall permitting process for the Project.
- HDR noted that CHPEI had previously consulted with the NYSHPO to identify a suitable buffer distance for avoiding adverse effects on maritime archaeological resources. Based on this consultation a 50-meter (164-foot) buffer around maritime archaeological resources was originally proposed. Based on a review of data provided by CHPEI in 2011, the NYSHPO determined in May 2012 that this buffer area could be reduced to a distance of 40 meters (131 feet) from the Project's APE. For the maritime sections of the Project, the APE will include a 4.6-meter-wide (15-foot-wide) corridor where disturbance of lake or river bottoms may occur during installation of the transmission cables.
- The NYSHPO confirmed that a 40-meter buffer from the APE was generally appropriate to avoid adverse Project-related effects on maritime archaeological resources. However, the NYSHPO noted that this could be adjusted on a case-by-case basis depending on the nature of the identified resource, the analyses previously conducted by the Lake Champlain Maritime Museum (LCMM), and/or the sonar signature of the resource or anomaly.
- HDR briefly summarized the process that was completed for identifying maritime archaeological resources and anomalies within the Project's APE. Maritime archaeological resources and anomalies were identified by the LCMM and HAA, Inc. through an analysis of side scan sonar data collected along the extent of proposed maritime sections of the Project's APE. The side scan sonar data was compared to information available from existing archaeological site files, historical records regarding shipwrecks, previous studies conducted by the LCMM and others within Lake Champlain and the Hudson River, and other sources of information regarding known, reported, or potential cultural resources within the Lake Champlain, Hudson River, Harlem River, and East River sections of the Project's APE.
- The comprehensive analysis conducted by the LCMM and HAA, Inc. resulted in the development of a geographic information system (GIS) database of maritime archaeological resources and anomalies identified by the LCMM within approximately 300 meters (984 feet) of the Project's centerline. In 2011, modifications to the Project's alignment along an 80-kilometer (50-mile) segment of the proposed transmission cable corridor within the Hudson River required a reanalysis of side scan sonar data provided by the New York State Department of Environmental Conservation (NYSDEC). This analysis of NYSDEC data identified maritime archaeological resources and anomalies and within 100 meters (328 feet) along sections of the Hudson River.
- In preparation for the September 12, 2012 consultation meeting, HAA, Inc. developed 40-meter buffers around maritime archaeological resources and potential cultural anomalies to identify resources that would be avoided by Project construction.
- Based on the results of this GIS analysis, HAA, Inc. prioritized identified archaeological resources or potential cultural anomalies. Those resources or anomalies within 40 meters of the APE were assigned a higher potential for Project-related effects. This information was combined with data compiled from the background literature review and LCMM's analyses of the side scan sonar data to develop a preliminary assessment of significance for high-

potential maritime resources and anomalies. If analyses or documentary evidence indicated that a high-potential resource or anomaly may represent a potentially significant cultural features (e.g., a documented shipwreck or remnants of a historic bridge), the resource or anomaly was ranked as a higher priority. However, if the LCMM's analysis of side scan sonar data indicated that the identified high-potential resource or anomaly likely represented a non-cultural feature (e.g., tree stump, bedrock outcropping, etc.), the resource or anomaly was given a lower classification in regards to potential priority.

- HDR explained that, for purposes of discussion, HAA, Inc. had selected a subset of high priority maritime archaeological resources and potential cultural anomalies that generally represented high-potential locations categorized by HAA, Inc. as having a high potential significance (typically documented or suspected shipwrecks within proximity to the Project's APE).
- The NYSHPO, CHPEI, HDR, and HAA, Inc. reviewed approximately 40 high priority archaeological resources and anomalies on a case-by-case basis. For each of these resources, the NYSHPO made recommendations regarding avoidance or the need for additional information.
- In most cases, the proposed transmission cable installation corridor will sufficiently avoid high priority resources.
- In other cases, potential modifications to the Project's alignment were proposed that would allow the Project to avoid adverse effects on maritime archaeological resources or potential cultural anomalies. CHPEI agreed to consult with their engineering staff to determine if potential modifications to the Project's route were feasible.
- The NYSHPO recommended that CHPEI complete the ongoing marine route survey and prepare additional information regarding proposed anomalies that may be unavoidable. This information could be used to provide additional information regarding the nature of these anomalies and whether they actually represent cultural features.
- CHPEI agreed to review the recommendations provided by the NYSHPO and consult the results of the ongoing marine route survey (expected to be completed in Q1 of 2013). Based on this information, CHPEI will present recommendations for each site and/or anomaly within the APE and consult with the NYSHPO to determine whether proposed avoidance measures are appropriate or additional data collection or mitigation measures may be necessary.

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November 26, 2012

## MEMORANDUM

**TO:** Bill Helmer (TDI)

**FROM:** Robert Quiggle (HDR Engineering, Inc.)

**SUBJECT:** **Champlain Hudson Power Express Transmission Line Project  
Summary of October 24, 2012 Consultation Meeting with the  
Advisory Council on Historic Preservation**

---

### 1.0 Introduction and Background

This memorandum provides a summary of the October 24, 2012 consultation meeting with the Advisory Council on Historic Preservation (ACHP) regarding the proposed Champlain Hudson Power Express Transmission Line Project (Project). Champlain Hudson Power Express, Inc. (CHPEI) has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the Project. The purpose of this meeting was to provide the ACHP with an overview of the Project, describe the cultural resources studies conducted to date, and discuss the approach to fulfilling the DOE's responsibilities pursuant to Section 106 of the National Historic Preservation Act (Section 106).

The consultation meeting was held from 11:00 AM – 11:45 AM at the ACHP's office located in the Old Post Office Pavilion in Washington, D.C. Representatives from the ACHP, DOE, HDR Environmental, Operations and Construction, Inc. (HDR EOC), and HDR Engineering, Inc. (HDR Engineering) participated in the consultation meeting. Specifically, meeting participants included:

- Charlene Dwin Vaughn (ACHP)
- Lee Webb (ACHP)
- Brian Mills (DOE)
- Greg Lockard (HDR EOC)
- Robert Quiggle (HDR Engineering)

## 2.0 Meeting Summary

- HDR Engineering provided an introduction to the Project and the meeting participants.
  - As noted above, the Project will require a Presidential Permit from the DOE. CHPEI filed an application for a Presidential Permit on January 27, 2010. CHPEI subsequently modified its application on August 6, 2010; July 7, 2011; and February 28, 2012.
  - The DOE has authorized HDR EOC to prepare an Environmental Impact Statement (EIS) for this Project pursuant to the National Environmental Policy Act (NEPA). The EIS will include an analysis of the Project's potential effects on cultural resources, including historic properties.
  - HDR Engineering is coordinating consultation activities pursuant to the Section 106 process.
- HDR Engineering presented a PowerPoint presentation detailing the technical aspects of the Project, the Project's proposed route, and transmission cable installation methods. This presentation is enclosed as an attachment to this meeting summary.
- The presentation also included information regarding the permitting process.
  - In addition to the Presidential Permit, HDR Engineering also noted that the Project will require a permit from the U.S. Army Corps of Engineers (USACE) pursuant to Section 404 of the Clean Water Act and a permit from the U.S. Coast Guard (USCG). The DOE explained that the DOE is the lead federal agency for purposes of consultation under Section 106, but that the USACE and the USCG are cooperating agencies.
  - HDR Engineering explained that the Project will require a Certificate of Environmental Compatibility and Public Need (Certificate) from the New York State Public Service Commission (PSC) pursuant to Article VII of the New York State Public Service Law.
  - Settlement discussions regarding the Certificate resulted in a Joint Proposal (JP) signed by New York State agencies, non-governmental organizations, the City of New York and the City of Yonkers.
  - The JP includes guidelines for the Environmental Management and Control Plan(s) (EM&CP) as well as Best Management Practices (BMP) for Project construction. Both the EM&CP and BMP guidance documents include provisions for addressing cultural resources.
  - The JP also includes a proposed Water Quality Certificate pursuant to Section 401 of the Clean Water Act.
  - The PSC has received the JP and the hearing process regarding the Certificate has been completed.
- The ACHP asked if consultation pursuant to Section 106 was being coordinated with the NEPA process. HDR Engineering explained that consultation under Section 106 was initiated in January 2011, but consultation activities were delayed to allow the settlement parties to reach a JP.
- The ACHP noted that, given the existing JP and the consensus regarding the Project, the DOE may wish to coordinate compliance with Section 106 with the steps taken to meet the NEPA process. The ACHP explained that 36 CFR § 800.8 of the ACHP's regulations describes the regulatory process for coordinating Section 106 and NEPA, although no applicant for a federal license or permit has pursued this coordinated approach. The ACHP is preparing new

guidance for coordinating the Section 106 and NEPA processes, with the goal of encouraging federal agencies and applicants for federal permits or licenses to follow the regulatory approach described in 36 CFR § 800.8.

- The ACHP noted that the coordinated process would allow the record of decision prepared pursuant to NEPA to satisfy the DOE's responsibilities under Section 106.
- The ACHP agreed to provide the DOE with the new guidance regarding coordination of the NEPA and Section 106 processes following approval (anticipated to occur during the ACHP's November 15, 2012 meeting).
- HDR Engineering described the cultural resources studies conducted to date. The studies have been conducted by an experienced local team including HDR Engineering, Hartgen Archaeological Associates, Inc., and the Lake Champlain Maritime Museum. The studies were developed in consultation with the New York State Historic Preservation Officer (NYSHPO), and have included background literature reviews, analyses of side scan sonar data, and subsurface testing conducted along portions of the Project's prospective area of potential effects (APE). Information regarding these studies is included in the presentation enclosed with this meeting summary.
- HDR Engineering noted that the DOE has identified consulting parties, and that formal consultation with these parties has been initiated. CHPEI intends to convene a meeting in November 2012 to finalize the definition of the APE and to review the results of the studies conducted to date.
- The DOE intends to develop a Programmatic Agreement pursuant to 36 CFR § 800.14(b) to address the Project's potential effects on historic properties. The PA will require development of a Cultural Resources Management Plan (CRMP) in consultation with the consulting parties prior to the initiation of Project construction activities. HDR Engineering noted that a CRMP is also required by the JP.
- The ACHP indicated that development of a PA could be facilitated by coordinating the NEPA and Section 106 processes. The Draft EIS could include a list of activities and issues to be addressed in the PA, as well as a schedule and milestones for PA development. This approach would also facilitate a holistic approach to potential mitigation activities to address the adverse effects of the Project as a whole rather than on a resource-specific basis. The ACHP noted that a PA should address a public education component, and provide opportunities for Indian tribes to participate in cultural resources studies.
- The ACHP also recommended that the PA include language to allow other federal agencies (in addition to the DOE, USACE, and USCG) to be included in the PA. The ACHP agreed to provide the DOE with recommended language.
- The ACHP noted that coordination of the NEPA and Section 106 processes should be initiated by notifying the NYSHPO, Indian tribes, and the ACHP.
- The DOE agreed to consider coordination of the NEPA and Section 106 processes and to review the forthcoming guidelines from the ACHP.

**Attachment: October 2012 Champlain Hudson Power Express  
Advisory Council on Historic Preservation Presentation**

Note: The latest version of the presentation is provided following the July 2013 Section 106 meeting announcement letter subsequently provided in this appendix.



**Department of Energy**  
Washington, DC 20585

November 20, 2012

**TO: Attached Cultural Resources Working Group Distribution List**

**SUBJECT: Proposed Champlain Hudson Power Express Transmission Line Project  
Section 106 Consultation Meeting**

Dear Cultural Resources Working Group:

Champlain Hudson Power Express, Inc. has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the portions of the proposed Champlain Hudson Power Express Transmission Line Project located within the United States (Project). In considering a Presidential Permit for the Project, the DOE has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA).<sup>1</sup> Section 106 of the NHPA (Section 106) directs federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment.

The DOE has formally initiated the Section 106 consultation process with the ACHP, the New York State Historic Preservation Officer, the Delaware Nation, the St. Regis Mohawk Tribe, the Stockbridge-Munsee Community, the Shinnecock Indian Nation, and the U.S. Bureau of Indian Affairs (collectively the "Consulting Parties") regarding the Project. Specifically, the DOE invited the Consulting Parties to participate in the conduct of our ongoing analysis of potential environmental impacts of this undertaking and to formally consult with us pursuant to Section 106 and its implementing regulations at 36 CFR Part 800.

At this time, we would like to invite the Consulting Parties, federal agencies involved in this undertaking, and other potentially interested parties (collectively, the "Cultural Resources Working Group") to participate in a consultation meeting on November 28, 2012. The purpose of this meeting will be to (a) determine and document the area of potential effects (APE) for this undertaking, (b) describe the studies that have been conducted to identify historic properties that may be affected by the Project, and (c) discuss the process for completing the Section 106 process, including measures to resolve any Project-related adverse effects. This Section 106 consultation meeting will be held from 9:00 AM–12:00 PM at the offices of Hiscock and

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<sup>1</sup> 16 USC 470 *et seq.*

Barclay, located at 80 State Street (6<sup>th</sup> floor) in Albany, New York 12207. Those wishing to participate but unable to attend in person are invited to participate via conference call. The dial-in number for the call will be 866-994-6437. Please enter conference code 989-014-9046 when prompted.

The DOE has established a website to provide information regarding the ongoing environmental review of this Project. Additional background information regarding the Project, an opportunity to subscribe to our mailing list, and more, are available at <http://www.chpexpresseis.org>.

Please feel free to contact me directly at any time at [Brian.Mills@hq.DOE.gov](mailto:Brian.Mills@hq.DOE.gov), or by phone at (202) 586-8267. I look forward to meeting with you on November 28, 2012.

Very truly yours,



Mr. Brian Mills  
Permitting, Siting, and Analysis, OE-20  
Office of Electricity Delivery and  
Energy Reliability  
U.S. Department of Energy

Cc: Attached Distribution List

L. Jackson (DOE)  
G. Lockard (HDR EOC)  
R. Quiggle (HDR Engineering, Inc.)

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Bureau of Technical Preservation Services  
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December 12, 2012

## MEMORANDUM

**TO:** Bill Helmer (TDI)

**FROM:** Robert Quiggle (HDR Engineering, Inc.)

**SUBJECT:** **Champlain Hudson Power Express Transmission Line Project  
Summary of November 28, 2012 Consultation Meeting**

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### 1.0 Introduction and Background

This memorandum provides a summary of the November 28, 2012 consultation meeting for the proposed Champlain Hudson Power Express Transmission Line Project (Project). Champlain Hudson Power Express, Inc. (CHPEI) has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the Project. In considering a Presidential Permit for the Project, the DOE has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA). Section 106 of the NHPA (Section 106) directs federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. As the lead federal agency for purposes of consultation pursuant to Section 106 for this Project, the DOE convened the November 28, 2012 consultation meeting to (a) discuss the area of potential effects (APE) for this undertaking, (b) describe the studies that have been conducted to date to identify historic properties that may be affected by the Project, and (c) discuss the process for completing the Section 106 process, including measures to resolve any Project-related adverse effects..

The consultation meeting was scheduled from 9:00 AM – 12:00 PM at the offices of Hiscock & Barclay, LLP in Albany, New York. As described in Attachment 1 to this memorandum, representatives from the U.S. Bureau of Indian Affairs, the National Park Service, the ACHP, the New York State Historic Preservation Office (NYSHPO), the New York City Landmarks Preservation Commission, the U.S. Army Corps of Engineers (USACE), the U.S. Coast Guard (USCG), and federally recognized Indian tribes were invited to participate in the meeting. Invited participants also included representatives from AECOM, HDR Engineering, Inc. (HDR Engineering), HDR Environmental, Operations and Construction, Inc. (HDR EOC), Hartgen Archaeological Associates, Inc. (HAA, Inc.), and Van Ness Feldman, LLP (VNF). A conference line was made available for those unable to attend in person.

Participants in the November 28, 2012 consultation meeting included:

- Brian Yates (NYSHPO)
- Lamont Jackson (DOE)
- Lee Webb (ACHP)
- Bill Helmer (CHPEI)
- Ed Alkiewicz (AECOM)
- Jay Ryan (VNF)
- Chuck Sensiba (VNF)
- Matt Kirk (HAA, Inc.)
- Tracy Miller (HAA, Inc.)
- Greg Lockard (HDR EOC)
- Robert Quiggle (HDR Engineering)

## **2.0 Meeting Summary**

- HDR Engineering provided an introduction to the Project and the meeting participants.
  - As noted above, the Project will require a Presidential Permit from the DOE. CHPEI filed an application for a Presidential Permit on January 27, 2010. CHPEI subsequently modified its application on August 6, 2010, July 7, 2011, and February 28, 2012.
  - The DOE has authorized HDR EOC to prepare an Environmental Impact Statement (EIS) for this Project pursuant to the National Environmental Policy Act (NEPA). The EIS will include an analysis of the Project's potential effects on cultural resources, including historic properties.
  - HDR Engineering is coordinating consultation activities pursuant to the Section 106 process.
- HDR Engineering presented a PowerPoint presentation detailing the technical aspects of the Project, the Project's proposed route, and transmission cable installation methods. This presentation is enclosed as Attachment 2 to this meeting summary.
- The presentation also included information regarding the permitting process.
  - In addition to the Presidential Permit, HDR Engineering also noted that the Project will require a permit from the USACE pursuant to Section 404 of the Clean Water. The DOE is the lead federal agency for purposes of consultation under Section 106, but that the USACE and the USCG are cooperating agencies.
  - HDR Engineering explained that the Project will require a Certificate of Environmental Compatibility and Public Need (Certificate) from the New York State Public Service Commission (PSC) pursuant to Article VII of the New York State Public Service Law.
  - Settlement discussions regarding the Certificate resulted in a Joint Proposal of Settlement (JP) signed by New York State agencies, non-governmental organizations, the City of New York and the City of Yonkers.

- The JP includes guidelines for the Environmental Management and Control Plan(s) (EM&CP) as well as Best Management Practices (BMP) for Project construction. Both the EM&CP and BMP guidance documents include provisions for addressing cultural resources.
- The JP also includes a proposed Water Quality Certificate pursuant to Section 401 of the Clean Water Act.
- The PSC has received the JP and the hearing process regarding the Certificate has been completed.
- HDR Engineering provided a summary of cultural resources studies and consultation activities, including the Phase IA Addendum Study currently being completed.
- In regards to the status of studies, HDR Engineering noted that:
  - A complete Phase IA study of the Project's entire terrestrial alignment has been completed. For this study, the Phase IA "study corridor" was developed in consultation with the NYSHPO and included an area encompassing 500 feet on either side of the Project's centerline (a total of 1,000 feet).
  - Phase IB and Phase II studies have been conducted along 66 miles of the 142-mile-long overland route. This represents approximately 46 percent of the terrestrial portion of the Project.
  - CHPEI previously consulted with the NYSHPO to identify a suitable buffer distance for avoiding adverse effects to maritime archaeological resources. The NYSHPO defined a 40-meter (130-foot) buffer from the APE as generally appropriate to avoid adverse Project-related effects on maritime archaeological resources. However, the NYSHPO noted that this could be adjusted on a case-by-case basis depending on the nature of the identified resource, the analyses previously conducted by the Lake Champlain Maritime Museum, and/or the sonar signature of the resource or anomaly.
  - An analysis of previously reported shipwrecks, maritime archaeological sites, and side scan sonar data for the entire maritime portion of the Project's alignment has been completed. In most cases, the proposed transmission cable installation corridor will sufficiently avoid high priority resources.
  - In other cases, potential modifications to the Project's alignment have been proposed by NYSHPO that would allow the Project to avoid adverse effects on maritime archaeological resources or potential cultural anomalies. CHPEI is currently consulting with engineering staff to determine if potential modifications to the Project's route were feasible.
- HDR Engineering noted that the DOE has identified consulting parties, and that formal consultation with these parties has been initiated.
- The DOE proposes to develop a Programmatic Agreement (PA) pursuant to 36 CFR § 800.14(b) to address the Project's potential effects on historic properties. The PA will require development of a Cultural Resources Management Plan (CRMP) in consultation with the consulting parties prior to the initiation of Project construction activities. HDR Engineering noted that a CRMP is also required by the JP. A draft PA is anticipated in Q1 of 2013.
- The ACHP asked if the DOE could briefly address the process for meeting the requirements of Section 106. Specifically, the ACHP noted in an October 24, 2012 consultation meeting with the DOE that the DOE might wish to coordinate compliance with Section 106 with the

steps taken to meet the NEPA process. The ACHP explained during the October 24, 2012 consultation meeting that the regulations implementing Section 106 at 36 CFR § 800.8 describe the regulatory process for coordinating Section 106 and NEPA, although no applicant for a federal license or permit has pursued this coordinated approach.

- The ACHP is preparing new guidance for coordinating the Section 106 and NEPA processes, with the goal of encouraging federal agencies and applicants for federal permits or licenses to follow the regulatory approach described in 36 CFR § 800.8. During the November 28, 2012 consultation meeting, the ACHP noted that this guidance is currently under review by the Council on Environmental Quality and is expected to be released after January 1, 2013.
- At this time, the DOE does not intend to integrate compliance with Section 106 with the steps being taken to meet the NEPA process. The guidance document under development by the ACHP has not been released, and HDR EOC noted that the development of the Draft EIS (DEIS) has advanced to the point where coordination of the Section 106 and NEPA processes may require significant revisions to the DEIS. For these reasons, the DOE does not intend to pursue the consultation process described at 36 CFR § 800.8 at this time. However, the DOE agreed to revisit this issue following distribution of the ACHP's anticipated guidance document after January 1, 2013.
- At the ACHP's request, the DOE agreed to notify (in writing) Charlene Dwin Vaughn, the ACHP's Assistant Director for the Office of Federal Agency Programs, regarding the DOE's decision to intend to pursue the consultation process described at 36 CFR § 800.8 at this time.
- At the request of the NYSHPO, CHPEI also agreed to provide the NYSHPO with an electronic copy of the JP.
- The DOE noted that, although no Indian tribes participated in the meeting, the DOE would continue to invite their participation in any future Section 106 consultation meetings. CHPEI agreed to provide the Indian tribes identified by the DOE with study reports and other information relevant to the Section 106 process.
- The meeting adjourned at approximately 10:45 AM.

**ATTACHMENT 1**

**LETTER FROM THE U.S. DEPARTMENT OF ENERGY INVITING THE CULTURAL  
RESOURCES WORKING GROUP TO PARTICIPATE IN THE NOVEMBER 28, 2012  
CHAMPLAIN HUDSON POWER EXPRESS SECTION 106  
CONSULTATION MEETING**



**Department of Energy**  
Washington, DC 20585

November 20, 2012

**TO: Attached Cultural Resources Working Group Distribution List**

**SUBJECT: Proposed Champlain Hudson Power Express Transmission Line Project  
Section 106 Consultation Meeting**

Dear Cultural Resources Working Group:

Champlain Hudson Power Express, Inc. has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the portions of the proposed Champlain Hudson Power Express Transmission Line Project located within the United States (Project). In considering a Presidential Permit for the Project, the DOE has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA).<sup>1</sup> Section 106 of the NHPA (Section 106) directs federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment.

The DOE has formally initiated the Section 106 consultation process with the ACHP, the New York State Historic Preservation Officer, the Delaware Nation, the St. Regis Mohawk Tribe, the Stockbridge-Munsee Community, the Shinnecock Indian Nation, and the U.S. Bureau of Indian Affairs (collectively the "Consulting Parties") regarding the Project. Specifically, the DOE invited the Consulting Parties to participate in the conduct of our ongoing analysis of potential environmental impacts of this undertaking and to formally consult with us pursuant to Section 106 and its implementing regulations at 36 CFR Part 800.

At this time, we would like to invite the Consulting Parties, federal agencies involved in this undertaking, and other potentially interested parties (collectively, the "Cultural Resources Working Group") to participate in a consultation meeting on November 28, 2012. The purpose of this meeting will be to (a) determine and document the area of potential effects (APE) for this undertaking, (b) describe the studies that have been conducted to identify historic properties that may be affected by the Project, and (c) discuss the process for completing the Section 106 process, including measures to resolve any Project-related adverse effects. This Section 106 consultation meeting will be held from 9:00 AM–12:00 PM at the offices of Hiscock and

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<sup>1</sup> 16 USC 470 *et seq.*

Barclay, located at 80 State Street (6<sup>th</sup> floor) in Albany, New York 12207. Those wishing to participate but unable to attend in person are invited to participate via conference call. The dial-in number for the call will be 866-994-6437. Please enter conference code 989-014-9046 when prompted.

The DOE has established a website to provide information regarding the ongoing environmental review of this Project. Additional background information regarding the Project, an opportunity to subscribe to our mailing list, and more, are available at <http://www.chpexpresseis.org>.

Please feel free to contact me directly at any time at [Brian.Mills@hq.DOE.gov](mailto:Brian.Mills@hq.DOE.gov), or by phone at (202) 586-8267. I look forward to meeting with you on November 28, 2012.

Very truly yours,



Mr. Brian Mills  
Permitting, Siting, and Analysis, OE-20  
Office of Electricity Delivery and  
Energy Reliability  
U.S. Department of Energy

Cc: Attached Distribution List

L. Jackson (DOE)  
G. Lockard (HDR EOC)  
R. Quiggle (HDR Engineering, Inc.)

**Champlain Hudson Power Express Transmission Line Project  
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**Attachment: November 2012 Champlain Hudson Power Express  
Section 106 Consultation Meeting Presentation**

Note: The latest version of the presentation is provided following the July 2013 Section 106 meeting announcement letter subsequently provided in this appendix.

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**Department of Energy**  
**Washington, DC 20585**

May 14, 2013

**TO: Consulting Parties**

**SUBJECT: Champlain Hudson Power Express Transmission Line Project  
Cultural Resources Study Reports and Area of Potential Effects**

Dear Consulting Parties:

Champlain Hudson Power Express, Inc. (CHPEI) has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the proposed Champlain Hudson Power Express Transmission Line Project (Project) across the U.S. border. In considering a Presidential Permit for the Project, the DOE evaluates the proposed transmission line as a connected action under the National Environmental Policy Act (NEPA) and is currently preparing an environmental impact statement (EIS). The DOE has the responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA).<sup>1</sup>

The DOE formally initiated the Section 106 consultation process with the Advisory Council on Historic Preservation (ACHP), the New York State Historic Preservation Officer (NYSHPO), the Delaware Nation, the St. Regis Mohawk Tribe, the Stockbridge-Munsee Community, the Shinnecock Indian Nation, and the U.S. Bureau of Indian Affairs (collectively the "Consulting Parties") regarding the Project. Specifically, the DOE invited the Consulting Parties to participate in the analysis of potential environmental impacts of this Project and to formally consult with the agency pursuant to Section 106 of the NHPA and its implementing regulations at 36 CFR Part 800. The DOE has designated Mr. Robert Quiggle, RPA, of HDR Engineering, Inc. (HDR) to coordinate consultation activities under Section 106. This letter represents consultation with the Consulting Parties identified in Attachment A to this letter regarding the proposed area of potential effects (APE) for this Project, the attached Cultural Resources Study Reports, and the proposed development of a Programmatic Agreement to address potential adverse effects of the Project.

## **I. BACKGROUND**

CHPEI proposes to construct the Project to connect renewable sources of power generation in central and eastern Canada with the New York City load center. CHPEI's application for a Presidential Permit was submitted to the DOE on January 27, 2010. CHPEI subsequently modified its application on August 6, 2010; July 7, 2011; and February 28, 2012. Settlement discussions conducted under the New York State Public Service Commission's Article VII process from November 2010 through February 2012 resulted in development of a Joint Proposal that was signed by seven New York State agencies, three non-

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<sup>1</sup> 16 USC 470 *et seq.*

governmental organizations (NGO), the City of New York, and the City of Yonkers. The Joint Proposal describes the route currently under evaluation by the DOE and other parties in the EIS.

The proposed Project under evaluation by the DOE would consist of a 1,000-megawatt (MW) underwater/underground high-voltage direct current (HVDC) controllable transmission system extending from the Canadian Province of Quebec to New York City. From the international border between the United States and Canada, two cables (consisting of a single bipole) would extend south to an HVDC converter station near Luyster Creek, north of 20<sup>th</sup> Avenue in Astoria, Queens. The converter station would be constructed on land that is currently owned by Consolidated Edison Company of New York, Inc. (ConEd).

From the Luyster Creek converter station, high-voltage alternating current (HVAC) cables would extend through Astoria, Queens, for a distance of approximately 3 miles to ConEd's Rainey Substation. In total, approximately 333 miles of proposed transmission cables would be located within the United States. CHPEI would not own or operate the Canadian portion of the transmission cables.

To the extent possible, CHPEI proposes to bury the transmission cable within existing waterways or transportation rights-of-way (ROW). CHPEI believes that this approach will minimize the visual and landscape impacts associated with traditional overhead transmission lines, while simultaneously providing the additional capacity required to meet the increasing clean energy demands of the greater New York City metropolitan area.

The ACHP's regulations at 36 CFR Part 800-Protection of Historic Properties define how federal agencies meet their statutory responsibilities pursuant to Section 106. The process described in 36 CFR Part 800 is intended to accommodate historic preservation concerns with the needs of federal undertakings through a process of consultation among agency officials, federally recognized Indian tribes, State Historic Preservation Officers, Tribal Historic Preservation Officers, and other parties, including the public, as appropriate. Pursuant to 36 CFR § 800.4, CHPEI has initiated cultural resource studies to assist the DOE and other federal agencies in identifying historic properties that may be affected by the Project.

## **II. AREA OF POTENTIAL EFFECTS (APE)**

The DOE has initiated consultation with the NYSHPO, federally recognized Indian tribes, and other interested parties regarding the proposed APE for this Project. The DOE has defined an APE that includes the geographic area or areas within which the Project may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE includes all areas along the transmission cable corridor where ground-disturbing activities will be conducted. The APE will also include areas outside the transmission cable corridor, including the converter station site, the HVAC cable alignment, transmission interconnection sites, laydown areas, access roads, and other locations that may be affected by Project construction and operations. Additionally, the APE will take into account standing historic properties (i.e., buildings, structures, individual objects, and districts) that may be indirectly affected by the use of heavy equipment, particularly along the overland sections of the Project's proposed route.

The width of the construction corridor varies based on installation techniques and environment. The excavation of the cable trench, installation of erosion and sediment control measures, installation of the cables, and stockpiling of excavated materials are expected to occur within a 25-foot-wide corridor, or 12.5 feet on either side of the Project's centerline. To accommodate additional areas beyond the footprint of the trench that may be necessary for laydown/staging areas, and to accommodate indirect effects of Project construction activities, the APE for this undertaking has been defined to include an area encompassing 25 feet on either side of the Project's centerline. The APE may be further refined through

additional engineering analyses. Table 1 describes the location, distance, and installation methods for each section of the Project.

**TABLE 1.  
LOCATION, DISTANCE, AND INSTALLATION METHODS FOR SECTIONS OF THE  
PROJECT**

Section	Distance	Description
US/Canadian border to Town of Dresden	101 miles	Marine installation within Lake Champlain
Town of Dresden to Village of Whitehall	11 miles	Upland installation within the ROW of NYS Route 22
Village of Whitehall to the City of Schenectady	65 miles	Upland installation primarily along CP ROW
City of Schenectady to the Town of Rotterdam	1.3 miles	Upland installation along surface streets and within CP ROW
Town of Rotterdam to the Town of Selkirk	24 miles	Upland installation primarily along CSX ROW
Town of Selkirk to Hamlet of Cementon	29 miles	Upland installation primarily along CSX ROW
Hamlet of Cementon to Town of Stony Point	67.05 miles	Marine installation within Hudson River
Stony Point to point south of Rockland Lake State Park	7.66 miles	Upland installation including CSX ROW, NYS Route 9 and HDD beneath parkland
south of Rockland Lake State Park to Spuyten Duyvil	20.07 miles	Marine installation within Hudson River
Spuyten Duyvil to the Bronx	6.58 miles	Marine installation within Harlem River
Bronx to East River	1.1 miles	Upland installation primarily along railroad ROW
East River to Converter Station in Astoria, Queens	River crossing	Marine installation in East River
Converter Station to Rainey Substation	3 miles	HVAC installation along surface streets

In total, the Project's APE includes a 50-foot-wide corridor extending along the Project's 333-mile-long alignment from the U.S./Canadian border to ConEd's Rainey Substation. The approximate area of the APE is 20,200 acres.

On November 20, 2012, the DOE invited the Consulting Parties to participate in a consultation meeting to discuss the APE for the Project. The meeting was held on November 28, 2012 in Albany, New York, and

a teleconference line was made available to those Consulting Parties unable to attend in person. The ACHP, NYSHPO, and DOE participated in the consultation meeting.

### III. CULTURAL RESOURCES STUDIES

At this time, the DOE is distributing the following reports to the Consulting Parties:

- *Phase IA Literature Review and Archaeological Sensitivity Assessment, Champlain Hudson Power Express;*
- *Phase IB Archaeological Field Reconnaissance and Phase II Archaeological Site Evaluation, Champlain Hudson Power Express, Canadian Pacific Railway Segment; and*
- *Phase IA Literature Review and Archaeological Sensitivity Assessment Addendum, Champlain Hudson Power Express Terrestrial Route Modifications.*

Each of these studies is described below.

Early in the permitting process CHPEI initiated cultural resources studies and informal consultation to identify historic properties within the Project's prospective area of potential APE that may be affected by this undertaking. On February 22, 2010, HDR, on behalf of CHPEI, distributed a letter to state and federal agencies, NGOs, Indian tribes, and other potential stakeholders with a prospective interest in the Project's potential effects on cultural and historic resources. The letter provided an overview of the proposed Project and included a request for additional information. The letter also described the need for additional studies to identify historic properties within the Project's vicinity and to determine the Project's potential effects on these resources.

CHPEI subsequently completed a cultural resources screening report that was distributed to resource agencies, Indian tribes, and other stakeholders on April 9, 2010. The report, entitled: *Pre-Phase IA Cultural Resources Screening Report, Champlain Hudson Power Express, Lake Champlain to Long Island*, was prepared by Hartgen Archeological Associates, Inc. (HAA, Inc.) of Albany, New York, under the direction of HDR. The screening report was developed through documentary research, including a review of information collected from the NYSHPO, the New York State Department of Environmental Conservation, the Lake Champlain Maritime Museum, and the New York State Museum. The pre-fieldwork report provided details concerning previously reported archaeological and historic resources within the Project's vicinity, as well as information regarding those resources that are potentially located within or immediately adjacent to the transmission cable corridor proposed at that time.

Based on discussions with the NYSHPO, CHPEI subsequently prepared a Phase IA literature review and archaeological sensitivity assessment of the Project's prospective APE. The Phase IA literature review and archaeological sensitivity assessment included nearly 400 linear miles of diverse environments in New York State and a proposed terminus in Connecticut. The resulting report, entitled *Phase IA Literature Review and Archaeological Sensitivity Assessment, Champlain Hudson Power Express*, was distributed to the NYSHPO, Indian tribes, and other stakeholders on September 3, 2010. The Phase IA report presented an assessment of the archaeological sensitivity and potential of the Project's prospective APE. The report also included detailed recommendations regarding additional Phase IB testing along the proposed transmission cable alignment. The Study Plan included as Appendix 1 of the Phase IA report described the recommended testing strategy for each section of the Project's proposed alignment. The testing strategy proposed in the Study Plan was developed through initial, informal consultation and discussions with the NYSHPO. The NYSHPO reviewed the Phase IA report and concurred with the methodologies proposed for the Phase IB studies (with minor modifications) in a letter dated March 14, 2010. CHPEI subsequently modified the Project's proposed alignment to avoid environmentally sensitive

areas and other resources and to remove the sections of the Project's alignment extending into Connecticut from further consideration.

At the request of CHPEI, HAA, Inc. completed Phase IB archaeological field investigations in 2010 that included subsurface testing along approximately 66 miles of the Project's proposed alignment (as proposed in August 2010) following the Canadian Pacific (CP) Railway right-of-way (ROW). The CP ROW segment of the Project investigated during 2010 segment begins at a point in Whitehall, New York, 1,850 feet north of the Poultney Street overpass, and ends at a point 197 feet southwest of the Princetown Road overpass in Rotterdam, New York. Testing indicated significant prior disturbance associated with construction of the railroad. A total of 11 archaeological sites were identified within the prospective APE. At CHPEI's request, HAA conducted Phase II archaeological site evaluations of these 11 sites to provide additional information suitable for the NYSHPO to make a determination of NRHP eligibility. Of the 11 sites, one was recommended as eligible for the NRHP, and three were recommended for avoidance or additional archaeological investigations. The results of the Phase IB and Phase II investigations were presented in HAA, Inc.'s June 2012 report, entitled *Phase IB Archaeological Field Reconnaissance and Phase II Archaeological Site Evaluation, Champlain Hudson Power Express, Canadian Pacific Railway Segment*. The Phase IB report was submitted in draft form to the NYSHPO for review in July 2012. The NYSHPO provided comments concurring with the recommendations and findings of the draft report.

In 2012, HAA, Inc. conducted an addendum Phase IA literature review and archaeological sensitivity assessment to provide supplemental information to assist the DOE in identifying reported archeological sites, historic properties, and previously completed archeological investigations along new sections of the Project's alignment that were not considered in the 2010 Phase IA report. As presented in the Joint Proposal, modifications were made to the original terrestrial portion of the Project's route along approximately 71.2 linear miles. These modifications include slight offsets from the original alignments (Rotterdam-Selkirk and Hell Gate Bypass) and three new sections (NY Route 22 from Dresden to Whitehall, Selkirk-Cementon, and Haverstraw Bay). The results of the addendum Phase IA study are presented in HAA, Inc.'s December 2012 report, entitled *Phase IA Literature Review and Archaeological Sensitivity Assessment Addendum, Champlain Hudson Power Express Terrestrial Route Modifications*.

#### IV. REVIEW AND CONSULTATION

As discussed above, the DOE is distributing the following reports to the Consulting Parties for consideration:

- *Phase IA Literature Review and Archaeological Sensitivity Assessment, Champlain Hudson Power Express;*
- *Phase IB Archaeological Field Reconnaissance and Phase II Archaeological Site Evaluation, Champlain Hudson Power Express, Canadian Pacific Railway Segment; and*
- *Phase IA Literature Review and Archaeological Sensitivity Assessment Addendum, Champlain Hudson Power Express Terrestrial Route Modifications.*

A Phase IA literature review and archaeological sensitivity assessment has been conducted for the terrestrial portions of the Project's APE. Phase IB and Phase II studies have been conducted along 66 miles of the 142-mile-long overland route. This represents approximately 46 percent of the terrestrial portion of the Project.

The DOE intends to develop a PA pursuant to 36 CFR § 800.14(b) to resolve the proposed Project's potential effects on historic properties. The PA will be developed in consultation with the Consulting Parties, the public, and other interested parties, as appropriate. The PA will require CHPEI to develop a

Cultural Resources Management Plan (CRMP) for this Project in consultation with the Consulting Parties prior to initiation of Project construction activities.

The DOE is seeking written comments from the Consulting Parties regarding the Project's APE and the enclosed reports. We are also seeking your views regarding the development of a PA for this Project that will resolve any adverse effects on historic properties. We respectfully request that the Consulting Parties provide written comments on the enclosed reports, the APE, and any views regarding the development of a PA for this Project within 30 days of this letter (June 13, 2013). The DOE intends to hold a meeting or conduct a conference call with the Consulting Parties to discuss the enclosed reports, the Project's APE, and the development of a PA during the 30-day review period. Additional information regarding this proposed meeting will be distributed to the Consulting Parties within the next few weeks. Should you have any additional questions or comments regarding the Project, please feel free to contact me directly at any time at [Brian.Mills@hq.DOE.gov](mailto:Brian.Mills@hq.DOE.gov), or by phone at (202) 586-8267.

Very truly yours,



Mr. Brian Mills  
National Electricity Delivery Division  
Office of Electricity Delivery and  
Energy Reliability  
U.S. Department of Energy

Cc: L. Jackson (DOE)  
G. Lockard (HDR EOC)  
R. Quiggle (HDR)



**APPENDIX A**  
**Champlain Hudson Power Express Transmission Line Project**  
**Consulting Parties**  
**Distribution List**

Franklin Keel, Regional Director  
U.S. Bureau of Indian Affairs  
Eastern Region Office  
545 Marriott Drive, Suite 700  
Nashville, TN, 37214

Charlene Dwin Vaughn, Assistant Director  
Advisory Council on Historic Preservation  
Office of Federal Agency Programs  
Old Post Office Building  
1100 Pennsylvania Avenue NW, Suite 803  
Washington, DC 2004

Rose Harvey, Commissioner  
New York State Office of Parks, Recreation and  
Historic Preservation  
Albany, NY 12238

Diane Rosen, Regional Director  
U.S. Bureau of Indian Affairs  
Midwest Region Office  
Norman Pointe II Building  
5600 W. American Boulevard, Suite 500  
Bloomington, MN 55347

Lee Webb  
Advisory Council on Historic Preservation  
Office of Federal Agency Programs  
Old Post Office Building  
1100 Pennsylvania Avenue NW, Suite 803  
Washington, DC 2004

Ruth Pierpont  
Deputy Commissioner/Deputy SHPO  
New York State Historic Preservation Office  
Peebles Island Resource Center  
Delaware Avenue  
Cohoes, NY 12047

Dan Deerinwater, Regional Director  
U.S. Bureau of Indian Affairs  
Southern Plains Region Office  
WCD Office Complex  
P.O. Box 368  
Anadarko, OK 73005

Stephen A. Ryba  
Regulatory, Western Section  
NY District U.S. Army Corps of Engineers  
26 Federal Plaza, Room 1937  
New York, NY 10278

John Bonafide, Director  
Bureau of Technical Preservation Services  
New York State Historic Preservation Office  
Peebles Island Resource Center  
Delaware Avenue  
Cohoes, NY 12047

Arnold Printup  
Saint Regis Mohawk Tribe  
Tribal Historic Preservation Office  
412 State Route 37  
Akwesasne, NY 13655

Mary K. (Missy) Morrison  
Resource Planning Specialist, External Review  
Coordinator  
National Park Service, Northeast Region  
Division of Resource Planning and Compliance  
200 Chestnut Street  
Philadelphia, PA 19106

Nancy Herter  
Program Leader/Native American Liaison  
New York State Historic Preservation Office  
Peebles Island Resource Center  
Delaware Avenue  
Cohoes, NY 12047

Kerry Holton, President  
Delaware Nation  
P.O. Box 825  
Anadarko, OK 73005

Robert Chicks, President  
Stockbridge Munsee Community of Wisconsin  
N8476 Mo He Con Nuck Road  
Bowler, WI 84416

Brian Yates  
New York State Historic Preservation Office  
Peebles Island Resource Center  
Delaware Avenue  
Cohoes, NY 12047

Randy King, Chairperson  
Shinnecock Indian Nation  
P.O. Box 5006  
Southampton, NY 11969

Donald Jessome, MBA, P.Eng  
President and CEO  
Transmission Developers, Inc.  
600 Broadway  
Albany, NY 12207

William Helmer, Esq.  
Sr. Vice President, General Counsel, and Secretary  
Transmission Developers, Inc.  
600 Broadway  
Albany, NY 12207

# Stockbridge-Munsee Tribal Historic Preservation Office

Sherry White - Tribal Historic Preservation Officer  
W13447 Camp 14 Road  
P.O. Box 70  
Bowler, WI 54416

Date 5/30/13  
Project Number Champlain Hudson Power Express  
TCNS Number \_\_\_\_\_  
Company Name Department of Energy

We have received your letter for the above listed project. Before we can process the request we need more information. The additional items needed are checked below.

## Additional Information Required:

- Site visit by Tribal Historic Preservation Officer
- Archeological survey, Phase 1
- Colored maps
- Pictures of the site
- Any reports the State Historic Preservation Office may have
- Review fee of \$300.00 must be included with letter
- Has site been previously disturbed, please explain what the use was and when it was disturbed

## After reviewing your letter:

- We are in the process of gathering more information on this site and will respond to your project request once all information has been gathered.
- This project has the potential to affect a Mohican cultural site, please contact us
- This project is not within Mohican area of interest
- This project is within Mohican territory, but we are not aware of any cultural site within the project area.

Additional comments

Please provide us with any documents.  
We currently have the Phase 1A 1A addendum  
Phase 1B and Phase 2 Reports

Should this project inadvertently uncover a Native American site, we require you to halt all construction and notify the Stockbridge-Munsee Tribe immediately.

Please do not resubmit projects for changes that are not ground disturbance

*Sherry White*

Sherry White, Tribal Historic Preservation Officer

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**Department of Energy**  
Washington, DC 20585

July 12, 2013

Paula Pechonick, Chief  
Delaware Tribe of Indians  
170 N.E. Barbara  
Bartlesville, OK 74006

**SUBJECT: Proposed Champlain Hudson Power Express Transmission Line Project**

Dear Ms. Pechonick:

Champlain Hudson Power Express, Inc. (CHPEI) has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the portions of the proposed Champlain Hudson Power Express Transmission Line Project across the U.S.-Canada border in northeastern New York State. In considering a Presidential Permit for the Project, the DOE has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA).<sup>a</sup> Section 106 of the NHPA (Section 106) directs federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. With this letter, the DOE is formally inviting the Delaware Tribe of Indians to participate in the conduct of our ongoing analysis of potential environmental impacts of this undertaking and to formally consult with us pursuant to Section 106 and its implementing regulations at 36 CFR Part 800. This letter also represents consultation with your office regarding the proposed Area of Potential Effects (APE) for this Project, the attached Cultural Resources Study Reports, and the proposed development of a Programmatic Agreement (PA) to address potential adverse effects of the Project on historic properties.

**I. BACKGROUND**

CHPEI proposes to construct the Project to connect renewable sources of power generation in central and eastern Canada with the New York City load center. CHPEI's application for a Presidential Permit was submitted to the DOE on January 27, 2010. CHPEI subsequently modified its application on August 6, 2010; July 7, 2011; and February 28, 2012. Settlement discussions conducted under the New York State Public Service Commission's Article VII process from November 2010 through February 2012 resulted in development of a Joint Proposal that was signed by seven New York State agencies, three non-governmental organizations

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<sup>a</sup> 16 USC 470 *et seq.*

(NGO), the City of New York, and the City of Yonkers. The Joint Proposal describes the route currently under evaluation by the DOE and other parties in the EIS.

The proposed Project under evaluation by the DOE would consist of a 1,000-megawatt (MW) underwater/underground high-voltage direct current (HVDC) controllable transmission system extending from the Canadian Province of Quebec to New York City. From the international border between the United States and Canada, two cables (consisting of a single bipole) would extend south to an HVDC converter station near Luyster Creek, north of 20th Avenue in Astoria, Queens. The converter station would be constructed on land that is currently owned by Consolidated Edison Company of New York, Inc. (ConEd).

From the Luyster Creek converter station, high-voltage alternating current (HVAC) cables would extend through Astoria, Queens, for a distance of approximately 3 miles to ConEd's Rainey Substation. In total, approximately 333 miles of proposed transmission cables would be located within the United States. CHPEI would not own or operate the Canadian portion of the transmission cables.

To the extent possible, CHPEI proposes to bury the transmission cable within existing waterways or transportation rights-of-way (ROW). CHPEI believes that this approach will minimize the visual and landscape impacts associated with traditional overhead transmission lines, while simultaneously providing the additional capacity required to meet the increasing clean energy demands of the greater New York City metropolitan area.

The ACHP's regulations at 36 CFR Part 800-Protection of Historic Properties define how federal agencies meet their statutory responsibilities pursuant to Section 106. The process described in 36 CFR Part 800 is intended to accommodate historic preservation concerns with the needs of federal undertakings through a process of consultation among agency officials, federally recognized Indian tribes, State Historic Preservation Officers (SHPO), Tribal Historic Preservation Officers, and other parties, including the public, as appropriate.

By letter dated January 13, 2011, the DOE formally initiated the Section 106 consultation process with the ACHP, New York SHPO (NYSHPO), Delaware Nation, St. Regis Mohawk Tribe, Stockbridge-Munsee Community, and the U.S. Bureau of Indian Affairs (BIA) (collectively the "Consulting Parties") regarding the Project. Specifically, we invited the Consulting Parties to participate in the conduct of our ongoing analysis of potential environmental impacts of this undertaking and to formally consult with us pursuant to Section 106 and its implementing regulations at 36 CFR Part 800. By letter dated November 20, 2012, the DOE also invited the Shinnecock Indian Nation to participate as a Consulting Party.

Based on subsequent consultation with BIA, the DOE has also identified the Delaware Tribe of Indians as an Indian tribe recognized and eligible to receive services from the BIA that may have a potential interest in the Project's effects on historic properties. Therefore, we are inviting the Delaware Tribe of Indians to participate as a Consulting Party and to formally consult with us regarding this undertaking pursuant to Section 106.

The DOE has determined that an Environmental Impact Statement (EIS) is the appropriate level of review under the National Environmental Policy Act (NEPA)<sup>b</sup> for the proposed Project, as

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<sup>b</sup> 42 USC 4321-4347

was documented in our June 18, 2010 Notice of Intent (NOI) to prepare an EIS (75 Federal Register [FR] 34720) and the amended NOI issued on April 30, 2012 (77 FR 10304). The NOI, and amended NOI, along with background information, an opportunity to subscribe to our mailing list, and more, are available on our EIS-specific website at <http://www.chpexpresseis.org>.

In accordance with 36 CFR § 800.2(a)(3), the DOE has authorized our contractor, HDR Environmental, Operations and Construction, Inc. (HDR EOC), to prepare the EIS, including the analysis of the Project's potential for adverse effects on cultural resources, including historic properties as defined by Section 106 of the NHPA and its implementing regulations (36 CFR Part 800). Specifically, we have designated Dr. Greg Lockard, RPA of HDR EOC as the point-of-contact for preparing this information on behalf of the DOE. He can be reached at (571) 327-5815 or by e-mail at [Gregory.Lockard@hdrinc.com](mailto:Gregory.Lockard@hdrinc.com). Coordination of consultation activities under the Section 106 process will be completed by Mr. Robert Quiggle, RPA, of HDR Engineering, Inc., who is working on behalf of CHPEI. Mr. Quiggle can be contacted at (315) 414-2216 or by e-mail at [Robert.Quiggle@hdrinc.com](mailto:Robert.Quiggle@hdrinc.com). As provided in 36 CFR Part 800, the DOE remains legally responsible for findings and determinations and for the DOE's government-to-government relationships with Indian tribes.

## **II. AREA OF POTENTIAL EFFECTS**

The DOE has defined a proposed APE that includes the geographic area or areas within which the Project may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE includes all areas along the transmission cable corridor where ground-disturbing activities will be conducted. The APE will also include areas outside the transmission cable corridor, including the converter station site, the HVAC cable alignment, transmission interconnection sites, laydown areas, access roads, and other locations that may be affected by Project construction and operations. Additionally, the APE will take into account standing historic properties (i.e., buildings, structures, individual objects, and districts) that may be indirectly affected by the use of heavy equipment, particularly along the overland sections of the Project's proposed route.

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LOCATION, DISTANCE, AND INSTALLATION METHODS FOR SECTIONS OF THE  
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In total, the Project's APE includes a 50-foot-wide corridor extending along the Project's 333-mile-long alignment from the U.S./Canadian border to ConEd's Rainey Substation. The approximate area of the APE is 20,200 acres.

On November 20, 2012, the DOE invited the Consulting Parties to participate in a consultation meeting to discuss the APE for the Project. The meeting was held on November 28, 2012 in Albany, New York, and a teleconference line was made available to those Consulting Parties unable to attend in person. The ACHP, NYSHPO, and DOE participated in the consultation meeting.

### **III. CULTURAL RESOURCES STUDIES**

Pursuant to 36 CFR § 800.4, CHPEI has initiated cultural resource studies to assist the DOE and other federal agencies in identifying historic properties that may be affected by the Project. By letter dated May 14, 2013, the DOE distributed the following cultural resources study reports to



the ACHP, (NYSHPO), Delaware Nation, St. Regis Mohawk Tribe, Stockbridge-Munsee Community, Shinnecock Indian Nation, and the BIA:

- *Phase IA Literature Review and Archaeological Sensitivity Assessment, Champlain Hudson Power Express;*
- *Phase IB Archaeological Field Reconnaissance and Phase II Archaeological Site Evaluation, Champlain Hudson Power Express, Canadian Pacific Railway Segment; and*
- *Phase IA Literature Review and Archaeological Sensitivity Assessment Addendum, Champlain Hudson Power Express Terrestrial Route Modifications.*

At this time, the DOE is transmitting a copy of the above-referenced study reports to the Delaware Tribe of Indians. Each of these studies is described below.

Early in the permitting process CHPEI initiated cultural resources studies and informal consultation to identify historic properties within the Project's prospective area of potential APE that may be affected by this undertaking. On February 22, 2010, HDR, on behalf of CHPEI, distributed a letter to state and federal agencies, NGOs, Indian tribes, and other potential stakeholders with a prospective interest in the Project's potential effects on cultural and historic resources. The letter provided an overview of the proposed Project and included a request for additional information. The letter also described the need for additional studies to identify historic properties within the Project's vicinity and to determine the Project's potential effects on these resources.

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consultation and discussions with the NYSHPO. The NYSHPO reviewed the Phase IA report and concurred with the methodologies proposed for the Phase IB studies (with minor modifications) in a letter dated March 14, 2010. CHPEI subsequently modified the Project's proposed alignment to avoid environmentally sensitive areas and other resources and to remove the sections of the Project's alignment extending into Connecticut from further consideration.

At the request of CHPEI, HAA, Inc. completed Phase IB archaeological field investigations in 2010 that included subsurface testing along approximately 66 miles of the Project's proposed alignment (as proposed in August 2010) following the Canadian Pacific (CP) ROW. The CP ROW segment of the Project investigated during 2010 segment begins at a point in Whitehall, New York, 1,850 feet north of the Poultney Street overpass, and ends at a point 197 feet southwest of the Princetown Road overpass in Rotterdam, New York. Testing indicated significant prior disturbance associated with construction of the railroad. A total of 11 archaeological sites were identified within the prospective APE. At CHPEI's request, HAA conducted Phase II archaeological site evaluations of these 11 sites to provide additional information suitable for the NYSHPO to make a determination of NRHP eligibility. Of the 11 sites, one was recommended as eligible for the NRHP, and three were recommended for avoidance or additional archaeological investigations. The results of the Phase IB and Phase II investigations were presented in HAA, Inc.'s June 2012 report, entitled *Phase IB Archaeological Field Reconnaissance and Phase II Archaeological Site Evaluation, Champlain Hudson Power Express, Canadian Pacific Railway Segment*. The Phase IB report was submitted in draft form to the NYSHPO for review in July 2012. The NYSHPO provided comments concurring with the recommendations and findings of the draft report.

In 2012, HAA, Inc. conducted an addendum Phase IA literature review and archaeological sensitivity assessment to provide supplemental information to assist the DOE in identifying reported archeological sites, historic properties, and previously completed archeological investigations along new sections of the Project's alignment that were not considered in the 2010 Phase IA report. As presented in the Joint Proposal, modifications were made to the original terrestrial portion of the Project's route along approximately 71.2 linear miles. These modifications include slight offsets from the original alignments (Rotterdam-Selkirk and Hell Gate Bypass) and three new sections (NY Route 22 from Dresden to Whitehall, Selkirk-Cementon, and Haverstraw Bay). The results of the addendum Phase IA study are presented in HAA, Inc.'s December 2012 report, entitled *Phase IA Literature Review and Archaeological Sensitivity Assessment Addendum, Champlain Hudson Power Express Terrestrial Route Modifications*.

#### IV. REVIEW AND CONSULTATION

As discussed above, the DOE is distributing the following reports to the Delaware Tribe of Indians for consideration:

- *Phase IA Literature Review and Archaeological Sensitivity Assessment, Champlain Hudson Power Express;*
- *Phase IB Archaeological Field Reconnaissance and Phase II Archaeological Site Evaluation, Champlain Hudson Power Express, Canadian Pacific Railway Segment; and*
- *Phase IA Literature Review and Archaeological Sensitivity Assessment Addendum, Champlain Hudson Power Express Terrestrial Route Modifications.*

A Phase IA literature review and archaeological sensitivity assessment has been conducted for the terrestrial portions of the Project's APE. Phase IB and Phase II studies have been conducted along 66 miles of the 142-mile-long overland route. This represents approximately 46 percent of the terrestrial portion of the Project.

The DOE intends to develop a PA pursuant to 36 CFR § 800.14(b) to resolve the proposed Project's potential effects on historic properties. The PA will be developed in consultation with the Consulting Parties, the public, and other interested parties, as appropriate. The PA will require CHPEI to develop a Cultural Resources Management Plan (CRMP) for this Project in consultation with the Consulting Parties prior to initiation of Project construction activities.

The DOE is seeking written comments from the Delaware Tribe of Indians regarding the Project's APE and the enclosed reports. We are also seeking your views regarding the development of a PA for this Project that will resolve any adverse effects on historic properties. We respectfully request that the Delaware Tribe of Indians provide written comments on the enclosed reports, the APE, and any views regarding the development of a PA for this Project within 30 days of this letter (August 9, 2013). The DOE intends to hold a meeting or conduct a conference call with the Consulting Parties to discuss the enclosed reports, the Project's APE, and the development of a PA. Additional information regarding this proposed meeting will be distributed to the Consulting Parties within the next few weeks. Should you have any additional questions or comments regarding the Project, please feel free to contact me directly at any time at [Brian.Mills@hq.DOE.gov](mailto:Brian.Mills@hq.DOE.gov), or by phone at (202) 586-8267.

Very truly yours,



Mr. Brian Mills  
National Electricity Delivery Division  
Office of Electricity Delivery and  
Energy Reliability  
U.S. Department of Energy

Cc: L. Jackson (DOE)  
G. Lockard (HDR EOC)  
R. Quiggle (HDR)

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**Department of Energy**  
Washington, DC 20585

July 12, 2013

**TO: Consulting Parties**

**SUBJECT: Proposed Champlain Hudson Power Express Transmission Line Project**

Dear Consulting Parties:

Champlain Hudson Power Express, Inc. has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the portions of the proposed Champlain Hudson Power Express Transmission Line across the U.S.-Canada border in northeastern New York State. In considering a Presidential Permit for the Project, the DOE has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA).<sup>1</sup> Section 106 of the NHPA (Section 106) directs federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment.

The DOE formally initiated the Section 106 consultation process with the ACHP, the New York State Historic Preservation Officer (NYSHPO), the Delaware Nation, the St. Regis Mohawk Tribe, the Stockbridge-Munsee Community, the Shinnecock Indian Nation, the Delaware Tribe of Indians, and the U.S. Bureau of Indian Affairs (collectively the "Consulting Parties") regarding the Project (see Attachment A to this letter). Specifically, the DOE invited the Consulting Parties to participate in the analysis of potential environmental impacts of this Project and to formally consult with the agency pursuant to Section 106 of the NHPA and its implementing regulations at 36 CFR Part 800.

At this time, we would like to invite the Consulting Parties to participate in an upcoming consultation meeting on July 31, 2013. The purpose of this meeting will be to discuss the proposed Area of Potential Effects (APE) for this Project, the Cultural Resources Study Reports, and the proposed development of a Programmatic Agreement (PA) to address potential adverse effects of the Project on historic properties. This Section 106 consultation meeting will be held from 9:00 AM–12:00 PM (EST) at the offices of Hiscock and Barclay, located at 80 State Street (6th floor) in Albany, New York 12207. Those wishing to participate but unable to attend in person are invited to participate via conference call. The dial-in number for the call will be 866-994-6437. Please enter conference code 989-014-9046# when prompted.

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<sup>1</sup> 16 USC 470 *et seq.*

The DOE has established a website to provide information regarding the ongoing environmental review of this Project. Additional background information regarding the Project, an opportunity to subscribe to our mailing list, and more, are available at <http://www.chpexpresseis.org>.

Please feel free to contact me directly at any time at [Brian.Mills@hq.DOE.gov](mailto:Brian.Mills@hq.DOE.gov), or by phone at (202) 586-8267. I look forward to meeting with you on November July 31, 2013.

Very truly yours,

A handwritten signature in black ink, appearing to read "B. Mills". The signature is fluid and cursive, with a long horizontal stroke extending to the left.

Mr. Brian Mills  
National Electricity Delivery Division  
Office of Electricity Delivery and  
Energy Reliability  
U.S. Department of Energy

Cc: L. Jackson (DOE)  
G. Lockard (HDR EOC)  
R. Quiggle (HDR)

**APPENDIX A**  
**Champlain Hudson Power Express Transmission Line Project**  
**Consulting Parties**  
**Distribution List**

Franklin Keel, Regional Director  
U.S. Bureau of Indian Affairs  
Eastern Region Office  
545 Marriott Drive, Suite 700  
Nashville, TN, 37214

Diane Rosen, Regional Director  
U.S. Bureau of Indian Affairs  
Midwest Region Office  
Norman Pointe II Building  
5600 W. American Boulevard, Suite 500  
Bloomington, MN 55347

Dan Deerinwater, Regional Director  
U.S. Bureau of Indian Affairs  
Southern Plains Region Office  
WCD Office Complex  
P.O. Box 368  
Anadarko, OK 73005

Arnold Printup  
Saint Regis Mohawk Tribe  
Tribal Historic Preservation Office  
412 State Route 37  
Akwesasne, NY 13655

Mark Garrow, Chief  
Randy Hart, Chief  
Ronald La France, Chief  
St. Regis Mohawk Tribe  
412 State Route 37  
Akwesasne, NY 13655

Randy King, Chairperson  
Shinnecock Indian Nation  
P.O. Box 5006  
Southampton, NY 11969

Charlene Dwin Vaughn, Assistant Director  
Advisory Council on Historic Preservation  
Office of Federal Agency Programs  
Old Post Office Building  
1100 Pennsylvania Avenue NW, Suite 803  
Washington, DC 2004

Lee Webb  
Advisory Council on Historic Preservation  
Office of Federal Agency Programs  
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Washington, DC 2004

Robert Chicks, President  
Stockbridge Munsee Community of Wisconsin  
N8476 Mo He Con Nuck Road  
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Mary K. (Missy) Morrison  
Resource Planning Specialist, External Review  
Coordinator  
National Park Service, Northeast Region  
Division of Resource Planning and Compliance  
200 Chestnut Street  
Philadelphia, PA 19106

Sherry White  
Tribal Historic Preservation Officer  
Stockbridge Munsee Community of Wisconsin  
P.O. Box 70  
Bowler, WI 54416

Paula Pechonick, Chief  
Delaware Tribe of Indians  
170 N.E. Barbara  
Bartlesville, OK 74006

Rose Harvey, Commissioner  
New York State Office of Parks, Recreation and  
Historic Preservation  
Albany, NY 12238

Ruth Pierpont  
Deputy Commissioner/Deputy SHPO  
New York State Historic Preservation Office  
Peebles Island Resource Center  
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Cohoes, NY 12047

John Bonafide, Director  
Bureau of Technical Preservation Services  
New York State Historic Preservation Office  
Peebles Island Resource Center  
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Cohoes, NY 12047

Nancy Herter  
Program Leader/Native American Liaison  
New York State Historic Preservation Office  
Peebles Island Resource Center  
Delaware Avenue  
Cohoes, NY 12047

Brian Yates  
New York State Historic Preservation Office  
Peebles Island Resource Center  
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Cohoes, NY 12047

Kerry Holton, President  
Delaware Nation  
P.O. Box 825  
Anadarko, OK 73005



**Attachment: July 2013 Champlain Hudson Power Express  
Section 106 Consultation Meeting Presentation**

# Champlain Hudson Power Express

Section 106 Consultation Meeting



July 31, 2013



# Agenda

- Champlain Hudson Power Express Project
  - Project Overview
  - Regulatory Framework
- Cultural Resources
  - Regional Overview
  - Status of Cultural Resources Studies
- Next Steps
  - Programmatic Approach
  - Cultural Resources Management Plan
- Questions and Discussion

# Project Introduction

# Project Introduction

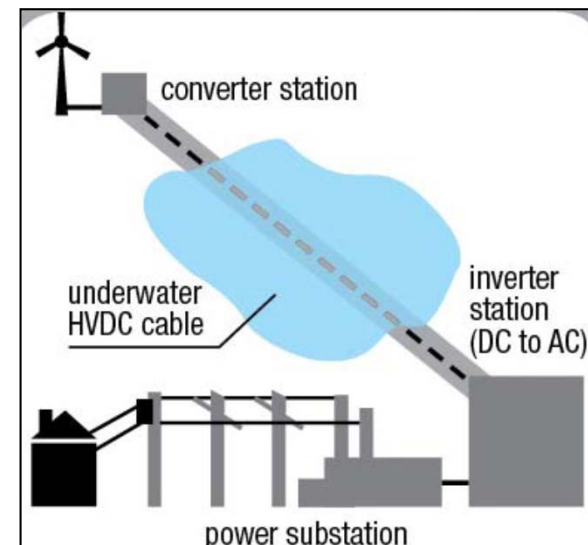
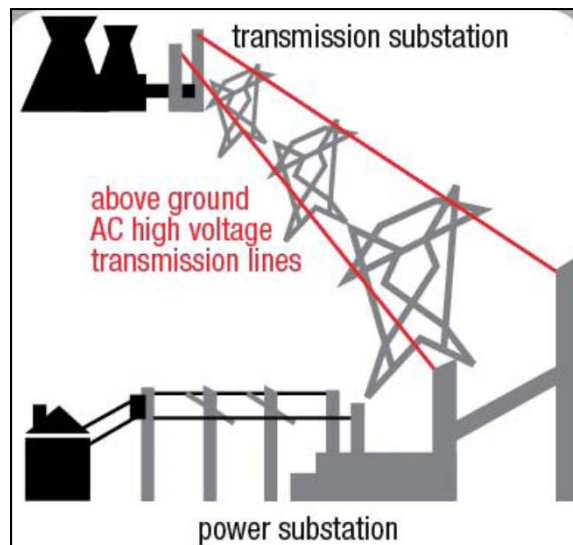
- Champlain Hudson Power Express, Inc. (CHPEI) has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the proposed Champlain Hudson Power Express Transmission Line Project (Project).
  - The proposed Project consists of a 1,000-megawatt (MW) high-voltage direct current (HVDC) Voltage Source Converter-controllable transmission system extending from the Canadian Province of Quebec to New York City.
  - CHPEI's application for a Presidential Permit was submitted to the DOE on January 27, 2010. CHPEI subsequently modified its application on August 6, 2010; July 7, 2011; and February 28, 2012.
  - The Project will bridge the gap between renewable sources of generation in Canada and the New York City load center.

# Project Introduction



# Project Introduction

- Selection of HVDC technology for this Project offers significant benefits over traditional alternating current (AC) transmission systems
  - HVDC technology allows high-voltage transmission over greater distances with minimal line loss and without generation of EMF.
  - CHPEI proposes to install the cables within waterways, and within the rights-of-way (ROW) of existing transportation infrastructure, including railroads and roadways.
  - This innovative routing will avoid the adverse impacts to viewscales associated with traditional transmission infrastructure.

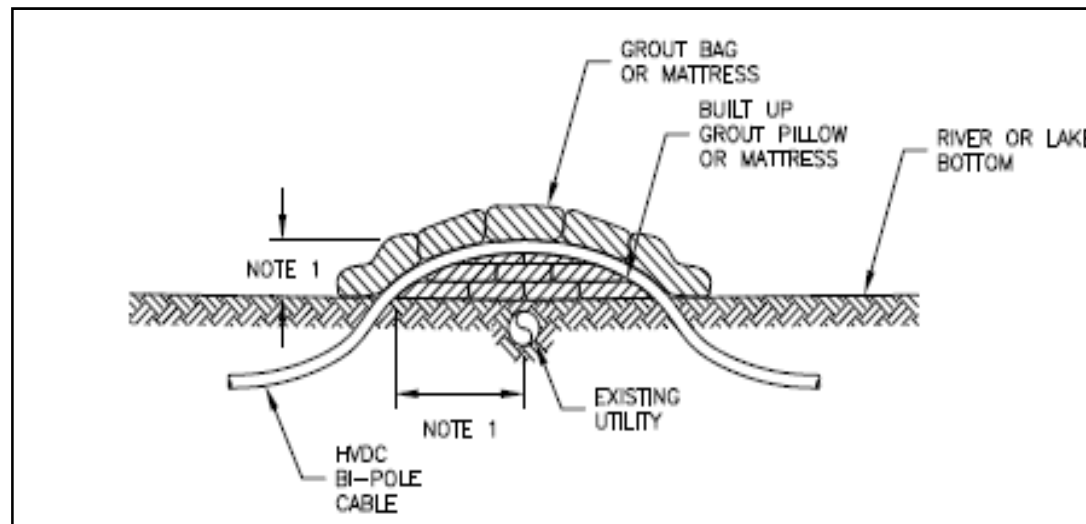
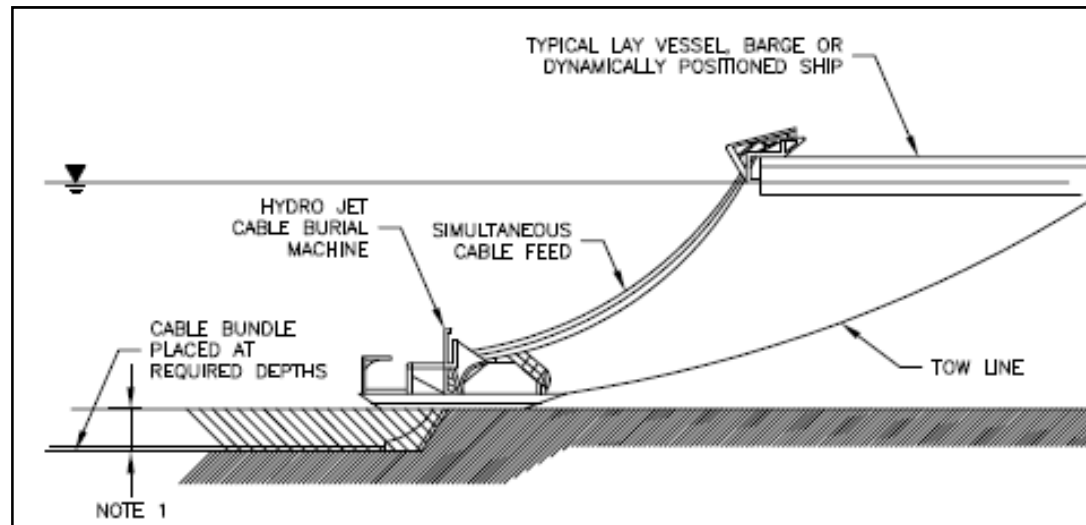


## Project Introduction

- From the international border between the United States and Canada, two cables (comprising a single bipole) would extend south approximately 330 miles to an HVDC Converter Station to be located near Luyster Creek, north of 20th Avenue in Astoria, Queens.
  - Where possible, the Project will be installed along existing waterways, including Lake Champlain, the Hudson River, the Harlem River, and the East River.
  - Installation within waterways will primarily be accomplished by jet plow.
  - Shear plow or remote-operated vehicles (ROV) may be used for installation in deeper waters.
  - Target burial depth is anticipated at 3-4 feet in Lake Champlain, 6 feet in the Hudson River, and various depths in the Harlem River. However, burial depth varies if conditions permit.
  - The maritime construction corridor is approximately 15 feet wide along lake/river bottoms.
  - If existing utilities or other infrastructure are present on the lake/river bottom, or if other conditions do not permit burial, the cable will be installed on the lake/river bottom and armored.



# Project Introduction



# Project Introduction

- The cables will follow an upland route when necessary to avoid environmentally sensitive areas or areas undergoing polychlorinated biphenyl (PCB) mitigation.
  - The upland sections of the Project will generally follow existing transportation infrastructure ROW, including:
    - Canadian Pacific (CP) Railway ROW
    - CSX Railroad ROW
    - New York State (NYS) Route 22
    - NYS Route 9
    - Surface Streets
  - CHPEI has also proposed to install cables via horizontal directional drilling (HDD) techniques to avoid impacts to Rockland Lakes State Park and Hook Mountain State Park
- Upland installation will generally use a cut-and-fill technique and will encompass an area within 12.5 feet from either side of the centerline. Burial depths will be approximately 3-5 feet.
- Transitions from marine to upland sections of the Project's route will be accomplished via HDD
- High-voltage AC cables will connect the Luyster Creek Converter Station to Consolidated Edison's Rainey Substation

# Project Introduction

Section	Distance	Description
US/Canadian border to Town of Dresden	101 miles	Marine installation within Lake Champlain
Town of Dresden to Village of Whitehall	11 miles	Upland installation within the ROW of NYS Route 22
Village of Whitehall to the City of Schenectady	65 miles	Upland installation primarily along CP ROW
City of Schenectady to the Town of Rotterdam	1.3 miles	Upland installation along surface streets and within CP ROW
Town of Rotterdam to the Town of Selkirk	24 miles	Upland installation primarily along CSX ROW
Town of Selkirk to Hamlet of Cementon	29 miles	Upland installation along CSX ROW
Hamlet of Cementon to Town of Stony Point	67.05 miles	Marine installation within Hudson River
Stony Point to point south of Rockland Lake State Park	7.66 miles	Upland installation including CSX ROW, NYS Route 9 and HDD beneath parkland
south of Rockland Lake State Park to Spuyten Duyvil	20.07 miles	Marine installation within Hudson River
Spuyten Duyvil to the Bronx	6.58 miles	Marine installation within Harlem River
Bronx to East River	1.1 miles	Upland installation primarily along railroad ROW
East River to Converter Station in Astoria, Queens	River crossing	Marine installation in East River
Converter Station to Rainey Substation	3 miles	HVAC installation along surface streets

## Project Introduction

- In addition to the Presidential Permit, the Project will require federal permits from the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act.
- The Project will also require a Certificate of Environmental Compatibility and Public Need from the NYS Public Service Commission (PSC) Pursuant to Article VII of the NYS Public Service Law. The Article VII Certificate was issued on April 18, 2013.
- Settlement discussions conducted from November 2010 through February 2012 resulted in development of a Joint Proposal that was signed by 7 NYS agencies, three non-governmental organizations (NGOs), the City of New York, and the City of Yonkers.
  - The Joint Proposal includes guidelines for the Environmental Management and Control Plan(s) (EM&CP) as well as Best Management Practices (BMP) for Project construction. Both the EM&CP and BMP guidance documents include provisions for addressing cultural resources.
  - The Joint Proposal also includes a proposed Water Quality Certification pursuant to Section 401 of the Clean Water Act.
  - The PSC approved the Joint Proposal in April 2013.



Cultural Resources

## Regulatory Overview

- In considering a Presidential Permit for the Project, the DOE has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA). Section 106 of the NHPA (Section 106) directs federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment.
  - The DOE is the lead federal agency for purposes of consultation under Section 106.
  - The Project corridor includes portions of southeastern New York, the Hudson River Valley, and the Lake Champlain regions that have a rich history dating from the precontact period through the 20<sup>th</sup> century.
  - Early in the permitting process CHPEI initiated cultural resources studies and informal consultation to identify historic properties within the Project's prospective area of potential effects (APE) that may be affected by this undertaking.

# Cultural Resources Studies

- CHPEI assembled a local and experienced team of archaeologists, architectural historians, and experts in maritime archaeology to lead the identification of historic properties.

HDR

**HARTGEN**

archeological associates inc



*Lake Champlain*  
**MARITIME MUSEUM**

HDR

## Cultural Resources Studies

- On February 22, 2010 CHPEI distributed a letter to state and federal agencies, NGOs, Indian tribes, and other potential stakeholders with a prospective interest in the Project's potential effects on cultural and historic resources.
- The letter provided an overview of the proposed Project and included a request for additional information. The letter also described the need for additional studies to identify historic properties within the Project's vicinity and to determine the Project's potential effects on these resources.
- CHPEI initiated informal consultation with the New York State Historic Preservation Officer (NYSHPO) in 2010 to discuss the Project and identify specific concerns.



# Cultural Resources Studies

- Cultural resources studies were initiated in 2010.
- The study team initially compiled information from a variety of resources:
  - New York State Museum and New York State Office of Parks, Recreation, and Historic Preservation (OPRHP) site files
  - Shipwreck data from the Lake Champlain Maritime Museum (LCMM)
  - Side scan sonar images of the Hudson River provided by the New York State Department of Environmental Conservation (NYSDEC)
  - Previous cultural resources studies conducted in the Project's vicinity
  - Information regarding properties listed in the National Register of Historic Places (NRHP) or determined eligible for the NRHP
  - Information regarding National Historic Landmarks within the Project's vicinity
  - Historic maps
  - Cultural contexts for the Project area
- This information was presented in the April 9, 2010 *Pre-Phase IA Cultural Resources Screening Report* which was distributed to NYSHPO, Indian tribes, and other parties.

## Cultural Resources Studies

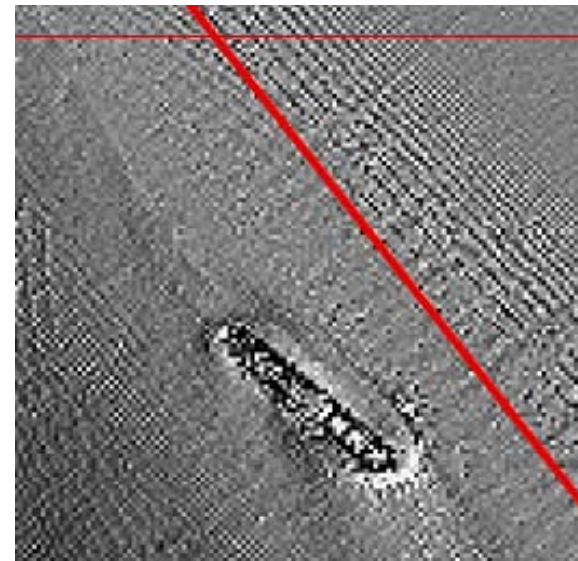
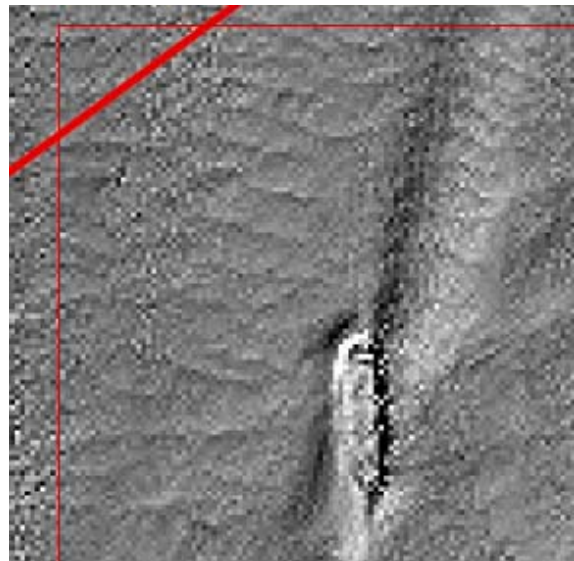
- CHPEI consulted with the NYSHPO to develop an approach to completing additional studies of the Project's prospective APE.
- A Phase IA Literature Review and Archaeological Sensitivity Assessment was prepared and distributed to the NYSHPO, Indian tribes, and other parties in September 2010. The Phase IA report included recommendations for additional studies.
  - Appendix A of the Phase IA report included a Study Plan that described the recommended testing strategy for each section of the Project's proposed alignment.
  - The testing strategy proposed in the Study Plan was developed through initial, informal consultation and discussions with the NYSHPO. The NYSHPO reviewed the Phase IA report and concurred with the methodologies proposed for the Phase IB studies (with minor modifications) in a letter dated March 14, 2011.

## Cultural Resources Studies

- Concurrent with the Phase IA study, CHPEI undertook additional analyses to identify potential maritime archaeological resources within or adjacent to the Project's alignment.
- The LCMM and Hartgen Archaeological Associates, Inc. (HAA) conducted a comprehensive review of side scan sonar data collected for the Project's maritime route to identify known shipwrecks, potential shipwrecks, and other anomalies that may represent cultural deposits.
- Maritime archaeological resources and anomalies were identified by the LCMM and HAA, Inc. through an analysis of side scan sonar data collected along the extent of proposed maritime sections of the Project's prospective APE.
  - The side scan sonar data was compared to information available from existing archaeological site files, historical records regarding shipwrecks, previous studies conducted by the LCMM and others within Lake Champlain and the Hudson River, and other sources of information regarding known, reported, or potential cultural resources within the Lake Champlain, Hudson River, Harlem River, and East River sections of the Project's APE.

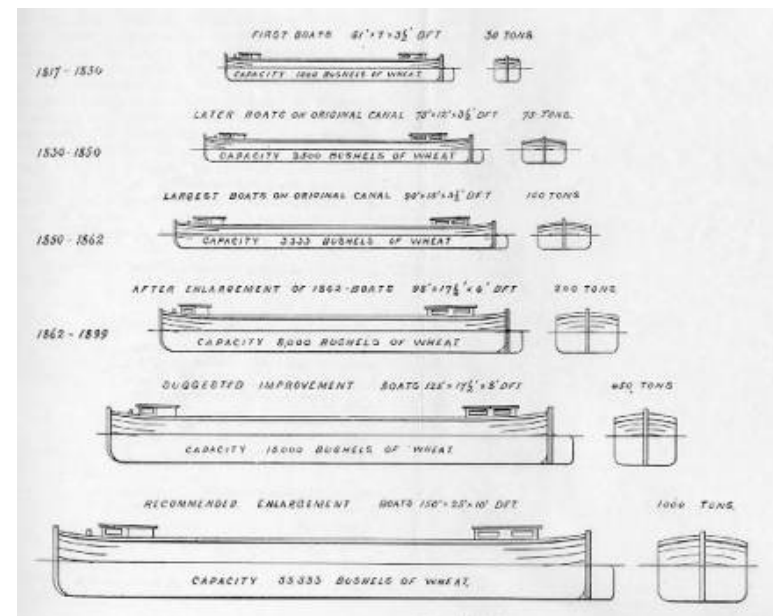
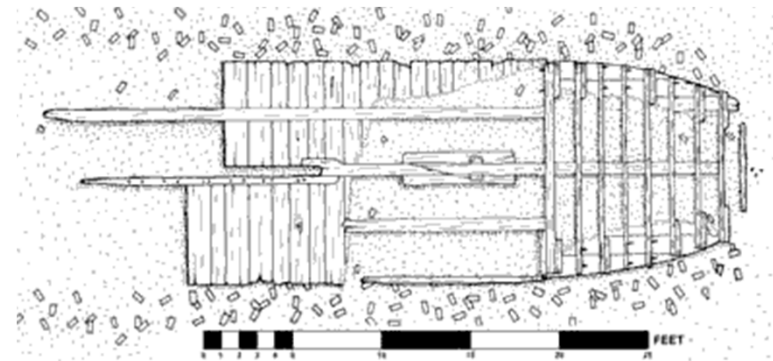
## Cultural Resources Studies

- The comprehensive analysis conducted by the LCMM and HAA, Inc. resulted in the development of a geographic information system (GIS) database of maritime archaeological resources and anomalies identified by the LCMM within approximately 300 meters (984 feet) of the Project's centerline.
- In 2011, modifications to the Project's alignment along an 80-kilometer (50-mile) segment of the proposed transmission cable corridor within the Hudson River required a reanalysis of side scan sonar data provided by the NYSDEC. This analysis of NYSDEC data identified maritime archaeological resources and anomalies and within 100 meters (328 feet) along sections of the Hudson River.



# Cultural Resources Studies

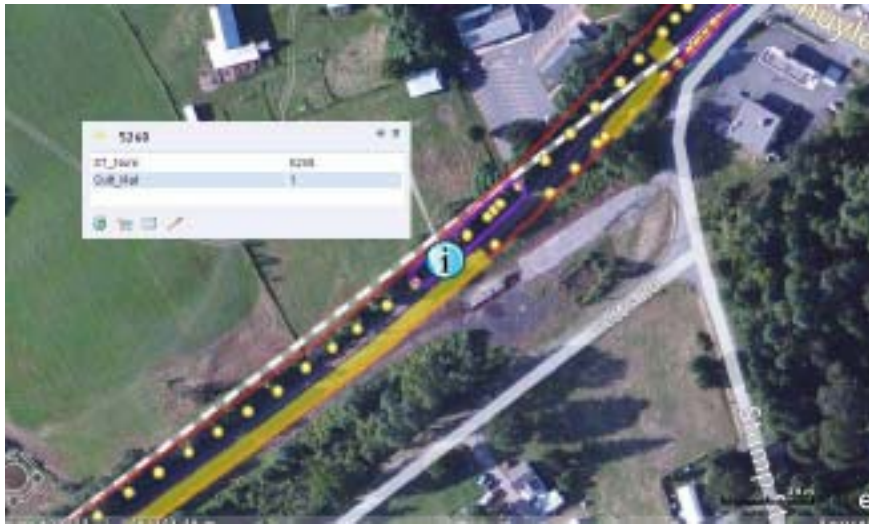
- CHPEI consulted with the NYSHPO to identify a suitable buffer distance for avoiding adverse effects on maritime archaeological resources.
- The NYSHPO determined that a 40-meter (131-foot) buffer from the APE was generally appropriate to avoid adverse Project-related effects on maritime archaeological resources.
  - NYSHPO noted that this buffer could be adjusted on a case-by-case basis depending on the nature of the identified resource, analyses conducted by the LCMM, and/or the sonar signature of the resource or anomaly.



## Cultural Resources Studies

- Based on the study methodology approved by the NYSHPO, CHPEI conducted Phase IB Archaeological Field Reconnaissance along portions of the Project's alignment in 2010.
  - HAA conducted subsurface testing along approximately 66 miles of the CP ROW.
  - Testing indicated significant prior disturbance associated with construction of the railroad.
  - A total of 11 archaeological sites were identified within the prospective APE.
  - At CHPEI's request, HAA conducted Phase II Archaeological Evaluations of these 11 sites to provide additional information suitable for the NYSHPO to make a determination of NRHP eligibility.
  - Of the 11 sites, 1 was recommended as eligible for the NRHP, and 3 were recommended for avoidance or additional archaeological investigations.
- The Phase IB report was submitted in draft form to the NYSHPO for review in July 2012. The NYSHPO provided comments concurring with the recommendations and findings of the draft report.

# Cultural Resources Studies



## Cultural Resources Studies

- In 2012, HAA conducted a Phase IA Addendum Study to identify reported archeological sites, historic properties, and previously completed archeological investigations along new sections of the Project's alignment that were not considered in the 2010 Phase IA report.

Route Segment	Approximate Length (miles)
NY Route 22 (Dresden to Whitehall)	11
Rotterdam to Selkirk (CSX Railroad ROW)	22
Selkirk to Cementon	29
Haverstraw Bay Bypass	8
Hell Gate Bypass	1.2
<b>Total</b>	<b>71.2 miles</b>



# Cultural Resources Studies

- Study Status
  - A complete Phase IA study of the Project’s entire terrestrial alignment has been completed. For this study, the Phase IA “study corridor” was developed in consultation with the NYSHPO and includes an area encompassing 500 feet on either side of the Project’s centerline (a total of 1,000 feet).
    - The broad study corridor assists in documenting the cultural setting and archaeological sensitivity of the Project Area.
  - Phase IB and Phase II studies have been conducted along 66 miles of the 142-mile long overland route. This represents approximately 46 percent of the terrestrial portion of the Project.
  - An analysis of previously reported shipwrecks, maritime archaeological sites, and side scan sonar data for the entire maritime portion of the Project’s alignment has been completed.

# Cultural Resources Studies

- Summary of Findings (Terrestrial Sections)
  - A total of 268 resources have been reported within the 1,000-foot-wide study corridor, including archaeological sites, properties listed in the NRHP, and properties previously determined eligible for the NRHP.
  - Of these, only 68 are located within 25 feet of the terrestrial sections Project’s centerline (12.5 feet on either side of the centerline).

## Reported Terrestrial Resources within 25 feet of the Project’s Centerline

Resource Type	Number
Archaeological Sites*	47
NRHP-eligible properties	13
NRHP-listed properties	8
National Historic Landmarks	0
<b>Total</b>	<b>68</b>

\*Represents reported number. Only 4 archaeological sites recommended as eligible or potentially eligible for the NRHP have been confirmed through field investigations

# Cultural Resources Studies

- Summary of Findings (Maritime Sections)
  - The NYSHPO has established a 40-meter buffer for avoidance around shipwrecks or anomalies.
  - CHPEI, HDR, and HAA reviewed shipwreck and anomaly data with the NYSHPO in September 2012 to identify shipwrecks and anomalies along the maritime sections of the route that may require avoidance or mitigation.
  - The buffer area for over 100 shipwrecks or anomalies may intersect with the prospective APE.
    - CHPEI's preference is to avoid these shipwrecks and/or anomalies. Additional side scan sonar data is currently being collected to identify certain anomalies and to determine if avoidance or mitigation of these is required.
    - CHPEI is currently assessing the engineering feasibility for avoidance, and has identified avoidance options for a majority of these resources in consultation with the NYSHPO.

# Cultural Resources Studies

- The DOE formally initiated consultation under Section 106 by letter dated January 13, 2011. The DOE has identified the following Consulting Parties:
  - ACHP
  - NYSHPO
  - St. Regis Mohawk Tribe
  - Delaware Nation
  - Stockbridge-Munsee Community
  - Shinnecock Indian Nation (November 20, 2012)
  - Delaware Tribe (July 12, 2013)
  - Bureau of Indian Affairs
- By letter dated May 14, 2013, the DOE initiated formal consultation with the Consulting Parties\* regarding the Project's APE.
  - The APE is defined to include a 25-foot area on either side of the Project's centerline.
  - The APE includes the construction corridor (approximately 12.5 feet on either side of the Project's centerline), as well as additional areas that may be necessary for laydown, staging, and to accommodate indirect effects.

\*Consultation with the Delaware Tribe regarding the APE was initiated on July 12, 2013

## Cultural Resources Studies

- The DOE distributed the following study reports to the Consulting Parties on May 14, 2013\*:
  - Phase IA Literature Review and Archaeological Sensitivity Assessment
  - Phase IB Archaeological Field Reconnaissance and Phase II Archaeological Site Evaluation, Canadian Pacific Railway Segment
  - Phase IA Literature Review and Archaeological Sensitivity Assessment Addendum
- To date, the DOE has not received any comments regarding the results or recommendations presented in these study reports.

\*The reports were distributed to the Delaware Tribe on July 12, 2013

## Next Steps

- The DOE currently intends to develop a Programmatic Agreement (PA) pursuant to 36 CFR Part 800.14(b) to address the proposed Project's potential effects on historic properties.
- A PA is appropriate for this undertaking:
  - Cultural resources studies are ongoing, but significant data characterizing historic properties within or potentially within the APE has been collected.
  - CHPEI anticipates that the DOE will issue a Presidential Permit prior to completion of all cultural resources studies, and therefore the effects on all properties cannot be fully determined prior to approval of this undertaking.
  - A PA is consistent with the provisions in the Joint Proposal, including the EM&CP and BMPs.
- The DOE will consult with the Consulting Parties to develop a PA.
- The PA will require the development of a Cultural Resources Management Plan (CRMP) for this Project in consultation with the Consulting Parties prior to the initiation of construction activities.
- A CRMP is also required under the Joint Proposal.

## Next Steps

- At minimum, the CRMP will address:
  - Completion of additional studies, as necessary, to assess potential Project effects
  - Control measures to avoid Project effects on identified archaeological resources.
  - The process for conducting additional evaluations, as necessary, to determine the NRHP eligibility of archaeological sites that cannot reasonably be avoided by Project construction activities.
  - Procedures for determining the appropriate measures to minimize or mitigate adverse effects on historic properties that cannot reasonably be avoided by Project construction activities.
  - Procedures for the unanticipated discovery of archaeological resources.
  - Procedures for the unanticipated discovery of human remains.
  - Identification and proposed treatment, avoidance, or mitigation of Project effects on properties of traditional religious or cultural significance.
  - Parties responsible for coordinating activities conducted under the CRMP, including coordinating consultation and maintenance of relevant records.
  - The use of qualified cultural resources professionals.
  - CHPEI staff/contractor training requirements.
  - Appropriate standards for cultural resources investigations.
  - Standards and processes for artifact curation and/or repatriation.
  - Procedures for amendment to the CRMP.
  - Consultation requirements and contacts.
  - Scheduling considerations.

# Questions/Discussion

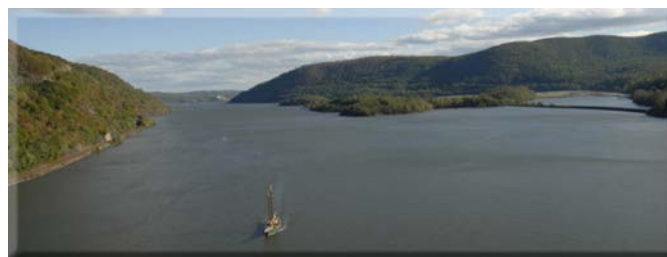






## APPENDIX K

### Visual and Recreational Resources along Proposed CHPE Project Route





## **Appendix K**

### **Visual and Recreational Resources along Proposed CHPE Project Route**

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The aesthetic and recreational resources found along the proposed CHPE Project route are described in the following tables:

- **Table K-1.** Lake Champlain Segment Recreational Activities
- **Table K-2.** Overland Segment Recreational Activities
- **Table K-3.** Hudson River Segment Recreation Activities
- **Table K-4.** New York City Metropolitan Area Segment Recreation Activities

**Table K-1. Lake Champlain Segment Recreational Activities**

<b>Aesthetic Resource</b>	<b>Milepost</b>	<b>Location</b>	<b>Resource Type</b>	<b>Recreational Facility/Activity</b>
Lakes to Locks Passage Scenic Byway	1 to 90	Byway follows Lake Champlain	National Scenic Byway	Boating, fishing, swimming, sailing, kayaking, canoeing, waterskiing, boating, golfing, hiking and biking trails, bird watching areas, cross-country skiing, ice fishing, ice skating, and snowshoeing (LCR 2012a, LCR 2012b).
Adirondack Park	1 to 145	Borders Lake Champlain, New York State Route 22, and CP railroad ROW	State Park	Boating, camping, picnicking, hiking, cycling, hunting, fishing, swimming, downhill and cross-country skiing, ice skating, and snowshoeing (ARTC 2012).
Kings Bay Wildlife Management Area	2 to 5	Kings Bay, NY	State Wildlife Management Area	Walking and hiking trails, hunting, fishing, and bird watching (NYSDEC 2012cc)
Point Au Roche State Park	17 to 19	Point Au Roche, NY	State Park	Swimming, boating, picnicking, hiking, biking, cross-country skiing, snowshoeing, ice fishing, sports fields, boat launches, and playgrounds (NYS OPRHP 2012e)
Valcour Island Primitive Area	28 to 30	Plattsburg, NY	State Nature and Historical Preserve	Hiking, wildlife viewing and hunting, bird watching (NYSDEC 2006b)
Schuyler Island Primitive Area	37 to 38	Port Douglass, NY	State Nature and Historical Preserve	Kayaking, camping, and hiking (ARTC 2012)
Split Rock Wild Forest	56 to 62	Westport, NY	State Nature and Historic Preserve	Hiking, camping, mountain biking, rock climbing, fishing, hunting, cross-country skiing, ice climbing, trapping, and snowmobiling (NYSDEC 2012dd)
Kingsland Bay State Park	57 to 58	Ferrisburg, VT	State Park	Canoeing, kayaking, swimming, fishing, sailing, picnicking, and hiking/walking (VTSP 2009a)

<b>Aesthetic Resource</b>	<b>Milepost</b>	<b>Location</b>	<b>Resource Type</b>	<b>Recreational Facility/Activity</b>
Button Bay State Park	63	Vergennes, VT	State Park	Swimming, picnicking, boating, fishing, sailing, and hiking (VTSP 2009b)
D.A.R. State Park	72	Chimney Point, VT	State Park	Camping, picnicking, hunting, and fishing (VTSP 2009c)
Crown Point Campground	73	Crown Point, NY	State Nature and Historical Preserve	Camping, boating, fishing, and picnicking (NYSDEC 2012ee)
Chimney Point State Historic Site	73	Chimney Point, VT	State Historic Site	Educational programs, walking tours, and a museum (VSHS 2012)
Crown Point State Historic Site	73 to 75	Crown Point, NY	State Park	Educational programs, biking, hiking, a museum, picnicking, and cross-country skiing (NYS OPRHP 2012a)
Putts Creek Wildlife Management Area	79	Putts Creek, NY	State Wildlife Management Area	Fishing, hiking, snowshoeing, cross-country skiing, bird watching, and hunting (NYSDEC 2012ff)
Lake George Wild Forest	93 to 94, 96 to 97	Putnam, NY	State Nature and Historical Preserve	Fishing, ice fishing, snowmobiling, camping, hiking/walking trails, picnicking, and horseback riding (NYSDEC 2012gg)

Sources: CHPEI 2010, NYSDEC 2012m, NPS 2012a, USDOT-FHWA 2012a

**Table K-2. Overland Segment Recreational Activities**

<b>Aesthetic Resource</b>	<b>Milepost</b>	<b>Location</b>	<b>Resource Type</b>	<b>Recreational Facility/Activity</b>
South Bay Boat Launch and Pier	110	Whitehall, NY	State Park	Fishing (NYSDEC 2012s)
Champlain Canalway Trail	112 to 135	Whitehall, NY to Fort Edward, NY	Local Park	Jogging and walking trails (CCTWG 2011)
McIntyre Park and Bradley Park	135	Fort Edward, NY	Local Park	Playground, picnicking, tennis courts, and sports fields (Village of Walden 2011)
Ganesvoort Town Park, Bertha Smith Park	141	Gansevoort, NY	Local Parks	Playground, picnicking, and sports fields (Northumberland 2006)
Wilton Wildlife Preserve and Park	145 to 146	Ballard Corners, NY	State Wildlife Management Area	Walking trails, science-based habitat restoration, management activities, and recreational opportunities for children and the general public (WWPP 2012)
Gavin Park	149	Saratoga Springs, NY	Local Park	Playground, gymnasium, sports fields, and tennis courts (Town of Wilton 2006)
Geyser Park	154	Saratoga Springs, NY	Local Park	
Saratoga Spa State Park	154 to 158	Saratoga Springs, NY	State Park	Biking, hiking, fishing, swimming, tennis, golf, snowshoeing, cross-country skiing and ice skating, museum/visitor center, playgrounds, and picnicking (NYS OPRHP 2012b).
Saratoga State Tree Nursery	156	Saratoga Springs, NY	State tree nursery	Tree nursery
Woods Hollow Nature Preserve	157	North Ballston Spa, NY	Local Park	Hiking trails, ice skating, and fishing (Town of Milton 2012)
William S. Kelley Park/Spensieri Park	158	North Ballston Spa, NY	Local Parks	Playgrounds and sports fields

<b>Aesthetic Resource</b>	<b>Milepost</b>	<b>Location</b>	<b>Resource Type</b>	<b>Recreational Facility/Activity</b>
Indian Kill Nature Preserve	168	Burnt Hills, NY	Local Park	Hiking, nature study, fishing, cross-country skiing, and snowshoeing (Schenectady County 2007)
Clifton Park	168	Burnt Hills, NY	Local Park	
Rexford Aqueduct	170	Schenectady, NY	Local Park	Hiking, walking, and jogging trails (Trails.com 2012)
Carrie St. Park	172	Schenectady, NY	Local Park	
Mohawk Towpath Byway	172 to 174	Schenectady, NY	National Scenic Byway	Walking, picnicking, and biking (MTSBC 2012)
South Ave. Park, Front St. Park, Riverside Park, Liberty Park, Pulaski Park, and Veterans' Park	173	Schenectady, NY	Local Parks	Swimming, walking, and playgrounds (City of Schenectady 2006)
Orchard Park	174	Schenectady, NY	Local Park	
Hillhurst Park, Fairview Park, Westinghouse Park	175	Schenectady, NY	Local Parks	
Roger Keenholts Park, Tawasentha Park	184	Guilderland, NY	Local Parks	Sports fields, picnicking, tennis courts, swimming, hiking and biking trails, fishing, kayaking, canoeing, gardening, and snowshoeing (Town of Guilderland 2012a, Town of Guilderland 2012b)
Black Creek Marsh Wildlife Management Area	187	Voorheesville, NY	State Wildlife Management Area	Walking and bird watching (NYSDEC 2012ii)
Jim Nichols Park, Evergreen Park, New Scotland Town Park, Scotch Pine Park	188 to 189	Voorheesville, NY	Local Parks	Playgrounds and sports fields (Village of Voorheesville 2009)
Five Rivers Environmental Education Center	191	New Scotland, NY	Outdoor Education Center	Walking, skiing, and bird watching (NYSDEC 2012r)

<b>Aesthetic Resource</b>	<b>Milepost</b>	<b>Location</b>	<b>Resource Type</b>	<b>Recreational Facility/Activity</b>
Feura Bush Park	193	Feura Bush, NY	Local Park	Amusement Park
Selkirk Park	199	Selkirk, NY	Local Park	Biking, picnicking, and playgrounds (Town of Bethlehem 2013)
Mosher Park	203	Ravena, NY	Local Park	
Schodack Island State Park	2 to 8 miles southeast of 199	Schodack Landing, NY	State Park	Biking, boating, fishing, hiking, hunting, picnicking, playgrounds, ice skating, sports fields, and cross-country skiing (NYS OPRHP 2012g)
Columbia-Greene North SASS	2 to 20 miles southeast of 199	Schodack Landing, NY to Hudson, NY	Scenic Area of Statewide Significance	Aesthetic resource
Hudson River Islands State Park	15 to 16 miles southeast of 199	Coxsackie, NY	State Park	Camping, fishing, picnicking, hunting, hiking, nature trails, and boating (NYS OPRHP 2012h)
Four Mile Point Park	16 miles southeast of 199	Coxsackie, NY	Local Park	Bird watching, fishing, kayaking, canoeing, picnicking, walking, cross-country skiing, and snowshoeing (Scenic Hudson 2012c)
Middle Grounds Flat Unique Area	10 to 12 miles north of 228	Athens, NY	State Nature and Historical Preserve	Aesthetic resource
Green Port Town Park and Athens Boat Launch	11 miles north of 228	Athens, NY	Local Parks	Playgrounds, sports fields, and boat launches
Brandow Point Unique Area	9 miles north of 228	Athens, NY	State Nature and Historical Preserve	Aesthetic resource
Rogers Island Wildlife Management Area	7 to 8 miles north of 228	Athens, NY	State Wildlife Management Area	Boating, bird watching, snowshoeing, hunting, fishing, and trapping (NYSDEC 2012t)
Dutchman's Landing Park	6 miles north of 228	Catskill, NY	Local Park	Boating and playgrounds (Catskill.com 2012)



<b>Aesthetic Resource</b>	<b>Milepost</b>	<b>Location</b>	<b>Resource Type</b>	<b>Recreational Facility/Activity</b>
Olana State Historic Site	6 miles north of 228	Catskill, NY	National Register of Historic Places and State Park	Aesthetic resource
Ernest R. Lasher Memorial Park	1 mile north of 228	Catskill, NY	Local Park	Boating, swimming, and picnicking (Town of Germantown 2009)
New Baltimore Detached Parcel	210	Coxsackie, NY	State Park	
Elliot Park	222	Catskill, NY	Local Park	
Catskill-Olana SASS	222 to 226	Catskill, NY	Scenic Area of Statewide Significance	Aesthetic resource

Sources: CHPEI 2010, NYSDEC 2012m, NPS 2012a, USDOT-FHWA 2012a

**Table K-3. Hudson River Segment Recreation Activities**

<b>Aesthetic Resource</b>	<b>Milepost</b>	<b>Location</b>	<b>Resource Type</b>	<b>Recreational Facility/Activity</b>
Ulster-North SASS	230 to 246	Various	Scenic Area of Statewide Significance	Aesthetic resource
Estates District SASS	230 to 257	Various	Scenic Area of Statewide Significance	Aesthetic resource
Bristol Beach State Park	232	Maiden, NY	State Park	Swimming (PPC 2012a)
Seamon Park	233	Saugerties, NY	Local Park	
Clermont State Historic Site	233	Tivoli, NY	State Park	
Tivoli Bays Wildlife Management Area	235 to 238	Tivoli, NY	State Wildlife Management Area	Educational programs and canoeing (NYSDEC 2012y)
Town of Saugerties Glasco Mini Park	237	Glasco, NY	Local Park	
Ulster Landing State Park	238	Ulster Landing, NY	State Park	
Poet's Walk Park	239	Barrytown, NY	Local Park	
Charles Rider Park, Robert E. Post Memorial Park	240	East Kingston, NY	Local Parks	
Kingston Point Park	244	Kingston, NY	Local Park	
George H. Freer Memorial Park	245	Port Ewen, NY	Local Park	
Esopus Lloyd SASS	247 to 265	Various	Scenic Area of Statewide Significance	Aesthetic resource
Ogden Mills and Ruth Livingston Mills Memorial State Park	249 to 251	Staatsburg, NY	State Park	
Maragaret Lewis Norrie State Park	250 to 252	Staatsburg, NY	State Park	
Vanderbilt Mansion National Historic Site	254	Hyde Park, NY	National Register of Historic Places	Cultural resource

<b>Aesthetic Resource</b>	<b>Milepost</b>	<b>Location</b>	<b>Resource Type</b>	<b>Recreational Facility/Activity</b>
Home of Franklin D. Roosevelt National Historic Site	256	Hyde Park, NY	National Register of Historic Places	Cultural resource
Quiet Cove Riverfront Park	259	Poughkeepsie, NY	Local Park	
Walkway Over the Hudson State Historic Park	260	Poughkeepsie, NY	National Register of Historic Places	
Victor C. Waryas Park, Kaal Rock Park, Eastman Park	261	Poughkeepsie, NY	Local Parks	
Dutchess County Bowdoin Park	267 to 268	Wappinger Falls, NY	Local Park	
Castle Point Park	272	Beacon, NY	Local Park	
Riverfront Park	275	Beacon, NY	Local Park	
Hudson Highlands SASS	276 to 298	Various	Scenic Area of Statewide Significance	Aesthetic resource
Washington's Headquarters	276	Newburgh, NY	National Register of Historic Places and State Park	Cultural resource
Dutchess Junction Park	276	Dutchess Junction, NY	Local Park	
Hudson Highlands State Park	277 to 281, 289 to 292	Various	State Park	
Knox Headquarters	279	Cornwall-on-Hudson, NY	National Register of Historic Places and State Park	Cultural resource
Donahue Memorial Park	279	Cornwall-on-Hudson, NY	Local Park	
Storm King State Park	280 to 282	Various	State Park	
Bear Mountain State Park	289 to 294	Fort Montgomery, NY	State Park	
Iona Island Marsh National Natural Landmark	290	Fort Montgomery, NY	National Natural Landmark	Cultural resource
Riverfront Green Park	292	Peekskill, NY	Local Park	

<b>Aesthetic Resource</b>	<b>Milepost</b>	<b>Location</b>	<b>Resource Type</b>	<b>Recreational Facility/Activity</b>
Stony Point Battlefield State Historic Site	296	Stony Point, NY	National Register of Historic Places and State Park	Walking tours and educational programs (NYS OPRHP 2012c)
George's Island County Park	1 mile south of 296	Montrose Point, NY	Local Park	Picnicking, playgrounds, athletic fields, biking, boating, and fishing (Westchester County 2012)
Oscawana County Park	2 miles south of 296	Montrose Point, NY	Local Park	Camping, hiking, biking, fishing, boating, and nature trails (RecreationParks.net 2012)
Bowline Point Town Park	298	Haverstraw, NY	Local Park	Swimming, playgrounds, tennis courts, and fishing
Haverstraw Baseball Fields	298	Haverstraw, NY	Local Park	Baseball fields
High Tor State Park	299 to 301	Haverstraw, NY	State Park	Picnicking, swimming, and hiking
Hook Mountain State Park, Hook Mountain National Natural Landmark, Haverstraw Beach State Park	301 to 306	Haverstraw, NY	State Parks and National Natural Landmark	Swimming, biking, walking, bird watching, and picnicking (NY-NJ TC 2012, PPC 2012b)
Rockland Lake State Park, Nyack Beach State Park	304 to 307	Haverstraw, NY	State Parks	Swimming, tennis courts, boating, bird watching, walking, biking, and golfing (PPC 2012c)
Rockwood Hall State Park	306	Sleepy Hollow, NY	State Park	Running, hiking, picnicking, and horseback riding (Westchester Secret Gardens 2012)
DeVries Park, Losee Park	309	Tarrytown, NY	Local Parks	Picnicking and playground (Village of Tarrytown 2012)
Tallman Mountain State Park	312 to 314	Sparkill, NY	State Park	Biking, picnicking, playgrounds, athletic fields, and cross-country skiing (NYS OPRHP 2012i)

<b>Aesthetic Resource</b>	<b>Milepost</b>	<b>Location</b>	<b>Resource Type</b>	<b>Recreational Facility/Activity</b>
Palisades Park	314 to 323	Various	National Register of Historic Places and National Natural Landmark	Cultural resource
Untermeyer Park	317	Yonkers, NY	Local Park	Gardening
Trevor Park, JFK Marina and Park	318	Glenwood, NY	Local Parks	Boating
Philipse Manor Hall	319	Yonkers, NY	National Historic Landmark and State Park	Educational programs and tours (NYS OPRHP 2012d)
War Memorial Field	319	Yonkers, NY	Local Park	Sports fields and playgrounds (City of Yonkers 2012)
Esplanade Park	319	Yonkers, NY	Local Park	Walking and picnicking (Scenic Hudson 2012a)
Habirshaw Park	319	Yonkers, NY	Local Park	Walking, bird watching, and picnicking (Scenic Hudson 2012b)
Riverdale Park	322	Yonkers, NY	Local Park	Dog park (NYC Parks 2012c)
Inwood Hill Park	324	Washington Heights, NY	Local Park	Picnicking, sports fields, dog park, kayaking, playgrounds, tennis courts, and a marina (NYC Parks 2012d)

Sources: CHPEI 2010, NYSDEC 2012m, NPS 2012a, USDOT-FHWA 2012a

**Table K-4. New York City Metropolitan Area Segment Recreation Activities**

<b>Aesthetic Resource</b>	<b>Milepost</b>	<b>Location</b>	<b>Resource Type</b>	<b>Recreational Facility/Activity</b>
Fort Tryon Park	326	Washington Heights, NY	Local Park	Basketball courts, dog park, playgrounds, and exercise equipment (NYC Parks 2012e)
Roberto Clemente State Park	326 to 327	Washington Heights, NY	State Park	Water park, swimming, gymnasium, picnicking, and sports fields (NYS OPRHP 2012f)
Swindler Cove, Sherman Creek Park	327	Washington Heights, NY	Local Park	Boating, nature center, walking trails, gardens, and bird watching (NYRP 2013)
Highbridge Park	326 to 328	Harlem, NY	Local Park	Picnicking, sports fields, dog park, exercise equipment, and a recreation center (NYC Parks 2012f)
Fort Washington Park	326 to 328	Washington Heights, NY	Local Park	Picnicking, sports fields, dog park, and playgrounds (NYC Parks 2012g)
Randall's Island Park	330 to 331	Queens, NY	Local Park	Picnicking, biking and walking trails, golfing, sports fields, and tennis courts (NYC Parks 2012a)
Wards Island Park	South of 331	Queens, NY	Local Park	Picnicking, sports fields, and playgrounds (NYC Parks 2012h)
Federation of Italian American Organizations of Queens, Inc., soccer fields	333	Queens, NY	Private athletic fields	Sports fields (soccer) (FIAOQ 2013)
Immaculate Conception Youth Program of Astoria baseball fields	333	Queens, NY	Private athletic fields	Sports fields (baseball) (ICYP 2013)
Woodtree Playground	334	Queens, NY	Local Park	Handball courts and playgrounds (NYC Parks 2013a)
Steinway Playground	334	Queens, NY	Local Park	Handball courts and playgrounds (NYC Parks 2013b)

<b>Aesthetic Resource</b>	<b>Milepost</b>	<b>Location</b>	<b>Resource Type</b>	<b>Recreational Facility/Activity</b>
Astoria Park	334	Queens, NY	Local Park	Picnicking, dog park, exercise equipment, swimming, skate park, sports courts, running tracks, and playgrounds (NYC Parks 2012i)
Chappetto Square	335	Queens, NY	Local Park	Sports courts (hockey rink) (NYC Parks 2013c)
Triborough Bridge Playgrounds B and C	335	Queens, NY	Local Park	Playground
Astoria Health Playground	335	Queens, NY	Local Park	Playground
Rainey Park	336	Queens, NY	Local Park	Sports fields (baseball) and playground

Sources: CHPEI 2010, NYSDEC 2012m, NPS 2012a, USDOT-FHWA 2012a

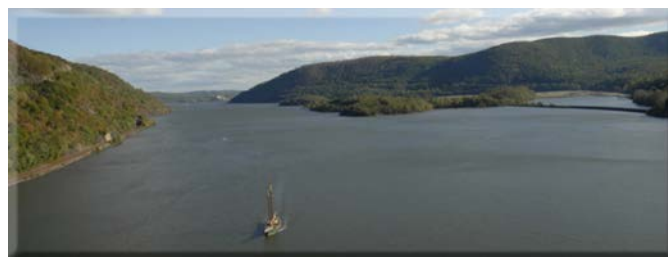
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## APPENDIX L

# Environmental Justice Analysis Background Information





## **Appendix L**

### **Environmental Justice Analysis Background Information**

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**Appendix L** presents demographic data for census tracts along the proposed CHPE Project route. Tables are broken down by county and contain information relating to population, percent minority, percent white, median income, and percent of families below the poverty level.

**Appendix L** contains the following tables:

- **Table L-1.** Lake Champlain Segment Census Tract Data
- **Table L-2.** Overland Segment Census Tract Data
- **Table L-3.** Hudson River Segment Census Tract Data
- **Table L-4.** New York City Metropolitan Area Segment Census Tract Data

**Table L-1. Lake Champlain Segment Census Tract Data**

<b>Geographies</b>	<b>County</b>	<b>Population</b>	<b>Percent Minority</b>	<b>Percent White</b>	<b>Median Income</b>	<b>Percent Family Below Poverty Level</b>
<b>New York State</b>	n/a	19,378,102	41.7	58.3	\$55,217	11.0
<b>Clinton County</b>	Clinton	82,128	8.9	91.1	\$46,843	9.4
Census Tract 1001	Clinton	5,754	4.0	96.0	\$50,833	7.9
Census Tract 1002	Clinton	4,284	3.1	96.9	\$55,733	5.3
Census Tract 1006	Clinton	5,545	4.0	96.0	\$70,709	3.2
Census Tract 1008	Clinton	4,412	6.7	93.3	\$56,585	7.5
Census Tract 1019	Clinton	6,998	4.7	95.3	\$54,707	7.5
Census Tract 1020	Clinton	3,146	4.5	95.5	\$38,688	14.6
Census Tract 1021	Clinton	2,120	10.0	90.0	\$54,423	15.6
<b>Essex County</b>	Essex	39,370	7.1	92.9	\$44,734	7.4
Census Tract 9601	Essex	2,445	2.4	97.6	\$49,470	7.2
Census Tract 9607	Essex	2,053	3.4	96.6	\$47,625	9.8
Census Tract 9608	Essex	2,025	2.8	97.2	\$45,020	8.3
Census Tract 9609	Essex	3,580	3.5	96.5	\$51,438	8.6
Census Tract 9610	Essex	4,798	5.0	95.0	\$40,169	9.1
Census Tract 9611	Essex	2,024	2.8	97.2	\$53,378	4.3
Census Tract 9612	Essex	5,042	3.5	96.5	\$35,608	12.7
<b>Washington County</b>	Washington	63,216	6.7	93.3	\$48,565	9.3
Census Tract 820.02	Washington	1,261	2.7	97.3	\$41,800	16.8

Source: USCB 2012b

**Table L-2. Overland Segment Census Tract Data**

<b>Geographies</b>	<b>County</b>	<b>Population</b>	<b>Percent Minority</b>	<b>Percent White</b>	<b>Median Income</b>	<b>Percent Family Below Poverty Level</b>
<b>New York State</b>	n/a	19,378,102	41.7	58.3	\$55,217	11
<b>Albany County</b>	Albany	304,204	24.0	76.0	\$56,424	7.3
Census Tract 144.02	Albany	3,267	14.0	86.0	\$52,714	0.0
Census Tract 143.01	Albany	2,852	16.5	83.5	\$68,482	2.6
Census Tract 143.02	Albany	7,792	11.1	88.9	\$90,136	1.3
Census Tract 144.01	Albany	4,151	7.1	92.9	\$68,165	1.5
Census Tract 145.01	Albany	2,380	4.3	95.7	\$83,625	1.4
Census Tract 145.02	Albany	3,479	5.0	95.0	\$67,785	6.4
Census Tract 145.03	Albany	2,789	5.3	94.7	\$76,587	5.2
Census Tract 146.06	Albany	3,675	10.3	89.7	\$82,724	0.0
Census Tract 146.11	Albany	1,818	10.8	89.2	\$67,237	11.2
Census Tract 146.13	Albany	2,863	8.0	92.0	\$63,219	0.0
<b>Greene County</b>	Greene	49,221	12.9	87.1	\$45,921	8.8
Census Tract 808	Greene	2,774	77.9	22.1	\$0	0.0
Census Tract 801	Greene	3,370	5.3	94.7	\$56,094	5.0
Census Tract 806	Greene	3,156	5.9	94.1	\$49,152	9.2
Census Tract 807	Greene	2,988	9.8	90.2	\$58,172	6.8
Census Tract 810	Greene	4,568	25.1	74.9	\$43,539	15.7
Census Tract 811.02	Greene	2,993	11.6	88.4	\$46,901	2.0
<b>Saratoga County</b>	Saratoga	219,607	7.3	92.7	\$65,613	4.2
Census Tract 601.01	Saratoga	6,199	8.9	91.1	\$57,866	7.6
Census Tract 606.01	Saratoga	2,715	4.4	95.6	\$50,560	5.0
Census Tract 607.01	Saratoga	7,078	5.9	94.1	\$62,454	0.9

<b>Geographies</b>	<b>County</b>	<b>Population</b>	<b>Percent Minority</b>	<b>Percent White</b>	<b>Median Income</b>	<b>Percent Family Below Poverty Level</b>
Census Tract 607.02	Saratoga	9,095	6.2	93.8	\$88,780	4.1
Census Tract 608	Saratoga	5,087	5.4	94.6	\$61,984	4.7
Census Tract 613.02	Saratoga	6,588	8.1	91.9	\$65,772	5.0
Census Tract 614.03	Saratoga	5,930	5.6	94.4	\$73,000	3.1
Census Tract 617.01	Saratoga	4,367	7.6	92.4	\$72,500	7.9
Census Tract 617.02	Saratoga	4,271	3.2	96.8	\$74,469	10.4
Census Tract 618	Saratoga	5,684	7.7	92.3	\$42,304	3.7
Census Tract 626.01	Saratoga	2,480	6.1	93.9	\$103,162	0.0
<b>Schenectady County</b>	Schenectady	154,727	22.8	77.2	\$53,322	7.9
Census Tract 202	Schenectady	2,596	48.4	51.6	\$36,313	18.7
Census Tract 203	Schenectady	1,683	26.9	73.1	\$26,563	43
Census Tract 212	Schenectady	2,999	19.9	80.1	\$44,000	10.6
Census Tract 325.02	Schenectady	3,535	3.8	96.2	\$82,788	2.6
Census Tract 326.01	Schenectady	2,064	5.2	94.8	\$83,571	1.1
Census Tract 326.02	Schenectady	4,005	5.4	94.6	\$56,042	3.8
Census Tract 327	Schenectady	3,742	7.4	92.6	\$52,763	7.6
Census Tract 330.02	Schenectady	2,303	5.6	94.4	\$74,200	0.0
Census Tract 330.04	Schenectady	2,852	6.9	93.1	\$59,022	8.0
Census Tract 335	Schenectady	1,975	22.6	77.4	\$35,119	10.8
<b>Washington County</b>	Washington	63,216	6.7	93.3	\$48,565	9.3
Census Tract 803	Washington	5,390	4.3	95.7	\$53,297	3.2
Census Tract 810	Washington	6,190	32.4	67.6	\$51,361	4.5
Census Tract 820.01	Washington	4,980	4.5	95.5	\$43,071	9.1
Census Tract 880	Washington	6,371	4.1	95.9	\$42,852	10.5

Source: USCB 2012b

**Table L-3. Hudson River Segment Census Tract Data**

<b>Geographies</b>	<b>County</b>	<b>Population</b>	<b>Percent Minority</b>	<b>Percent White</b>	<b>Median Income</b>	<b>Percent Family Below Poverty Level</b>
<b>New York State</b>	n/a	19,378,102	41.7	58.3	\$55,217	11
<b>Bronx County</b>	Bronx	1,385,108	89.1	10.9	\$33,742	26.2
Census Tract 293.01	Bronx	1,875	25.5	74.5	\$100,776	0.0
Census Tract 309	Bronx	3,891	18.0	82.0	\$86,053	1.7
Census Tract 319	Bronx	751	38.5	61.5	\$0	0.0
<b>Columbia County</b>	Columbia	63,096	11.8	88.2	\$52,140	5.6
Census Tract 19	Columbia	1,965	9.9	90.1	\$65,682	8
<b>Dutchess County</b>	Dutchess	297,488	25.4	74.6	\$69,739	6.1
Census Tract 601	Dutchess	4,799	38.0	62.0	\$79,020	0.0
Census Tract 602.02	Dutchess	3,997	19.7	80.3	\$65,583	1.7
Census Tract 701.01	Dutchess	4,373	14.6	85.4	\$63,654	7.1
Census Tract 702.01	Dutchess	2,860	13.2	86.8	\$60,152	0.0
Census Tract 704.01	Dutchess	4,623	23.2	76.8	\$61,875	4.4
Census Tract 1401.01	Dutchess	5,126	25.4	74.6	\$58,490	0.8
Census Tract 1406.02	Dutchess	2,840	29.0	71.0	\$77,536	6.6
Census Tract 1408.01	Dutchess	2,804	20.9	79.1	\$64,617	9.7
Census Tract 1500.03	Dutchess	3,027	13.6	86.4	\$61,250	9.8
Census Tract 1600.03	Dutchess	2,361	10.0	90.0	\$62,917	5.8
Census Tract 1903.01	Dutchess	3,439	29.9	70.1	\$70,000	4.2
Census Tract 2201	Dutchess	6,011	45.3	54.7	\$25,551	36.5
Census Tract 2207	Dutchess	2,517	65.7	34.3	\$31,203	29.3
<b>New York County</b>	New York	1,585,873	52.0	48.0	\$65,184	13.8
Census Tract 297	New York	161	72.7	27.3	\$0	0.0

<b>Geographies</b>	<b>County</b>	<b>Population</b>	<b>Percent Minority</b>	<b>Percent White</b>	<b>Median Income</b>	<b>Percent Family Below Poverty Level</b>
<b>Orange County</b>	Orange	372,813	31.8	68.2	\$69,144	7.3
Census Tract 4	Orange	4,957	86.8	13.2	\$26,888	35.5
Census Tract 5.02	Orange	4,578	90.7	9.3	\$36,953	37.9
Census Tract 101.02	Orange	4,856	29.4	70.6	\$86,588	7.3
Census Tract 131	Orange	5,094	12.9	87.1	\$66,650	0.0
Census Tract 136	Orange	6,763	25.1	74.9	\$92,841	0.0
Census Tract 138	Orange	2,983	18.8	81.2	\$75,547	1.5
<b>Putnam County</b>	Putnam	99,710	17.1	82.9	\$88,619	3.0
Census Tract 108	Putnam	3,449	14.4	85.6	\$82,179	2.6
<b>Rockland County</b>	Rockland	311,687	34.7	65.3	\$82,245	7.5
Census Tract 107.01	Rockland	4,079	68.0	32.0	\$57,412	5.1
Census Tract 107.02	Rockland	4,309	89.7	10.3	\$41,830	11
Census Tract 101.01	Rockland	5,813	18.0	82.0	\$120,833	1.3
Census Tract 102	Rockland	4,473	21.6	78.4	\$81,250	1.0
Census Tract 106.02	Rockland	6,588	70.2	29.8	\$54,057	3.5
Census Tract 107.03	Rockland	3,522	84.4	15.6	\$39,034	22.9
Census Tract 109.02	Rockland	4,117	35.6	64.4	\$88,872	3.5
Census Tract 110	Rockland	2,063	15.7	84.3	\$111,167	4.1
<b>Ulster County</b>	Ulster	182,493	13.3	86.7	\$56,434	7.4
Census Tract 9514	Ulster	3,334	15.4	84.6	\$45,571	6.3
Census Tract 9517	Ulster	4,782	35.4	64.6	\$44,231	12.9
Census Tract 9525	Ulster	3,411	12.4	87.6	\$62,875	4.2
Census Tract 9501	Ulster	5,336	7.9	92.1	\$56,336	8.1
Census Tract 9513	Ulster	4,337	12.1	87.9	\$49,869	4.5
Census Tract 9526	Ulster	5,630	14.6	85.4	\$67,303	0.7



<b>Geographies</b>	<b>County</b>	<b>Population</b>	<b>Percent Minority</b>	<b>Percent White</b>	<b>Median Income</b>	<b>Percent Family Below Poverty Level</b>
Census Tract 9549	Ulster	1,585	8.8	91.2	\$71,111	1.4
<b>Westchester County</b>	Westchester	949,113	42.6	57.4	\$77,881	6.3
Census Tract 132.01	Westchester	4,366	18.5	81.5	\$211,250	3.1
Census Tract 2.02	Westchester	4,175	73.6	26.4	\$57,212	9.5
Census Tract 1.04	Westchester	100	0.0	0.0	\$0	0.0
Census Tract 2.03	Westchester	3,329	58.2	41.8	\$49,635	5.6
Census Tract 4.02	Westchester	5,902	91.5	8.5	\$38,906	22.5
Census Tract 7.02	Westchester	4,096	68.6	31.4	\$60,293	2.0
Census Tract 103	Westchester	3,111	28.5	71.5	\$83,287	3.3
Census Tract 104	Westchester	3,916	29.7	70.3	\$82,361	13.7
Census Tract 113	Westchester	6,413	17.1	82.9	\$115,875	1.8
Census Tract 114	Westchester	6,368	30.3	69.7	\$107,909	0.7
Census Tract 115	Westchester	4,916	45.3	54.7	\$53,558	6.5
Census Tract 116	Westchester	6,848	77.5	22.5	\$56,918	12.4
Census Tract 117	Westchester	2,926	20.7	79.3	\$148,958	5.5
Census Tract 118	Westchester	5,626	16.4	83.6	\$198,452	0.0

Source: USCB 2012b

**Table L-4. New York City Metropolitan Area Segment Census Tract Data**

<b>Geographies</b>	<b>County</b>	<b>Population</b>	<b>Percent Minority</b>	<b>Percent White</b>	<b>Median Income</b>	<b>Percent Family Below Poverty Level</b>
<b>New York State</b>	n/a	19,378,102	41.7	58.3	\$55,217	11.0
<b>Bronx County</b>	Bronx	1,385,108	89.1	10.9	\$33,742	26.2
Census Tract 19	Bronx	1,917	90.2	9.8	\$25,093	38.5
<b>New York County</b>	New York	1,585,873	52.0	48.0	\$65,184	13.8
Census Tract 210	New York	6,637	98.0	2.0	\$36,922	22.6
Census Tract 236	New York	6,404	99.0	1.0	\$36,791	22.0
Census Tract 242	New York	3,396	98.1	1.9	\$21,276	28.3
Census Tract 243.02	New York	7,370	99.2	0.8	\$16,505	42.2
Census Tract 297	New York	161	72.7	27.3	\$0	0.0
Census Tract 299	New York	3,834	98.4	1.6	\$21,909	34.8
Census Tract 311	New York	2	0.0	0.0	\$0	0.0
<b>Queens County</b>	Queens	2,230,722	72.4	27.6	\$54,878	11.0
Census Tract 37	Queens	0	0.0	0.0	\$0	0.0
Census Tract 39	Queens	1,592	78.1	21.9	\$33,750	35.9
Census Tract 43	Queens	2,437	91.8	8.2	\$16,638	53.9
Census Tract 45	Queens	2,975	45.4	54.6	\$61,667	12.7
Census Tract 69	Queens	4,611	55.0	45.0	\$52,549	10.4
Census Tract 71	Queens	3,963	46.3	53.7	\$44,653	4.7
Census Tract 77	Queens	1,478	62.3	37.7	\$64,732	0.0
Census Tract 79	Queens	3,493	68.9	31.1	\$42,333	14.1
Census Tract 81	Queens	1,188	70.0	30.0	\$55,917	0.0
Census Tract 85	Queens	1,270	72.8	27.2	\$51,413	24.0
Census Tract 95	Queens	2,289	28.6	71.4	\$54,533	14.4

<b>Geographies</b>	<b>County</b>	<b>Population</b>	<b>Percent Minority</b>	<b>Percent White</b>	<b>Median Income</b>	<b>Percent Family Below Poverty Level</b>
Census Tract 97	Queens	3,580	25.5	74.5	\$66,058	14.5
Census Tract 101	Queens	2,552	31.3	68.7	\$57,097	2.6
Census Tract 103	Queens	3,934	38.3	61.7	\$48,106	9.7
Census Tract 105	Queens	4,244	59.3	40.7	\$33,211	21.2
Census Tract 111	Queens	3,050	42.5	57.5	\$79,948	6.8
Census Tract 113	Queens	4,234	41.3	58.7	\$52,810	13.4
Census Tract 107.01	Queens	0	0.0	0.0	\$0	0.0

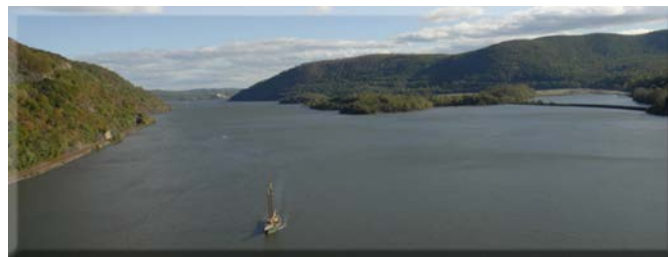
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## APPENDIX M

# Air Quality Analysis Background Information





## **Appendix M**

### **Air Quality Analysis Background Information**

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**Appendix M** contains detailed lists of construction equipment, and associated emissions calculations for the four proposed CHPE Project route segments. This appendix also contains various emissions factors that were used in the air quality analysis.

#### **Lake Champlain Segment**

- **Table M-1.** Estimated Equipment and Vehicle Use During Aquatic Cable Installation
- **Table M-2.** Emissions Factors
- **Table M-3.** Estimated Total Emissions

#### **Overland Segment**

- **Table M-4.** Estimated Equipment and Vehicle Use During Terrestrial Cable Installation
- **Table M-5.** Estimated Equipment and Vehicle Use During Construction of Cooling Stations
- **Table M-6.** Emissions Factors
- **Table M-7.** Fugitive Dust Estimation Calculations – Earthmoving
- **Table M-8.** Fugitive Dust Estimation Calculations – Road Dust
- **Table M-9.** Estimated Total Emissions

#### **Hudson River Segment**

- **Table M-10.** Estimated Equipment and Vehicle Use During Aquatic Cable Installation
- **Table M-11.** Estimated Equipment and Vehicle Use During Terrestrial Cable Installation
- **Table M-12.** Estimated Equipment and Vehicle Use During Construction of Cooling Stations
- **Table M-13.** Aquatic Cable Installation Emissions Factors
- **Table M-14.** Terrestrial Cable Installation and Cooling Station Construction Emissions Factors
- **Table M-15.** Fugitive Dust Estimation Calculations – Earthmoving
- **Table M-16.** Fugitive Dust Estimation Calculations – Road Dust
- **Table M-17.** Estimated Total Emissions

## **New York City Metropolitan Area Segment**

- **Table M-18.** Estimated Equipment and Vehicle Use During Construction of Converter Station
- **Table M-19.** Estimated Equipment and Vehicle Use During Aquatic Cable Installation
- **Table M-20.** Estimated Equipment and Vehicle Use During Terrestrial Cable Installation
- **Table M-21.** Estimated Equipment and Vehicle Use During Construction of Cooling Station
- **Table M-22.** Emissions Factors
- **Table M-23.** Fugitive Dust Estimation Calculations – Earthmoving
- **Table M-24.** Fugitive Dust Estimation Calculations – Road Dust
- **Table M-25.** Estimated Total Emissions
- **Table M-26.** Proposed One-MW Generator Emissions



**Table M-1. Estimated Equipment and Vehicle Use During Aquatic Cable Installation, Lake Champlain Segment**

Activity	Equipment and Vehicles			Hours per Day	Working Days	LF	trips	cables	Total hours
	Type	BHP	Qty						
Cable installation	Primary Cable Vessel								
	2 azimuth units	2,640	2	24	68	0.25	1	2	1,632
	azimuth unit	1,360	1	24	68	0.25	1	2	816
	retractable azimuth unit	2,475	1	24	68	0.1	1	2	326.4
	tunnel unit	1,300	1	24	68	0.25	1	2	816
	generators (500 kVA)	536	4	24	68	0.75	1	2	9,792
	generators (600 kVA)	643	1	24	68	0.5	1	2	1,632
	Survey boat	1,131	1	24	68	0.5	1	2	1,632
	Crew boat	425	1	24	68	0.2	1	2	652.8
Installation of Cable Protection	Tugboat, Towboat	1,970	1	12	68	0.25	1	2	408
	Crew boat	425	1	12	68	0.2	1	2	326.4
Cable Shipments	Main propulsion	8,201	1	10		0.5	19		95
	Auxiliary engine	1,776	1	10		0.17	19		32.3

Notes:

BHP: Brake-horsepower. The maximum rated load of the vehicle or vessel engine(s).

LF: Load Factor

68 work-days based on 1.49 miles per day from mileposts 0 to 101.3.

Cable shipments emission duration of 10 hours per trip based on 12 mph for 120 miles.

120 miles is the average distance for each of the 19 cable shipments (6 miles of cable per shipment) round trip.

**Table M-2. Emissions Factors<sup>1</sup>, Lake Champlain Segment**

Activity	Equipment and Vehicles			VOC lb/hr	CO lb/hr	NO <sub>x</sub> lb/hr	SO <sub>x</sub> lb/hr	PM <sub>10</sub> lb/hr	PM <sub>2.5</sub> lb/hr	CO <sub>2</sub> lb/hr	CH <sub>4</sub> lb/hr <sup>2</sup>	N <sub>2</sub> O lb/hr <sup>2</sup>
	Type	Category	BHP									
Cable Installation	2 azimuth units	Marine	2,640	2.07	10.48	29.64	0.03	1.41	1.37	3,118.31	0.12	0.02
	azimuth unit	Marine	1,360	1.06	5.40	15.27	0.01	0.73	0.70	1,606.40	0.06	0.01
	retractable azimuth unit	Marine	2,475	1.94	9.82	27.79	0.03	1.32	1.28	2,923.41	0.11	0.02
	tunnel unit	Marine	1,300	1.02	5.16	14.60	0.01	0.69	0.67	1,535.53	0.06	0.01
	generators (500 kVA)	Marine	536	0.33	1.47	5.46	0.01	0.23	0.23	626.53	0.02	0.00
	generators (600 kVA)	Marine	643	0.40	1.76	6.55	0.01	0.28	0.27	751.60	0.03	0.01
	Survey boat	Marine	1,131	0.89	4.49	12.70	0.01	0.60	0.59	1,335.91	0.05	0.01
	Crew boat	Marine	425	0.21	1.44	3.48	0.00	0.19	0.18	502.37	0.02	0.00
Installation of Cable Protection	Tugboat, Towboat	Marine	1,970	1.67	8.66	23.20	0.02	1.18	1.14	2,326.55	0.09	0.02
	Crew boat	Marine	425	0.21	1.44	3.48	0.00	0.19	0.18	502.37	0.02	0.00
Cable Shipment <sup>3</sup>	OGV main propulsion	Marine (kW)	8,201	10.85	25.31	307.36	65.45	8.14	7.59	10,645.38	0.11	0.56
	OGV auxiliary engine	Marine (kW)	1,776	1.57	4.31	54.42	16.60	1.92	1.76	2,704.41	0.02	0.12

Notes:

<sup>1</sup> Emissions factors weighted for calendar year 2013 (USEPA 2003, USEPA 2006, USEPA 2009b).

<sup>2</sup> Offroad N<sub>2</sub>O and CH<sub>4</sub> emissions are based on 40 CFR 98, Subpart C.

<sup>3</sup> Cable Shipment emissions based on USEPA 2009b.

BHP: Brake-horsepower. This should be the maximum rated load of the vehicle of vessel engine(s).

**Table M-3. Estimated Total Emissions<sup>1</sup>, Lake Champlain Segment**

Activity	Equipment and Vehicles			VOC lbs	CO lbs	NO <sub>x</sub> lbs	SO <sub>x</sub> lbs	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs	CO <sub>2</sub> lbs	CH <sub>4</sub> lbs	N <sub>2</sub> O lbs	CO <sub>2</sub> eqv lbs <sup>2</sup>
	Type	Category	hrs										
Cable Installation	2 azimuth units	Marine	1632	3,372	17,102	48,373	45	2,303	2,233	5,089,079	199	40	5,105,635
	azimuth unit	Marine	816	869	4,405	12,460	12	593	575	1,310,823	51	10	1,315,088
	retractable azimuth unit	Marine	326.4	632	3,207	9,070	8	432	419	954,202	37	7	957,306
	tunnel unit	Marine	816	830	4,211	11,910	11	567	550	1,252,993	49	10	1,257,069
	Generators (500 kVA)	Marine	9792	3,279	14,374	53,462	54	2,276	2,208	6,134,933	243	49	6,155,101
	generators (600 kVA)	Marine	1632	656	2,874	10,689	11	455	441	1,226,605	49	10	1,230,637
	Survey boat	Marine	1632	1,445	7,326	20,723	19	986	957	2,180,208	85	17	2,187,300
	Crew boat	Marine	652.8	136	941	2,270	3	124	120	327,947	13	3	329,013
Installation of Cable Protection	Tugboat, Towboat	Marine	408	680	3,535	9,466	8	480	465	949,232	37	7	952,321
	Crew boat	Marine	326.4	7	47	112	0	6	6	16,227	1	0	16,279
Cable Shipment	OGV	Marine	95	1,031	2,405	29,199	6218	773	721	1,011,311	10	53	1,028,033
	OGV	Marine	32.3	51	139	1,758	536	62	57	87,352	1	4	88,578
<b>Total Underwater Cable Laying Emissions, lbs</b>				<b>12,988</b>	<b>60,564</b>	<b>209,492</b>	<b>6925</b>	<b>9,056</b>	<b>8,753</b>	<b>20,540,911</b>	<b>776</b>	<b>210</b>	<b>20,622,361</b>
<b>Total Underwater Cable Laying Emissions, tons</b>				<b>6.49</b>	<b>30.28</b>	<b>104.75</b>	<b>3.46</b>	<b>4.53</b>	<b>4.38</b>	<b>10,270</b>	<b>0.39</b>	<b>0.11</b>	<b>10,311</b>

Notes:

<sup>1</sup> Emissions weighted for calendar year 2013 (USEPA 2003, USEPA 2006, USEPA 2009a).

<sup>2</sup> Carbon dioxide equivalents (CO<sub>2</sub> eqv) are calculated by summing the products of mass GHG emissions by species times their respective GWP coefficients (USEPA 2009a).

**Table M-4. Estimated Equipment and Vehicle Use During Terrestrial Cable Installation, Overland Segment**

Task	Equipment and Vehicles				Working Days	Daily		# equipment hours operation (127 miles)	Miles Per Hour (on road only)
	Equipment Type	Progress (miles)/8-hour day	BHP	Qty		hours	VMT		
Vegetation Clearing	Brush Hog	1	11	1	127	8		1,016	
Topsoil removal and storage	Small Bulldozer	1	285	1	127	8		1,016	
	Bobcat	1	73	1	127	8		1,016	
Access path prep (gravel)	Small Bulldozer	0.5	285	1	254	8		2,032	
	18-yard dump	0.5		2	254	8	20,320	4,064	5
	Backhoe	0.25	73	1	508	8		4,064	
	Bobcat	0.25	73	1	508	8		4,064	
	Ram Hoe	0.25	330	1	508	4		2,032	
	Hard Rock Trencher	0.25	335	1	508	2		1,016	
Deliver Cable @ 3 reels per	Flatbed Truck, 30 mph	0.5		1	254	8	60,960	2,032	30
	Crane	0.5	300	1	254	2		508	
HDD <sup>1,2</sup>	Drilling Unit				282	8		2,256	
	Drilling Power Unit		800		282	8		2,256	
	Generator		50		282	8		2,256	
	Water Pumps				282	8		2,256	
	Mud Pump				282	8		2,256	
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	0.5		1	254	8	60,960	2,032	30
	Crane, 40-ton	0.5		1	254	2		508	
	Puller/Tensioner	0.5	165	2	254	8		4,064	
	Mid-pull caterpillars	0.5	165	2	254	8		4,064	
Splice Cable	Generators	0.25	48	1	508	8		4,064	
	Propane heaters	0.25	0.5	1	508	8		4,064	
Deliver and install Thermal Backfill	18-yard dump	0.25		2	508	8	243,840	8,128	30
	Backhoe	0.25	73	1	508	8		4,064	
	Bobcat	0.25	73	1	508	8		4,064	

Task	Equipment and Vehicles				Working Days	Daily		# equipment hours operation (127 miles)	Miles Per Hour (on road only)
	Equipment Type	Progress (miles)/8-hour day	BHP	Qty		hours	VMT		
Install Native Backfill	Backhoe	0.5	73	1	254	8		2,032	
	Bobcat	0.5	73	1	254	8		2,032	
	Shaker/screen	0.5	110	1	254	8		2,032	
	Compressor for tampers	0.5		1	254	8		2,032	
Remove Excess Native Fill from Site	18-yard dump	1		2	127	8	10,160	2,032	5
	Backhoe	1	73	1	127	8		1,016	
Replace Topsoil, York Rake Vegetation	Small Bulldozer	0.5	285	1	254	8		2,032	
	Hydroseed Sprayer	0.5	115	1	254	8		2,032	
Miscellaneous	Pickup trucks			10	220	4	264,000	8,800	30

Notes:

HDD: Horizontal Directional Drilling

<sup>1</sup> HDD includes 44 Upland Streams, 1 Champlain exit, 2 Hudson Entrance/Exit, 47 Locations, and 6 equipment days per location.

<sup>2</sup> Support for HDD includes 3 Locations, 12 Working Days (4 Equipment Days per location) at 8 hours per day, and 96 equipment hours of operation.

**Table M-5. Estimated Equipment and Vehicle Use During Construction of Cooling Stations, Overland Segment**

Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (on road only)
		Equipment Type	BHP	Qty		Hours	VMT		
Site Preparation (pavement and foundations)	4.5 days (half a day at each cooling station)	Bulldozer	285	1	4.5	8		36	
		Backhoe	73	1	4.5	8		36	
		Loader	150	1	4.5	8		36	
		18-yard dump			1	4.5	8	180	36
Site Prep Grading	4.5 days (half a day at each cooling station)	Bulldozer	285	1	4.5	8		36	
		Backhoe	73	1	4.5	8		36	
		Loader	150	1	4.5	8		36	
		18-yard dump			2	4.5	8	360	72
Building Foundations, Floor	4.5 days (half a day at each cooling station)	Backhoe	73	1	4.5	8		36	
		Bobcat	73	1	4.5	8		36	
		Loader	150	1	3	8		24	
		Bulldozer	285	1	3	8		24	
		Small crane-forms	155	2	0	8		0	
		Medium crane-concrete bucket	300	2	0	8		0	
		Concrete Mixer, offsite delivery			1	2	8	40	16
Building	18 days (2 days at each station)	Small crane	155	1	13.5	8		108	
		Forklifts, offloading equipment	75	1	9	8		72	
		Generators	50	2	9	8		144	
		Propane heaters	58.9	2	9	8		144	
HDD, transmission cables		Drilling Power Unit, 9 locations @ 6 equipment days/location	800		54	8		432	
		Generator	50		54	8		432	

Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (on road only)
		Equipment Type	BHP	Qty		Hours	VMT		
Final Site Preparation, traprock, vegetation paving, plantings	9 days (1 day at each cooling station)	Bulldozer		1	2	8		16	
		18-yard dump		1	2	8	80	16	5
		Hotbox with truck		1	2	8	40	16	2.5
		Roller	100	1	2	8		16	
		Flatbed Truck, 30 mph		1	1	8	240	8	30
		Backhoe, plantings	73	1	1	8			
Miscellaneous	7 weeks	Craft utility, delivery trucks		2	35	4	8,400	280	30
		Pickup trucks		1	35	4	4,200	140	30

Notes:

\* Calendar days are used to provide for long workdays and weekend work.

HDD: Horizontal Directional Drilling

**Table M-6. Emissions Factors<sup>1</sup>, Overland Segment**

Activity	Equipment and Vehicles			VOC lb/unit <sup>2</sup>	CO lb/unit <sup>2</sup>	NO <sub>x</sub> lb/unit <sup>2</sup>	SO <sub>x</sub> lb/unit <sup>2</sup>	PM <sub>10</sub> lb/unit <sup>2,3</sup>	PM <sub>2.5</sub> lb/unit <sup>2,3</sup>	CO <sub>2</sub> lb/unit <sup>2,6</sup>	CH <sub>4</sub> lb/unit <sup>2,4,5</sup>	N <sub>2</sub> O lb/unit <sup>2,4,5</sup>
	Type	Category	BHP									
<b>Installation of Terrestrial Transmission Cables</b>												
Vegetation Clearing	Brush Hog	offroad	11	0.02	0.11	0.11	0.00	0.01	0.01	14.27	0.00	0.00
Topsoil Removal and Storage	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
Access Path Prep (gravel)	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	18-yard dump	onroad HHD		0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
Trench Excavation	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Ram Hoe	offroad	330	0.14	0.94	2.35	0.00	0.13	0.13	390.14	0.01	0.00
	Hard Rock Trencher	offroad	335	0.24	1.61	3.40	0.00	0.22	0.21	395.76	0.02	0.00
Cable Delivery	Flatbed Truck, 30 mph	onroad HHD		0.00	0.00	0.01	0.00	0.00	0.00	3.70	0.00	0.00
	Crane, 40 ton	offroad	300	0.17	0.47	2.22	0.00	0.10	0.09	350.73	0.01	0.00
HDD <sup>7</sup>	Drilling Power Unit	offroad	800	0.89	3.39	11.69	0.01	0.54	0.52	933.94	0.04	0.01
	Generator	offroad	50	0.03	0.18	0.53	0.00	0.03	0.03	64.97	0.00	0.00
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	onroad HHD		0.00	0.00	0.01	0.00	0.00	0.00	3.70	0.00	0.00
	Crane, 40-ton	offroad	300	0.17	0.47	2.22	0.00	0.10	0.09	350.73	0.01	0.00
	Puller/Tensioner	offroad	165	0.34	1.28	2.02	0.00	0.23	0.22	226.92	0.01	0.00
	Mid-pull caterpillars	offroad	165	0.34	1.28	2.02	0.00	0.23	0.22	226.92	0.01	0.00
Splice Cable	Generators	offroad	48	0.03	0.18	0.51	0.00	0.03	0.03	62.37	0.00	0.00
	Propane heaters	offroad	58.9	0.00	0.01	0.02	0.00	0.00	0.00	20.64	0.00	0.00
Deliver and Install Thermal Backfill	18-yard dump	onroad HHD		0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00



Activity	Equipment and Vehicles			VOC lb/unit <sup>2</sup>	CO lb/unit <sup>2</sup>	NO <sub>x</sub> lb/unit <sup>2</sup>	SO <sub>x</sub> lb/unit <sup>2</sup>	PM <sub>10</sub> lb/unit <sup>2,3</sup>	PM <sub>2.5</sub> lb/unit <sup>2,3</sup>	CO <sub>2</sub> lb/unit <sup>2,6</sup>	CH <sub>4</sub> lb/unit <sup>2,4,5</sup>	N <sub>2</sub> O lb/unit <sup>2,4,5</sup>
	Type	Category	BHP									
<b>Installation of Terrestrial Transmission Cables (continued)</b>												
Install Native Backfill	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Shaker/screen	offroad	110	0.07	0.22	0.90	0.00	0.05	0.05	128.57	0.01	0.00
	Compressor for tampers	offroad	20	0.03	0.12	0.22	0.00	0.02	0.02	25.94	0.00	0.00
Remove Excess Native Fill from site	18-yard dump	onroad HHD		0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
Replace Topsoil, York Rake Vegetation	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Hydroseed Sprayer	offroad	115	0.27	0.99	1.64	0.00	0.17	0.17	158.04	0.01	0.00
Miscellaneous	Pickup trucks	onroad LD		0.00	0.02	0.00	0.00	0.00	0.00	0.97	0.00	0.00
<b>Construction of Cooling Stations</b>												
Site Preparation (pavement and foundations)	Bulldozer	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	Backhoe	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Loader	offroad	150	0.3	1.2	1.8	0.0	0.2	0.2	206.3	0.0	0.0
	18-yard dump	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
Site Prep Grading	Bulldozer	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	Backhoe	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Loader	offroad	150	0.3	1.2	1.8	0.0	0.2	0.2	206.3	0.0	0.0
	18-yard dump	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0

Activity	Equipment and Vehicles			VOC lb/unit <sup>2</sup>	CO lb/unit <sup>2</sup>	NO <sub>x</sub> lb/unit <sup>2</sup>	SO <sub>x</sub> lb/unit <sup>2</sup>	PM <sub>10</sub> lb/unit <sup>2,3</sup>	PM <sub>2.5</sub> lb/unit <sup>2,3</sup>	CO <sub>2</sub> lb/unit <sup>2,6</sup>	CH <sub>4</sub> lb/unit <sup>2,4,5</sup>	N <sub>2</sub> O lb/unit <sup>2,4,5</sup>
	Type	Category	BHP									
<b>Construction of Cooling Stations (continued)</b>												
Building Foundations (floor)	Backhoe	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Bobcat	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Loader	offroad	150	0.3	1.2	1.8	0.0	0.2	0.2	206.3	0.0	0.0
	Bulldozer	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	Small crane-forms	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0
	Medium crane-concrete bucket	offroad	300	0.2	0.5	2.2	0.0	0.1	0.1	350.7	0.0	0.0
	Concrete Mixer, offsite delivery	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
Building	Large crane	offroad	450	0.2	1.1	4.2	0.0	0.2	0.2	526.1	0.0	0.0
	Small crane	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0
	Forklifts, offloading equipment	offroad	75	0.1	0.6	0.7	0.0	0.1	0.1	98.4	0.0	0.0
	Small crane, offloading equipment	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0
	Generators	offroad	50	0.0	0.2	0.5	0.0	0.0	0.0	65.0	0.0	0.0
	Propane heaters	offroad	58.9	0.00	0.01	0.02	0.00	0.00	0.00	20.64	0.00	0.00
Final Site Preparation, traprock, paving, vegetation plantings	Bulldozer	offroad		0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	18-yard dump	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Hotbox with truck	onroad LD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Roller	offroad	100	0.1	0.8	0.9	0.0	0.1	0.1	131.2	0.0	0.0
	Flatbed Truck, 30 mph	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Backhoe, plantings	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0

Activity	Equipment and Vehicles			VOC lb/unit <sup>2</sup>	CO lb/unit <sup>2</sup>	NO <sub>x</sub> lb/unit <sup>2</sup>	SO <sub>x</sub> lb/unit <sup>2</sup>	PM <sub>10</sub> lb/unit <sup>2,3</sup>	PM <sub>2.5</sub> lb/unit <sup>2,3</sup>	CO <sub>2</sub> lb/unit <sup>2,6</sup>	CH <sub>4</sub> lb/unit <sup>2,4,5</sup>	N <sub>2</sub> O lb/unit <sup>2,4,5</sup>
	Type	Category	BHP									
<b>Construction of Cooling Stations (continued)</b>												
HDD	Drilling Power Unit, 9 locations @ 6 equipment days/location	offroad	800	0.9	3.4	11.7	0.0	0.5	0.5	933.9	0.0	0.0
	Generator	offroad	50	0.0	0.2	0.5	0.0	0.0	0.0	65.0	0.0	0.0
Miscellaneous	Craft utility, delivery trucks	onroad MD		0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0
	Pickup trucks	onroad LD		0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0

Notes:

Overland Equipment estimate includes mileposts 101.3 to 228.4.

BHP: Brake-horsepower. This should be the maximum rated load of the vehicle of vessel engine(s).

HDD: Horizontal Directional Drilling. LD: Light Duty. HD: Heavy Duty. HHD: Heavy Heavy Duty

<sup>1</sup> Emissions factors weighted for calendar year 2013.

<sup>2</sup> Units are operating hours for offroad engines, vehicle miles traveled (VMT) for onroad vehicles.

<sup>3</sup> Offroad diesel exhaust PM<sub>2.5</sub> = 92% of PM<sub>10</sub>; Onroad HHD particulate emission factors include allowances for tire and brake wear.

<sup>4</sup> Offroad N<sub>2</sub>O and CH<sub>4</sub> emissions are based on 40 CFR 98, Subpart C.

<sup>5</sup> Onroad N<sub>2</sub>O and CH<sub>4</sub> emissions are based on the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008 (USEPA 2009b).

<sup>6</sup> Onroad CO<sub>2</sub> emissions are based on EPA420-F-05-001 which rates gasoline emissions at 19.4 lb/gal and diesel at 22.2 lb/gal (USEPA 2005).

<sup>7</sup> HDD includes 44 Upland Streams, 1 Champlain exit, 2 Hudson Entrance/Exit, 47 Locations, and 6 equipment days per location.

**Table M-7. Fugitive Dust Estimation Calculations - Earthmoving, Overland Segment**

<b>Construction Earthmoving</b>	<b>Project hours</b>	<b>PM<sub>10</sub> lb/hr</b>	<b>PM<sub>2.5</sub> lb/hr</b>	<b>PM<sub>10</sub> lbs</b>	<b>PM<sub>2.5</sub> lbs</b>
<b>Topsoil Removal and Storage</b>					
Small bulldozer	1,016	16.64	4.91	16,911.15	4,993.17
Bobcat	1,016	0.00034	0.000052	0.35	0.05
<b>Access path prep (gravel)</b>					
Small bulldozer	2,032	16.64	4.91	33,822.29	9,986.33
18-yard dump	4,064	0.00034	0.000052	1.38	0.21
<b>Trench Excavation</b>					
Backhoe	4,064	0.00034	0.000052	1.38	0.21
Bobcat	4,064	0.103	0.005126	419.71	20.83
Ram Hoe	2,032	0.103	0.005126	209.85	10.42
Hard Rock Trencher	1,016	0.103	0.005126	104.93	5.21
<b>HDD</b>					
Drilling Unit	2,256	0.00034	0.000052	0.77	0.12
Generator	2,256	0.00034	0.000052	0.77	0.12
<b>Deliver and Install Thermal Backfill</b>					
18-yard dump	8,128	0.00034	0.000052	2.77	0.42
Backhoe	4,064	0.00034	0.000052	1.38	0.21
Bobcat	4,064	16.64	4.91	67,644.58	19,972.67
<b>Install Native Backfill</b>					
Backhoe	2,032	0.00034	0.000052	0.69	0.10
Bobcat	2,032	16.64	4.91	33,822.29	9,986.33
Shaker/screen	2,032	0.00034	0.000052	0.69	0.10
Compressor for tampers	2,032	0.00034	0.000052	0.69	0.10
<b>Remove Excess Native Fill from Site</b>					
18-yard dump	2,032	0.00034	0.000052	0.69	0.10
Backhoe	1,016	0.00034	0.000052	0.35	0.05
<b>Replace Topsoil, York Rake Vegetation</b>					
Small bulldozer	2,032	16.64	4.91	33,822.29	9,986.33
Hydroseed Sprayer	2,032	0.103275	0.005126	209.85	10.42
<b>Site Preparation</b>					
Bulldozer	36	16.64	4.91	599.21	176.92
Backhoe	36	0.00034	0.000052	0.01	0.00
Loader	36	0.00034	0.000052	0.01	0.00
18-yard dump	36	0.00034	0.000052	0.01	0.00

Construction Earthmoving	Project hours	PM <sub>10</sub> lb/hr	PM <sub>2.5</sub> lb/hr	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs
<b>Site Prep Grading</b>					
Bulldozer	36	16.64	4.91	599.21	176.92
Backhoe	36	0.00034	0.000052	0.01	0.00
Loader	36	0.00034	0.000052	0.01	0.00
18-yard dump	72	0.00034	0.000052	0.02	0.00
<b>Building Foundations</b>					
Backhoe	36	0.00034	0.000052	0.01	0.00
Bobcat	36	0.10328	0.00513	3.72	0.18
Loader	24	0.00034	0.000052	0.01	0.00
Bulldozer	24	16.64	4.91	399.48	117.95
Concrete Mixer, offsite delivery	16	0.00034	0.000052	0.01	0.00
<b>Final Site Preparation</b>					
Bulldozer	16	16.64	4.91	266.32	78.63
18-yard dump	16	0.00034	0.000052	0.01	0.00
Hotbox with truck	16	0.00034	0.000052	0.01	0.00
Roller	16	0.10328	0.00513	1.65	0.08
<b>HDD</b>					
Drilling Power Unit	432	0.00034	0.000052	0.15	0.02
<b>TOTAL (lbs)</b>				<b>186,979</b>	<b>54,974</b>
<b>Total Earthmoving Emissions, tons</b>				<b>93.49</b>	<b>27.49</b>

Notes:

HDD: Horizontal Directional Drilling

Based on USEPA 2006 (USEPA 2006).

AP-42 Section 11.9 for dozing (Table 11.9-1):

$E = 0.75 * (s)^{1.5} / (M)^{1.4}$  for PM<sub>10</sub>

$E = 0.105 * 5.7 * (s)^{1.2} / (M)^{1.3}$  for PM<sub>2.5</sub>

E = lb/hr fugitive

s = Silt Content assumed to be 55% for construction sites. (CHPEI 2010)

M = moisture content = 8% (assumes unwatered subsoil)

AP-42 Section 11.9 for grading, rolling, and excavating (Table 11.9-1) (USEPA 2006)

$E = S * 0.60 * 0.051 * (S)^{2.0}$  for PM<sub>10</sub>

$E = S * 0.031 * 0.040 * (S)^{2.5}$  for PM<sub>2.5</sub>

Simplifies to  $E = 0.60 * 0.051 * (S)^{3.0}$  for PM<sub>10</sub>

Simplified to  $E = 0.031 * 0.040 * (S)^{3.5}$  for PM<sub>2.5</sub>

E = lb/VMT \* VMT/hr = lb/hr fugitive

S = Mean Vehicle Speed assumed to be 3 mph for graders, 1.5 mph for excavators & rollers

Assumes VMT = S \* hours of use

AP-42 Section 13.2.4 Loading/Handling (digger, driller, backhoe, loader): (USEPA 2006)

$E = 0.35 * 0.0032 * (U/5)^{1.3} / (M/2)^{1.4}$  for PM<sub>10</sub>

$E = 0.053 * 0.0032 * (U/5)^{1.3} / (M/2)^{1.4}$  for PM<sub>2.5</sub>

E = lb/ton \* tons/hr = lb/hr fugitive

U = average wind speed is 8.9 mph for Albany, New York (NOAA 2002)

M = moisture content = 8% (assumes unwatered subsoil)

**Table M-8. Fugitive Dust Estimation Calculations - Road Dust, Overland Segment**

Construction Road Dust	Project VMT	PM <sub>10</sub> lb/VMT	PM <sub>2.5</sub> lb/VMT	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs
<b>All Roads</b>					
Pickup Truck	268,200				
18-yard dump Truck	0				
Flatbed Truck	122,160				
<b>Subtotals</b>	<b>390,360</b>				
<b>Unpaved Roads</b>					
Pickup Truck	80,460	0.06820	0.00682	5,487	549
18-yard dump Truck	0	0.10604	0.01060	0	0
Flatbed Truck	12,216	0.19222	0.01922	2,348	235
<b>Subtotals</b>	<b>92,676</b>			<b>7,836</b>	<b>784</b>
<b>Paved Roads</b>					
Pickup Truck	187,740	0.00622	0.00076	1,168	143
18-yard dump Truck	0	0.02802	0.00403	0	0
Flatbed Truck	109,944	0.20521	0.03061	22,561	3,365
<b>Subtotals</b>	<b>297,684</b>			<b>23,729</b>	<b>3,509</b>
<b>Total Road Dust Emissions, tons</b>				<b>15.78</b>	<b>2.15</b>

Notes:

Based on USEPA 2006 and USEPA 2003.

Unpaved Road Dust (AP-42 Section 13.2.2):

$E = 1.5 * (s/12)^{0.9} * (W/3)^{0.45} * PC * (1-CE)$  for PM<sub>10</sub>

$E = 0.15 * (s/12)^{0.9} * (W/3)^{0.45} * PC * (1-CE)$  for PM<sub>2.5</sub>

E = lb/VMT fugitive

s = surface silt content = 9%

(average for unpaved roads and construction sites, AP-42 Table 13.2.2-1)

W = average vehicle weight (see below)

PC=(365-P/365)

CE = Control Efficiency for watering = 90% for M between 4 and 5

(AP-42 Figure 13.2.2-2)

Based on USEPA 2006.

Paved Road Dust (AP-42 Section 13.2.1)

$E=0.016*(sL/2)^{0.65}*(W/3)^{1.5}-0.00047*PC$  for PM<sub>10</sub>

$E=0.0024*(sL/2)^{0.65}*(W/3)^{1.5}-0.00036*PC$  for PM<sub>2.5</sub>

E = lb/VMT fugitive

sL=Silt Loading assumed to be 0.5 g/m<sup>2</sup> for average ADT categories from Table 13.2.1-3

Note: precipitation correction not used (PC=1) for worst case day calculations

PC=(1-P/4N)

P = number of wet days over 0.01 in precipitation for averaging period

(150 days/year average for New York State)

N=days of period = 365 days

Vehicle Weights based on USEPA 2010.

Light Duty = 3 tons average

Medium Duty = 8 tons average

Heavy Heavy Duty = 30 tons average (loaded 40 tons, unloaded 20 tons)

18-yard dump assumes 70% unpaved mileage, and 30% paved mileage.

Pickup Truck assumes 30% unpaved mileage, and 70% paved mileage.

Flatbed Truck assumes 10% unpaved mileage, and 90% paved mileage.

**Table M-9. Estimated Total Emissions<sup>1</sup>, Overland Segment**

Activity	Equipment and Vehicles <sup>2</sup>			VMT	VOC lbs	CO lbs	NO <sub>x</sub> lbs	SO <sub>x</sub> lbs	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs	CO <sub>2</sub> lbs	CH <sub>4</sub> lbs	N <sub>2</sub> O lbs	CO <sub>2</sub> eqv lbs <sup>3</sup>
	Type	Category	hrs											
<b>Emissions from Installation of Terrestrial Transmission Cables</b>														
Vegetation Clearing	Brush Hog	offroad	1,016		15	109	110	0	11	10	14,500	1	0	14,543
Topsoil Removal and Storage	Small Bulldozer	offroad	1,016		148	621	1,830	3	118	114	342,255	13	3	343,368
	Bobcat	offroad	1,016		202	1,031	928	1	153	149	113,203	3	1	113,488
Access Path Prep (gravel)	Small Bulldozer	offroad	2,032		297	1,242	3,661	6	236	229	684,510	27	5	686,735
	18-yard dump	onroad HDD	4,064	20,320	48.83	281.74	387.14	0.59	7.54	5.89	75,184	0.22	0.22	75,255
Trench Excavation	Backhoe	offroad	4,064		810	4,122	3,714	4	613	595	452,811	14	3	453,951
	Bobcat	offroad	4,064		810	4,122	3,714	4	613	595	452,811	14	3	453,951
	Ram Hoe	offroad	2,032		284	1,908	4,766	7	262	255	792,768	28	6	795,110
	Hard Rock Trencher	offroad	1,016		244	1,640	3,454	4	219	213	402,093	16	3	403,401
Cable Delivery	Flatbed Truck, 30 mph	onroad HDD	2,032	60,960	47.85	169.47	601.00	1.77	22.62	17.68	225,552	0.671	0.65	225,766
	Crane, 40 ton	offroad	508		85	237	1,127	2	48	47	178,170	7	1	178,756
HDD	Drilling Power Unit	offroad	2,256		2015	7,645	26,366	19	1,209	1,173	2,106,975	84	17	2,113,910
	Generator	offroad	2,256		78	417	1,187	1	74	72	146,578	5	1	147,012
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	onroad HDD	2,032	60,960	47.85	169.47	601.00	1.77	22.62	17.68	225,552	0.67	0.65	225,766
	Crane, 40-ton	offroad	508		85	237	1,127	2	48	47	178,170	7	1	178,756
	Puller/Tensioner	offroad	4,064		1,362	5,202	8,226	8	927	900	922,194	31	6	924,770
	Mid-pull caterpillars	offroad	4,064		1,362	5,202	8,226	8	927	900	922,194	31	6	924,770
Splice Cable	Generators	offroad	4,064		135	721	2,053	2	128	125	253,487	9	2	254,236
	Propane heaters	offroad	4,064		7	50	87	0	5	5	83,868	1	6	85,768
Deliver and Install Thermal Backfill	18-yard dump	onroad HDD	8,128	243,840	585.95	3,380.84	4,645.64	7.07	90.46	70.71	902,208	2.68	2.58	903,066
	Backhoe	offroad	4,064		810	4,122	3,714	4	613	595	452,811	14	3	453,951
	Bobcat	offroad	4,064		810	4,122	3,714	4	613	595	452,811	14	3	453,951

Activity	Equipment and Vehicles <sup>2</sup>			VMT	VOC lbs	CO lbs	NO <sub>x</sub> lbs	SO <sub>x</sub> lbs	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs	CO <sub>2</sub> lbs	CH <sub>4</sub> lbs	N <sub>2</sub> O lbs	CO <sub>2</sub> eqv lbs <sup>3</sup>
	Type	Category	hrs											
<b>Emissions from Installation of Terrestrial Transmission Cables (continued)</b>														
Install Native Backfill	Backhoe	offroad	2,032		405	2,061	1,857	2	307	297	226,406	7	1	226,976
	Bobcat	offroad	2,032		405	2,061	1,857	2	307	297	226,406	7	1	226,976
	Shaker/screen	offroad	2,032		143	452	1,830	2	107	104	261,260	10	2	262,119
	Compressor for tampers	offroad	2,032		59.17	246.01	449.68	0.48	36.62	35.52	52,717.80	1.88	0.38	52,874
Remove Excess Native Fill from site	18-yard dump	onroad HHD	2,032	10,160	24.41	140.87	193.57	0.29	3.77	2.95	37,592	0.11	0.11	37,628
	Backhoe	offroad	1,016		202	1031	928	1	153	149	113,203	3	1	113,488
Replace Topsoil, York Rake Vegetation	Small Bulldozer	offroad	2,032		297	1,242	3,661	6	236	229	684,510	27	5	686,735
	Hydroseed Sprayer	offroad	2,032		556	2,007	3,339	3	349	338	321,130	11	2	322,028
Miscellaneous	Pickup trucks	onroad LD	8,800	264,000	383.06	6,250.99	354.55	5.02	14.52	6.60	256,080	9.50	3.8544	257,474
<b>Emissions from Construction of Cooling Stations</b>														
Site Preparation (pavement and foundations)	Bulldozer	offroad	36		5.3	22.0	64.9	0.1	4.2	4.1	12,127.1	0.5	0.1	12,167
	Backhoe	offroad	36		7.2	36.5	32.9	0.0	5.4	5.3	4,011.1	0.1	0.0	4,021
	Loader	offroad	36		11.0	41.9	66.2	0.1	7.5	7.2	7,426.4	0.3	0.1	7,447
	18-yard dump	onroad HHD		180	0.4	2.5	3.4	0.0	0.1	0.1	666.0	0.0	0.0	667
Site Prep Grading	Bulldozer	offroad	36		5.3	22.0	64.9	0.1	4.2	4.1	12,127.1	0.5	0.1	12,167
	Backhoe	offroad	36		7.2	36.5	32.9	0.0	5.4	5.3	4,011.1	0.1	0.0	4,021
	Loader	offroad	36		11.0	41.9	66.2	0.1	7.5	7.2	7,426.4	0.3	0.1	7,447
	18-yard dump	onroad HHD		360	0.9	5.0	6.9	0.0	0.1	0.1	1,332.0	0.0	0.0	1,333
Building Foundations (floor)	Backhoe	offroad	36		7.2	36.5	32.9	0.0	5.4	5.3	4,011.1	0.1	0.0	4,021
	Bobcat	offroad	36		7.2	36.5	32.9	0.0	5.4	5.3	4,011.1	0.1	0.0	4,021
	Loader	offroad	24		7.3	27.9	44.2	0.0	5.0	4.8	4,950.9	0.2	0.0	4,965
	Bulldozer	offroad	24		3.5	14.7	43.2	0.1	2.8	2.7	8,084.8	0.3	0.1	8,111
	Forklifts, offloading equipment	offroad	72		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
	Generators	offroad	144		14.0	44.5	178.5	0.2	10.5	10.2	26,089.3	1.0	0.2	26,175
	Propane heaters	offroad	144		5.0	26.6	75.8	0.1	4.7	4.6	9,356.1	0.3	0.1	9,384



Activity	Equipment and Vehicles <sup>2</sup>			VMT	VOC lbs	CO lbs	NO <sub>x</sub> lbs	SO <sub>x</sub> lbs	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs	CO <sub>2</sub> lbs	CH <sub>4</sub> lbs	N <sub>2</sub> O lbs	CO <sub>2</sub> eqv lbs <sup>3</sup>
	Type	Category	hrs											
<b>Emissions from Construction of Cooling Stations (continued)</b>														
Final Site Preparation, traprock, paving, vegetation plantings	Bulldozer	offroad	16		2.3	9.8	28.8	0.0	1.9	1.8	5,389.8	0.2	0.0	5,407
	18-yard dump	onroad HHD		80	0.2	1.1	1.5	0.0	0.0	0.0	296.0	0.0	0.0	296
	Hotbox with truck	onroad LD		40	0.1	0.6	0.8	0.0	0.0	0.0	148.0	0.0	0.0	148
	Roller	offroad	16		1.3	12.6	14.1	0.0	1.7	1.6	2,098.9	0.1	0.0	2,105
	Flatbed Truck, 30 mph	onroad HHD		240	0.2	0.7	2.4	0.0	0.1	0.1	888.0	0.0	0.0	889
	Backhoe, plantings	offroad	8		1.6	8.1	7.3	0.0	1.2	1.2	891.4	0.0	0.0	894
HDD	Drilling Power Unit, 9 locations @ 6 equipment days/location	offroad	432		385.8	1,463.9	5,048.9	3.6	231.5	224.6	403,463.3	16.0	3.2	404,791
	Generator	offroad	432		15.0	79.9	227.3	0.3	14.2	13.8	28,068.2	1.0	0.2	28,151
Miscellaneous	Craft utility, delivery trucks	onroad MD		8,400	22.6	276.9	19.5	0.2	0.5	0.2	10,864.0	0.6	0.2	10,954
	Pickup trucks	onroad LD		4,200	6.1	99.4	5.6	0.1	0.2	0.1	4,074.0	0.2	0.1	4,096
<b>TOTAL Combustion Emissions By Activity (tons)</b>					<b>VOC lbs</b>	<b>CO lbs</b>	<b>NO<sub>x</sub> lbs</b>	<b>SO<sub>x</sub> lbs</b>	<b>PM<sub>10</sub> lbs</b>	<b>PM<sub>2.5</sub> lbs</b>	<b>CO<sub>2</sub> lbs</b>	<b>CH<sub>4</sub> lbs</b>	<b>N<sub>2</sub>O lbs</b>	<b>CO<sub>2</sub> eqv lbs<sup>3</sup></b>
Vegetation Clearing					0.01	0.05	0.05	0.00	0.01	0.01	7.25	0.00	0.00	7.27
Topsoil Removal and Storage					0.18	0.83	1.38	0.00	0.14	0.13	227.73	0.01	0.00	228.43
Access Path Prep (gravel)					0.17	0.76	2.02	0.00	0.12	0.12	379.85	0.01	0.00	381.00
Trench Excavation					1.07	5.90	7.82	0.01	0.85	0.83	1,050.24	0.04	0.01	1,053.21
Cable Delivery					0.07	0.20	0.86	0.00	0.04	0.03	201.86	0.00	0.00	202.26
HDD					1.05	4.03	13.78	0.01	0.64	0.62	1,126.78	0.04	0.01	1,130.46
Site Deliver and Pull Cable					1.43	5.41	9.09	0.01	0.96	0.93	1,124.05	0.03	0.01	1,127.03
Splice Cable					0.07	0.36	1.03	0.00	0.06	0.06	126.74	0.00	0.00	127.12
Deliver and Install Thermal Backfill					1.10	5.81	6.04	0.01	0.66	0.63	903.92	0.02	0.00	905.48
Install Native Backfill					0.51	2.41	3.00	0.00	0.38	0.37	383.39	0.01	0.00	384.47
Remove Excess Native Fill from site					0.11	0.59	0.56	0.00	0.08	0.08	75.40	0.00	0.00	75.56
Replace Topsoil, York Rake Vegetation					0.43	1.62	3.50	0.00	0.29	0.28	502.82	0.02	0.00	504.38
Miscellaneous					0.19	3.13	0.18	0.00	0.01	0.00	128.04	0.00	0.00	128.74

<b>TOTAL Combustion Emissions By Activity (tons)</b>	<b>VOC lbs</b>	<b>CO lbs</b>	<b>NOx lbs</b>	<b>SOx lbs</b>	<b>PM<sub>10</sub> lbs</b>	<b>PM<sub>2.5</sub> lbs</b>	<b>CO<sub>2</sub> lbs</b>	<b>CH<sub>4</sub> lbs</b>	<b>N<sub>2</sub>O lbs</b>	<b>CO<sub>2</sub> eqv lbs<sup>3</sup></b>
Site Preparation	0.01	0.05	0.08	0.00	0.01	0.01	12.12	0.00	0.00	12.15
Site Prep Grading	0.01	0.05	0.09	0.00	0.01	0.01	12.45	0.00	0.00	12.48
Building Foundations	0.01	0.06	0.08	0.00	0.01	0.01	10.53	0.00	0.00	10.56
Final Site Preparation, traprock, paving, vegetation plantings	0.00	0.02	0.03	0.00	0.00	0.00	4.86	0.00	0.00	4.87
HDD	0.20	0.77	2.64	0.00	0.12	0.12	215.77	0.01	0.00	216.47
<b>Subtotal</b>	<b>6.62</b>	<b>32.05</b>	<b>52.22</b>	<b>0.06</b>	<b>4.39</b>	<b>4.24</b>	<b>6,493.78</b>	<b>0.21</b>	<b>0.04</b>	<b>6,511.94</b>
<b>Total Combustion Emissions, lbs</b>	<b>15,782</b>	<b>78,441</b>	<b>122,699</b>	<b>141</b>	<b>10,863</b>	<b>10,502</b>	<b>15,664,926</b>	<b>510</b>	<b>113</b>	<b>15,710,761</b>
<b>Total Combustion Emissions, tons</b>	<b>8</b>	<b>39</b>	<b>61</b>	<b>0</b>	<b>5</b>	<b>5</b>	<b>7,832</b>	<b>0</b>	<b>0</b>	<b>7,855</b>
<b>Total Fugitive Dust emissions, earthmoving tons<sup>4</sup></b>	-	-	-	-	<b>93</b>	<b>27</b>	-	-	-	-
<b>Total Fugitive Dust emissions, road dust, tons<sup>4</sup></b>	-	-	-	-	<b>16</b>	<b>2</b>	-	-	-	-
<b>Combined Combustion and Fugitive Dust emissions, tons</b>	<b>7.89</b>	<b>39.22</b>	<b>61.35</b>	<b>0.07</b>	<b>114.70</b>	<b>34.88</b>	<b>7,832</b>	<b>0.26</b>	<b>0.06</b>	<b>7,855</b>

Notes:

No underwater cable laying in segment.

Overland Equipment estimate includes mileposts 101.3 to 228.4.

BHP: Brake-horsepower. This should be the maximum rated load of the vehicle or vessel engines(s).

HDD: Horizontal Directional Drilling.

<sup>1</sup> Emissions factors weighted for calendar year 2013 (USEPA 2003, USEPA 2009b).

<sup>2</sup> Units are operating hours for offroad engines, vehicle miles traveled (VMT) for onroad vehicles.

<sup>3</sup> Carbon dioxide equivalents (CO<sub>2</sub> eqv) are calculated by summing the products of mass GHG emissions by species times their respective GWP coefficients (USEPA 2009a).

<sup>4</sup> See Fugitive Dust Estimation Calculations tables for more detailed information.

**Table M-10. Estimated Equipment and Vehicle Use During Aquatic Cable Installation, Hudson River Segment**

Activity	Equipment and Vehicles			Hours per Day	Working Days	LF	trips	cables	Total hours
	Type	BHP	Qty						
Cable installation	Primary Cable Vessel								
	2 azimuth units	2,640	2	24	59	0.25	1	2	1,416
	azimuth unit	1,360	1	24	59	0.25	1	2	708
	retractable azimuth unit	2,475	1	24	59	0.1	1	2	283.2
	tunnel unit	1,300	1	24	59	0.25	1	2	708
	generators (500 kVA)	536	4	24	59	0.75	1	2	8,496
	generators (600 kVA)	643	1	24	59	0.5	1	2	1,416
	Survey boat	1,131	1	24	59	0.5	1	2	1,416
Crew boat	425	1	24	59	0.2	1	2	566.4	
Installation of Cable Protection	Tugboat, Towboat	1,970	1	12	59	0.25	1	2	354
	Crew boat	425	1	12	59	0.2	1	2	283.2
Cable Shipments	Main propulsion	8,201	1	10.5		0.5	20		105
	Auxiliary engine	1,776	1	10.5		0.17	20		35.7

Notes:

BHP: Brake-horsepower. The maximum rated load of the vehicle or vessel engine(s).

LF: Load Factor

59 work days based on 1.49 miles per day from mileposts 228.4 to 295.4 and 302.8 to 324.0.

Cable shipments emission duration of 10.5 hours per trip based on 12 mph for 125.7 miles.

125.7 miles is the average distance for each of the 20 cable shipments (6 miles of cable per shipment) round trip.

**Table M-11. Estimated Equipment and Vehicle Use During Terrestrial Cable Installation, Hudson River Segment**

Task	Equipment and Vehicles				Working Days	Daily		# equipment hours operation (7.6 miles)	Miles Per Hour (on road only)
	Equipment Type	Progress (miles)/ 8-hour day	BHP	Qty		Hours	VMT		
Vegetation Clearing	Brush Hog	1	11	1	7.6	8		60.80	
Topsoil removal and storage	Small Bulldozer	1	285	1	7.6	8		60.80	
	Bobcat	1	73	1	7.6	8		60.80	
Access path prep (gravel)	Small Bulldozer	0.5	285	1	15.2	8		121.60	
	18-yard dump	0.5		2	15.2	8	1,216	243.20	5
Trench Excavation	Backhoe	0.25	73	1	30.4	8		243.20	
	Bobcat	0.25	73	1	30.4	8		243.20	
	Ram Hoe	0.25	330	1	30.4	4		121.60	
	Hard Rock Trencher	0.25	335	1	30.4	2		60.80	
Deliver Cable @ 3 reels per	Flatbed Truck, 30 mph	0.5		1	15.2	8	3,648	121.60	30
	Crane	0.5	300	1	15.2	2		30.40	
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	0.5		1	15.2	8	3,648	121.6	30
	Crane, 40 ton	0.5		1	15.2	2		30.4	
	Puller/Tensioner	0.5	165	2	15.2	8		243.2	
	Mid-pull caterpillars	0.5	165	2	15.2	8		243.2	
Splice Cable	Generators	0.25	48	1	30.4	8		243.2	
	Propane heaters	0.25	0.5	1	30.4	8		243.2	
Deliver and install Thermal Backfill	18-yard dump	0.25		2	30.4	8	14,592	486.4	30
	Backhoe	0.25	73	1	30.4	8		243.2	
	Bobcat	0.25	73	1	30.4	8		243.2	
Install Native Backfill	Backhoe	0.5	73	1	15.2	8		121.6	
	Bobcat	0.5	73	1	15.2	8		121.6	
	Shaker/screen	0.5	110	1	15.2	8		121.6	
	Compressor for tampers	0.5		1	15.2	8		121.6	

Task	Equipment and Vehicles				Working Days	Daily		# equipment hours operation (7.6 miles)	Miles Per Hour (on road only)
	Equipment Type	Progress (miles)/ 8-hour day	BHP	Qty		Hours	VMT		
Remove Excess Native Fill from Site	18-yard dump	1		2	7.6	8	608	121.6	5
	Backhoe	1	73	1	7.6	8		60.8	
Replace Topsoil, York Rake Vegetation	Small Bulldozer	0.5	285	1	15.2	8		121.6	
	Hydroseed Sprayer	0.5	115	1	15.2	8		121.6	
Miscellaneous	Pickup trucks			10	30.4	4	36,480	1216	30

**Table M-12. Estimated Equipment and Vehicle Use During Construction of Cooling Stations, Hudson River Segment**

Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (on road only)	
		Equipment Type	BHP	Qty		Hours	VMT			
Site Preparation (pavement and foundations)	3 days (half a day at each cooling station)	Bulldozer	285	1	3	8		24		
		Backhoe	73	1	3	8		24		
		Loader	150	1	3	8		24		
		18-yard dump			1	3	8	120	24	5
Site Prep Grading	3 days (half a day at each cooling station)	Bulldozer	285	1	3	8		24		
		Backhoe	73	1	3	8		24		
		Loader	150	1	3	8		24		
		18-yard dump			2	3	8	240	48	5
Building Foundations, floor	3 days (half a day at each cooling station)	Backhoe	73	1	3	8		24		
		Bobcat	73	1	3	8		24		
		Loader	150	1	2	8		16		
		Bulldozer	285	1	2	8		16		
		Small crane-forms	155	2	0	8		0		
		Medium crane-concrete bucket	300	2	0	8		0		
		Concrete Mixer, offsite delivery			1	1.5	8	30	12	2.5
Building	12 days (2 days at each station)	Small crane	155	1	9	8		72		
		Forklifts, offloading equipment	75	1	6	8		48		
		Generators	50	2	6	8		96		
		Propane heaters	58.9	2	6	8		96		
HDD, transmission cables		Drilling Power Unit, 6 locations @ 6 equipment days/location	800		36	8		288		
		Generator	50		36	8		288		
Final Site Preparation, Paving	6 days	Bulldozer		1	1.5	8		12		
		18-yard dump			1	1.5	8	60	12	5
		Hotbox with truck			1	1.5	8	30	12	2.5
		Roller	100		1	1.5	8		12	

Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (on road only)
		Equipment Type	BHP	Qty		Hours	VMT		
Final Site Preparation, Plantings	(1 day at each cooling station)	Flatbed Truck, 30 mph		1	0.5	8	120	4	30
		Backhoe, plantings	73	1	0.5	8		4	
Miscellaneous	4.5 weeks	Craft utility, delivery trucks		2	22.5	4	5,400	180	30
		Pickup trucks		1	22.5	4	2,700	90	30

Notes:

\* Calendar days are used to provide for long workdays and weekend work.

HDD: Horizontal Directional Drilling

**Table M-13. Aquatic Cable Installation Emissions Factors<sup>1</sup>, Hudson River Segment**

Activity	Equipment and Vehicles			VOC lb/hr	CO lb/hr	NOx lb/hr	SOx lb/hr	PM <sub>10</sub> lb/hr	PM <sub>2.5</sub> lb/hr	CO <sub>2</sub> lb/hr	CH <sub>4</sub> lb/hr <sup>2</sup>	N <sub>2</sub> O lb/hr <sup>2</sup>
	Type	Category	BHP									
Cable Installation	2 azimuth units	Marine	2,640	2.07	10.48	29.64	0.03	1.41	1.37	3,118.31	0.12	0.02
	azimuth unit	Marine	1,360	1.06	5.40	15.27	0.01	0.73	0.70	1,606.40	0.06	0.01
	retractable azimuth unit	Marine	2,475	1.94	9.82	27.79	0.03	1.32	1.28	2,923.41	0.11	0.02
	tunnel unit	Marine	1,300	1.02	5.16	14.60	0.01	0.69	0.67	1,535.53	0.06	0.01
	generators (500 kVA)	Marine	536	0.33	1.47	5.46	0.01	0.23	0.23	626.53	0.02	0.00
	generators (600 kVA)	Marine	643	0.40	1.76	6.55	0.01	0.28	0.27	751.60	0.03	0.01
	Survey boat	Marine	1,131	0.00	0.00	0.02	0.00	0.00	0.00	1.52	0.00	0.00
	Crew boat	Marine	425	0.00	0.00	0.02	0.00	0.00	0.00	1.52	0.00	0.00
Installation of Cable Protection	Tugboat, Towboat	Marine	1,970	0.00	0.00	0.02	0.00	0.00	0.00	1.52	0.00	0.00
	Crew boat	Marine	425	0.00	0.00	0.02	0.00	0.00	0.00	1.52	0.00	0.00
Cable Shipment <sup>3</sup>	OGV main propulsion	Marine (kW)	8,201	10.85	25.31	307.36	65.45	8.14	7.59	10,645.38	0.11	0.56
	OGV auxiliary engine	Marine (kW)	1,776	1.57	4.31	54.42	16.60	1.92	1.76	2,704.41	0.02	0.12

Notes:

<sup>1</sup> Emissions factors weighted for calendar year 2013 (USEPA 2003, USEPA 2006).

<sup>2</sup> Offroad N<sub>2</sub>O and CH<sub>4</sub> emissions are based on 40 CFR 98, Subpart C.

<sup>3</sup> Cable Shipment emissions based on USEPA 2009b.

BHP: Brake-horsepower. This should be the maximum rated load of the vehicle of vessel engines(s).



**Table M-14. Terrestrial Cable Installation and Cooling Station Construction Emissions Factors<sup>1</sup>, Hudson River Segment**

Activity	Equipment and Vehicles			VOC lb/unit <sup>2</sup>	CO lb/unit <sup>2</sup>	NO <sub>x</sub> lb/unit <sup>2</sup>	SO <sub>x</sub> lb/unit <sup>2</sup>	PM <sub>10</sub> lb/unit <sup>2,3</sup>	PM <sub>2.5</sub> lb/unit <sup>2,3</sup>	CO <sub>2</sub> lb/unit <sup>2,6</sup>	CH <sub>4</sub> lb/unit <sup>2,4,5</sup>	N <sub>2</sub> O lb/unit <sup>2,4,5</sup>
	Type	Category	BHP									
<b>Installation of Terrestrial Transmission Cables</b>												
Vegetation Clearing	Brush Hog	offroad	11	0.02	0.11	0.11	0.00	0.01	0.01	14.27	0.00	0.00
Topsoil Removal and Storage	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
Access Path Prep (gravel)	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	18-yard dump	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	4.22	0.00	0.00
Trench Excavation	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Ram Hoe	offroad	330	0.14	0.94	2.35	0.00	0.13	0.13	390.14	0.02	0.00
	Hard Rock Trencher	offroad	335	0.24	1.61	3.40	0.00	0.22	0.21	395.76	0.02	0.00
Cable Delivery	Flatbed Truck, 30 mph	onroad HHD	0	0.00	0.00	0.01	0.00	0.00	0.00	4.22	0.00	0.00
	Crane	offroad	300	0.10	0.31	1.24	0.00	0.07	0.07	181.18	0.01	0.00
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	onroad HHD	0	0.00	0.00	0.01	0.00	0.00	0.00	4.22	0.00	0.00
	Crane, 40 ton	offroad	0	0.17	0.47	2.22	0.00	0.10	0.09	350.73	0.01	0.00
	Puller/Tensioner	offroad	165	0.34	1.28	2.02	0.00	0.23	0.22	226.92	0.01	0.00
	Mid-pull caterpillars	offroad	165	0.34	1.28	2.02	0.00	0.23	0.22	226.92	0.01	0.00
Splice Cable	Generators	offroad	48	0.03	0.18	0.51	0.00	0.03	0.03	62.37	0.00	0.00
	Propane heaters	offroad	0.5	0.00	0.01	0.02	0.00	0.00	0.00	20.64	0.00	0.00
Deliver and Install Thermal Backfill	18-yard dump	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	4.22	0.00	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
Install Native Backfill	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Shaker/screen	offroad	110	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Compressor for tampers	offroad	0	0.03	0.12	0.22	0.00	0.02	0.02	25.94	0.00	0.00
Remove Excess Native Fill from site	18-yard dump	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	4.22	0.00	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00

Activity	Equipment and Vehicles			VOC lb/unit <sup>2</sup>	CO lb/unit <sup>2</sup>	NO <sub>x</sub> lb/unit <sup>2</sup>	SO <sub>x</sub> lb/unit <sup>2</sup>	PM <sub>10</sub> lb/unit <sup>2,3</sup>	PM <sub>2.5</sub> lb/unit <sup>2,3</sup>	CO <sub>2</sub> lb/unit <sup>2,6</sup>	CH <sub>4</sub> lb/unit <sup>2,4,5</sup>	N <sub>2</sub> O lb/unit <sup>2,4,5</sup>
	Type	Category	BHP									
<b>Installation of Terrestrial Transmission Cables (continued)</b>												
Replace Topsoil, York Rake Vegetation	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Hydroseed Sprayer	offroad	115	0.27	0.99	1.64	0.00	0.17	0.17	158.04	0.01	0.00
Miscellaneous	Pickup trucks	onroad LD	0	0.00	0.02	0.00	0.00	0.00	0.00	0.97	0.00	0.00
<b>Construction of Cooling Stations</b>												
Site Preparation (pavement and foundations)	Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Loader	offroad	150	0.30	1.16	1.84	0.00	0.21	0.20	206.29	0.01	0.00
	18-yard dump	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
Site Prep Grading	Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Loader	offroad	150	0.30	1.16	1.84	0.00	0.21	0.20	206.29	0.01	0.00
	18-yard dump	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
Building Foundations (floor)	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Loader	offroad	150	0.30	1.16	1.84	0.00	0.21	0.20	206.29	0.01	0.00
	Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Small crane-forms	offroad	155	0.10	0.31	1.24	0.00	0.07	0.07	181.18	0.01	0.00
	Medium crane-concrete bucket	offroad	300	0.17	0.47	2.22	0.00	0.10	0.09	350.73	0.01	0.00
	Concrete Mixer, offsite delivery	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
Building	Small crane	offroad	155	0.10	0.31	1.24	0.00	0.07	0.07	181.18	0.01	0.00
	Forklifts, offloading equipment	offroad	75	0.07	0.60	0.69	0.00	0.08	0.08	98.37	0.00	0.00
	Generators		50	0.03	0.18	0.53	0.00	0.03	0.03	64.97	0.00	0.00
	Propane heaters	offroad	58.9	0.00	0.01	0.02	0.00	0.00	0.00	20.64	0.00	0.00

Activity	Equipment and Vehicles			VOC lb/unit <sup>2</sup>	CO lb/unit <sup>2</sup>	NO <sub>x</sub> lb/unit <sup>2</sup>	SO <sub>x</sub> lb/unit <sup>2</sup>	PM <sub>10</sub> lb/unit <sup>2,3</sup>	PM <sub>2.5</sub> lb/unit <sup>2,3</sup>	CO <sub>2</sub> lb/unit <sup>2,6</sup>	CH <sub>4</sub> lb/unit <sup>2,4,5</sup>	N <sub>2</sub> O lb/unit <sup>2,4,5</sup>
	Type	Category	BHP									
<b>Construction of Cooling Stations (continued)</b>												
Final Site Preparation, traprock, paving, vegetation plantings	Bulldozer	offroad	0	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	18-yard dump	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Hotbox with truck	onroad LD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Roller	offroad	100	0.08	0.79	0.88	0.00	0.11	0.10	131.18	0.00	0.00
	Flatbed Truck, 30 mph	onroad HHD	0	0.00	0.00	0.01	0.00	0.00	0.00	3.70	0.00	0.00
	Backhoe, plantings	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
HDD	Drilling Power Unit, 6 locations @ 6 equipment days/location	offroad	800	0.89	3.39	11.69	0.01	0.54	0.52	933.94	0.04	0.01
	Generator	offroad	50	0.03	0.18	0.53	0.00	0.03	0.03	64.97	0.00	0.00
Miscellaneous	Craft utility, delivery trucks	onroad MD	0	0.00	0.03	0.00	0.00	0.00	0.00	1.29	0.00	0.00
	Pickup trucks	onroad LD	0	0.00	0.02	0.00	0.00	0.00	0.00	0.97	0.00	0.00

Notes:

Overland Equipment estimate includes 7.6 miles.

BHP: Brake-horsepower. This should be the maximum rated load of the vehicle or vessel engines(s).

HDD: Horizontal Directional Drilling. LD: Light Duty. HD: Heavy Duty. HHD: Heavy Heavy Duty.

<sup>1</sup> Emissions factors weighted for calendar year 2013.

<sup>2</sup> Units are operating hours for offroad engines, vehicle miles traveled (VMT) for onroad vehicles.

<sup>3</sup> Offroad diesel exhaust PM<sub>2.5</sub> = 92% of PM<sub>10</sub>; Onroad HHD particulate emission factors include allowances for tire and brake wear.

<sup>4</sup> Offroad N<sub>2</sub>O and CH<sub>4</sub> emissions are based on 40 CFR 98, Subpart C.

<sup>5</sup> Onroad N<sub>2</sub>O and CH<sub>4</sub> emissions are based on the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008 (USEPA 2009b).

<sup>6</sup> Onroad CO<sub>2</sub> emissions are based on EPA420-F-05-001 which rates gasoline emissions at 19.4 lb/gal and diesel at 22.2 lb/gal (USEPA 2005).

**Table M-15. Fugitive Dust Estimation Calculations - Earthmoving, Hudson River Segment**

<b>Construction Earthmoving</b>	<b>Project hours</b>	<b>PM<sub>10</sub> lb/hr</b>	<b>PM<sub>2.5</sub> lb/hr</b>	<b>PM<sub>10</sub> lbs</b>	<b>PM<sub>2.5</sub> lbs</b>
<b>Site Preparation (pavement and foundations)</b>					
Bulldozer	24	16.64	4.91	399.48	117.95
Backhoe	24	0.00034	0.000052	0.01	0.00
Loader	24	0.00034	0.000052	0.01	0.00
18-yard dump	24	0.00034	0.000052	0.01	0.00
<b>Site Prep Grading</b>					
Bulldozer	24	16.64	4.91	399.48	117.95
Backhoe	24	0.00034	0.000052	0.01	0.00
Loader	24	0.00034	0.000052	0.01	0.00
18-yard dump	48	0.00034	0.000052	0.02	0.00
<b>Building Foundations, floor</b>					
Backhoe	24	0.00034	0.000052	0.01	0.00
Bobcat	24	0.10328	0.00513	2.48	0.12
Loader	16	0.00034	0.000052	0.01	0.00
Bulldozer	16	16.64	4.91	266.32	78.63
Concrete Mixer, offsite delivery	12	0.00034	0.000052	0.00	0.00
<b>Final Site Preparation</b>					
Bulldozer	12	16.64	4.91	199.74	58.97
18-yard dump	12	0.00034	0.000052	0.00	0.00
Hotbox with truck	12	0.00034	0.000052	0.00	0.00
Roller	12	0.10328	0.00513	1.24	0.06
<b>HDD, transmission cables</b>					
Drilling Power Unit, 6 locations @ 6 equipment days/location	288	0.00034	0.000052	0.10	0.01
<b>Topsoil Removal and Storage</b>					
Small bulldozer	60.80	16.64	4.91	1012.01	298.80
Bobcat	60.80	0.00034	0.000052	0.02	0.00
<b>Access path prep (gravel)</b>					
Small bulldozer	121.60	16.64	4.91	2024.01	597.61
18-yard dump	243.20	0.00034	0.000052	0.08	0.01
<b>Trench Excavation</b>					
Backhoe	243.20	0.00034	0.000052	0.08	0.01
Bobcat	243.20	0.103	0.005126	25.12	1.25
Ram Hoe	121.60	0.103	0.005126	12.56	0.62
Generators	60.80	0.103	0.005126	6.28	0.31

Construction Earthmoving	Project hours	PM <sub>10</sub> lb/hr	PM <sub>2.5</sub> lb/hr	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs
<b>Deliver and Install Thermal Backfill</b>					
18-yard dump	486.40	0.00034	0.000052	0.17	0.03
Backhoe	243.20	0.00034	0.000052	0.08	0.01
Bobcat	243.20	16.64	4.91	4,048.02	1,195.21
<b>Install Native Backfill</b>					
Backhoe	121.60	0.00034	0.000052	0.04	0.01
Bobcat	121.60	16.64	4.91	2,024.01	597.61
Shaker/screen	121.60	0.00034	0.000052	0.04	0.01
Compressor for tampers	121.60	0.00034	0.000052	0.04	0.01
<b>Remove Excess Native Fill from Site</b>					
18-yard dump	121.60	0.00034	0.000052	0.04	0.01
Backhoe	60.80	0.00034	0.000052	0.02	0.00
<b>Replace Topsoil, York Rake Vegetation</b>					
Small bulldozer	121.60	16.64	4.91	2,024.01	597.61
Hydroseed Sprayer	121.60	0.103275	0.005126	12.56	0.62
<b>TOTAL (lbs)</b>				<b>12,458</b>	<b>3,663</b>
<b>Total Earthmoving Emissions, tons</b>				<b>6.23</b>	<b>1.83</b>

Notes:

HDD: Horizontal Directional Drilling

Based on USEPA 2006 (USEPA 2006).

AP-42 Section 11.9 for dozing (Table 11.9-1):

$E = 0.75 * (s)^{1.5} / (M)^{1.4}$  for PM<sub>10</sub>

$E = 0.105 * 5.7 * (s)^{1.2} / (M)^{1.3}$  for PM<sub>2.5</sub>

E = lb/hr fugitive

s = Silt Content assumed to be 55% for construction sites. (CHPEI 2010)

M = moisture content = 8% (assumes unwatered subsoil)

AP-42 Section 11.9 for grading, rolling, and excavating (Table 11.9-1) (USEPA 2006)

$E = S * 0.60 * 0.051 * (S)^{2.0}$  for PM<sub>10</sub>

$E = S * 0.031 * 0.040 * (S)^{2.5}$  for PM<sub>2.5</sub>

Simplifies to  $E = 0.60 * 0.051 * (S)^{3.0}$  for PM<sub>10</sub>

Simplified to  $E = 0.031 * 0.040 * (S)^{3.5}$  for PM<sub>2.5</sub>

E = lb/VMT \* VMT/hr = lb/hr fugitive

S = Mean Vehicle Speed assumed to be 3 mph for graders, 1.5 mph for excavators & rollers

Assumes VMT = S \* hours of use

AP-42 Section 13.2.4 Loading/Handling (digger, driller, backhoe, loader): (USEPA 2006)

$E = 0.35 * 0.0032 * (U/5)^{1.3} / (M/2)^{1.4}$  for PM<sub>10</sub>

$E = 0.053 * 0.0032 * (U/5)^{1.3} / (M/2)^{1.4}$  for PM<sub>2.5</sub>

E = lb/ton \* tons/hr = lb/hr fugitive

U = average wind speed is 8.9 mph for Albany, New York (NOAA 2002)

M = moisture content = 8% (assumes unwatered subsoil)

**Table M-16. Fugitive Dust Estimation Calculations - Road Dust, Hudson River Segment**

Construction Road Dust	Project VMT	PM <sub>10</sub> lb/VMT	PM <sub>2.5</sub> lb/VMT	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs
<b>All Roads</b>					
Pickup Truck	39,180				
18-yard dump Truck	0				
Flatbed Truck	7,416				
<b>Subtotals</b>	<b>46,596</b>				
<b>Unpaved Roads</b>					
Pickup Truck	11,754	0.06820	0.00682	802	80
18-yard dump Truck	0	0.10604	0.01060	0	0
Flatbed Truck	742	0.19222	0.01922	143	14
<b>Subtotals</b>	<b>12,496</b>			<b>944</b>	<b>94</b>
<b>Paved Roads</b>					
Pickup Truck	27,426	0.00622	0.00076	171	21
18-yard dump Truck	0	0.02802	0.00403	0	0
Flatbed Truck	6,674	0.20521	0.03061	1,370	204
<b>Subtotals</b>	<b>34,100</b>			<b>1,540</b>	<b>225</b>
<b>Total Road Dust Emissions, tons</b>				<b>1.24</b>	<b>0.16</b>

Notes:

Based on USEPA 2006 and USEPA 2003.

Unpaved Road Dust (AP-42 Section 13.2.2):

$E = 1.5 * (s/12)^{0.9} * (W/3)^{0.45} * PC * (1-CE)$  for PM<sub>10</sub>

$E = 0.15 * (s/12)^{0.9} * (W/3)^{0.45} * PC * (1-CE)$  for PM<sub>2.5</sub>

E = lb/VMT fugitive

s = surface silt content = 9%

(average for unpaved roads and construction sites, AP-42 Table 13.2.2-1)

W = average vehicle weight (see below)

PC=(365-P/365)

CE = Control Efficiency for watering = 90% for M between 4 and 5

(AP-42 Figure 13.2.2-2)

Based on USEPA 2006.

Paved Road Dust (AP-42 Section 13.2.1)

$E=0.016*(sL/2)^{0.65}*(W/3)^{1.5}-0.00047*PC$  for PM<sub>10</sub>

$E=0.0024*(sL/2)^{0.65}*(W/3)^{1.5}-0.00036*PC$  for PM<sub>2.5</sub>

E = lb/VMT fugitive

sL=Silt Loading assumed to be 0.5 g/m<sup>2</sup> for average ADT categories from Table 13.2.1-3

Note: precipitation correction not used (PC=1) for worst case day calculations

PC=(1-P/4N)

P = number of wet days over 0.01 in precipitation for averaging period

(150 days/year average for New York State)

N=days of period = 365 days

Vehicle Weights based on USEPA 2010.

Light Duty = 3 tons average

Medium Duty = 8 tons average

Heavy Heavy Duty = 30 tons average (loaded 40 tons, unloaded 20 tons)

18-yard dump assumes 70% unpaved mileage, and 30% paved mileage.

Pickup trucks assumes 30% unpaved mileage, and 70% paved mileage.

Flatbed truck assumes 10% unpaved mileage, and 90% paved mileage.

**Table M-17. Estimated Total Emissions<sup>1</sup>, Hudson River Segment**

Activity	Equipment and Vehicles <sup>2</sup>			VMT	VOC lbs	CO lbs	NO <sub>x</sub> lbs	SO <sub>x</sub> lbs	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs	CO <sub>2</sub> lbs	CH <sub>4</sub> lbs	N <sub>2</sub> O lbs	CO <sub>2</sub> eqv lbs <sup>3</sup>
	Type	Category	hrs											
<b>Emissions from Installation of Aquatic Transmission Cables</b>														
Cable Installation	2 azimuth units	Marine	1,416		2,926	14,838	41,971	39	1,998	1,938	4,415,524	173	35	4,429,889
	azimuth unit	Marine	708		754	3,822	10,811	10	515	499	1,137,332	45	9	1,141,032
	retractable azimuth unit	Marine	283.2		549	2,782	7,869	7	375	363	827,911	32	6	830,604
	tunnel unit	Marine	708		720	3,653	10,334	10	492	477	1,087,155	43	9	1,090,692
	generators (500 kVA)	Marine	8,496		2,845	12,471	46,386	47	1,975	1,915	5,322,956	211	42	5,340,455
	generators (600 kVA)	Marine	1,416		569	2,493	9,274	9	395	383	1,064,260	42	8	1,067,759
	Survey boat	Marine	1,416		1	5	31	4	1	1	2,154	0	0	2,179
Crew boat	Marine	566.4		0	2	12	2	0	0	862	0	0	872	
Installation of Cable Protection	Tugboat, Towboat	Marine	354		0	1	8	1	1	0	539	0	0	545
	Crew boat	Marine	283.2		0	0	1	0	0	0	54	0	0	55
Cable Shipment	OGV	Marine	105		1,139	2,658	32,273	6,872	854	797	1,117,764	11	59	1,136,247
	OGV	Marine	35.7		56	154	1,943	593	68	63	96,547	1	4	97,902
<b>Emissions from Installation of Terrestrial Transmission Cables</b>														
Vegetation Clearing	Brush Hog	offroad	60.8	0	10.67	76.23	76.56	0.09	7.42	7.20	10,104.29	0.36	0.07	10,134.22
Topsoil Removal and Storage	Small Bulldozer	offroad	60.8	0	41.34	173.04	510.22	0.82	32.88	31.90	95,400.19	3.74	0.75	95,710.34
	Bobcat	offroad	60.8	0	141.04	718.11	646.96	0.72	106.84	103.63	78885.39	2.39	0.48	79,083.99
Access Path Prep (gravel)	Small Bulldozer	offroad	121.6	0	1,240.14	5,191.24	15,306.70	24.52	986.50	956.90	2,862,005.76	112.10	22.42	2,871,310.21
	18-yard dump	onroad HHDV	243.2	1,216	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trench Excavation	Backhoe	offroad	243.2	0	282.08	1,436.23	1,293.92	1.45	213.67	207.26	157,770.77	4.79	0.96	158,167.98
	Bobcat	offroad	243.2	0	112.83	574.49	517.57	0.58	85.47	82.90	63,108.31	1.91	0.38	63,267.19
	Ram Hoe	offroad	121.6	0	49.45	332.46	830.26	1.20	45.73	44.36	138,110.15	5.41	1.08	138,559.05
	Hard Rock Trencher	offroad	60.8	0	68.08	457.21	962.66	1.00	61.08	59.25	112,079.40	4.39	0.88	112,443.96
Cable Delivery	Flatbed Truck, 30 mph	onroad HHDV	121.6	3,648	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crane	offroad	30.4	0	3.48	11.03	44.25	0.06	2.60	2.53	6467.98	0.26	0.05	6,489.25
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	onroad HHDV	121.6	3,648	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crane, 40 ton	offroad	30.4	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Puller/Tensioner	offroad	243.2	0	8.04	30.72	48.58	0.05	5.48	5.31	5,446.02	0.18	0.04	5,461.24
	Mid-pull caterpillars	offroad	243.2	0	8.04	30.72	48.58	0.05	5.48	5.31	5,446.02	0.18	0.04	5,461.24
Splice Cable	Generators	offroad	243.2	0	0.80	4.26	12.12	0.01	0.76	0.74	1,496.97	0.05	0.01	1,501.40
	Propane heaters	offroad	243.2	0	0.04	0.30	0.52	0.00	0.03	0.03	495.28	0.01	0.04	506.51

Activity	Equipment and Vehicles <sup>2</sup>			VMT	VOC lbs	CO lbs	NO <sub>x</sub> lbs	SO <sub>x</sub> lbs	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs	CO <sub>2</sub> lbs	CH <sub>4</sub> lbs	N <sub>2</sub> O lbs	CO <sub>2</sub> eqv lbs <sup>3</sup>
	Type	Category	hrs											
<b>Emissions from Installation of Terrestrial Transmission Cables (continued)</b>														
Deliver and Install Thermal Backfill	18-yard dump	onroad HHDV	486.4	14,592	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Backhoe	offroad	243.2	0	4.78	24.34	21.93	0.02	3.62	3.51	2,674.08	0.08	0.02	2,680.81
	Bobcat	offroad	243.2	0	4.78	24.34	21.93	0.02	3.62	3.51	2,674.08	0.08	0.02	2,680.81
Install Native Backfill	Backhoe	offroad	121.6	0	4.78	24.34	21.93	0.02	3.62	3.51	2,674.08	0.08	0.02	2,680.81
	Bobcat	offroad	121.6	0	9.56	48.69	43.86	0.05	7.24	7.03	5,348.16	0.16	0.03	5,361.63
	Shaker/screen	offroad	121.6	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Compressor for tampers	offroad	121.6	0	0.70	2.91	5.31	0.01	0.43	0.42	622.65	0.02	0.00	624.50
Remove Excess Native Fill from site	18-yard dump	offroad	121.6	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Backhoe	onroad HHD	60.8	608	3.19	16.23	14.62	0.02	2.41	2.34	1,782.72	0.05	0.01	1,787.21
Replace Topsoil, York Rake Vegetation	Small Bulldozer	offroad	121.6	0	2.34	9.78	28.83	0.05	1.86	1.80	5,389.84	0.21	0.04	5,407.36
	Hydroseed Sprayer	offroad	121.6	0	3.28	11.85	19.72	0.02	2.06	2.00	1,896.44	0.06	0.01	1,901.74
Miscellaneous	Pickup trucks	onroad HHDV	1216	36,480	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Emissions from Construction of Cooling Stations</b>														
Site Preparation (pavement and foundations)	Bulldozer	offroad	24	0	3.50	0.00	6.31	0.00	0.73	0.00	246.87	0.00	0.65	448.83
	Backhoe	offroad	24	0	4.78	0.00	4.37	0.00	0.66	0.00	73.45	0.00	0.05	88.84
	Loader	offroad	24	0	7.31	0.00	13.45	0.00	2.79	0.00	575.70	0.00	0.80	823.57
	18-yard dump	onroad HHD	24	120	0.06	1.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Prep Grading	Bulldozer	offroad	24	0	3.50	0.00	6.31	0.00	0.73	0.00	246.87	0.00	0.65	448.83
	Backhoe	offroad	24	0	4.78	0.00	4.37	0.00	0.66	0.00	73.45	0.00	0.05	88.84
	Loader	offroad	24	0	7.31	0.00	13.45	0.00	2.79	0.00	575.70	0.00	0.80	823.57
	18-yard dump	onroad HHD	48	240	0.12	3.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Foundations (floor)	Backhoe	offroad	24	0	4.78	0.00	4.37	0.00	0.66	0.00	73.45	0.00	0.05	88.84
	Bobcat	offroad	24	0	4.78	0.00	4.37	0.00	0.66	0.00	73.45	0.00	0.05	88.84
	Loader	offroad	16	0	4.87	0.00	8.97	0.00	1.86	0.00	383.80	0.00	0.53	549.05
	Bulldozer	offroad	16	0	2.34	0.00	4.21	0.00	0.49	0.00	164.58	0.00	0.43	299.22
	Concrete Mixer, offsite delivery	onroad HHD	12	30	0.03	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building	Small crane	offroad	72	0	7.02	0.00	8.70	0.00	0.63	0.00	114.98	0.00	0.17	166.13
	Forklifts, offloading equipment	offroad	48	0	3.29	0.00	2.27	0.00	0.19	0.00	18.70	0.00	0.01	22.72
	Generators		96	0	3.33	0.00	1.75	0.00	0.06	0.00	3.75	0.00	0.00	4.29
	Propane heaters	offroad	96	0	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



Activity	Equipment and Vehicles <sup>2</sup>				VOC lbs	CO lbs	NO <sub>x</sub> lbs	SO <sub>x</sub> lbs	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs	CO <sub>2</sub> lbs	CH <sub>4</sub> lbs	N <sub>2</sub> O lbs	CO <sub>2</sub> eqv lbs <sup>3</sup>
	Type	Category	hrs	VMT										
<b>Emissions from Construction of Cooling Stations (continued)</b>														
Final Site Preparation, traprock, paving, vegetation plantings	Bulldozer	offroad	12	0	1.75	0.00	3.16	0.00	0.37	0.00	123.44	0.00	0.33	224.42
	18-yard dump	onroad HHD	12	60	0.03	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hotbox with truck	onroad LD	12	30	0.03	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Roller	offroad	12	0	1.00	0.00	0.89	0.00	0.09	0.00	12.37	0.00	0.01	15.92
	Flatbed Truck, 30 mph	onroad HHD	4	120	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Backhoe, plantings	offroad	4	0	0.80	0.00	0.73	0.00	0.11	0.00	12.24	0.00	0.01	14.81
HDD	Drilling Power Unit, 6 locations @ 6 equipment days/location	offroad	288	0	257.22	0.00	3,006.24	0.00	1,611.00	0.00	1,504,580	0.00	11,145.21	4,959,595
	Generator	offroad	288	0	9.99	0.00	5.26	0.00	0.17	0.00	11.25	0.00	0.01	12.87
Miscellaneous	Craft utility, delivery trucks	onroad MD	180	5,400	0.48	177.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pickup trucks	onroad LD	90	2,700	0.13	63.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total Combustion Emissions, lbs</b>					<b>11,892</b>	<b>52,327</b>	<b>184,488</b>	<b>7,625</b>	<b>9,876</b>	<b>7,969</b>	<b>20,140,302</b>	<b>695</b>	<b>11,350</b>	<b>23,673,258</b>
<b>Total Combustion Emissions, tons</b>					<b>5.95</b>	<b>26.16</b>	<b>92.24</b>	<b>3.81</b>	<b>4.94</b>	<b>3.98</b>	<b>10,070.15</b>	<b>0.35</b>	<b>5.67</b>	<b>11,836.63</b>
<b>Total Fugitive Dust emissions, earthmoving tons<sup>4</sup></b>					<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>6.23</b>	<b>1.83</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Total Fugitive Dust emissions, road dust, tons<sup>4</sup></b>					<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1.24</b>	<b>0.16</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Combined Combustion and Fugitive Dust emissions, tons</b>					<b>5.95</b>	<b>26.16</b>	<b>92.24</b>	<b>3.81</b>	<b>12.41</b>	<b>5.98</b>	<b>10,070</b>	<b>0.35</b>	<b>5.67</b>	<b>11,837</b>

Notes:

<sup>1</sup> Emissions factors weighted for calendar year 2013 (USEPA 2006, USEPA 2009b).

<sup>2</sup> Units are operating hours for offroad engines, vehicle miles traveled (VMT) for onroad vehicles.

<sup>3</sup> Carbon dioxide equivalents (CO<sub>2</sub> eqv) are calculated by summing the products of mass GHG emissions by species times their respective GWP coefficients (USEPA 2009a).

<sup>4</sup> See Fugitive Dust Estimation Calculations tables for more detailed information.

**Table M-18. Estimated Equipment and Vehicle Use During Construction of Converter Station,  
New York City Metropolitan Area Segment**

Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (on road only)	
		Equipment Type	BHP	Qty		hours	VMT			
Site Preparation (pavement and foundations)	1 month	Bulldozer	285	2	30	8		480		
		Backhoe	73	2	30	8		480		
		Loader	150	1	30	8		240		
		18-yard Truck, transport debris			2	30	8	2,400	480	5
Site Prep Grading	2 weeks	Bulldozer	285	1	15	8		120		
		Backhoe	73	1	15	8		120		
		Loader	150	1	15	8		120		
		18-yard Truck, clean fill			2	15	8	1,200	240	5
Fence, Paving of street accesses, AC site lighting and trailer	2 weeks	Truck with Kelly bar auger			2	15	8	600	240	2.5
		Concrete Mixer, offsite delivery	6	1	15	8	300	120	2.5	
		Bobcat	73	2	15	8		240		
		Bulldozer	285	1	15	8		120		
		18-yard Truck, asphalt			1	15	8	600	120	5
		Hotbox with truck			1	15	8	300	120	2.5
		Roller	100	1	15	8		120		
		Backhoe	73	1	15	8		120		
Converter Building Foundations, floor	3 months	Small crane	155	1	15	8		120		
		Backhoe	73	2	90	8		1,440		
		Bobcat	73	1	90	8		720		
		Loader	150	2	60	8		960		
		Bulldozer	285	1	60	8		480		
		Small crane-forms	155	2	30	8		480		
		Medium crane-concrete bucket	300	2	30	8		480		
Concrete Mixer, offsite delivery			4	30	8	2,400	960	2.5		

Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (on road only)
		Equipment Type	BHP	Qty		hours	VMT		
Converter Building Superstructure	3 months	Large crane, for frame and gantry crane	450	1	30	8		240	
		Small crane, for roof and cladding	155	2	90	8		1,440	
		Forklifts, offloading equipment	75	1	60	8		480	
		Small crane, offloading equipment	155	1	60	8		480	
		Generators		5	90	8		3,600	
		Propane heaters	58.9	5	90	8		3,600	
Transformer Yard Foundations and Conduits	2 months	Backhoe	73	1	30	8		240	
		Loader	150	1	60	8		480	
		Small crane-forms	155	1	30	8		240	
		Bulldozer	285	1	60	8		480	
		Bobcat	73	1	60	8		480	
Transformer Yard Structural, Electrical	3 months	Small crane	155	2	30	8		480	
		Manlift trucks		2	90	8	3,600	1,440	2.5
		Compressor	20	2	90	8		1,440	
HDD, transmission cables		Drilling Power Unit, 2 locations @ 6 equipment days/location	800		12	8		96	
		Generator	50		12	8		96	
Final Site Preparation, traprock, paving, vegetation plantings	2 weeks	18-yard Truck, traprock		1	15	8	600	120	5
		Loader	150	1	15	8		120	
		Bulldozer, paving	285	1	15	8		120	
		Bulldozer, planting		1	15	8		120	
		18-yard Truck, asphalt		1	15	8	600	120	5
		Hotbox with truck		1	15	8	300	120	2.5
		Roller	100	1	15	8		120	
		Flatbed Truck, plantings		1	5	8	1,200	40	30
Backhoe, plantings	73	1	10	8		80			

Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (on road only)
		Equipment Type	BHP	Qty		hours	VMT		
Miscellaneous	1 year	Construction Trailers, propane	58.9	5	90	8		3,600	
		Craft utility, delivery trucks		30	360	4	1,296,000	43,200	30
		Pickup trucks		10	360	4	432,000	14,400	30

Notes:

\* Calendar days are used to provide for long workdays and weekend work.

**Table M-19. Estimated Equipment and Vehicle Use During Aquatic Cable Installation, New York City Metropolitan Area Segment**

Activity	Equipment and Vehicles			Hours per Day	Working Days	LF	trips	cables	Total hours
	Type	BHP	Qty						
Cable Installation	Primary Cable Vessel								
	2 azimuth units	2,640	2	24	5	0.25	1	2	120
	azimuth unit	1,360	1	24	5	0.25	1	2	60
	retractable azimuth unit	2,475	1	24	5	0.1	1	2	24
	tunnel unit	1,300	1	24	5	0.25	1	2	60
	generators (500 kVA)	536	4	24	5	0.75	1	2	720
	generators (600 kVA)	643	1	24	5	0.5	1	2	120
	Survey boat	1,131	1	24	5	0.5	1	2	120
Crew boat	425	1	24	5	0.2	1	2	48	
Installation of Cable Protection	Tugboat, Towboat	1,970	1	12	5	0.25	1	2	30
	Crew boat	425	1	12	5	0.2	1	2	24
Dredging	Clamshell dredge	1,920	1	24	5	0.9	1	1	108
	Tender, Pushboat	1,131	1	24	5	0.5	1	1	60
	Tugboat, Towboat	1,970	1	24	5	0.5	1	1	60
	Crew boat	425	1	24	5	0.2	1	1	24
Cable Shipment	Main propulsion	8,201	1	1.8		0.5	3		2.7
	Auxiliary engine	1,776	1	1.8		0.17	3		0.918

Dredging at Navigation Crossings			
Equipment Type	Average Horsepower	Estimated Equipment Duty*	# of days for New York City Area
Clamshell dredge	1,920	Marine medium continuous duty/transient	10
Tender, Pushboat	1,131	Marine heavy-duty	10
Tugboat, Towboat	1,970	Marine heavy-duty	10
Crew boat	425	Marine medium continuous duty	10

Notes:

BHP: Brake-horsepower. The maximum rated load of the vehicle or vessel engine(s). LF: Load Factor

5 work days based on 1.49 miles per day from mileposts 324.0 to 330.2 and 331.6 to 332.3.

Cable shipments emission duration of 1.8 hours per trip based on 12 mph for 21.5 miles.

21.5 miles is the average distance for each of the 3 cable shipments (6 miles of cable per shipment) round trip.

**Table M-20. Estimated Equipment and Vehicle Use During Terrestrial Cable Installation, New York City Metropolitan Area Segment**

Task	Equipment and Vehicles				Working Days	Daily		# equipment hours operation (3.7 miles)	Miles Per Hour (on road only)
	Equipment Type	Progress (miles)/8-hour day	BHP	qty		hours	VMT		
Vegetation Clearing	Brush Hog	1	11	1	1.40	8		11.20	
Topsoil removal and storage	Small Bulldozer	1	285	1	1.40	8		11.20	
	Bobcat	1	73	1	1.40	8		11.20	
Access path prep (gravel)	Small Bulldozer	0.5	285	1	2.80	8		22.40	
	18-yard dump	0.5		2	2.80	8	224	44.80	5
Trench Excavation	Backhoe	0.25	73	1	5.60	8		44.80	
	Bobcat	0.25	73	1	5.60	8		44.80	
	Ram Hoe	0.25	330	1	5.60	4		22.40	
	Hard Rock Trencher	0.25	335	1	5.60	2		11.20	
Deliver Cable @ 3 reels per	Flatbed Truck, 30 mph	0.5		1	2.80	8	672	22.40	30
	Crane	0.5	300	1	2.80	2		5.60	
HDD <sup>1,2</sup>	Drilling Unit				12	8		96	
	Drilling Power Unit		800		12	8		96	
	Generator		50		12	8		96	
	Water Pumps				12	8		96	
	Mud Pump				12	8		96	
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	0.5		1	2.8	8	672	22.4	30
	Crane, 40 ton	0.5		1	2.8	2		5.6	
	Puller/Tensioner	0.5	165	2	2.8	8		44.8	
	Mid-pull caterpillars	0.5	165	2	2.8	8		44.8	
Splice Cable	Generators	0.25	48	1	5.6	8		44.8	
	Propane heaters	0.25	0.5	1	5.6	8		44.8	

Task	Equipment and Vehicles				Working Days	Daily		# equipment hours operation (3.7 miles)	Miles Per Hour (on road only)
	Equipment Type	Progress (miles)/8-hour day	BHP	qty		hours	VMT		
Deliver and install Thermal Backfill	18-yard dump	0.25		2	5.6	8	2,688	89.6	30
	Backhoe	0.25	73	1	5.6	8		44.8	
	Bobcat	0.25	73	1	5.6	8		44.8	
Install Native Backfill	Backhoe	0.5	73	1	2.8	8		22.4	
	Bobcat	0.5	73	1	2.8	8		22.4	
	Shaker/screen	0.5	110	1	2.8	8		22.4	
	Compressor for tampers	0.5		1	2.8	8		22.4	
Remove Excess Native Fill from Site	18-yard dump	1		2	1.4	8	112	22.4	5
	Backhoe	1	73	1	1.4	8		11.2	
Replace Topsoil, York Rake Vegetation	Small Bulldozer	0.5	285	1	2.8	8		22.4	
	Hydroseed Sprayer	0.5	115	1	2.8	8		22.4	
Miscellaneous	Pickup trucks			10	15	4	18,000	600	30

Notes:

HDD: Horizontal Directional Drilling

<sup>1</sup> HDD includes 2 Hudson Entrance/Exit, 2 Locations, and 6 equipment days per location.

<sup>2</sup> Support for HDD includes 3 Locations, 12 Working Days (4 Equipment Days per location) at 8 hours per day, and 96 equipment hours of operation.

**Table M-21. Estimated Equipment and Vehicle Use During Construction of Cooling Station, New York City Metropolitan Area Segment**

Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (onroad only)
		Equipment Type	BHP	Qty		hours	VMT		
Site Preparation (pavement and foundations)	0.5 days (half a day at each cooling station)	Bulldozer	285	1	0.5	8		4	
		Backhoe	73	1	0.5	8		4	
		Loader	150	1	0.5	8		4	
		18-yard Truck, transport debris			1	0.5	8	20	4
Site Prep Grading	0.5 days (half a day at each cooling station)	Bulldozer	285	1	0.5	8		4	
		Backhoe	73	1	0.5	8		4	
		Loader	150	1	0.5	8		4	
		18-yard Truck, clean fill			2	0.5	8	40	8
Building Foundations, floor	0.5 days (half a day at each cooling station)	Backhoe	73	1	4.5	8		36	
		Bobcat	73	1	4.5	8		36	
		Loader	150	1	0.5	8		4	
		Bulldozer	285	1	0.5	8		4	
		Small crane-forms	155	2	0	8		0	
		Medium crane-concrete bucket	300	2	0	8		0	
		Concrete Mixer, offsite delivery			1	0.5	8	10	4
Building	2 days (2 days at each station)	Small crane	155	1	0.5	8		4	
		Forklifts, offloading equipment	75	1	1	8		8	
		Generators	50	2	1	8		16	
		Propane heaters	58.9	2	1	8		16	
HDD, transmission cables		Drilling Power Unit, 1 location @ 6 equipment days/location	800		6	8		48	
		Generator	50		6	8		48	



Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (onroad only)
		Equipment Type	BHP	Qty		hours	VMT		
Final Site Preparation, traprock, paving, vegetation plantings	1 day (1 day at each cooling station)	Bulldozer		1	0.5	8		4	
		18-yard Truck, asphalt		1	0.5	8	20	4	5
		Hotbox with truck		1	0.5	8	10	4	2.5
		Roller	100	1	0.5	8		4	
		Flatbed Truck, plantings		1	0.5	8	120	4	30
		Backhoe, plantings	73	1	0.5	8		4	
Miscellaneous	7 weeks	Craft utility, delivery trucks		2	5	4	1,200	40	30
		Pickup trucks, 30 mph		1	5	4	600	20	30

Notes:

\* Calendar days are used to provide for long workdays and weekend work.

HDD: Horizontal Directional Drilling

**Table M-22. Emissions Factors<sup>1</sup>, New York City Metropolitan Area Segment**

Activity	Equipment and Vehicles			VOC lb/unit <sup>2</sup>	CO lb/unit <sup>2</sup>	NO <sub>x</sub> lb/unit <sup>2</sup>	SO <sub>x</sub> lb/unit <sup>2</sup>	PM <sub>10</sub> lb/unit <sup>2,3</sup>	PM <sub>25</sub> lb/unit <sup>2,3</sup>	CO <sub>2</sub> lb/unit <sup>2,6</sup>	CH <sub>4</sub> lb/unit <sup>2,4,5</sup>	N <sub>2</sub> O lb/unit <sup>2,4,5</sup>
	Type	Category	BHP									
<b>Construction of the Converter Station</b>												
Site Preparation (pavement and foundations)	Bulldozer	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	Backhoe	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Loader	offroad	150	0.3	1.2	1.8	0.0	0.2	0.2	206.3	0.0	0.0
	18-yard Truck, transport debris	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
Site Prep Grading	Bulldozer	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	Backhoe	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Loader	offroad	150	0.3	1.2	1.8	0.0	0.2	0.2	206.3	0.0	0.0
	18-yard Truck, clean fill	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
Fence, Paving of street accesses, AC, lighting, and trailers	Truck with Kelly bar auger	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Concrete Mixer, offsite delivery	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Bobcat	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Bulldozer	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	18-yard Truck, asphalt	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Hotbox with truck	onroad LD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Roller	offroad	100	0.1	0.8	0.9	0.0	0.1	0.1	131.2	0.0	0.0
	Backhoe	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
Small crane	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0	
Converter Building Foundations (floors)	Backhoe	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Bobcat	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Loader	offroad	150	0.3	1.2	1.8	0.0	0.2	0.2	206.3	0.0	0.0
	Bulldozer	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	Small crane-forms	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0
	Medium crane-concrete bucket	offroad	300	0.2	0.5	2.2	0.0	0.1	0.1	350.7	0.0	0.0
	Concrete Mixer, offsite delivery	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0

Activity	Equipment and Vehicles			VOC lb/unit <sup>2</sup>	CO lb/unit <sup>2</sup>	NO <sub>x</sub> lb/unit <sup>2</sup>	SO <sub>x</sub> lb/unit <sup>2</sup>	PM <sub>10</sub> lb/unit <sup>2,3</sup>	PM <sub>25</sub> lb/unit <sup>2,3</sup>	CO <sub>2</sub> lb/unit <sup>2,6</sup>	CH <sub>4</sub> lb/unit <sup>2,4,5</sup>	N <sub>2</sub> O lb/unit <sup>2,4,5</sup>
	Type	Category	BHP									
<b>Construction of the Converter Station (continued)</b>												
Converter Building Superstructure	Large crane, for frame and gantry crane	offroad	450	0.2	1.1	4.2	0.0	0.2	0.2	526.1	0.0	0.0
	Small crane, for roof and cladding	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0
	Forklifts, offloading equipment	offroad	75	0.1	0.6	0.7	0.0	0.1	0.1	98.4	0.0	0.0
	Small crane, offloading equipment	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0
	Generators	offroad	50	0.0	0.2	0.5	0.0	0.0	0.0	65.0	0.0	0.0
	Propane heaters	offroad	58.9	0.00	0.01	0.02	0.00	0.00	0.00	20.64	0.00	0.00
Transformer Yard Foundations and Conduits	Backhoe	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Loader	offroad	150	0.3	1.2	1.8	0.0	0.2	0.2	206.3	0.0	0.0
	Small crane-forms	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0
	Bulldozer	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	Bobcat	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
Transformer Yard Structural, Electrical	Small crane	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0
	Manlift trucks	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Compressor	offroad	20	0.0	0.1	0.2	0.0	0.0	0.0	25.9	0.0	0.0
Final Site Preparation, traprock, paving, vegetation plantings	18-yard Truck, traprock	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Loader	offroad	150	0.3	1.2	1.8	0.0	0.2	0.2	206.3	0.0	0.0
	Bulldozer, paving	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	Bulldozer, planting	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	18-yard Truck, asphalt	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Hotbox with truck	onroad LD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Roller	offroad	100	0.1	0.8	0.9	0.0	0.1	0.1	131.2	0.0	0.0
	Flatbed Truck, plantings	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
HDD	Backhoe, plantings	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Drilling Power Unit	offroad	800	0.9	3.4	11.7	0.0	0.5	0.5	933.9	0.0	0.0
	Generator	offroad	50	0.0	0.2	0.5	0.0	0.0	0.0	65.0	0.0	0.0

Activity	Equipment and Vehicles			VOC lb/unit <sup>2</sup>	CO lb/unit <sup>2</sup>	NO <sub>x</sub> lb/unit <sup>2</sup>	SO <sub>x</sub> lb/unit <sup>2</sup>	PM <sub>10</sub> lb/unit <sup>2,3</sup>	PM <sub>25</sub> lb/unit <sup>2,3</sup>	CO <sub>2</sub> lb/unit <sup>2,6</sup>	CH <sub>4</sub> lb/unit <sup>2,4,5</sup>	N <sub>2</sub> O lb/unit <sup>2,4,5</sup>
	Type	Category	BHP									
<b>Construction of the Converter Station (continued)</b>												
Miscellaneous	Construction Trailers, propane	offroad	58.9	0.0	0.0	0.0	0.0	0.0	0.0	20.6	0.0	0.0
	Craft utility, delivery trucks	onroad MD		0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0
	Pickup trucks	onroad LD		0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
<b>Installation of Aquatic Transmission Cables</b>												
Cable Installation	2 azimuth units	Marine	2,640	2.07	10.48	29.64	0.03	1.41	1.37	3,118.31	0.12	0.02
	azimuth unit	Marine	1,360	1.06	5.40	15.27	0.01	0.73	0.70	1,606.40	0.06	0.01
	retractable azimuth unit	Marine	2,475	1.94	9.82	27.79	0.03	1.32	1.28	2,923.41	0.11	0.02
	tunnel unit	Marine	1,300	1.02	5.16	14.60	0.01	0.69	0.67	1,535.53	0.06	0.01
	generators (500 kVA)	Marine	536	0.33	1.47	5.46	0.01	0.23	0.23	626.53	0.02	0.00
	generators (600 kVA)	Marine	643	0.40	1.76	6.55	0.01	0.28	0.27	751.60	0.03	0.01
	Survey boat	Marine	1,131	0.00	0.00	0.02	0.00	0.00	0.00	1.52	0.00	0.00
	Crew boat	Marine	425	0.00	0.00	0.02	0.00	0.00	0.00	1.52	0.00	0.00
Installation of Cable Protection	Tugboat, Towboat	Marine	1,970	0.00	0.00	0.02	0.00	0.00	0.00	1.52	0.00	0.00
	Crew boat	Marine	425	0.00	0.00	0.02	0.00	0.00	0.00	1.52	0.00	0.00
Dredging	Clamshell dredge	Marine MD	1,920	0.00	0.00	0.02	0.00	0.00	0.00	1.52	0.00	0.00
	Tender, Pushboat	Marine HD	1,131	0.00	0.00	0.02	0.00	0.00	0.00	1.52	0.00	0.00
	Tugboat, Towboat	Marine HD	1,970	0.00	0.00	0.02	0.00	0.00	0.00	1.52	0.00	0.00
	Crew boat	Marine MD	425	0.00	0.00	0.02	0.00	0.00	0.00	1.52	0.00	0.00
Cable Shipment <sup>7</sup>	OGV main propulsion	Marine HD	8,201	10.85	25.31	307.36	65.45	8.14	7.59	10,645.38	0.11	0.56
	OGV auxiliary engine	Marine HD	1,776	1.57	4.31	54.42	16.60	1.92	1.76	2,704.41	0.02	0.12
<b>Installation of Terrestrial Transmission Cables</b>												
Vegetation Clearing	Brush Hog	offroad	11	0.02	0.11	0.11	0.00	0.01	0.01	14.27	0.00	0.00
Topsoil Removal and Storage	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
Access Path Prep (gravel)	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	18-yard dump	onroad HHD		0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00

Activity	Equipment and Vehicles			VOC lb/unit <sup>2</sup>	CO lb/unit <sup>2</sup>	NO <sub>x</sub> lb/unit <sup>2</sup>	SO <sub>x</sub> lb/unit <sup>2</sup>	PM <sub>10</sub> lb/unit <sup>2,3</sup>	PM <sub>25</sub> lb/unit <sup>2,3</sup>	CO <sub>2</sub> lb/unit <sup>2,6</sup>	CH <sub>4</sub> lb/unit <sup>2,4,5</sup>	N <sub>2</sub> O lb/unit <sup>2,4,5</sup>
	Type	Category	BHP									
<b>Installation of Terrestrial Transmission Cables (continued)</b>												
Trench Excavation	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Ram Hoe	offroad	330	0.14	0.94	2.35	0.00	0.13	0.13	390.14	0.01	0.00
	Hard Rock Trencher	offroad	335	0.24	1.61	3.40	0.00	0.22	0.21	395.76	0.02	0.00
Cable Delivery	Flatbed Truck, 30 mph	onroad HHD		0.00	0.00	0.01	0.00	0.00	0.00	3.70	0.00	0.00
	Crane	offroad	300	0.17	0.47	2.22	0.00	0.10	0.09	350.73	0.01	0.00
HDD <sup>7</sup>	Drilling Power Unit	offroad	800	0.89	3.39	11.69	0.01	0.54	0.52	933.94	0.04	0.01
	Generator	offroad	50	0.03	0.18	0.53	0.00	0.03	0.03	64.97	0.00	0.00
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	onroad HHD		0.00	0.00	0.01	0.00	0.00	0.00	3.70	0.00	0.00
	Crane, 40 ton	offroad		0.17	0.47	2.22	0.00	0.10	0.09	350.73	0.01	0.00
	Puller/Tensioner	offroad	165	0.34	1.28	2.02	0.00	0.23	0.22	226.92	0.01	0.00
	Mid-pull caterpillars	offroad	165	0.34	1.28	2.02	0.00	0.23	0.22	226.92	0.01	0.00
Splice Cable	Generators	offroad	48	0.03	0.18	0.51	0.00	0.03	0.03	62.37	0.00	0.00
	Propane heaters	offroad	0.5	0.00	0.01	0.02	0.00	0.00	0.00	20.64	0.00	0.00
Deliver and Install Thermal Backfill	18-yard dump	onroad HHD		0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
Install Native Backfill	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Shaker/screen	offroad	110	0.07	0.22	0.90	0.00	0.05	0.05	128.57	0.01	0.00
	Compressor for tampers	offroad		0.03	0.12	0.22	0.00	0.02	0.02	25.94	0.00	0.00
Remove Excess Native Fill from site	18-yard dump	onroad HHD		0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
Replace Topsoil, York Rake Vegetation	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Hydroseed Sprayer	offroad	115	0.27	0.99	1.64	0.00	0.17	0.17	158.04	0.01	0.00
Miscellaneous	Pickup trucks	onroad LD		0.00	0.02	0.00	0.00	0.00	0.00	0.97	0.00	0.00
<b>Construction of the Cooling Station</b>												
Site Preparation (pavement and foundations)	Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Loader	offroad	150	0.30	1.16	1.84	0.00	0.21	0.20	206.29	0.01	0.00
	18-yard Truck, transport debris	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00

Activity	Equipment and Vehicles			VOC lb/unit <sup>2</sup>	CO lb/unit <sup>2</sup>	NO <sub>x</sub> lb/unit <sup>2</sup>	SO <sub>x</sub> lb/unit <sup>2</sup>	PM <sub>10</sub> lb/unit <sup>2,3</sup>	PM <sub>25</sub> lb/unit <sup>2,3</sup>	CO <sub>2</sub> lb/unit <sup>2,6</sup>	CH <sub>4</sub> lb/unit <sup>2,4,5</sup>	N <sub>2</sub> O lb/unit <sup>2,4,5</sup>
	Type	Category	BHP									
<b>Construction of the Cooling Station (continued)</b>												
Site Prep Grading	Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Loader	offroad	150	0.30	1.16	1.84	0.00	0.21	0.20	206.29	0.01	0.00
	18-yard Truck, clean fill	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
Building Foundations (floor)	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Loader	offroad	150	0.30	1.16	1.84	0.00	0.21	0.20	206.29	0.01	0.00
	Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Small crane-forms	offroad	155	0.10	0.31	1.24	0.00	0.07	0.07	181.18	0.01	0.00
	Medium crane-concrete bucket	offroad	300	0.17	0.47	2.22	0.00	0.10	0.09	350.73	0.01	0.00
	Concrete Mixer, offsite delivery	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
Building	Small crane	offroad	155	0.10	0.31	1.24	0.00	0.07	0.07	181.18	0.01	0.00
	Forklifts, offloading equipment	offroad	0	0.07	0.60	0.69	0.00	0.08	0.08	98.37	0.00	0.00
	Generators	offroad	75	0.03	0.18	0.53	0.00	0.03	0.03	64.97	0.00	0.00
	Propane heaters	offroad	155	0.00	0.01	0.02	0.00	0.00	0.00	20.64	0.00	0.00
Final Site Preparation, traprock, paving, vegetation plantings	Bulldozer	offroad	0	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	18-yard Truck, asphalt	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Hotbox with truck	onroad LD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Roller	offroad	100	0.08	0.79	0.88	0.00	0.11	0.10	131.18	0.00	0.00
	Flatbed Truck, plantings	onroad HHD	0	0.00	0.00	0.01	0.00	0.00	0.00	3.70	0.00	0.00
	Backhoe, plantings	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
HDD	Drilling Power Unit, 1 location @ 6 equipment days/location	offroad	800	0.89	3.39	11.69	0.01	0.54	0.52	933.94	0.04	0.01
	Generator	offroad	50	0.03	0.18	0.53	0.00	0.03	0.03	64.97	0.00	0.00

Activity	Equipment and Vehicles			VOC lb/unit <sup>2</sup>	CO lb/unit <sup>2</sup>	NO <sub>x</sub> lb/unit <sup>2</sup>	SO <sub>x</sub> lb/unit <sup>2</sup>	PM <sub>10</sub> lb/unit <sup>2,3</sup>	PM <sub>25</sub> lb/unit <sup>2,3</sup>	CO <sub>2</sub> lb/unit <sup>2,6</sup>	CH <sub>4</sub> lb/unit <sup>2,4,5</sup>	N <sub>2</sub> O lb/unit <sup>2,4,5</sup>
	Type	Category	BHP									
<b>Construction of the Cooling Station (continued)</b>												
Miscellaneous	Craft utility, delivery trucks	onroad MD	0	0.00	0.03	0.00	0.00	0.00	0.00	1.29	0.00	0.00
	Pickup trucks, 30 mph	onroad LD	0	0.00	0.02	0.00	0.00	0.00	0.00	0.97	0.00	0.00

**Notes:**

<sup>1</sup> Emissions factors weighted for calendar year 2013 (USEPA 2003, USEPA 2006, USEPA 2009a).

<sup>2</sup> Units are operating hours for offroad engines, vehicle miles traveled (VMT) for onroad vehicles.

<sup>3</sup> Offroad diesel exhaust PM<sub>2.5</sub> = 92% of PM<sub>10</sub>; Onroad HHD particulate emission factors include allowances for tire and brake wear.

<sup>4</sup> Offroad N<sub>2</sub>O and CH<sub>4</sub> emissions are based on 40 CFR 98, Subpart C.

<sup>5</sup> Onroad N<sub>2</sub>O and CH<sub>4</sub> emissions are based on the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008 (USEPA 2009b).

<sup>6</sup> Onroad CO<sub>2</sub> emissions are based on EPA420-F-05-001 which rates gasoline emissions at 19.4 lb/gal and diesel at 22.2 lb/gal (USEPA 2005).

<sup>7</sup> Cable Shipment emissions based on STARCREST 2005.

Project counties include Bronx and Queens. Mileposts 324.0 to 333.7 for underwater cable laying and dredging.

Onland Construction activities - Mileposts 333.7 to 337.4/Astoria and Rainey substations connections.

BHP: Brake-horsepower. This should be the maximum rated load of the vehicle of vessel engines(s).

HDD: Horizontal Directional Drilling

**Table M-23. Fugitive Dust Estimation Calculations - Earthmoving,  
New York City Metropolitan Area Segment**

<b>Construction Earthmoving</b>	<b>Project hours</b>	<b>PM<sub>10</sub> lb/hr</b>	<b>PM<sub>2.5</sub> lb/hr</b>	<b>PM<sub>10</sub> lbs</b>	<b>PM<sub>2.5</sub> lbs</b>
<b>Site Preparation (pavement and foundations)</b>					
Bulldozer	480	16.64	4.91	7989.52	2358.98
Backhoe	480	0.00034	0.000052	0.16	0.02
Loader	240	0.00034	0.000052	0.08	0.01
18-yard Truck, transport debris	480	0.00034	0.000052	0.16	0.02
<b>Site Prep Grading</b>					
Bulldozer	120	16.64	4.91	1997.38	589.74
Backhoe	120	0.00034	0.000052	0.04	0.01
Loader	120	0.00034	0.000052	0.04	0.01
18-yard Truck, clean fill	240	0.00034	0.000052	0.08	0.01
<b>Converter Building Foundations (floors)</b>					
Backhoe	1440	0.00034	0.000052	0.49	0.07
Bobcat	720	0.10328	0.00513	74.36	3.69
Loader	960	0.00034	0.000052	0.33	0.05
Bulldozer	480	16.64	4.91	7989.52	2358.98
Small crane-forms	480	0.00034	0.000052	0.16	0.02
Medium crane-concrete bucket	480	0.00034	0.000052	0.16	0.02
Concrete Mixer, offsite delivery	960	0.00034	0.000052	0.33	0.05
<b>Transformer Yard Foundations and Conduit</b>					
Backhoe	240	0.00034	0.000052	0.08	0.01
Loader	480	0.00034	0.000052	0.16	0.02
Small crane-forms	240	0.00034	0.000052	0.08	0.01
Bulldozer	480	16.64	4.91	7989.52	2358.98
Bobcat	480	0.10328	0.00513	49.57	2.46
<b>Final Site Preparation</b>					
18-yard Truck, traprock	120	0.00034	0.000052	0.04	0.01
Loader	120	0.00034	0.000052	0.04	0.01
Bulldozer	120	16.64	4.91	1997.38	589.74
Bulldozer	120	16.64	4.91	1997.38	589.74
18-yard Truck, asphalt	120	0.00034	0.000052	0.04	0.01
Hotbox with truck	120	0.00034	0.000052	0.04	0.01
Roller	120	0.10328	0.00513	12.39	0.62
<b>HDD</b>					
Drilling Power Unit	96	0.00034	0.000052	0.03	0.00



<b>Construction Earthmoving</b>	<b>Project hours</b>	<b>PM<sub>10</sub> lb/hr</b>	<b>PM<sub>2.5</sub> lb/hr</b>	<b>PM<sub>10</sub> lbs</b>	<b>PM<sub>2.5</sub> lbs</b>
<b>Topsoil Removal and Storage</b>					
Small bulldozer	11.20	16.64	4.91	186.42	55.04
Bobcat	11.20	0.00034	0.000052	0.00	0.00
<b>Access path prep (gravel)</b>					
Small bulldozer	22.40	16.64	4.91	372.84	110.09
18-yard dump	44.80	0.00034	0.000052	0.02	0.00
<b>Trench Excavation</b>					
Backhoe	44.80	0.00034	0.000052	0.02	0.00
Bobcat	44.80	0.103	0.005126	4.63	0.23
18-yard dump	22.40	0.103	0.005126	2.31	0.11
Backhoe	11.20	0.103	0.005126	1.16	0.06
<b>HDD</b>					
Drilling Unit	96	0.00034	0.000052	0.03	0.00
Generator	96	0.00034	0.000052	0.03	0.00
<b>Deliver and Install Thermal Backfill</b>					
18-yard dump	89.6	0.00034	0.000052	0.03	0.00
Backhoe	44.8	0.00034	0.000052	0.02	0.00
Bobcat	44.8	16.64	4.91	745.69	220.17
<b>Install Native Backfill</b>					
Backhoe	22.4	0.00034	0.000052	0.01	0.00
Bobcat	22.4	16.64	4.91	372.84	110.09
Shaker/screen	22.4	0.00034	0.000052	0.01	0.00
Compressor for tampers	22.4	0.00034	0.000052	0.01	0.00
<b>Remove Excess Native Fill from Site</b>					
18-yard dump	22.4	0.00034	0.000052	0.01	0.00
Backhoe	11.2	0.00034	0.000052	0.00	0.00
<b>Replace Topsoil, York Rake Vegetation</b>					
Small bulldozer	22.4	16.64	4.91	372.84	110.09
Hydroseed Sprayer	22.4	0.103275	0.005126	2.31	0.11
<b>Site Preparation</b>					
Bulldozer	4	16.64	4.91	66.58	19.66
Backhoe	4	0.00034	0.000052	0.00	0.00
Loader	4	0.00034	0.000052	0.00	0.00
18-yard Truck, transport debris	4	0.00034	0.000052	0.00	0.00

Construction Earthmoving	Project hours	PM <sub>10</sub> lb/hr	PM <sub>2.5</sub> lb/hr	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs
<b>Site Prep Grading</b>					
Bulldozer	4	16.64	4.91	66.58	19.66
Backhoe	4	0.00034	0.000052	0.00	0.00
Loader	4	0.00034	0.000052	0.00	0.00
18-yard Truck, clean fill	8	0.00034	0.000052	0.00	0.00
<b>Building Foundations</b>					
Backhoe	36	0.00034	0.000052	0.01	0.00
Bobcat	36	0.10328	0.00513	3.72	0.18
Loader	4	0.00034	0.000052	0.00	0.00
<b>Final Site Preparation, traprock, paving, vegetation plantings</b>					
Bulldozer	4	16.64	4.91	66.58	19.66
18-yard Truck, asphalt	4	0.00034	0.000052	0.00	0.00
Hotbox with truck	4	0.00034	0.000052	0.00	0.00
Roller	4	0.10328	0.00513	0.41	0.02
<b>HDD</b>					
Drilling Power Unit	48	0.00034	0.000052	0.02	0.00
<b>TOTAL</b>				<b>32,365</b>	<b>9,519</b>
<b>Total Earthmoving Emissions, tons</b>				<b>16.18</b>	<b>4.76</b>

Notes:

Based on USEPA 2006.

AP-42 Section 11.9 for dozing (Table 11.9-1):

$$E = 0.75 * (s)^{1.5} / (M)^{1.4} \text{ for PM}_{10}$$

$$E = 0.105 * 5.7 * (s)^{1.2} / (M)^{1.3} \text{ for PM}_{2.5}$$

E = lb/hr fugitive

s = Silt Content assumed to be 55% for construction sites. (CHPE 2010)

M = moisture content = 8% (assumes unwatered subsoil)

AP-42 Section 11.9 for grading, rolling, and excavating (Table 11.9-1) (USEPA 2006).

$$E = S * 0.60 * 0.051 * (S)^{2.0} \text{ for PM}_{10}$$

$$E = S * 0.031 * 0.040 * (S)^{2.5} \text{ for PM}_{2.5}$$

Simplifies to  $E = 0.60 * 0.051 * (S)^{3.0}$  for PM<sub>10</sub>

Simplified to  $E = 0.031 * 0.040 * (S)^{3.5}$  for PM<sub>2.5</sub>

E = lb/VMT \* VMT/hr = lb/hr fugitive

S = Mean Vehicle Speed assumed to be 3 mph for graders, 1.5 mph for excavators & rollers

Assumes VMT = S \* hours of use

AP-42 Section 13.2.4 Loading/Handling (digger, driller, backhoe, loader): (USEPA 2006).

$$E = 0.35 * 0.0032 * (U/5)^{1.3} / (M/2)^{1.4} \text{ for PM}_{10}$$

$$E = 0.053 * 0.0032 * (U/5)^{1.3} / (M/2)^{1.4} \text{ for PM}_{2.5}$$

E = lb/ton \* tons/hr = lb/hr fugitive

U = average wind speed is 8.9 mph for Albany, New York (NOAA 2002)

M = moisture content = 8% (assumes unwatered subsoil)

**Table M-24. Fugitive Dust Estimation Calculations - Road Dust,  
New York City Metropolitan Area Segment**

<b>Construction Road Dust</b>	<b>Project VMT</b>	<b>PM<sub>10</sub> lb/VMT</b>	<b>PM<sub>2.5</sub> lb/VMT</b>	<b>PM<sub>10</sub> lbs</b>	<b>PM<sub>2.5</sub> lbs</b>
<b>All Roads (paved)</b>					
Light Duty (pickup trucks)	432,600	0.00622	0.00076	2,691	330
Medium Duty (work trucks)	1,296,000	0.02802	0.00403	36,314	5,226
Heavy Heavy Duty (tractor/trailers)	13,500	0.20521	0.03061	2,770	413
<b>Subtotals</b>	<b>1,742,100</b>			<b>41,775</b>	<b>5,969</b>
<b>All Roads</b>					
Pickup Truck	432,015				
18-yard dump Truck	0				
Flatbed Truck	1,344				
<b>Subtotals</b>	<b>433,359</b>				
<b>Unpaved Roads</b>					
Pickup Truck	129,605	0.06820	0.00682	8,839	884
18-yard dump Truck	0	0.10604	0.01060	0	0
Flatbed Truck	134	0.19222	0.01922	26	3
<b>Subtotals</b>	<b>129,739</b>			<b>8,865</b>	<b>887</b>
<b>Paved Roads</b>					
Pickup Truck	302,411	0.00622	0.00076	1,881	231
18-yard dump Truck	0	0.02802	0.00403	0	0
Flatbed Truck	1,210	0.20521	0.03061	248	37
<b>Subtotals</b>	<b>3,171,916</b>			<b>52,769</b>	<b>7,124</b>
<b>Total Road Dust Emissions, tons</b>				<b>26.38</b>	<b>3.56</b>

Notes:

Based on USEPA 2003 and USEPA 2006.

All roads assumed paved.

Paved Road Dust (AP-42 Section 13.2.1) (USEPA 2006).

$E = [0.016 \cdot (sL/2) \cdot 0.65 \cdot (W/3) \cdot 1.5 - 0.00047] \cdot PC$  for PM<sub>10</sub>

$E = [0.0024 \cdot (sL/2) \cdot 0.65 \cdot (W/3) \cdot 1.5 - 0.00036] \cdot PC$  for PM<sub>2.5</sub>

E = lb/VMT fugitive

sL = Silt Loading assumed to be 0.5 g/m<sup>2</sup> for average ADT categories from Table 13.2.1-3.

W = Average weight of vehicles in tons (below)

C = Correction for exhaust, break wear, tire wear: 0.00047 lb/VMT for PM<sub>10</sub>, 0.00036 lb/VMT for PM<sub>2.5</sub>

PC = (1-P/4N)

P = Number of wet days over 0.01 in precipitation for averaging period (150 days/year average for New York State)

N = days of period = 365 days

Note: precipitation correction not used (PC=1) for worst case day calculations

Vehicle Weights based on USEPA 2010

HDD: Horizontal Directional Drilling

Light Duty = 3 tons average; Medium Duty = 8 tons average; and Heavy Heavy Duty = 30 tons average (loaded 40 tons, unloaded 20 tons)

**Table M-25. Estimated Total Emissions<sup>1</sup>, New York City Metropolitan Area Segment**

Activity	Equipment and Vehicles <sup>2</sup>			VMT	VOC lbs	CO lbs	NO <sub>x</sub> lbs	SO <sub>x</sub> lbs	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs	CO <sub>2</sub> lbs	CH <sub>4</sub> lbs	N <sub>2</sub> O lbs	CO <sub>2</sub> eqv lbs <sup>3</sup>
	Type	Category	hrs											
<b>Emissions from Construction of the Converter Station</b>														
Site Preparation (pavement and foundations)	Bulldozer	offroad	480		70.1	293.3	864.8	1.4	55.7	54.1	161,695.2	6.3	1.3	162,221
	Backhoe	offroad	480		95.6	486.9	438.6	0.5	72.4	70.3	53,481.6	1.6	0.3	53,616
	Loader	offroad	240		73.1	279.3	441.6	0.4	49.8	48.3	49,509.3	1.7	0.3	49,648
	18-yard Truck, transport debris	onroad HHD		2,400	5.8	33.3	45.7	0.1	0.9	0.7	8,880.0	0.0	0.0	8,888
Site Prep Grading	Bulldozer	offroad	120		17.5	73.3	216.2	0.3	13.9	13.5	40,423.8	1.6	0.3	40,555
	Backhoe	offroad	120		23.9	121.7	109.7	0.1	18.1	17.6	13,370.4	0.4	0.1	13,404
	Loader	offroad	120		36.6	139.6	220.8	0.2	24.9	24.1	24,754.7	0.8	0.2	24,824
	18-yard Truck, clean fill	onroad HHD		1,200	2.9	16.6	22.9	0.0	0.4	0.3	4,440.0	0.0	0.0	4,444
Fence, Paving of street accesses, AC, lighting, and trailers	Truck with Kelly bar auger	onroad HHD		600	1.4	8.3	11.4	0.0	0.2	0.2	2,220.0	0.0	0.0	2,222
	Concrete Mixer, offsite delivery	onroad HHD		300	0.7	4.2	5.7	0.0	0.1	0.1	1,110.0	0.0	0.0	1,111
	Bobcat	offroad	240		47.8	243.4	219.3	0.2	36.2	35.1	26,740.8	0.8	0.2	26,808
	Bulldozer	offroad	120		17.5	73.3	216.2	0.3	13.9	13.5	40,423.8	1.6	0.3	40,555
	18-yard Truck, asphalt	onroad HHD		600	1.4	8.3	11.4	0.0	0.2	0.2	2,220.0	0.0	0.0	2,222
	Hotbox with truck	onroad LD		300	0.7	4.2	5.7	0.0	0.1	0.1	1,110.0	0.0	0.0	1,111
	Roller	offroad	120		10.0	94.6	106.1	0.1	12.7	12.4	15,741.7	0.6	0.1	15,788
	Backhoe	offroad	120		23.9	121.7	109.7	0.1	18.1	17.6	13,370.4	0.4	0.1	13,404
Small crane	offroad	120		11.7	37.1	148.7	0.2	8.8	8.5	21,741.1	0.9	0.2	21,813	

Activity	Equipment and Vehicles <sup>2</sup>			VMT	VOC lbs	CO lbs	NO <sub>x</sub> lbs	SO <sub>x</sub> lbs	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs	CO <sub>2</sub> lbs	CH <sub>4</sub> lbs	N <sub>2</sub> O lbs	CO <sub>2</sub> eqv lbs <sup>3</sup>
	Type	Category	hrs											
<b>Emissions from Construction of the Converter Station (continued)</b>														
Converter Building Foundations (floor)	Backhoe	offroad	1440		286.9	1,460.6	1,315.9	1.5	217.3	210.8	160,444.9	4.9	1.0	160,849
	Bobcat	offroad	720		143.4	730.3	657.9	0.7	108.6	105.4	80,222.4	2.4	0.5	80,424
	Loader	offroad	960		292.4	1,117.2	1,766.5	1.8	199.1	193.2	198,037.3	6.7	1.3	198,591
	Bulldozer	offroad	480		70.1	293.3	864.8	1.4	55.7	54.1	161,695.2	6.3	1.3	162,221
	Small crane-forms	offroad	480		46.8	148.3	594.9	0.8	35.0	34.0	86,964.5	3.4	0.7	87,250
	Medium crane-concrete bucket	offroad	480		79.9	224.2	1,064.8	1.5	45.6	44.2	168,349.9	6.7	1.3	168,903
	Concrete Mixer, offsite delivery	onroad HHD		2,400	5.8	33.3	45.7	0.1	0.9	0.7	8,880.0	0.0	0.0	8,888
Converter Building Superstructure	Large crane, for frame and gantry crane	offroad	240		57.8	261.5	1,004.7	1.1	39.7	38.5	126,268.8	5.0	1.0	126,684
	Small crane, for roof and cladding	offroad	1440		140.4	445.0	1,784.8	2.3	105.0	101.9	260,893.4	10.3	2.1	261,751
	Forklifts, offloading equipment	offroad	480		32.9	290.1	331.2	0.4	40.2	39.0	47,217.2	1.7	0.3	47,356
	Small crane, offloading equipment	offroad	480		46.8	148.3	594.9	0.8	35.0	34.0	86,964.5	3.4	0.7	87,250
	Generators	offroad	3600		124.9	665.6	1,894.4	2.1	118.5	115.0	233,901.4	8.3	1.7	234,593
	Propane heaters	offroad	3600		5.9	44.6	77.3	0.1	4.2	4.2	74,292.5	1.2	5.3	75,976
Transformer Yard Foundations and Conduits	Backhoe	offroad	240		47.8	243.4	219.3	0.2	36.2	35.1	26,740.8	0.8	0.2	26,808
	Loader	offroad	480		146.2	558.6	883.3	0.9	99.6	96.6	99,018.6	3.3	0.7	99,295
	Small crane-forms	offroad	240		23.4	74.2	297.5	0.4	17.5	17.0	43,482.2	1.7	0.3	43,625
	Bulldozer	offroad	480		70.1	293.3	864.8	1.4	55.7	54.1	161,695.2	6.3	1.3	162,221
	Bobcat	offroad	480		95.6	486.9	438.6	0.5	72.4	70.3	53,481.6	1.6	0.3	53,616
Transformer Yard Structural, Electrical	Small crane	offroad	480		46.8	148.3	594.9	0.8	35.0	34.0	86,964.5	3.4	0.7	87,250
	Manlift trucks	onroad HHD		3,600	8.7	49.9	68.6	0.1	1.3	1.0	13,320.0	0.0	0.0	13,333
	Compressor	offroad	1440		41.9	174.3	318.7	0.3	26.0	25.2	37,359.1	1.3	0.3	37,470

Activity	Equipment and Vehicles <sup>2</sup>			VMT	VOC lbs	CO lbs	NO <sub>x</sub> lbs	SO <sub>x</sub> lbs	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs	CO <sub>2</sub> lbs	CH <sub>4</sub> lbs	N <sub>2</sub> O lbs	CO <sub>2</sub> eqv lbs <sup>3</sup>
	Type	Category	hrs											
<b>Emissions from Construction of the Converter Station (continued)</b>														
Final Site Preparation, traprock, paving, vegetation plantings	18-yard Truck, traprock	onroad HHD		600	1.4	8.3	11.4	0.0	0.2	0.2	2,220.0	0.0	0.0	2,222
	Loader	offroad	120		36.6	139.6	220.8	0.2	24.9	24.1	24,754.7	0.8	0.2	24,824
	Bulldozer, paving	offroad	120		17.5	73.3	216.2	0.3	13.9	13.5	40,423.8	1.6	0.3	40,555
	Bulldozer, planting	offroad	120		17.5	73.3	216.2	0.3	13.9	13.5	40,423.8	1.6	0.3	40,555
	18-yard Truck, asphalt	onroad HHD		600	1.4	8.3	11.4	0.0	0.2	0.2	2,220.0	0.0	0.0	2,222
	Hotbox with truck	onroad LD		300	0.7	4.2	5.7	0.0	0.1	0.1	1,110.0	0.0	0.0	1,111
	Roller	offroad	120		10.0	94.6	106.1	0.1	12.7	12.4	15,741.7	0.6	0.1	15,788
	Flatbed Truck, plantings	onroad HHD		1,200	0.9	3.3	11.8	0.0	0.4	0.3	4,440.0	0.0	0.0	4,444
Backhoe, plantings	offroad	80		15.9	81.1	73.1	0.1	12.1	11.7	8,913.6	0.3	0.1	8,936	
HDD	Drilling Power Unit	offroad	800		714.5	2,710.9	9,349.8	6.7	428.7	415.8	747,154.3	29.6	5.9	749,614
	Generator	offroad	50		1.7	9.2	26.3	0.0	1.6	1.6	3,248.6	0.1	0.0	3,258
Miscellaneous	Construction Trailers, propane	offroad	3600		5.9	44.6	77.3	0.1	4.2	4.2	74,292.5	1.2	5.3	75,976
	Craft utility, delivery trucks	onroad MD		1,296,000	3,480.1	42,715.0	3,011.5	32.9	71.4	32.9	1,676,160.0	95.1	38.3	1,690,027
	Pickup trucks	onroad LD		432,000	626.8	10,228.9	580.2	8.2	23.8	10.8	419,040.0	15.6	6.3	421,322
<b>Emissions from Installation of Aquatic Transmission Cables</b>														
Cable Installation	2 azimuth units	Marine	120		248	1,257	3,557	3	169	164	374,197	15	3	375,414
	azimuth unit	Marine	60		64	324	916	1	44	42	96,384	4	1	96,698
	retractable azimuth unit	Marine	24		46	236	667	1	32	31	70,162	3	1	70,390
	tunnel unit	Marine	60		61	310	876	1	42	40	92,132	4	1	92,432
	generators (500 kVA)	Marine	720		241	1,057	3,931	4	167	162	451,098.0	18	4	452,581
	generators (600 kVA)	Marine	120		48	211	786	1	33	32	90,192	4	1	90,488
	Survey boat	Marine	120		0	0	3	0	0	0	183	0	0	185
	Crew boat	Marine	48		0	0	1	0	0	0	73	0	0	74

Activity	Equipment and Vehicles <sup>2</sup>			VMT	VOC lbs	CO lbs	NO <sub>x</sub> lbs	SO <sub>x</sub> lbs	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs	CO <sub>2</sub> lbs	CH <sub>4</sub> lbs	N <sub>2</sub> O lbs	CO <sub>2</sub> eqv lbs <sup>3</sup>
	Type	Category	hrs											
<b>Emissions from Installation of Aquatic Transmission Cables (continued)</b>														
Installation of Cable Protection	Tugboat, Towboat	Marine	30		0	0	1	0	0	0	46	0	0	46
	Crew boat	Marine	24		0	0	1	0	0	0	37	0	0	37
Dredging	Clamshell dredge	Marine MD	108		0	0	2	0	0	0	164	0	0	166
	Tender, Pushboat	Marine HD	60		0	0	1	0	0	0	91	0	0	92
	Tugboat, Towboat	Marine HD	60		0	0	1	0	0	0	91	0	0	92
	Crew boat	Marine MD	24		0	0	1	0	0	0	37	0	0	37
Cable Shipment	OGV main propulsion	Marine HD	2.7		29	68	830	177	22	21	28,743	0	2	29,218
	OGV auxiliary engine	Marine HD	0.9		1	4	50	15	2	2	2,483	0	0	2,517
<b>Emissions from Installation of Terrestrial Transmission Cables</b>														
Vegetation Clearing	Brush Hog	offroad	11.20		0	1	1	0	0	0	160	0	0	0
Topsoil Removal and Storage	Small Bulldozer	offroad	11.20		2	7	20	0	1	1	3,773	0	0	0
	Bobcat	offroad	11.20		2	11	10	0	2	2	1,248	0	0	0
Access Path Prep (gravel)	Small Bulldozer	offroad	22.40		3	14	40	0	3	3	7,546	0	0	0
	18-yard dump	onroad HHD	44.80	224	0.54	3.11	4.27	0.01	0.08	0.06	828.80	0.00	0.00	0.00
Trench Excavation	Backhoe	offroad	44.80		9	45	41	0	7	7	4,992	0	0	0
	Bobcat	offroad	44.80		9	45	41	0	7	7	4,992	0	0	0
	Ram Hoe	offroad	22.40		3	21	53	0	3	3	8,739	0	0	0
	Hard Rock Trencher	offroad	11.20		3	18	38	0	2	2	4,433	0	0	0
Cable Delivery	Flatbed Truck, 30 mph	onroad HHD	22.40	672	1	2	7	0	0	0	2,486	0	0	0
	Crane	offroad	5.60		1	3	12	0	1	1	1,964	0	0	0
HDD	Drilling Power Unit	offroad	96		86	325	1122	1	51	50	89,659	4	1	0
	Generator	offroad	96		3	18	51	0	3	3	6,237	0	0	0

Activity	Equipment and Vehicles <sup>2</sup>			VMT	VOC lbs	CO lbs	NO <sub>x</sub> lbs	SO <sub>x</sub> lbs	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs	CO <sub>2</sub> lbs	CH <sub>4</sub> lbs	N <sub>2</sub> O lbs	CO <sub>2</sub> eqv lbs <sup>3</sup>
	Type	Category	hrs											
<b>Emissions from Installation of Aquatic Transmission Cables (continued)</b>														
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	onroad HHD	22.4	672	1	2	7	0	0	0	2,486	0	0	0
	Crane, 40 ton	offroad	5.6		1	3	12	0	1	1	1,964	0	0	0
	Puller/Tensioner	offroad	44.8		15	57	91	0	10	10	10,166	0	0	0
	Mid-pull caterpillars	offroad	44.8		15	57	91	0	10	10	10,166	0	0	0
Splice Cable	Generators	offroad	44.8		1	8	23	0	1	1	2,794	0	0	0
	Propane heaters	offroad	44.8		0	1	1	0	0	0	925	0	0	0
Deliver and Install Thermal Backfill	18-yard dump	onroad HHD	89.6	2,688	6	37	51	0	1	1	9,946	0	0	0
	Backhoe	offroad	44.8		9	45	41	0	7	7	4,992	0	0	0
	Bobcat	offroad	44.8		9	45	41	0	7	7	4,992	0	0	0
Install Native Backfill	Backhoe	offroad	22.4		4	23	20	0	3	3	2,496	0	0	0
	Bobcat	offroad	22.4		4	23	20	0	3	3	2,496	0	0	0
	Shaker/screen	offroad	22.4		2	5	20	0	1	1	2,880	0	0	0
	Compressor for tampers	offroad	22.4		1	3	5	0	0	0	581	0	0	0
Remove Excess Native Fill from site	18-yard dump	onroad HHD	22.4	112	0	0	0	0	0	0	83	0	0	0
	Backhoe	offroad	11.2		2	11	10	0	2	2	1,248	0	0	0
Replace Topsoil, York Rake Vegetation	Small Bulldozer	offroad	22.4		3	14	40	0	3	3	7,546	0	0	0
	Hydroseed Sprayer	offroad	22.4		6	22	37	0	4	4	3,540	0	0	0
Miscellaneous	Pickup trucks	onroad LD	15	15	0	0	0	0	0	0	15	0	0	0
<b>Emissions from Construction of the Cooling Station</b>														
Site Preparation (pavement and foundations)	Bulldozer	offroad	4	0	0.6	0.0	1.1	0.0	0.1	0.0	41.1	0.0	0.1	0.0
	Backhoe	offroad	4	0	0.8	0.0	0.7	0.0	0.1	0.0	12.2	0.0	0.0	0.0
	Loader	offroad	4	0	1.2	0.0	2.2	0.0	0.5	0.0	95.9	0.0	0.1	0.0
	18-yard Truck, transport debris	onroad HHD	4	20	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



Activity	Equipment and Vehicles <sup>2</sup>			VMT	VOC lbs	CO lbs	NO <sub>x</sub> lbs	SO <sub>x</sub> lbs	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs	CO <sub>2</sub> lbs	CH <sub>4</sub> lbs	N <sub>2</sub> O lbs	CO <sub>2</sub> eqv lbs <sup>3</sup>
	Type	Category	hrs											
<b>Emissions from Construction of the Cooling Station (continued)</b>														
Site Prep Grading	Bulldozer	offroad	4	0	0.6	0.0	1.1	0.0	0.1	0.0	41.1	0.0	0.1	0.0
	Backhoe	offroad	4	0	0.8	0.0	0.7	0.0	0.1	0.0	12.2	0.0	0.0	0.0
	Loader	offroad	4	0	1.2	0.0	2.2	0.0	0.5	0.0	95.9	0.0	0.1	0.0
	18-yard Truck, clean fill	onroad HHD	8	40	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Building Foundations (floor)	Backhoe	offroad	36	0	7.2	0.0	6.6	0.0	1.0	0.0	110.2	0.0	0.1	0.0
	Bobcat	offroad	36	0	7.2	0.0	6.6	0.0	1.0	0.0	110.2	0.0	0.1	0.0
	Loader	offroad	4	0	1.2	0.0	2.2	0.0	0.5	0.0	95.9	0.0	0.1	0.0
	Bulldozer	offroad	4	0	0.6	0.0	1.1	0.0	0.1	0.0	41.1	0.0	0.1	0.0
	Small crane-forms	offroad	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Medium crane-concrete bucket	offroad	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Concrete Mixer, offsite delivery	onroad HHD	4	10	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Building	Small crane	offroad	4	0	0.4	0.0	0.5	0.0	0.0	0.0	6.4	0.0	0.0	0.0
	Forklifts, offloading equipment	offroad	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Generators	offroad	8		0.3	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0
	Propane heaters	offroad	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final Site Preparation, traprock, paving, vegetation plantings	Bulldozer	offroad	4	0	0.6	0.0	1.1	0.0	0.1	0.0	41.1	0.0	0.1	0.0
	18-yard Truck, asphalt	onroad HHD	4	20	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Hotbox with truck	onroad LD	4	10	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Roller	offroad	4	0	0.3	0.0	0.3	0.0	0.0	0.0	4.1	0.0	0.0	0.0
	Flatbed Truck, plantings	onroad HHD	4	120	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Backhoe, plantings	offroad	4	0	0.8	0.0	0.7	0.0	0.1	0.0	12.2	0.0	0.0	0.0

Activity	Equipment and Vehicles <sup>2</sup>			VMT	VOC lbs	CO lbs	NO <sub>x</sub> lbs	SO <sub>x</sub> lbs	PM <sub>10</sub> lbs	PM <sub>2.5</sub> lbs	CO <sub>2</sub> lbs	CH <sub>4</sub> lbs	N <sub>2</sub> O lbs	CO <sub>2</sub> eqv lbs <sup>3</sup>
	Type	Category	hrs											
<b>Emissions from Construction of the Cooling Station (continued)</b>														
HDD	Drilling Power Unit, 1 location @ 6 equipment days/location	offroad	48	0	42.9	0.0	501.0	0.0	268.5	0.0	250,763.5	0.0	1,857.5	826,600
	Generator	offroad	48	0	1.7	0.0	0.9	0.0	0.0	0.0	1.9	0.0	0.0	2
Miscellaneous	Craft utility, delivery trucks	onroad MD	40	1,200	0.1	39.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Pickup trucks, 30 mph	onroad LD	20	600	0.0	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>TOTAL Combustion Emissions By Activity (tons)</b>					<b>VOC lbs</b>	<b>CO lbs</b>	<b>NO<sub>x</sub> lbs</b>	<b>Sox lbs</b>	<b>PM<sub>10</sub> lbs</b>	<b>PM<sub>2.5</sub> lbs</b>	<b>CO<sub>2</sub> lbs</b>	<b>CH<sub>4</sub> lbs</b>	<b>N<sub>2</sub>O lbs</b>	<b>CO<sub>2</sub> eqv lbs<sup>3</sup></b>
Site Preparation					0.1	0.5	0.9	0.0	0.1	0.1	136.8	0.0	0.0	137.2
Site Prep Grading					0.0	0.2	0.3	0.0	0.0	0.0	41.5	0.0	0.0	41.6
Fence, Paving of street accesses, AC, lighting, and trailers					0.1	0.3	0.4	0.0	0.0	0.0	62.3	0.0	0.0	62.5
Converter Building Foundations					0.5	2.0	3.2	0.0	0.3	0.3	432.3	0.0	0.0	433.6
Converter Building Superstructure					0.2	0.9	2.8	0.0	0.2	0.2	414.8	0.0	0.0	416.8
Transformer Yard Foundations and Conduits					0.2	0.8	1.4	0.0	0.1	0.1	192.2	0.0	0.0	192.8
Transformer Yard Structural, Electrical					0.0	0.2	0.5	0.0	0.0	0.0	68.8	0.0	0.0	69.0
Final Site Preparation, traprock, paving, vegetation plantings					0.1	0.2	0.4	0.0	0.0	0.0	70.1	0.0	0.0	70.3
HDD					0.4	1.4	4.7	0.0	0.2	0.2	375.2	0.0	0.0	376.4
Miscellaneous					2.1	26.5	1.8	0.0	0.0	0.0	1,084.7	0.1	0.0	1,093.7
<b>Subtotal</b>					<b>3.6</b>	<b>33.1</b>	<b>16.4</b>	<b>0.0</b>	<b>1.1</b>	<b>1.1</b>	<b>2,878.8</b>	<b>0.1</b>	<b>0.0</b>	<b>2,894</b>
Cable Installation					0.4	1.7	5.4	0.0	0.2	0.2	587.2	0.0	0.0	595.1
Installation of Cable Protection					0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dredging					0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2
Cable Shipment					0.0	0.0	0.4	0.1	0.0	0.0	15.6	0.0	0.0	16.2
<b>Subtotal</b>					<b>0.4</b>	<b>1.7</b>	<b>5.8</b>	<b>0.1</b>	<b>0.3</b>	<b>0.2</b>	<b>603.1</b>	<b>0.0</b>	<b>0.0</b>	<b>611.6</b>
Vegetation Clearing					0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Topsoil Removal and Storage					0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0
Access Path Prep (gravel)					0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0

TOTAL Combustion Emissions By Activity (tons)	VOC lbs	CO lbs	NOx lbs	Sox lbs	PM <sub>10</sub> lbs	PM <sub>25</sub> lbs	CO <sub>2</sub> lbs	CH <sub>4</sub> lbs	N <sub>2</sub> O lbs	CO <sub>2</sub> eqv lbs <sup>3</sup>
Trench Excavation	0.0	0.1	0.1	0.0	0.0	0.0	11.6	0.0	0.0	0.0
Cable Delivery	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0
HDD	0.0	0.2	0.6	0.0	0.0	0.0	47.9	0.0	0.0	0.0
Site Deliver and Pull Cable	0.0	0.1	0.1	0.0	0.0	0.0	12.4	0.0	0.0	0.0
Splice Cable	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0
Deliver and Install Thermal Backfill	0.0	0.1	0.1	0.0	0.0	0.0	10.0	0.0	0.0	0.0
Install Native Backfill	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0
Remove Excess Native Fill from site	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0
Replace Topsoil, York Rake Vegetation	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.0	0.0	0.0
Miscellaneous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Subtotal</b>	0.5	2.2	6.8	0.1	0.3	0.3	706.2	0.0	0.0	611.6
Site Preparation	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Site Prep Grading	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Building Foundations	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Building	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final Site Preparation, traprock, paving, vegetation plantings	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HDD	0.0	0.0	0.3	0.0	0.1	0.0	125.4	0.0	0.9	413.3
Miscellaneous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Subtotal</b>	0.0	0.0	0.3	0.0	0.1	0.0	125.7	0.0	0.9	413.3
<b>Total Combustion emissions, lbs</b>	<b>8,197</b>	<b>70,520</b>	<b>46,899</b>	<b>278</b>	<b>3,201</b>	<b>2,790</b>	<b>7,421,537</b>	<b>296</b>	<b>1,952</b>	<b>7,824,913</b>
<b>Total Combustion emissions, tons</b>	<b>4</b>	<b>35</b>	<b>23</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>3,711</b>	<b>0</b>	<b>1</b>	<b>3,912</b>
<b>Total Fugitive Dust emissions, earthmoving, tons<sup>4</sup></b>	-	-	-	-	<b>16</b>	<b>5</b>	-	-	-	-
<b>Total Fugitive Dust emissions, road dust, tons<sup>4</sup></b>	-	-	-	-	<b>26</b>	<b>4</b>	-	-	-	-
<b>Combined Engine and Fugitive Dust emissions, tons</b>	<b>4.10</b>	<b>35.26</b>	<b>23.45</b>	<b>0.14</b>	<b>44.16</b>	<b>9.72</b>	<b>3,711</b>	<b>0.15</b>	<b>0.98</b>	<b>3,912</b>

Notes:

Underwater Cable Laying includes mileposts 290 to 333.

VMT: vehicle-miles traveled for on-road vehicles. LD: Light Duty. HD: Heavy Duty. HHD: Heavy Heavy Duty.

<sup>1</sup> Emissions weighted for calendar year 2013 (USEPA 2003, USEPA 2006, USEPA 2009a).

<sup>2</sup> Units are operating hours for offroad engines, vehicle miles traveled (VMT) for onroad vehicles.

<sup>3</sup> Carbon dioxide equivalents (CO<sub>2</sub> eqv) are calculated by summing the products of mass GHG emissions by species times their respective GWP coefficients (USEPA 2009a).

<sup>4</sup> See Fugitive Dust Estimation Calculations tables for more detailed information.

**Table M-26. Proposed One-MW Generator Emissions**

<b>Generator Kilowatts</b>		<b>Conversion from kW to Btu/hr</b>	<b>Engine Btu/hr (Assume 90% efficiency converting mechanical to electrical power)</b>	<b>Engine MMBtu/hr</b>		
1000		3414.4	3,793,807	3.79		
<b>Diesel Industrial Engine Emissions Factors from AP-42, Section 3.4</b>	<b>NO<sub>x</sub></b>	<b>CO</b>	<b>VOC</b>	<b>PM<sub>10</sub></b>	<b>SO<sub>2</sub></b>	<b>CO<sub>2</sub></b>
	<b>lb/MMBtu</b>	<b>lb/MMBtu</b>	<b>lb/MMBtu</b>	<b>lb/MMBtu</b>	<b>lb/MMBtu</b>	<b>lb/MMBtu</b>
Emissions Factor	3.2	0.85	0.09	0.1	1.01	165
	<b>(lbs/yr)</b>	<b>(lbs/yr)</b>	<b>(lbs/yr)</b>	<b>(lbs/yr)</b>	<b>(lbs/yr)</b>	<b>(lbs/yr)</b>
Assume max. 300 hr/yr operation and testing	3,642.05	967.42	102.43	113.81	1,149.52	187,793.42
	<b>(tons/yr)</b>	<b>(tons/yr)</b>	<b>(tons/yr)</b>	<b>(tons/yr)</b>	<b>(tons/yr)</b>	<b>(tons/yr)</b>
<b>Emissions Per Generator</b>	<b>1.821</b>	<b>0.484</b>	<b>0.0512</b>	<b>0.0569</b>	<b>0.575</b>	<b>93.897</b>

Source: USEPA 1996. AP-42. Large Stationary Diesel And All Stationary Dual-fuel Engines. Table 3.4-1. Page 3.4-5.

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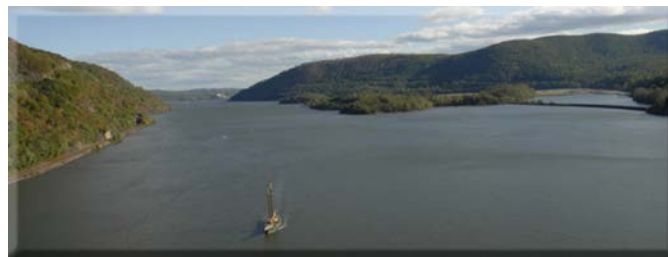
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## APPENDIX N

# Noise Analysis Background Information







## **Appendix N**

### **Noise Analysis Background Information**

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Modeling of noise levels associated with construction of the proposed CHPE Project was conducted for certain cases where reasonable noise data from previous studies were not available. Noise levels were determined based upon the types of equipment that would be used and the duration of their use. Noise emission factors for common construction equipment were obtained from guidance documents from the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) (USFTA 2006, FHWA 2006a, FHWA 2006b), and corresponding sound levels were estimated (Maling et al. 1992) or calculated based on rated construction equipment horsepower. Other construction equipment noise emissions levels were estimated from brake horsepower ratings (Wood 1992). Utilization factors were employed to represent the amount of time each noise source contributed to the potential noise exposure. This approach is considered conservative, and in some cases a more realistic and lower noise estimate was obtained from the FHWA guidance document (FHWA 2006a).

**Appendix N** contains detailed tables showing the noise emissions and utilization factors for each piece of equipment associated with various forms of construction and operating equipment related to the proposed CHPE project.

The following tables are included in **Appendix N**:

- **Table N-1.** Land-Based Construction Noise Sources
- **Table N-2.** Converter Station Construction Noise Sources
- **Table N-3.** Prominent Discrete (Pure) Tone Analysis for Transformers
- **Table N-4.** Pure Tone Analysis for Coolers

**Table N-1. Land-Based Construction Noise Sources**

Activity	Equipment and Vehicles	SWL/ Unit (dBA)	Qty per 1 hour	UF	Total SWL (dBA)	Calculated Sound Pressure Level (dBA) as $L_{eq}$ (1 hour) at distance			
						100 feet	500 feet	1,000 feet	2,000 feet
Vegetation Clearing	Brush Hog	108	2	40%	107	66	53	46	40
	<b>TOTAL COMBINED NOISE</b>					<b>66</b>	<b>53</b>	<b>46</b>	<b>40</b>
Topsoil Removal and Storage	Small Bulldozer	114	2	40%	113	72	58	52	46
	Bobcat	116	2	40%	115	75	61	55	49
	<b>TOTAL COMBINED NOISE</b>					<b>77</b>	<b>63</b>	<b>57</b>	<b>51</b>
Access Path Prep (gravel)	Small Bulldozer	114	2	40%	113	72	58	52	46
	18-yard dump	108	2	40%	107	66	52	46	40
	<b>TOTAL COMBINED NOISE</b>					<b>73</b>	<b>59</b>	<b>53</b>	<b>47</b>
Excavate Trench	Backhoe	110	2	40%	109	68	54	48	42
	Bobcat	116	2	40%	115	75	61	55	49
	Ram Hoe	122	2	10%	115	74	60	54	48
	Hard Rock Trencher	123	2	20%	119	78	64	58	52
	<b>TOTAL COMBINED NOISE</b>					<b>81</b>	<b>67</b>	<b>61</b>	<b>55</b>
Cable Delivery	Flatbed Truck, 30 mph	106	2	40%	105	64	50	44	38
	Crane, 40 ton	113	2	16%	108	67	53	47	41
	<b>TOTAL COMBINED NOISE</b>					<b>69</b>	<b>55</b>	<b>49</b>	<b>43</b>
HDD	Drilling Power Unit	127	2	50%	127	86	72	66	60
	Generator	113	2	50%	113	72	58	52	46
	<b>TOTAL COMBINED NOISE</b>					<b>86</b>	<b>72</b>	<b>66</b>	<b>60</b>
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	106	2	40%	105	64	50	44	38
	Crane, 40 ton	113	2	16%	108	67	53	47	41
	Puller/Tensioner	120	2	40%	119	78	64	58	52
	Mid-pull caterpillars	120	2	40%	119	78	64	58	52
	<b>TOTAL COMBINED NOISE</b>					<b>81</b>	<b>68</b>	<b>61</b>	<b>55</b>
Splice Cable	Generator	113	2	40%	112	71	57	51	45
	Propane heaters	115	2	75%	117	77	63	57	50
	<b>TOTAL COMBINED NOISE</b>					<b>78</b>	<b>64</b>	<b>58</b>	<b>52</b>
Deliver and Install Thermal Backfill	18-yard dump	108	2	40%	107	66	52	46	40
	Backhoe	110	2	40%	109	68	54	48	42
	Bobcat	116	2	40%	115	75	61	55	49
	<b>TOTAL COMBINED NOISE</b>					<b>76</b>	<b>62</b>	<b>56</b>	<b>50</b>

Activity	Equipment and Vehicles	SWL/ Unit (dBA)	Qty per 1 hour	UF	Total SWL (dBA)	Calculated Sound Pressure Level (dBA) as $L_{eq}$ (1 hour) at distance			
						100 feet	500 feet	1,000 feet	2,000 feet
<b>Install Native Backfill</b>	Backhoe	110	2	40%	109	68	54	48	42
	Bobcat	116	2	40%	115	75	61	55	49
	Shaker/screen	118	2	50%	118	77	63	57	51
	Compressor for tamperers	110	2	40%	109	68	54	48	42
<b>TOTAL COMBINED NOISE</b>						<b>80</b>	<b>66</b>	<b>60</b>	<b>54</b>
<b>Remove Excess Native Fill from site</b>	18-yard dump	108	2	40%	107	66	52	46	40
	Backhoe	110	2	40%	109	68	54	48	42
	<b>TOTAL COMBINED NOISE</b>						<b>70</b>	<b>56</b>	<b>50</b>
<b>Replace Topsoil, York Rake Vegetation</b>	Small Bulldozer	114	2	40%	113	72	58	52	46
	Hydroseed Sprayer	118	2	75%	120	79	65	59	53
	<b>TOTAL COMBINED NOISE</b>						<b>80</b>	<b>66</b>	<b>60</b>

Notes: SWL=sound power level; UF=Utilization Factor

**Table N-2. Converter Station Construction Noise Sources**

Activity	Equipment and Vehicles	Source noise emission by SPL at 50 feet				Calculated SPL (dBA) as $L_{eq}$ (1 hour) at distance			
	Type	SPL Per Unit (dBA)	Qty. per 1 hour	UF	Net SPL (dBA)	100 feet	500 feet	1,000 feet	2,000 feet
Site Preparation	Bulldozer	91	2	40%	90	84	70	64	58
	Backhoe	78	2	40%	77	71	57	51	45
	Loader	79	1	40%	75	69	55	49	43
	18-yard Truck, transport debris	76	2	40%	75	69	55	49	43
	<b>TOTAL COMBINED NOISE</b>						<b>84</b>	<b>70</b>	<b>64</b>
Site Prep Grading	Bulldozer	91	1	40%	87	81	67	61	55
	Backhoe	78	1	40%	74	68	54	48	42
	Loader	79	1	40%	75	69	55	49	43
	18-yard Truck, clean fill	76	2	40%	75	69	55	49	43
	<b>TOTAL COMBINED NOISE</b>						<b>81</b>	<b>67</b>	<b>61</b>
Fence, Paving of street accesses, AC, lighting, and trailers	Truck with Kelly bar auger	79	2	75%	81	75	61	55	49
	Concrete Mixer, offsite delivery	79	1	40%	75	69	55	49	43
	Bobcat	85	2	40%	84	78	64	58	52
	Bulldozer	91	1	40%	87	81	67	61	55
	18-yard Truck, asphalt	76	1	40%	72	66	52	46	40
	Hotbox with truck	77	1	75%	76	70	56	50	44
	Roller	80	1	20%	73	67	53	47	41
	Backhoe	78	1	40%	74	68	54	48	42
	Small crane	78	1	16%	70	64	50	44	38
	<b>TOTAL COMBINED NOISE</b>						<b>84</b>	<b>70</b>	<b>64</b>
Converter Building Foundations	Backhoe	78	2	40%	77	71	57	51	45
	Bobcat	85	1	40%	81	75	61	55	49
	Loader	79	2	40%	78	72	58	52	46
	Bulldozer	91	1	40%	87	81	67	61	55
	Small crane-forms	78	2	16%	73	67	53	47	41
	Medium crane-concrete bucket	81	2	16%	76	70	56	50	44
	Concrete Mixer, offsite delivery	79	4	40%	81	75	61	55	49
	<b>TOTAL COMBINED NOISE</b>						<b>83</b>	<b>69</b>	<b>63</b>

Activity	Equipment and Vehicles	Source noise emission by SPL at 50 feet				Calculated SPL (dBA) as $L_{eq}$ (1 hour) at distance			
	Type	SPL Per Unit (dBA)	Qty. per 1 hour	UF	Net SPL (dBA)	100 feet	500 feet	1,000 feet	2,000 feet
<b>Converter Building Superstructure</b>	Large crane, for frame and gantry crane	83	1	16%	75	69	55	49	43
	Small crane, for roof and cladding	78	2	16%	73	67	53	47	41
	Forklifts, offloading equipment	75	1	40%	71	65	51	45	39
	Small crane, offloading equipment	78	1	16%	70	64	50	44	38
	Generator	81	5	50%	85	79	65	59	53
	Propane heaters	84	5	75%	90	84	70	64	57
	<b>TOTAL COMBINED NOISE</b>						<b>85</b>	<b>71</b>	<b>65</b>
<b>Transformer Yard Foundations and Conduits</b>	Backhoe	78	1	40%	74	68	54	48	42
	Loader	79	1	40%	75	69	55	49	43
	Small crane-forms	78	1	16%	70	64	50	44	38
	Bulldozer	91	1	40%	87	81	67	61	55
	Bobcat	85	1	40%	81	75	61	55	49
	<b>TOTAL COMBINED NOISE</b>						<b>82</b>	<b>68</b>	<b>62</b>
<b>Transformer Yard Structural, Electrical</b>	Small crane	78	2	16%	73	67	53	47	41
	Manlift trucks	75	2	20%	71	65	51	45	39
	Compressor	78	2	40%	77	71	57	51	45
	<b>TOTAL COMBINED NOISE</b>						<b>73</b>	<b>59</b>	<b>53</b>
<b>Final Site Preparation, traprock, paving, vegetation plantings</b>	18-yd Truck, traprock	76	1	40%	72	66	52	46	40
	Loader	79	1	40%	75	69	55	49	43
	Bulldozer	91	1	40%	87	81	67	61	55
	Bulldozer	91	1	40%	87	81	67	61	55
	18-yard Truck, asphalt	76	1	40%	72	66	52	46	40
	Hotbox with truck	77	1	75%	76	70	56	50	44
	Roller	80	1	20%	73	67	53	47	41
	Flatbed Truck, plantings	74	1	40%	70	64	50	44	38
	Backhoe	78	1	40%	74	68	54	48	42
<b>TOTAL COMBINED NOISE</b>						<b>84</b>	<b>70</b>	<b>64</b>	<b>58</b>

Activity	Equipment and Vehicles	Source noise emission by SPL at 50 feet				Calculated SPL (dBA) as $L_{eq}$ (1 hour) at distance			
	Type	SPL Per Unit (dBA)	Qty. per 1 hour	UF	Net SPL (dBA)	100 feet	500 feet	1,000 feet	2,000 feet
<b>HDD</b>	Drilling Power Unit	95	2	50%	95	89	75	69	63
	Generator	81	2	50%	81	75	61	55	49
	<b>TOTAL COMBINED NOISE</b>					<b>89</b>	<b>75</b>	<b>69</b>	<b>63</b>

Notes: SPL=sound pressure level; UF=Utilization Factor

**Table N-3. Prominent Discrete (Pure) Tone Analysis for Transformers**

TDI- Astoria Converter Station Transformers One-Third Octave Band Analysis for Prominent Pure Tones																															
Typical Transformer Spectrum from the Handbook of Acoustical Measurements and Noise Control, Harris 1991																															
		1 / 3 Octave Band (dB)																													
		18	20	26	31.6	40	50	63	80	100	125	160	200	250	316	400	500	630	800	1K	1.25K	1.6K	2K	2.5K	3.16K	4K	5K	6.3K	8K	10K	12.5K
Measured Levels (dB)**				49	53	64	51	51	57	63	75	58	62	74	71	74	73	66	64	60	56	54	52	49	47	45	43	42	40	39	
1.) Does the 1/3 octave band have a greater dB value than do both of the adjacent 1/3 octave bands? ("1" is yes, "0" is no)																															
		0	0	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
The actual arithmetic average of adjacent 1/3 octave bands, where applicable																															
		-	-	-	52.0	-	-	-	-	60.5	-	-	66.5	-	72.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2.) Does condition 1) apply, and is the 1/3 octave band greater than the arithmetic average of its adjacent 1/3 octave bands? ("1" is yes, "0" is no)																															
		0	0	0	1	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
The amount by which the 1/3 octave band does exceed the arithmetic average of its adjacent 1/3 octave bands, where applicable																															
		-	-	-	12.0	-	-	-	-	14.5	-	-	7.5	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Allowable exceedence per NYSDPS protocol																															
		15	15	15	15	15	15	15	15	15	8	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
3.) Is the standard exceeded - is the 1/3 octave band a "prominent pure tone"?																															
		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	

Note: Definition of pure tone as defined by "Model Community Noise Control Ordinance" USEPA, 1975.

Source: CHPEI 2012ff

**Table N-4. Pure Tone Analysis for Coolers**

TDI- Astoria Converter Station																														
Valve Coolers																														
One-Third Octave Band Analysis for Prominent Pure Tones																														
Typical Cooler Spectrum from the Handbook of Acoustical Measurements and Noise Control, Harris 1991																														
1 / 3 Octave Band (dB)																														
Measured Levels (dB)**	18	20	25	31.6	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1K	1.25K	1.6K	2K	2.5K	3.15K	4K	5K	6.3K	8K	10K	12.5K
					85	87	86	84	89	101	92	93	96	95	101	99	99	98	97	94	94	95	97	93	87	85	87	82	78	
1.) Does the 1/3 octave band have a greater dB value than do both of the adjacent 1/3 octave bands? ("1" is yes, "0" is no)																														
	0	0	0	0	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	
The actual arithmetic average of adjacent 1/3 octave bands, where applicable																														
	-	-	-	-	85.5	-	-	-	90.5	-	-	94.0	-	97.0	-	-	-	-	-	-	-	-	94.0	-	-	-	83.5	-	-	
2.) Does condition 1) apply, and is the 1/3 octave band greater than the arithmetic average of its adjacent 1/3 octave bands? ("1" is yes, "0" is no)																														
	0	0	0	0	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	
The amount by which the 1/3 octave band does exceed the arithmetic average of its adjacent 1/3 octave bands, where applicable																														
	-	-	-	-	1.5	-	-	-	10.5	-	-	2.0	-	4.0	-	-	-	-	-	-	-	-	3.0	-	-	-	3.5	-	-	
Allowable exceedence per NYSDPS protocol																														
	15	15	15	15	15	15	15	15	15	8	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
3.) Is the standard exceeded - Is the 1/3 octave band a "prominent pure tone"?																														
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	

Note: Definition of pure tone as defined by "Model Community Noise Control Ordinance" USEPA, 1975.

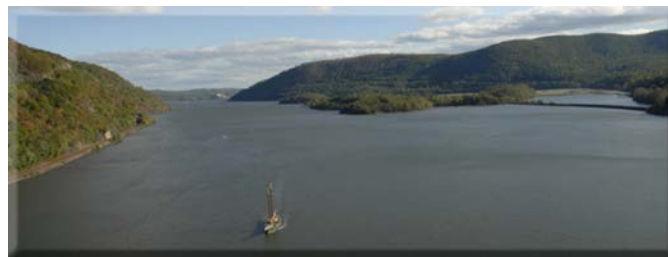
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## APPENDIX O

# Contractor Disclosure Statement





Appendix A

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE  
CHAMPLAIN HUDSON POWER EXPRESS TRANSMISSION LINE PROJECT  
ENVIRONMENTAL IMPACT STATEMENT

The Council on Environmental Quality (CEQ) Regulations at Title 40 of the *Code of Federal Regulations* (CFR) Section 1506.5(c), which have been adopted by the U.S. Department of Energy (10 CFR Part 1021), require contractors who will prepare an environmental impact statement to execute a disclosure specifying that they have no financial or other interest in the outcome of the project.

“Financial or other interest in the outcome of the project” is defined as any direct financial benefit such as a promise of future construction or design work on the project, as well as indirect financial benefits the contractor is aware of (e.g. if the project would aid proposals sponsored by the firm’s other clients). It excludes any benefits such person or entity may enjoy in common with other electricity ratepayers in the same service territory.

In accordance with these requirements, HDR, Inc. shall complete this document.

HDR, Inc., on behalf of itself, its subsidiaries (including but not limited to HDR Environmental, Operations and Construction, Inc. and HDR Engineering, Inc.) and its employees, hereby certifies as follows, to the best of its knowledge as of the date set forth below:

(a) HDR, Inc, HDREOC, HDR Eng has no financial or other interest in the outcome of the project.

~~(b) \_\_\_\_\_ has the following financial or other interest in the outcome of the project and hereby agrees to divest itself of such interest prior to award of this contract, or agrees to the attached plan to mitigate, neutralize or avoid any such conflict of interest.~~

Financial or Other Interests

- 1.
- 2.
- 3.

W.R.N.

Certified by:

William H. Wadsworth  
Name, Title Exec. V.P. - HDR Engineering, Inc.

COI Administrator - HDR, Inc.  
Company

6-29-12  
Date

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