

## **Basis for Overhead Transmission Cost Estimate**

- Work items and quantities determined from a preliminary detailed optimized design of line and structures.
- Includes all identified work items associated with siting, approvals, design, construction and commissioning costs.
- Includes 345kV single circuit transmission line from Pleasant Valley Station to CVEC, termination structure at CVEC, modifications in Bay 2 at Pleasant Valley Substation and relay protection at Pleasant Valley Station
- Includes 345kV single circuit transmission line from the termination structure at CVEC to the existing L-line near tower L-60, and reconducting from tower L-61 thru L-76 adjacent to the Connecticut border. The continuation of the line to Long Mountain Substation is the responsibility of Northeast Utilities (NU).
- Labor costs based upon local union labor
  - Local #60 for general laborers
  - Local #137 for equipment operators
  - Local #457 for teamsters
  - Local #361 (NYC) for linemen, substations, structure erection and stringing
  - Local #29 Blasters for foundation construction and blasting
  - Cost estimate based upon five, eight-hour days per week.
  - 10% overhead
  - 10% profit

### Labor Rates

Category	Local	Total
Laborer - Common	#60 Heavy & Highway	\$77.99
Laborer - Concrete	#60 Heavy & Highway	\$78.54
Foreman - Laborers	#60 Heavy & Highway	\$82.04
Flagperson	#60 Heavy & Highway	\$67.90
Laborer- Driller	#60 Heavy & Highway	\$79.74
Laborer - Job Steward	#60 Heavy & Highway	\$79.74
Operator - Large Cranes	#137 Heavy & Highway	\$125.95
Operator - Large Equipment	#137 Heavy & Highway	\$105.52
Mechanic	#137 Heavy & Highway	\$101.29
Operator - Driller	#137 Heavy & Highway	\$101.29
Teamster -	#456 Teamsters	\$92.04
Teamster -Low Boy	#456 Teamsters	\$93.44
Linemen/Electrician JM	#361 Ironworkers NYC	\$167.31
Blasters - Drillers	#29 Blasters NYC	\$131.78
Blasters - Helpers & Jackhammer	#29 Blasters NYC	\$126.39
Blasters - Watch Persons	#29 Blasters NYC	\$84.90
Office Assistant		\$90.00
Inspectors		\$120.00
Field Engineers		\$140.00
Superintendent		\$220.00
Project Manager		\$180.00
Ironworker Foreman	#361 Ironworkers NYC	\$174.21
Surveyor, PC	#15D, Oper Engrs, NYC	\$139.04
Surveyor Instrument	#15D, Oper Engrs, NYC	\$112.81
SR Engineer		\$150.00
Asst Superintendent		\$160.00

(1) Based upon 5 - 8 hour days

- Crews developed for calculating labor costs

**Crews**

<b>Crew Designation</b>	<b>Crew Type</b>	<b>Men Quantity &amp; Skill Level</b>	<b>Labor Cost</b>	<b>Equipment</b>
A	Laborers	2 laborers	\$158	Pickup truck
B	Laborers with end loader or excavator	2 laborers, 1 equipment operator, 1 foreman	\$344	Pickup truck & end loader
C	Line Crew-Ground	4 linemen, 1 foreman, 1 equipment operator	\$1,011	2 line trucks , 1 pickup, 1 large equipment (small crane, end loader)
E	Access Road Crew	2 laborer, 1 equipment operator, 1 foreman	\$345	Dozer or end loader and pick-up
F	Access Road Maintenance	1 equipment operator, 2 laborers	\$284	Dozer or grader
G	Crane	1 equipment operator, 1 mechanic	\$227	
H	Tree removal and clearing	6 laborers, 2 equipment operators, 1 foreman	\$759	Dozer, bucket truck, 3 pickups, dump truck, shredder
I	Flagmen	1 laborer	\$68	Pickup
J	Drilled pier crew	2 drillers, 4 driller helper and 1 foreman	\$901	Drilled rig, boom truck, 2 pickups, flatbed truck
K	Supervision and field office	1 job superintendent, 2 book keepers, 6 field engineers, 2 assistant	\$1,560	3-Trailer rentals, 6 pickups (no pickup for book keeper), utilities
K1	Supervision and field office, Begin & End	1 job superintendent, 1 book keepers, 3 field engineers, 1 assistant	\$880	Trailer rental, 4 pickups (no pickup for book keeper), utilities
L	Inspection	1 engineer and 1 inspector	\$260	2 pickup trucks
M	Surveying	3 Surveyors	\$365	
O	Helicopter	About 5	\$4,000	Helicopter and support equipment
P	Security	2 Security personnel	\$184	2 cars
Q	Test Borings	1 ENGR Driller, 2 Helpers	\$360	TB Drill rig, Water Truck, Stake truck
Z	Sr Engr	Sr Engineer	\$150	

- Equipment costs based rental costs on a per month basis. Equipment costs are from line contractors, published rental costs and phone calls to equipment rental agencies.

**TRANSMISSION LINE CONSTRUCTION EQUIPMENT RENTAL COSTS for  
Pleasant Valley to Cricket Valley Segment**

EQUIPMENT	Monthly Rental Fee	Quantity	Months	Cost w/ mob
Mobilization (initial & return)	3500			
Mobilization (initial & return)	1500			
Small Helicopter Mob		1		\$15,000
Standard Crawler Dozer	15000	1	12	\$183,500
Front-End Loader	12000	1	12	\$147,500
Wheel loader	8660	0		
	10100	0		
Crane	18000	1	1	\$21,500
Excavator	6625	0		
Backhoe	4331	1	12	\$53,475
Grader	10000	1	4	\$47,000
Air Compressor	1188	1	2	\$3,876
Dump Truck	2650	1	9	\$25,350
Line/Auger Truck	5775	6	10	\$355,500
Pickup Truck 4WD	1540	12	12	\$239,760
Equipment/Matl trailer	502	3	9	\$15,046
Field Trailer	1115	2	12	\$29,763
Office Trailer	2230	2	12	\$55,026
Deck trailer	932	1	14	\$14,552
Cable Puller System	7582	2	3	\$48,491
Connection & Splicing Equipment)	836	3	3	\$12,024
Bucket Truck to 170'	37813	2	5	\$379,625
Bucket Truck to 150'	30525	3	5	\$462,375
Dump Truck 5 yd	2750	1	10	\$29,000
Flatbed w/ Boom and winch	5156	3	6	\$97,313
Reel Trailer	1925	3	3	\$21,825
Quad Runner	589	6	12	\$51,372
10,000-Watt Portable Generator	743	2	8	\$13,380
Ground testing Equipment	631	2	3	\$5,287
Miscellaneous Tools	5000	1	10	\$51,500
Fuel & Equipment Repairs	30000	1	12	\$361,500

\$2,740,538

**TRANSMISSION LINE CONSTRUCTION EQUIPMENT RENTAL COSTS for Cricket Valley to Connecticut Border Segment**

EQUIPMENT	Rental fee (4 week periods) or noted	Quantity	Months	Cost w/ mob
Mobilization (initial & return)	3500			
Mobilization (initial & return)	1500			
Small Helicopter Mob		1		\$15,000
Standard Crawler Dozer	15000	1	4	\$63,500
Front-End Loader	12000	1	4	\$51,500
Wheel loader	8660	0		
	10100	0		
Crane	12000	1	1	\$15,500
Excavator	6625	0		
Backhoe	4331	1	4	\$18,825
Grader	10000	1	4	\$47,000
Air Compressor	1188	1	3	\$5,064
Dump Truck	2650	1	4	\$12,100
Line/Auger Truck	5775	4	4	\$98,400
Pickup Truck 4WD	1540	6	5	\$55,200
Equipment/Matl trailer	502	2	4	\$5,515
Field Trailer	1115	1	5	\$7,076
Office Trailer	2230	1	6	\$14,882
Deck trailer	932	1	6	\$7,094
Cable Puller System	7582	1	2	\$16,664
Connection & Splicing Equipment)	836	2	2	\$6,344
Bucket Truck to 170'	37813	0	0	\$1,500
Bucket Truck to 150'	30525	2	3	\$186,150
Dump Truck 5 yd	2750	1	3	\$9,750
Flatbed w/ Boom and winch	5156	1	4	\$22,125
Reel Trailer	1925	2	2	\$10,700
Quad Runner	589	3	5	\$13,328
10,000-Watt Portable Generator	743	1	3	\$3,728
Ground testing Equipment	631	1	2	\$2,762
Miscellaneous Tools	5000	1	5	\$26,500
Fuel & Equipment Repairs	10000	1	5	\$51,500

\$767,704

## Transmission Line Cost Assumptions

<p>Access &amp; Pole/Stringing Site Preparation</p>	<ul style="list-style-type: none"> <li>• Best access route for each structure determined in EM&amp;CP.</li> <li>• Use of existing access routes for Cricket Valley to CN border reconducted segment</li> <li>• Access routes &gt; 15% slope requires equipment assistance for large equipment and line trucks</li> <li>• Access routes &gt; 25% slope deemed inaccessible with large equipment and line trucks – requires helicopter erection of poles</li> <li>• Access routes &lt; 2% slope are in wet soft areas requiring filter fabric under 18” crushed rock</li> <li>• Access road width of 20’</li> <li>• Existing access roads to be used unless unsuitable. Minimal clearing and grading is specified</li> <li>• Normal access roads include 6” crushed rock</li> <li>• Access through wetlands prohibited</li> <li>• Off ROW access via existing access roads is included in estimate of work required</li> <li>• Limited blasting to remove localized areas with steep slopes. Blast mats required for all blast operations</li> <li>• 50’ x 25’ level area required for stringing sites and pole sites utilizing cranes for pole erection. Grading shall be accomplished by balanced cuts and fills</li> </ul>
<p>Clearing</p>	<ul style="list-style-type: none"> <li>• On Pleasant Valley to Cricket Valley segment, clearing of remaining trees from edge to edge of ROW, based upon Google Earth images</li> <li>• On Cricket Valley to Connecticut border segment the clearing is incidental to existing maintenance requirements</li> </ul>
<p>Construction Services</p>	<ul style="list-style-type: none"> <li>• Includes Contractor Supervisor and field office support</li> <li>• Surveying costs for locating structure sites, test borings and conductor sagging operations</li> <li>• Security 16 hrs/weekday, 24 hrs/weekend day, 2 roving personnel</li> </ul>
<p>Equipment</p>	<ul style="list-style-type: none"> <li>• Equipment estimation based upon monthly rental charges</li> </ul>
<p>Foundations -</p>	<ul style="list-style-type: none"> <li>• Foundation costs represent the greatest variability of all other</li> </ul>

Cricket Valley to Pleasant Valley segment	<p>construction components.</p> <ul style="list-style-type: none"> <li>• Foundation cost high due to inaccessibility by large equipment and very hard rock.</li> <li>• Estimate based upon rock micropile foundations which is suitable for all foundations. Drilled pier foundations and rock anchor foundations may be less costly than that estimated at some locations.</li> </ul>
Foundations - Cricket Valley to Connecticut border segment	<ul style="list-style-type: none"> <li>• Foundation costs represent the greatest variability of all other construction components.</li> <li>• Estimate based upon drilled pier foundations for the take-off structure and foundation CV-L-2 and CV-L-3.</li> <li>• Rock anchor or rock micropile foundations with an anchor cap for 3-pole structure CV-L-4.</li> <li>• Rock anchor foundation reinforcement for 5 existing towers due to increased loads</li> <li>• A 25% increase in cost attributed to many uncertainties and geologic variability</li> <li>• Rock anchor foundations designed and constructed by a specialty contractor.</li> </ul>
Grounding	<ul style="list-style-type: none"> <li>• Based upon 5-50' radial counterpoise at each site with grounding backfill to reduce resistance</li> </ul>
Inspection	<ul style="list-style-type: none"> <li>• Includes Owner/Engineer inspection and field engineering services with 1 inspector and/or 1 field engineer at each work site during construction</li> <li>• Includes office support by Engineering and Engineering Project Manager (1/3 time) with bi-weekly field trips for meetings and site inspection</li> </ul>
Insulators & hardware	<ul style="list-style-type: none"> <li>• Cricket Valley to Connecticut border segment - Replace existing insulator assemblies for bundled conductor.</li> <li>• Cricket Valley to Pleasant Valley segment - V-String insulator assemblies mounted on structure prior to pole erection. by air-crane helicopter.</li> <li>• Cricket Valley to Pleasant Valley segment - Dead-end insulator assemblies installed on structure after pole erection using small helicopter or crane.</li> </ul>
Structures - Cricket Valley to Pleasant Valley	<ul style="list-style-type: none"> <li>• 61 structures erected using air-crane helicopter, 3 structures erected using crane (where helicopter usage is prohibited).</li> <li>• Construction support also provided by a small helicopter to air-lift men</li> </ul>

segment	<p>and equipment to structure sites where ground access is difficult or not provided.</p> <ul style="list-style-type: none"> <li>• Estimate and productivity for air-crane helicopter from Erickson Air-Crane</li> </ul>
Structures - Cricket Valley to Connecticut border segment	<ul style="list-style-type: none"> <li>• 4 structures erected using crane</li> <li>• Construction support also provided by a small helicopter to air-lift men and equipment to structure sites where ground access is difficult or not provided</li> <li>• Helicopter support is a minor construction component – most work can be done using ground forces</li> </ul>
Conductor/OPGW/ Shield Wire	<ul style="list-style-type: none"> <li>• Pull conductor in L-line section using existing conductor</li> <li>• Pull conductor in new section by ground forces (pull wire by hand)</li> <li>• Provide extra 125 feet conductor at L-60 to permit transferring conductor from L-60 to CV-L-4. Once transferred, tower L-60 is removed.</li> <li>• Where cost effective, use crane and/or climbing.</li> </ul>
Real Estate	<ul style="list-style-type: none"> <li>• Property acquisition or easement at \$30,000/ acre or 1.25* assessed value of property and residence. Note: property acquisition costs are excluded from the cost estimate.</li> </ul>

### **Transmission Line Cost Exclusions and Limitations**

- Excludes property acquisition
- Excludes property leases for field office and staging yards
- Cricket Valley to Pleasant Valley segment - Based upon use of an air-crane helicopter at approximately 60 sites
- Cricket Valley to Connecticut Border segment - Based upon use of normal transmission line equipment, and stringing equipment
- Overhead transmission line crossing the Taconic Parkway
- Fees and costs for crossing Parkway is limited to standard permit fees and traffic control.
- Availability of air-crane helicopter as scheduled.
- Overtime not included except during pole erection by air-crane helicopter.