New York State Thruway Authority

Design and Construction Requirements for Aerial Communication and Power Line Installations

Office of Real Property Management

TAP-421C (1/2010)

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I. INTRODUCTION

Thruway Authority (Authority) policy is to maintain a clear zone for safe highway operation with as little interference and impairment as possible to the overall integrity of the highway. Underground crossings are encouraged and the Authority will not allow aerial installations unless placement of Utilities underground is unsafe, unusually difficult, or not technically feasible.

Plans for aerial construction shall indicate the proposed location of all poles, towers and conductors with the horizontal and vertical clearances from the Thruway pavements and other affected Authority facilities. The size and type of conductors, maximum voltage, type of insulator, number of lightning arresters per mile and location of transformers shall also be indicated. The plans should also include a layout of the support equipment and safety devices, as well as a narrative describing the process (including stoppages needed) when pulling or placing wires over the highway.

The following aerial requirements shall be adhered to in the event that an overhead crossing is the only construction alternative that is available at a given location.

II. POLES

A. DISTANCE FROM PAVEMENT

Permanent poles and temporary poles shall, where possible, be placed outside Authority Property. In no case, will permanent poles, temporary poles or their guy wires be permitted closer than fifty (50) feet from the edge of pavement, or in the median if the median is less than eighty (80) feet in width.

Temporary poles may be permitted closer than the above mentioned requirements if guide railing is in existence and the Authority determines that the guide railing adequately protects the proposed pole installation. Temporary poles shall not be placed within the design deflection distance of the type(s) of guide railing as specified by the Authority. Where guide rail is not in existence, a temporary concrete barrier which has been constructed to Authority standards as shown in the *Occupancy and Work Permit Specification Diagram: Temporary Concrete Barrier Protection* available from the Division Permit Coordinator must be installed.

B. POSITIONING

Poles shall, insofar as possible, be set in line, plumbed and well guyed in an approved manner, at points where the overhead line changes direction or dead ends.

C. STABILITY

Foundations for steel poles and towers shall be designed to prevent overturning. Where the crossing is located in wet ground or a swampy area, special precautions shall be taken to ensure stability of the poles and towers. The current industry standard factor for safety must be used.

D. TEMPORARY POLES AND CRADLES

Temporary poles and cradles, near or on overhead bridges, shall be used during construction and rehabilitation projects. The poles and cradles, near or on overhead bridges, shall be removed within five (5) working days from the date of completion of conductor installation, unless written authorization for an extension is obtained from the Authority Division Director or designee.

E. FLAMMABLE MATERIALS

The space around poles or towers (permanent and temporary) shall be kept free from flammable material, underbrush and grass for a minimum distance of ten feet (10') and six feet (6') for primary and secondary power lines, respectively, so as not to endanger such poles or towers.

F. TREE TRIMMING

In the event it is found necessary to trim trees within the boundaries of the Thruway, the least possible amount of trimming shall be done. In all cases, the consent of the Authority Division Director must be secured in writing before any trees are trimmed. A Work Permit will be necessary and may be obtained from the Division Permit Coordinator (see TAP-401).

III. CROSSING SPANS

A. LENGTH

Unusually long crossing spans shall be avoided wherever practicable. Underground facilities shall be used whenever possible.

B. SUPPORT STRUCTURES

Where practicable, the poles or towers supporting the crossing span shall be double-armed.

C. INTERSECTING WIRES

Electric lighting wires, or high voltage cables, shall cross above telegraph, telephone and similar low voltage wires where such crossings are necessary.

IV. WIRES/CABLES

A. CLEARANCES

The following minimum clearances shall be maintained under the most unfavorable conditions of temperature and loading:

1. Between wire/cable and crown of highway:

Voltage		Clearance
under 750 volts		not less than eighteen feet (18')
750-7,499 volts		not less than twenty feet (20')
7,500-50,000 volts		not less than thirty feet (30')
above 50,000 volts		thirty feet (30') plus one-half inch (0.5") for each 1,000 volts

2. Between alternating current circuits and any existing wires/cables:

Voltage		Clearance
under 750 volts		not less than two feet (2')
750-7,499 volts		not less than four feet (4')
7,500-50,000 volts		not less than six feet (6')
above 50,000 volts		six feet (6') plus one-half inch (0.5") for each 1,000 volts

OR

Between wires/cables where the distance from the nearest support (i.e. pole) for the first wire/cable to the point of intersection of the wires/cables plus the distance from the nearest support for the second wire/cable to the point of intersection, is less than one hundred feet (100'). See the *Occupancy and Work Permit Specification Diagram: Intersecting Power Transmission Lines* available from the Division Permit Coordinator for further information.

3. Where telegraph, telephone or other low voltage wires cross transmission or power distribution wires/cables, special precautions shall be taken to maintain proper clearance under the worst possible conditions of temperature and loading.

B. GROUNDING

The towers and poles supporting the crossing span where wires/cables carry more than 7,500 volts shall be permanently grounded, unless two (2) cross arms are used on each pole of the crossing span. In addition, a satisfactory device shall be used to ground each part of the tower or pole in the event of breakage.

C. CONDUCTORS

1. Materials

Conductors shall be of copper, steel reinforced aluminum, fiber optic cable or other noncorrodible material, except where mechanical strength is insufficient because of an extra long span. The conductors in crossing spans shall contain no joints.

2. Size

The minimum size of conductors shall be:

- For spans of less than 150 feet:
  - No. 4 B & S gauge for soft-drawn copper wires.
  - No. 6 B & S gauge for medium or hard-drawn copper wires or for aluminum wires with steel reinforcement.
- For spans of 150 feet or more:
  - According to the National Electrical Safety Code (NESC).
- For fiber optic cable:
  - According to NYS DOT Accommodation Plan for Longitudinal Use of Freeway Right-of-Way by Utilities.

D. INSULATORS

1. Materials

Insulators shall be of porcelain for voltages exceeding 5,000 volts.

2. Strain Insulators

Strain insulators for guy wires shall have a mechanical strength at least equal to that of the guy in which they are placed and shall not flash over at four (4) times the maximum line voltage under the precipitation of water of one to five inches (1" - 5") per minute. Strain insulators shall be so constructed that the guy wires holding insulators in place interlock in case of insulator failure.

3. Insulator Pins

Insulator pins for lines of 11,000 volts or more shall be of an approved metal, protected from corrosion. Insulator pins for lines of less than 11,000 volts shall be of wood, not less than one inch (1") in diameter at the shank.

V. GUY WIRES

A. SIZE

The diameter of guy wires shall be not less than 5/16 inch.

B. MATERIALS

The composition of guy wires shall be National Electric Safety Code (NESC) approved material protected from corrosion.

C. ANCHORAGE

Details of anchorage of guy wires are to be definitively shown in the design plan.

D. WOODEN POLES

Wooden poles used to support the crossing span shall be side-guyed in both directions, if practicable, and be head-guyed away from the crossing span. The next adjoining poles shall be head-guyed in both directions.

E. BRACES

Braces may be used instead of guys.

F. STRAIN INSULATORS

1. Strain insulators shall be used in guys from wooden poles carrying any power wire of more than 300 volts and less than 6,600 volts, providing the guys are not thoroughly grounded to permanently damp earth.

2. Strain insulators shall not be used in guying steel structures.

3. Strain insulators will not be required on wooden poles carrying wires, which are 6,600 volts or more, provided the guys are thoroughly grounded to permanently damp earth.

VI. WARNING SIGNS

Warning signs of an approved design shall be placed on all towers, on all poles stepped less than six and one-half feet (6.5') from the ground and carrying wires or cables, and on all transformers.

VII. UTILITY MARKING REQUIREMENT

All underground and aerial crossings shall be properly identified with markers at both Authority Property lines. Markers shall include the type of installation (water line, gas pipeline, etc.) and the name of the Utility or agency responsible for repair of the installation. This marking must be durable and secure, and be approved by the Authority.