



Environmental Assessment

Prepared For:

United States Fish and Wildlife Service

For

**Land Exchange with Conectiv Power Delivery Involving
The Edwin B. Forsythe National Wildlife Refuge**



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INTRODUCTION

The United States Fish and Wildlife Service (Service) and Conectiv Power Delivery (Conectiv)¹ are proposing to undertake a land exchange involving portions of the Edwin B. Forsythe National Wildlife Refuge (Forsythe Refuge), a component of the National Wildlife Refuge System located in New Jersey that is managed by the Service. The purpose of the land exchange is two-fold: 1) to allow Conectiv to complete construction of an approximately 13.96-mile transmission line running from the Oyster Creek Substation to the Cedar Substation (the "line") along a route approved by agencies of the State of New Jersey and its subdivisions (approved route), and 2) to secure for the Forsythe Refuge an approximate twenty-acre parcel of property within the refuge's approved acquisition boundary in order to further the purposes of the refuge by providing habitat of greater ecological value.

ENSR has prepared this Environmental Assessment for the Service in order to satisfy the Service's obligations under the National Environmental Policy Act (NEPA). Because the purpose of the land exchange is, in part, to allow Conectiv to complete construction of the line along the approved route, the scope of this environmental assessment encompasses the entire 13.96-mile length of the line. Section 1.0 discusses the purpose and need for the land exchange and the line. Section 2.0 describes the reasonable alternatives to the proposed action (the land exchange), including reasonable alternatives to the route of the line should the Service take no action. Section 3.0 describes the affected environment with particular emphasis on the resources most likely to be affected by the alternatives considered. Section 4.0 analyzes the anticipated environmental consequences of the reasonable alternatives described in Section 2.0, including proposed mitigation measures. Section 5.0 discusses the permits, consultations, and other authorizations required for the land exchange and the construction of the line.

¹ Atlantic City Electric Company, the entity that is constructing the transmission line that is the subject of this assessment, does business as Conectiv Power Delivery. For ease of reference, this assessment will use the term "Conectiv" to refer to Atlantic City Electric and its affiliates.

1.0 PURPOSE AND NEED FOR ACTION

1.1 Purpose for Taking Action

One purpose for the proposed land exchange is to allow the completion of the line along the approved route. On April 14, 2004, the New Jersey Board of Public Utilities (BPU) approved a route for the line. This approved route is part of the Preferred Alternative. The Preferred Alternative extends 13.96 miles from Oyster Creek Substation to the Cedar Substation. The Preferred Alternative utilizes 5.13 miles of existing right-of-way (ROW) and 8.83 miles of new ROW. In the section of new ROW, the Preferred Alternative traverses a narrow portion of what is now the Forsythe Refuge that is immediately adjacent to the New Jersey Garden State Parkway (Parkway) at the refuge's western boundary. A map of the area of the proposed action, showing the Preferred Alternative, the Forsythe Refuge, the Parkway, and other features is attached as Figure 1. The portion of the refuge that is traversed by the Preferred Alternative is 60 feet wide and 5,702 feet long. Figure 3 shows the narrow portion of the refuge to be traversed.

Another purpose of the proposed land exchange is to secure for the Forsythe Refuge a new parcel of property within the refuge's approved acquisition boundary ("New Acquisition Property"). The New Acquisition Property is approximately twenty acres and is located in Stafford Township, New Jersey, east of the Parkway and north of Manahawkin. The location of the New Acquisition Property is depicted on Figure 2. The New Acquisition Property contains valuable wetlands and wildlife resources that the Service seeks to protect by including such wetlands and resources within the Forsythe Refuge. Completing the land exchange and taking ownership of the New Acquisition Property would further the purposes of the refuge by providing habitat of greater ecological value than that of the parcel to be exchanged.

Through the land exchange, Conectiv intends to aid the Service with its goal to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. The 43,000-acre Forsythe Refuge is one of more than 500 refuges in the National Wildlife Refuge System. Figure 2 in Appendix A indicates the limits of the Forsythe Refuge. Forsythe Refuge's Brigantine and Barnegat Divisions were originally two distinct refuges, established in 1939 and 1967 respectively, to protect tidal wetland and shallow bay habitat for migratory water birds. In 1984, they were combined under the Edwin B. Forsythe name, in honor of the late conservationist Congressman from New Jersey.

The refuge's location in one of the Atlantic Flyway's most active flight paths makes it an important link in the vast network of national wildlife refuges. New Jersey coastal wetlands are a major wintering area for Atlantic brant and American black duck. While meeting the habitat needs of these two species is a primary concern here, the Refuge's diversified habitats are managed to support a wide variety of water birds and other wildlife.

Nearly 80 percent of Forsythe Refuge is tidal salt meadow and marsh, interspersed with shallow coves and bays. Most of the remainder of the refuge acreage is woodlands dominated by pitch pines, oaks, and white cedar-red maple swamps, with some upland fields which are maintained in the midst of these wooded communities to increase habitat diversity. Deer are controlled in these areas to ensure there is adequate ground nesting cover for nesting passerines and woodcock. More than 6000 acres are designated as Wilderness Area, including Holgate and Little Beach, two of the few remaining undeveloped barrier beaches in New Jersey. These pristine sites provide critical nesting habitat for threatened piping plovers and a wide variety of other beachnesting species. Beaches and dunes provide nesting habitat for piping plovers, black skimmers and least terns. Occasionally peregrine falcons, bald eagles, and osprey are seen.

The New Acquisition Property is located in Stafford Township, Ocean County, New Jersey. This parcel is designated on municipal tax records and mapping as Block 296, Lot 36. It is depicted as a land-locked parcel of approximately 20.56 acres in size and is located north of Route 72 and Beach Avenue and east of Route 9. Zoning for the parcel is designated as "P" – Preservation Zone, under the municipal land use ordinance. It is located completely outside the Federal Emergency Management Agency (FEMA) designated flood zone. There are no available utilities including sewer, water, stormwater, electric and telephone (<http://twp.stafford.nj.us/>). Aerial photo mapping (<http://terraserver.microsoft.com/>) shows no improved or unimproved access roads. There are no reported solid or hazardous waste sites on or in immediate vicinity of the acquisition property (<http://www.state.nj.us/dep/gis/imapnj/>). There are no reported groundwater contaminated areas on or in immediate vicinity of the acquisition property.

Publicly available databases were used to research the environmental features of the proposed acquisition parcel. These resources indicate the subject parcel is at an elevation of approximately 15 feet above sea level (USGS 1927 NAD) and is relatively flat (<2% slope). Review of available mapping and aerial photographs indicate no streams or other surface water bodies. The acquisition property is located in the Manahawkin/Upper Little Egg Harbor tributary area of the Barnegat Bay Watershed Management Area. All 20.56 acres are mapped as forested freshwater wetlands by the New Jersey Department of Environmental Protection (NJDEP) in their Geographic Information System (GIS) database. NJDEP's Landscape Project data (Version 1) indicates potential habitat at the acquisition property for barred owl (*Strix varia*), a state-listed threatened species, as well as for southern gray treefrog (*Hyla chrysoscelis*), a state listed endangered species (see Figure 5). There are no federally listed species reported in the vicinity of the proposed acquisition parcel.

The 7.9 acre parcel that is currently owned by the refuge, which will be crossed under Preferred Alternative, is designated on municipal tax records and mapping as Block 52, Lots 1 and 6, and Block 69, Lots 1 and 2. This narrow portion of what is now the Forsythe Refuge is immediately adjacent to the Parkway at the refuge's western boundary. Aerial photo mapping shows one dirt road (Little Worth Mill Road) intersecting this property. According to tax maps, this road has been vacated. In addition, a portion of this parcel is located within a 100-year flood zone, as maintained by Federal Emergency Management Agency Federal Insurance Rate Map community panel number 340393 00005C. This portion of the refuge contains valuable upland habitat dominated by pitch pine (*Pinus rigida*) and white

oak (*Quercus alba*) and a high resource value palustrine forested wetland that is associated with Mill Creek. NJDEP's Landscape Project data (Version 1) indicates potential habitat at the parcel for barred owl (*Strix varia*), northern pine snake (*Pituophis melanoleucus melanoleucus*), and Pine Barrens treefrog (*Hyla andersonii*).

1.2 Need for Taking Action

Conectiv already operates a 69 kV electric transmission line running 14.1-miles from Oyster Creek Substation to the Cedar Substation. Upgrading this line is necessary in order to meet an increasing demand for electricity.

In 2000, transmission planning studies were performed by Conectiv and by PJM Interconnection, LLC (PJM). PJM is the Regional Transmission Organization approved by the Federal Energy Regulatory Commission that serves as the independent operator of the transmission system that includes this line. PJM assessed the future needs of the PJM transmission system with an emphasis on Conectiv's Atlantic Region. The transmission studies determined that the eastern portion of the transmission system as a whole would be susceptible to severe low voltages and thermal overloads without transmission system re-enforcement. Another deficiency would be in the local supply capability to and through the West Creek area in the northeast territory of the Atlantic Region. This area, which includes Long Beach Island, is becoming too heavily loaded to be adequately served by the three existing 69 kV lines feeding the area.

These transmission planning studies determined a need for additional reactive supplies and additional thermal delivery capability into the eastern part of the Atlantic Region. In response to that need, Conectiv developed several transmission upgrades plans in order to ensure the reliability of electric supply for their present and future customers. Among the alternatives researched within the transmission study, Conectiv selected the upgrade discussed in this assessment. The Preferred Alternative is a result of considerable public process in which concern was expressed about the transmission facility being routed through residential areas. Public concerns have largely been addressed as a result of routing the facility along the Garden State Parkway and through undeveloped areas.

The original analysis performed in early 2000 concluded that the line should be completed prior to summer 2003 to mitigate severe low voltages and prior to summer 2004 to mitigate for thermal overloads which could occur as a result of a possible transmission outage. This timeline has been exceedingly challenging. Electric load in the Atlantic Region has been growing faster than all but one of PJM's subregions. By comparison to the development of similar transmission line improvements elsewhere in the nation, this line has been quickly developed. Nevertheless, electric load in the area served by the line has outstripped supply.

In 1989, when the last major upgrade into the eastern part of the Atlantic Region System (New Freedom-Cardiff 230 kV line) was placed in service, the system load peaked at 1800 megawatts (MW).

By 2004, the system load will have grown to almost 2800 MW. This translates to a 55 percent increase in load over a fifteen-year period, which is on the order of 3 percent per year. Further, a disproportionately large amount of that load growth is in the eastern part of the system. While the eastern system may represent up to 50 percent of the total system load on a typical hot summer day, that eastern load is growing at a rate that represents approximately 60 percent of total growth. This is a high growth system (second fastest growing in PJM study) and within that system, the eastern portion is growing even faster than the system as a whole.

Conectiv has conducted a system-wide planning analysis, which is based on projections of growth, including high-load growth areas in Ocean County. The proposed 230 kV project is a result of Conectiv's desire to meet the needs of its customers.

2.0 ALTERNATIVES TO THE PROPOSED ACTION

The Service has two alternatives available with respect to the proposed action. The Service may either 1) complete the land exchange with Conectiv or 2) take no action (i.e., decide not to complete the land exchange). Both alternatives have consequences for the route of the line. If the Service completes the land exchange, Conectiv can complete construction of the line along the approved route. This is the Preferred Alternative.

State law obligates utilities to provide reliable electric service to their customers. If the Service takes no action, Conectiv would be faced with two principal alternatives to the Preferred Alternative. One alternative is to route the new 230kV line entirely along the 14.1-mile ROW of the existing 69 kV line ("69kV Alternative"). A second alternative is to route the new line generally along the Preferred Alternative, but to move the line onto Parkway property instead of the ROW exchange property ("Parkway Alternative").

Both of these alternatives were rejected after thorough consideration through State processes and consideration of public input. Public opposition to entirely utilizing the existing 69 kV route resulted in route changes, developed in consultation with and under the approval of State officials. The State has objected to siting the facility within the Parkway property in the area of the refuge. These matters are discussed in more detail below.

Consequently, neither the 69kV Alternative nor the Parkway Alternative is a route that is authorized by the BPU. Conectiv is not authorized to carry out either of these alternatives at this time. Only the alternative identified as the Preferred Alternative has been approved by the BPU. Both the Existing 69kV Alternative and the Parkway Alternative would require Conectiv to seek a new approval from the BPU (and other agencies that have approved the approved route). Such new approvals would extend the time for constructing the line for an unknown length of time, and, further, it is not certain that such approvals would be granted. Despite these legal and practical constraints, each of these three alternatives for the route of the line is analyzed in detail below.

2.1 Alternatives Considered But Determined Not Feasible

Several other alternatives to the Preferred Alternative were considered but determined to be infeasible due to various technological, social, legal, economic, or other considerations. One alternative considered but rejected is failing to construct the line. Due to the clear need for additional transmission capability, the growing demand for electricity in the area, and the risks to public health and safety if electrical service is interrupted, this alternative is not reasonable from the standpoint of the public safety and health, public utility law, and social and economic prudence.

A second alternative considered was upgrading the Sands Point-Cedar and #1 Lewis-Motts Farm-Cedar 69 kV lines to 138 kV in conjunction with installing static VAR compensators (SVC) at various

eastern locations. While this plan was viable, it was determined that the installation of a 230 kV transmission line was superior. A 138kV line would require further upgrades and would not accommodate load growth as well as a 230kV line. Separately, an upgrade of other sections of the transmission system such as the Landis – Lewis 138 kV circuits, while providing an incremental increase in eastern transmission delivery capability, would not address the immediate needs of the West Creek service area. These upgrades would also not provide the necessary electricity required at the Cardiff Substation located at the southern end of the existing 69kV line. Conversely, an upgrade that addressed only the West Creek service area, such as upgrading both the #1 and #2 Lewis-Motts Farm Cedar 69 kV lines to a higher capacity 69 kV, plus the installation of the SVC at various locations in the east, were found to be inadequate in terms of meeting the needs of the eastern system as a whole. The 230kV line also proved to be the most cost efficient in the long term, as opposed to the 138kV. Due to these constraints this alternative was considered infeasible.

A third alternative considered involved utilizing other alternative sources of energy to service customer needs. The Salem and Oyster Creek Nuclear facilities and the B.L. England Generating Station are among existing facilities which have been identified by the PJM study as other alternative sources of energy to service Conectiv's customers in lieu of the Oyster Creek to Cedar 230 kV Line. Generating plants, transmission lines, and distribution systems are all part of an interconnected network. For this reason, each project must be evaluated on a system-wide basis as activities in one part of the network may influence how other components of the system will react. The power from a generating plant is delivered via a network of transmission lines to substations where the power is stepped down to lower the voltage; then the power is delivered to homes and businesses via distribution lines. For the Oyster Creek to Cedar system, the power delivery capability into the southern Ocean County area and to the east as a whole must be increased.

As described throughout this assessment, the demand for electric energy within the Atlantic Region has recently increased more rapidly than previously expected and is based on current trends in new construction, population growth, and development. Although there is increasing demand for energy in the region under consideration, there is very significant electric generation available from existing power plants to meet that growth. However, today's 69kV network cannot continue to reliably deliver that generation to the ever-increasing load. As an alternative, it is more efficient to utilize this generating capacity than undertake new generation construction. Constructing new power plants in the region could be an option. Given current conditions in the electric generation business as well environmental considerations brought forward by the construction of a new power plant in an environmentally sensitive area, such as the area in the vicinity of the refuge, construction of a power plant was not considered in detail. Nationwide, power plant development has been decreasing due to economic concerns. Power plant developers are focused on completing their existing projects quickly and efficiently, rather than initiating new plants.

In addition to the economic concerns of power developers themselves, the economics of new projects are not as attractive as it has been in recent years. Also, the fuel choice for new energy generation could be problematic. Although natural gas is currently an economically efficient and relatively clean fossil fuel, the pipeline system in the Northeast may be inadequate. A report issued by the Energy

Information Administration in 2002 has identified the Northeast as the area where “gas pipeline capacity is reaching the throughput limits at several strategic points.” This potential deficiency could impinge on the ability to construct new generation. Building new generation that would meet the needs of this service area would likely lead to more adverse environmental impacts than the Preferred Alternative. In contrast to a new generating station, the Preferred Alternative will have little or no permanent impact on air quality, water quality and supply, and aquatic resources. The increase in demand is more efficiently met by improving the transmission of available power output from currently existing facilities by means of the proposed 230 kV project.

A fourth construction or technological alternative is to install the transmission line offshore. This alternative would entail laying the electric transmission cable along the bottom of the back bays making up the Intracoastal Waterway or further off the New Jersey shore within the Atlantic Ocean. Installing the proposed transmission line offshore would help to eliminate or reduce some of the onshore impacts associated with the Preferred Alternative. Forested and emergent wetland impacts associated with the Preferred Alternative would be reduced as a result of this alternative. However, potential impacts to estuarine wetlands, submerged aquatic vegetation, benthic shellfish, and finfish spawning areas due to the installation of this alternative are unknown but could be extensive as well as controversial. For example, the Cross Sound cable connecting Connecticut and Long Island New York has been beset by these issues. Although the overall number of poles located within both freshwater and coastal wetlands would decrease, they would not be eliminated as a result of this alternative. Poles still would be necessary from the existing Oyster Creek and Cedar Substations to the Intracoastal Waterway. In addition, costs associated with the construction and maintenance of this alternative would far outweigh the costs of the Preferred Alternative. Due to the increase in environmental impacts to aquatic resources, compared to the onshore alternative, as well as high construction costs to install the offshore transmission line, this alternative was not considered feasible.

A fifth technological alternative is to install the Oyster Creek to Cedar transmission line underground. A 230 kV underground installation is technically possible. Installation and maintenance of an underground utility line may have similar, or in some instances more, potential environmental impacts than an aerial line. They require nearly the same vegetation clearing, have additional impact of earth disturbances from trenching which also slows the reestablishment of vegetation and increases the likelihood of invasive plants. Furthermore, underground installation would require manholes approximately every 1,000 feet and causing additional environmental impact. Underground installations also raise operational and reliability concerns, as the long-term reliability of these cables and accessories is not presently known. The ease of access to an underground line for maintenance, which especially in emergency situations raises additional reliability issues. In addition, costs will exceed aerial transmission lines by more than four times. One cable with no directional drill will cost approximately \$3 million per mile while construction of an aerial transmission line would cost approximately \$650,000 per mile. There is no rational basis to support the use of underground construction for this line. In addition to technological concerns and operation and maintenance limitations, underground cables, particularly where significant wetland area exist, present the potential for serious environmental impacts. For these reasons this alternative was not considered feasible.

2.2 Alternative 1: Preferred Alternative (Land Exchange and Approved Route)

The Preferred Alternative utilizes a combination of upgrades to the existing 14.1-mile transmission line from 69 kV to 230 kV (Figure 1, Appendix A). The Preferred Alternative utilizes both existing ROW as well as new segments of 230 kV transmission line ROW and is approximately 13.96 miles in length. This will result in a route of similar distance to the existing line and will avoid more densely populated areas currently traversed by the existing 69 kV transmission line. A map showing the Preferred Alternative is depicted in Figure 1.

For ease of reference, the Preferred Alternative is divided into four segments based on five numbered nodes. Segment 1-2 of the Preferred Alternative follows the existing 69 kV ROW and involves pole for pole replacement of that line. This segment traverses Lacey, Ocean, and Barnegat Townships within Ocean County and is 5.1 miles long. One-hundred thirty eight (138) new poles will be placed in this existing ROW. The route crosses the New Jersey Garden State Parkway (Parkway), where it is located within the Rural Development Area of the Pinelands for 3.3 miles and the Regional Growth Area for one-mile. The pole heights in this section of the line will range in height from 55 to 65 feet. The span between poles in segment 1-2 is up to approximately 210 feet.

Segment 2-3 of the Preferred Alternative is 3.4 miles in length and is located entirely within Barnegat Township and is within the Regional Growth Area of the Pinelands. Ninety-two (92) new poles will be required for segment 2-3. The pole heights in this section of the line will be 55 to 80 feet in height. The span between poles in segment 2-3 is up to approximately 210 feet.

Segment 3-4 of the Preferred Alternative is 3.8 miles in length and located within Barnegat and Stafford Townships. The line then crosses over the Parkway just south of the Barnegat/Stafford Township Line and commences in a new 60 foot ROW just east of the Parkway easement. From the crossover just south of the Barnegat/Stafford Township Line, the proposed transmission line will travel south in a new 60 foot ROW outside the eastern edge of the Parkway through private property and a narrow strip of what is today the Forsythe Refuge. Ninety-seven (97) new poles will be placed within this new ROW. The pole heights in this section of the line will be 55 to 80 feet in height. The span between poles in segment 3-4 is up to approximately 210 feet. The northern portion of this segment is within the Regional Growth Area of the Pinelands for 1.1 miles.

Segment 4-5 of the Preferred Alternative is 1.9 miles in length and located entirely within Stafford Township in Ocean County. It is outside the Pinelands jurisdictional boundaries. Forty-three (43) new poles will be placed in new ROW; the pole heights in this section of the line will range in height from 55 to 80 feet and span up to approximately 210 feet.

Public outreach on this route included discussions with numerous public officials, informal public meetings in 2003 held by Conectiv, a BPU hearing to receive public comment in February 2004, and subsequent public meetings of the BPU and the NJDEP in April and May 2004. Public opposition to

this route was substantially less than that expressed with respect to the other two alternatives discussed below. Public participation is also discussed below in Section 3.3.

2.3 Alternative 2: No Land Exchange and Alternative Routes

If the Service takes no action on the land exchange, Conectiv will be unable to use the approved route and has two possible options for constructing the line.

2.3.1 69kV Alternative

Under this alternative, the existing 69 kV ROW would be utilized for the entire length of the line. This existing line extends from the Oyster Creek Substation in Ocean County and terminates at the Cedar Substation in Stafford Township, Ocean County and is 14.1 miles long.

Segment 1-2 of the Preferred Alternative consists of the existing 69 kV route. Between segments 1 to 2, the existing 69kV ROW is 6.1 miles in length and travels through 3.3 miles of Rural Development Area and 1.0 mile of Regional Growth Growth Area in the Pinelands Management Area.

Between segments 2 to 5, the existing 69 kV ROW traverses both high density residential and rural to low density residential areas within Barnegat and Stafford Townships. Total distance from nodes 2 to 5 is 8 miles; total mileage in Pinelands Management Areas between segments 2 to 5 is 5.4 miles. Segments 2 to 5 are within the Regional Growth Area for 5.4 miles. Presently, the existing 69 kV ROW has 370 existing wooden poles. These existing wooden poles would be replaced with metal poles ranging from 50 to 80 feet in height.

In September 2001 and again in February 2003, Conectiv filed for approval with the New Jersey Board of Public Utilities (BPU) to construct a 230 kV line along the existing 69 kV ROW. Because of considerable opposition from affected municipalities and counties, Conectiv withdrew these filings and proceeded with a filing to construct the facility along a route that, with subsequent modification arising from public process, has become the Preferred Alternative.

2.3.2 Parkway Alternative

This alternative is similar to the Preferred Alternative in that it utilizes essentially the same portions of the existing ROW along this route. However, one segment (3-4) of this alternative route would be located on the Parkway whereas these same segments of the Preferred Alternative are located approximately 30-feet off the Parkway property leaving the Parkway's tree line buffer intact. Route mileage and node locations for this alternative are identical to the Preferred Alternative. Segment 1-2 is the same for the Parkway Alternative and the Preferred Alternative.

Segment 3-4 of this alternative is located entirely within and Barnegat and Stafford Townships. Segment 3-4 is within the Regional Growth Area of the Pinelands for a total distance of 3.8 miles; the total mileage of this segment is 3.9 miles.

The alternative route for segment 4-5 of this alternative traverses Stafford Township in Ocean County for 2.1 miles. This segment is located along Route 72 where approximately forty-three (43) new poles would be placed in this new ROW. This would require the destruction of the tree line buffer that defines the Parkway, shields the Refuge property from the Parkway, and preserves the view of the forest from the Parkway. Segment 4-5 is within the Regional Growth Area of the Pinelands for a total distance of 2.9 miles.

After reviewing the project, the New Jersey Turnpike Authority (NJTA) objected to locating the transmission facility on the Parkway property at the point where the facility is proposed to be located on the refuge property, finding that such a route would be inappropriate. The NJTA found that a route on Parkway property at this location would eliminate the tree buffer, would limit the possibility of future improvements to the roadway, and would be viewed by the New Jersey State Historic Preservation Officer (SHPO) as an adverse impact upon the Parkway's historic characteristics (Attached in Appendix F).

The following table details the three alternatives in regards overall physical characteristics of the route:

Table 2.0: Summary of Alternatives

Parameter	Preferred Alternative	Existing 69kV Alternative	Parkway Alternative
Total length (miles)	13.96	14.1	13.1
New right-of-way required (miles)	8.83	0	5.2
Approved by Board of Public Utilities	Yes	No	No
Population centers crossed	None	One community at Barnegat/Stafford Twp boundary	None

3.0 AFFECTED ENVIRONMENT

The affected environment includes those physical, biological, and social resources and considerations that may potentially be permanently or temporarily impacted by the proposed action. Section 3.0 presents a discussion of each of those resources and considerations with particular emphasis on the resources most relevant to the alternatives considered.

3.1 Physical Considerations

3.1.1 Climate

Ocean County is typically hot in the summer and relatively cold in the winter. In the winter, the average temperature is 33 degrees Fahrenheit and in the summer, the average temperature is 72 degrees. Precipitation is distributed year-round, with snow in the winter only covering the ground for several days. Precipitation amounts average approximately 47 inches annually.

3.1.2 Air Quality

The U.S. Environmental Protection Agency (EPA) is required to set National Ambient Air Quality Standards (NAAQS) for pollutants found harmful to the environment and public health. The EPA, under the Clean Air Act (CAA) has established both primary and secondary NAAQS. Primary standards set limits to protect public health, while secondary standards protect public welfare.

The EPA has issued NAAQS for six pollutants, which are referred to as "criteria" pollutants. These include: carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), lead (Pb), particulate matter less than 10 microns (PM₁₀), and sulfur dioxide (SO₂). According to the EPA, Ocean County is in nonattainment for one hour or eight hour ozone criteria (EPA 2004). Ocean County is in attainment for all of the other criteria pollutants.

3.1.3 Topography

All alternatives are located within the West Creek, Brookville, and Forked River, New Jersey USGS topographic quadrangles. The entire project area is located within the Atlantic Coastal Plain. The Atlantic Coastal Plain covers a large portion of southern New Jersey. More than half of this area, which is characterized by gently rolling hills, is less than 100 feet above sea level.

3.1.4 Geology

According to the Bedrock Geologic Map of Central and Southern New Jersey, the area of the line lies within the Coastal Plain Sediments, and the area is underlain by the Cohansey Formation, which consists of white to yellow sand with local gravel and clay. The sand is typically medium

grained and moderately sorted, although it ranges from fine to very coarse-grained and from poorly to well-sorted. The sand consists of quartz and siliceous rock fragments. The Cohansey Formation is markedly thin because of erosion prior to deposition of overlying units. The formation has been extensively eroded and stripped down and is poorly exposed due to its loose sandy composition. Ocean County is currently known for its mineral resources in the form of sand and gravel. Historically, Ocean County has also been a source of bog iron and charcoal. In addition, there has been one recorded earthquake within Ocean County between the years 1638 and 1998 (Wheeler et al. 2001).

Soil within the vicinity of all of the alternatives include: Lakehurst-Lakewood-Evesboro, Downer-Evesboro, Sulfaquents-Sulfihemists, Woodmansie-Downer, and the Manahawkin-Atsion-Berryland associations (USDA 1978).

3.1.5 Hydrology

The Preferred Alternative is located within the Mullica-Toms River Watershed, USGS Cataloging Unit: 02040301. This watershed is located within the Barnegat Bay Watershed Management Area of the Atlantic Coastal Water Region. Mill Creek is the only major watershed located within the ROW exchange property. Other rivers and tributaries are located throughout the project area.

The Clean Water Act (CWA) establishes the basic scheme for restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. Section 303(d) of the federal CWA requires all states to identify waters that do not meet water quality standards after applying certain effluent limits. States are required to submit a list to the EPA for their subsequent review and approval. According to the EPA, there are 123 waters on New Jersey's 303(d) list, including Barnegat Bay.

The New Jersey Department of Environmental Protection (NJDEP) has also established surface water quality standards (NJAC 7:9B) for the entire state of New Jersey. These standards include classification of waters, water quality-based effluent limitations, and beneficial uses of state surface waters. Waters located in the project area are primarily classified as both freshwater and estuarine suitable for swimming, fishing, and secondary contact recreation.

3.1.6 Floodplains

Floodplains generally refer to 100-year floodplains established by the Federal Emergency Management Agency (FEMA). These areas are shown on Flood Insurance Rate Maps (FIRM) or Flood Hazard Boundary Maps (FHBM) for all communities that are members of the National Flood Insurance Program (NFIP). The 100-year floodplain designates the area inundated during a storm having a one percent chance of occurring in any given year. FEMA also identifies the 500-year floodplain, which is the area inundated during a storm having a 0.2 percent chance of occurring in any given year. In particular, the area of the ROW exchange property is located within FEMA FIRM panel #3403930005C, where only the crossing of Mill Creek occurs in the flood prone zone.

In addition to FEMA floodplains, the State of New Jersey implements the NJDEP Flood Hazard Act and Surface Water Standards (NJAC 7:13 and NJAC 7:9B). These regulations establish floodplains within the state, which are broken up into floodways and fringe areas. Since FEMA maps only reflect the 100-year floodplain at the time of the study and did not anticipate future development in the drainage basin, NJDEP stipulates that these maps cannot be used to establish the regulatory flood elevation unless it can be demonstrated to the satisfaction of the NJDEP that the FEMA study reflects full development in the drainage basin or that there is a viable basin-wide storm water management system in place that will not increase the peak flows developed by the FEMA study.

3.1.7 Wetlands

In general, wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface (Cowardin, December 1979). Differences in soils, hydrology, vegetation, topography, climate, and water chemistry create various types of wetlands in different regions. A number of freshwater wetlands are located within the area of the proposed project, including both existing and new rights-of-way. Wetlands located within the land exchange area are associated with Mill Creek.

Freshwater wetlands are most common on floodplains along rivers and streams, in isolated depressions, along edges of waterbodies, and in other low-lying areas where groundwater or precipitation sufficiently saturates the soil. Freshwater wetlands include swamps dominated by trees or shrubs, and emergent marshes and meadows dominated by herbaceous flora.

Twenty-two (22) wetlands were identified along the Preferred Alternative. Ten (10) of these wetlands were delineated within the Pinelands jurisdictional limits. The remaining thirteen (12) wetlands were delineated within NJDEP jurisdiction. Eighteen (18) of these wetlands were within the existing previously cleared ROW. One of these wetlands is located on the ROW exchange property. Table 3.0 details the wetland characteristics for the 22 wetlands identified within the Preferred Alternative.

Table 3.0 Wetlands Identified within the Preferred Alternative

Federal Land	Pinelands ^a	Segment Identification ^b	Feature ID ^c	Community ^{d/e}	Habitat Resource Value ^f
		1-2	W-OC-058	PEM	Low
		1-2	W-OC-057	PSS // PFO	High
		1-2	W-OC-056	PEM	Low
		1-2	W-OC-055	PEM	Moderate
		1-2	W-OC-054	PSS	High
		1-2	W-OC-052	PEM	Moderate
		1-2	W-OC-051	PEM	Moderate
		1-2	W-OC-049	PSS // PFO	Moderate
		1-2	W-OC-047	PSS // PFO	High
		1-2	W-OC-046	PSS // PFO	High
	X	1-2	W-OC-048	PSS // PFO	High
	X	1-2	W-OC-059	PSS // PFO	High
	X	1-2	W-OC-060	PSS // PFO	High
	X	1-2	W-OC-551	PEM // PFO	High
	X	1-2	W-OC-550	PSS // PFO	High
	X	1-2	W-OC-553a	PSS	Moderate
	X	1-2	W-OC-549	PEM // PFO	High
	X	1-2	W-OC-548	PSS	High
	X	2-3	W-OC-700	PFO	High
		4-5	W-OC-410	PFO	High
X	X	4-5	W-OC-202	PFO	High
		4-5	W-OC-001	PFO	Moderate

a: Identified as being within Pinelands jurisdictional limits.

b: Identifies location of wetland by Segment on the Preferred Alternative.

c: ENSR field designation

d: As per Cowardin *et. al.* PFO = Palustrine Forest, PSS = Palustrine Scrub-shrub, PEM = Palustrine Emergent

e: on ROW // off ROW

f: Low = degraded habitat and/or dominated by invasive species; High = white cedar swamp and/or T&E pursuant to Landscape v1.0; Moderate = neither low nor high.

In regards to wetland value, each wetland located along the Preferred Alternative was identified using the New Jersey Landscape Project Version 1.0 to identify any rare, threatened, or endangered species or critical habitat associated with each wetland. A High Habitat Resource Value was given to any wetland assigned an exceptional resource value for transition areas as determined by the Landscape Project developed by NJDEP. Similarly, a High Habitat Resource Value was given to any wetland identified as being dominated by Atlantic white cedar (*Chamaecyparis thyoides*).

Conversely, a Low Habitat Resource Value was assigned to any wetland that was dominated by an invasive species, such as common reed (*Phragmites australis*). A Moderate Habitat Resource Value was assigned to any wetland that was neither a High Habitat Resource Value nor a Low Habitat Resource Value.

3.1.8 Noise

The Noise Control Act (NCA) of 1972 (42 U.S.C. 4901 to 4918) was created in order to determine the extent and effects of different qualities and quantities of noise and acceptable levels of noise toward public health and safety. The responsibility of noise abatement and control is given to state and local governments. Noise levels and exposure recommendations developed by the EPA under the NCA are relevant to the Preferred Alternative. The EPA describes sound in terms of its amplitude (loudness), frequency (pitch), and time pattern (continuous, fluctuating, intermittent, impulsiveness). Noise impacts are often described in terms of public and occupational hazards.

Sensitive receptors (areas that sustain greater impacts from noise sources than other areas) in the vicinity of the proposed action include residential areas and churches. Other sensitive receptors could include schools, hospitals, and public facilities, such as parks and recreational areas. Ambient noise levels (background sound) in the vicinity of the proposed action would vary depending on present background noise sources. Noise regulations and ordinances within Ocean County vary from municipality to municipality.

3.2 Biological Considerations

3.2.1 Vegetation - Species of Special Concern

A total of some 129 plant species of regulatory or special concern were determined to be of potential occurrence in the region based on a review of listings of the Service, the New Jersey Natural Heritage database, and the Pinelands Commission. Surveys of potential habitat within the existing ROW and Preferred Alternative were conducted during the spring/early summer and the fall seasons. A total of 140 plant species were identified on the existing ROW and the Preferred Alternative during the course of these surveys.

Only one plant of special concern to the Pinelands Commission Barratt's sedge (*Carex barratti*) was found to be present. Small colonies of this plant occur in the wetlands on either side of Well's Mills Road within Segment 1-2 of the Preferred Alternative. This segment is part of the existing 69 kV line and is common to all alternatives. Vegetative clearing of this ROW occurs every 3-5 years and the existing sedge colonies appear to benefit from the removal of greenbrier and other shrubs, which would otherwise create adverse shade conditions for this sun loving plant. A plan has been developed and discussed with the Pinelands Commission to avoid impacting the sedge population, which abuts one of the existing poles slated for replacement. The replacement pole will be situated outside the current limit of the Barratt's sedge population. The existing pole will be cut off rather than pulled from

the wetland to avoid physically disturbing the Barratt's sedge population, which abuts the pole. Removal of a greenbriar thicket will permit further expansion of the sedge population, which appears to have been constrained by dense shade from this shrub community.

One federally listed threatened plant species, swamp pink (*Helonias bullata*), is known to occur in the vicinity of the project. Populations are known to occur in wetlands along Four Mile Branch in the vicinity of Harpoon Drive in Barnegat Township. The Preferred Alternative at this crossing is located on the shoulder of the road and only very restricted trimming of the trees in this area will be conducted. Trimming will be undertaken in the presence of a trained biologist serving as an environmental monitor, and trimmed branches will be removed from the wetland area. The Service is aware of the proposed crossing and the methods to be utilized and has indicated that this crossing should pose no hazard to the swamp pink population (C. Popolizio, personal communication May 18, 2004).

Another swamp pink population was known to have occurred in the mid-1990s further downstream on Four-Mile Branch just east of the Parkway. This area is north of the refuge boundary; however, the stream continues to the southeast and eventually enters the refuge. Surveys conducted in spring 2003 failed to locate this population and further surveys, which included participation of Service biologist Carlo Popolizio, confirmed that this population did not occur on the Preferred Alternative which crosses Four Mile Branch just east of the Parkway. The most recent survey completed by Douglas Kibbe and Don Schall of ENSR along with a Service biologist on May 18, 2004 succeeded in locating three swamp pink plants in the refuge approximately 240 feet east of the eastern boundary of the Preferred Alternative. This distance was confirmed by ENSR biologist on May 27, 2004. It was concluded that these plants are the closest remnants of the previously reported population. They are well outside the area proposed for clearing and will not be impacted by the Preferred Alternative. Best management practices as well as environmental monitors present during pole installation will ensure that no construction activity will encroach on the population which is well outside the area of proposed disturbance and the applicant has committed to best practices during construction. Furthermore best management practices (such as use of hay bales) utilized to preclude off-site impacts from sediments.

A swamp pink population was also known to have occurred in the mid-1990s along Mill Branch on the portion of the Forsythe Refuge proposed for the land exchange. Surveys conducted in spring of 2003 failed to find any swamp pink along this portion of the proposed ROW. This finding was confirmed by Service personnel (J. Darren Harris and Steve Atzert) who examined this area in the spring of 2004. Their findings indicated that the current hydrology appears to be too dry to support swamp pink and that no plants are present in the area proposed for the land exchange (J. Darren Harris, personal communication May 18, 2004).

3.2.2 Wildlife - Species of Special Concern

A total of some 36 wildlife species of state or federal regulatory concern were determined to be of potential occurrence in the region (i.e., Ocean County) based on a review of listings of the Service, the New Jersey Natural Heritage Database, and the Pinelands Commission. Surveys of potential habitat

within the existing, preferred, and alternate ROWs were conducted during the spring/early summer 2003. A total of 28 species of birds were identified on the existing ROW, and Preferred Alternative ROW during the course of these surveys. None of the birds surveyed were on the agency lists. Avian diversity along the routes was generally low, a reflection of the uniformity of habitats present. Most of the habitat on or immediately adjacent to the routes is scrub-shrub, oak-pine forest, and highway or suburban residential development areas. Open water, emergent marsh and swamp forest areas are generally very small or lacking along the alignments. No marine or coastal habitat is present.

Although not observed during the course of the surveys, two species of concern in New Jersey, Cooper's Hawk and Barred Owl, have been reported from habitat areas adjacent to the area where the Preferred Alternative crosses Four Mile Branch along Harpoon Drive. The approved line in this crossing will be located on the berm of Harpoon Drive and will overhang the roadway. Only very limited trimming of trees on the south side of the drive will be required. Trimming and pole installation at this crossing will be overseen by a qualified biologist serving as an environmental monitor. Biologists from the Pinelands Commission have visited the crossing area, are aware of the proposed activities, and concur that no loss of potential breeding habitat or other adverse ecological impacts will occur as a result of the installation of the poles and transmission line along Harpoon Drive.

Pine Barrens tree frogs (*Hyla andersonii*), listed as endangered under New Jersey law, have been found in three wetlands on or adjacent to the Preferred Alternative. This species is known to occur frequently in the wetland shrub habitat associated with transmission lines. Notably, two of the wetlands where this species was found were along the existing ROW. Shrub regrowth in the wetland crossing is utilized in both of these locations. The third recorded area where the Pine Barrens tree frog has been identified is from a wetland, that is being avoided by the Preferred Alternative.

Northern pine snakes (*Pituophis melanoleucus melanoleucus*), a state listed species in New Jersey, are known to occur in the vicinity of the route. A survey of the entire Preferred Alternative and alternatives was conducted to determine whether snake critical habitat was present. No critical habitat was located as a result of this survey within the Preferred Alternative. To further ensure that pole installation activities will not impact this species, a biologist serving as an environment monitor will be present during construction and inspect each proposed pole location prior to drilling the hole.

3.3 Social Considerations

A major social consideration to be taken into account is public acceptance of the facility. Conectiv initially filed a petition with the BPU to seek approval for the line on September 28, 2001, almost exclusively following the existing 69 kV route. Due to various filings made in opposition to the facility by certain municipalities and counties, this petition was withdrawn not long thereafter. Opposition focused on aesthetic concerns and concerns related to electro-magnetic fields (EMF), both arising as a result of the facility being routed through populated areas. Conectiv filed a second petition with the BPU on August 9, 2002, seeking a permit for a route utilizing existing right-of-way, the Parkway, and rights-of-way across other property. This route took into account public criticism of the initial filing and

received substantially less public opposition. After modifications were made to address much of the opposition that was voiced, this filing ultimately gained BPU approval and is reflected herein as the Preferred Alternative. On February 6, 2003, the company filed a third petition for a modified version of the first route along the existing 69 kV route. Based on public opposition similar to that experienced with respect to the first petition, this petition was also withdrawn.

Major public meetings on the line included a Galloway Township Town Hall meeting on March 23, 2003. At this meeting, the public expressed considerable opposition to the third petition, and residents suggested that the company site the facility along the Parkway. On June 10, 2003, a Barnegat Township Community meeting was held, with residents again expressing strong opposition to the third petition and suggesting that the facility be sited along the Parkway and through the Pinelands. On February 10, 2004, the BPU hosted a public field hearing on the second petition. Conectiv provided buses for residents to attend, many of which voiced concerns about a portion of the route which, at the time, would have been sited between two senior citizen communities. Far fewer citizens attended the BPU meeting on April 14, 2004 when the permit for the line was approved. Only 10 or so citizens attended the DEP public hearing considering the line on May 6, 2004.

Notwithstanding the initial opposition to the line, land acquisition for the line has proceeded comparatively smoothly. For the portion of the right-of-way that must be acquired, Conectiv and private landowners successfully have negotiated necessary transactions for all but a few remaining parcels. Conectiv still is engaged in negotiations with these landowners but now has begun the legal process necessary to acquire the properties. The New Jersey Board of Public Utilities (BPU) is engaged in proceedings to enable the acquisition of these few parcels. Negotiations and the legal process will continue to enable timely acquisition of these parcels.

Throughout the public process, citizen comments have predominantly focused on (1) moving the facility away from populated areas into transportation corridors and undeveloped areas, and (2) concerns about electromagnetic fields (EMF). Few other concerns were raised during the public comment process.

3.3.1 Historic and Architectural Resources

3.3.1.1 Previously Identified Historic and Architectural Resources

Surveys for historic and architectural resources were conducted within the Area of Potential Affect of the project. Under federal regulation the Area of Potential Effect (APE) is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The APE effect is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking. For this project the APE was determined by Conectiv's cultural resources firm in conjunction with the New Jersey State Historic Preservation Office. The APE for archeological resources subject to direct physical impact by the proposed transmission line was limited to a 60 foot-wide easement. The APE

for historic and architectural resources encompassed an area within one-mile of the transmission lines new and existing ROW.

Two previously identified historic resources exist adjacent to the Preferred Alternative: Parkway and the Manahawkin Village Historic District. The Preferred Alternative crosses the Parkway at several places. The Preferred Alternative is adjacent to the Manahawkin Village Historic District when Route 72 meets Route 9 in Segment 4-5. There are five historic resources recorded within one mile of the Preferred Alternative (see Table 3.1). The resources include Rose Hill, the Manahawkin Baptist Church, the Old Stone Store, the Cedar Run Historic District, and the Tuckerton Railroad.

These sites are discussed in order of their location along the project corridor, from north to south.

The Parkway was determined eligible for inclusion on the National Register of Historic Places in 2001 (Guzzo 2001). It is characterized as both a scenic drive, for its park-like landscape, and high-speed expressway that extends from the New York state line in the north to Cape May County, New Jersey in the south. Mile 63 through Mile 71 of the Parkway are either within the project area or less than one mile from the project area; in other words, the Parkway is within the APE of the entire alignment (Segment 3-4 of the Preferred Alternative is just outside the Parkway ROW). One of the major features of the Parkway is the tree line buffer that shields the adjoining land (e.g., the Refuge) from the roadway and preserves a view for the traveler. [Note: the APE for this project is defined as a 1-mile radius surrounding the route.] The Parkway was largely responsible for the significant suburban and commercial development of the New Jersey Shore region in the late 20th century. The chief designer of the Parkway, Harold W. Griffin, was a noted engineer who made numerous contributions to highway design and development in the United States. For example, the placement of service areas in the center malls of the Parkway was considered innovative for its time and was credited with providing better services and facilities to motorists. While landscape architecture is evident throughout the park-like serpentine design of the Parkway, it can also be seen in the placement and design of picnic areas, roadside phone booth areas, and service areas. A unified architectural theme was also employed as the service areas, maintenance areas, police barracks, and toll plaza facilities were generally built in a New Jersey Colonial design (Spies et al. 2000).

Rose Hill, Barnegat Township, is an African-American community established in the 1920s. It is located less than 0.50 miles northeast of the Preferred Alternative. The community of about twenty families was centered on St. Luke's Methodist Church. It was identified in 1980 as part of a cultural resource survey completed for the New Jersey Pinelands Commission. (Liggett and Wilson 1980).

The Manahawkin Baptist Church was listed on the National Register of Historic Places in 1973. It is located on Main Street in Manahawkin, Stafford Township, approximately 0.50 miles north of the Preferred Alternative. Church records indicate that the frame and clapboard structure on a brick and mortar foundation was remodeled in 1867 to reinforce the structure of the original church, built in 1758. Thus the walls, floors, ceilings, etc. of the 1758 church are contained within corresponding elements of the existing church (Cramer 1972).

The Manahawkin Village Historic District, Stafford Township, located 0.50 miles northeast from the Preferred Alternative, reflects a period of tremendous growth in Manahawkin's history, due to the introduction of the railroad and the development of nearby Long Beach Island as a summer tourist area. The district, with both commercial and residential resources, was identified as part of the Ocean County Survey of the New Jersey Historic Sites Survey (May 1981b). The residential resources within the district were determined eligible for inclusion on the National Register of Historic Places in 1990 (Zerbe 1990). The 19th-century vernacular homes are frame construction with either clapboard or shingle exteriors with Gothic elements in their design.

The Old Stone Store in Manahawkin, Stafford Township, opened in the 1830s as a general store and remained in business until the early 20th century. Although it burned in 1964, it was reconstructed with the original stone in 1976. It is located 0.25 miles north of the Preferred Alternative. It was identified in 1981 as part of the Ocean County Survey of the New Jersey Historic Sites Survey (May 1981b).

Cedar Run Historic District, Stafford Township, consists of several houses along Main Street. The houses all date from the late 19th century and are vernacular examples of the Queen Anne style. They were identified in 1981 as part of the Ocean County Survey of the New Jersey Historic Sites Survey (May 1981b). The Cedar Run Historic District is less than 0.25 miles southeast of the Preferred Alternative.

The Tuckerton Railroad, completed in 1872, is located less than one mile east of the Preferred Alternative. It ran between Tuckerton in the south and Balmer in the north and passed through West Creek and Manahawkin along its route. It was identified in 1980 as part of the cultural resource survey completed for the New Jersey Pinelands Commission (Liggett and Wilson 1980).

TABLE 3.1: List of Historic Districts, Sites, Buildings, Structures, and Objects within the APE for the Preferred Alternative.

SITE/ PROPERTY	NAME	NUMBER	SOURCE	NR STATUS	LOCATION
District	Garden State Parkway	Mult Z 78	Guzzo 2001, Spies et al. 2000	Determined Eligible 10/2001	Adjacent to project area. Segment 3-4
District	Rose Hill	19-8	Liggett and Wilson 1980	To be determined	< .5 mile from project area. Segment 3-4
District	Manahawkin Village Historic District	1531-12 to 1531-16 1531-18 to 1531-35	May 1981b, Zerbe 1990	Only Residential Resources Determined Eligible in 1990, Commercial To Be Determined	Adjacent to project area. Segment 4-5
Building	Manahawkin Baptist Church	n/a	Historic Preservation Office	Listed 4/3/1973	< .5 mile from project area. Segment 4-5
Building	Old Stone Store	1531-11	May 1981b	To be determined	< .25 mile from project area. Segment 4-5

PROPERTY	NAME	NUMBER	SOURCE	NR STATUS	LOCATION
District	Cedar Run Historic District	1531-7 to 1531-10	May 1981b	To be determined	< .25 mile from Project area. Segment 4-5
District	Tuckerton Railroad	T-7	Liggett and Wilson 1980	To be determined	< .75 mile of project area. Segment 4-5

*Note: The location information, inside or outside the Area of Potential Effects (APE), is approximate. As project planning progresses and more information about these properties is gathered, the properties' location relative to the individual utility poles within the Preferred Alternative will be reassessed.

3.3.1.2 Potential for Previously Unidentified Historic and Architectural Resources

The potential for previously unidentified historic and/or architectural resources is moderate to high throughout the Preferred Alternative. The fields of historic preservation and architectural history have no predictive models that can be used to ascertain the probability of finding previously unidentified historic resources. However, over twenty years have passed since most of the historic resource surveys covering the project APE were conducted. In the meantime, professionals in historic preservation have broadened their views on what constitutes historical significance and architectural integrity. Consequently, there is a moderate to high probability that resources previously considered insignificant have gained a new significance with the implementation of new definitions of historical significance and architectural integrity. Also, there are areas within the APE that have never been formally surveyed; these areas may hold undiscovered historic resources that would otherwise have been recognized as significant. The potential for finding previously unidentified historical and architectural resources are discussed below by alignment segment.

Segment 1-2:

This segment of the Preferred Alternative runs south from the Sands Point Substation to a few hundreds yards south of Straight Road (Route 554). No documented historic resources were found in this segment. Field surveys coordinated in early 2004 did not identify additional historic resources on this segment.

Segment 2-3:

This segment of the Preferred Alternative stretches to the east south of Straight Road. No documented historic resources were found in this segment, however Pancoast Road was identified as a potentially significant early American travel route and is being researched further.

Segment 3-4:

This segment crosses over the Parkway and continues south along the east edge of the Parkway and around the Route 72 cloverleaf. Two historic resources have been identified along this segment (the Parkway and Rose Hill).

Segment 4-5:

This segment of the alignment travels east along the southern edge of Route 72 to Route 9, where it travels south and terminates at the Cedar Substation. Four historic resources have been identified along this segment (the Manahawkin Baptist Church, the Manahawkin Village Historic District, the Old Stone Store, and the Cedar Run Historic District). Field surveys conducted in early 2004 did not identify additional historic resources on this segment.

3.3.2 Economic

The line is located within Lacey, Ocean, Barnegat, and Stafford Townships, all of which are situated within Ocean County, New Jersey. Ocean County is located in the Atlantic Coastal Plain in central New Jersey. The County is the second largest in the State in terms of size and is one of four New Jersey counties that border the Atlantic Ocean. Toms River, in Dover Township, serves as the County Seat and is centrally located within Ocean County. The population of Ocean County per the 2000 Census is 510,916 with a median age of 41. The County is in close proximity to two of the Nation's largest metropolitan centers, New York City, approximately 60 miles to the north, and Philadelphia, roughly 50 miles to the west. In addition, Atlantic City is located approximately 50 miles to the south of the County Seat.

With the growing year round population, Ocean County's economic base has become increasingly diverse, with a variety of industries now supplementing traditional tourist related businesses. The growth in employment opportunities within Ocean County is now becoming as notable as the population growth was in the recent past. Over the last ten years, Ocean County has had one of the fastest increases in new jobs in the State. The Health Care Industry has been by far the fastest growing employment sector and is now the top employer in the County. Employment projections released by the New Jersey Department of Labor show that Ocean County will continue to be at the forefront of New Jersey employment growth well into the next decade – with the consequent increase in electric load.

According to the New Jersey Department of Labor, the potential labor force as of 2002 for Ocean County was 235,429, with 222,739 actually employed at that time. The unemployment rate in 2002 was 5.4%, slightly up from 3.9% in 2001. While the County's unemployment rate increased slightly due to the current national recession, it is below the state rate of 5.8%. According to the New Jersey Department of Labor, between 1998 and 2008, the Coastal Region of the State has a projected employment growth of 14.4%, making it the fastest growing region in New Jersey. The Region includes Atlantic, Cape May, Monmouth, and Ocean Counties. During the same time period, Ocean County's employment is projected to grow at a rate of 14.0% (150,150 jobs), making it the 7th fastest

growing county in the State and more robust than the State's overall average employment growth of 11.6%.

The 2000 United States Census identified the median household income at \$46,443 for Ocean County. Within Ocean County, approximately 4.8% or 6,631 families live below the poverty level. The median home value in Ocean County according to the 2000 census is \$131,300.

3.3.3 Land Use

The region traversed by the line has been settled for several centuries. Historically an area where forestry, minerals, and marine activities constituted the principal sources of revenue, the area has over the past several decades become increasingly important as a residential area. Improvements in the transportation corridors (e.g., Atlantic City Expressway, Garden State Parkway) and the proximity of the sea-coast have led to substantial increases in suburban growth. Residents frequently commute to jobs in urban centers (e.g., Atlantic City, Philadelphia). During the summer months, the population increases significantly as tourists and vacationers head to the region to avail themselves of the nearby coastal resorts.

Communities are closely tied to historically significant access routes such as Route 9, which, until a half decade ago, constituted the principal avenue through the area. Development of major transportation routes such as the Parkway led to concern about uncontrolled growth and the formation of the Pineland Commission and establishment of Pinelands Jurisdictional areas which sought to restrict future growth of the region to specific areas. Development activities, including this transmission line project, within the Pinelands Jurisdictional area (all areas from the Parkway westward) are subject to Pinelands Commission review and require Commission certification before they can be acted upon by other regulatory agencies. The Pinelands Commission has established management areas (e.g., preservation, forest, rural development, regional growth) in which proposed activities may be restricted. The line crosses portions of rural development and rural growth areas.

3.3.4 Aesthetics

Aesthetics are defined as items such as noise and scenery, which can comparatively impact a person's comfort of living for better or worse or impact the quality of the surrounding human environment.

The potential for adverse noise levels and impacts at a given location can be predicted based on surrounding land use and based upon the presence or absence of noise-sensitive receptors. Land uses surrounding the Preferred Alternative and associated alternatives include a mixture of residential and developed areas as well as undeveloped forested and wetland areas. Noise associated with these land use types can generally consist of intermittent noises from cars traveling local roadways to minimal noise associated with forested and undeveloped area that have little to no noise output.

Noise-sensitive receptors or sites generally include residences, hotels, schools, churches, libraries, parks, cemeteries, hospitals, and other areas where quiet is necessary.

Scenery pertains to unimpeded views such as forest or coastlines that may be associated with scenic drives, transportation corridors, or undeveloped property surrounding a residential area. Within New Jersey, the Garden State Parkway has been deemed a scenic drive as a result of the undeveloped swath of forest and wetland that parallels this roadway. The New Jersey Garden State Parkway has received national recognition for its beautifully landscaped and well-maintained roadside environment.

4.0 ENVIRONMENTAL CONSEQUENCES

Section 4.0 analyzes the environmental factors identified in Section 3.0 for each of the three alternatives described in Section 2.0. Where appropriate, a discussion of mitigation measures is also provided. Several of the environmental factors in Section 3.0 are not significantly related to the land exchange or the line. Thus, these environmental factors, although considered, are not analyzed in detail in Section 4.0. A table summarizing and contrasting the impacts of each of the three alternatives is included as Table 4.0 at the end of Section 4.0.

4.1 Environmental Consequences of the Preferred Alternative

4.1.1 Physical Considerations

4.1.1.1 Climate

The Preferred Alternative is not expected to cause adverse impacts to regional or local climate.

4.1.1.2 Air Quality

Minor air quality impacts associated from clearing activities and pole installation may arise from fugitive dust generation and the operation of construction equipment. Large trucks and other mobile sources may be powered by diesel or gasoline and are sources of combustion emissions which include nitrous oxides (NOX), carbon monoxide (CO), and other emissions typically associated with fuel combustion.

Fugitive dust may result from vehicle traffic on paved and unpaved roads. The amount of dust generated is a function of construction activities, silt and moisture content of the soil, wind speed, frequency of precipitation, vehicle traffic and vehicle types, and roadway characteristics. Dust emissions would be greater during drier summer and autumn months and in areas of finer textured soils. During these periods, dust suppression techniques such as watering may be used in construction zones near residential and commercial areas to minimize fugitive dust impacts.

Emissions from diesel powered vehicles may be generated for a short period in the locations designated for pole replacement. There is the possibility of localized incremental, temporary increases in air emissions, but there are no anticipated long-term impacts to air quality resulting from the construction and operation of the Preferred Alternative.

As discussed, construction activities along the Preferred Alternative will result in minor temporary impacts to existing air quality. However, through the use of best management practices such as dust suppression, dust and gaseous and particulate exhaust emissions related to the construction activities will be limited. Therefore, impacts to the existing air quality are anticipated to be negligible from construction activities. The operation of the new transmission line will have no negative impact to

existing air quality within the area. In addition, all construction activities would comply with local and regional air quality regulations.

4.1.1.3 Topography

It is anticipated that the Preferred Alternative would not result in adverse impacts to topography.

4.1.1.4 Geology

In ROW where forest will be cleared, the area will be allowed to revert to a shrub community that will serve to slow runoff and the potential for soil erosion. With regard to temporary impacts, protective measures will be employed such as utilizing matting or all terrain vehicles within wetland areas to minimize soil compression and mechanical erosion. Matting should be of either steel, timber, or plastic sheets that evenly distribute the weight of construction vehicles traversing wetland areas and helps to minimize disturbance to underlying soil and vegetation. Areas that are disturbed as a result of construction grubbing or pole installation will be restored to the original surface contour and stabilized with the appropriate seeding and/or mulch, and be allowed to return to a scrub-shrub state. In addition, siltation of surface waters will be minimized through use of best management practices including, but not limited to, silt fencing and hay bales. Where the access enters onto a paved public roadway, measures will be taken to prevent tracking or flowing of sediment onto the public road.

It is anticipated that the Preferred Alternative would not result in increased risk of landslide from either the construction or operation of this alternative. In addition, as this region is at low risk for seismic activity, adverse impacts to the transmission line due to earthquakes are not anticipated. Additionally, as only a relatively small amount of soil will be excavated to implement this alternative due to installation of poles, no adverse impacts to mineral resources are anticipated.

4.1.1.5 Hydrology

The Preferred Alternative crosses a total of five (5) streams consisting of Oyster Creek, Four Mile Branch, Manahawkin Mill Creek and associated tributaries to these waterways. No poles would be located within these waterways. Only the associated electric line would span these features. Impacts to water quality would be minimized by implementation of best management practices.

The Preferred Alternative crosses several floodplains associated with intersecting streams and other low-lying areas. Approximately 1.53 acres of new clearing within floodplains will occur within the Preferred Alternative (palustrine forested wetlands). In particular, the area of the ROW exchange property is located within FEMA FIRM panel #3403930005C. Clearing of existing vegetation within the floodplains would be minimized to the greatest extent possible. Best management practices shall be utilized to prevent sedimentation and erosion impacts to soils and siltation of nearby waterbodies within the floodplains.

In areas where existing poles are being replaced with new poles, there will be no permanent change in ground cover type; therefore, there would be no change in stormwater runoff. Forested areas are the only areas where groundcover will be altered. As a result of this, a Stormwater Management Plan has been prepared for a large portion of the Preferred Alternative in order to reduce impacts to surface waters within areas that are proposed to be cleared of vegetation. Best Management Practices (BMPs) shall be utilized to prevent sedimentation and erosion impacts to site soils and nearby waterbodies. This Stormwater Management Plan was approved by the New Jersey Pinelands Commission on May 21, 2004.

4.1.1.6 Wetlands

The Preferred Alternative would result in impacts to wetlands along the 13.96-mile route. However, impacts have been minimized through route selection, pole for pole replacement on existing ROW, and the design phase. Work activities will be coordinated so as to minimize the number and frequency that vehicles are in work areas. The clearing activities associated with new ROW construction and pole installation will only permanently impact forested wetland since both emergent and scrub-shrub wetlands will be allowed to revegetate and return to their pre-construction state upon completion of construction.

The amount of permanent wetland impact totals 4.23 acres. Of this amount, 0.96 acre is located within the refuge. The amount of wetland forest clearing totals 4.22 acres. When selecting pole placement, wetlands along the Preferred Alternative will be avoided in order to minimize impacts to on-site wetlands. As a result of permanent wetland impacts over one acre, the Preferred Alternative requires an Individual Freshwater Wetland permit from the NJDEP, as discussed in Section 5.4.

The centerline of segments 1-2, 2-3, 3-4, and 4-5 of the Preferred Alternative cross 0.9 miles, 0.01, 0.5 miles, and 0.1 miles of the wetlands, respectively. The total length of the wetlands crossed for the line totals 7,920 linear feet or 1.5 miles. Of the three segments that contain wetlands, only segments 3-4 and 4-5 will require clearing since segment 1-2 consists of existing ROW. Details of wetlands crossed by segment are provided in Table 4.

Segment 1-2 of the Preferred Alternative will have twenty-one (21) new poles in palustrine emergent and palustrine scrub-shrub wetlands. Existing poles in wetlands will be permanently removed below grade and covered with soil containing at least 12 percent organic matter. Segment 3-4 of the Preferred Alternative will have twelve (12) new poles in palustrine forested wetland. Segment 4-5 of the Preferred Alternative will have four (4) new poles in palustrine forested wetlands. Permanent impacts will result from the surface area coverage taken up by the installation of new poles within scrub-shrub or herbaceous wetland areas and the clearing and maintenance for forested wetland ROWs. Where new poles are being constructed, the permanent impact will be limited to the surface area of the pole base or its foundation.

Conectiv will also implement best management practices when working in and around wetlands. These measures have been developed to provide a practical and workable means of minimizing detrimental impacts to wetlands as a result of the associated activities. Conectiv will ensure that there is minimum disturbance of the land surface or soil while conducting project activities within wetland areas. Construction mats will be placed on the surface of the wetland to prevent or decrease rutting caused by equipment. If the survey equipment causes ruts, they will be graded to their original conditions following the work performed. Any excess soils shall be removed to upland areas. Additionally, all cut or cleared wood and branches will be removed from wetland areas and disposed of in an upland area or other approved manner. Work activities will be scheduled to minimize the time period of vehicle use in these areas. Care shall be taken not to allow the discharge of fluids such as crankcase oil, gasoline, diesel fuel, etc., into or immediately adjacent to the wetlands or waterways. All areas disturbed during construction activities will be graded and stabilized upon completion of the work.

Upon the completion of the construction activities, all temporary materials, including matting used for access within wetlands, shall be removed following completion of their use and disturbed areas will be stabilized with appropriate seeding and/or mulch. Should these restoration activities occur during inappropriate seasons for seeding (i.e., November through February), then only mulch will be used. Such areas shall be properly restored (i.e., seed and new mulch applied) at the next growing season. All access areas and work areas within wetland areas will only be temporary in nature.

A wetland mitigation plan is included as Appendix D. Conectiv will coordinate with the Service and the New Jersey Department of Environmental Protection to establish in a collaborative manner further specific mitigation measures.

4.1.1.7 Noise

Sources of temporary noise during construction of the transmission line would include diesel-fueled heavy machinery and chainsaws. Construction activities will occur during normal business hours. Because the Preferred Alternative avoids many of the residential areas of the townships that are traversed by the Existing 69kV Alternative, noise impacts should have little impact to the human environment.

4.1.2 Biological Considerations

4.1.2.1 Vegetation

A total of 140 plant species were identified on the Preferred Alternative ROW during the course of surveys. No federally endangered or threatened plant species were located on the ROW and none are expected to occur. One endangered plant species, swamp pink, is known to occur in the vicinity of the Preferred Alternative outside the ROW. Populations are known to occur in wetlands along Four Mile Branch in the vicinity of Harpoon Drive in Barnegat Township. The

ROW at this crossing will be located on the shoulder of the road and only very restricted trimming of the trees in this area will be required. Trimming will be undertaken in the presence of a trained biologist serving as an environmental monitor and trimmed branches will be removed from the wetland area. The Service is aware of the proposed crossing and the methods to be utilized and indicated that this crossing should pose no hazard to the swamp pink population (C. Popolizio, pers. communication May 18, 2004). With respect to this swamp pink populations Conectiv will conduct no tree cutting and only minimal branch removal within 300 feet of the wetlands.

Another swamp pink population occurred in the mid 1990s further downstream on Four Mile Branch just east of the Parkway in or near an area crossed by the Preferred Alternative. Surveys conducted in spring 2003 did not locate this population and further surveys, which including participation of Service biologist Carlo Popolizio, confirmed that this population did not occur on the proposed ROW that crosses Four Mile Branch just east of the Parkway. The most recent survey (May 27, 2004) succeeded in locating three swamp pink plants approximately 240 feet east of the eastern boundary of the Preferred Alternative ROW. It was concluded that these plants are the closest remnants of the previously reported population. They are well outside the area proposed for clearing and will not be impacted by the proposed activities. Environmental monitors present during pole installation will ensure that no construction activity will encroach on the population, which is well outside the area of proposed disturbance.

To protect the wetland habitats, Conectiv has committed to the NJDEP and Pinelands Commission to use best management practices (BMPs) along the route, including the use of matting, hand cutting of vegetation and lining newly cleared areas with hay bales to prevent siltation that might affect swamp pink. A copy of these BMPs are included in Appendix E.

A swamp pink population was also known to have occurred in the mid-1990s along Mill Branch on the portion of the Forsythe Refuge proposed for the land swap. Surveys conducted in spring of 2003 did not find any swamp pink along this portion of the proposed ROW. This finding was confirmed by Service personnel (J. Darren Harris and Steve Atzert) who examined this area in the spring of 2004. Their findings indicated that the current hydrology appears to be too dry to support swamp pink and that no plants are present in the area proposed for the land swap (J. Darren Harris, pers. communication May 18, 2004).

Based on findings to date the proposed project will have no adverse impact on any population of any federally listed plant species.

The Preferred Alternative will require forest clearing parallel to Pancoast Road, Caribbean Drive, Harpoon Drive, Lighthouse Drive and the Garden State Parkway. A portion of upland forest between Lighthouse Drive and the GSP will be fragmented by some 1000 feet of the proposed route, however the forest area on either side of this portion of the route is being permitted for future development through the New Jersey Pinelands Commission and will be cleared for those

developments in the near future. A total of some 39.77 acres of forest will be cleared in conjunction with the development of the Preferred Alternative. This clearing includes nearly eight acres of forested land on the Forsythe Refuge adjacent to the Parkway. Although trees and shrubs will be removed prior to construction, the shrub community within the ROW will be allowed to grow back and the habitat value will return to nearly that which was present originally. Conectiv has developed a ROW management program in conjunction with the USFWS that protects low-growing vegetation with high wildlife value (see Appendix C).

4.1.2.2 Wildlife

Surveys of potential habitat within the Preferred Alternative ROW were conducted during the spring/early summer. A total of 28 species of birds were identified on the existing and proposed portions of the Preferred Alternative ROW during the course of these surveys. No avian threatened or endangered species or species of special concern was noted. Avian diversity along the routes was generally low, a reflection of the uniformity of habitats present. Most of the habitat on or immediately adjacent to the routes is scrub-shrub, oak-pine forest, and highway or suburban residential development areas. Open water, emergent marsh and swamp forest areas are generally very small or lacking along this alignment. No marine or coastal habitat is present.

Although not observed during the course of the surveys, two species of concern in New Jersey, Cooper's hawk and barred owl, have been reported from habitat areas adjacent to the area where the Preferred Alternative crosses Four Mile Branch along Harpoon Drive. The approved line in this crossing will be located on the berm of Harpoon Drive and will overhang the roadway. Only very limited trimming of trees on the south side of the drive will be required. Trimming and pole installation at this crossing will be overseen by a qualified biologist serving as an environmental monitor. Biologists from the Pinelands Commission have visited the crossing area, are aware of the proposed activities and concur that no loss of potential breeding habitat or other adverse ecological impacts will occur as a result of the installation of the poles and transmission line along Harpoon Drive.

Pine Barrens tree frogs, listed as endangered by the State of New Jersey, have been found in three wetlands on or adjacent to the Preferred Alternative. This species is known to occur frequently in the wetland shrub habitat associated with transmission lines. Notably, two of the wetlands where this species was found were along the existing ROW, which has been maintained in a shrub habitat for several decades. Shrub regrowth in the wetland crossing is utilized in both of these locations. The third record is from a wetland on the Parkway, which is being avoided by the Preferred Alternative.

Northern pine snakes, a listed threatened species in New Jersey, are known to occur in the vicinity of the route. A survey of the entire Preferred Alternative and alternatives was conducted to determine whether snake denning sites were present. No dens were located as a result of this

survey. To further ensure that pole installation activities will not impact this species, a biologist serving as an environment monitor is present during construction and inspects each proposed pole location prior to drilling the hole.

No bird species of concern were detected within the transmission line route during these surveys, including within the ROW exchange property, and no such species are expected to be adversely impacted by the project. The transmission lines are designed for raptor protection and meet the Edison Electric Institute's (EEI) suggested practices for raptor protection on power lines². To prevent electrocutions of bird species, the conductor separation distances from each other and ground lines are in excess of EEI's suggested spacing distance.

Based on findings to date, the Preferred Alternative will have no adverse impact on any population of any federally listed wildlife species.

4.1.3 Social Considerations

4.1.3.1 Cultural Resources

The Preferred Alternative is not expected to result in any impact to cultural resources.

4.1.3.2 Economic

The construction of the Preferred Alternative will not directly impact the economics of the surrounding area; however, maintaining the reliability of electric service in the area will likely have a positive indirect economic impact by facilitating continued economic growth in the area. In regards to increased employment rates, construction of the line could result in a small and temporary rise in the number of individuals currently employed within Ocean County at that time. During construction individuals from the local labor force and unions may be utilized to install the transmission line. However, there will not be a permanent increase in employment upon completion of the line since there will be no long-standing permanent positions created as a result of constructing this transmission line.

During construction of the line, the influx of work crews may result in additional spending at local hotels and service stores which could result in an increase in taxable revenue from spending. Also, local taxes will be garnered from the workforce working on the project, which will be added to the local government economy. These expenditures and increases are only temporary in nature and upon completion of the line will cease. Therefore, there will only be a short and insignificant impact to the local economy in the form of taxes and additional local spending as a result of line.

² Avian Power Line Interaction Committee (APLIC). 1996. Suggested Practices For Raptor Protection On Power Lines: The State of The Art In 1996, Edison Electric Institute and the Raptor Research Foundation. Washington, D.C.

4.1.3.3 Land Use

Segment 1-2 of the route is common to all alternatives. It is existing, maintained ROW through a rural setting dominated by pine-oak forest. Segment 2-3 passes between two residential developments then along Bay Avenue to Cloverdale Road, down Cloverdale for a half mile until it turns east and skirts the southern edge of an active sand and gravel operation. Areas to the south of the line are part of a large block slated for residential development. The line turns north along the edge of the gravel operation and then heads east again along Harpoon Drive overhanging the Drive. Both sides of Harpoon are currently forested although several building lots are present. At Lighthouse Drive, the route turns north for 2300 feet before crossing to the east-side of the road and heading east toward the Parkway. This portion (1000 feet) of the route is currently forested but is being permitted for clearing and development in the near future. The Preferred Alternative turns south parallel to the Parkway for 4900 feet before crossing the highway and continuing south on the eastern side just outside the Parkway easement. Areas off the Parkway easement are forested. The Preferred Alternative crosses Forsythe Refuge before reaching Route 72. The route crosses to the south side of Route 72, a four-lane thoroughfare, and continues east along this highway through a commercial business district of malls and restaurants. The Preferred Alternative crosses Route 9 continuing east to an existing transmission line right of way that it parallels south to Cedar Substation.

4.1.3.4 Aesthetics

While the Preferred Alternative does travel through some residential areas, the majority of the route avoids the larger populations centers traversed by the Existing 69kV Alternative. As a result, there will be some minimal impacts to ambient noise levels in residential areas resulting from construction. In regards to visual impacts, it is the intent of Conectiv to minimize any potential visual impacts through the use of weathering steel poles, which will more readily blend with the natural background of the surrounding area. The proposed poles will range from 55 to 80 feet, thereby helping to reduce visual impacts. In addition, approximately half of the line will be in existing road and utility ROWs, which within the Preferred Alternative is situated within relatively undeveloped areas. Moreover, as compared to the Parkway Alternative, the Preferred Alternative avoids degradation of the viewshed along the Parkway by leaving the existing vegetation buffer along the Parkway in place.

4.2 Environmental Consequences of the Existing 69kV Alternative

4.2.1 Physical Considerations

4.2.1.1 Climate

This alternative is not expected to cause adverse impacts to regional or local climate.

4.2.1.2 Air Quality

The 69kV Alternative is not expected to differ from the Preferred Alternative in the nature and magnitude of potential air quality impacts.

4.2.1.3 Topography

It is anticipated that the 69 kV Alternative would not result in adverse impacts to topography.

4.2.1.4 Geology

The 69kV Alternative is not expected to differ from the Preferred Alternative in the nature and magnitude of potential impacts to geological resources.

4.2.1.5 Hydrology

The existing line crosses four (4) streams. No poles are located within these streams. The electric transmission line would span these waterways. Utilizing the existing route would impact no additional waterways. Impacts to water quality would be minimized by implementation of best management practices.

The 69 kV Alternative crosses several floodplains associated with intersecting streams and other low-lying areas. No new clearing within floodplains would occur with this alternative. Clearing of existing vegetation within the floodplains would be minimized to the greatest extent possible. Best management practices shall be utilized to prevent sedimentation and erosion impacts to soils and siltation of nearby waterbodies within the floodplains.

4.2.1.6 Wetlands

Currently, the total number of poles along the existing line that are within wetlands is 28. These poles would be removed and eleven (11) new poles would be placed in portions of wetlands that are located along segment 1-2 of the 69 kV ROW (Table 5). Therefore, there will be a net reduction of 30 percent in poles as a result of utilizing existing ROW. There are no poles located in wetlands along segment 2-5. The centerline of the 69 kV ROW crosses 1.1 linear miles of wetlands (Table 4). Permanent wetland impacts associated with pole installation total 116.23 square feet; of this amount, 51.83 square feet is located within Pinelands jurisdiction. Temporary impacts to scrub-shrub wetlands and herbaceous wetlands are anticipated with construction activities. Utilizing the existing route will reduce additional wetland impacts. This alternative would alleviate the need to create new ROW, which would result in clearing of both upland and wetland forested areas. In addition, temporary construction activities impacting the wetlands and other sensitive resources would be minimized. Wetlands along the 69 kV route would be avoided where possible when selecting pole placement in order to minimize impacts to wetlands. Mitigation measures would be the same as the Preferred Alternative.

4.2.1.7 Noise

The 69 kV Alternative would have temporary noise impacts associated with construction. Because this alternative is routed through residential neighborhoods, this impact, although temporary, would impact those neighborhoods during normal business hours.

4.2.2 Biological Considerations

4.2.2.1 Vegetation

Use of the 69 kV ROW Alternative will result in the smallest amount of new habitat disturbance since it will occupy the ROW currently occupied by a 69 kV electrical transmission line. This ROW is already cleared for the full width necessary to accommodate the proposed 230kV line.

Over 130 plant species were identified on the existing 69 kV route ROW during the course of surveys. The existing 69 kV ROW is maintained in periodically mowed state. This ROW passes through the suburban development of Ocean Acres and several miles of roadways (Mirage, Cloverdale, Nautilus, Route 72, Oak Avenue and Back Road) enroute to Cedar Substation and the vegetation is predominantly weedy successional species.

No federally endangered or threatened plant species were located on the existing 69 kV ROW.

4.2.2.2 Wildlife

Segment 1-2 of this route is common to all alternatives and yielded the greatest variety of wildlife since it was bordered by pine-oak forest and crosses several shrub wetlands. The remainder of the 69 kV Alternative is dominated by suburban and roadside environments and all wildlife noted were highly tolerant of disturbances associate with humans.

4.2.3 Social Considerations

Overall, use of this route was not well accepted by some local communities because it crosses dense residential areas. The Preferred Alternative avoids those areas.

4.2.3.1 Cultural Resources

This alternative is not expected to result in any impacts to cultural resources.

4.2.3.2 Economic

Economic impacts associated with this alternative do not differ substantially from the economic impacts of the Preferred Alternative.

4.2.3.3 Land Use

Segment 1-2 of the route is common to all alternatives. It is existing, maintained ROW through a rural setting dominated by pine-oak forest. The remainder of the 69 kV Alternative is maintained ROW which passes through residential developments (Barnegat Estates, Ocean Acres) and along highway commercial development on Route 72 before re-entering residential areas along Oak Avenue.

4.2.3.4 Aesthetics

The 69kV Alternative locates the transmission line through several densely populated neighborhoods and residential areas. As a result, these areas would be impacted by the visual aesthetics of the transmission line. Conectiv would minimize any potential visual impacts through the use of weathering steel or possibly laminated wood poles, which more readily blend into the natural background. Along the 69kV Alternative, taller poles will be used to replace the existing poles, which will increase the cumulative visual impact of the line. In densely populated areas, poles will generally be replaced on a one-to-one basis and the visual intrusion of the larger poles will be more noticeable. These residential areas would also be temporarily affected during the construction of this alternative due to increased noise levels from machinery and construction, which would be a detriment to the surrounding aesthetics of the area.

4.3 Environmental Consequences of the Parkway Alternative

4.3.1 Physical Considerations

4.3.1.1 Climate

This alternative is not expected to cause adverse impacts to regional or local climate.

4.3.1.2 Air Quality

The Parkway Alternative is not expected to differ from the Preferred Alternative in the nature and magnitude of the potential air quality impacts.

4.3.1.3 Topography

Like the Preferred Alternative, it is anticipated that the Parkway Alternative would not result in adverse impacts to topography.

4.3.1.4 Geology

The Parkway Alternative is not expected to differ from the Preferred Alternative in the nature and magnitude of the potential impacts to geological resources.

4.3.1.5 Hydrology

This alternative route crosses six (6) streams. Only the associated electric line would span these features. Impacts to water quality would be minimized by implementation of best management practices.

The Parkway Alternative crosses several floodplains associated with intersecting streams and other low-lying areas. Approximately 1.53 acres of new clearing within floodplains would occur. Clearing of existing vegetation within the floodplains would be minimized to the greatest extent possible. Best management practices would be utilized to prevent sedimentation and erosion impacts to soils and siltation of nearby waterbodies within the floodplains.

4.3.1.6 Wetlands

The amount of wetland forest clearing for the Parkway Alternative totals 1.1 acres (Table 5). Temporary impacts to scrub-shrub wetlands and herbaceous wetlands are anticipated with construction activities. Scrub-shrub and herbaceous areas will be allowed to revegetate upon completion. Wetlands along this alternative route will be avoided where possible when selecting pole placement in order to minimize impacts to wetlands.

Segment 3-4 of this alternative crosses 0.2 linear miles of wetlands completely within Pinelands Jurisdiction (Table 4). Segment 4-5 crosses 0.1 linear miles of wetland outside of Pinelands Jurisdiction. Except for segment 3-4, no other wetland clearing is anticipated. Segment 3-4 of this alternative route would have two (2) poles in palustrine forested wetlands. Details of poles in wetlands are provided in Table 5. The amount of permanent wetland impacts for this alternative totals 1.0 acre (Table 5). Mitigation measures would be the same as the Preferred Alternative.

4.3.1.7 Noise

The noise impacts associated with this alternative would be similar to the Preferred Alternative, except that removal of the vegetative buffer along the Parkway would increase traffic noise impacts for refuge users.

4.3.2 Biological Considerations

4.3.2.1 Vegetation

The Parkway Alternative will require forested clearing parallel to Pancoast Road, Caribbean Drive, Harpoon Drive, Lighthouse Drive and the Garden State Parkway. A portion of upland forest between Lighthouse Drive and the Parkway will be fragmented to some small extent; however the forest area on either side of this portion of the route is being permitted for future development through the Pinelands Commission and will be cleared for that development in the near future. A total of some 35 acres of upland forest would be cleared in conjunction with this alternative.

Over 130 plant species were identified on the Parkway Alternative during the course of the survey. No federally endangered or threatened plant species were located on this ROW. A substantial portion of this route parallels existing roadways and the flora observed was often dominated by weedy successional species.

4.3.2.2 Wildlife

Wildlife observed along this alternative was similar to the Preferred Alternative. Segments 1-2 and 4-5 are identical to the Preferred Alternative and segment 3-4 is only 50 feet closer to the Parkway.

4.3.3 Social Considerations

4.3.3.1 Cultural Resources

This alternative is not expected to result in any impact to cultural resources.

4.3.3.2 Economics

Economic impacts associated with this alternative do not differ substantially from the economic impacts of the Preferred Alternative.

4.3.3.3 Land Use

Land use along this route is very similar to the Preferred Alternative. Only segment 2-3, which borders the south side of Bay Avenue, differs substantially from the Preferred Alternative. This segment which would be constructed in the highway ROW is more urbanized than the comparable segment of the Preferred Alternative.

4.3.3.4 Aesthetics

By utilizing the Parkway Alternative, the transmission line would be located at the edge of the Parkway easement, which currently consists of an undeveloped 50ft swath of upland and wetland forested. Installing the line within this area would require clearing this entire area to accommodate the poles with the removal; of the tree line buffer, and thus, the people utilizing the Parkway would be impacted visually by the location of this linear utility. While it is Conectiv's intent to minimize any potential visual impacts through the use of weathering steel poles or possibly laminated wood poles, which would more readily blend with the natural background, they would still be visible to passengers. In addition, the Parkway is a known for its scenic drive and park-like landscape, and the addition of this transmission line would effectively impact and decrease the current aesthetics offered by this transportation corridor, which is eligible for inclusion on the National Register of Historic Places. By locating this alternative within the Parkway, noise levels resulting from construction will be largely irrelevant as few densely populated areas are traversed by this route. The remainder of this alternative consists of existing ROW that is located within a relatively undeveloped area, therefore there will be little to no aesthetic impacts within this area.

The following is a table that overviews all the physical, biological, and social resources impacted by the three alternatives.

Table 4.0: Summary of Impacts by Alternative

Impact Topic	Preferred Alternative	69kV Alternative	Parkway Alternative
Climate	No impact	No impact	No impact
Air Quality	Minor, temporary	Minor, temporary	Minor, temporary
Topography	No impact	No impact	No impact
Geology	Minimal. Re-establishment of vegetation to prevent erosion. Use of protective measures will minimize disturbance and erosion.	Minimal. Re-establishment of vegetation to prevent erosion. Use of protective measures will minimize disturbance and erosion.	Minimal. Re-establishment of vegetation to prevent erosion. Use of protective measures will minimize disturbance and erosion.
Hydrology (Number of stream crossings)	5	4	6
Hydrology (Clearing in floodplains (acres))	1.53	0	1.53
Wetlands (Permanent wetland impact from pole installation and forested wetland clearing)	4.23 acres	116.23 square feet	1 acre
Noise	Temporary during construction. Avoids residential areas.	Temporary during construction. Would occur in residential areas	Temporary during construction. Avoids residential areas. Removal of tree buffer along Parkway would increase traffic

	Preferred Alternative	69kV Alternative	Parkway Alternative
			noise for refuge users.
Vegetation (vegetation clearing in acres)	42.6 (approximate)	0	30.27
Vegetation—federally-listed species	No impact	No impact	No impact
Wildlife—federally-listed species	No impact.	No impact	No impact
Cultural / Historical Resources	No impact	No impact	No impact
Economic	Not a significant impact. Minimal temporary positive impact.	Not a significant impact. Minimal temporary positive impact.	Not a significant impact. Minimal temporary positive impact.
Land use areas crossed	Undeveloped/forest. Some residential. Business/commercial.	Significant residential. Some undeveloped/forest.	Undeveloped/forest. Some residential. Business/comm/Hwy.
Aesthetics	Avoids taller poles in residential areas. Preserves Parkway viewshed.	Requires larger poles in residential area. Preserves Parkway viewshed.	Degrades Parkway viewshed. Avoids taller poles in residential areas.

5.0 COMPLIANCE, CONSULTATION AND COORDINATION WITH OTHERS

5.1 Route Approval from New Jersey Board of Public Utilities

On April 14, 2004, the New Jersey Board of Public Utilities (BPU) issued an order approving the route of the line called for in the Preferred Alternative. See In the Matter of Amended Petition of Atlantic City Electric Company, Docket No. EE2080521, New Jersey Board of Public Utilities (April 14, 2004). The route approved by the BPU is depicted on the map labeled as Figure 1. The BPU determined that the Preferred Alternative is reasonable and necessary for the service, convenience, and welfare of the public. In its order, the BPU accepted the testimony of the witness from PJM Interconnection LLC (PJM), the FERC-approved regional transmission organization (RTO) for the area. That testimony concludes that no superior alternatives to the Preferred Alternative exists.

Neither the Existing 69kV Alternative nor the Parkway Alternative is a route that is authorized by the BPU. Thus, Conectiv is not authorized at this time to carry out either of these alternatives. Both the Existing 69kV Alternative and the Parkway Alternative would require Conectiv to seek a new approval from the BPU (and other agencies that have approved the Approved Route). Such new approvals would extend the time for constructing the line for an unknown length of time, and, further, it is not certain that such approvals would be granted.

5.2 New Jersey Pinelands Commission Certificate of Need

The Preferred Alternative crosses two management areas within the jurisdiction of the New Jersey Pinelands Commission (Pinelands Commission). Approximately 7.8 miles of the line is within the jurisdiction of the Pinelands Commission. Under cover dated March 21, 2003, Conectiv filed with the Pinelands Commission an application for a Certificate of Filing that would authorize construction of the line within the Pinelands Commission's jurisdiction.

The March 2003 application to the Pinelands Commission contained, among other things: (1) a report detailing the methodology and results of endangered species surveys; (2) an environmental alternative analysis that analyzed the environmental impacts of the line, including the impacts of reasonable alternatives; (3) a wetland delineation report; and (4) a cultural resources reconnaissance report. The March 2003 application to the Pinelands Commission stated that the route of the line would cross the Forsythe Refuge. The application stated that Conectiv and the Service were discussing a land exchange to accommodate this segment of the line.

On April 23, 2004, the Pinelands Commission issued to Conectiv the requested Certificate of Filing.

5.3 New Jersey Coastal Facility Review Act Permit

Approximately 6.4 miles of the Preferred Alternative are located in an area requiring a permit under the New Jersey Coastal Facility Review Act (CAFRA). On March 10, 2004, Conectiv filed an application for the required permit with the New Jersey Department of Environmental Protection (NJDEP). On April 21, 2004, the NJDEP published a public notice of Conectiv's CAFRA and Wetlands Permit application and announced a public hearing to be held on May 6, 2004, and a public comment period to extend for fifteen days after the public hearing. On April 26, 2004, the NJDEP issued to Conectiv an emergency permit under CAFRA to begin work on the line in upland areas. The issuance of the emergency permit was recommended and supported by the New Jersey Board of Public Utilities. On May 6, 2004, the NJDEP held a public hearing in Barnegat, New Jersey, on Conectiv's applications for a CAFRA permit and a Freshwater Wetlands permit. The public comment period closed on May 21, 2004. As of the date of this assessment, the final CAFRA permit was pending with NJDEP.

5.4 New Jersey Freshwater Wetlands Permit

On February 24, 2004, Conectiv filed with the New Jersey Department of Environmental Protection (NJDEP) an application for a Freshwater Wetlands Individual Permit ("Wetlands Permit") for the line. The application included an environmental impact statement. On April 21, 2004, the NJDEP published a public notice of Conectiv's CAFRA and Wetlands Permit application and announced a public hearing to be held on May 6, 2004, and a public comment period to extend fifteen days after the public hearing. On May 6, 2004, the NJDEP held a public hearing in Barnegat, New Jersey, on Conectiv's applications for a CAFRA permit and a Freshwater Wetlands permit. The public comment period closed on May 21, 2004. Based on the scope of the comments received at the public hearing, on May 25, 2004, NJDEP issued to Conectiv an emergency authorization pursuant to the Freshwater Wetlands Protection Act to allow work on the Preferred Alternative of the line. As of the date of this assessment, the final Wetlands Permit was pending with NJDEP.

5.5 Executive Order 13212 on Actions to Expedite Energy-Related Projects

On May 18, 2001, the President issued Executive Order 13212 (the Order) recognizing the importance of environmentally sound production and transmission of energy to all American people. The Order was amended by the President on May 16, 2003. The purpose of the Order is to take additional steps to expedite the increased supply and availability of energy to the Nation.

The Order establishes the policy that all executive departments and agencies take appropriate actions, to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy. To this end, the Order requires that, for energy-related projects, agencies expedite their review of permits or take other actions as necessary to accelerate the completion of such projects, while maintaining safety, public health, and environmental protections. The agencies shall take such actions to the extent permitted by law and regulation, and where appropriate. The Order establishes an Interagency Task Force (Task Force) to monitor and assist the

agencies in their efforts to expedite review of permits or similar actions, as necessary, to accelerate the completion of energy-related projects, increase energy production and conservation, and improve transmission of energy.

The construction of the line is an energy-related transmission project that is subject to the Order. As discussed in Section 1.0, the construction of the line is necessary to respond to rapidly growing demand for electricity and to prevent service interruptions. Because the land exchange is essential to completion of the Preferred Alternative of the line, the Service is expediting, pursuant to the Order, its review of the land exchange in order to accelerate the completion of the line. The Service is actively consulting with the Task Force to identify appropriate mechanisms that can be used to expedite the land exchange.

5.6 Consultation under Section 7 of the Endangered Species Act

By letter dated September 3, 2002, Conectiv initiated informal consultation with the Service by requesting that the Service provide information about the occurrence of any species listed under federal law as threatened or endangered along the line. By letter dated October 31, 2002, the FWS requested certain additional surveys for listed species. As discussed in detail in Section 3.2.1, Conectiv conducted multiple surveys of the area of the line for listed species and determined that no federally-listed species occur in the area to be affected by the construction or operation of the line and no such species will be impacted by the project. As discussed in detail in Section 4.1.3.1, swamp pink populations were located in recent surveys outside the ROW for the Preferred Alternative, and Conectiv will use best management practices in order to prevent any impact to those populations. The conclusion of informal consultation with the Service was documented in a letter to the Service's New Jersey Field Office from Conectiv dated May 27, 2004, which included a description of the BMPs to be utilized.

5.7 Consultation Regarding Cultural and Historical Resources

At the request of the Service, Conectiv conducted in May 2004 a cultural resources survey on the ROW exchange property and determined that no cultural or historic resources are present. This work was conducted in consultation with the Service's Cultural Resources Officer and pursuant to a special use permit allowing access to the refuge. A draft report of the survey was prepared and provided to the Service's Cultural Resources Officer. The report concludes that no historic or cultural resources were found within the ROW exchange property. The Service's Cultural Resources Officer has reviewed the report and, by way of correspondence dated May 26, 2004, documented concurrence with its findings. This determination is sufficient to document compliance with the National Historic Preservation Act and the Archeological Resources Protection Act. A final report documenting this survey is in the process of being prepared and will be provided to the Service's Cultural Resources Officer.

Consultation with the State Historic Preservation Officer (SHPO) with respect to the entire 13.96-mile length of the line has been initiated and is on-going. The Service is not a required participant in that consultation. As part of that consultation, Conectiv, through its consultant, conducted a study to determine the presence of any cultural or historic resources within the area of the line. The study was conducted as part of Conectiv's permit applications to the NJDEP and the Pinelands Commission (as discussed in Sections 5.2, 5.3, 5.4) in order to enable those agencies to consult with the SHPO. The study involved the review of documentary material and a site visit. The cultural and historical resources identified in the study are discussed in Section 3.4.1. The Service's Cultural Resources Officer will be provided a copy of relevant correspondence between the parties to this consultation.

6.0 REFERENCES

- Avain Power Line Interaction Committee (APLIC). 1996. Suggested Practices For Raptor Protection On Power Lines: The State of The Art In 1996, Edison Electric Institute and the Raptor Research Foundation. Washington, D.C.
- Cowardin, L. M. , V. Carter, F.C. Golet, and E. T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Biological Services Program FWS/OBS-79/31. U.S. Fish and Wildlife Service, Washington, D.C.
- Guzzo, Dorothy P. 1997. Letter from State Historic Preservation Office, Trenton, NJ to Mr. Guy A. Zompa, Egg Harbor City, NJ, May 7. State Historic Preservation Office, Trenton, NJ.
- J. Darren Harris. United States Fish and Wildlife Service. Personal communication with ENSR on May 18, 2004.
- Liggett, Barbara and Budd Wilson. 1980. Historical Arcaeological Resources of the Pinelands for the New Jersey Pinelands Commission. Prepared for the New Jersey Pinelands Commission, New Lisbon, New Jersey.
- New Jersey Department of Environmental Protection. December 2003. NJDEP Flood Hazard Act and Surface Water Standards N.J.A. C. 7:13 and N.J.A.C. 7:9B.
- New Jersey Department of Environmental Protection. May 2004. Geographic Information System (GIS) database (<http://www.state.nj.us/dep/gis/>).
- New Jersey Department of Environmental Protection. May 2004. Landscape Project Version 1.0. <http://www.njfishandwildlife.com/ensp/landscape>.
- Popolizio, Carlo. United States Fish and Wildlife Service. Personal communication with ENSR on May 18, 2004
- Spies, Stacy E., Jennifer B. Leynes, Paul J. McEachen and Glenn R Modica. 2000. Technical Memorandum No. 18. Cultural Resources Investigation, Garden State Parkway Widening Interchanges 30-80. Ocean, Burlington, and Atlantic Counties, New Jersey. Prepared for T&M Associates, Inc., Middletown, NJ. Richard Grubb & Associates, Cranbury, New Jersey.
- U.S. Department of Agriculture, Soil Conservation Service (USDA). 1978. Soil Survey of Ocean County, New Jersey.

United States Environmental Protection Agency. 2004. Surf Your Watershed. Mullica Toms Watershed, Cataloging Unit #02040301.
http://cfpub.epa.gov/surf/huc.cfm?huc_code=02040301. Site accessed May 22, 2004.

United States Environmental Protection Agency (EPA). "Nonattainment Areas for Criteria Pollutants".
<http://www.epa.gov/oar/oaqps/greenbk/>. Site accessed May 22, 2004.

Wheeler, Russell L, Trevor, Nathan K., Tarr, Arthur C., & Crone, Anthony. 2001. Earthquakes in and near the Northeastern United States, 1638-1998.

Zerbe, Nancy L. 1990. Letter from State Historic Preservation Office, Trenton, NJ, to Ms. Mary Ann Barlowski, Brick, NJ. State Historic Preservation Office, Trenton, NJ.

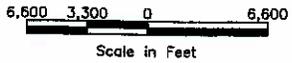
APPENDIX A

FIGURES



OYSTER CREEK
230 KV PLANT
NORTH PHASE
RECONSTRUCTION

CEDAR
BLUFFS STATION
NORTHERN PHASE
END



LEGEND

-  **SUB-STATION**
-  **GARDEN STATE PARKWAY EXISTING RIGHT-OF-WAY**
-  **NEW PROPOSED RIGHT-OF-WAY**
-  **STATE PINELANDS COMMISSION JURISDICTIONAL BOUNDARY**
-  **1 NODE MARKER INDICATOR**

A:\M Dept\PROJECTS\Connectivity 01855\085-026 Conrail to Oyster Creek\Cadd\2-11-04 Autumn Edit\NoPhase Planned Route.dwg

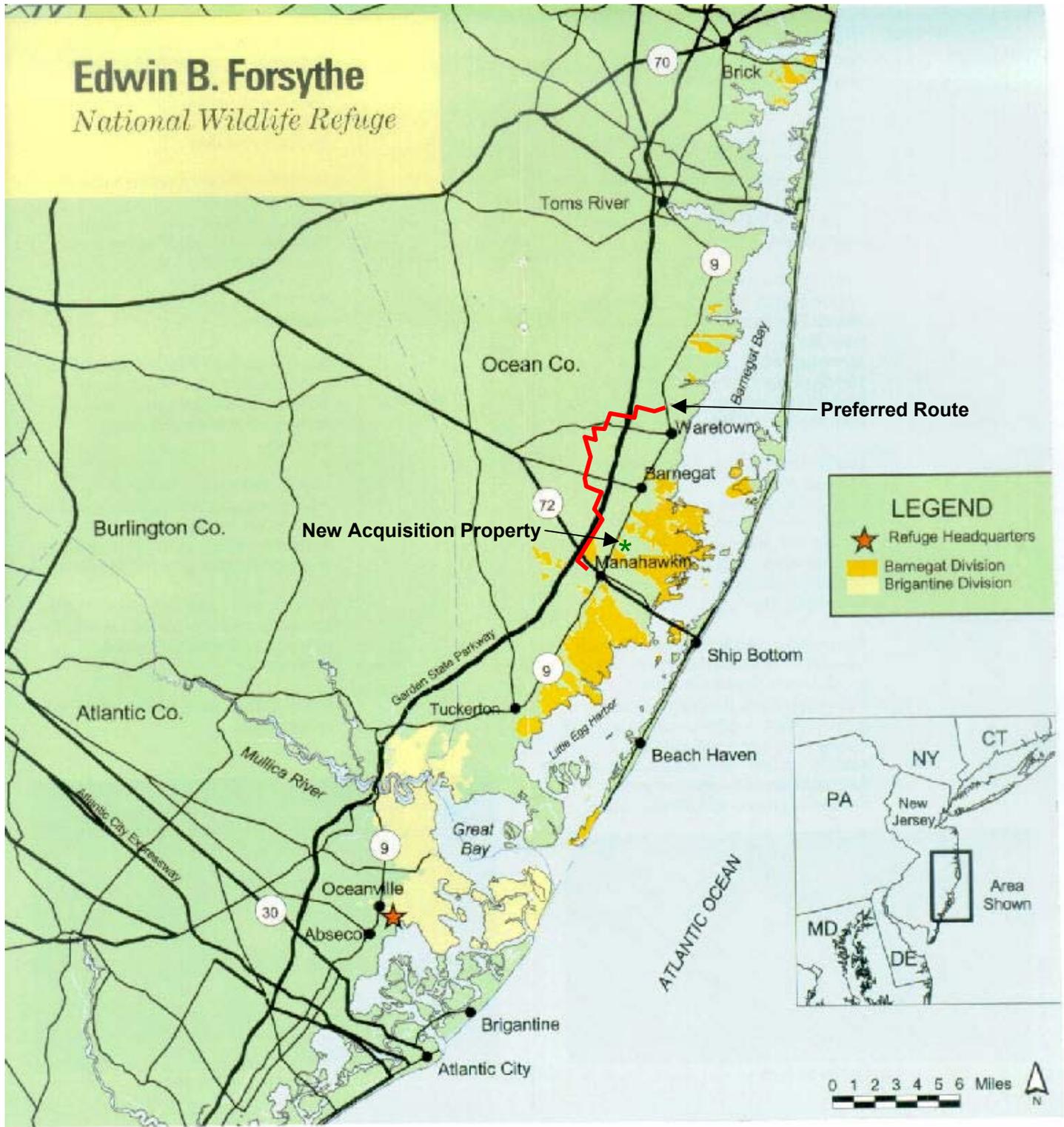
1	PROJECT NUMBER
	1855-026
SHEET NUMBER	1 OF 1

Preferred Alternative		
OYSTER CREEK TO CEDAR 230 KV TRANSMISSION LINE PROJECT		
SCALE:	DATE:	PROJECT NUMBER:
AS SHOWN	02/12/04	1855-026

ENSR
Engineering & Construction Services

3006 Cabot Boulevard West
 Suite 100
 Langhorne, PA 19047
 Phone: (215) 757-4900
 Fax: (215) 757-3004
 Web: <http://www.ensr.com>

DESIGNED BY:	REVISIONS			
	NO.	DESCRIPTION	DATE	BY
JOP				
DRAWN BY:				
/jk				
CHECKED BY:				
APPROVED BY:				



Oyster to Cedar 230 kV
Transmission Line Project

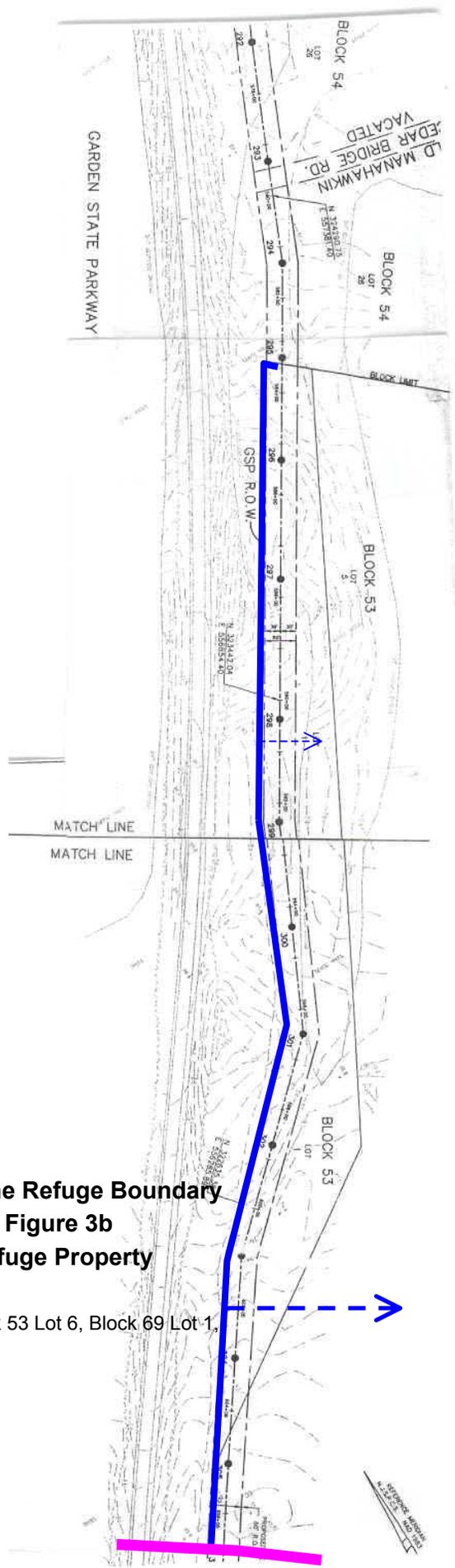
Legend:

Preferred Route —————

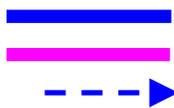


2005 Cabot Boulevard
Suite 100
Langhorne, PA 19047
215-757-4900

Figure 2



Legend:



GSP/Forsythe Refuge Boundary

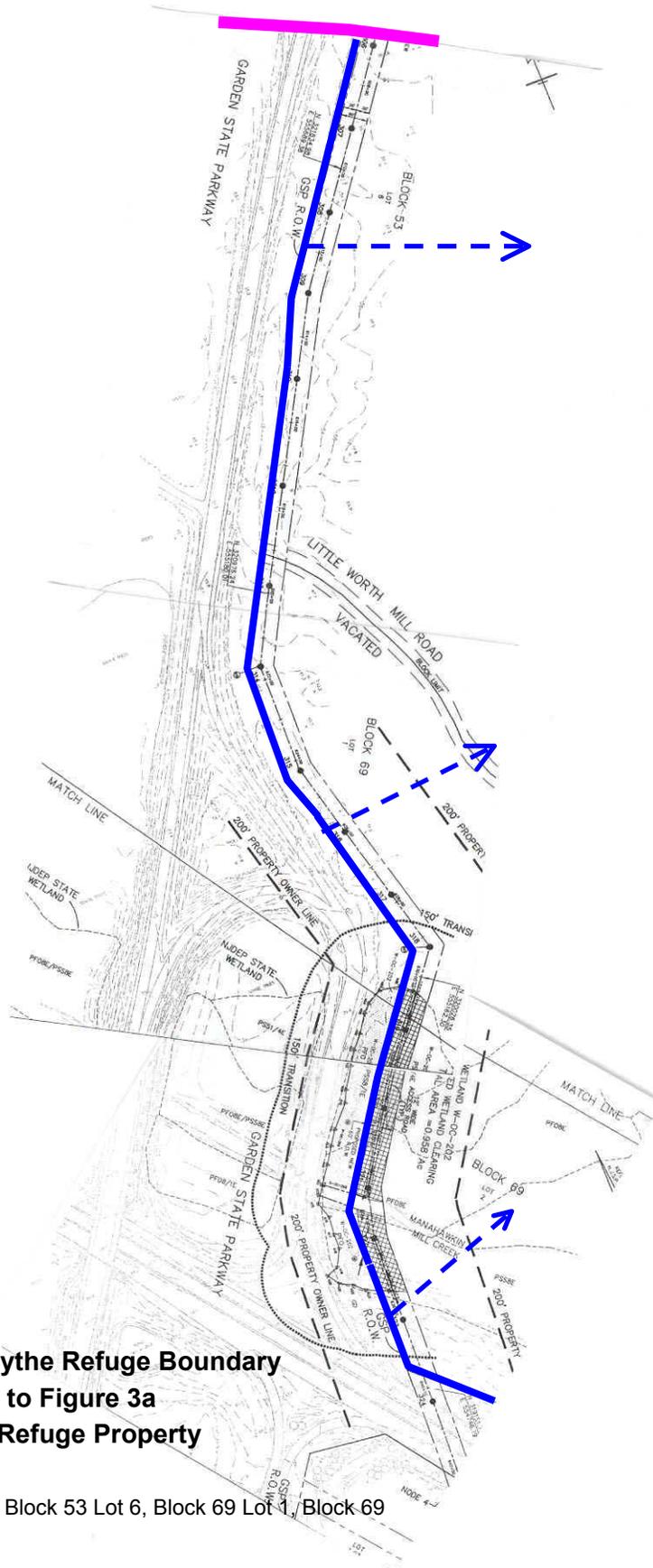
Matchline to Figure 3b

Forsythe Refuge Property

Block 53 Lot 1, Block 53 Lot 6, Block 69 Lot 1,
Block 69 Lot 2



Figure 3a
Forsythe Refuge
Boundaries



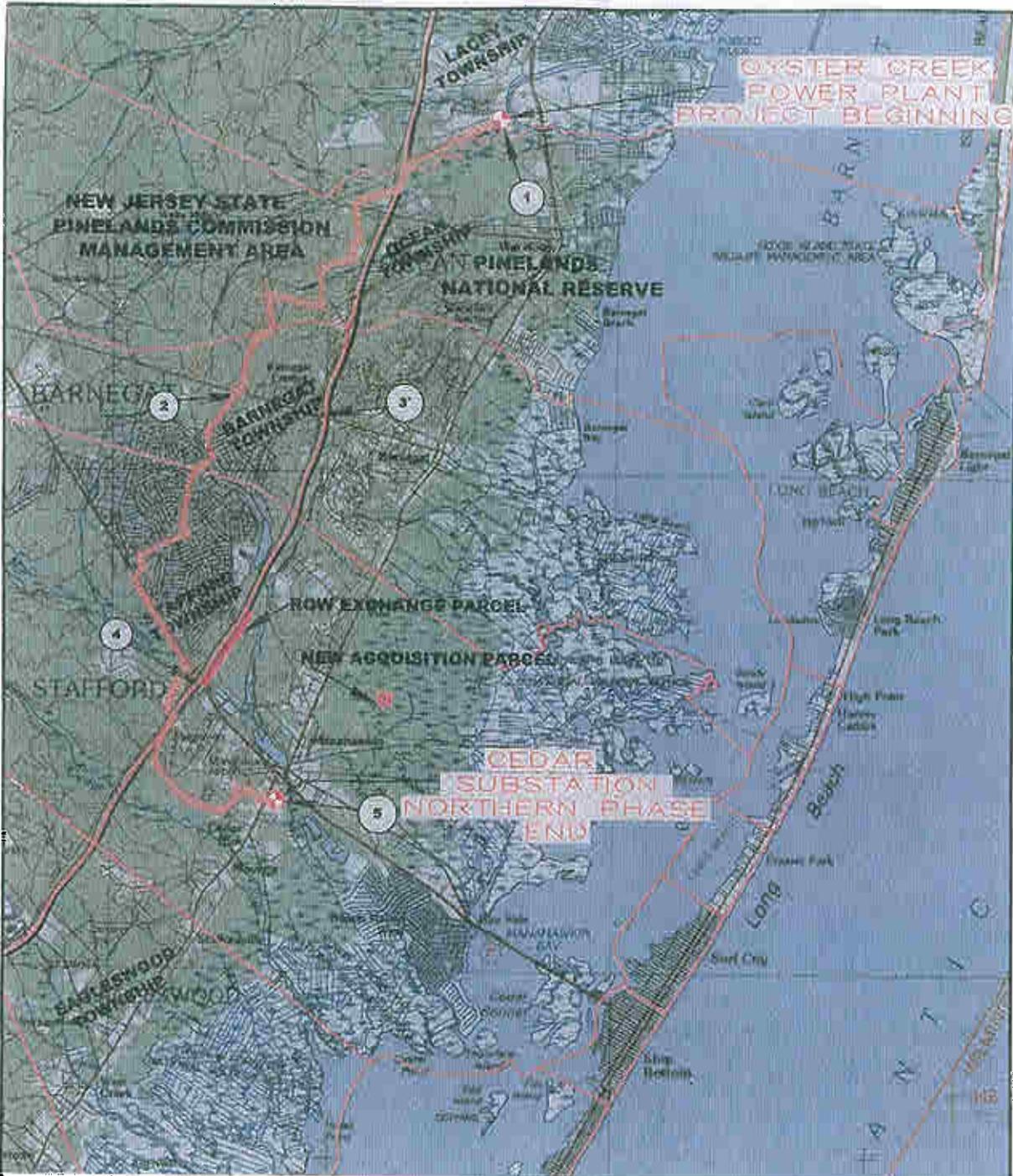
Legend:

-  GSP/Forsythe Refuge Boundary
-  Matchline to Figure 3a
-  Forsythe Refuge Property

Block 53 Lot 1, Block 53 Lot 6, Block 69 Lot 1, Block 69 Lot 2



Figure 3b
Forsythe Refuge
Boundaries

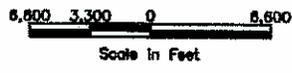


OYSTER CREEK
POWER PLANT
PROJECT BEGINNING

CEDAR
SUBSTATION
NORTHERN PHASE
END

LEGEND

-  SUB-STATION
-  GARDEN STATE PARKWAY
-  EXISTING 69kV RIGHT OF WAY
-  STATE PINELANDS COMMISSION JURISDICTIONAL BOUNDARY
-  ROW EXCHANGE PARCEL
-  SEGMENT INDICATORS



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4	1 of 1
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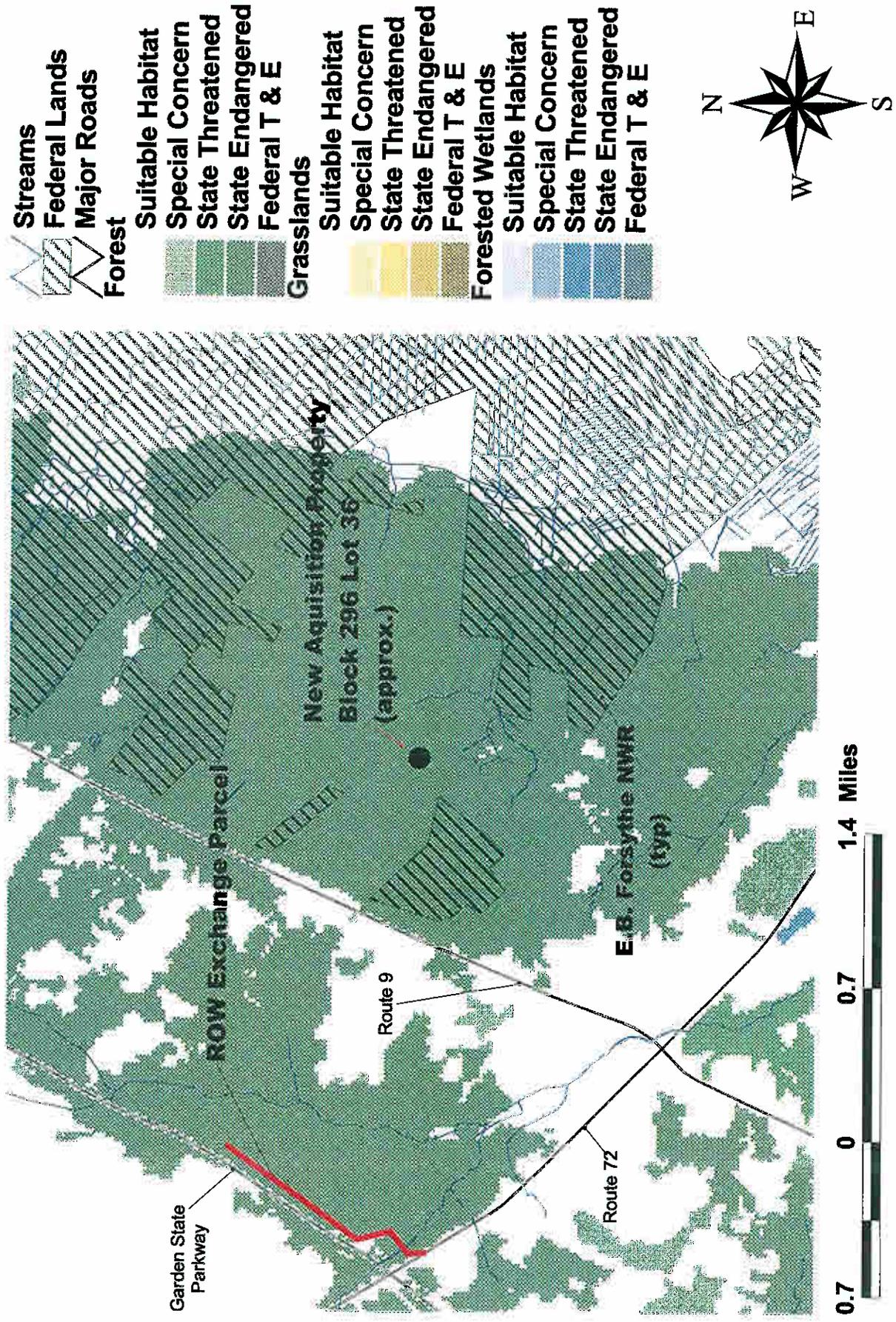
69 kV Alternative		
OYSTER CREEK TO CEDAR 230KV TRANSMISSION LINE PROJECT		
SCALE	DATE	PROJECT NUMBER
AS SHOWN	05/23/04	1855-026

ENSR
Engineering & Construction Services

281 CENTENNIAL AVENUE
PROCTERVILLE, NJ 08654
PHONE: (732) 457-0500
FAX: (732) 457-0550
WEB: HTTP://WWW.ENSR.COM

REVISION NO.	NO.	DESCRIPTION	DATE	BY
JO'P				
DESIGN BY				
/jk				
CHECKED BY				
APPROVED BY				

Figure 5 - Aquisition Habitat Assessment



Parcels on this Map
Include*:

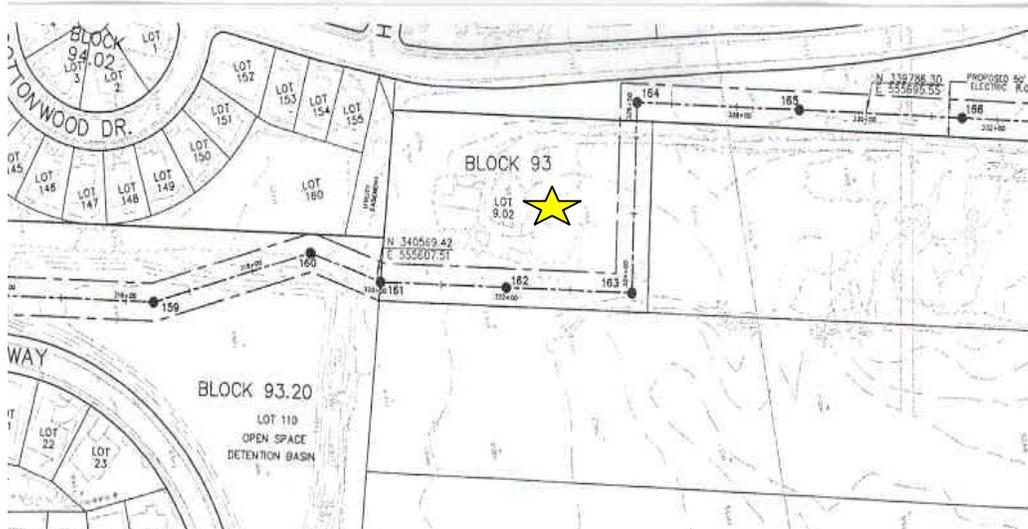
Barnegat Township
Block 92.112 Lot 42.01
Block 92.112 Lot 42.02
Block 92.111 Lot 24.06



Legend:
Parcel Subject to
Negotiation

* Two landowners each hold multiple parcels
among the total of 10 parcels subject to
negotiation.

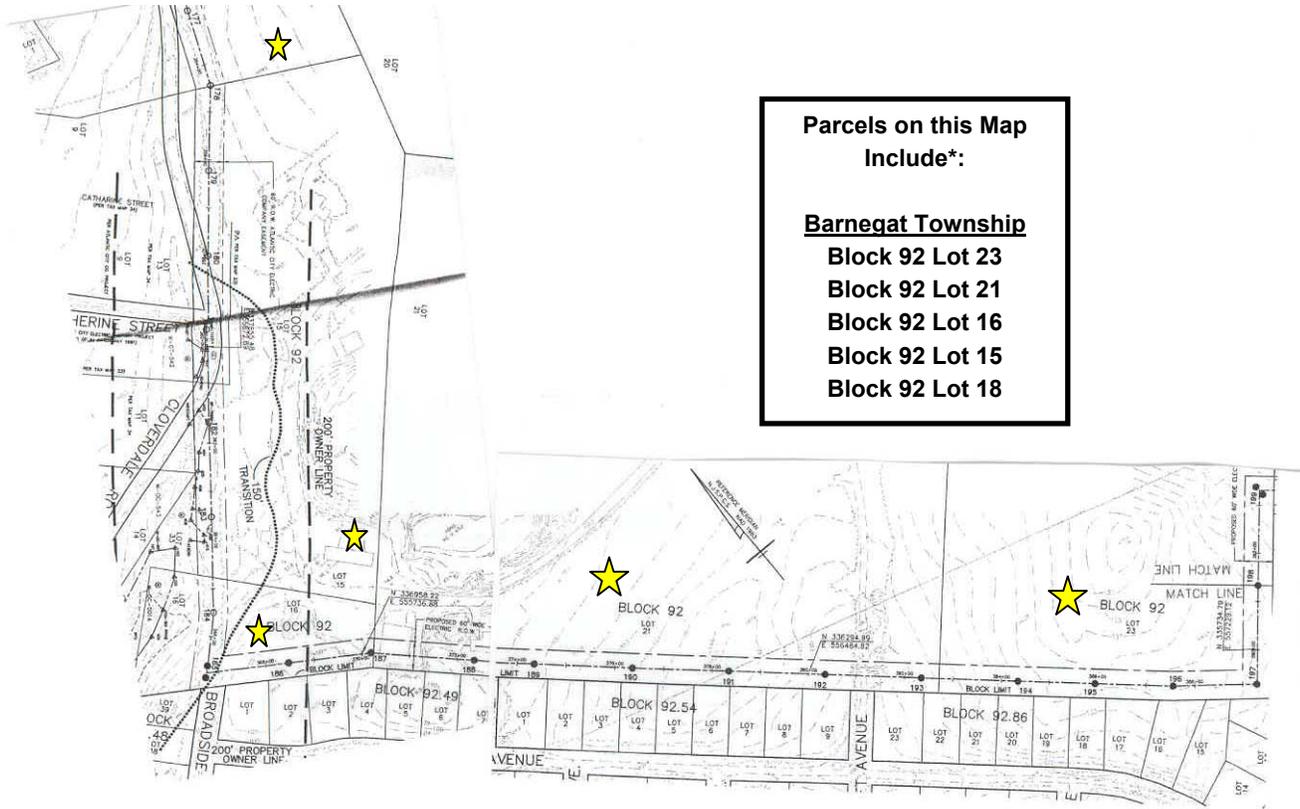
Figure 6a
Parcels Subject to
Negotiation



Legend:
 Parcel Subject to
 Negotiation

* Two landowners each hold multiple parcels
 among the total of 10 parcels subject to
 negotiation.

Figure 6b
 Parcels Subject to
 Negotiation



**Parcels on this Map
Include*:**

Barnegat Township
Block 92 Lot 23
Block 92 Lot 21
Block 92 Lot 16
Block 92 Lot 15
Block 92 Lot 18



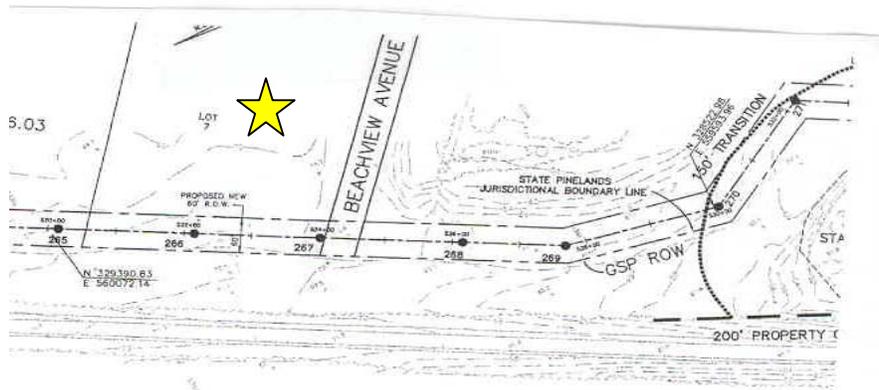
Legend:
**Parcel Subject to
 Negotiation**

Figure 6c
**Parcels Subject to
 Negotiation**

* Two landowners each hold multiple parcels among the total of 10 parcels subject to negotiation.

Parcels on this Map
Include*:

Stafford Township
Block 46.03 Lot 7



★ Legend:
Parcel Subject to Negotiation

* Two landowners each hold multiple parcels among the total of 10 parcels subject to negotiation.

Figure 6d
Parcels Subject to
Negotiation

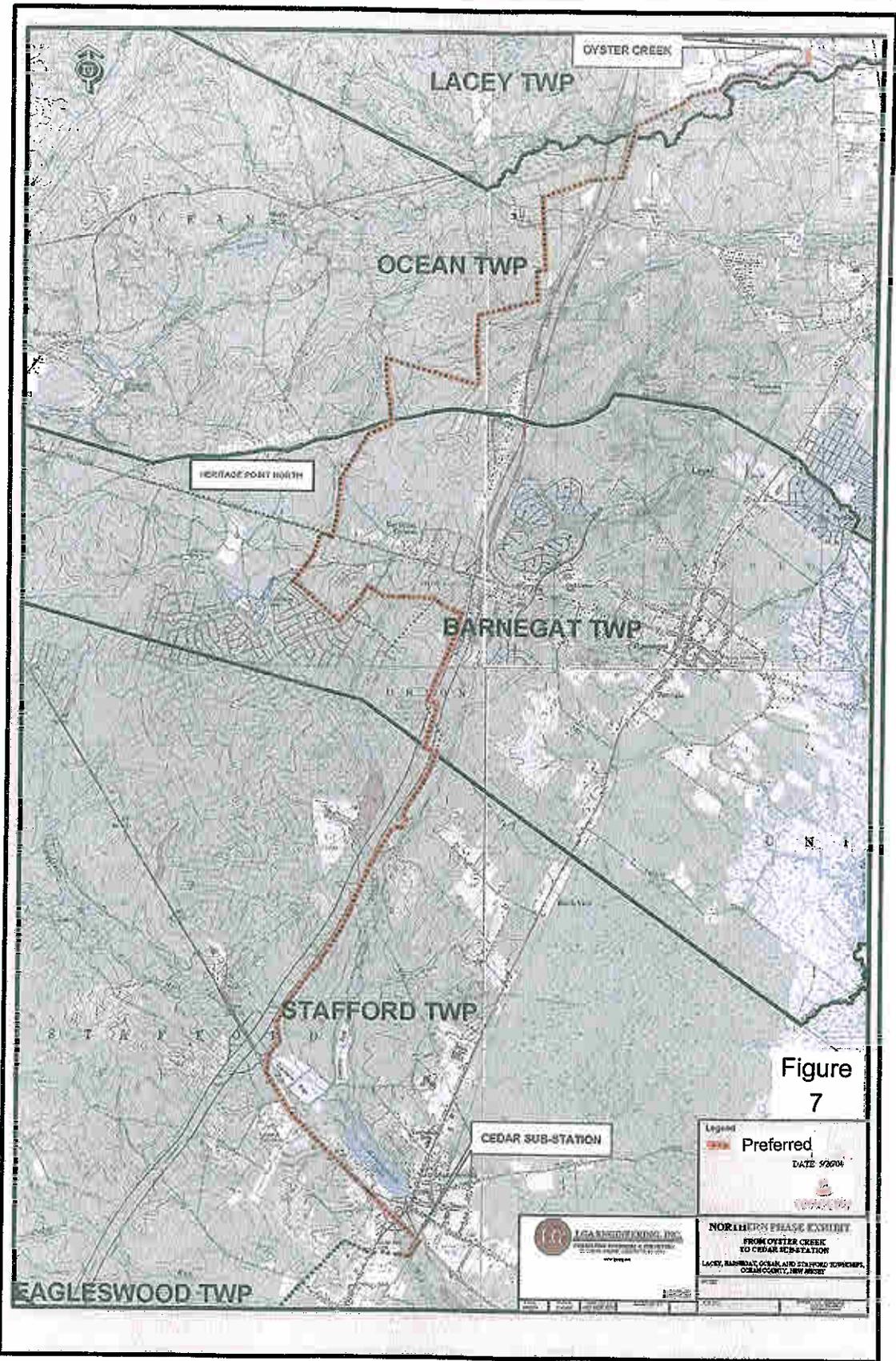


Figure
7

Legend
— Preferred
 DATE 5/20/04


 **LCA ENGINEERING, INC.**
 PROFESSIONAL ENGINEERING & SURVEYING
 1000 ROUTE 100, SUITE 200
 FREEHOLD, NJ 07728
 WWW.LCA-ENG.COM

NORTHERN PHASE EXHIBIT
 FROM OYSTER CREEK
 TO CEDAR SUB-STATION
 LACEY, BARNEGAT, OCEAN, AND STAFFORD TOWNSHIPS,
 OZANCO COUNTY, NEW JERSEY

APPENDIX B

TABLES

Table 1
Route Length for Alternatives (miles)

Segment	Preferred Alternative	Parkway Alternative	69 kV Alternative
1 to 2	5.13*	6.1*	6.1*
2 to 3	3.35*	1.0*	8.0*
3 to 4	3.69**	3.9*	
4 to 5	1.79	2.1	
Total	13.96	13.1	14.1

Notes:

1. Preferred Alternative: Route length calculated from electronic coverage of the Plan Drawings (Lynch, Giuliano & Associates dated: 04-23-04).
2. Preferred Alternative Segments 3 to 4 and 4 to 5: Route length is referenced from Supplemental Direct Testimony of Frank Sobonya, Team Lead Engineer, Atlantic City Electric Company Docket No. EE02080521

* Denotes full or partial segments within the NJ Pinelands Commission Jurisdictional boundaries.

** Denotes full or partial segments with Federal Land or NJ Pinelands Commission Jurisdictional boundaries.

Table 2

New Right-of-Way Required

Segment	Preferred Alternative			Parkway Alternative			69 kV Alternative		
	Width (ft)	Length of New ROW Required (miles)	New ROW (Acres)	Width (ft)	Length of New ROW Required (miles)	New ROW (Acres)	Width (ft)	Length of New ROW Required (miles)	New ROW (Acres)
1 to 2	60	0	0*	60	0	0*	60	0	0*
2 to 3	25 to 100	3.35	24.7*	50	1.0	3.03	50 and 60	0	0*
3 to 4	60	3.69	26.85**	60	3.9	28.2*			
4 to 5	60	1.79	13.0	50 and 60	0.3	2.1			
Total	--	8.83	64.55 ₁	--	5.2	36.05	--	0	0

Notes:

1. Right of Way acreage is approximate. Acreage calculated from the Photo Overlay Drawings (Lynch, Giuliano & Associates dated 03-29-04).

Total Right of Way required excludes road crossings and existing easements.

* Denotes full or partial segment within NJ Pinelands Commission Jurisdictional boundaries.

** Denotes full or partial segment within Federal Land or NJ Pinelands Commission Jurisdictional boundaries.

Table 3
Number of Stream Crossings for Alternatives

Segment	Preferred Alternative	Parkway Alternative	69 kV Alternative
	Streams Crossed		
1 to 2	1	1	1
2 to 3	1	2	3
3 to 4	3	3	
4 to 5			
Total Streams Crossed	5	6	4

Notes:

ENSR Delineated streams shown on the electronic coverage of the Plan Drawings (Lynch, Giuliano & Associates dated 04-08-04).

Parkway Alternative: Segment runs from nodes 2 to 3' and 3' to 4.

69 kV Alternative: Segment runs from nodes 2 to 5

Table 4
Wetlands Crossing the Centerline for Alternative Routes (miles)

Segment	Preferred Alternative	Parkway Alternative	69 kV Alternative
1 to 2	0.9*	0.8*	0.8*
2 to 3	0.01*	0*	0.3 *
3 to 4	0.5**	0.2 *	
4 to 5	0.1	0.1	
Total Wetlands Crossed (mi.)	1.5	1.1	1.1

Notes:

Wetland length measured along centerline of aerial transmission line within right-of-way.

Preferred Alternative segments 1 to 2, 4 to 5 and portions of 3 to 4, wetland boundary referenced from ENSR's delineation as shown on Plan Drawings (Lynch, Giuliano & Associates dated 04-08-04).

Parkway Alternative segment 2 to 3 and portions of segment 3 to 4, wetland boundary referenced from New Jersey State Wetlands Maps available at: <http://www.state.nj.us/dep/gis/>.

Parkway Alternative: Segment runs from nodes 2 to 3' and 3' to 4.

69 kV Alternative: Segment runs from nodes 2 to 5

* Denotes full or partial segment within the NJ State Pinelands Commission Jurisdiction boundaries.

** Denotes full or partial segment within Federal Lands or NJ State Pinelands Commission Jurisdiction boundaries.

TABLE 5

Permanent Wetland Impacts: Poles in Wetlands and Wetland Forest Clearing for Four Alternatives

Segment	Preferred Alternative				Parkway Alternative				69 kV Alternative				
	No. of Poles in Wetlands	Pole Impact within Wetland Area (Acres)	Wetland Forest Clearing (Acres)	Permanent Wetland Impact Within Pinelands Jurisdiction	No. of Poles in Wetlands	Pole Impact within Wetland Area (Acres)	Wetland Forest Clearing (Acres)	Permanent Wetland Impact Within Pinelands Jurisdiction	No. of Poles in Wetlands ²	No. of Existing Poles in Wetlands	Pole Impact within Wetland Area (Acres)	Wetland Forest Clearing (Acres)	Permanent Wetland Impact within Pinelands Jurisdiction (Acres)
1 to 2	21	0.002 (85.67 sq. ft.)	0	0.0005 (23.58 sq. ft.)	11	0.003 (116.23 sq. ft.)	0	0.001 (51.83 sq. ft.)	11	28	0.003 (116.23 sq. ft.)	0	0.001 (51.83 sq. ft.)
2 to 3	0	0	0	0	0	0	0	0	0	0	0	0	
3 to 4	12	0.002 (84.84 sq. ft.)	3.321	0.0006 (28.28 sq. ft.)	0	0	0	0					
4 to 5	4	0.001 (28.28 sq. ft.)	0.905	0	2	0	1.0 (43,900 sq. ft.)	1.0 (43,900 sq. ft.)					
Total	37	0.005 (198.79 sq. ft.)	4.226	0.001 (51.86 sq. ft.)	13	0.003 (116.23 sq. ft.)	1.0 (43,900 sq. ft.)	1.001 (43,951.83 sq. ft.)	11	28	0.003 (116.23 sq. ft.)	0	0.001 (51.83 sq. ft.)

Notes:

1. Segment runs from node to node
 2. New poles located within wetlands areas
 3. Area of impact dependent on pole support structure
- Segment runs from node 2 – 5 along 69 kV Alternative

Table 6
Vegetative Clearing (acres)

Segment	Preferred Alternative	Parkway Alternative	69 kV Alternative
1 to 2 ^a	0*	0*	0*
2 to 3 ₁ ^a	15.5*	1.21*	0*
3 to 4 ₁	13.4*	28.2*	
ROW Exchange Parcel	13.3	0	
4 to 5	0.4	0.86	
Total Clearing	42.6₂	30.27	0

Notes:

1. 60' ROW clearing necessary for portions of segment 2-3 and segment 3-4.
2. Clearing acreage is approximate. Acreage calculated from the Photo Overlay Drawings (Lynch, Giuliano & Associates dated 03-29-04).

Total vegetative clearing excludes road crossings and existing easements.

*Denotes full or partial segments within NJ Pinelands Commission Jurisdictional boundaries.

a = Only routine maintenance vegetative clearing will be required in segment 1-2 and a portion of segment 2-3.

Table 7a

Listing of Threatened and Endangered Wildlife

Scientific Name	Common Name	County Location	Federal Status	State Status
<i>Accipiter cooperii</i>	Cooper's Hawk	Atlantic/Burlington/Ocean		T/T
<i>Ambystoma tigrinum t.</i>	Eastern Tiger Salamander	Atlantic/Burlington/Ocean		E
<i>Ammodramus savannarum</i>	Grasshopper Sparrow	Atlantic/Burlington/Ocean		T/S
<i>Bartramia longicauda</i>	Upland Sandpiper	Atlantic/Burlington/Ocean		E
<i>Buteo Lineatus</i>	Red-Shouldered Hawk	Atlantic/Burlington/Ocean		E/T
<i>Calidris canutus</i>	Red Knot	Atlantic/Ocean		T
<i>Charadrius melodus</i>	Piping Plover	Atlantic/Ocean	LT	E
<i>Circus cyaneus</i>	Northern Harrier	Atlantic/Burlington/Ocean		E/U
<i>Cistothorus platensis</i>	Sedge Wren	Atlantic/Burlington/Ocean		E
<i>Clemmys insculpta</i>	Wood Turtle	Atlantic/Burlington/Ocean		T
<i>Clemmys muhlenbergii</i>	Bog Turtle	Atlantic/Burlington/Ocean	LT	E
<i>Crotalus horridus h.</i>	Timber Rattlesnake	Atlantic/Burlington/Ocean		E
<i>Elaphe guttata g.</i>	Corn Snake	Atlantic/Burlington/Ocean		E
<i>Falco peregrinus</i>	Peregrine Falcon	Atlantic/Burlington/Ocean		E
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Atlantic/Burlington/Ocean	LT	E
<i>Hyla andersonii</i>	Pine Barrens Treefrog	Atlantic/Burlington/Ocean		E
<i>Hyla chrysoscelis</i>	Cope's Gray Treefrog	Atlantic/Ocean		E
<i>Laterallus jamaicensis</i>	Black Rail	Atlantic/Ocean		T/T
<i>Melanerpes erythrocephalus</i>	Red-Headed Woodpecker	Atlantic/Burlington/Ocean		T/T
<i>Nyctanassa violacea</i>	Yellow-Crowned Night-Heron	Atlantic/Ocean		T/T
<i>Nycticorax nycticorax</i>	Black-Crowned Night-Heron	Atlantic/Ocean		T/S
<i>Pandion haliaetus</i>	Osprey	Atlantic/Burlington/Ocean		T/T
<i>Pituophis melanoleucus m.</i>	Northern Pine Snake	Atlantic/Burlington/Ocean		T
<i>Podilymbus podiceps</i>	Pied-Billed Grebe	Atlantic/Burlington/Ocean		E/S
<i>Pooecetes gramineus</i>	Vesper Sparrow	Atlantic/Burlington/Ocean		E
<i>Pseudotriton montanus m.</i>	Eastern Mud Salamander	Atlantic/Burlington		T
<i>Rynchops niger</i>	Black Skimmer	Atlantic/Ocean		E
<i>Sterna antillarum</i>	Least Tern	Atlantic/Burlington/Ocean		E
<i>Strix varia</i>	Barred Owl	Atlantic/Burlington/Ocean		T/T
<i>Callophrys irus</i>	Frosted Elfin	Atlantic/Ocean		T
<i>Alasmidonta undulata</i>	Triangle Floater	Burlington		T
<i>Atrytone arogos a.</i>	Arogos Skipper	Burlington/Ocean		E
<i>Boloria selene myrina</i>	Silver-Bordered Fritillary	Burlington/Ocean		T
<i>Lampsilis cariosa</i>	Yellow Lampmussel	Burlington		T
<i>Lampsilis radiata</i>	Eastern Lampmussel	Burlington		T
<i>Leptodea ochracea</i>	Tidewater Mucket	Burlington		T
<i>Ligumia nasuta</i>	Eastern Pondmussel	Burlington		T
<i>Nicrophorus americanus</i>	American Burying Beetle	Burlington/Ocean	LE	E
<i>Pontia protodice</i>	Checkered White	Burlington/Ocean		T
<i>Acipenser brevirostrum</i>	Shortnose Sturgeon	Burlington	LE	E
<i>Botaurus lentiginosus</i>	American Bittern	Burlington/Ocean		E/S
<i>Dolichonyx oryzivorus</i>	Bobolink	Burlington		T/T
<i>Passerculus sandwichensis</i>	Savanna Sparrow	Burlington		T/T
<i>Sterna dougallii d.</i>	Roseate Tern	Ocean	LE	E
<i>Cicindela dorsalis d.</i>	Northeastern Beach Tiger Beetle	Ocean	LT	E

Table 7b
Listing of Threatened, Endangered, and Pinelands Commission Plants

Scientific Name	Common Name	County Location	Federal Status	State Status	Habitat	Flowering Period	Fruiting Period	Source
<i>Aeschynomene virginica</i>	Sensitive-joint vetch	A	LE	E	Fresh to brackish shores	August to October	August to October	NHP/PC
<i>Aeschynomene rubra</i>	Red Milkweed	Pinelands area						PC
<i>Amaranthus pumilus</i>	Seabeach amaranth	A/O	LT	E	Overwash flats accreting ends of islands, and lower foredunes	July to late Fall	July to it death but reaches peak in September	NHP
<i>Aristida lanosa</i>	Woolly three-awn grass	B		E				NHP
<i>Asimina triloba</i>	Pawpaw	B		E	Deciduous forests, on slopes of ravines, along streams, and floodplains. Soils are deep, rich, damp, sandy, or clayey	April to May	August to October	NHP
<i>Aster concolor</i>	Silvery aster	Pinelands area						PC
<i>Aster radula</i>	Low rough aster	O		E	Wet woods or swamps	July to September		NHP
<i>Breweria pickeringii</i>	Pickering's morning glory	Pinelands area						PC
<i>Cacalia atriplicifolia</i>	Pale indian plantain	B/O		E	Wooded slopes, rocky stream margins, open woods	June to October		NHP
<i>Calamagrostis pickeringii</i>	Pickering's reed grass	B		E	Acid peats or sands, gravels, and shores	Late June to early September		NHP
<i>Calamovilfa brevipilis</i>	Pine Barren's reedgrass	Pinelands area						PC
<i>Calystegia sepium ssp.</i>	Occluded bindweed	B		E	Thickets and shores, coastal	Mid-May to September		NHP
<i>Cardamine longii</i>	Long's bittercress	B/O		E	Woods in moist alluvial soil	June to September		NHP
<i>Carex cumulata</i>	Clustered sedge	A		E	Dry or moist acid soils	June to September		NHP
<i>Carex Barrattii</i>	Barratt's sedge	Pinelands area						PC
<i>Chrysopsis falcata</i>	Sickle-leaved golden aster	Pinelands area						PC
<i>Chenopodium rubrum</i>	Red goosefoot	A		E	Salt marshes or saline soils	August to October	June to August	NHP
<i>Cirsium virginianum</i>	Virginia thistle	A/B/O		E	Wet pineland, sphagnum or peaty bogs, swales and clearings on coastal plain.	Mid-August to October		NHP
<i>Cleistes</i>	Spreading	B		E	Damp pine barrens and	Late June to July		PC

Scientific Name	Common Name	County Location	Federal Status	State Status	Habitat	Flowering Period	Fruiting Period	Source
<i>divaricata</i>	pogonia				peaty thickets			
<i>Clitoria mariana</i>	Butterfly-pea	A/O		E	Upland rocky woods with acid soils, sandstone glades, ravines, ridges and stream openings	May to September		NHP
<i>Coelorachis rugosa</i>	Wrinkled jointgrass	A		E	Flatwoods, cypress swamp edges, pond maragins, marshes	August to September	Fall	NHP
<i>Corema conradii</i>	Broom crowberry	A/B/O		E	Sandy pine barrens and sandhills	Mid-March to mid-April	Late June to late July	PC
<i>Coreopsis rosea</i>	Rose-colored tickseed	Pinelands area						PC
<i>Crotonopsis elliptica</i>	Rushfoil	Pinelands area						PC
<i>Cuscuta cephalanthus</i>	Button-bush dodder	B		E	Low grounds, on varius shrubs and coarse herbs	August and September		NHP
<i>Cyperus lancastris</i>	Lancaster flat sedge	B		E	Sandy or loamy woods, thickets, meadows , clearings	August to October		NHP
<i>Cyperus polystachyos</i>	Coast flat sedge	A		E	Damp sands, peats, shores and clearings.	Late July to October		NHP
<i>Cyperus retrofractus</i>	Rough flat sedge	A		E	Dry sandy soil	August to October		NHP
<i>Cyperus tenuifolius</i>	Low-spike sedge	B		E	Damp soil	July to October		NHP
<i>Desmodium Pauciflorum</i>	Few-flower tick-trefoil	B/O		E	Rich, moist woods, ravines, bases of bluffs	June to September		NHP
<i>Desmodium sessilifolium</i>	Sessile-leaf tick-trefoil	A/B		E	Dry, open, sandy or sterile ground of woods and shaded areas	July to August	September	NHP
<i>Desmodium strictum</i>	Stiff tick trefoil	Pinelands area						PC
<i>Draba reptans</i>	Carolina whitlow-grass	B		E	Rocky open ground, glades, pastures, roadsides, railroads.	February to May		NHP
<i>Eleocharis equisetoides</i>	Knotted spike-rush	A		E	Shallow water	Early August to September	Early August to Septemebr	PC
<i>eleocharis melanocarpa</i>	Black-fruit Spike-rush	B		E	Sandy or peaty shores and pine barrens	Late June to October		NHP
<i>Eleocharis tortilis</i>	Tristed spike-rush	B/O		E	Springy swamps, wet woods and thickets of the coastal plain	June to September		NHP
<i>Eriophorum tenellum</i>	Rough cotton-grass	A/B/O		E	Peaty soil	Late June to September		NHP
<i>Eupatorium capillifolium</i>	Dog-fennel thoroughwort	B		E	Borders of woods, clearings, fields, and roadsides	Mid-Sept to November		NHP
<i>Eupatorium resinosum</i>	Pine barron boneset	A/B/O		E	Wet, low ground of open bogs, swamps, streamsides	Early July to October		NHP/PC
<i>Fraxinus profunda</i>	Pumkin ash	O		E	fresh water swamps, often along blackwater rivers in the Coastal Plain			NHP
<i>Galactia volubilis</i>	Downy milk-pea	O		E	Dry thickets and borders of woods	July, August		NHP

Scientific Name	Common Name	County Location	Federal Status	State Status	Habitat	Flowering Period	Fruiting Period	Source
<i>Melanthium virginicum</i>	Virginia bunchflower	B/O		E	Meadow, swales, savannahs, and thickets	Mid-June, July		NHP
<i>Micranthemum micranthemoides</i>	Nuttall's mudwort	B		E	Fresh tidal mud	August to October		NHP
<i>Muhlenbergia capillaris</i>	Long-awn smoke grass	A		E	Sandy or rocky woods and clearins	September, October		PC
<i>Muhlenbergia torreyana</i>	Torrey's muhly	Pinelands area				September, October		NHP
<i>Myriophyllum tenellum</i>	Slender water-milfoil	A/O		E	Shallow margins of ponds and pools in sand, granitic gravel, mud, and peat	July to October		NHP
<i>Myriophyllum verticillatum</i>	Whorled water-milfoil	O		E	Shallow waters,	June to September		NHP
<i>Nartheccium americanum</i>	Bog (yellow) asphodel	A/B/O	C	E	Boggy Pinebarrens and savannahs	Late June to late July	July to September	PC
<i>Nelumbo lutea</i>	American lotus	B		E	Ponds, quiet streams, and estuaries	July to September		NHP
<i>Nuphar microphyllum</i>	Small yellow pond-lily	B		E	Pond margins and dead waters	June to October		NHP
<i>Nymphoides cordata</i>	Floating Heart	Pinelands area						PC
<i>Oenothera humifusa</i>	Sea-beach evening-primrose	A/O		E	Sandy beaches and dune- hollows	June to September		NHP
<i>Onosmodium virginianum</i>	Virginia false-gromwell	A/B/O		E	Pinelands, dry sandy woods, and open sands	May to July		NHP
<i>Panicum aciculare</i>	Bristling panic grass	B		E	Dry sands	June to October		NHP
<i>Panicum hemitomon</i>	Narrow Panic Grass	Pinelands area						PC
<i>Panicum hirstii</i>	Hirst's panic grass	A	C	E	Wet shores	Late June to August	Late June to August	PC
<i>Penstemon laevigatus</i>	Smooth beardtongue	B		E	Meadows, bottoms, rich woods, calcareous bluffs	May , June		NHP
<i>Phlox pilosa</i>	Downy phlox	B		E	Dry open woods, sandhills, openings, prairies	May to Early July		NHP
<i>Phoradendron flavescens</i>	American mistletoe	Pinelands area						PC
<i>Plantago pusilla</i>	Dwarf plantain	O		E	Sandy fields and openings	April to June		NHP
<i>Platanthera integra</i>	Yellow fringeless orchid	A/B		E				NHP
<i>Polemonium reptans</i>	Greek-valerian	B		E	Rich woods and bottoms,	Mid-April to June		NHP
<i>Polygala mariana</i>	Maryland milkwort	Pinelands area						PC
<i>Polygonum glaucum</i>	Sea-beach knotweed	A/O		E	Sandy seabeaches, saline pond-shores and dune-hollows	July to November		NHP
<i>Preanthes autumnalis</i>	Slender rattlesnake	Pinelands area						PC

Scientific Name	Common Name	County Location	Federal Status	State Status	Habitat	Flowering Period	Fruiting Period	Source
<i>Gentiana autumnalis</i>	Pine Barrems Gentian	Pinelands area						PC
<i>Glaux maritima</i>	Sea-milkwort	A/O		E	Saline or brackish shores, marshes and sands	June, July		NHP
<i>Gnaphalium helleri</i>	Small everlasting	A/O		E	Dry clearings, borders of woods and fields	August and November		NHP
<i>Habenaria ciliaris</i>	Yellow-fringed orchid	Pinelands area						PC
<i>Habenaria cristata</i>	Crested Yellow Orchid	Pinelands area						PC
<i>Habenaria integra</i>	Southern yellow orchid	Pinelands area						PC
<i>Helonias bullata</i>	Swamp-pink	A/B/O	LT	E	Swamps and Bogs	Bloom Early May to July	Fruit June to July	NHP
<i>Hieracium kalmii</i>	Canada hawkweed	A		E				NHP
<i>Hottonia inflata</i>	Featherfoil	O		E	Pools and ditches	April to June	Autumn and winter	NHP
<i>Hypericum adpressum</i>	Barton's St. John's-wort	A/B		E	Damps sands, peats, and sand margins	Late July to Early September		NHP
<i>Jeffersonia diphylla</i>	Twinleaf	O		E	Woods	April, May		NHP
<i>Juncus caeseriensis</i>	New Jersey rush	A/B/O		E	Sandy, wet soil of isolated pineland bogs, cedar swamps, springy woods			NHP/PC
<i>Juncus torreyi</i>	Torrey's rush	A/O		E	Low often sandy soils	July to October		NHP
<i>Kuhnia eupatorioides</i>	False boneset	A/B		E	Open woods, thickets, clearings rocky slopes	Late July to October		NHP
<i>Lemna perpusilla</i>	Minute duckweed	A		E				NHP
<i>Limosella subulata</i>	Awl-leaf mudwort	B/O		E	Brackish sand or mud	Late June to October		NHP
<i>Linum intercursum</i>	Sandplain flax	A/B/O		E	Agrillaceous, siliceous or peaty shores	July, August		NHP
<i>Liparis loeselii</i>	Lily-leaved twayblade	Pinelands area						PC
<i>Liparis</i>	Loesel's twayblade	Pinelands area						PC
<i>Liparis</i>	Southern twayblade	Pinelands area						PC
<i>Lobelia boykinii</i>	Boykin's lobelia	A		E	Wet Pinelands	May to late July	Early August to Septemebr	PC
<i>Lobelia canbyi</i>	Canby's lobelia	Pinelands area						PC
<i>Ludwigia hirtella</i>	Hairy ludwigia	Pinelands area						PC
<i>Ludwigia linearis</i>	Linear-leaved ludwigia	Pinelands area						PC
<i>Luzula acuminata</i>	Hairy wood-rush	O		E	Woods , clearings, and bluffs	April, May		NHP
<i>Lygodium palmatum</i>	Climbing fern	Pinelands area						PC

Scientific Name	Common Name	County Location	Federal Status	State Status	Habitat	Flowering Period	Fruiting Period	Source
	root							
<i>Prunus angustifolia</i>	Chicksaw plum	A/O		E	Dry thickets and borders of woods	Late March, April	June , July	NHP
<i>Ptelea trifoliata</i>	Wafer-ash	B		E	Alluvial thickets, rocky slopes, and gravels	Late May to early July		NHP
<i>Ranunculus cymbalaria</i>	Seaside buttercup	A/O		E	Saline or brackish shores rarely in fresh habitats	May to October		NHP
<i>Rhexia aristosa</i>	Awned meadow-beauty	A		E	Wet pine barrens	July to Early September		NHP/PC
<i>Rhododendron Aum</i>	Dwarf Azalea	O		E	Pine barrens and sandy open woods	April to early June		NHP
<i>Rhynchospora cephalantha</i>	Capitate beakrush	Pinelands area						PC
<i>Rhynchospora globularis</i>	Coarse grass-like beaked-rush	O		E	Low grounds, on various shrubs and coarse herbs		July to early September	NHP
<i>Rhynchospora inundata</i>	Slender beaked rush	Pinelands area						PC
<i>Rhynchospora knieskernii</i>	Knieskern's beaked rush	A/B/O	LT	E	Wet soil of pineland bogs over iron deposits	Late July to September	Late July to September	NHP
<i>Rhynchospora microcephala</i>	Small-head beaked rush	A/B/O		E				NHP
<i>Sagittaria australis</i>	Southern arrowhead	B		E				NHP
<i>Sagittaria teres</i>	Slender arrowhead	A		E	Submersed in shallow water, or on sandy, wet shores, of ponds and swamps			NHP
<i>Schizaea pusilla</i>	Curly grass fern	Pinelands area						PC
<i>Schoenoplectus torreyi</i>	Torrey's bulrush	B		E				NHP
<i>Schwalbea americana</i>	Chaffseed	A/B/O	LE	E	Moist to Dry, sandy ground of pine-oak woods and shaded edges, marshes	Early May to June	August	NHP/PC
<i>Scirpus longii</i>	Long's woolgrass	A/B/O		E	Fresh water of swamps, marshes, and meadows	Late May to August, but plants usually only vegetative	Late May to August	NHP/PC
<i>Scirpus maritimus</i>	Saltmarsh bulrush	O		E	Saline to brackish marshes and brackish to fresh tidal shores		Mid-July to October	NHP
<i>Scleria minor</i>	Slender nut rush	Pinelands area						PC
<i>Scleria reticularis</i>	Reticulated nut rush	Pinelands area						PC
<i>Sclerolepis uniflora</i>	Sclerolepis	Pinelands area						PC
<i>Solidago stricta</i>	Wand-like goldenrod	Pinelands area						PC
<i>Spiranthes laciniata</i>	Lace-lip ladies' tresses	A/B/O		E	Bogs, marshes, shallow ponds	July to September		NHP
<i>Spiranthes</i>	Little ladies	Pinelands						PC

Scientific Name	Common Name	County Location	Federal Status	State Status	Habitat	Flowering Period	Fruiting Period	Source
<i>tuberosa</i>	tresses	area						
<i>Stylisma pickeringii</i> var	Pickering's morning-glory	A/B/O		E				NHP
<i>Tofieldia racemosa</i>	False asphodel	B		E	Wet, sand, clay ot Peat	Late June to late July	August	Pinelands
<i>Tridens flavus</i> var <i>chapmanii</i>	Chapman's redbtop	O		E	Dry fields, roadsides, openings and borders of woods	August to October		NHP
<i>Triglochin maritima</i>	Seaside arrow-grass	O		E	Saline, brackish or fresh marshes and shores	May to August		NHP
<i>Utricularia biflora</i>	Two-flower bladderwort	B/O		E	Shallow pools	July to October		NHP
<i>Utricularia minor</i>	Lessor bladderwort	O		E	Shallow pools, wet meadows, bogs and shores	May to August		NHP
<i>Utricularia olivacea</i>	Dwarf white bladderwort	A		E				NHP
<i>Utricularia resupinata</i>	Reversed bladderwort	A		E	Pond, lake, river shores and margins, Pools in Pine barrens	July to September		NHP
<i>Uvularia puberula</i> var <i>nitida</i>	Pine barron bellwort	B/O		E	Moist soil of swamp edges in pinelands	Early May to June		NHP
<i>Valerianella radiata</i>	Beaked cornsalad	B		E	Damp to dry woods, meadows, fields, and roadsides	April, May		NHP
<i>Verbena simplex</i>	Narrow-leaf vervain	A/B/O		E	Dry, Open, sandy or rocky, no-acid ground of thin woods, fields, roadsides	Early June to late July, some September		NHP
<i>Vulpia ellioatea</i>	Squirrel-tail six weeks grass	A		E	Sandy ground	May, June		NHP
<i>Xyris caroliniana</i>	Sand yellow-eyed-grass	A/B		E	Wet peaty or sany soil,	July to September		NHP
<i>Xyris caroliniana</i>	Fringed yellow-eyed-grass	A/B/O		E	Pinelands, swamps, and pond margins, bogs	Mid July to September	Mid August to late September	NHP
<i>Zigadenus leimanthoides</i>	Death-camus	O		E	Sandy pinelands and bogs of the costal plain	June to August		

Notes:

B = Burlington County

A = Atlantic County

O = Ocean County

Table 8
Land Use for Alternatives

Segment	Preferred Alternative	Parkway Alternative	69 kV Alternative
1 to 2	Undeveloped/Forest Residential Utility & associated structures (Oyster Creek Power Plant, Sands Point Substation)*	Undeveloped/Forest Residential Utility & associated structures (Oyster Creek Power Plant, Sands Point Substation)*	Undeveloped/Forest Residential Utility & associated structures (Oyster Creek Power Plant, Sands Point Substation)*
2 to 3	Undeveloped/Forest, Residential Highway*	Highway Undeveloped/Forest*	Residential Undeveloped/Forest 2 Quarries Utility & associated structures (Cedar Substation)*
3 to 4	Undeveloped/Forest, Federal Land (National Wildlife Refuge) Highway	Highway Undeveloped/Forest*	
4 to 5	Business/Commercial, Undeveloped/Forest Highway, Utility & associated structures (Cedar Substation)	Business/Commercial Quarry Utility & associated structures (Cedar Substation)	

Notes:

Land use was determined through review of aerial photographs and field verification. Primary land use for each segment is listed first.

Parkway Alternative: Segment runs from nodes 2 to 3' and 3' to 4

69 kV Alternative: Segment runs from nodes 2 to 5

Table 9
Aesthetics for Alternatives

Segment	Preferred Alternative			Parkway Alternative			69 kV Alternative				
	No. of poles	Height above grade (ft)	Impact Description	No. of poles	Height above grade (ft)	Impact Description	No. of Proposed Poles	Height above grade (ft) Proposed Poles	No. of Existing Poles	Height above grade (ft) Existing Poles	Impact Description
1-2	138*	55 to 65	Poles originate from the existing Oyster Creek Substation, partially screened by trees along ROW through undeveloped areas. Poles visible to GSP traffic at aerial road crossing. Poles partially screened by trees as ROW skirts residential areas near node 2. The existing line will be strung on 55 foot poles.	80*	77 to 82	Poles originate from the existing Oyster Creek Substation, partially screened by trees along ROW through undeveloped areas. Poles visible to GSP traffic at aerial road crossing. Poles partially screened by trees as ROW skirts residential areas near node 2. The existing line will be strung on new taller poles, but the total number of poles on this segment will be reduced by 78 (49%).	80*	77 to 82	158*	52 – 74.5	Poles originate from the existing Oyster Creek Substation, partially screened by trees along ROW through undeveloped areas. Poles visible to GSP traffic at aerial road crossing. Poles partially screened by trees as ROW skirts residential areas near node 2. The existing line will be strung on new taller poles, but the total number of poles on this segment will be reduced by 78 (49%).
2-3	92*	55 to 80	Weathered steel will be located directly adjacent to the roadway. Poles will be visible from roadway traffic but will replace existing distribution line poles on an one to one basis.	26*	77 to 82	Weathered steel or possibly laminated wood poles will be located directly adjacent to the roadway (Straight Rd.). Poles will be visible from roadway traffic but will replace (and reduce the number of) existing distribution line poles thereby mitigating potential visual impacts.	214*	77 to 100	217*	52 – 74.5	Weathered steel or possibly laminated wood poles are partially screened by trees in existing ROW located in undeveloped areas. Poles are visible to traffic along roadways in residential areas and at aerial crossings of roads and the Garden State Parkway. Poles lead into the Cedar Substation via an existing ROW in an industrial area. Pole replacement will be on a one to one basis for existing poles, however the new poles will be double circuit weathered steel or possibly laminates wood and 10 to 15 feet taller than the existing wooden poles.
3-4	97**	55 to 80	Weathered steel will be partially screened by trees along the GSP ROW. An aerial crossing of the line over the GSP will cross highway traffic at right angles and only be briefly visible by highway traffic.	45*	86 to 100	Weathered steel or possibly laminated wood poles will be visible to traffic along the GSP ROW, as few trees will provide screening. A diagonal aerial crossing of the line over the GSP will be briefly visible by highway traffic					
4-5	43	55 to 80	Weathered steel poles will be partially screened from highway travelers by trees on the GSP ROW. In addition existing development along Route 72 will help minimize visual impacts of the poles. The poles lead into the Cedar Substation via an existing ROW in an industrial area.	57	86	Weathered steel or possibly laminated wood poles will be located directly adjacent to the roadway, visible from roadway traffic in this already commercial area. Weathered steel or possibly laminated wood poles lead into the Cedar Substation via an existing ROW in an industrial area. The existing line will be strung on new taller poles, but the total number of poles on this segment will be reduced by 3 (17%).					

Notes:

* Denotes full or partial segments within NJ Pinelands Commission Jurisdictional boundaries.

** Denotes full or partial segments within Federal Land and NJ Pinelands Commission Jurisdictional boundaries.

Table 10
Pole Details for Alternatives

Segment	Preferred Alternative			Parkway Alternative			69 kV Alternative ₂		
	No. of poles	Height above grade (ft)	Pole Type	No. of poles	Height above grade (ft)	Pole Type	No. of poles	Height above grade (ft)	Pole Type
1 to 2	138	55 to 65	B ²	80*	77 to 82	B ²	80*	75 to 85	B ²
2 to 3	92	55 to 80	H ¹	26*	77 to 82	H ¹	214	75 to 85	H ¹ Portions Not Determined
3 to 4	97**	55 to 80	B ¹	45	86 to 100	B ¹			
4 to 5	43	55 to 80	H ¹	57	86	H ¹			
Total	370	--	--	208	--	--	294	--	--

Notes:

* Denotes full or partial segments within NJ Pinelands Commission Jurisdictional boundaries

** Denotes full or partial segments within Federal Land

H¹ – Steel Pole, Horizontal Post Construction (Double Circuit 69kV/230kV)

B¹ – Steel Pole, Braced Post Construction (Tangent, Double Circuit – 69 kV/230 kV)

B² – Steel Pole, Braced Post Construction (Tangent, Single Circuit – 230 kV)

D¹ – Steel Pole, Delta Post Construction (Tangent, Single Circuit – 230 kV)

Each segment may possibly have laminated wood poles

Table 11: Roads Crossed

Preferred Alternative

Segment	Road Name	Usage	Comments
1 to 2	Garden State Parkway	Limited access toll road	High speed 4-lane divided highway
	Wells Mills (County Road 532)	Local Access	--
	Morey Road	Residential area access	--
	Drift Road	Local off road travel	Undedicated
	Drift Road	Local off road travel	Undedicated
	Drift Road	Local off road travel	Undedicated
	Drift Road	Local off road travel	Undedicated
	Pan Coast Road	Residential area access	Unpaved
2 to 3	Wells Mill Road	Local off road travel	Unpaved
	Pan Coast Road	Local Connector	Unpaved/Shared ROW
	Pine-Oak Boulevard	Residential area access	--
	Pine Oak Boulevard	Residential area access	--
	West Bay Ave. (aka Straight Road)	Regional distribution highway	Shared ROW
	Cloverdale Road	Local off road travel	Unpaved
	Catherine Street	Local access	Unpaved
	Cloverdale Road	Local off road travel	Unpaved
	Nautilus Lane	Local access	--
	Harpoon Drive	Local Connector	Shared ROW
	Mutineer Avenue	Residential area access	--
	Four-Mile Avenue	Residential area access	--
	Lighthouse Drive	Local Connector	Shared ROW
3 to 4	Garden State Parkway	Limited access toll road	High speed 4-lane divided highway
	Beachview Avenue	Local access	Dead ends at crossing
	Old Manahawkin Cedar Bridge Road	Vacated	--
	Little Worth Mill Road	Vacated	--
	State Highway Route 72	Regional access	--
4 to 5	Washington Avenue	Local access	--
	East Road	Local access	--
	Westerly Master	Local access	--
	Eastern Connector	Local access	--
	State Highway Route 72	Regional Access	--
	State Route 9	Ramp	--
	State Route 9	Regional Access	--
	State Route 9 Ramp	Ramp	--

Notes:

Road Crossings as shown on the electronic coverage of the Plan Drawings (Lynch, Giuliano & Associates dated 04-08-04).

APPENDIX C

**MEMORANDUM OF UNDERSTANDING BETWEEN CONECTIV POWER DELIVERY
AND THE U.S. FISH AND WILDLIFE SERVICE**

&

INTEGRATED VEGETATION MANAGEMENT

**Memorandum of Understanding
between
Conectiv Power Delivery
and the
U.S. Fish and Wildlife Service**

I. Parties

The parties to this Memorandum of Understanding (MOU) are Atlantic City Electric Company and Delmarva Power & Light Company "d/b/a Conectiv Power Delivery" (Conectiv) and the U.S. Fish and Wildlife Service (Service).

II. Purpose

This MOU establishes a partnership between Conectiv and the Service to promote mutually beneficial Integrated Vegetation Management (IVM) on Conectiv Right-of-Ways (ROW) on Service lands and to provide an opportunity for the Service to use, at benchmarked costs, Conectiv's contractors to carry out vegetation management practices on other Service-owned lands. These actions can improve the management of Service-owned lands and overlaying ROW's by maintaining forest health, improving wildlife habitat, and reducing the occurrence of non-native invasive plant species.

III. Background Information

Conectiv and the Service both recognize the opportunities to improve natural resource management along electric ROW's, specifically through proper tree selection, proper pruning techniques and IVM. Proper tree selection (right tree in the right place) improves aesthetics and eliminates or minimizes the need for utility tree maintenance. Proper pruning techniques, such as directional pruning, minimize impacts on tree health and help reduce the need for future tree maintenance and tree removal. IVM, using biological, cultural, chemical, and mechanical methods, controls unwanted vegetation and encourages plant species compatible with maintenance and operation of the ROW corridor and Refuge goals and objectives.

Studies have shown that a three-tiered plant community - grass in the center of the corridor, flanked by progressively taller plants to each side (shrubs then trees) - provides excellent wildlife habitat, particularly when adjacent to a mature forest. It may also serve to minimize forest fragmentation, to the extent possible, while providing the necessary ROW vegetation management. Both Conectiv and the Service recognize the benefits of using this management regime when proper conditions exist (adjacent land use, width of ROW, accessibility, terrain, etc.). Conectiv continues to strive to develop these three-tiered plant communities on its existing ROW's when possible, using IVM techniques, such as mechanical cutting followed by increasingly selective chemical treatments.

In 2000, Conectiv received the *Tree Line USA* award from the National Arbor Day Foundation for the company's tree planting, public education, employee training, and professional arboricultural programs. Furthermore, the Edison Electric Institute, in its Environmental Stewardship Strategy, cited Conectiv's IVM program as an environmental and economic success.

This strategy was formulated in a partnership with the U.S. Environmental Protection Agency and the U.S. Department of Agriculture. The Strategy's goal is to achieve well managed ROW vegetation while lowering the level of risk to both humans and the environment. Conectiv has helped the Service to teach other utilities and refuge managers IVM techniques. Conectiv's System Forester is an instructor at the Service's ROW Habitat Management Course.

IV. Conectiv's Responsibilities

Conectiv agrees to:

- A) Coordinate with each respective Refuge Manager prior to implementing ROW habitat management. ROW habitat management will consider impacts to threatened and endangered species, rare or sensitive plant communities, breeding/nesting of birds and other wildlife, cultural and historic resources, and other areas of refuge management concern.
- B) Submit a Pesticide Use Proposal to each respective Refuge Manager covering each proposed herbicide use and include the relevant Environmental Protection Agency pesticide use label.
- C) Apply herbicides in accordance with label instructions and Service/U. S. Department of the Interior-approved Pesticide Use Proposals;
- D) Provide an annual report to each refuge of all pesticides applied on the refuge by January 31 of the following year.
- E) Make available to the Service wood chips from tree pruning operations for use in constructing trails or other purposes.
- F) Use IVM techniques in its ROW's within Service-owned lands. Conectiv shall:
 - Place the debris from tree pruning and tree removal into windrows along the ROW edge, or as directed, to provide additional wildlife habitat. If this is not possible, the debris shall be chipped and chips made available to the Service;
 - Preserve beneficial plant species that meet the objectives of the ROW as much as possible;
 - Minimize the amount of herbicides used over time by employing appropriate IVM techniques of the least hazardous product, and rotate the approved herbicides applied in order to minimize the chance of herbicide-resistant strains;
 - Utilize approved biological controls appropriate to the IVM goals when practical;
 - Attempt to eradicate non-native, invasive plant species that interfere with the ROW vegetation management objectives; and
 - Maintain written documentation of all ROW maintenance activities on ROW's within Service-owned lands, and provide this documentation to the Service upon request.

- G) Help the Service promote IVM techniques to other companies and entities that manage ROW's on Service-owned lands. This assistance could include instructors and demonstrations of these techniques.
- H) Help the Service manage vegetation/habitat on Service-owned lands by helping to train Service employees to use IVM techniques, or by providing trained personnel and equipment at benchmarked costs.
- I) Share its transmission system maps with the Service to assist with fire management operations.

V. Service Responsibilities

The Service agrees to:

- A) Recognize Conectiv's need to manage vegetation in ROW corridors for the safe and reliable transmission of energy.
- B) Coordinate with Conectiv regarding ROW habitat management on Service-owned lands and consider impacts to threatened and endangered species, rare or sensitive plant communities, breeding/nesting of birds and other wildlife, cultural and historic resources, or other areas of refuge management concern.
- C) Provide Conectiv with wood chip disposal sites as needed for vegetation removed from ROW's on Service-owned lands.
- D) Provide Conectiv with a list of Service-owned lands containing Conectiv ROW's, with updates corresponding to property acquisitions.
- E) Invite Conectiv forestry personnel to participate in training of other companies, industries, and entities in IVM techniques along ROW's.

VI. Other Provisions

Nothing in this MOU is intended to conflict with current law or regulation or the directives of the Service. If a term of this agreement is inconsistent with such authority, then that term shall be invalid, but the remaining terms and conditions of this MOU shall remain in full force and effect.

VII. Required Clauses

- A) During the performance of this MOU, the participants agree to abide by the terms of Executive Order 11246 on non-discrimination and will not discriminate against any person because of race, color, religion, sex or national origin. The participants will take affirmative action to ensure that applicants are employed without regard to race, color, religion, sex or national origin.
- B) No member or delegate to Congress, or resident Commissioner, shall be admitted to any share or part of this MOU, or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this MOU if made with a corporation for its general benefit.

- C) Notwithstanding any provisions herein, nothing shall commit the Service to incurring monetary obligations for the purposes of this MOU, except to the extent that funds are provided in Congressional Appropriations Acts.

VIII. Terms

The parties to this Memorandum of Understanding (MOU) are Atlantic City Electric Company and Delmarva Power & Light Company "d/b/a Conectiv Power Delivery" (Conectiv) and the U.S. Fish and Wildlife Service (Service)

This agreement shall be effective for 5 (five) years from the date of the last signature hereto and may be terminated by mutual agreement at anytime or by either party providing thirty (30) days written notice.

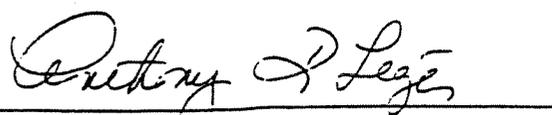
If a modification is desired, the party desiring the change shall give thirty (30) days written notice to the other party. The action may be expedited by written mutual consent of both parties.

Any provision of this MOU that is inconsistent with any federal or state laws, regulation, policy, or procedure will be void. Any provision inconsistent with other agreements or directives shall be resolved by consultation and mutual consent.

IX. Signatures


Richard Johnstone
System Forester
Conectiv Power Delivery

5/21/01
Date


Anthony Leget
Chief, National Wildlife Refuge System
Northeast Region
U. S. Fish and Wildlife Service

June 29, 2001
Date

Integrated Vegetation Management

Utility rights-of-way (ROW) corridors are the arteries that provide the energy to run the nation's economy and serve as vital links for our national security. Utilities must control vegetation to provide safe and reliable service and maintain ready access for emergency repairs or routine maintenance. Tall growing vegetation are weeds for electric utilities that must be controlled to prevent contact with high voltage conductors that could cause a power outage.

Many utilities control vegetation by routine cutting with mechanized mowers or chainsaws. While this can control vegetation to provide short-term access, it must be repeated on a regular basis since the cut vegetation will simply resprout and continue its growth. Mechanized cutting is also a non-selective technique that will remove both desirable and undesirable plant species. This tends to encourage growth by the more aggressive plants, some which are non-native exotic plants that then become invasive.

Conectiv Power Delivery maintains its ROW easements by employing an Integrated Vegetation Management (IVM) program. IVM is a method of controlling vegetation by first identifying the problem species and a threshold level of when control is necessary, and then choosing from an assortment of methods that can eliminate the problem plants and encourage the desirable species. Treatments can be composed of manual, mechanical, cultural, chemical or biological controls. IVM can provide long-term control of plants for the needs of the utility while also providing food and cover for a wide assortment of wildlife.

Conectiv's IVM program is recognized by the United States Environmental Protection Agency as complying with the goals of the Pesticide Environmental Stewardship Program (PESP), a voluntary cooperative program designed to lower the level of risk for both humans and the environment. As a charter PESP member, Conectiv's program was used as the guideline for Edison Electric Institute's *Environmental Stewardship Strategy for Electric Utility Rights-of-Way* and more recently for the "New Jersey Department of Environmental Protection *Integrated Pest Management Prerequisites and Minimum Criteria for Utility Rights-of-Way*".

A variety of methods can be used for vegetation management, but for an IVM program a planner first inspects the site and schedules the appropriate management tool in a prescriptive fashion. Conectiv uses a GIS mapping program that merges land use and environmental information from government sources with Conectiv's facility locations and access points. The technique(s) chosen are based on the number, height and type of incompatible trees, the presence or lack of compatible species, terrain, water, wetlands, rare or endangered species, adjacent land use, accessibility, worker and public safety, and economics. Our preferred strategy is to manage vegetation with a minimum of inputs to decrease populations of tall growing, incompatible tree species and select for retention low growing, compatible plant species. This may first involve manual and/or mechanical cutting of trees with subsequent application of herbicides to stop regrowth of the

incompatible plants. Controlling the incompatible trees allows more growing space for low growing grass, forbs and shrubs and permits more selective and lower disturbance rates as natural competition between plant species, and the activity of wildlife, result in cultural and biological controls. The result is a fairly stable meadow or shrub-scrub habitat community.

The herbicides used on Conectiv's rights-of-way are extremely low in toxicity and are biodegradable. Most of them affect treated plants by inhibiting the production of certain amino acids that plants need for chlorophyll production, while one herbicide inhibits the formation of leaf-buds. Without chlorophyll production, or functional leaves, the treated plant exhausts its stored food supply and dies. Only those herbicides approved by the U.S. EPA and the State Department of Agriculture or Environmental Control are applied under the uses outlined on the label and under the supervision of a certified commercial pesticide applicator.

Conectiv normally uses combinations of herbicide products, depending on the target plants, to increase efficacy and lower overall necessary volume of material. In wetland areas and where water is present on site, application is restricted to only herbicide products registered for that use. This approach is preferred over arbitrary buffers that exclude herbicide use in sensitive areas because that would limit management choices to cutting only. Cutting can potentially contaminate water with petroleum products that pose a higher risk to sensitive sites than the recommended herbicides. Cutting encourages resprouting and subsequent increased density of incompatible trees and can increase the acreage lost to non-native, invasive plants. The rapid regrowth of undesirable plants also necessitates more frequent maintenance disturbance of the sensitive sites.

Where no access lane is present on the ROW a grass access lane less than twenty-feet wide may be created through application of herbicides that affect broadleaf plants but not grass. Within the wire-zone of the ROW the preferred vegetation will consist of grass, forbs and small shrubs, with gradually taller plant species toward the ROW edge. Low stature trees, such as holly, dogwood, serviceberry, red bud, witch-hazel, and cedar are examples of trees adapted to the ROW edge.

Conectiv's successful IVM program has been recognized by several government agencies for its ability to manage vegetation while practicing environmental stewardship. The compatible vegetation retained on rights-of-way is also vegetation that provides excellent wildlife food and cover, streamside riparian buffers and rare plant habitats. This fact has enabled Conectiv to form Memoranda of Understanding (MOU) with State and Federal land management agencies, and to assist the U. S. Fish & Wildlife Service in the control of invasive plant species and wildlife habitat improvements on their refuges.

As a member of the Vegetation Management Committee of Edison Electric Institute, Conectiv's System Forester is assisting work on a draft MOU between utilities and federal agencies to work in a partnership for the needs of the utilities while also providing for the needs of wildlife and the environment. This MOU is patterned after an agreement

negotiated between Conectiv Power Delivery and the U.S. Fish & Wildlife Service for vegetation management of ROW across the refuges served by Conectiv in DE, MD, VA and NJ. Cooperative agreements have also been signed with several state agencies that include the joint use of electric rights-of-way for purposes of access and fire line establishment. The need for this type of cooperation was demonstrated in July 2002 as the Arizona Forest Service successfully established a fire line along a 500Kv transmission ROW to halt a devastating wildfire.

Conectiv's System Forester routinely conducts IVM training at industry and agency seminars and he has formed a consulting company, VMES, LLC, for purposes of conducting training outside of Conectiv's service territory. He has presented IVM training for the U.S. Fish & Wildlife Service at Patuxent Wildlife Refuge in Laurel, Maryland, the National Park Service at Everglades National Park, Florida, and the U.S. Army Corp of Engineers at Aberdeen Proving Grounds, Maryland. VMES, LLC has a web site (www.vegmgmt.com) for disseminating accurate information that includes a 13-minute video outlining IVM for both utility and highway rights-of-way, titled; *Integrated Vegetation Management: Principles and Practices for Rights-of-Way*.

Richard A. Johnstone
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APPENDIX D
WETLAND MITIGATION PLAN

Conectiv Power Delivery
Cedar to Oyster Creek – 230kV Project (Northern Phase)
Wetland Mitigation Plan

Authority

The New Jersey Freshwater Protection Act Rules (NJAC 7:7 A-15) state that the New Jersey Department of Environmental Protection may require mitigation in accordance with this chapter in order to compensate for impacts to a freshwater wetland and/or State open water resulting from regulated activities authorized under an individual or general freshwater wetlands permit. Furthermore, mitigation shall, at a minimum, fully compensate for the loss of ecological value caused by a disturbance, by replacing any freshwater wetlands values and functions lost or disturbed with equal values and functions. In order to comply with the regulations Conectiv has developed the following mitigation plan in order to finalize discussions with the New Jersey Department of Environmental Protection on the appropriate mitigation measures for the Cedar to Oyster Creek 230 kV project.

Impacts

The approved route for the Cedar to Oyster Creek 230 kV project will traverse emergent, scrub-shrub and forested wetlands. The total wetlands impact for the Approved Route is approximately 5.517 acres. Of this approximately 4.229 acres of forested wetlands will be cleared for the power line right of way. Although forest clearing will take place in the right of way, a scrub-shrub wetland environment will be allowed to return. Conectiv's vegetation management plan encourages the establishment of a shrub community by the selective removal of tree species during periodic maintenance clearing activities. Total wetland loss due to the placement of fill material (i.e., pole foundations) will be 0.003 acres. The remaining impacts consist of clearing of emergent and scrub shrub wetlands within the power line right of way. These wetlands will be permitted to return to their emergent and scrub shrub states after the construction of the line.

Mitigation.

The proposed mitigation to compensate for the impacts to wetlands associated with the project is as follows:

Forested Wetland – Forested wetlands will be restored at a 2:1 ratio. Therefore, the 4.229 acres of forested wetland impacts will be compensated through two methods. The forested wetland impact associated with the clearing of the right of way will be restored to either an emergent and/or scrub-shrub wetland (1:1 restoration). In addition, another 4.229 acres of wetland will be compensated through land donation or a monetary contribution in accordance with NJAC 7:7 A-15, or the creation of new forested wetland on another parcel of land located within the watershed of the approved project corridor. This latter compensation is intended as mitigation for the permanent loss of forested habitat

Emergent and Scrub-Shrub Wetland - Approximately 1.285 acres of emergent and scrub-shrub wetlands will be impacted by the clearing of the project corridor. Mitigation of

these temporarily impacted wetlands will consist of restoring the approved project corridor to an emergent and scrub-shrub state upon completion of the construction of the power line.

Wetlands Impacted by Fill – To compensate for the permanent loss by the filling of approximately 0.003 acres of wetlands, mitigation will be at a 2:1 ratio, for a total of 0.006 acres. The mitigation will be in the form of land donation or a monetary contribution in accordance with NJAC 7:7 A-15, or the creation of wetland on another parcel of land located within the watershed of the Approved Route.

It is possible that enhancement, rather than creation, or land or monetary donation, will be selected as the preferred mitigation method. If this method is approved by the NJDEP, then a ratio of 4:1 is proposed so that approximately 16.94 acres of existing, degraded wetlands would be enhanced via the removal of invasive species, hydrology improvements, or other method to improve the quality of the wetland identified for improvement.

Negotiations are currently on-going to ascertain the optimal and mutually acceptable manner of mitigating these wetland impacts.

Specification

In the event that mitigation rather than land donation or a monetary contribution is the agreed upon method for compensating for the impacts to wetlands as a result of the Cedar to Oyster Creek 230 kV project, the specification contained in Attachment A will be used to select the appropriate contractor in order to meet the mitigation requirements specified above.

ATTACHMENT A
WETLAND MITIGATION
SPECIFICATIONS FOR CONSTRUCTION CONTRACTOR
CEDAR TO OYSTER CREEK 230 kV Project

ATTACHMENT A
SPECIFICATIONS FOR CONSTRUCTION CONTRACTOR
CEDAR TO OYSTER CREEK 230 kV Project

SECTION 0100

PART 1 GENERAL

1.01 DOCUMENT COMPLIANCE

- A. Site preparation and conditions as described in the State of New Jersey, Department of Environmental Protection, Freshwater Wetlands Individual Permit, No. (To be provided) and Wetlands Compensation Plan – Cedar to Oyster Creek 230 kV Transmission Line, will be followed. The text of permit requirements and project objectives are included here as part of the above referenced plan to provide a general background. In addition, policies and procedures as described in CONECTIV - MASTER BID SPECIFICATION - TERMS AND CONDITIONS will be followed.

- B. Work shall confirm to the drawings and specifications and shall comply with applicable codes and regulations, specifically with the conditions under which the NJDEP issued the permit (and Wetland Mitigation Plan approval) to work in this area.

- C. The NJDEP Permit requires that:
 - 1. *Mitigation for the loss of forested and scrub/shrub wetlands through an on-site or off-site creation, restoration or enhancement project as detailed below in condition number 2.*

 - 2. *For an on-site or off-site individual mitigation project the permittee must submit a mitigation proposal to the Land Use Regulation Program, to create, enhance or restore an area of freshwater wetlands of equal ecological value to those, which will be lost by the authorized activity for review and approval. Attached to this permit is a list of the necessary information that must be included in that on-site or off-site mitigation proposal. If the permittee is proposing to construct a wetland creation or restoration project, two acres of creation or restoration must be performed for each acre disturbed and the mitigation area must, in addition to this, included a 50/150 foot transition area. If the permittee is proposing to construct a wetland enhancement project, the ratio of wetlands enhanced to wetlands disturbed shall be approved by the Program....*

SECTION 0110

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.01 PRECONSTRUCTION MEETING

- A. OWNER shall schedule a preconstruction meeting at the Project site or other convenient location prior to commencement of construction activities. At the meeting, responsibilities and personnel assignments shall be reviewed.
- B. Attendees: OWNER, ENGINEER, WETLANDS MITIGATION SPECIALIST, and CONTRACTOR, and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall be represented at the meeting by persons familiar with and authorized to conclude matters relating to the Work.
- C. Agenda: Owner shall prepare the agenda for the meeting, which shall include items of significance that could affect progress including such topics as:
 - 1. Construction schedule
 - 2. Critical work sequencing
 - 3. Designation of responsible personnel
 - 4. Construction quality control requirements
 - 5. Procedures for processing field decisions and Change Orders
 - 6. Procedures for processing Applications for Payment
 - 7. Distribution of Contract Documents
 - 8. Submittal of shop drawings, product data, and supplies
 - 9. Preparation of record documents
 - 10. Use of the premises
 - 11. Office, work, and storage areas (including on-site fuel storage)
 - 12. Equipment, deliverables and priorities
 - 13. Safety procedures and standards
 - 14. First aid
 - 15. Security
 - 16. Housekeeping
 - 17. Working hours
 - 18. Sanitary facilities
 - 19. Water source and disposal
 - 20. Electric power

21. Noise control
22. Dust control
23. Site access

1.02 PRE-CONSTRUCTION PLAN

- A. The Contractor shall develop a general plan for a review by Wetlands Mitigation Specialist that addresses all items requiring Wetlands Mitigation Specialist approval. These generally include, but are not limited to, project coordination, selection of equipment, plans to minimize compaction of subsoils and topsoils in the compensation wetland site, site dewatering, and stockpiling of topsoils.
- B. The Contractor will provide sufficient equipment of a type suitable to excavate, transport, spread, and level fills promptly according to the objectives and guidelines of this project. The Contractor may use any equipment or device that he finds convenient or economical, but Wetlands Mitigation Specialist retains the right to disapprove equipment that, in his opinion, is unsuitable to the task. The use of wheeled machinery with low pressure floatation tires or extra wide low pressure tracks is an example of suitable equipment.
- C. At a minimum the Pre-Construction Plan shall,
 - Describe the equipment, techniques, for construction and excavation
 - Sequencing of construction
 - Spoil handling procedures
 - Procedures for removal of existing vegetation
 - Erosion and sediment control procedures including placement and maintenance of silt fence
 - Dewatering means and methods
 - Procedures for installation, operation, and maintenance of a sediment filtration device, and
 - Procedures for controlling turbidity of discharged water*New Jersey Erosion and Sediment Control Plan*

1.03 PROJECT COORDINATION

- A. The Contractor and General Contractor shall coordinate activities with representatives of the Owner through the Engineer. All appropriate representatives will be designated by the Owner prior to the start of construction, and will include the Engineer and a consultant in wetland restoration (Wetlands Mitigation Specialist). Project coordination will include certain points requiring approval from Wetlands Mitigation

Specialist, such as approval of subgrade elevations, work during adverse weather (significant precipitation or saturated soils) and placement of hydric soils. The Contractor shall develop a general plan for review by Wetlands Mitigation Specialist that addresses items requiring wetland consultant=s approval.

1.03 WETLAND MITIGATION SPECIALIST

- A. The Wetland Mitigation Specialist will monitor excavation and planting activities during construction. For wetland excavation the Wetlands Mitigation Specialist will:

Help the Contractor identify areas not to be disturbed

Monitor and document the excavation and removal of material from the wetland mitigation area, and

Monitor and document the excavation of the wetland area, to identify unexpected subsurface conditions.

Monitor and document planting techniques, noting any deviations from the planting plans as approved by NJDEP.

Monitor and document the condition of vegetation delivered to the project site.

Provide plant selection, source-selection and allowable substitute species.

SECTION 0120

MOBILIZATION AND SITE PREPARATION

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section covers the work necessary for mobilization of personnel and equipment, set up all temporary offices, buildings, facilities, utilities and prepare the site for construction, complete.

1.2 GENERAL

- A. The limits of the site and areas designated for Contractor's temporary facilities are shown on the Drawings.
- B. The limits of the Owner's property or temporary easements are shown on the Drawings.
- C. In the event additional space is required for the Contractor's operations, the Contractor shall make own arrangements and pay for such additional space.

1.3 POLLUTION CONTROL

- A. Contractor shall provide methods, means and facilities required to prevent contamination of soil, water, or atmosphere by discharges from construction operations and construction equipment.
- B. Contractor's equipment used during construction shall conform to current federal, state, and local laws and regulations regarding pollution control.
- C. Contractors shall comply with CONECTIV Master Bid Specifications with regard to construction noise and fuel storage/containment.

PART 2 PRODUCTS

2.1 TEMPORARY FACILITIES

- A. The Contractor shall provide all temporary facilities as required for performing the work, including the facilities for the Engineer's use.

2.2 TEMPORARY UTILITIES

- A. The Contractor shall obtain the necessary permits for connection to temporary utility services. Installation shall not be in conflict with mitigation plan design.

2.3 SECURITY FENCE

- A. Contractor's security fence for temporary storage may be constructed for the protection of the Contractor's materials, tools and equipment. Access gate(s) to the property shall be locked (double lock for access by CONECTIV personnel) at the end of each working day and on days work is not occurring, such as weekends, holidays or adverse weather days.

PART 3 EXECUTION

3.1 CLEARING THE SITE

- A. Specified in Section 003 CLEARING, GRUBBING AND STRIPPING.

3.2 LAYOUT

- A. Set up temporary construction facilities in a neat and orderly manner within designated area at location of choice. Accomplish all required work in accordance with applicable portions of these Specifications. Confine operations to work area shown in the approved plans.

3.3 OBSTRUCTIONS

- A. Some obstructions may not be shown. Bidders are advised to carefully inspect the site before preparing their proposals. The removal of minor obstructions shall be anticipated and accomplished, even though not shown or specifically mentioned.
- B. Major obstructions encountered that are not shown on the Drawings, or could not have been foreseen by visual inspection of the site prior to bidding, should immediately be brought to the attention of the Engineer. The Engineer will make a determination for proceeding with the work. If the Engineer finds that the obstruction adversely affects the Contractor's costs or schedule for completion, a proper adjustment to the Contract will be made.

SECTION 0130

SURVEYING REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. CONTRACTOR shall retain the services of an independent Professional Land Surveyor licensed in the State of New Jersey to provide survey control for each stage of construction and to provide survey Record Drawings (*as-built* documentation) for various components of construction. The Surveyor shall furnish all labor, materials, tools, supervision, transportation, and equipment necessary to perform the project surveying work as specified herein for the Project as shown on the Drawings.
- B. The work of this section shall include, but not necessarily be limited to:
 - 1. Establishing survey control benchmarks,
 - 2. Surveying existing conditions
 - 3. Providing survey control during construction, and
 - 4. Preparing Record Drawings

1.2 QUALIFICATIONS OF SURVEYOR

- A. CONTRACTOR shall retain the services of a Professional Land Surveyor licensed in the State of New Jersey that is acceptable to OWNER and ENGINEER.
- B. The SURVEYOR, in the opinion of OWNER and ENGINEER, shall have a proven record of successful performance on projects of similar magnitude.

1.3 SUBMITTALS

- A. Contractor shall submit to Engineer the Survey Plan for the project. The Survey Plan shall be submitted at least 10 days prior to the Pre-Construction Meeting. The Survey Plan shall include, but not be limited to, the following:
 - 1. The name, address, and telephone number of the Surveyor
 - 2. Qualifications of the survey firm.
 - 3. The type of equipment the Surveyor intends to use in the field and in the office (i.e., computer software).

4. The survey firm's commitment to meet the project schedule.

- B. CONTRACTOR shall submit to Wetland Mitigation Specialist, Engineer or Owner, on request, Working Drawings of the project progress.
- C. CONTRACTOR shall submit to Wetland Mitigation Specialist and Engineer Record Drawings as described herein.
- D. CONTRACTOR shall submit to Wetland Mitigation Specialist and Engineer Working Drawing that identifies the property boundary, and includes a written summary of the actions performed to verify the location in the field.

1.4 EXAMINATION

- A. Contractor or Contractor's Surveyor shall verify locations of survey control points identified on the Drawings prior to starting work.
- B. CONTRACTOR shall promptly notify OWNER of any discrepancies discovered.

1.5 SURVEY REFERENCE POINTS

- A. The Surveyor shall verify the existence of survey control points identified on the Drawings prior to starting site work. Engineer shall be promptly notified in writing of any discrepancies discovered before or during construction. CONTRACTOR shall report, in writing, to OWNER and Engineer any survey control point that is lost, destroyed, or requires relocation due to construction. The survey control monuments shall be shown on all Record Drawings.
- B. CONTRACTOR shall install a minimum of three new construction bench marks on-site prior to construction.
- C. CONTRACTOR shall protect pre-existing and new survey control and reference points, and monuments during construction.

1.6 SURVEY REQUIREMENTS

- A. The Surveyor shall locate and clearly mark in the field all property boundaries within 100 ft. of the work area. The Surveyor shall submit to Engineer a description of the evidence and procedures used to locate the property boundary or boundaries. The Surveyor shall immediately notify OWNER and Engineer of any discrepancy between the boundary location shown on the Drawings and the location indicated by the evidence and procedures used by the Surveyor.
- B. CONTRACTOR shall maintain lines and levels, layout, and locate the work utilizing recognized engineering survey practices. A complete and accurate log of control and survey work shall be maintained. The Surveyor shall, at a minimum, establish a 50-foot by 50-foot survey grid for construction and Record Drawing documentation. In addition, all survey control points shown on the Drawings shall be included in the Surveyor=s documentation.
- C. Topographic surveys shall extend a minimum of 100ft past the limit of construction, or to the property boundary.
- D. The survey instruments used shall be capable of reading to a precision of 0.01 ft and with a setting accuracy of 10 seconds.

1.7 CONSTRUCTION TOLERANCES

- A. The construction tolerances on final grades shall be within plus or minus 0.1 ft measured across any 50 ft section. Surveying tolerances on slopes shall be within plus or minus 10 percent of the specified slope as calculated from the highest point of the slope (e.g., for a 3 horizontal to 1 vertical design slope, the constructed slope shall be 33.3 percent + 3.3 percent).
- B. No surveying will be allowed between one hour before sunset and one after sunrise, unless approved by Engineer.
- C. CONTRACTOR shall be aware of the surveying activities and shall account for them in the construction schedule.

PART 2 PRODUCTS

1.1 RECORD DRAWINGS

- A. CONTRACTOR shall submit to Engineer the following Record Drawings.

1. The initial work area (including property boundaries within 100 ft of the limits of disturbance of any of CONTRACTOR=s work) after clearing and grubbing, but prior to commencing site construction.
2. The final elevations of the Wetland Mitigation Area including the location, cross-sections and inverts for constructed wetland channels, locations of wetland features.
3. Wetland mitigation area as-built planting plan.
4. The final elevation of the spoil deposition area.

SECTION 0140

CLEARING, GRUBBING AND STRIPPING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section covers the work necessary to remove all interfering or objectionable material from the designated areas of work as shown on the Drawings or designated in the Specifications.
- B. This work shall also include the preservation from injury or defacement of all vegetation and existing objects designated to remain as shown or as specified herein.
- C. This work shall also include stockpiling of topsoil in areas designated on the Drawings.
- D. Review with the Engineer the location, limits and methods to be used prior to commencing the work under this section.

PART 2 PRODUCTS

2.1 GENERAL

- A. Provide all materials, suitable and in adequate quantity, required to accomplish the work on schedule and as specified herein.

2.2 CLEARING

- A. Definition: Clearing shall consist of cutting, removing and disposing of trees, snags, stumps, shrubs, brush, limbs and other vegetative growth, and shall be performed in such a manner as to remove all evidence of their presence from the surface and shall be inclusive of sticks and branches greater than 2 inches in diameter or thickness. Clearing shall also include the removal and disposal of trash piles, rubbish and fencing; and the preservation of trees, shrubs and vegetative growth which are not designated for removal.

2.3 PRESERVATION OF TREES, SHRUBS AND OTHER VEGETATION

- A. Protect trees, shrubbery and other vegetation not designated for removal from damage resulting from the work. Cut and remove tree branches only where, in the opinion of the Engineer, such cutting is necessary to effect construction operation. Scars resulting from the removal of branches shall be treated with an approved tree sealant.

2.4 GRUBBING

- A. Definition: Grubbing shall consist of the mechanical removal and disposal of wood or root matter below the ground surface remaining after clearing and shall include stumps, trunks, roots or root systems greater than 2 inches in diameter or thickness to a depth of 6 inches below the ground surface.

2.5 CLEARING AND GRUBBING LIMITS

- A. Construction Staking: (For information only)
 1. The Engineer will stake the clearing limits on a 50-foot interval and determine the elevation of each point staked. Intermediate points will be used in the clearing limit where, in the judgment of the Engineer, irregular topography dictates the need.
 2. The Contractor shall maintain a minimum of 1 foot horizontal clearance between the stakes and his actual limits of clearing and grubbing.
 3. Since the Engineer will perform all surveying, staking and posting, the Contractor shall pay the Owner for any costs to re-survey, replace and post stakes destroyed, damaged or moved as a result of the Contractor's land grading work. The Contractor shall remove all stakes after completion and acceptance of the land grading.
- A. All borrow areas will be cleared and grubbed. These areas will be cleared and grubbed in stages as the borrow area is increased to ensure that no more clearing and grubbing is done than necessary.
- B. All waste disposal areas will be cleared and grubbed and only to the extent necessary for the disposal of waste materials and placed in only approved temporary stock pile areas.

2.6 DISPOSAL OF CLEARING AND GRUBBING DEBRIS

- A. No burning of combustible materials will be permitted. Remove all cleared and grubbed material from the worksite and dispose of in accordance with all local laws, codes and ordinances. The Contractor shall bear full responsibility for lawful and safe disposal of all cleared and grubbed material.

2.7

STRIPPING

- A. Definition: Stripping shall include the removal and disposal of all organic sod, topsoil, grass and grass roots, and other objectionable material remaining after clearing and grubbing from the areas designated to be stripped to a minimum depth of 6 inches. The exact depth of stripping will be determined by the Engineer.
- B. Areas to be Stripped: All areas shall be stripped as specified. Do not mix strippings with excavation. See Earthwork 2.3.
- C. Disposal of Strippings: Topsoil from the strippings shall be stockpiled in the area designated on the Drawings. Organic and other objectionable material from the strippings shall be placed in the waste disposal area at the location or as otherwise specified and shown on the Drawings. See Earthwork 2.3.

SECTION 0150

EARTHWORK

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section covers the work necessary for the earthwork.

1.2 DEFINITIONS

- A. Prepared Ground Surface: The ground surface after clearing, grubbing, stripping, excavation and scarification and/or compaction.
- B. Truck Measure: The truck volumes shall be determined by leveling off selected loads in the truck box after the material has been transported from the site of loading to the site of placement. The Engineer may call for such measurement at any time. The Contractor shall cooperate with the Engineer in the measurement, and they shall together determine and agree upon the volume of material in the truck box.
- C. Unclassified Excavation: The nature of materials to be encountered has not been identified or described herein.
- D. Borrow: Material excavated on the site.

1.3 SUBMITTALS

- A. Provide the following submittals: Copies of permits obtained for excavation, blasting, etc., that are required by state and local governing authorities.

1.4 CODES, ORDINANCES AND STATUTES

- A. Contractors shall familiarize themselves with, and comply with, all applicable codes, ordinances, statutes and bear sole responsibility for the penalties imposed for noncompliance.

1.5 TOLERANCES

- A. All material limits shall be constructed within a tolerance of 0.1 foot except where dimensions or grades are shown or specified as minimum. All grading shall be performed to maintain slopes and drainage as shown. No reverse slopes will be permitted.

PART 2 PRODUCTS

2.1 GENERAL

- A. Provide all labor, materials and equipment necessary to accomplish the work specified in this section.

2.2 UNCLASSIFIED EXCAVATION

- A. Excavation is unclassified. Complete all excavation regardless of the type, nature or condition of the materials encountered. Make own estimate of the kind and extent of the various materials to be excavated in order to accomplish the work.

2.3 TOPSOIL

- A. Selected topsoil at the site, properly stored and protected, free from roots, sticks, hard clay and stones which will not pass through a 1-inch square opening.
- B. The selection of equipment and execution of construction will be conducted to minimize the compaction of subsoils during compensation site stripping and particularly, the compaction of hydric soils during fill placement and subsequent grading to final elevations. First, the Contractor will employ equipment that has low pressure floatation tires or extra wide low density tracks for these tasks. Second, the Contractor will through equipment type and operator experience reduce, as far as possible, the number of passes over top soil fill in achieving final design grade elevations. Specific equipment to meet these objectives will be at the Contractor's discretion, but Wetlands Mitigation Specialist will review for approval the suggested equipment by task. However, approval of equipment by Wetlands Mitigation Specialist will not relieve the Contractor from assuring that all specifications of the contract are met. The Owner will supply a soil technician to ensure that these compaction specifications will be met through the execution of the Contractor's plan.

- C. Where topsoils at the compensation site are to be excavated in order to meet the grading plans, the material from the 0 to 1.0 foot zone and below the 1.0 foot zone are to be separately stock piled on-site for relocation after achieving the final subgrades. These areas are shown on design drawings. If on-site wetland topsoils need to be excavated, they should not be stock piled for periods longer than four weeks. If periods longer than four weeks are necessary, additional steps will be required, such as lowering the pile height and capping to seal the pile.
- D. Each time top soils are handled increases the loss of structure, including an increase in compaction. This is particularly a problem in soils with high clay and silt content.
- E. Where upland topsoils are to be excavated from compensation sites, the material from the 0 to 1.0 foot zone and lower depth zones are to be separately stock piled in the designated area on-site. Material from the 0 to 1.0 foot depth zone is to be located for relocation as needed, after achieving the final subgrades. The piles shall be seeded for the quick establishment of a vegetated cover.
- F. All topsoil stock piles will be kept isolated from areas of machine or equipment maintenance to protect topsoils from possible spill contamination of oils and degreasers. Area topsoils either for excavation or avoidance for topsoil stockpile placement, will be clearly shown on drawings. Topsoil piles will be allowed to dewater for a period of one to four weeks before grading to the final compensation site elevations. Compaction of subsoils and topsoils during the grading and filling will be minimized as described in the Pre-Construction Plan prepared by the Contractor.

2.4

RIPRAP

- A. Riprap shall consist of hard, strong, durable, non-carbonate particles that are free of any metal, roots, concrete, debris, organics, and other deleterious materials and coatings.
- B. Riprap shall conform to the latest version of NJDOT Standard 901.17 and 901.04, and the Standard for Riprap per the *Standards for Soil Erosion and Sediment Control in New Jersey*, as defined below:
 - 1. The median diameter shall be 9 inches.
 - 2. The maximum loss of weight, when tested in accordance with ASTM C 88, shall be 10 percent.
 - 3. The maximum of wear, when tested in accordance with ASTM C 535, shall be 50 percent.

PART 3 EXECUTION

3.1 CLEARING, GRUBBING AND STRIPPING

- A. Complete clearing, grubbing and stripping work as specified in Section 003 CLEARING, GRUBBING AND STRIPPING prior to beginning work in the section.

3.2 GENERAL EXCAVATION

- A. Perform all excavation of every description, regardless of the type, nature or condition of material encountered, as specified, shown or required to accomplish the construction.

3.3 LIMITS OF EXCAVATION

- A. Correct all over excavated areas at the Contractor=s sole expense. Excavated material from other areas can be replaced on these areas as shown in drawings if it is of suitable quality for growing the plants listed in Table 1 (To be Determined). Contact the Landscape Architect or Wetlands Mitigation Specialist before replacing material.

3.4 REMOVAL OF WATER

- A. Dewatering means the prevention of surface water and subsurface or groundwater from flowing into excavations and from flooding the project site and the surrounding area. Generally, the working of soils, particularly clayey soils, in inundated or saturated conditions may lead to severe loss of soil structure, possibly resulting in high degrees of compaction. Although structure of hydric soils will be affected by excavation, transport and grading, much greater impact may occur from working in saturated conditions and this may be avoided to a large extent.
- B. The Contractor shall dewater the excavations promptly and continuously throughout the progress of the work and shall keep the excavations dry at all times until the structures to be built are completed. Pumping and other dewatering procedures will be necessary to maintain excavated areas free of water. Specifically, sediment traps will be routinely pumped to ensure lowering of the soil saturation elevations in the soils within the compensatory wetland area basins as indicated by monitoring the depth to free water in pits to below 6" of the soil surface. This will be required in basins where earthwork is required. Basins where earthwork is not underway or soon to be underway, may be allowed to dewater without

pumping. Dewatering discharges will flow either into sediment traps or over upland vegetated surfaces and not contribute to site erosion. The Contractor shall protect the uncompleted work as depicted in the sediment and erosion control plan. These methods should be sufficient to achieve adequate dewatering. If they do not prove to be adequate, temporary dewatering structures may be installed as approved by Wetlands Mitigation Specialist. Water will be conveyed from excavations and rain water to collecting or run-off areas.

3.5 PLACING RIPRAP

- A. If required, place riprap carefully to depth of riprap as indicated by the Engineer. Intermix the sizes of riprap material to provide uniform gradation between small and large material.

3.6 DISPOSAL OF EXCAVATION

- A. Dispose of all excavation in the designated disposal area, as shown. Uniformly grade disposal area to conform to existing contours, leave with a neat appearance, and in free-draining condition.
- B. Stockpiled soils will be placed as required either in final fill placement areas or in secure adjacent areas. Stockpiles will be located as to protect soil material from the possible contamination from machine or equipment related materials.

3.7 PLACING TOPSOIL

- A. After rough grading is completed and reviewed by the Engineer, spread topsoil, herein before specified, over entire graded area to a minimum depth of one foot with surface elevations as shown.
- B. Wetlands Mitigation Specialist will be allowed to inspect all subgrades and each fill or backfill layer. Augmentation fill or backfill shall not be placed until Wetlands Mitigation Specialist has approved the subgrade and/or previous layer of fill. Generally, topsoils excavated are to be placed in the augmentation areas in the appropriate depth sequence. Soils of high silt and clay content will be generally placed in the lower elevations of the basins.
- C. No fill shall be placed during weather conditions which will alter the moisture content of the materials sufficiently to cause soil compaction from normal machine operation. At all times the Contractor will maintain and operate proper and adequate surface and subsurface drainage to the satisfaction of Wetlands Mitigation Specialist in order to keep the

construction site dry and in such condition that placement of fill may proceed unhindered by saturation of the area.

3.8 SITE GRADING

- A. Perform all earthwork to the lines and grades as shown and/or established by the Engineer. Shape, trim and finish slopes to conform to the lines, grades and cross sections shown. Make slopes free of all exposed roots and stones exceeding 3-inch diameter which are loose and liable to fall. Round tops of banks to circular curves, in general, not less than a 6-foot radius. Neatly blend all new grading into surrounding, existing terrain. Over excavating and backfilling to the proper grade will not be acceptable. Finished site grading will be reviewed by the Engineer.
- B. The words *finished grades* as used herein shall mean the required final grade elevations indicated on the drawings. Spot elevations shall govern over proposed contours as indicated on the drawings. Where not otherwise indicated, areas shall be given uniform slopes between points for which finished grades are indicated or between such points and existing established grades. The word *subgrade* as used herein means the required surface of subsoil. These comments are also shown on the project drawings.
- C. When excavations have reached the prescribed depths, the Wetlands Mitigation Specialist shall be notified and will make an inspection of the conditions. After inspection, Contractor will receive approval to proceed if conditions meet the design requirements.
- D. The contractor will uniformly grade areas within the limits of grading, including adjacent transition areas. Finished surfaces will be within specified tolerances with uniform levels or slopes between where elevations are shown, or between such points and existing grades. Final graded surfaces will be free from irregular surface changes and within not more than 0.1 feet above or below required grade elevations. Newly graded areas will be protected from traffic and erosion. Contractor will repair and re-establish grades in settled, eroded, and rutted areas to specific tolerances.
- E. After achieving final grades, the Contractor will rip or chisel plow all areas. The chisel plow will be adjustable to a depth of at least 18 inches. Forestry type chisel or bog plows are suggested. After final grading, the Contractor will provide a registered engineer/land surveyor to survey final elevations (for as-built drawings) of the compensatory wetland site. This will be the survey submitted to the NJDEP. All exposed soil will be seeded with a mixture of facultative wetland grass species as specified in the Wetland Compensation Plan.

SECTION 0160

ACCESS ROADS AND CONSTRUCTION TRAIL

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section covers work required for the construction and maintenance of access roads and construction trails.

PART 2 PRODUCTS

2.1 GENERAL

- A. The Contractor shall furnish all fill, crushed rock, culverts, fence gates fabric matting and other materials and equipment necessary for the construction and maintenance of access roads and construction trails.

PART 3 EXECUTION

3.1 ACCESS ROADS

- A. The Contractor shall provide and maintain all access between the existing public highway and the site. The Contractor shall satisfy as to the actual location, physical condition and capability of the existing access road.
- B. Upon completion of construction, the Contractor shall restore the access roads and routes to their original grades and in accordance with Section 0300 CONTRACT CLOSEOUT, Article 3.1 FINAL CLEANING.

3.2 CONSTRUCTION TRAILS

- A. The Contractor shall limit Contractors activities to the area within the site limits and restrict movement of equipment to a designated construction trail as specified in the approved construction plan. The Contractor shall prepare the designated construction trail as necessary to be passable for construction vehicles.
- B. Portions of the site have been mapped as jurisdictional wetlands as indicated on the Drawings. Construction trails should not be constructed in these areas until the Contractor has the necessary local, state and federal permits to do so.

- C. Construction trails shall be constructed in such a manner as not to impede the flow of groundwater.

SECTION 0170

SOIL EROSION STABILIZATION (VEGETATIVE) FOR STOCKPILED MATERIAL

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section covers work necessary for stabilization of soil to prevent erosion following construction in the areas designated on the Drawings. The work shall include the furnishing and delivery of all required materials, miscellaneous construction work and planting. The Contractor shall be responsible for any damage to vegetation outside the designated construction area and shall repair damage at the Contractor's sole expense.
- B. For bidding purposes, the areas requiring stabilization are indicated on the Drawings. The right is reserved to modify the use, location and quantities of the areas during construction as the Engineer considers to be to the best interest of the Owner. During construction, the Engineer will designate the extent of stabilization used in each location throughout the project.

PART 2 PRODUCTS

2.1 SEED

- A. Seed shall be clean, delivered in original unopened packages and bearing an analysis of the contents.
- B. The seed mixtures and specifications shall meet the minimum requirements as specified below.
 - 1. Furnish the kinds and amounts of seed as indicated below in Sections 2.2 and 2.3 to be seeded in all areas designated by the engineer, landscape architect, etc.
 - 2. The minimum requirements for grass and legume seed used in the vegetative work are as follows:
 - a. All seed shall be labeled to show that it meets the requirements of the New Jersey State Seed Law.
 - b. Accumulated bag tags of seed used shall be submitted with the final pay estimate.
 - c. All seed shall have been tested within the 6 months immediately preceding the date of sowing such material on this job.

- d. Inoculant B The inoculant for treating legume seed in the seed mixtures shall be a pure culture of nitrogen-fixing bacteria prepared for the species seeded. Inoculants shall not be used later than the date indicated on the container. Twice the supplier=s recommended rate of inoculant will be used when seed is broadcasted; four times the recommended rate if hydroseeded.
- e. The quality of the seed used shall conform to the guidelines shown below.

C. Grass seed mixtures checked by the Chief of the Bureau of Seed Certification, New Jersey Department of Agriculture, Trenton, New Jersey, will assure the purchaser that the mixture obtained is the mixture ordered.

D. A temporary seed, mulch fertilizer and soil amendments products are described on the drawings.

2.2 SEED - SOURCE

A. Seed will be provided by a reputable supplier and be from the current year crop.

2.3 SEED - SPECIES SELECTION

A. The use of any temporary seed mixture will exclude *Eragrostis curvula* (weeping lovegrass) and any weedy annual.

2.4 FERTILIZER

A. Fertilizer shall be commercial, chemical type, uniform in composition, free flowing, conforming to state and federal laws and suitable for application with equipment designed for that purpose.

B. Fertilizer shall have a minimum percentage of plant food by weight for the following:

1. Summer hydro seed mix shall be 10 percent nitrogen, 10 percent phosphoric acid and 6 percent potash.
2. Winter hydro seed mix shall be 16 percent nitrogen, 8 percent phosphoric acid and zero percent potash.

2.5 SILT FENCING

- A. Silt fence shall meet the requirements for Silt Fence, sediment barrier as described in Standard 25 of the *Standards for Soil Erosion and Sediment Control in New Jersey*, 1999, and as shown on the drawings.

2.6 STRAW

- A. Straw shall be threshed straw of oats, wheat or rye, free from seed or obnoxious weeds or clean salt hay. Average stalk length shall be 6 inches.

2.7 SOIL EROSION NETTING

- A. Erosion Control mat shall meet the requirements of Type F flexible liner as defined by Specification Section 18 (Grassed Waterway) of the Standards for Soil Erosion and Sediment Control in New Jersey.

PART 3 EXECUTION

3.1 SUBMITTALS

- A. Contractor shall submit to Engineer certificates of inspection of seed by state or federal authorities and copies of delivery invoices or other proof of quantities of mulch, bark dust and fertilizer.
- B. The Contractor shall give at least 3 days notice to the Engineer of the time and place of starting the following operations:
 - 1. Delivery of materials.
 - 2. Planting of grass.
- C. The Contractor shall keep the Engineer advised of schedule of operations.

3.2 PLANTING AND SEEDING SCHEDULES

- A. Planting and hydro seeding shall be performed in accordance with the following schedule:
 - 1. Summer Hydro seeding: No earlier than April 1st and no later than October 15th.
 - 2. Winter Hydro seeding: October 16th until weather conditions prohibit further construction operations as determined by the Engineer.

3.3 SOIL PREPARATION

- A. Prior to hydro seeding operations and after surface has been shaped, and graded, scarify surface to a minimum depth of 1 inch.
- B. After soil has been scarified, apply seed by hydro seeding method. Prepare and apply slurry at the rate and proportion specified below:

3.5

WINTER SEEDING

- A. Prepare seedbeds. Seed with winter seed mix and place soil erosion netting as specified herein.
- B. Seed entire disturbed area by hydro seeding method. Prepare and apply slurry in the following proportions and rates:
- C. The Contractor shall notify the Engineer in writing of completion of soil erosion stabilization. Within 10 days of notification, an inspection will be made. If stabilization operations are complete according to the Specifications, payment will be made for that portion of the work.

SECTION 0180

CULVERTS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section covers the work necessary for the construction of the culverts, complete.

PART 2 PRODUCTS

2.1 CULVERT PIPE

- A. Corrugated metal pipe shall be manufactured of not lighter than 16-gauge sheet steel and be furnished in single lengths where practicable.

PART 3 EXECUTION

3.1 LAYING PIPE

- A. Install batter boards to provide proper line and grade for the pipe laying. Inspect pipe before laying and remove any damaged or defective pipe from the job and replace at the Contractor=s sole expense.
- B. Begin laying at the lowest end of culvert. Lay corrugated metal pipe culverts and connect sections in conformance with the manufacturer=s printed instructions.

3.2 BACKFILLING

- A. Backfill pipe zone with selected material placed in 6-inch lifts on each side of the pipe simultaneously and compact each lift with pneumatic tampers. Be careful to compact the backfill solidly under the pipe. Wet backfill material if necessary for optimum moisture content prior to compaction. Compaction of the backfill shall provide a dry density equal to, or greater than, the original adjacent undisturbed earth. Backfill above the pipe zone with selected material placed in 6-inch lifts and compact to a dry density equal to, or greater than, the original adjacent undisturbed earth. Hand tamping will not be permitted.

3.3 EXCESS EXCAVATION

A. Dispose of excavation not required for backfill off of the site.

SECTION 0200

PLANTING

PART 1 GENERAL

1.1 WORK INCLUDED

A. This section covers the work necessary for the planting and establishment of plant materials, complete, including furnishing, delivery, planting and maintenance of trees, shrubs and ground covers.

1.2 RELATED WORK SPECIFIED AND PERFORMED UNDER OTHER SECTIONS

Section	Item
EARTHWORK	Earthwork
FINISH GRADING	Finish Grading

PART 2 PRODUCTS

2.1 ABBREVIATIONS

A. The following abbreviations as used in this Specification shall means:

BB	Balled & burlapped
CG	Container grown
BP	Balled, burlapped and fixed to a platform
BR	Bare root seedlings
Cal.	The caliper of the main trunk in inches measured as in American Standard for Nursery Stock, current edition, American Association of Nurserymen

CY	Cubic yard, not compacted
AAN	American Association of Nurserymen
Wetlands Mitigation Specialist	The Wetlands Mitigation Specialist assigned to this project
Engineer	The Engineer assigned to this project
Landscape Architect	Landscape Architect assigned to the project
Contractor	Planting Contractor (unless otherwise specified)
Owner	CONNECTIV
N	Nitrogen
P	Phosphorus
K	Potassium

2.2 TOPSOIL

- A. Topsoil is available from stockpiles on the site. Topsoil shall consist of the uppermost 6 inches of excavated materials which contain fertile and friable soil with humus materials and which are free from roots, sticks, hard clay and stones which will not pass through a 1-inch square opening. If more topsoil is needed than has been stockpiled, supply imported topsoil at Contractor's sole expense.

2.3 IMPORTED TOPSOIL

- A. Imported topsoil shall be a natural, friable soil, representative of productive soils in the vicinity. It shall be obtained from well-drained areas, free from admixture of subsoil and foreign matter and objects larger than 1 inch in diameter, toxic substances and any other deleterious material which may be harmful to plant growth and be a hindrance to grading, planting and maintenance operations. Manufactured or de-contaminated soils shall not be approved for project use.

- B. Topsoil shall meet, or shall be improved to meet, the following mechanical requirements by adding sand and/or peat or manure and incorporating into the topsoil:

Component	Maximum Percentage
Sand	65%
Silt	50%
Clay	25%

2.4 pH CONTROL

- A. The following amendments shall be included in soils where required by the soils analysis test:
1. Soil sulfur.
 2. Commercially packaged gypsum.
 3. Ground dolomitic limestone.

2.5 LIME

- A. Ground dolomitic limestone not less than 85 percent total carbonates and magnesium, ground so that 50 percent passes 100-mesh sieve and 90 percent 20-mesh sieve. Coarser material will be acceptable provided the specified rates of application are increased proportionately on the basis of quantities passing the 100-mesh sieve.

2.6 FERTILIZER

- A. Fertilizer rates are shown in Table (To be Determined) on the Drawings.
- B. Commercial Fertilizer: A complete plant food containing, by weight, a minimum of 10 percent nitrogen, 10 percent available phosphoric acid, and 6 percent potash, conforming to applicable state fertilizer laws, availability of plant nutrients conforming to standards of the Association of Official Agricultural Chemists (AOAC), uniform in composition, dry, free-flowing, and delivered in original, unopened containers bearing manufacturer=s guaranteed analysis. For areas specified on the Drawings, fertilizer shall be slow-release granular 10-10-10 (N,P,K).

- C. Planting Tablets: Tablets shall be of a time release type such as agriform or equal and shall consist of compressed urea-formaldehyde containing added phosphorous and potassium to yield a 20:10:5 ratio of N-P-K +1.4 percent sulfur.

2.7 TEXTURAL SOIL AMENDMENTS

- A. Peat: A natural residue formed by decomposition of reeds, sedges or mosses from fresh water site, free from lumps, roots and stones, absorbing at least four times its dry weight of water, organic matter not less than 90 percent on a dry weight basis. The maximum moisture content at time of delivery 65 percent by weight.
- B. Manure: Well-rotted, unleached stable or cattle manure, reasonably free from weed, seed and refuse, containing no chemicals or materials harmful to plant life: not less than 4 months nor more than 2 years old. Sawdust or shavings shall not exceed 50 percent content of manure.
- C. Sand: Clean, coarse, ungraded, meeting the requirements of ASTM C33 for fine aggregate.

2.8 MULCH

- A. General: Compost and mulch rates are shown in Table (To be Determined) on the Plant Details and shall be mixed with soil during backfilling procedures as shown on the Details.
- B. Leaf Compost: Leaf compost shall consist of decomposed leaf litter containing no chemicals or noxious weed seed harmful to plant life.
- C. Wood Mulch: Wood mulch shall consist of wood chips derived from the chipping of trunks, limbs and stumps of various tree species or barkdust medium grind, fir, pine, hemlock : inch plus size or pine bark.

2.9 TREE PAINT

- A. Waterproof, asphalt-base paint with antiseptic properties, manufactured for use on tree wounds.

2.10 ANTI-DESICCANT

- A. A transpiration retarding material to be used where any plant material is moved during the growing season.

2.11 PLANT MATERIALS

- A. Nomenclature: Names of horticultural plants conform to those given in Standardized Plant Names, 1942 Edition, prepared by the American Joint Committee on Horticultural Nomenclature. Names of varieties not included therein conform to names generally accepted in the nursery trade. Names of native plants will be as given in Gleason and Cronquest, 1991. Manual of Vascular Plants of North America.
- B. Quality and Size: Nursery-grown in moist conditions suitable for planting at wetland elevations, habit of growth that is normal for the species, sound, healthy, vigorous and free from insects, disease and injuries, equal to or exceeding measurements specified in plant list (Table (To be Determined) on the Drawings). Plants measured before pruning with branches in normal position. Necessary pruning done at time of planting as recommended by the Landscape Architect. Sizes and methods of handling according to the American Standard for Nursery Stock recommended by the AAN.
- C. Plant List: The Plant List (Table (To be Determined) on the Drawings) describes the species, sizes and quantities of the required plant materials. No substitution of species will be considered unless noted in Table 1 or approved by the Wetlands Mitigation Specialist prior to purchase orders. Substitution of different sizes of trees or shrubs will be considered if specified sizes are unavailable. Plants shall be locally grown or of regional stock suitable in the coastal plain of New Jersey.
- D. Seeds: Seed shall be clean, delivered in original unopened packages and bearing an analysis of the contents, guaranteed 95 percent pure with minimum germination of 85 percent and of local or regional origin.

PART 3 EXECUTION

3.1 INSPECTIONS AND REPORTS

- A. Before excavation to a level 6 inches below the proposed finished grades, submit soil analysis report on analysis of the stockpiled topsoil to Landscape Architect and Wetlands Mitigation Specialist for approval before replacement of the material to the site and before planting proceeds.
 - 1. Mechanical Analysis of Topsoil:
 - a. Before delivery to the site, mechanical analysis of topsoil shall be performed by a qualified soils analyst or engineer in accordance with AASHTO T 88-72, Mechanical Analysis of Soils.

- b. Submit to Landscape Architect and Wetlands Mitigation Specialist the analysis report and indicate qualities of materials to be used to bring topsoil into conformance with paragraph TOPSOIL.
- 2. Chemical Analysis of Topsoil: Submit a sample of topsoil to the County or State Soil Testing Laboratory for chemical analysis. Submit to Landscape Architect and Wetlands Mitigation Specialist the analysis report indicating quantity of lime and quantity, and analysis of fertilizer to add for growing the types of plants listed in the Plant List. (Tables (To be Determined) on the Drawings.) To obtain meaningful recommendations, the Contractor must inform the testing laboratory of the species of plants that are to be grown in the soil.
- B. Notify Wetlands Mitigation Specialist of sources of plant materials and the names and qualifications of the planting contractor at least 3 weeks prior to anticipated delivery. Landscape Architect and Wetlands Mitigation Specialist will inspect plants immediately after delivery to the site and prior to planting.
- C. Accompany shipments of plant materials with all certificates of inspection of plants required by federal or state regulations.

3.2

METHOD OF DELIVERY

- A. Balled and Burlapped Plants: Supply plants designated as BB in Plant List with firm, natural balls of earth of diameter and depth sufficient to encompass the fibrous and feeding root system necessary for full recovery of plant. Firmly wrap balls with burlap and bind with twine, cord or wire mesh. Where necessary to prevent breaking or cracking of ball during process of planting, or where the tree exceeds 4 inches caliper, secure ball to a platform.
- B. Container-Grown Plants: Furnish plants designated CG in Plant List with self-established root systems sufficient to hold earth together after removal from container but not root-bound, in container of specified size.
- C. Bare Root Plants: Furnish plants with easily separated roots and in sealed (bagged) containers.
- D. Plant Protection: If plants are not in dormant state, spray all plants with anti-desiccant to cover foliage as recommended by manufacturer, prior to digging plants. During shipment, protect plants with tarpaulin or other suitable covering to prevent excessive drying from sun and wind.

3.3

PREPARATION AND STORAGE OF MATERIALS

- A. Heeling-In: Cover balls of BB plants and containers of CG plants which cannot be planted immediately upon delivery with moist mulch to protect from drying. Water plants often as necessary to prevent drying until planted. Store BR plants in containers in temperature controlled cooling storage buildings or on-site (if ambient temperatures allow), if short term (days) storage is required between shipping and planting.
- B. Planting Soil Mixture:
 - 1. After chemical analysis report for topsoil is received, if necessary, prepare topsoil mixture for plant pits and beds by thoroughly mixing topsoil with soil conditioner materials, fertilizer and lime. Thoroughly mix in proportions recommended in the report with rotary mixer or other method.
 - 2. Adjust proportions in accordance with above-mentioned chemical analysis report. Store and protect topsoil mixture and other materials at designated area of the site. Protect topsoil mixture from excessive leaching if stored for more than 6 weeks by covering with tarpaulin.

3.4

PLANTING PROCEDURES

- A. Project Schedule:
 - 1. Within 20 calendar days after the date specified for the commencement of work, submit to the Landscape Architect and Wetlands Mitigation Specialist a proposed time schedule indicating dates for commencement and completion of the following operations:
 - a. Tagging of plants in the nurseries
 - b. Survey and staking of plant locations.
 - c. Delivery of topsoil and other materials
 - d. Digging and preparation of plant pits and beds.
 - e. Delivery of trees to the site.
 - f. Delivery of other plants to the site.
 - g. Planting of trees.
 - h. Planting of other plants.
 - I. Mulching.
 - j. Completion of work for start of guarantee period.
 - 2. At least 20 days before start of the guarantee period, submit a schedule of proposed maintenance operations indicating the number of man-hours contemplated for each operation by season during Autumn, Winter, Spring and Summer.

- B. Time of Planting: Planting trees and shrubs shall be performed in Fall or Spring seasons as ground and weather conditions allow and not during warm, dry, weather, typical of Summer conditions. Seeding shall occur between April 1 and June 1, or between September 1 and October 15, after trees and shrubs are planted or as modified to current year conditions and approved by NJDEP.
- C. Location of Plants: Plant all trees and shrubs within clumps. Within each clump, trees and shrubs will be planted on a minimum of 5-foot centers and a maximum of 10-foot centers. No trees or shrubs shall be planted outside of clumps, to achieve a mix of plantings and small clearings. Spacing between outer edges of clumps will be at a maximum of 20 feet and a minimum of 10 feet (see Clump Planting Details). Each acre shall have a mix of approximately 194 trees and shrubs or 116 trees and 78 shrubs of mixed varieties as specified in Details.
- D. Finished Grades: Prior to planting, the excavation Contractor will re-survey the site to determine that the final grades are as specified in the drawings. The excavation Contractor shall submit drawings for approval by the Engineer, certified and signed by a registered surveyor. The Wetlands Mitigation Specialist will approve the final grades based on this survey.

3.5

PLANTING

- A. Prepare planting area prior to planting and seeding by disking to loosen soils compacted by heavy machinery (See Section 004 Earthwork 3.8 E).
- B. Excavate circular pits with vertical sides by auguring or digging, as shown in planting Details. Diameter of pits for CG and BB trees and shrubs shall be at least twice the diameter of the root ball. Pits for CG and BB shall also be 6 inches deeper than necessary to accommodate ball of roots when plant is set to finished grade.
- C. Backfill bottom 6 inches of pit with planting topsoil, placing fertilizer tablets as described herein and on Table (To be Determined).
- D. Set plants upright as shown on the Planting Details. Place fertilizer planting pellets 3 to 5 inches below bottom of BB or CG roots according to manufacturer=s recommended rates. **Do not** remove plant from container until immediately before planting. Examine roots to determine if they are pot bound. Carefully separate any pot bound or cramped roots and spread

them out when placing the plant so that the roots can grow without further constriction of the root ball. Carefully pull burlap off of root ball making sure no roots get torn or pulled off. Cut all frayed or broken roots off cleanly.

- E. Place planting topsoil mixed with compost or mulch (as specified in Materials section) around roots and compact carefully to avoid injury to roots and to fill voids. Compost and mulch rates are listed in Table (To be Determined). Water as directed herein. When hole is two-thirds filled, tamp and add water to thoroughly soak planting topsoil and allow to soak into ground. For BB and CG plants, fill hole with soil to 1-2 inches below final grade after tamping to form a saucer around plant. Fill each saucer with water to final grade and allow to soak into ground.
- F. Following the planting of the trees and shrubs, broadcast the specified seed between trees, shrubs and clumps throughout the areas where seeding is specified (see Drawing). Take care not to broadcast seed over saucers planted with trees and shrubs. Seed shall be spread by hand, cultipactor or other approved mechanical seeding equipment. Seeds shall be thoroughly mixed with an equal volume of clean washed sand prior to broadcasting for more even distribution. By use of a York rake or cultipactor, subsurface sow the seeds to a depth no greater than 1/8 of an inch.
- G. Following seeding, broadcast 400 pounds per acre of slow release 10-10-10 fertilizer over the seeded areas.
- H. Water seeded areas to soak ground as needed for grasses to become healthy and established.

3.6

PLANTING PROTECTION

- A. To ensure survivability of planted trees and shrubs as stated in GUARANTEE, spraying plantings with deer repellent, use of plant protection tubes and/or fencing around entire area to be planted shall be put in place by the Contractor for protection of the site from damage.
- B. The Contractor must supply some means of protection against herbivores such as mice, deer, etc., to ensure the success rate of the planted trees and shrubs as stated in the GUARANTEE. Examples noted here are not the only choices; however, the Wetlands Mitigation Specialist must approve of the means of plant protection chosen prior to implementation. Some examples are as follows:

1. Fence off entire planted area on the property or around each clump of trees and shrubs.
2. Use plant protection tubes; a rigid photodegradable mesh plastic tube for trees and shrubs with an estimated life span of 3 years as supplied by International Reforestation Supplies Inc., California, or Forestry Supplies Inc., Mississippi.
3. Implement weed control, especially near plantings and around boundary of planted area to avoid rodent's damage. Weed control can be accomplished by carefully applying RODEO or equivalent (with LI 700 surfactant) during spring or fall months and/or disking.
4. Commercial sprays are available that can be directly applied to plants to deter deer from eating the foliage (see above for potential suppliers).
5. Any combination of the above (a-d) with approval of the Wetlands Mitigation Specialist.

3.7 WEED CONTROL

- A. Disk areas as often as necessary to control weeds immediately preceding the planting of trees and shrubs and seeding of grasses.
- B. Apply ROUNDUP, RODEO, or other nonselective, nonpersistent herbicide as necessary to eliminate and control weeds at least 15 days before planting trees and shrubs and seeding of grasses. A State of New Jersey Commercial Applicator's License must be obtained by the Planting Contractor prior to application of ANY herbicide on the site. Proof of this license must be provided to the Wetlands Mitigation Specialist prior to implementation of the planting project.

3.8 PLANT GUARANTEE

- A. Guarantee all plants for a minimum of 3 years to be alive and in vigorous growing condition at the end of guarantee period. Remove unsatisfactory plants and replace with plants of the same kind, quality, and size as specified in the Schedule of Plant Materials. Furnish and plant as specified under PLANTING PROCEDURES.
- B. Guarantee all plant replacements to be alive and in vigorous growing condition 1 year after replacement. Replacement shall be at Contractor's sole expense, except for possible replacements resulting from: (1) removal, (2) loss or damage due to occupancy of project in any part, (3) vandalism, or (4) acts of neglect on part of others. Proven animal damage (except where damage is the result of improper application of plant protection

devices) to be determined by a coordination with the Landscape Architect and the Wetlands Mitigation Specialist.

- C. Make plant replacements under the guarantee as required during the planting season as described. Replace plants that die during a season unfavorable for planting during the first month of the next favorable planting season.

3.9

MAINTENANCE

- A. Scheduled maintenance/monitoring visits will be performed by the Wetlands Mitigation Specialist. After each visit, the Wetlands Mitigation Specialist will notify the Contractor and Landscape Architect for implementation of the maintenance requirements, begin maintenance immediately after each plant is installed and continue to maintain for 5 years until the end of the guarantee period.
- B. Perform the following operations: watering all trees and shrubs as often as required to maintain capillary water within 2 inches of the soil surface around plants; watering all seeded areas as often as required to maintain viable population of grasses; weeding of all planting saucers and planting areas to keep free of weeds using hand weeding and/or a selective herbicide according to manufacturer=s directions for use, but not within 90 days of last application; restoration of planting saucers and plant protection devices as needed; seasonal spraying to control disease or insect pests that may impair plant vigor. Additional maintenance may be needed to ensure plant survival as stated in the GUARANTEE, to be determined by the Wetlands Mitigation Specialist and/or Landscape Architect.
- C. Monitoring Mitigation Site (For Information Only):
 - 1. Site visits, by the Wetlands Mitigation Specialist, will be conducted after planting, and in each of the following five years, to assess how well the site is meeting the goals of the mitigation plan and GUARANTEE, namely, the growth of a t least 85 percent of all the vegetation planted at the site during the first 5 years and the improvement of wildlife habitat on the site. Photographs will be taken from the same vantage points around the site to document the health and growth of the planted trees and shrubs, and the other established vegetation on the site. Percent cover of dominant vegetative growth will also be determined during the site visits. Annual reports will include these photographs and will be submitted to NJDEP documenting the conditions at the site.

2. Site visits will be conducted during the Spring, Summer and Fall of the first year after completion of the planting, and the summer and fall of the second, third, fourth, and fifth year.

3.10 PROTECTION OF EXISTING TREES

- A. Where existing trees are designated on the Drawings as trees to remain, protect as specified.

3.11 INSPECTIONS FOR ACCEPTANCE OF WORK

- A. Acceptance for Start of Maintenance: The Contractor shall notify the Landscape Architect and Wetlands Mitigation Specialist in writing of completion of planting. Within 15 days after completion of work, an inspection for acceptance to start the maintenance period will be made. When the work is accepted, the maintenance period will begin and continue until final acceptance.
- B. Final Acceptance: The Contractor shall notify the Landscape Architect and Wetlands Mitigation Specialist within 20 days of the date of the date for final inspection at the end of the maintenance period and an inspection will be arranged with 15 days of this date. Before final acceptance, the terms of the plant guarantee must be met and the project site must be in the condition stipulated under MAINTENANCE.

SECTION 0300

CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Procedures to be followed in closing out the Contract.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 FINAL CLEANING

A. At completion of work and immediately prior to final inspection, clean entire project according to the following provisions:

1. Leave the site in a complete and finished condition to the satisfaction of the Engineer and Owner.
2. Should Contractor not remove rubbish or debris or not clean the site as specified above, the Owner reserves the right to have final cleaning done at the sole expense of the Contractor.

B. The Contractor shall:

1. Broom clean paved surfaces; rake clean other surfaces.
2. Remove from the Owner=s property temporary structures, materials and equipment.
3. Leave water courses, gutters and ditches open and in condition satisfactory to Engineer and Wetlands Mitigation Specialist.
4. Restore access roads to the condition found prior to beginning the work or as specified on the Drawings including reestablishment of vegetation.

3.2 FINAL INSPECTION

A. After final cleaning and upon written notice from Contractor that work is completed, Engineer will make preliminary inspection with the Owner and Contractor present. Upon completion of preliminary inspection, Engineer

will notify Contractor in writing of particulars in which the completed work is defective or incomplete.

- B. Upon receiving written notice from Engineer, Contractor shall immediately undertake work required to remedy defects and complete the work to the satisfaction of Engineer and Owner.
- C. After the items as listed in Engineer=s written notice are corrected or completed, inform Engineer in writing that required work has been completed. Upon receipt of this notice, Engineer, in the presence of Owner and Contractor, will make final inspection of the project.
- D. Should the Engineer find all work satisfactory at the time of final inspection, Contractor will be allowed to make application for final payment. Should Engineer still find deficiencies in the work, Engineer will notify Contractor in writing of deficiencies and will not approve Contractor=s request for final payment until such time as Contractor has satisfactorily completed the required work.

APPENDIX E
COPIES OF PERMITS

215-757-3904



State of New Jersey

Department of Environmental Protection

Land Use Regulation

P.O. Box 439

Trenton, New Jersey 08625

James E. McGreevey
Governor

Bradley M. Campbell
Commissioner

May 25, 2004

Nancy Palmstrom
ENSR International
20 New England Avenue
Piscataway, NJ 08854

Re: Freshwater Wetlands Emergency Authorization
 Applicant: Atlantic City Electric d/b/a Conectiv Power Delivery
 Project: Oyster Creek to Cedar Creek 230kV Line – Northern Phase
 LURP #1500-03-0004.2CAF040001, FWW040001
 Block(s): Various Lot(s): Various
 Townships of Lacey, Ocean, Barnegat, Stafford, Ocean County

Dear Ms. Palmstrom:

This letter is to confirm an emergency authorization pursuant to the Freshwater Wetlands Protection Act (FWPA) rules for the emergency upgrade of the existing 14.1 mile transmission line from 69 kV to 230 kV and installation of 13.4 miles of 23kV transmission line for Conectiv's Oyster Creek to Cedar Creek 230kV Line – Northern Phase.

The proposed development is shown on plans in 13 sheets, titled: "Plan, Oyster Creek to Cedar Creek Substation, 230 kV Transmission Line Situated in Lacey, Ocean, Barnegat and Stafford Townships, Ocean County, New Jersey", dated April 26, 2004, all sheets unrevised, as prepared by LGA Engineering, Inc.

This project requires both a CAFRA Individual Permit and a Freshwater Wetlands Permit, and formal permit applications are pending with the Program. However, the current system serves much of southern Ocean County and Long Beach Island and is not capable of providing safe and reliable service under peak conditions. If peak conditions are reached, there is a possibility of having to "dump" load or shut off service. This step is required under Conectiv's operating plan to preserve Conectiv's transmission and potentially the entire Mid Atlantic Regional System.

The current transmission infrastructure that serves southern Ocean County and Long Beach Island is antiquated and failures have increased steadily over the past few years. Therefore, the Department has determined that it is in the best interest of public safety and welfare and the protection of the environment to grant this project an emergency authorization for work to begin immediately. The Department previously issued an

emergency authorization to commence construction of the proposed upgrades within areas regulated pursuant to CAFRA. This authorization allows continued construction of the upgrades in areas subject to jurisdiction under the FWPA.

The Department conducted a public hearing on these applications on May 6, 2004. Based on the scope of comments received at the hearing, the Department determined that this emergency authorization was appropriate.

Please be advised that all activities are subject to the applicant receiving a CAFRA Permit and a Freshwater Wetlands Individual Permit. This letter shall, in no way, substitute for a CAFRA Permit or Freshwater Wetlands Individual Permit or be misconstrued as such.

The activities authorized herein shall not be seen as a final decision by the Department on the pending CAFRA Permit or Freshwater Wetlands Individual Permit applications (Oyster Creek to Cedar Creek 230kV Line - Northern Phase LURP #1500-03-0004.2CAF040001, FWW040001). All conditions of any forthcoming CAFRA Permit or Freshwater Wetlands Individual Permit shall be satisfied by the permittee. In addition, construction undertaken pursuant to this authorization shall be at your own risk and peril.

In addition, Conectiv has consulted with the US Fish & Wildlife Service (FWS) and has agreed to provide certain information to that agency as part of Section 7 consultation. This emergency authorization is issued pursuant to those discussions and is conditioned on Conectiv complying with the specific requirements, and information submission to FWS, as follows:

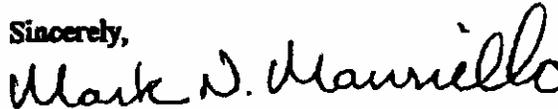
- 1) A map (dated) of the final route for the ROW delineated on topographical quadrangle sheets;
- 2) A commitment by Conectiv to incorporate avoidance and minimization measures, including wetland mats, protocols for the use of herbicides, placing poles for the transmission line on uplands, and minimal tree clearance and removal for maintenance for areas within the vicinity of swamp pink colonies;
- 3) For two swamp pink sites (Four-mile Branch and Harpoon Road) a 300-ft. buffer zone will be maintained around the swamp pink colonies with no tree cutting and minimal branch removal; and
- 4) A third swamp pink site requires the above protective measures with the exception of the 300-ft. buffer (a 140-ft. buffer has been agreed upon).

Additionally, should the ROW change, Conectiv must re-initiate informal section 7 consultation with the FWS to determine if swamp pink or other federally listed species would be adversely affected by any new alternative routes.

This emergency authorization does not obviate you from obtaining any other local, State or Federal authorizations required by law. By undertaking the work approved by this emergency permit, you accept full responsibility for any inconveniences, injuries or damages that could be caused by the proposed activities.

Please contact Michael Garrity of my staff at 609-984-0288 or by email at michael.garrity@dep.state.nj.us if you have any questions regarding this authorization.

Sincerely,



Mark Mauriello, Director
Land Use Regulation Program

c: NJDEP Division of Fish & Wildlife
NJDEP Enforcement
Municipal Clerks
Municipal Construction Officials
Municipal Engineers
USFWS



State of New Jersey

Department of Environmental Protection

Land Use Regulation Program
P.O. Box 439, Trenton, NJ 08625-0439
Fax # (609) 292-8115
www.state.nj.us/dep/landuseJames E. McGreevey
GovernorBradley M. Campbell
CommissionerNancy Palmstrom
ENSR International
20 New England Avenue
Fiscataway, NJ 08854

April 26, 2004

Re: CAFRA Emergency Authorization
Applicant: Atlantic City Electric d/b/a Conectiv Power Delivery
Project: Oyster Creek to Cedar Creek 230kV Line – Northern Phase
LURP #1500-03-0004.2CAF040001
Block(s): Various Lot(s): Various
Lacey, Ocean, Barnegat & Stafford Townships, Ocean County

Dear Ms Palmstrom:

Pursuant to your recent request, this letter is to confirm an emergency authorization given by the Land Use Regulation Program, for the emergency upgrade of the existing 14.1 mile transmission line from 89 kV to 230 kV and installation of 13.4 miles of 23kV transmission line for Conectiv's Oyster Creek to Cedar Creek 230kV Line – Northern Phase.

Please be advised that this authorization is for the proposed areas of construction which are within the jurisdiction of the Coastal Area Facility Review Act (CAFRA) *only and does not authorize any activities within areas defined as "wetlands" or "transition areas"*. This emergency authorization does not obviate you from obtaining a formal CAFRA permit and any other local, State or Federal authorizations required by law.

The proposed construction authorized by this letter is shown on plans in 13 sheets, entitled: "Plan, Oyster Creek to Cedar Substation, 230 kV Transmission Line Project, Northern Phase, Situated in Lacey, Ocean, Barnegat and Stafford Townships, Ocean County, New Jersey", dated April 26, 2004, all sheets unrevised, as prepared by LGA Engineering Inc.

All activities are subject to the applicant receiving a CAFRA permit authorization. This letter shall, in no way, substitute for a CAFRA permit or be misconstrued as such. The activities authorized herein shall not be seen as a final decision by the Department on the pending CAFRA application (Oyster Creek to Cedar Creek 230kV Line – Northern Phase LURP #1500-03-0004.2CAF040001). All conditions of any forthcoming CAFRA

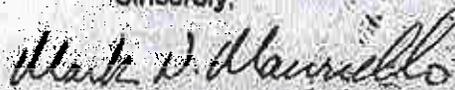
Emergency CAFRA Authorization
LURP #1500-03-0004.2CAF040001

2

permit shall be satisfied by the permittee. In addition, construction undertaken pursuant to this authorization is at your own risk and peril.

Please contact Michael Garity of my staff at 609-292-0060 or by email at michael.garity@dep.state.nj.us if you have any questions regarding this authorization.

Sincerely,



Mark N. Mauriello, Director
Land Use Regulation Program

NJDEP Division of Fish & Wildlife
NJDEP Enforcement
Municipal Clerks
Municipal Construction Officials
Municipal Engineers
BPU



State of New Jersey
 THE PINELANDS COMMISSION
 PO Box 7
 New Lisbon NJ 08064
 (609) 594-7300

JAMES E. MCGREEVEY
 Governor

JOHN C. STOKES
 Executive Director

CERTIFICATE OF FILING

April 23, 2004

Atlantic City Electric Company
 d/b/a Connecticut Power Delivery
 New Castle Regional Office
 I-95 & Route 273
 PO Box 9239
 Newark, DE 19714-9239

Please Always Refer To
This Application Number

Re: Application #01-0545.01
 See attached Appendix A
 for project location

Dear Applicant:

This application proposing to upgrade an existing 69 kV electric transmission line to a 230 kV electric transmission line and the construction of a new 230 kV electric transmission line with associated clearing on the above referenced parcels is complete. The parcels are located in Pinelands Regional Growth and Rural Development Areas and are depicted on Attachment A hereto.

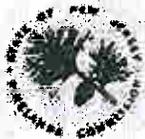
The completion of this application has resulted in the issuance of this Certificate of Filing. The applicant must give notice to the Pinelands Commission of any modification of the proposed development and of any approval received for the proposed development from another state or local agency within 5 days of receiving any approval.

The site plan for the entire project, consisting of fourteen sheets, submitted to the Pinelands Commission was prepared by LGA Engineering, Inc. That portion of the project located in the Pinelands Area is depicted on the following sheets:

Sheets 3-5 & 9-11 - April 8, 2004

Sheets 6 & 8 - April 23, 2004 (Note that Sheet 7 has been superceded)

The entire project will result in a new 14.2 mile long 230 kV electric transmission line beginning at the Oyster Creek Substation in Lacey Township and ending at the Cedar Substation in Stafford Township. Approximately 7.8 miles of the proposed project is located within the Pinelands Area. The portion of the



<http://www.state.nj.us/pinelands/>
 E-mail: info@njpinelands.state.nj.gov

The Pinelands—Our Country's First National Reserve and a U.S. Biosphere Reserve

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project located within the Pinelands Area will consist of upgrades to approximately 4.75 miles of existing electric transmission right-of-way (ROW) (69 kV to 230 kV) and construction of a 230 kV electric transmission line in approximately 3.05 miles of new ROW. This ROW will be 50 to 60 feet wide throughout the entire length of the ROW. New poles will vary from 55 to 80 feet in height.

There are freshwater wetlands located on and within 300 feet of the existing and proposed ROWs. Pole replacement activities are proposed in both freshwater wetlands and freshwater wetland buffers. In order to maintain consistency with the freshwater wetlands, cultural resource and other environmental protection standards of the Pinelands Comprehensive Management Plan (CMP) and the land use ordinances of the respective municipalities, all development shall be undertaken in accordance with the following conditions:

1. By April 28, 2004, the applicant shall supplement its cultural resource summary report by submitting to the Pinelands Commission its final report for the entire ROW within the Pinelands Area. No construction shall be initiated in any portion of this ROW located within 300 feet of freshwater wetlands prior to Commission receipt and approval of the Cultural Resource Survey.
2. As certified by the applicant in its stormwater submission, it shall submit to the Pinelands Commission by May 7, 2004 its detailed stormwater management plan. This plan shall include stormwater drainage calculations utilizing TR-55, a proposed stormwater facility maintenance and inspection program as well as information identifying the entity responsible for such maintenance and inspection program. This plan shall pertain to all portions of the proposed ROW which require clearing of forested areas or dense understory. The applicant shall clearly identify these areas. No construction shall be initiated in these portions of the ROW prior to Commission receipt and approval of the stormwater management plan.
3. The applicant shall obtain a Freshwater Wetlands Statewide Individual Permit from the New Jersey Department of Environmental Protection in accordance with the Freshwater Wetlands Protection Act (N.J.S.A. 13:19B-1 et seq.). No activities in freshwater wetlands shall occur until this permit has been obtained and a copy of same submitted to the Pinelands Commission.
4. Appropriate measures, such as installation of silt fencing, shall be taken during construction to preclude sedimentation from entering freshwater wetlands.
5. The applicant shall adhere to the specified location of the replacement poles as provided for in Attachment B of this Certificate of Filing.
6. When activities will occur in freshwater wetlands the construction contractor shall utilize pallettes, mats, or other appropriate devices to prevent tire rutting by construction vehicles. Vegetation may be cut prior to placement of pallettes or matting.
7. Vegetation clearing in freshwater wetlands shall be accomplished by hand whenever feasible.
8. All cut vegetation shall be removed from freshwater wetlands and areas within 300 feet of

freshwater wetlands.

9. Any freshwater wetlands disturbed as a result of construction activities, including existing pole removal, shall be graded to natural conditions and seeded with native Pinelands grass species suitable for wetland areas.
10. Native Pinelands species shall be used for revegetation purposes when necessary.
11. Existing poles shall be removed and the resulting void filled with soil excavated from the replacement pole location.
12. The use of herbicides are prohibited during construction of the ROW. The use of herbicides for future vegetation management purposes shall also be prohibited in any portion of the ROW.
13. The limits of the proposed new ROW shall be flagged in the field prior to clearing occurring.
14. All vegetation (timber, woodchips) removed from the ROW shall be lawfully disposed of unless the property owners adjacent to the ROW can promptly remove this debris for their personal use. No disposal of wood chips in the ROW shall be permitted during construction nor shall any temporary stockpiling or placement of woodchips shall occur in freshwater wetlands or within 300 feet of freshwater wetlands.
15. No construction debris or excess fill shall be disposed of in the Pinelands Area without the prior approval of the Pinelands Commission.
16. To supplement the applicant's threatened and endangered species analysis, biologists qualified in the identification of threatened and endangered plants and animals and their habitats shall be present throughout construction. The biologists shall ensure that construction techniques do not affect any habitats critical to the survival of any threatened and/or endangered species of animals or plants and that any such plants and animals discovered during construction are protected. The Pinelands Commission shall be notified immediately if any threatened and/or endangered species of plants or animals or their critical habitat are identified during construction. The biologists shall be authorized by the applicant to ensure that those species or habitats are protected and shall take appropriate measures to protect said habitat or individuals including modification or temporary cessation of construction activities.
17. The Pinelands Commission staff shall be permitted to inspect construction activities to ensure compliance with the conditions set forth in this Certificate of Filing.
18. Any modifications to the proposed ROW alignment or construction plans within the Pinelands Area shall be submitted to the Pinelands Commission staff for review prior to any construction commencing in such areas.
19. Following completion of construction, steps shall be taken to prohibit unauthorized access

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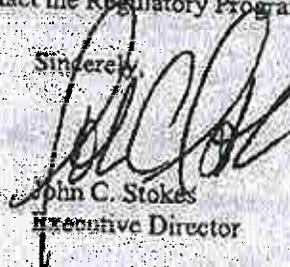
to the ROW, such as the installation of fencing or gates.

This application is for the proposed upgrade of the existing 69 kV electric transmission line to a 230 kV electric transmission line and the construction of a new 230 kV electric transmission line on the above referenced parcels only. Any other future development of the above referenced parcels shall be governed by the provisions of the Pinelands Comprehensive Management Plan and the land use ordinances of the respective municipalities.

This Certificate of Filing is not an approval. If either a municipal or county agency grants an approval or permit for the proposed development, that approval is subject to review by the Pinelands Commission. No local approval shall take effect and no construction or development shall occur unless written notice from the Pinelands Commission has been received, indicating either that the Commission will not review the local approval or that the Commission has approved the local approval.

If you have any questions, please contact the Regulatory Programs staff.

Sincerely,



John C. Stokes
Executive Director

BS:KC:JS:CH

Encl. (2):

Appendix A: List of Parcels

Appendix B: Replacement Pole Locations

- C:
- Secretary, Barnegat Township Planning Board
 - Barnegat Township Construction Code Official
 - Barnegat Township Environmental Commission
 - Barnegat Township Zoning Official
 - Secretary, Ocean Township Planning Board
 - Ocean Township Construction Code Official
 - Ocean Township Environmental Commission
 - Ocean Township Zoning Official
 - Ocean County Planning Board
 - John Stanziola, New Jersey Board of Public Utilities
 - Frank Smolenski, ENSR
 - Bob Iubic, Conectiv
 - John Mullan, Schoor DePalma
 - Linda L. Cavanaugh, Esq., New Jersey Turnpike Authority
 - Michael Garrity, New Jersey Department of Environmental Protection
 - Brian P. Szura

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APPLICATION #01-0545.01
CONNECTIV 230 KV TRANSMISSION LINE

ATTACHMENT A - List of Parcels within Pinelands Commission Jurisdiction

OCEAN TOWNSHIP

<u>Block</u>	<u>Lots</u>
34	14, 10.04, 7
33	24, 25
38	2, 5
35	16
38	8, 7, 12, 11, 10, 27
36	18, 15, 7, 6, 5.01, 4
31	9
29	1
28	2

BARNEGAT TOWNSHIP

<u>Block</u>	<u>Lots</u>
93.20	46-57, 110
93	9.02
94.01	162
Country Route 554 (West Bay Avenue/Straight Road) between Block 93, Lot 9.01 and Cloverdale Road	
92	18, 15, 16, 21, 23
92.86	6
Harpoon Drive between Nautilus Lane and Lighthouse Drive	
Lighthouse Drive between Harpoon Drive and Block 92.12, Lot 42.02	
92.112	42.01
92.111	24.06
92.112	42.02
113	4

APPLICATION #01-0545.01
CONNECTIV 230 kV TRANSMISSION LINE

ATTACHMENT B - Required Replacement Pole Locations

<u>POLE #</u>	<u>PLACEMENT FROM EXISTING POLE</u>	<u>FEET</u>
52	to the east	5-10
55	to the west	5-10
64	to the north	5-10
66	to the south	5-10
68	to the east	5-10
69	to the west	5-10
70	to the northwest	5-10
71	to the east	5-10
72	to the north	5-10
78	to the south	5-10
94	to the south	5-10
100	to the south	10
173	to the north	5-10
174	to the south	5-10

APPENDIX F

CORRESPONDENCE WITH NJ TURNPIKE AUTHORITY



New Jersey Turnpike Authority

P.O. BOX 5050, WOODBRIDGE, NEW JERSEY 07095-5050
TELEPHONE (732) 442-8800

JAMES E. MCGREEVEY
GOVERNOR

VIA FACSIMILE

May 25, 2004

JOSEPH SIMUNOVICH, *Chairman*
JOSEPH (J.P.) MIELE, *Vice Chairman*
JOHN HIBBS, *Treasurer*
LUIS FERNANDEZ, *Commissioner*
HAROLD L. HOOBS, *Commissioner*
DAVID G. EVANS, *Commissioner*
HARRY LARRISON, JR., *Commissioner*
JOHN LETTIERE, *Commissioner*
MICHAEL LAPOLLA, *Executive Director*

Mr. William Pyle
Atlantic City Electric Company
Right of Way Department
5200 Harding Highway
Mays Landing, NJ 08330

**Re: New Jersey Turnpike Authority
Garden State Parkway
Conectiv - Northern Alignment**

Dear Mr. Pyle:

Please be advised that we have received and reviewed Conectiv's proposed northern alignment for its transmission line (the "Northern Phase"). As we understand it, a portion of the Northern Phase near Interchange 63 of the Garden State Parkway (the "Parkway"), specifically Mile Post 64 to Mile Post 65+ (the "Subject Area"), will impact portions of federally-owned lands, and the federal agencies that own those lands have requested that the Northern Phase be re-aligned so that the transmission lines will be re-located off of the federally-owned lands and onto the Parkway right-of-way. Such a re-alignment onto the Parkway right-of-way would eliminate the existing tree-buffer between the Parkway corridor and surrounding properties, would limit the possibility for any future modifications and improvements to the roadway, and would be subject to New Jersey State Historic Preservation Office ("NJSHPO") review because of its impacts on the historic characteristics of the Parkway, all as more fully described below. For these reasons, a re-alignment that would place the transmission lines on the Parkway right-of-way in the Subject Area, is inappropriate and is strongly discouraged.

Within the area of Mile Post 64 through Mile Post 65+ the following conditions exist:

- (1) on the westerly side of the Parkway, a residential development is immediately adjacent to the right-of-way. The southbound roadway, from the edge of pavement, has an eighty-eight foot (88') right-of way between the roadway and the residential housing. The first thirty feet (30') of the western right-of-way is a grassy area designated as required "clear-zone". The remaining fifty-eight feet (58') of right-of-way is a treed buffer between the roadway and the residential housing. Thus, the sixty (60) foot "clearance envelope" necessary for the Conectiv project would cause the elimination of the remaining treed buffer, result in an encroachment into the required clear-zone and

would cause the project to be visible to motorists using the Parkway as well as the adjacent homeowners.

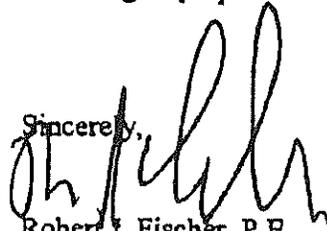
- (2) the treed right-of-way on the easterly side of the Parkway is as limited in width as that of the westerly side. Vacant federally-owned lands exist adjacent to the easterly right-of-way. Therefore the placement of the project within the Parkway's easterly right-of-way would also result in a visual impact visible to the motorists using the Parkway.

In addition, it should be noted that any use of the westerly or easterly area between the roadway and the adjacent right-of-way boundary lines would impact on any future improvements to the Parkway because it would leave the Parkway's trademark characteristic -- its median -- as the only space available for such improvements.

Further, because the Parkway is subject to NJSHPO jurisdiction, the re-alignment suggested by the federal agencies, which would have the effect of eliminating a relatively small tree buffer between the Parkway corridor and surrounding properties, would undoubtedly be viewed by NJSHPO as an adverse impact upon the historic characteristics of the Parkway, giving rise to a requirement for mitigation.

Therefore, in light of the reasons cited above, we could not support and would strongly discourage a proposed re-alignment onto the Parkway's right-of-way in the Subject Area.

Sincerely,



Robert J. Fischer, P.E.
Director of Engineering
Parkway Division

APPENDIX G
PROOF OF PUBLIC NOTICE

NOTICE OF STATE PERMIT APPLICATION PUBLIC HEARING

TAKE NOTICE that the New Jersey Department of Environmental Protection, Land Use Regulation Program will hold a Public Hearing on the following permit applications submitted under the Coastal Area Facility Review Act (NJSA 13:19-1 et seq.) and the Freshwater Protection Act Freshwater Wetlands NJSA 13:9B-1 et seq.

Applicant: Atlantic City Electric d/b/a
Connective Power Delivery
File No: 1500-02-0004.2CAF040001
Project: Oyster Creek to Cedar Creek 230 Kv
Northern Phase
Project Description: Upgrade and installation of power lines
Location: Oyster Creek to Cedar Creek
Municipality: Townships of Lacey,
Ocean, Barnegat, Stafford
County: Ocean County
Lot(s) No.: Various
Block(s) No.: Various

File No: 1500-03-0008.2CAF0400011
Project: Ship Bottom Substation Upgrade
Upgrade to electric substation
Ship Bottom
Location: Borough of Ship Bottom,
Ocean County
Municipality: Ocean County
Lot(s) No.: 4, 5, 6 (AKA 6.01)
Block(s) No.: 104

The Land Use Regulation Program invites the public to attend the Public Hearing and present written or oral comments on the application and staff preliminary analysis.

Hearing Date: May 6, 2004
Hearing Time: 7:00pm
Hearing Location: Russell O. Blackman Middle School
600 Barnegat Boulevard North
Barnegat, NJ 08005
Hearing Officer: Michael Garity

File No: 1500-02-0004.3CAF040001
Project: Cedar Substation Upgrade
Project Description: Upgrade to electric substation
Location: Route 9
Municipality: Townships of Stafford
County: Ocean County
Lot(s) No.: Various
Block(s) No.: Various

The Land Use Regulation Program invites the public to submit written comments on the above-referenced permit application within fifteen (15) days following the public hearing to:
Michael Garity
NJDEP

Land Use Regulation Program
PO Bbx 439, Trenton, New Jersey 08625

Southern Ocean County Hospital presents

ASK THE EXPERT

APPENDIX H
BEST MANAGEMENT PRACTICES

APPENDIX H BEST MANAGEMENT PRACTICES

All activities will be conducted within Conectiv's existing transmission line right-of-way (ROW) or newly obtained ROW. It is anticipated that the activities will not cause an adverse impact on the environment when the following practices are followed.

EROSION AND SEDIMENTATION CONTROL

Conectiv will ensure that there is minimum disturbance of the land surface or soil while conducting maintenance activities within wetland areas. If conditions warrant, mats will be placed on the surface of the wetland to prevent or decrease rutting caused by construction equipment. If ruts are caused by construction equipment, they will be graded to their original conditions following the work performed. Any excess soils shall be removed to upland areas. Upon the completion of construction activities, disturbed areas will be stabilized with appropriate seeding and/or mulch.

Sediment barriers (i.e., silt fence, hay bales) will be used for work adjacent to a stream or within or adjacent to a wetland area to prevent the flow of sediment into the water body. Sediment barriers will be inspected on a regular basis to ensure the erosion control structures are functioning properly. Any damaged or missing control features will be replaced upon discovery.

EQUIPMENT USE IN WETLAND AREAS

Use of wheeled, tracked, or rubber tire vehicles in wetlands will be minimized when site conditions are such that use of these vehicles may cause excessive rutting in saturated soils. During such periods, equipment will work on mats.

Vehicles shall be parked in work areas overnight, if possible, in order not to create any additional disturbance due to continued access to the work site. Care shall be taken not to allow the discharge of fluids such as crankcase oil, gasoline, diesel fuel, etc., into or immediately adjacent to the wetlands. Work activities will be scheduled to minimize the time period of vehicle use in these areas.

ACCESS ROADS AND WORK AREAS

In all cases, existing access roads along the existing ROW will be used for access. If existing access roads are not available or usable, then access to the work site will be the shortest distance over wetlands to the maximum extent practical to avoid any additional or unnecessary impact.

All access areas and work areas for the activity within wetland areas are temporary only. No permanent filling shall be allowed unless specifically permitted by the appropriate regulatory agencies. All temporary materials, including matting used to construct access roads within wetlands, shall be removed following completion of their use.

Whenever an access road or entrance to the ROW intersects any paved public roadway, measures will be taken to prevent tracking or flowing of sediment onto the public road.

RESTORATION

Restoration is expected to be minimal, as the installation of the new poles will cause the greatest degree of soil disturbance. The new poles are not expected to create large amounts of exposed soil. However, the surface areas disturbed during installation of the new poles will be graded and stabilized. All wetland areas, with the exception of water-covered areas, will be graded to their pre-construction contours and stabilized temporarily with seed and mulch. Should these restoration activities occur during inappropriate seasons for seeding (i.e. November through February), then only mulch will be used. Such areas shall be properly restored (i.e. seed and new mulch applied) at the next appropriate growing season. Because the area of disturbance is relatively small, natural revegetation by nearby plant species is expected to occur rapidly.

For minor disturbances, such as track or rubber tire vehicles driving over herbaceous species, no seeding or monitoring should be necessary.

SOIL EROSION AND SEDIMENT CONTROL

This plan has been prepared for use by Conectiv as a guidance manual during construction activities on its transmission line and associated facilities. Conectiv's best management practices (BMPs) are designed to accommodate varying field conditions while maintaining rigid minimum standards for the protection of environmentally sensitive areas during routine activities. The measures described in this plan have been developed to provide a practical and workable means of minimizing detrimental impacts to soil and water resources as a result of construction activities.

The goal of this erosion and sedimentation control plan is to:

1. Minimize the amount of distributed soil;
2. Prevent runoff from off site areas from flowing across disturbed areas;
3. Slow down the runoff flowing across the site; and
4. Remove sediment from onsite runoff before it leaves the site.

GENERAL PRACTICES

These erosion and sedimentation control guidelines shall be utilized when and if the conditions described are encountered. All erosion and sedimentation control measures shall be used and maintained in an effective operating condition during construction.

1. No fuels, chemicals or lubricating oils will be stored within 100 feet of the edge of a water body or wetland area.
2. Refueling of construction equipment will not be permitted within 100 feet of the edge of a water body or wetland area.
3. All paved road and access points will be kept clear of soil, mud, and other debris during construction and restoration. Soil and mud cleared from the roadways will be returned to disturbed areas of the ROW.
4. Construction equipment will access the work sites along the Conectiv ROW and/or existing roadways.

5. Excavations left open overnight will have a plastic safety fence placed around the perimeter of the work area.
6. All disturbed areas will be returned to their natural conditions. Conectiv may utilize the services of a maintenance or professional landscaping crew to reseed and mulch the disturbed areas, if necessary.

SITES ADJACENT TO STREAMS AND WETLANDS

For activities conducted within 50 feet of a stream or wetland area, Conectiv will install sediment barriers as necessary to prevent the siltation of adjacent water bodies and/or wetlands down slope of the disturbed ROW.

WETLAND SITES

For maintenance activities performed within a wetland area the following procedures will be followed.

1. For ROW maintenance activities, cut vegetation off at ground level, leaving existing root systems intact. Remove vegetative waste from the wetland for proper disposal.
2. Do not drain wetland areas to improve working conditions.
3. Install sediment barriers as necessary to prevent the flow of cuttings off of the ROW
4. Use tracked or rubber tire equipment or use timber or wooden equipment mats when standing water or saturated soils are present.
5. Remove all cuttings to an upland area for disposal.
6. Temporarily revegetate disturbed areas with seed mixtures that can tolerate drought and nutrient poor conditions as listed by the Pinelands which include fescue species, smooth brome grass, reed canary grass, little bluestem, deertongue, redtop, and switch grass. The appropriate seed mixture selected will be applied at a rate of 40 pounds/acre, unless standing water is prevalent in which case no seed will be sown. No fertilizer or lime will be used in wetland areas.

SEDIMENT BARRIERS

As necessary, install temporary erosion controls immediately after initial disturbance of the ROW.

1. Maintain erosion controls throughout construction (on a daily basis) and reinstall as necessary until replaced by permanent controls or restoration is complete.
2. Install temporary interceptor dikes as necessary to reduce runoff velocity and divert water off the disturbed ROW. Temporary interceptor dikes may be constructed of materials such as soil, silt fence, staked straw bales or sandbags.
3. Install sediment barriers as necessary to filter waterborne sediment. Sediment barriers may be constructed of materials such as silt fence, staked straw bales or sand bags.