U.S. Department of the Interior
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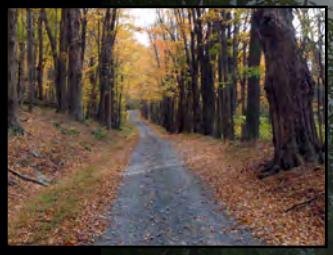
Appalachian National Scenic Trail
Delaware Water Gap National Recreation Area
Middle Delaware National Scenic and Recreational River

New Jersey and Pennsylvania



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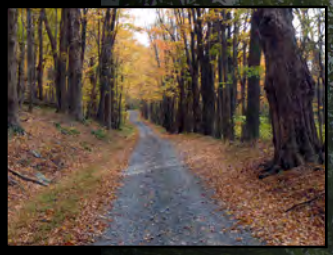

Susquehanna to Roseland 500kV Transmission Line Right-of-Way and Special Use Permit Draft Environmental Impact Statement

Volume 1

December 2011

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
SUSQUEHANNA TO ROSELAND 500-kV TRANSMISSION LINE RIGHT-OF-WAY AND SPECIAL USE PERMIT DRAFT ENVIRONMENTAL IMPACT STATEMENT

APPALACHIAN NATIONAL SCENIC TRAIL, DELAWARE WATER GAP NATIONAL RECREATION AREA, MIDDLE DELAWARE NATIONAL SCENIC AND RECREATIONAL RIVER, PENNSYLVANIA AND NEW JERSEY

Lead Agency: National Park Service, U.S. Department of the Interior
Cooperating Agency: U.S. Fish and Wildlife Service

This *Susquehanna to Roseland 500-kV Transmission Line Right-of-Way and Special Use Permit Draft Environmental Impact Statement (EIS)* was prepared for the Delaware Water Gap National Recreation Area (DEWA), Appalachian National Scenic Trail (APPA), and Middle Delaware National Scenic and Recreational River (MDSR) in Pennsylvania and New Jersey. This EIS describes the proposal of PPL Electric Utilities Corporation (PPL) and Public Service Electric and Gas Company (PSE&G), jointly known as the applicant, to construct a portion of the Susquehanna to Roseland 500-kV transmission line (S-R Line) and reconstruct an existing 230-kV line along their current ROW through the parks, and details the six alternatives for the route of the transmission line, the resources that would be affected by the alternatives, and the environmental consequences of the alternatives.

The purpose of the proposed action is to respond to the applicant's expressed request to construct a double 500-kV power line across three units of the national park system in light of the purposes and resources of the affected units of the national park system, as expressed in statutes, regulations, and policies. Federal action by the NPS is needed because the applicant has submitted the required applications and a preliminary construction plan to expand the size of the current ROW, access the ROW through existing natural and cultural areas, construct new and taller power line towers, and remove and replace the existing 230-kV B-K Line, with an additional 500-kV power line in accordance with Title 36 of the Code of Federal Regulations part 14 (36 CFR 14) and applicable NPS management policies.

Under alternative 1 (no action), the permit to approve construction of the 500-kV S-R Line and reconstruction of the 230-kV line would be denied, and current conditions would be presumed to continue. Under alternative 2 (applicant's proposed route), the permit would be approved, and the S-R Line would follow the corridor of the existing transmission line through DEWA, MDSR, and APPA for 4.3 miles, requiring an expansion of the cleared ROW to approximately 200 to 380 feet in width. Alternative 2b (applicant's alternate route) would follow the same route as alternative 2, but would be constructed within the existing ROW. Alternative 3 would cross approximately 5.4 miles of NPS lands, and would require a ROW that ranges between 150 and 300 feet. Alternative 4 would require a ROW ranging from 200 to 300 feet, and would traverse approximately 1.5 miles of NPS lands. This alternative would not cross the MDSR. Alternative 5 would follow the same route as alternative 4, but would not include a 0.6-mile stretch of NPS land found west of the Bushkill substation. Alternative 1 is the ***environmentally preferred alternative***. NPS does not have a preferred alternative at this time, but an ***NPS preferred alternative*** will be designated in the final EIS. The EIS analyzes the impacts of the alternatives in detail for geologic resources (including topography and paleontology); floodplains; wetlands; vegetation; landscape connectivity, wildlife habitat, and wildlife; special-status species; rare and unique communities; archeological resources; historic structures; cultural landscapes; socioeconomics; infrastructure, access, and circulation; visitor use and experience; visual resources; soundscapes; wild and scenic rivers; park operations; and health and safety.

This draft EIS is available for public and agency review and comment beginning with publication of the notice of availability in the Federal Register. Comments will be accepted during the 60-day public comment period electronically through the NPS Planning, Environment and Public Comment website listed below or by hard copy sent to the address listed below by mail or hand delivery. Comments will also be accepted during public meetings on the EIS. Comments will not be accepted by fax, email, or in any other way than those specified above. After public review, NPS will select a preferred alternative and revise this document in response to public comments, a final version of this document will then be released, and a 30-day no-action period will follow the notice of availability. After this period, the alternative or actions constituting the approved plan will be documented in a record of decision that will be signed by the Regional Director of the Northeast Region of the NPS. For further information regarding this document, please visit http://parkplanning.nps.gov/dewa.

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National Park Service
U.S. Department of the Interior

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EXECUTIVE SUMMARY

This *Susquehanna to Roseland 500-kilovolt (kV) Transmission Line Right-of-Way and Special Use Permit Draft Environmental Impact Statement* (EIS) analyzes a range of alternatives and actions for the proposed construction of a transmission line through portions of the Delaware Water Gap National Recreation Area (DEWA), Appalachian National Scenic Trail (APPA), and the Middle Delaware River National Scenic and Recreation Area (MDSR) in Pennsylvania and New Jersey in order to determine if the National Park Service (NPS) will grant or deny permit required for construction of the transmission line through NPS lands. The EIS also assesses the impacts that could result from the denial of permit and the continuation of current conditions (the no-action alternative) or the implementation of any of the five action alternatives (2, 2b, 3, 4, and 5). This EIS has been prepared in accordance with the National Environmental Policy Act (NEPA) and the NPS Director's Order (DO) 12: Conservation Planning, Environmental Impact Analysis, and Decision Making. The EIS also complies with section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended.

PURPOSE OF ACTION

The federal action under consideration for this EIS is granting or denying the applicant's proposal by either issuing or not issuing the requested construction and right-of-way (ROW) permit. In accordance with the DO 12 Handbook: *Conservation Planning, Environmental Impact Analysis, and Decision Making* (NPS 2001a), the purpose component of an EIS defines the goals and objectives that are critical to meet if the NPS is to properly consider the proposal. Accordingly, the purpose of the proposed action is to respond to the applicant's expressed request to construct a double 500-kV power line across three units of the national park system in light of the purposes and resources of the affected units of the national park system, as expressed in statutes, regulations, and policies.

NEED FOR ACTION

In 2007, the regional transmission operator, PJM Interconnection (PJM), identified a 500-kV transmission line between the Susquehanna Substation in Pennsylvania and the Roseland Substation in New Jersey as the preferred and most effective solution for forecast reliability violations as part of the Federal Energy Regulatory Commission – approved Regional Transmission Expansion Plan (RTEP) process. The 2008, 2009 and 2010 RTEPs confirmed the prediction of grid reliability violations and the utility of the S-R Line in remedying them.

Federal action by the NPS is needed because the applicant has submitted the required applications and a preliminary construction plan to expand the size of the current ROW (easement), access the ROW through existing natural and cultural resource areas, construct new and taller power line towers, and remove and replace the existing 230-kV transmission line that runs from Bushkill to Kittatinny (the B-K Line), with an additional 500-kV power line in accordance with applicable regulations. Under NEPA, before the NPS may issue any permit necessary to allow a double 500-kV line across any unit of the national park system it must consider and assess the impact on the human environment.

BACKGROUND AND PURPOSE OF DEWA, MDSR, AND APPA

DEWA, MDSR, and APPA are three separate units of the national park system. DEWA, MDSR, and APPA are central components of nature-based recreation for the New York City/Philadelphia metroplex.

DEWA is a 67,210-acre park along the shores of the Delaware River in New Jersey and Pennsylvania. DEWA offers a variety of outdoor recreational opportunities, including boating, fishing, swimming,

biking, crosscountry skiing, rock climbing, sightseeing, natural and cultural history, and the general solitude of a rural environment. Each year, DEWA receives more than 5.2 million recreational visitors (NPS 2010b). The park is the eighth most visited unit (depending on the year) in the national park system and visitation is growing at a steady rate. Much of this visitation is from the nearby, rapidly expanding, New York/northern New Jersey and Philadelphia suburban areas (NPS 2010c, NPS 2010b). The Delaware River is one of the primary recreational attractions in the park unit. The river is the last free-flowing river on the eastern seaboard (NPS 2003a, 1). Some of the important purposes of DEWA are to meet outdoor recreational needs, as well as to preserve scenic, scientific, and historic resources that contribute to the public enjoyment of the lands and waters in the park, and to leave the resources unimpaired for future generations.

MDSR was established as a scenic and recreational river in 1978 under the Wild and Scenic Rivers Act. The Delaware River is one of the cleanest rivers in the nation making it a popular destination for swimming, fishing, boating, canoeing, kayaking, rafting, and tubing. It is estimated that more than 15 million persons in the United States, including New York City, Philadelphia, and surrounding urban areas, depend on the water of the Delaware River Basin for public water supply and industrial use (Sloto and Buxton 2006, 2). A portion of the Delaware River Water Trail, a national scenic trail from Hancock, New York to Trenton, New Jersey, runs through MDSR. The purpose of the MDSR is to protect and enhance those values which contribute to making the river a recreational and scenic river, and that provide public use and enjoyment of these values.

APPA is a 2,175-mile-long public footpath from Maine to Georgia conceived in 1921 and completed in 1937. APPA was designated as the nation's first national scenic trail by the NSTA (National Scenic Trails Act) in 1968. It is arguably the most famous hiking path in the world. The trail was built by private citizens and is enjoyed by an estimated two to three million people each year. It is within a day's drive of two-thirds of the U.S. population. APPA is managed cooperatively by the NPS, the Appalachian Trail Conservancy, volunteers from 30 local Appalachian Trail Clubs, the U.S. Department of Agriculture Forest Service, and other public land–managing agencies. APPA is located on more than 75 federal and state forests and park lands (NPS 2010d). APPA was created with the purpose of providing maximum outdoor recreational potential as an extensive footpath, as well as to provide for the enjoyment of and conservation of the scenic, historic, natural, and cultural resources found in areas where the trail passes. It also stands as a monument to the historical movement of the visionaries and volunteers who conceived of and brought the Trail into existence.

OBJECTIVES

Physical resources

- Avoid adverse effects on geologic resources (geology, paleontology, and rare and unique geologic features), soil resources (soils and prime and unique farmlands), and water resources (surface waters and groundwater).

Natural resources

- Avoid adverse effects on natural resources (vegetation, landscape connectivity and wildlife habitat, special-status species, and rare and unique communities).
- Protect existing functions and values of wetlands and floodplains by avoiding adverse impacts or limiting impacts to an insignificant level.
- Maintain the ecological integrity of rare and unique communities and prevent degradation of the communities from occurring.

- Protect threatened and endangered species by avoiding impacts. Complete consultation with federal agencies as required under the Endangered Species Act of 1973, as amended (16 United States Code [USC] 1531–1544), and coordinate with state agencies regarding state-listed species.
- Manage any construction and maintenance activities to avoid or reduce impacts on wildlife and plant species as much as possible.
- Manage any construction and maintenance activities to avoid or reduce the introduction and spread of invasive species.
- Avoid or minimize adverse effects on migratory birds in accordance with Migratory Bird Treaty Act and the 2010 *Memorandum of Understanding Between the U.S. Department of the Interior National Park Service and the U.S. Fish and Wildlife Service to Promote the Conservation of Migratory Birds*.
- Mitigate impacts on landscape connectivity.

Cultural resources

- Avoid, minimize, or mitigate adverse effects on identified archeological resources.
- Avoid, minimize, or mitigate adverse effects on identified historic structures.
- Avoid, minimize, or mitigate adverse effects on identified cultural landscapes.
- Protect the eligibility of cultural resources for National Register of Historic Places (national register) nomination.

Socioeconomics

- Avoid impacts on surrounding land use; socioeconomics; and infrastructure, access, and circulation; or gateway communities.

Visitor use and experience

- Maintain visitor experience, including preservation of key qualities such as primitive, solitary, and pastoral experiences. If impacts are unavoidable, mitigate impacts as appropriate, including any lost use due to closures or diminished experience caused by construction.

Visual resources

- Avoid, minimize, or mitigate impacts to scenic viewsheds and landscapes.

Soundscapes

- Avoid, minimize, or mitigate impacts on soundscapes.

Wild and scenic rivers

- Avoid adverse effects on the esthetic, scenic, historic, archeological, and scientific features of MDSR.

Park operations

- Avoid adverse effects on the parks' fiscal and operating resources, including long-term management of resources and volunteer organizations.

Human health and safety

- Protect the safety of staff and visitors; measures taken to ensure human health and safety could include closures of roads, the river, trails, and airspace, as necessary.

SUSQUEHANNA TO ROSELAND TRANSMISSION LINE LOCATION AND BACKGROUND

A consortium of PPL Electric Utilities Corporation (PPL) and Public Service Electric and Gas Company (PSE&G), jointly known as the applicant, has proposed constructing a double 500,000-volt (500-kV) transmission line, the S-R Line, including crossings of DEWA, APPA, and MDSR, in Pennsylvania and New Jersey. Applicant has applied for a permit to allow the construction, maintenance, and operation of the S-R Line across three units of the national park system, and the replacement of an existing 230-kV transmission line it owns. This existing 230-kV transmission line runs from the northwest to the Bushkill substation crossing a small segment of DEWA, and from Bushkill substation across DEWA, MDSR, and APPA, connecting to the Kittatinny substation, and is referred to in this document as the Bushkill-Kittatinny line or B-K Line. This line and its right of way predate the establishment of all of the three Park units, and have been described by the applicant as physically obsolescent if not actually obsolete. The B-K Line towers are approximately 80 feet in height and its right-of-way varies from 100 to 300 feet in width through the Parks. The applicant's proposal would replace the B-K Line with a new set of towers up to 195 feet tall on a widened right of way carrying both the S-R Line and a replacement B-K Line. The replacement B-K Line would be capable of carrying 500 kV, though initially energized at 230 kV. The proposal and the action alternatives to it discussed herein all include both the construction of the S-R Line and the replacement of the B-K Line. References in this document to "the Line" refer to a set of towers carrying both lines.

The applicant's stated purpose for the proposed S-R Line is to strengthen the reliability of the grid at the direction of the regional transmission operator, PJM. PJM oversees the overall movement of wholesale electricity between many electric utilities in all or parts of 13 states and the District of Columbia. The PJM 2007 load forecast model identified 23 projected reliability criteria violations starting in 2012 and beyond. The need for the proposed S-R Line has been expressed several times by PJM in planning documents. RTEPs from PJM from 2007 to 2010 have identified the proposed S-R Line as an important project on what was termed by PJM as a "backbone" line. Construction of this line would aid in resolving several violations and issues related to reliability and congestion. North American Electric Reliability Corporation (NERC) also identified the proposed S-R Line as a "backbone," while the applicant has repeatedly noted the need for and importance of increased electrical transmission capacity between Berwick, Pennsylvania and Roseland, New Jersey. If constructed, the new S-R Line would convert the current transmission line corridor from noncritical to critical status as part of the PJM-managed transmission grid. The two new lines proposed would require a much higher level of access roads and activity.

Some members of the public expressed concerns about the need for and impacts of the project during NPS public scoping and alternatives development workshops. Some individuals and public organizations question the need for expanded transmission line, given the static-to-recessional economic climate and increases in energy efficiency. In areas along the proposed S-R Line, energy consumption has decreased in recent years, and forecasts of a continued downward trend in reduced regional demand caused some to question a verifiable need for the proposed line. Three municipalities also question the need, and have

noted engineering concerns with long-distance electrical power transmission and its potential to cause cascading power failures through the increased current needed to maintain power flows across such lines.

The Pennsylvania Public Utility Commission (PAPUC) and the New Jersey Board of Public Utilities (NJBPU) approved the S-R Line, although the approval included permit conditions and the NJBPU approval is being challenged in court.

Whether there is a need for the proposed S-R Line project is not for the NPS to decide, nor is it a factor in the preparation of this EIS. The NPS prepared this EIS to determine whether to grant or deny the applicant's proposal for construction and ROW permit within NPS lands.

ALTERNATIVES CONSIDERED

This EIS considers six alternatives that would cross NPS lands and require an NPS-issued permit. The NPS does not control the route of the proposed S-R Line in areas outside NPS lands. Although the applicant could choose any route outside of NPS jurisdiction, the NPS identified possible routes in each alternative that could connect the Susquehanna and Roseland substations. The NPS identified routes solely to determine if construction on the routes is technically feasible. Route identification does not constitute any NPS attempt to determine the actual location of the proposed lines outside of NPS jurisdiction. The routes and requirements of the proposed alternatives are presented as follows.

DESCRIPTION OF THE ALTERNATIVES

Alternative 1: The No-action Alternative

Under the no-action alternative, the NPS would deny the application for ROW and construction permit to replace the B-K Line with a new double-circuit line through NPS lands. The existing B-K Line traverses approximately 4.3 miles of DEWA, with the ROW varying between 100 ft and 380 ft. The line begins at the Susquehanna Substation and enters DEWA in Pennsylvania approximately 0.25 mile east of Big Bushkill Creek. The line then exits the park, connects to the Bushkill Substation, travels through developed areas, including Fernwood Golf Course, and re-enters DEWA south of the South Zone Ranger Station and north of DEWA Headquarters, crossing MDSR just north of Depew Island. The line continues southeast past the Watergate Recreation Site and across APPA to the eastern DEWA boundary. There are 22 existing transmission towers located within DEWA boundaries for the existing B-K Line, and there are no existing access roads to the ROW. This alternative would have no effect on the existing transmission line outside of NPS property and assumes that the existing line within the parks would remain in place without expansion or replacement. In essence, it assumes that current conditions on the ground will continue indefinitely into the future. However, the applicant could seek to expand or replace the existing utility lines within the existing easements through the parks. There are no proposals at this time.

Alternative 2: Applicant's Proposed Route

The route proposed by the applicant would follow the route of the existing B-K Line, which traverses approximately 4.3 miles of DEWA. Within DEWA boundaries, the route crosses MDSR and APPA approximately perpendicularly. In this EIS, 5.6 miles of Alternative 2 were analyzed, 4.26 of which were within NPS boundaries. The alignment would enter DEWA from the west in Pennsylvania approximately 0.25 mile east of Big Bushkill Creek. The alignment would cross approximately 0.6 mile of DEWA land and then exit the park. Once the alignment exits the park, it would travel to the Bushkill Substation, cross a small (0.06-mile) portion of DEWA, cross the Fernwood Golf Course, and then re-enter DEWA south of the South Zone Ranger Station and north of DEWA Headquarters. The alignment would travel southeast within DEWA for approximately 0.85 mile, then cross 0.10 mile of MDSR just north of Depew

Island. The route would continue southeast approximately 2.4 miles past the Watergate Recreation Site and cross APPA. The route would then traverse another 0.25 mile from APPA to the eastern DEWA boundary. The width of the existing B-K Line ROW ranges from 100 to 380 feet in Pennsylvania and New Jersey. This alternative would require clearing of vegetation for an additional 50 to 200 feet of ROW. The alignment for this alternative also crosses MDSR and APPA within DEWA.

Alternative 2b: Applicant's Alternate Proposal

The alignment for the applicant's alternate proposal would follow the same route as described for alternative 2. The difference between alternative 2 and alternative 2b is that the former would require widening the existing ROW, while the latter would be constructed within the existing ROW. The towers for alternative 2b would be the same height as those described for alternative 2, but alternative 2b would require two additional towers within NPS lands compared to alternative 2. These towers would be constructed within the 100-foot-wide portion of the alignment. Because the ROW under alternative 2b is narrow, the applicant's plans require these additional towers to protect against fire hazards presented by the risk of the line being blown by the wind into contact with nearby trees. The minimum horizontal clearance to the edge of the ROW under high wind conditions to prevent the line from coming into contact with nearby trees was determined to be greater than 100 feet. The alignment for this alternative also crosses MDSR and APPA within DEWA. The feasibility of this alternative is dependent on the applicant's ability to clear danger trees beyond the existing ROW. In communications with NPS, the applicant has indicated they have the right to clear danger trees from NPS property without additional permission from NPS. NPS does not agree with this determination.

Alternative 3

The alternative 3 alignment would pass through DEWA along the ROW of existing transmission and distribution lines. The existing transmission and distribution lines would be removed before construction of the Line. The ROW for the existing transmission line is 100 feet wide, and this alternative would require clearing of vegetation for an additional 50 to 200 feet of ROW. The structures of the transmission and distribution lines would be constructed so that these lines and the S-R Line would run parallel to one another within the expanded ROW. That is, two separate sets of structures would be constructed, one set for the proposed Line and one set for the existing transmission and distribution lines along the alternative 3 alignment. Alternative 3 would cross a total of 5.4 miles within the DEWA boundary. The route would cross about 1.3 miles of DEWA, and the additional 0.6-mile portion of the alignment from the western boundary of DEWA to the Bushkill Substation. The alignment of Alternative 3 would also travel through about 1.7 miles of the northern end of Worthington State Forest, which is located within DEWA. Alternative 3 also runs along the eastern boundary of DEWA for approximately 1.8 miles. The alignment for this alternative also crosses MDSR within DEWA, and crosses APPA. Construction of this alternative would require the removal and relocation of the existing B-K Line crossing inside the parks.

Alternative 4

Alternative 4 would pass through the southernmost portion of DEWA along the path of an existing distribution line ROW. The existing ROW ranges from 100 to 200 feet wide, and this alternative would require permanent clearing of vegetation for an additional 100 to 200 feet of ROW. This line along alternative 4 would be removed before construction of the S-R Line. The structures of the existing distribution line would be replaced so this line and the double-circuited S-R Line would run parallel to one another within the expanded ROW. The route would cross about 1.5 mile of NPS lands, including DEWA and APPA. The alignment in this alternative would also cross the Lower Delaware River; however, the crossing of the Delaware River would occur outside the DEWA boundary. As with alternative 3, the alternative 4 alignment would follow the alignment of the B-K Line for 0.6 mile from

the western boundary of DEWA to the Bushkill Substation. The alignment would leave DEWA and travel southwest where it would reenter DEWA. Upon entering DEWA from the north, the alternative 4 alignment would cross about 0.42 mile of DEWA land, roughly following the DEWA boundary, and would cross Mountain and Totts Gap roads. The alignment would pass outside DEWA boundaries for approximately 0.51 mile. Upon reentering DEWA, the alignment would immediately cross APPA, then extend approximately 0.50 mile south to the boundary of DEWA. The designated boundary of Cherry Valley National Wildlife Refuge borders the existing ROW of the alternative 4 alignment north of APPA for approximately 0.73 mile. The alternative 4 alignment would also cross through portions of Cherry Valley National Wildlife Refuge. Construction of this alternative would require the removal and relocation of the existing B-K Line crossing inside the parks.

Alternative 5

Inside the study area, alternative 5 would follow a similar alignment as alternative 4 (described above); however, beyond the study area, alternatives 4 and 5 would split. The alternative 5 alignment would not cross the 0.6 mile portion west of the Bushkill Substation associated with alternative 4. Thus, under alternative 4 the applicant would have the option of a secondary crossing of NPS land west of Bushkill while under alternative 5 it would not. This is the only difference between 4 and 5 over which NPS exercises any discretion or control. Inside the study area, alternative 5 would be approximately 1.7 miles long, with approximately 0.9 mile within NPS lands.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative is the alternative that would promote the requirements of the national environmental policy expressed in section 101(b) of NEPA. It is the alternative that causes the least damage to the biological and physical environment and that best protects, preserves, and enhances historic, cultural, and natural resources (CEQ 1981, Q6a). Alternative 1, the no-action alternative, was selected as the environmentally preferred alternative by the NPS. This decision was based on the available scientific data about the proposal and mitigation measures presented by the applicant and collected by NPS. An analysis of this data made it clear that alternative 1 best meets the requirements of the environmentally preferred alternative.

ENVIRONMENTAL CONSEQUENCES

The summary of environmental consequences considers the actions being proposed and the cumulative impacts to resources from occurrences inside and outside the park. The potential environmental consequences of the actions are addressed for geologic resources (including topography and paleontology); floodplains; wetlands; vegetation; landscape connectivity, wildlife, and wildlife habitat; special-status species; and rare and unique communities. Other topics considered in detail include archeological resources; historic structures; cultural landscapes; socioeconomics; infrastructure, access, and circulation; visitor use and experience; visual resources; soundscapes; wild and scenic rivers; park operations; and health and safety. A brief summary of the major environmental consequences for each alternative is presented below. NPS may change the way in which the EIS organizes and presents this information in the final EIS, and welcomes public comment on how this information is presented.

Alternative 1 would not have significant impacts on the environment. The actions under alternative 1 would be in keeping with the parks' enabling legislations, NPS Management Policies, and all other applicable federal and state laws. Any cumulative impacts to resources would remain adverse primarily from other actions taken outside the study area. While there are adverse impacts associated with the continued operation and maintenance of the 230 kV transmission line, the duration and intensity of these impacts are not such as to make them significant impacts in the context of the Park.

Alternative 2 would cause significant impacts to geologic resources; wetlands; vegetation; landscape connectivity, wildlife, and habitats; rare and unique communities; archeological, historic structures, cultural landscapes, visitor use and experience, scenic resources, park operations, and infrastructure, access and circulation.

Alternative 2b would cause significant impacts to geologic resources; wetlands; vegetation; landscape connectivity, wildlife, and habitats; rare and unique communities; archeological, historic structures, cultural landscapes, visitor use and experience, scenic resources, park operations, and infrastructure, access and circulation.

Alternative 3 would have significant adverse impacts on geologic and paleontological resources, wetlands, visitor use and experience, visual resources, vegetation, rare and unique communities, species of special concern, wild and scenic rivers, historic structures, cultural landscapes, park operations, and infrastructure, access and circulation.

Alternative 4 would have significant adverse impacts on many resources, including Special Status Species, Wetlands, Rare and Unique Communities, Landscape Connectivity, Visitor Use and Experience, Visual Resources, Archaeological Resources, Cultural Landscapes, and Historic Structures.

Alternative 5 would have significant adverse impacts on many resources including Special Status Species, Wetlands, Rare and Unique Communities, Landscape Connectivity, Visitor Use and Experience, Visual Resources, Archaeological Resources, Cultural Landscapes, and Historic Structures.

Resource	Alternative 1: No-Action Alternative	Alternative 2: The Applicant's Proposed Route	Alternative 2b	Alternative 3	Alternative 4	Alternative 5
Geologic Resources	No impacts from vegetation maintenance activities on geology and topography; vegetation maintenance could increase access to and visibility of paleontological specimens, particularly at previously identified sites.	Impacts from tower construction and grading on geology, topography, and paleontology; the installation of **12 tower locations/crane pads** in rare or unique features, in areas with slopes greater than 10%, and in unstable geologic formations could impact geologic resources; blasting and/or excavation could disturb paleontological resources.	Same as alternative 2.	Impacts on geology due to the drilling, blasting, and excavation activities; the installation of **25 towers/crane pads** in areas with slopes greater than 10% and 11 to 15 towers in unstable areas and in rare or unique geologic features; construction and clearing would impact paleontology through direct damage, collection, or vandalism of paleontological sites.	Impacts from tower construction and grading on geology, topography, and paleontology; **the installation of 2 towers/crane pads** in areas with slopes greater than 10%; no towers would be constructed within rare or unique geology inside the study area; construction and clearing would impact paleontology through direct damage, collection, or vandalism of paleontological sites.	Same as alternative 4.
Floodplains	Clearing vegetation in the ROW due to periodic maintenance in the floodplain, would affect natural floodplain values but no new development would occur.	A maximum of **14.3 acres of vegetation in the floodplain** would be affected by vegetation management; access roads and crane pads would develop 0.202 acre of the floodplain.	A maximum of **8.35 acres of vegetation in the floodplain** would be affected by vegetation management; access roads and crane pads would develop 0.142 acre of the floodplain.	A maximum **of 7.93 acres of vegetation in the floodplain** would be affected by vegetation management; access roads and crane pads would develop 0.222 acre of the floodplain.	No vegetation in the floodplain would be cleared; access roads and crane pads would develop 0.162 acre of the floodplain.	No vegetation in the floodplain would be cleared and no development in the floodplain would occur.
Wetlands	Impact from maintenance, resulting in **conversion of 9.92 acres of wetlands** to scrub shrub or emergent wetlands; rare and unique wetlands as well as Exceptional Value Wetlands would be affected.	Impacts from clearing wetlands, resulting in **conversion of 23.94 acres of wetlands** to scrub shrub or emergent wetlands; construction of access roads and crane pads in wetlands (1.02 acres), and from blasting activities; rare and unique wetlands as well as Exceptional Value Wetlands would be affected.	Impacts from clearing wetlands, resulting in **conversion of 12.13 acres of wetlands** to scrub shrub or emergent wetlands; construction of access roads and crane pads in wetlands (0.56 acres), and from blasting activities; rare and unique wetlands as well as Exceptional Value Wetlands would be affected.	Impacts from clearing wetlands, resulting in **conversion of 3.21 acres of wetlands** to scrub shrub or emergent wetlands; construction of access roads in wetlands (0.02 acres).	Impacts from clearing wetlands, resulting in **conversion of 5.8 acres of wetlands** to scrub shrub or emergent wetlands; construction of access roads in wetlands (0.09 acres).	Impacts from clearing wetlands, resulting in **conversion of 4.31 acres of wetlands** to scrub shrub or emergent wetlands; construction of access roads in wetlands (0.09 acres).
Vegetation	Impacts would result from vegetation maintenance activities and maintenance of scrub shrub habitat in the ROW.	Approximately **240 acres of vegetation would be cleared** in the ROW, 129 acres of this which is mature forest; impacts would also result from spread of invasive species, vegetation maintenance activities, and vegetation clearing from other construction activities outside the ROW (25.7 acres).	Approximately **144 acres of vegetation would be cleared in the ROW**, 42 acres of this which is mature forest; impacts would also result from spread of invasive species, vegetation maintenance activities, and vegetation clearing from other construction activities outside the ROW (26.7 acres).	Approximately **313 acres of vegetation would be cleared in the ROW**, 204 acres of this which is mature forest; impacts would also result from spread of invasive species, vegetation maintenance activities, and vegetation clearing from other construction activities outside the ROW (100.6 acres).	Approximately **113 acres of vegetation would be cleared in the ROW**, 70 acres of this which is mature forest; impacts would also result from spread of invasive species, vegetation maintenance activities, and vegetation clearing from other construction activities outside the ROW (55.9 acres).	Approximately **74 acres of vegetation would be cleared in the ROW**, 44 acres of this which is mature forest; impacts would also result from spread of invasive species, vegetation maintenance activities, and vegetation clearing from other construction activities outside the ROW (55.3 acres).

Resource	Alternative 1: No-Action Alternative	Alternative 2: The Applicant's Proposed Route	Alternative 2b	Alternative 3	Alternative 4	Alternative 5
Landscape Connectivity, Wildlife Habitat, and Wildlife	Impacts would result from the continued maintenance of the ROW, loss of habitat from removal of danger trees outside the ROW, and disturbance and direct mortality of wildlife.	Impacts would result from habitat loss, habitat alteration, the continued maintenance of the ROW, the isolation of habitat patches, increased edge habitat, the disturbance and direct mortality of wildlife, and the isolation of some species.	Impacts would result from habitat loss, habitat alteration, continued maintenance of the ROW, the isolation of habitat patches, the disturbance and direct mortality of wildlife, and the isolation of some species.	Same as alternative 2.	Impacts would result from habitat loss, habitat alteration, continued maintenance of the ROW, the isolation of habitat patches, increased edge habitat, the disturbance and direct mortality of wildlife, and the isolation of some species.	Same as alternative 4.
Special-status Species: Aquatic Species	Impacts from temporary changes to water quality during maintenance activities.	Impacts from habitat loss and some changes to habitat during construction and maintenance activities.	Same as alternative 2.	Impacts from temporary changes to habitat during construction and maintenance activities.	No impact because no aquatic species are likely to exist in the ROW.	Same as alternative 4.
Special-status Species: Terrestrial Invertebrate Species	Vegetation maintenance activity would maintain and could expand suitable habitat (herbaceous).	Same as alternative 1.	Same as alternative 1.	N/A	N/A	N/A
Special-status Species: Birds	Impacts from presence of existing transmission line, maintenance activities, electrocution/collision potential; could create additional scrub shrub habitat in ROW.	Impacts from construction of line resulting in habitat loss and from presence of line resulting in collision or electrocution; could create additional scrub shrub habitat in ROW; this alternative would not be consistent with the Bald Eagle Guidelines.	Same as alternative 2.	Same as alternative 2.	Impacts from construction of line resulting in habitat loss and from presence of line resulting in collision or electrocution; could create additional scrub shrub habitat in ROW.	Same as alternative 4.
Special-status Species: Reptiles and Amphibians	Impacts from maintenance and human activities from disturbance of denning, basking, foraging, nesting, and breeding as well as introduction of invasive species.	Impacts from direct mortality, destruction of nests and/or overwintering areas; impacts on habitat used for foraging and basking; habitat loss/fragmentation during construction and maintenance activities.	Same as alternative 2.	Same as alternative 2.	Same as alternative 2.	Same as alternative 2.
Special-status Species: Mammals	Impacts from disturbance during maintenance activities and from tree removal in areas with potential habitat.	Impacts from noise and disturbance during construction; loss of potential habitat.	Same as alternative 2.	Same as alternative 2.	Same as alternative 2.	Same as alternative 2.
Special-status Species: Plants	Impacts from maintenance activities, including some wetland areas that support listed plants; disturbance as well as introduction of invasive species would occur.	Impacts from forest clearing, construction in wetland areas from access roads and crane pads, and blasting, as well as from vegetation maintenance.	Same as alternative 2.	Same as alternative 2.	Same as alternative 2.	Same as alternative 2.

Resource	Alternative 1: No-Action Alternative	Alternative 2: The Applicant's Proposed Route	Alternative 2b	Alternative 3	Alternative 4	Alternative 5
Rare and Unique Communities	Impacts from artificially maintaining scrub shrub habitat in the park artificially maintaining scrub shrub habitat in the parks; soils and wildlife would be affected.	Impacts from vegetation clearing, line construction, deconstruction of the existing line, and potential spread of invasive species, as well as artificial maintenance of scrub shrub habitat; six communities would be affected (Arnott Fen, Delaware River Riparian Corridor, eastern hemlock forests, Hogback Ridge, Kittatinny Ridge, Van Campens).	Impacts from vegetation clearing, line construction, blasting, deconstruction of the existing line, and potential spread of invasive species, as well as artificial maintenance of scrub shrub habitat; six communities would be affected (Arnott Fen, Delaware River Riparian Corridor, eastern hemlock forests, Hogback Ridge, Kittatinny Ridge, Van Campens).	Impacts from vegetation clearing, line construction, blasting, deconstruction of the existing line, and potential spread of invasive species, as well as artificial maintenance of scrub shrub habitat; three communities would be affected (Delaware River Riparian Corridor, eastern hemlock forests, Kittatinny Ridge).	Impacts from vegetation clearing, line construction, deconstruction of the existing line, and potential spread of invasive species, as well as artificial maintenance of scrub shrub habitat; for communities would be affected (eastern hemlock forests, Kittatinny Ridge, Minsi Lake / Bear Swamp, Totts Gap).	Same as alternative 5 but would not impact eastern hemlock forests.
Archeological Resources	Impacts on archeological sites due to physical impacts from the maintenance of vegetation along the existing ROW.	Impacts from physical impacts of construction and disturbance of archeological resources; **3 known archeological sites** would be directly affected by construction activities; impacts would depend on the nature and extent of physical disturbance to the archeological resources.	Same as alternative 2.	Possible impacts from physical impacts of construction and disturbance of archeological resources; **1 potential archeological site** exists along this alternative; impacts would depend on the nature and extent of physical disturbance to the potential archeological resources**.**	Possible impacts from physical impacts of construction and disturbance of archeological resources; **1 potential archeological site** exists along this alternative; impacts would depend on the nature and extent of physical disturbance to the potential archeological resources**.**	Same as alternative 4.
Historic Structures	Impacts from the visual impact of vegetation removal during maintenance activities.	**Impacts on 32 identified historic structures** from the visual impact of larger towers and lines, which would diminish the integrity of the setting, feeling, and association of numerous historic structures.	Same as alternative 2.	**Impacts on 72 identified historic structures** from the visual impact of larger towers and lines, which would diminish the integrity of the setting, feeling, and association of numerous historic structures.	**Impacts on 27 identified historic structures** from the visual impact of larger towers and lines, which would diminish the integrity of the setting, feeling, and association of numerous historic structures.	Same as alternative 4.
Cultural Landscapes	Physical and visual impacts of the existing line and vegetation maintenance; would diminish the integrity of setting, feeling, and association of numerous cultural landscapes.	**Five cultural landscapes would be impacted** and the character-defining features would be altered and result in measurable changes, thus diminishing the overall integrity of the resources; additionally, **13 cultural landscapes would be substantially impacted**, producing noticeable changes or alterations to the character-defining features of the cultural landscapes.	**Eight cultural landscapes would be impacted** and the character-defining features would be altered and result in measurable changes, thus diminishing the overall integrity of the resources; additionally, **5 cultural landscapes would be substantially impacted**, producing noticeable changes or alterations to the character-defining features of the cultural landscapes.	**Three cultural landscapes would be impacted** and the character-defining features would be altered and result in measurable changes, thus diminishing the overall integrity of the resources.	**Three cultural landscapes would be impacted** and the character-defining features would be altered and result in measurable changes, thus diminishing the overall integrity of the resources**.**	Same as alternative 4.

Resource	Alternative 1: No-Action Alternative	Alternative 2: The Applicant's Proposed Route	Alternative 2b	Alternative 3	Alternative 4	Alternative 5
Socioeconomics	No impact on socioeconomics.	Impacts to the local and regional economy due to changes in recreation, visitation, tourism, and agricultural revenue. Opportunity for job placement during the construction period.	Same as alternative 2.	Same as alternative 2.	Same as alternative 2.	Same as alternative 2.
Infrastructure, Access, and Circulation	Temporary, brief road closures or detours during the maintenance periods. Hamilton Trail in New Jersey, the McDade Trail near Community Drive, and part of the Van Campens Glen Trail would be used for maintenance activities.	Use of heavy construction equipment on historic River Road and 1.5 miles of Old Mine Road would result in impacts on infrastructure. Impacts on access and circulation would occur at specific locations during the construction period**.**	Same as alternative 2.	Use of heavy construction equipment on approximately 4.5 miles of River Road and 6.5 miles of Old Mine Road would result in impacts to infrastructure. Impacts on access and circulation would occur at specific locations during the construction period**.**	The use of heavy equipment on NPS Drive, Totts Gap Road, and Mountain Road would result in impacts to infrastructure. Impacts on access and circulation would occur during the construction period at specific locations**.**	Same as alternative 4.
Visual Resources	The presence of the existing alignment would affect visual intactness from continued operation of the existing transmission line.	Changes to visual resources from the deconstruction and construction activities would be most apparent along Millbrook Flatbrook Road and Old Mine Road in New Jersey. Affected sites in Pennsylvania potentially include Fernwood Resort, Pennsylvania Hwy 209 near Bushkill, McDade Trail, the cultural landscape related to the Schoonover house, and Community Drive. Affected sites in New Jersey potentially include Van Campens Glen, Hamilton, and Pioneer trails, Watergate Recreation Site, and Millbrook Village.	Changes to visual resources from the deconstruction and construction activities would be most apparent along McDade Trail near the Schoonover House and Community Drive, and MDSR. There would be two additional nearly 200-foot towers.	Changes to visual resources from the deconstruction and construction activities would be most apparent along McDade Trail, Old Mine Road, MDSR, and APPA. Improved visual cohesiveness and unity resulting from the unobstructed natural forest cover within due to the removal of the existing B-K Line.	Changes to visual resources from the deconstruction and construction activities would be most apparent where the line would be in proximity to APPA. Improved visual cohesiveness and unity resulting from the unobstructed natural forest cover within due to the removal of the existing B-K Line.	Changes to visual resources from the deconstruction and construction activities would be most apparent where the transmission line would cross APPA because it would also be intersected by an access road. Improved visual cohesiveness and unity resulting from the unobstructed natural forest cover within due to the removal of the existing B-K Line.
Soundscapes	Intermittent impacts on soundscapes due to maintenance activities associated with continued operation of the existing transmission line.	Impacts would result from disturbance during decommissioning, construction, and maintenance activities. Some readily detectable impacts would be expected within 350 feet of the alignment centerline from the operation of the line.	Same as alternative 2.	Impacts would result from disturbance during decommissioning, construction, and maintenance activities. Some readily detectable impacts would be expected within 300 feet of the alignment centerline during operation and maintenance.	Temporary disturbance during decommissioning, construction, and maintenance activities. Some readily detectable impacts would be expected within 350 feet of the alignment centerline during operation and maintenance.	Same as alternative 4.

Resource	Alternative 1: No-Action Alternative	Alternative 2: The Applicant's Proposed Route	Alternative 2b	Alternative 3	Alternative 4	Alternative 5
Visitor Use and Experience	Impacts would result primarily from the continued visual impacts of the existing transmission line. Noise and visual intrusions would result in slight impacts during maintenance activities.	Impacts to visitor use and experience with the most intense impacts at Watergate Recreation Site. Visitors would experience impacts where the transmission line crosses APPA. Impacts related to deconstruction and construction would be localized, particularly related to noise.	Same as alternative 2.	The 90-degree bend of line would affect views from several vantage points, affecting many visitors. New visual intrusions would be created at Raccoon Ridge along APPA, and would be seen from other vantage points along the trail. Impacts at APPA would occur for 2.5 miles. Construction-related impacts would occur from impacts on soundscapes based on location.	Impacts would occur at the Red Dot (Tammany) Trail and Karamac Trail. APPA would occur for 2.5 miles. Construction-related impacts would occur from impacts on soundscapes based on location.	Same as alternative 4.
Wild and Scenic Rivers	**No impact** on the values on which the river was designated from any maintenance activities.	Many of the values for which the river was designated would be perceptibly changed and would result in visual changes that would affect a relatively large area, a large number of users, and would exist for the period of analysis.	Same as alternative 2.	Many of the values for which the river was designated would be perceptibly changed and would result in visual changes that would affect a relatively large area, a large number of users, and would exist for the period of analysis. Enhancement of MDSR values from the decommissioning and restoration of the alternative 2 alignment.	Enhancement of MDSR values from the decommissioning and restoration of the alternative 2 alignment.	Same as alternative 4.
Park Operations	Park staff would monitor vegetation maintenance activities, but the maintenance would not be conducted on a regular basis; there would be **no change in the number of park staff** and no change to the parks' budgets because it is assumed that the applicant would be responsible for the costs associated with the NPS managing the permit.	Impacts on park operations would result from construction-related activities and monitoring activities; **2 to 3 new employees would be hired**; there would be no change to the parks' or divisions' budgets because the applicant would be responsible for the parks' costs associated with the NPS managing the permit.	Same as alternative 2.	Impacts on park operations would result from construction-related activities and monitoring activities (including actions along APPA); **2 to 3 new employees would be hired**; there would be no change to the parks' or divisions' budgets because the applicant would be responsible for the parks' costs associated with the NPS managing the permit.	Impacts on park operations would result from construction-related activities and monitoring activities (including actions along APPA); **1 new employee would be hired**; there would be no change to the parks' or divisions' budgets because the applicant would be responsible for the parks' costs associated with the NPS managing the permit.	Same as alternative 4.
Health and Safety	No impacts to health and safety.	Impacts on DEWA, MDSR, and APPA from potential safety hazards associated with construction, equipment related hazards, and transportation of materials.	Inconsistent with NESC code / NERC standards.	Impacts on DEWA, MDSR, and APPA from potential safety hazards associated with construction, equipment related hazards, and transportation of materials; removal of the existing B-K Line would eliminate the generation of electromagnetic fields (EMFs) at the line's current location.	Same as alternative 3.	Same as alternative 3.

CONTENTS

APPENDIXES

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

AC	alternating current
ACCC	aluminum conductor composite core
ACHP	Advisory Council on Historic Preservation
ACSR	aluminum conductor steel reinforced
Advisory Group	Natural Resource Advisory Group
AMSL	above mean sea level
APE	area of potential effects
APLIC	Avian Power Line Interaction Committee
APPA	Appalachian National Scenic Trail
BA	biological assessment
B-K Line	Bushkill to Kittatinny Line
BMP	Best Management Practice
CFR	Code of Federal Regulations
CLI	Conservation Landscape Initiative
dB	decibel
dBA	A-weighted decibel scale
DDT	dichlorodiphenyltrichloroethane
DEWA	Delaware Water Gap National Recreation Area
EIS	Environmental Impact Statement
EMF	electromagnetic field
FHWA	Federal Highway Administration
FR	Federal Register
GIS	Geographic Information System
GMP	general management plan
IBA	important bird area
IMA	important mammal area
KOP	key observation point
kHz	kilohertz
kV	kilovolt
MDSR	Middle Delaware National Scenic and Recreational River
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code
NHPA	National Historic Preservation Act of 1966
NJBPU	New Jersey Board of Public Utilities
NJDEP	New Jersey Department of Environmental Protection
NJENSP	New Jersey Endangered and Nongame Species Program
NJNHP	New Jersey Natural Heritage Program

NJFWS	New Jersey Division of Fish and Wildlife
NJ HPO	New Jersey Historic Preservation Office or Officer
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	U.S. Department of Agriculture Natural Resources Conservation Service
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
Organic Act	National Park Service Organic Act of 1916
ORV	off-road vehicle
PADCNR	Pennsylvania Department of Conservation and Natural Resources
PADEP	Pennsylvania Department of Environmental Protection
PADOT	Pennsylvania Department of Transportation
PFBC	Pennsylvania Fish and Boat Commission
PAPUC	Pennsylvania Public Utility Commission
PEM	Palustrine Emergent Wetlands
PEMB	Saturated Palustrine Emergent Wetlands
PEMY	palustrine emergency saturated/semipermanent/seasonal wetland
PEPC	Planning, Environment, and Public Comment
PFO	Palustrine Forested Wetlands
PJM	PJM Interconnection
PL	Public Law
PNHP	Pennsylvania Natural Heritage Program
PPL	Pennsylvania Power and Light Electric Utilities Corporation
PSE&G	Public Service Electric and Gas Company
PSS	Palustrine Scrub Shrub Wetlands
PUBHx	Palustrine Non-vegetation Wetlands
ROW	right-of-way
RTEP	regional transmission expansion plan
SHPO	State Historic Preservation Office
S-R Line	Transmission Line Upgrade and Expansion from Susquehanna, Pennsylvania, to Roseland, New Jersey
TNC	The Nature Conservancy
TSS	total suspended solids
USACE	U.S. Army Corps of Engineers
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VSL	visual split location
ZVI	zone of visual influence

Chapter 1
Purpose of and Need for Action

CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

INTRODUCTION

A consortium of utilities, consisting of Pennsylvania Power and Light Electric Utilities Corporation (PPL) and Public Service Electric and Gas Company (PSE&G), jointly known as the applicant, propose to construct a 500,000-volt (500-kilovolt [kV]) transmission line from the Susquehanna Substation (Berwick, Pennsylvania) to the Roseland Substation (Roseland, New Jersey) (the S-R Line), which would require crossing of Delaware Water Gap National Recreation Area (DEWA), Middle Delaware National Scenic and Recreational River (MDSR), and Appalachian National Scenic Trail (APPA) in Pennsylvania and New Jersey (figure 1).

The applicant has applied for construction and right-of-way permits for the crossings of these parks.

The applicant's stated purpose for the proposed S-R Line is to strengthen the reliability of the grid at the direction of the regional transmission operator, PJM Interconnection (PJM).

The S-R Line, as proposed, would necessitate granting additional legal rights beyond the applicant's current rights in some areas along the existing ROW (easement). The applicant's proposed action would also include the construction of new access roads and the rehabilitation and widening of public roads for accessing the transmission line corridor. The applicant's stated purpose for the proposed S-R Line is to strengthen the reliability of the grid at the direction of the regional transmission operator, PJM Interconnection (PJM). PJM oversees the overall movement of wholesale electricity between many electric utilities throughout a 13-state region. The PJM 2007 load forecast model identified 23 projected reliability criteria violations starting in 2012.

The proposed S-R Line is designed to alleviate most of these deficiencies. If constructed, the new S-R Line would convert the current transmission line corridor from noncritical to critical status as part of the PJM-managed transmission grid.

PURPOSE AND NEED

The purpose of and need for action by the National Park Service (NPS) is distinct from the applicant's stated need to upgrade the existing B-K Line, consistent with the Department of the Interior National Environmental Policy Act (NEPA) regulations, 43 CFR § 46.420.

PURPOSE OF ACTION

The federal action under consideration for this EIS is granting or denying the applicant's proposal by issuing, issuing with necessary terms and conditions, or not issuing the requested construction and ROW permits. In accordance with the Director's Order 12 Handbook: *Conservation Planning, Environmental Impact Analysis, and Decision Making* (NPS 2001a), the purpose component of an EIS defines the goals and objectives that are critical to meet if the NPS is to properly consider the proposal. The applicant's proposal is to construct a double-circuit transmission line across NPS lands. One of the circuits would carry the new 500-kV S-R line and the other would carry the 230-kV B-K line, which could later be energized to 500-kV. The purpose of the

The NPS purpose of the proposed action is to respond to the applicant's expressed need to construct a double circuit line connecting the Susquehanna and Roseland substations.

federal action is to respond to this proposal in light of the purposes and resources of the affected units of the national park system, as expressed in statutes, regulations, and policies.

NEED FOR ACTION

In 2007, the regional transmission operator, PJM, identified a 500-kV transmission line between the Susquehanna Substation and the Roseland Substation as the preferred and most effective solution for forecast reliability violations as part of the Federal Energy Regulatory Commission - approved Regional Transmission Expansion Plan (RTEP) process. The 2008, 2009, and 2010 PJM RTEPs confirmed the prediction of grid reliability violations and the utility of the S-R Line in remedying them.

The federal action by the NPS is needed because the applicant has submitted the required applications and a preliminary construction plan to expand the size of the current ROW, to access the ROW through existing natural and cultural areas, to construct new and taller support towers, and to remove and replace the existing 230-kV B-K Line with an additional double 500-kV power line in accordance with applicable regulations.

COOPERATING AGENCY

In February 2011, the NPS formally invited the U.S. Fish and Wildlife Service (USFWS) to participate as a cooperating agency in the review for this EIS. The S-R Line could affect lands proposed to be a part of the Cherry Valley National Wildlife Refuge (NWR), which was established in October 2010 with the acquisition of the first 185 acres (USFWS 2010f, 1). Cherry Valley, Pennsylvania contains a variety of wetland and upland habitats, as well as a portion of a migration flyway used by migrating raptors, and supports federally and Pennsylvania state-listed species (USFWS 2008, xi). The request to add USFWS as a cooperating agency is based on USFWS expertise and local knowledge of the resources within Cherry Valley NWR that could be affected by the proposed S-R Line. The USFWS has accepted that invitation. The USACE was also invited to be a cooperating agency but declined.

SUSQUEHANNA TO ROSELAND TRANSMISSION LINE LOCATION AND BACKGROUND

A consortium of PPL and PSE&G, jointly known as the applicant, has proposed constructing a double 500-kV transmission line, the S-R Line, including crossings of DEWA, APPA, and MDSR, in Pennsylvania and New Jersey. The applicant has applied for permits to allow the construction, maintenance and operation of the S-R Line across three units of the national park system, and the replacement of an existing 230-kV transmission line it owns. This existing 230-kV transmission line runs from the northwest to the Bushkill substation crossing a small segment of DEWA, and from Bushkill substation across DEWA, MDSR, and APPA, connecting to the Kittatinny substation, and is referred to in this document as the Bushkill-Kittatinny line or B-K Line. This line and its right of way predate the establishment of all of the three Park units, and have been described by the applicant as physically obsolescent if not actually obsolete. The B-K Line towers are approximately 80 feet in height and its right-of-way varies from 100 to 300 feet in width through the Parks. The applicant's proposal would replace the B-K Line with a new set of towers up to 195 feet tall on a widened right of way carrying both the S-R Line and a replacement B-K Line. The replacement B-K Line would be capable of carrying 500 kV, though initially energized at 230 kV. The proposal and the action alternatives to it discussed herein all include both the construction of the S-R Line and the replacement of the B-K Line. References in this document to "the Line" refer to a set of towers carrying both lines.

The applicant's stated purpose for the proposed S-R Line is to strengthen the reliability of the grid at the direction of the regional transmission operator, PJM. PJM oversees the overall movement of wholesale electricity between many electric utilities in all or parts of 13 states and the District of Columbia. The PJM 2007 load forecast model identified 23 projected reliability criteria violations starting in 2012. The need for the proposed S-R Line has been expressed several times by PJM in planning documents. RTEPs from PJM from 2007 to 2010 have identified the proposed S-R Line as an important project on what was termed by PJM as a "backbone" line. An upgrade to this line would aid in resolving several violations and issues related to reliability and congestion. North American Electric Reliability Corporation also identified the proposed S-R Line as a "backbone," while the applicant has repeatedly noted the need for and importance of increased electrical transmission capacity between Berwick, Pennsylvania and Roseland, New Jersey. If constructed, the new S-R Line would convert the current transmission line corridor from noncritical to critical status as part of the PJM-managed transmission grid. The two new lines proposed would require a much higher level of access roads and activity.

The public expressed concerns about the need for and impacts of the project. Individuals and public organizations question the need for expanded transmission line, given the static-to-recessional economic climate and increases in energy efficiency. In areas along the proposed S-R Line, energy consumption has decreased in recent years, and forecasts of a continued downward trend in reduced regional demand caused some to question a verifiable need for the proposed line. Three municipalities also question the need, and have noted engineering concerns with long-distance electrical power transmission and its potential to cause cascading power failures through the increased current needed to maintain power flows across such lines.

The Pennsylvania Public Utility Commission (PAPUC) and the New Jersey Board of Public Utilities (NJBPU) have approved the S-R Line, although the approval included permit conditions and the NJBPU approval is being challenged in court.

Whether there is a need for the proposed S-R Line project is not for the NPS to decide, nor is it a factor in the preparation of this EIS. The NPS prepared this EIS to determine whether to grant or deny the applicant's proposal for construction and ROW permits within NPS lands.

BACKGROUND OF THE PARKS

DEWA, MDSR, and APPA are three separate units of the national park system (figure 1). DEWA, MDSR, and APPA are central components of nature-based recreation for the New York City/Philadelphia metroplex.

DELAWARE WATER GAP NATIONAL RECREATION AREA

DEWA is a 67,210-acre park along the shores of the Delaware River in New Jersey and Pennsylvania. DEWA offers a variety of outdoor recreational opportunities, including boating, fishing, swimming, bicycling, cross-country skiing, rock climbing, sightseeing, natural and cultural history, and the general solitude of a rural environment. In addition, the recreation area offers more than 200 miles of hiking trails, including more than 27 miles of APPA (NPS 2010a).

Delaware Water Gap National Recreation Area is a 67,210-acre park along the shores of the Delaware River in New Jersey and Pennsylvania.

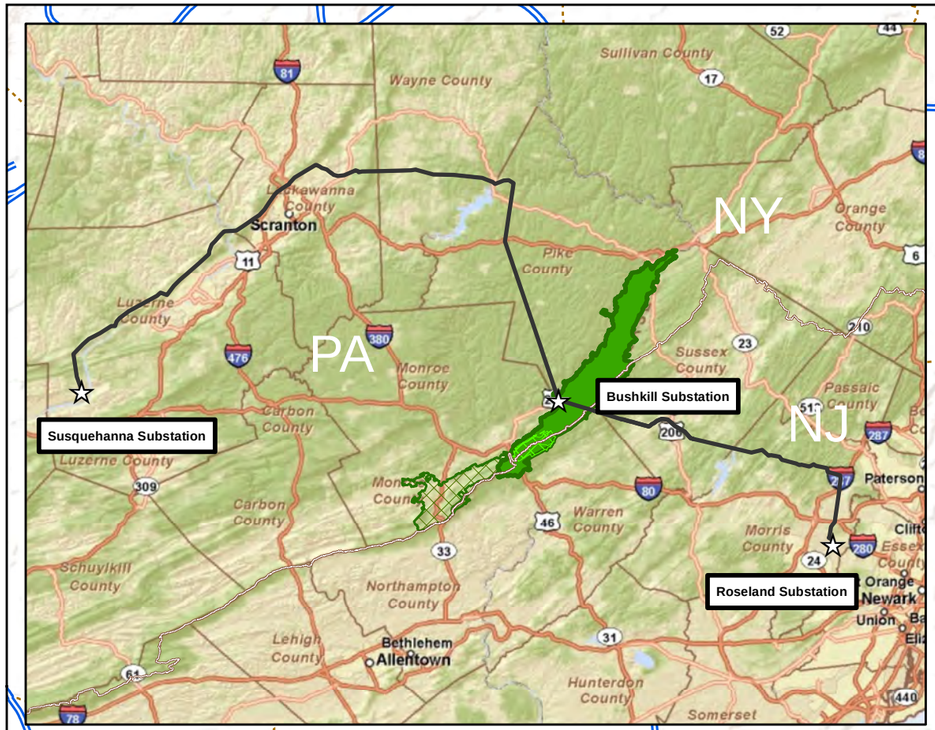
Each year, DEWA receives more than 5.2 million recreational visitors (NPS 2010b). The park is the eighth most visited unit (depending on the year) in the national park system and visitation is growing at a steady rate. Much of this visitation is from the nearby, rapidly expanding, New York/northern New Jersey and Philadelphia suburban areas (NPS 2010c, 2010b). Open spaces, combined with other regional protection and preservation initiatives, create a multistate greenway corridor. This corridor preserves essential habitat for the sustained health of plant and animal communities, including special-status species, in the region.

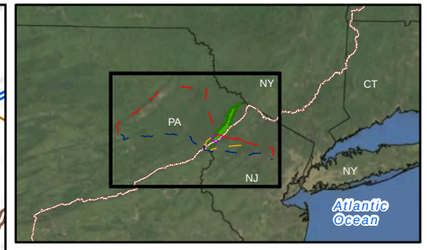
The park contains an environment of unique geologic and natural features as well as cultural landscapes and historic resources. The diverse ecosystems and landscape features provide unique scenery and experiences for visitors and crucial habitat for plants and animals. The park's outstanding geologic and natural features form some of the best-known scenic landscapes in the northeastern United States and illustrate the characteristic landforms and biotic areas of the Appalachian Ridge and Valley Province and the Southern Appalachian Plateau Province. The most popular geologic feature is the Delaware Water Gap itself which is approximately 1,200 feet deep from the tops of the mountains to the surface of the Delaware River. The Gap is a mile wide from New Jersey's Mount Tammany to Pennsylvania's Mount Minsi. The park also contains a significant concentration of cultural resources spanning 12,000 years of human habitation. The valley has been inhabited for thousands of years, and dozens of historic structures dot the park's scenic roads. Historic rural villages from the eighteenth and nineteenth centuries remain intact on the New Jersey side, and landscapes of past settlements are scattered throughout the park (NPS 2010a). Additionally, the park encompasses significant Native American archeological sites.

MIDDLE DELAWARE NATIONAL SCENIC AND RECREATIONAL RIVER

Middle Delaware National Scenic and Recreational River was established as a scenic and recreational river in 1978 under the Wild and Scenic Rivers Act.

The Delaware River is the longest undammed river in the Eastern United States. MDSR was established as a scenic and recreational river in 1978 under the Wild and Scenic Rivers Act. For 40 miles the MDSR passes between low, forested mountains with barely a house in sight. Then the river cuts through the mountain ridge to form the famed Delaware Water Gap. Exiting the park, the river runs 200 miles south to the Delaware Bay at Wilmington, Delaware, and then to the Atlantic Ocean. The Delaware River is one of the cleanest rivers in the nation due to years of work to protect and restore it (NPS 2010a; Delaware River Keeper n.d.), making it a popular destination for swimming, fishing, boating, canoeing, kayaking, rafting, and innertubing. It is estimated that more than 15 million people in the United States, including New York City, Philadelphia, and surrounding urban areas, depend on the water of the Delaware River Basin for public water supply and industrial use (Sloto and Buxton 2006, 2). A portion of the Delaware River Water Trail, a national scenic trail from Hancock, New York, to Trenton, New Jersey, runs through MDSR.





Legend

- Substation
- Existing BK Transmission Line
- Appalachian National Scenic Trail
- Middle Delaware National Scenic & Recreational River
- Delaware River
- Interstate
- Delaware Water Gap National Recreation Area
- Worthington State Forest
- CVNWR Boundary
- County Line

Note: Designated boundary of CVNWR is depicted, not all property is owned within the boundary

0 3 6
Miles

Susquehanna to Roseland Transmission Line Proposal and Right-of-Way Request EIS

Figure 1
Location Map for the Parks and Existing Transmission Line

Source: ESRI Streetmap 2006, Penn State 2010, ESRI ArcGISonline Map Service 2010, PennDOT 2011, NJOIT 2010, USGS 2006, NJ DEP 2008,

Projection: NAD 83 UTM Zone 18N
Date: October, 2011

APPALACHIAN NATIONAL SCENIC TRAIL

The Appalachian National Scenic Trail is a 2,175-mile-long public footpath.

APPA is a 2,175-mile-long public footpath. Conceived in 1921 and completed in 1937, the trail was built by private citizens and each year thousands volunteer to maintain its footprint. From Maine's Mount Katahdin and Georgia's Springer Mountain, this footpath traverses scenic, wooded, pastoral, wild, and culturally resonant lands through 14 of the eastern United States (NPS 2010d). APPA was designated as the nation's first national scenic trail by the NSTA in 1968. It is arguably the most famous hiking path in world. APPA is enjoyed by an estimated 4 million people each year. It is within a day's drive of two-thirds of the U.S. population. People of all ages and abilities enjoy short walks, day hikes, and long-distance backpacking journeys on the trail. APPA offers a variety of opportunities for viewing spectacular scenery, for exploring, for adventure, for exercise, for nature study, and for renewal (NPS 2010d).

APPA is managed cooperatively by the NPS, the Appalachian Trail Conservancy, volunteers from 30 local Appalachian Trail Clubs, the U.S. Department of Agriculture Forest Service (U.S. Forest Service), and other public land–managing agencies. Within this partnership, thousands of volunteers do much of the work each year to keep the trail open for all to enjoy. APPA is located on more than 75 federal and state forests and park lands (NPS 2010d). APPA is also located within an extensive corridor of federal public land acquired by the NPS for its protection (i.e., the national park lands).

Appalachian Trail Conservancy (ATC) is the volunteer-based nonprofit organization dedicated to the protection and management of APPA and its associated lands, which constitute a 250,000-acre greenway from Katahdin to Springer Mountain. ATC is the primary source of information about the Appalachian Trail (NPS 2010d).

ENABLING LEGISLATION OF THE NATIONAL PARK SYSTEM UNITS

DEWA, MDSR, and APPA are three separate units of the national park system, each with distinct enabling legislation. In enabling legislation, Congress and the president create and define a park unit's boundaries and management. The DEWA, MDSR, and APPA enabling laws follow.

DELAWARE WATER GAP NATIONAL RECREATION AREA

DEWA Enabling Legislation: Public Law (PL) 89-158; 89th Congress H.R. 89 (September 1, 1965): This legislation authorizes the establishment of DEWA from an area of the Tocks Island Dam and Reservoir, a project that was never implemented and was later deauthorized by Congress. The legislation authorized DEWA for outdoor recreational purposes, and included among the purposes of DEWA the preservation of the scenic, scientific, and historic resources of the area contributing to public enjoyment of the lands and waters. A full text of the entire legislation authorizing the establishment of DEWA is provided in appendix A. The enabling legislation was created in accordance with the Organic Act: "to conserve the scenery and the natural and historical objects and the wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations. The Organic Act, August 25, 1916."

MIDDLE DELAWARE NATIONAL SCENIC AND RECREATIONAL RIVER

MDSR Enabling Legislation: Wild and Scenic Rivers Act, PL 90-542 (16 U.S. Code [USC] 1271–1287) (November 10, 1978): In 1978, the Delaware River within DEWA was designated as a scenic and

recreational river under the Wild and Scenic Rivers Act. The provisions of the act stipulate that as a scenic and recreational river, the Middle Delaware

> shall be administered in such manner as to protect and enhance the values which caused it to be included in [the wild and scenic rivers] system without … limiting other uses that do not substantially interfere with public use and enjoyment of these values. In such administration primary emphasis shall be given to protect [the area's] esthetic, scenic, historic, archeological, and scientific features. (Wild and Scenic Rivers Act [16 USC 1271–1287])

APPALACHIAN NATIONAL SCENIC TRAIL

APPA Enabling Legislation: National Trails System Act, PL 90-543 (16 USC 1241 et seq.), as amended through PL 103-145 (November 17, 1993). The National Trails System Act established APPA and directed the Secretary of the Interior, in cooperation with the Secretary of Agriculture, state and local governments, and private citizens, to protect and administer APPA. The act provided the Secretary of the Interior and the Secretary of Agriculture with the authority to relocate APPA; administer use of and access to APPA; regulate incompatible uses, including motorized uses, bicycles, and horses; and enter into agreements with state agencies and nongovernment organizations to protect, manage, maintain, and develop APPA. It also encouraged state agencies to pass similar legislation and take active steps to protect APPA and authorized federal land acquisition, as necessary, to establish a permanent route and protective corridor surrounding the footpath.

On March 21, 1978, President Carter signed the "Appalachian Trail Amendments" to the National Trails System Act. This law reauthorized the Appalachian National Scenic Trail Advisory Council, required a comprehensive management plan for APPA, and increased the amount of funding for land acquisition. Authority to acquire by eminent domain was increased to an average of 125 acres per mile, and the Secretary of the Interior and the Secretary of Agriculture were directed to substantially protect APPA within three years.

On March 28, 1983, President Reagan signed an Act of Congress (PL 98-11) to amend the National Trails System Act, thus strengthening support for volunteers and volunteer-based organizations, refining the process for designating side and connecting trails, providing the authority for administrative transfers of land, authorizing whole tract acquisition with the consent of the landowner, defining trail uses, and clarifying that donated easements qualify as conservation tax exemptions.

PURPOSE AND SIGNIFICANCE OF THE THREE PARKS

National park system units are established by Congress to fulfill specified purposes. A park unit's purpose is the fundamental building block for its decisions to conserve resources and "to allow visitation in such a manner as to leave these resources unimpaired for future generations" (NPS Organic Act of 1916 [Organic Act]). The NPS Organic Act of August 25, 1916, states that "the Service thus established shall promote and regulate the use of Federal areas known as national parks, monuments and reservations … by such means and measures as to conform to the fundamental purpose of the said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

The purpose and significance of the three parks are described below.

DELAWARE WATER GAP NATIONAL RECREATION AREA

Establishment: Congress established DEWA in 1965 to provide for "public outdoor recreation use and enjoyment of the proposed Tocks Island Reservoir and lands adjacent thereto and for the preservation of the scenic, scientific, and historic features contributing to public enjoyment of such lands and waters" (PL 89-158).

Purpose: The purposes of the national recreation area are as follows:

> *Park Resource Protection*: Preserve the natural, cultural, and scenic resources contributing to public enjoyment of the national recreation area's lands and waters.
>
> *River Resource Protection*: Protect and enhance the values which caused the river to be included in the national wild and scenic river system.
>
> *Education*: Foster preservation and educational activities that support natural and cultural resource protection.
>
> *Research and Conservation*: Protect the national recreation area's resources through research and appropriate resource conservation and restoration practices.
>
> *Recreation Use and Enjoyment*: Provide for public outdoor recreation use and enjoyment, assuring that such use and enjoyment has minimal impacts on the national recreation area's natural and cultural resources (NPS 1999).

Significance: DEWA provides a distinctive combination of natural resources, cultural resources, and recreational features that collectively offer outstanding opportunities for public use and enjoyment in an increasingly urbanized region. The following resources and features contribute to the national recreation area's significance:

- Outstanding geologic and natural features form some of the best-known scenic landscapes in the northeastern United States and illustrate the characteristic landforms and biotic areas of the Appalachian Ridge and Valley Province and the Southern Appalachian Plateau Province.
- Open spaces, combined with other regional protection and preservation initiatives, create a multistate greenway corridor that preserves essential habitat for the sustained health of plant and animal communities, including potentially threatened species, in the region.
- DEWA has the most significant, intact concentration and diversity of known archeological resources in the northeastern United States, as well as outstanding examples of American Indian and European settlements dating from the Early Woodland through Late Colonial historic periods. The early European settlement of the Middle Delaware Valley is manifested in the park through unique cultural landscapes (NPS n.d.a; Puniello 1991; Kraft 1986). Additionally, the park has historic structures representative of eighteenth-century frontier farms, nineteenth-century rural farms and villages, and twentieth-century energy-efficient design (NPS 1996).

The park is significant due to the exceptional quality of the Delaware River; it is the last free-flowing river in the eastern United States, and provides outstanding recreational and scenic opportunities. The quality and quantity of river water remain in good condition and provide a stable ecological environment because approximately 40 miles of river within the boundaries of the park have been designated as MDSR, and the river is buffered by a combination of protected lands (federal, state, local, and other conservation lands) including the Upper Delaware Scenic and Recreational River.

DEWA is one of the largest public open spaces remaining in the northeastern metropolitan corridor and the second largest acreage NPS unit in the Northeast Region of the NPS. The national recreation area provides a broad diversity of exceptional and unique nearby natural resource–based recreational opportunities. The park is the eighth most visited area in the national park system, with almost 5 million recreational visits each year. Visitation is growing at a steady rate. Much of this visitation is from the nearby, rapidly expanding, New York/northern New Jersey and Philadelphia suburban areas (NPS 2010c).

MIDDLE DELAWARE NATIONAL SCENIC AND RECREATIONAL RIVER

In 1968, the Delaware River within DEWA was designated as a scenic and recreational river under the Wild and Scenic Rivers Act. The provisions of the act stipulate that as a scenic and recreational river, the Middle Delaware shall be administered in such manner as to protect and enhance the values that caused it to be included in the wild and scenic rivers system without limiting other uses that do not substantially interfere with public use and enjoyment of these values. According to the act, the primary emphasis in the administration of MDSR should be on protecting the area's aesthetic, scenic, historic, archeological, and scientific features.

APPALACHIAN NATIONAL SCENIC TRAIL

Establishment: APPA was established as part of the National Trails System Act (PL 90-543, October 2, 1968, 16 USC §1244.) Coordination of management and maintenance of APPA is the responsibility of the Appalachian Trail Park Office. Language specific to the Trail's establishment follows:

> The Appalachian National Scenic Trail, a trail of approximately two thousand miles extending generally along the Appalachian Mountains from Mount Katahdin, Maine, to Springer Mountain, Georgia. Insofar as practicable, the right-of-way for such trail shall comprise the trail depicted on the maps identified as "Nationwide System of Trails, Proposed Appalachian Trail, NST-AT-101-May 1967", which shall be on file and available for public inspection in the office of the Director of the National Park Service. Where practicable, such rights-of-way shall include lands protected for it under agreements in effect as of October 2, 1968, to which Federal agencies and States were parties. The Appalachian Trail shall be administered *primarily as a footpath* by the Secretary of the Interior, in consultation with the Secretary of Agriculture. [emphasis added]

Purpose: APPA is administered primarily as a footpath in cooperation with the U.S. Forest Service, ATC, and the 14 States encompassing the Trail, providing for maximum outdoor recreation potential as an extended trail and for the conservation and enjoyment of the nationally significant scenic, historic, natural, and cultural resources of the areas through which the Appalachian Trail passes (NPS 2005a).

Significance: APPA is a way, continuous from Maine to Georgia, for travel on foot through the wild, scenic, wooded, pastoral, and culturally significant lands of the Appalachian Mountains. It is a means of sojourning among these lands, such that visitors may experience them by their own unaided efforts. The body of the Trail is provided by the lands it traverses, and its soul is in the living stewardship of the volunteers and partners of the Appalachian Trail Cooperative Management System (NPS 2005a).

LAWS, REGULATIONS, AND POLICIES RELEVANT TO THIS EIS

Various laws, regulations, and policies of the NPS and the federal government are described in this section to show the constraints within which this EIS will need to operate and the goals and policies it

must meet. The NPS, in preparing this EIS, must conform to the federal laws, regulations, and policies listed in this section.

Table 1 lists the authorities potentially applicable to the proposed S-R Line. This list is not intended to be exhaustive and if a law is not listed it does not relieve the NPS or the applicant from compliance with that directive. Descriptions of these and other relevant laws, regulations, and planning documents are presented in appendix B.

TABLE 1: FEDERAL LAWS, REGULATIONS, EXECUTIVE ORDERS, AND SECRETARIAL ORDERS POTENTIALLY APPLICABLE TO THE S-R LINE

Laws and Regulations	Reference
Federal Noxious Weed Act of 1975, as amended	7 USC 2801–2814
NPS Organic Act of 1916 (Organic Act)	16 USC 1, 2–4
General Authorities Act of 1970	16 USC 1a1 et seq.
Park System Resource Protection Act	16 USC 19jj
NPS authorities governing issuance of rights-of-way for power transmission lines	16 USC 5 36 CFR 14.70–78
Antiquities Act of 1906	16 USC 431 et seq.
National Historic Preservation Act of 1966, as amended (NHPA), and regulations implementing the act	16 USC 470 et seq.
Archaeological Resources Protection Act of 1979, as amended	16 USC 470aa et seq.
Bald and Golden Eagle Protection Act of 1940, as amended	16 USC 668–668c
Migratory Bird Treaty Act of 1918	16 USC 703–711
Wild and Scenic Rivers Act	16 USC 1271–1287
Endangered Species Act of 1973, as amended	16 USC 1531 et seq.
National Parks Omnibus Management Act of 1998	16 USC 5901–6011
Native American Graves Protection and Repatriation Act of 1990	25 USC 3001–3013 et seq.
Occupational Safety and Health Act of 1970	29 USC 651 et seq.
Clean Water Act	33 USC 1251 et seq.
American Indian Religious Freedom Act of 1978	42 USC 1996
Safe Drinking Water Act of 1974	42 USC 3000f et seq.
National Environmental Policy Act of 1969, as amended (NEPA)	42 USC 4371 et seq.
Noise Control Act of 1972, as amended	42 USC 4901 et seq.
Pollution Prevention Act of 1990	42 USC 13101 et seq.
Energy Policy Act of 2005	42 USC 13201 et seq.
Title 36, Code of Federal Regulations	36 CFR Chapter I
NPS regulations governing issuance of rights-of-way for power transmission lines	36 CFR part 5
Council on Environmental Quality general regulations implementing NEPA	40 CFR 1500–1508
National Environmental Policy Act, Protection and Enhancement of Environmental Quality	Executive Order 11512
National Historic Preservation	Executive Order 11593
Floodplain Management	Executive Order 11988
Protection of Wetlands	Executive Order 11990
Federal Compliance with Pollution Control Standards	Executive Order 12088
Environmental Justice	Executive Order 12898

Laws and Regulations	Reference
Indian Sacred Sites	Executive Order 13007
Invasive Species	Executive Order 13112
Responsibilities of Federal Agencies to Protect Migratory Birds	Executive Order 13186
Responsibilities, and the Endangered Species Act, June 5, 1997	Secretarial Order 3206
Department of the Interior NEPA regulations	43 CFR Part 46
Transmission Vegetation Management Program	NERC Standard FAC-003-01

OBJECTIVES IN TAKING ACTION

All action alternatives selected for detailed analysis must meet S-R Line objectives to a large degree and resolve the purpose of and need for action.

The NPS's objectives for preparing this EIS were developed in accordance with Director's Order 12 (NPS 2001a). An objective is a statement of park-management goals that the NPS has identified as relevant in responding to the applicant's request. The NPS's objectives must be achieved to a large degree for the action (granting or denying the applicant's proposal by either issuing or not issuing the requested permits) to be considered appropriate. All action alternatives selected for detailed analysis must meet NPS objectives to a large degree and resolve the purpose of and need for action. Objectives must be grounded in the parks' enabling legislation, purpose, significance, and mission goals, and must be compatible with direction and guidance provided in the parks' general management plan (GMP), comprehensive management plans, strategic plans, and/or other management guidance, including NPS policies.

During the internal scoping meeting the interdisciplinary team, composed of resource specialists from the NPS and consultant staff, developed and refined goals and objectives for the following topics.

Physical resources

- Avoid adverse effects on geologic resources (geology, paleontology, and rare and unique geologic features), soil resources (soils and prime and unique farmlands), and water resources (surface waters and groundwater).

Natural resources

- Avoid adverse effects on natural resources (vegetation, landscape connectivity and wildlife habitat, special-status species, and rare and unique communities).
- Protect existing functions and values of wetlands and floodplains by avoiding adverse impacts or limiting impacts to an insignificant level.
- Maintain the ecological integrity of rare and unique communities and prevent degradation of the communities from occurring.
- Protect threatened and endangered species by avoiding impacts. Complete consultation with federal agencies as required under the Endangered Species Act of 1973, as amended (16 USC 1531–1544), and coordinate with state agencies regarding state-listed species.
- Manage any construction and maintenance activities to avoid or reduce impacts on wildlife and plant species as much as possible.

- Manage any construction and maintenance activities to avoid or reduce the introduction and spread of invasive species.
- Avoid or minimize adverse effects on migratory birds in accordance with Migratory Bird Treaty Act and the 2010 *Memorandum of Understanding Between the U.S. Department of the Interior National Park Service and the U.S. Fish and Wildlife Service to Promote the Conservation of Migratory Birds*.
- Mitigate impacts on landscape connectivity.

Cultural resources

- Avoid, minimize, or mitigate adverse effects on identified archeological resources.
- Avoid, minimize, or mitigate adverse effects on identified historic structures.
- Avoid, minimize, or mitigate adverse effects on identified cultural landscapes.
- Protect the eligibility of cultural resources for National Register of Historic Places (national register) nomination.

Socioeconomics

- Avoid impacts on surrounding land use; socioeconomics; and infrastructure, access, and circulation; or gateway communities.

Visitor use and experience

- Maintain visitor experience, including preservation of key qualities such as primitive, solitary, and pastoral experiences. If impacts are unavoidable, mitigate impacts as appropriate, including any lost use due to closures or diminished experience caused by construction.

Visual resources

- Avoid, minimize, or mitigate impacts to scenic viewsheds and landscapes.

Soundscapes

- Avoid, minimize, or mitigate impacts on soundscapes.

Wild and scenic rivers

- Avoid adverse effects on the esthetic, scenic, historic, archeological, and scientific features of MDSR.

Park operations

- Avoid adverse effects on the parks' fiscal and operating resources, including long-term management of resources and volunteer organizations.

Human health and safety

- Protect the safety of staff and visitors; measures taken to ensure human health and safety could include closures of roads, the river, trails, and airspace, as necessary.

SCOPING PROCESS AND PUBLIC PARTICIPATION

Scoping is an early and open process to determine the breadth of environmental issues and alternatives to be addressed in any planning document prepared in accordance with NEPA. Scoping includes obtaining early input about the planning project from the public, park staff, interested agencies, or any agencies with jurisdiction by law or expertise. Scoping activities for this proposed S-R Line EIS are summarized below. Additional information on the public involvement process and ongoing agency coordination is presented in "Chapter 5: Consultation and Coordination."

NEPA public involvement: a notice of intent to prepare an EIS was published in the Federal Register on January 21, 2010, to announce the beginning of the S-R Line EIS process. The NPS also released a public scoping newsletter for the S-R Line to the public for review and comment in January 2010. The newsletter included a description of the proposed S-R Line, the purpose of and need for the project, background information, project objectives, and a list of issues and impact topics.

To determine the scope of issues to be analyzed in depth in this EIS, three public scoping meetings were held in Pennsylvania and New Jersey in February 2010. During the scoping comment period, approximately 6,500 comments were received from over 29 states and 4 countries (the United States, United Kingdom, France, and Serbia). Individuals living in the proposed area of the S-R Line submitted 6,343 letters. The NPS Planning, Environment, and Public Comment (PEPC) database was used for management of the comments. A summary of the comments can be found in the public scoping comment summary report dated April 2010, which is located on the NPS PEPC website http://parkplanning.nps.gov/ (NPS 2010e).

During the scoping comment period, approximately 6,500 comments were received from over 29 states and 4 countries.

Additional public meetings were held in August 2010 and a public comment period was held from August to September 2010 to examine the range of preliminary alternatives and solicit input on alternative elements. During the comment period, approximately 1,700 separate pieces of correspondence were received and entered into the PEPC system. A public comment summary report was generated and made available to the public in November 2010; this report can be found on the NPS PEPC website (NPS 2010f).

Chapter 5 of this EIS provides more details about the public scoping activities, including agency scoping and consultation that were an integral part of the EIS process.

ISSUES AND IMPACT TOPICS RETAINED FOR DETAILED ANALYSIS

To focus the environmental analysis, the issues identified during scoping were used to derive a number of impact topics. Impact topics are resources of concern that could be affected, either beneficially or adversely, by implementing any of the proposed alternatives. The issues and potential impacts associated with the applicant's proposed route and all the other action alternatives are discussed in the following sections. Details on the existing conditions for each resource topic are presented in "Chapter 3: Affected Environment," and the anticipated impacts are presented in "Chapter 4: Environmental Consequences."

NATURAL RESOURCES

Geologic Resources (Geology, Paleontology, and Rare and Unique Geologic Features)

Construction activities could impact geologic resources. The foundations for the new towers may extend below grade 40 feet or more, requiring blasting, which could affect geological and paleontological resources. Construction activities could cause geohazards such as rockslides and limestone fracturing, which could alter wetland environments that provide rare and unique habitats for both plant and wildlife species.

Floodplains

Impacts on floodplains and their functionality could occur from the proposed Line. The construction of towers and access roads, displacement of floodwater by towers, and compaction of soil from crane pads could all affect floodplains and riparian buffers. An NPS floodplain statement of findings may be required.

Wetlands

The proposed Line could have impacts on wetlands and their functionality. Blasting could affect water flows and vegetation trimming could affect plant growth. Wetland delineations and assessments of functions and values for wetlands have been conducted. Access roads and towers, crane pads, and other construction activities could compact soils, involve vegetation removal, and alter surface hydrology, which could impact wetland functions and values. An NPS wetlands statement of findings may be required.

Vegetation

Impacts on vegetation in the ROW and along the routes of proposed access roads are expected. All action S-R Line alternatives would require significant trimming or clearing of some vegetation in their respective ROWs. The B-K Line ROW has not been maintained and would also require vegetation trimming. Access roads would require vegetation clearing. Areas needed for pulling and splicing of the wires may require some trimming and clearing, or use of these areas may result in trampling of vegetation. All action alternatives also have the potential to promote invasive species.

Landscape Connectivity, Wildlife Habitat, and Wildlife

The proposed transmission line expansion may contribute to habitat fragmentation by increasing the width of the ROW, clearing heavily forested areas in the ROW and along proposed access roads, and reducing large, contiguous blocks of habitat. Impacts on wildlife and their habitats in and adjacent to the ROW and proposed access roads may also occur. Construction noise may deter wildlife from using their normal home ranges. Road widening and clearing of trees along the roads would result in removal and alteration of wildlife habitat. The installation of taller towers with transmission lines above the current tree height could adversely affect migratory birds, and the Secretary of the Interior has been petitioned to designate a national raptor migration corridor in this area. Impacts such as illegal off road vehicle use, as unfortunately often occurs on other ROWs in the park, would compound habitat fragmentation.

Special-status Species (Aquatic and Terrestrial)

Federal and state-listed species and other species of conservation concern are located near and along the proposed alternative routes and could be affected by construction and maintenance of the S-R Line. The

degradation of water quality and habitat alteration as a result of construction activities may affect special-status aquatic species.

Rare and Unique Communities

The proposed action alternatives for the Line could have impacts on many rare and unique ecological communities in DEWA. The hemlock forest community is a natural heritage site and a DEWA outstanding natural feature that supports rare species. Kittatinny talus slope, which is located just downslope of APPA, is in the Kittatinny Mountains, a New Jersey priority natural heritage site. Hogback Ridge is a unique ecosystem in DEWA. Van Campens Brook and its tributaries are important fish habitat (such as for wild native trout reproduction).

CULTURAL RESOURCES

The S-R Line action alternatives have the potential to affect cultural resources in DEWA and along MDSR. Pennsylvania and New Jersey have deemed the entire length of APPA eligible for nomination to the national register, as have the other 12 states through which the trail passes. Currently, other sections of the trail are listed on the register. Scenic impacts on cultural landscapes are also possible.

Archeological Resources

Impacts on archeological resources are anticipated. The applicant is currently conducting site surveys for archeological resources around existing and proposed tower structure, access road, and crane pad locations as well as "harvest impact areas" along their proposed route. River terraces along the Delaware River are prime locations for archeological sites, including sites containing prehistoric structural remains, and have the potential to be affected by the transmission line expansion.

Historic Structures

Surveys have identified historic structures in Pennsylvania and New Jersey and at DEWA. No physical impacts on historic structures are anticipated, but visual impacts would occur. The S-R Line would involve the regular placement of new towers and intervening electrical transmission lines within identified alternative alignments. Because these features are large in scale and readily visible from great distances, they would have visual impacts on historic structures within the valley.

Cultural Landscapes

According to NPS-28: *Cultural Resource Management Guideline*, a cultural landscape is a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions.

The parks themselves jointly form a man made cultural landscape that would be permanently altered by the action alternatives. Construction activities, the new transmission lines, and new access roads would all affect significant cultural landscape features and characteristics (natural systems and features, spatial organization, land use, cultural traditions, circulation, topography, vegetation, wild or domestic fauna, buildings and structures, cluster arrangements, small-scale features, constructed water features, views and vistas, and archeological sites). Impacts on cultural landscapes would be permanent. Any cultural landscapes that have been identified would be evaluated. Cultural landscapes studies would likely be necessary for several locations, including Van Campens Glen, APPA, Old Mine Road Historic District,

Watergate Recreation Site, Delaware View, and Community Drive. Additional cultural landscapes that could be affected by alternatives would be identified through the viewshed analysis.

Tribal Resources (Including Sacred Sites and Indian Trust Resources)

An ethnographic evaluation should be completed to determine whether any ethnographic resources exist at the parks and whether ethnographic resources would be affected by the transmission line expansion. The relevant Tribal Historic Preservation Officers are being consulted regarding tribal resource impacts. The Delaware Nation has stated that they prefer that the powerline be routed around the park.

Most tribes have expressed an interest in continued consultation on the project and will be providing input when the Draft EIS is released.

OTHER AGENCY LAND USE PLANS OR POLICIES

Federal, state, county, and municipality-based land use plans or policies related to the study area exist. The counties in the existing study area have comprehensive land use and zoning plans. Some of the municipalities (townships and boroughs) have zoning and land use plans, as well. Some of the proposed S-R Line activities may not be compatible with these agency land use plans.

SOCIOECONOMICS (SOCIOECONOMICS AND INFRASTRUCTURE, ACCESS, AND CIRCULATION)

The proposed action alternatives for the Line may change the way the parks, park resources, and park concessionaires' resources are used, resulting in economic impacts. The expanded ROW and new transmission lines could result in economic impacts due to changes in visitation or use of park resources. Employment for the local community and businesses may rise during construction activities. Tourism may also be affected by the Line. Transporting construction equipment and towers would have impacts on public roads including increased traffic, road deterioration from heavy trucks, and reduced access from surrounding communities. The Line has the potential to negatively affect real estate values near the proposed transmission lines.

VISITOR USE AND EXPERIENCE

The existing visitor experience, including key elements such as primitiveness and solitude, may be affected by the action alternatives for the Line. In all three parks, construction activities and the visibility of the new towers above the existing tree line would have an impact on visitor experience. Construction activities (including blasting, boring, clearing, and heavy equipment noise) and large visible towers would affect visitor experience at APPA. Effects on visitor experience due to changes or reduced access to scenic resources are also anticipated. Scenic resource protection is specified in the enabling legislation of APPA, DEWA, and MDSR. Temporary and permanent closures of roads, river, trails, and campsites would be implemented for safety and transport needs. Action alternatives would result in an adverse impact on the visitor experience.

VISUAL RESOURCES

The proposed Line and associated access roads may alter some viewsheds, which could adversely affect the visitors' appreciation of the parks' viewsheds and scenic resources. Separate viewshed analyses have been conducted for scenic and visual impacts in the three parks. DEWA and the surrounding lands are

part of the scenic viewshed for APPA. Construction is expected to affect the visual and aesthetic resources of the parks for decades.

SOUNDSCAPES

Construction and maintenance activities would cause noise impacts. An increase in transmission line voltage may cause increases in corona effect noise (audible electric line noise), especially during periods of high aerial conductivity (such as times of high humidity). Visitors could be subjected to non-natural sounds as a result of construction activities and operation of the proposed line for the life of the line, not just during construction. More roads and more maintenance would result from selection of any action alternative.

WILD AND SCENIC RIVERS

All alternatives would cross the Delaware River and several would cross the Delaware River where the river is designated as the MDSR, a wild and scenic river. The Wild and Scenic Rivers Act defines scenic river areas as those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads. The proposed Line may have impacts on natural viewsheds along the Delaware River. The construction of new towers and expansion of the ROW would disrupt the character of the shoreline.

PARK OPERATIONS

Construction and operation of the proposed S-R Line is likely to negatively affect park operations such as law enforcement and resource management. The S-R Line would require park staff to monitor and oversee more frequent maintenance activities associated with the newly cleared areas. More time would be required for park staff to handle additional long-term resource management responsibilities, utility coordination, law enforcement, and maintenance. Volunteers may also be redirected from their usual activities to monitor vegetation, create off-road vehicle (ORV) barriers, or address trail erosion problems.

HUMAN HEALTH AND SAFETY

The local roads and park roads are narrow, typically only rated for loads less than 10 tons, restricted to noncommercial traffic, and subject to constant maintenance issues. Large, heavy equipment use would be a potential problem due to traffic control issues, deterioration caused by excess loads, and exceedances of bridge and culvert weight capacities. Transporting large construction equipment and new towers on park and public roads would cause a safety concern, and the river would be closed to public use as necessary during installation of the power lines for visitor safety. In addition, electromagnetic field (EMF) exposure related to transmission lines was identified by the public during the scoping process as a topic of concern.

SUSTAINABILITY AND LONG-TERM MANAGEMENT

Impacts on natural resources from the proposed Line would be ongoing, and potential mitigation measures would necessitate long-term management and monitoring actions by the parks. In addition, a variety of ramifications are generally associated with power lines, such as illegal ORV use and forest cover fragmentation. Another long-term management consideration is that the conversion of this transmission corridor from a noncritical status to a critical corridor would affect the way this area is accessed and maintained in the future. It is reasonably foreseeable that the logic being applied to justify adding more lines to the existing B-K Line ROW would continue as future needs expand, and further

transmission line expansion proposals may be forthcoming. Continued addition of ROW and roads would diminish the value and services provided by the existing natural and cultural resources.

ISSUES AND IMPACT TOPICS ELIMINATED FROM FURTHER CONSIDERATION

The following resources were analyzed in detail while drafting this EIS. The analysis determined that each of the alternatives would have minimal impacts on these resources in the study area, and either the impacts are similar across the action alternatives or impacts on the resource are thoroughly analyzed and described under another resource topic. The following resources were dismissed from further analysis in this EIS.

AIR QUALITY

Section 118 of the 1963 Clean Air Act (42 USC 7401 et seq.) requires park units to meet all federal, state, and local air pollution standards. Further, the Clean Air Act provides that the federal land manager has an affirmative responsibility to protect air quality related values (including visibility, plants, animals, soils, water quality, cultural resources, and visitor health) from adverse pollution impacts. NPS *Management Policies 2006* also requires parks to perpetuate the best possible air quality in parks to (1) preserve natural resources and systems, (2) preserve cultural resources, and (3) sustain visitor enjoyment, human health, and scenic vistas (NPS 2006a, 53). The construction and operation of the S-R Line under all action alternatives would comply with the NPS mandates. DEWA is not a federal Class I area afforded additional protection for air quality related values such as visibility. DEWA is a Class II area, which allows for a less stringent level of air quality protection than Class I areas.

Impacts on air quality would be the same across all action alternatives inside and outside the study area. The amount of criteria pollutants emitted as a result of the action alternatives would include trace amounts of particulate matter, nitrogen oxides, and carbon monoxide and impacts on air quality would be no greater than minimal. On a regional level, the amount of criteria pollutants emitted would not be substantial and the impacts on air quality would be the same for all action alternatives. Therefore, this resource topic is dismissed from further analysis.

Climate Change and Greenhouse Gas Emissions

The Environmental Quality Division of the NPS has released draft interim guidance on considering climate change in NPS NEPA analysis, one of the key questions that should be addressed is “What is the contribution of the proposed project to climate change, as indicated by greenhouse gas emissions associated with the project?” (NPS 2009a, 1). On February 18, 2010, the Council on Environmental Quality released a draft guidance memorandum on the consideration of greenhouse gas emissions and climate change impacts as part of compliance with NEPA (Sudley 2010, 1).

DEWA is involved in the Climate Friendly Parks Program, which is a collaboration of the NPS and the U.S. Environmental Protection Agency (USEPA) aimed at addressing climate change. The purpose of the program is to measure greenhouse gas emissions, develop sustainable strategies to mitigate these emissions and adapt to climate change impacts, and educate the public about these efforts (NPS 2005b, 6). DEWA has also developed “climate friendly” objectives and targets for DEWA employees for climate change mitigation and air pollution reduction (NPS 2005b, 6).

Climate change has had, and will continue to have, a marked impact on natural systems (NPS 2006b, 10). However, the responses of ecosystems to global warming have only been postulated and likely will vary

among systems (Shaver et al. 2000). It is expected that one result of future climate change in the eastern United States will be an increase in the number of ice storms, which can disturb forest systems (National Assessment Synthesis Team 2001). There may also be changes in the number and intensity of extreme events such as hurricanes and northeasters (Groisman, Knight, and Karl 2000), all of which stress the natural systems of the Eastern Rivers and Mountains Network (NPS 2006b, 11).

Construction and maintenance activities associated with the S-R Line alternatives would result in fossil fuel consumption. However, the park is in fact a carbon sink but the issue of the contribution of the alternatives to climate change through greenhouse gas emissions was dismissed from further analysis.

Climate change may contribute to the adverse impacts on natural resources expected from the proposed S-R Line. However, these adverse impacts are not expected to increase the intensity of the impacts identified for the alternatives and impacts from climate change are also similar across all action alternatives. In addition, ecosystems are currently under pressure from a number of stressors in addition to climate change, including habitat loss and degradation, development, pollution, toxic chemicals, overfishing, invasive species, pests, disease outbreaks, habitat fragmentation, and wildfires (NABCI 2010, 44). Due to these reasons and the impossibility of predicting the severity of future climate change or its impacts with certainty, this topic was dismissed from further consideration.

SOIL RESOURCES (SOILS AND PRIME AND UNIQUE FARMLANDS)

Soils

NPS *Management Policies 2006* requires the NPS "to understand and preserve the soil resources of parks, and to prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil or its contamination of other resources. … Management action will be taken by superintendents to prevent or at least minimize adverse, potentially irreversible impacts on soil" (NPS 2006a, 56).

The majority of soils in the study area formed as a result of glaciations that once covered the mountains of the park. Soils in DEWA are primarily composed of a poorly to excessively well-drained, fine to coarse, loamy mix formed in glacial material such glacial till, colluvium, or outwash derived from sandstone, siltstone, shale, conglomerate, and/or quartzite (USDA Natural Resources Conservation Service [NRCS] 2010a). Most of the adverse impacts on soils are due to soil compaction; this is similar across all action alternatives. Soil compaction results in loss of soil productivity and this is addressed and analyzed under the wetlands resource topic. Therefore, the soil resources topic is not carried forward in this EIS.

Prime and Unique Farmlands

The Farmland Protection Policy Act (7 USC 4201 et seq.) was passed to address the effects of federal programs on the conversion of farmland to nonagricultural uses. In support of this legislation, the Department of the Interior issued several memoranda to guide its agencies in addressing prime and unique farmlands in the NEPA process. Prime farmlands are those lands that have the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fertilizer, pesticides, and labor, and without intolerant soil erosion. Unique farmlands are those that are used for the production of specific high-value food and fiber crops.

The majority of prime and unique soil along the proposed alternative alignments is currently forested land and is not being actively farmed. Impacts on prime and unique farmlands would be no greater than minimal because it is likely that the agriculture land containing the prime soil would continue to be

farmed. Other areas containing prime or unique farmlands are currently forested habitat. Therefore, the prime and unique farmlands topic is dismissed from further analysis.

WATER RESOURCES (SURFACE WATER AND WATER QUALITY, GROUNDWATER, AND AQUATIC RESOURCES)

The Clean Water Act requires the NPS to "comply with all Federal, State, interstate, and local requirements, administrative authority, and process and sanctions respecting the control and abatement of water pollution" (33 USC 1251 et seq., section 313). NPS *Management Policies 2006* states that the NPS will "take all necessary actions to maintain or restore the quality of surface waters and ground waters in the parks consistent with the Clean Water Act and all other applicable federal, state, and local laws and regulations" (NPS 2006a). The NPS has also established general goals for water quality, and in accordance with these goals, the NPS works cooperatively with states to protect and enhance the quality of water in national park system units.

Water quality protection is one of the most important responsibilities of the Delaware River Basin Commission; its water quality standards designate the MDSR and the portion of the river and tributaries contained in DEWA as outstanding basin waters.

Surface Water and Water Quality

Within the boundaries of DEWA and MDSR, the Delaware River flows 40 miles from near Matamoras, Pennsylvania, to Slateford Creek, Pennsylvania (Horwitz et al. 2008, 1). The portion of the Delaware River Basin in DEWA is composed of 48 major tributaries and encompasses a drainage area of 69,000 acres in parts of Pennsylvania and New Jersey. In addition to the Delaware River and tributaries, approximately 200 lakes and ponds are within the boundaries of DEWA. These ponds and lakes vary in size, ranging from surface dimensions of less than an acre to 35 acres (NPS 2010g). The surface water quality in the mainstem of the Delaware River in DEWA is considered high quality (NPS 2010f, 1). Within DEWA, all streams but one originate outside the park boundary. Water quality in these streams is generally high; however, nearby human development has resulted in increased nutrient, sediment, and fecal coliform levels in some streams (NPS 2010f). Other surface water bodies in DEWA, including lakes and ponds, generally have good water quality, although depressed dissolved oxygen concentrations have been observed in later summer when large quantities of aquatic plants die and decay (NPS 2010f).

Because no construction would be completed in any waterbodies and no discharge permit is being requested, impacts to water quality would primarily occur from increased sediment loads being introduced into the stream from construction activities (short term) and from increased erosion due to vegetation loss and new access roads (long term). Analysis of these impacts was conducted using the USFS WEPP model to estimate increased total suspended solids (TSS) concentrations. The WEPP model does not account for the installation of best management practices (BMPs) such as silt fence and straw bales therefore it represents the worst case scenario of 100% failure of required erosion and sedimentation controls. The WEPP model indicated minimal short term and long term increases in TSS for some tributaries and undetectable increases in TSS in the Delaware River. The model did not detect differences between the alternatives. The likelihood of 100% failure of erosion and sedimentation controls is remote so it is unlikely that impacts to surface water quality would be detectable. Therefore, the topic of surface water and water quality is not carried forward in this EIS.

Groundwater

An aquifer is a geologic formation that yields water. The principal sources of groundwater (water beneath surface of the ground) in the Delaware River Basin are unconsolidated sand and gravel aquifers and

fractured, consolidated bedrock aquifers (Sloto and Buxton 2006, 2). Unconsolidated aquifer systems are found underlying both valley and upland areas of DEWA, MDSR, and APPA and are generally composed of glacial materials such as coarse-grained sand and gravel with mixtures of clay and silts (Sloto and Buxton 2006, 2).

Due to the presence of limestone there is an increased potential of groundwater contamination during blasting activities; this is similar across all action alternatives. Impacts to groundwater from blasting activities are addressed and analyzed under the wetlands resource topic. Therefore, the topic of groundwater is not carried forward in this EIS.

Aquatic Resources

Aquatic resources include fish and aquatic macroinvertebrates. Most of the adverse impacts on aquatic resources are due to a measurable change in the water quality due to stream crossings and runoff; the loss of vegetation, which would alter habitat and food availability; the opening of tree canopies, which could also lead to changes in water temperature that could affect stream health and biodiversity; and the potential for blasting in limestone, which could alter flow or water availability. These issues are addressed and analyzed under the wildlife and wetlands resource topics. Therefore, the topic of aquatic resources is not carried forward in this EIS.

MUSEUM COLLECTIONS

Natural and cultural studies related to this EIS would generate collections of discipline-based museum objects (biological, physical, geological, and archeological). The NPS is required to curate these collections in perpetuity. An extensive administrative record (hard copy and digital) would be catalogued and archived in the parks for any resources discovered and evaluated. Cataloging and curating archives can cost between $1 and $10 per object. Archeological objects can cost between $2 and $10 per object to catalog and curate. These scientific records would be archived permanently. The proposed project would require the expansion of the parks' archival and museum collection operations to permanently maintain all museum collections (objects and archives). Mitigation measures for any permitted action alternative will include funds to catalog and curate museum collections resulting from the project. Therefore, this impact topic can be dismissed.

ENERGY RESOURCES AND CONSERVATION POTENTIAL

This topic involves assessing NPS energy requirements and the potential for energy conservation associated with the various alternatives, but it is most relevant to facility construction projects. The construction of the S-R Line would not affect any NPS facilities. Because there would be monitoring of the mitigation required under this EIS, some increased energy may be needed; however, there would only be negligible impacts on energy resources, because NPS fuel consumption would not change to a large degree as a result of the construction or because of the maintenance of resources impacted by this action. The parks would continue to operate under the wise energy–use guidelines and requirements stated in the NPS *Management Policies 2006* (NPS 2006a); Executive Order 13123, "Greening the Government through Effective Energy Management"; Executive Order 13031, "Federal Alternative Fueled Vehicle Leadership"; Executive Order 13149, "Greening the Government through Federal Fleet and Transportation Efficiency;" and the 1993 NPS *Guiding Principles of Sustainable Design* (NPS 1993a). Therefore, this resource topic is eliminated from further analysis.

ENVIRONMENTAL JUSTICE

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires federal agencies to make achieving environmental justice part of their mission. Specifically, each agency must identify and address "disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

A compilation of statistics on population composition, median income, and poverty level has determined that no minority or low-income populations exist in the counties and townships in the study area (USCB 2000a; 2000b). Therefore, no impacts would occur on minority or low-income populations in the study area and any impacts on these groups outside the study area would not be disproportionate for any one group of people. Therefore, this topic is eliminated from further consideration. The lost use and other impacts would affect all citizens equally.

GATEWAY COMMUNITIES

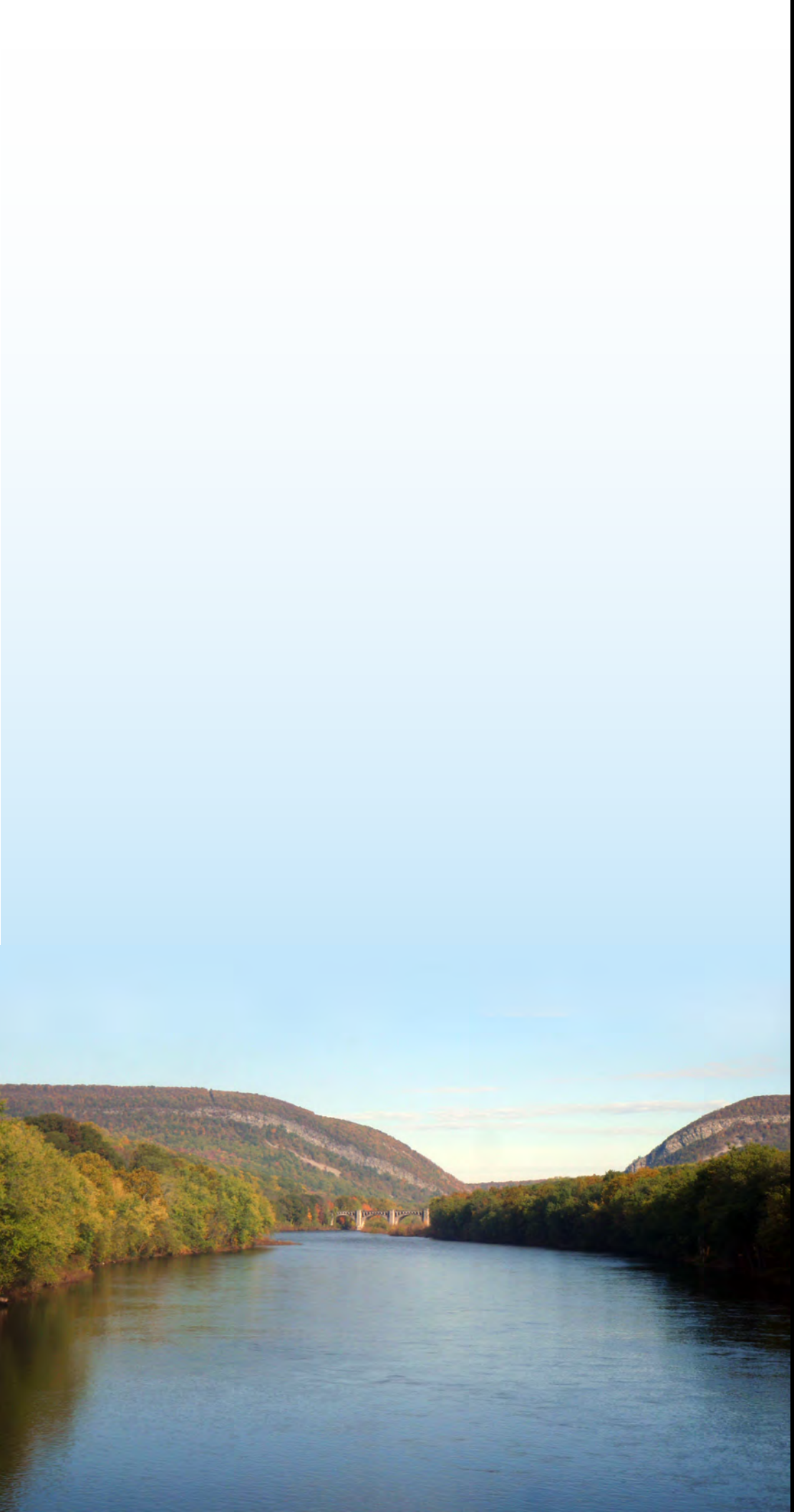
According to the NPS *Management Policies 2006* (2006a, 158), a gateway community is a community close to a unit of the national park system whose residents and elected officials are often affected by the decisions made in the course of managing the park, and whose decisions may affect the resources of the park. Gateway communities usually offer food, lodging, and other services to park visitors. They also provide opportunities for employee housing and a convenient location to purchase goods and services essential to park administration (NPS 2006a, 158).

To a limited degree, all action alternatives could have a small, temporary beneficial impact on local economies during construction due to construction employment (it is expected that workers specifically skilled in transmission line construction would be brought in from outside the area). Although not all communities would be affected under each alternative, where adverse impacts are expected, they would be similar and would minimally affect the quality of the human environment. Because similar impacts are expected under each alternative, they would not meaningfully contribute to decision making and the selection of a preferred alternative. Because impacts on gateway communities are not expected to affect decision making for this EIS, this topic was dismissed from further analysis.

LAND USE

The proposed alternatives have the potential to affect how land within park boundaries is used. NPS *Management Policies 2006* states, "appropriate land protection methods must be applied to protect park resources and values from incompatible land use" (NPS 2006a, 29). Similarly, section 3.1 of Director's Order 25: *Land Protection* says, "The National Park Service will use all available authorities to protect lands and resources within NPS units" (NPS 2001b).

Though the applicant's project may impact certain values that land use plans seek to preserve (such as vegetation), it would not greatly change existing land use itself, nor land use plans. Therefore, the impact topic of Land Use has been dismissed from further detailed analysis.



Chapter 2
Alternatives

CHAPTER 2: ALTERNATIVES

INTRODUCTION

This chapter describes alternatives for the proposed action to cross NPS lands as part of the applicant's stated need to construct the S-R Line. Included is an overview of the transmission system, followed by a description of the alternatives development process and of the elements common to all alternatives. The remainder of the chapter addresses the following: details of the alternatives; alternatives that were eliminated from further study; impacts of the alternatives; the NPS-preferred alternative; the environmentally preferred alternative; and consistency with sections 101(B) and 102(1) of NEPA.

NEPA requires that federal agencies explore a range of reasonable alternatives and provide an analysis of impacts the alternatives could have on the natural and human environment. "Chapter 4 Environmental Consequences," presents the results of the impact analyses.

The National Environmental Policy Act requires that federal agencies explore a range of reasonable alternatives and provide an analysis of impacts the alternatives could have on the natural and human environment.

Six alternatives are analyzed in this EIS. The alternatives under consideration must include a no-action alternative, as prescribed by 40 CFR 1502.14. Under the no-action alternative in this EIS, the B-K Line within the parks would remain in place without expansion or replacement. Five action alternatives for the S-R Line were developed based on input and scoping activities conducted with the NPS, the applicant, stakeholders, and the public. The action alternatives were subsequently evaluated and determined to be technically feasible. Detailed design has been completed for alternative 2, the applicant's proposed route, and alternative 2b, the applicant's alternate proposal. A comparable level of planning has not been carried out for alternatives 3 through 5; however, these alternatives have been designed at a conceptual level, which is sufficient for analyzing impacts.

ALTERNATIVES OVERVIEW

Figure 2 presents the alternative routes from the Susquehanna Substation in Pennsylvania to the Roseland Substation in New Jersey. Alternatives 1, 2, and 2b follow the same alignment from Susquehanna to Roseland. Alternative 1 is identified as the no-action alternative. Alternative 2, the applicant's proposed route, is an expansion of the current transmission line with the addition of a second 500-kV line. Alternative 2b is the applicant's alternative route and is a modification of alternative 2. Alternatives 3, 4, and 5 follow routes different than the applicant's two proposed alternatives.

All of the action alternatives described in this section have alignments that would cross at least two units of the national park system and would therefore require NPS permits. The NPS cannot require the applicant to follow a certain route outside the boundaries of park lands; therefore, the portion of the route outside park lands is not discussed in detail in this chapter. Although the applicant could select any route outside of park lands, the NPS identified potential alternatives that could connect the Susquehanna and Roseland substations. These are described in detail in appendix C. The routes described in appendix C were developed by the NPS simply to determine whether construction on a route was possible and does not constitute an attempt to determine the actual location in areas outside NPS jurisdiction. The NPS is not suggesting or endorsing the route of any alternative beyond its actual crossing of parklands.

The alignments for all alternatives would follow existing transmission or distribution line rights of way across NPS lands.

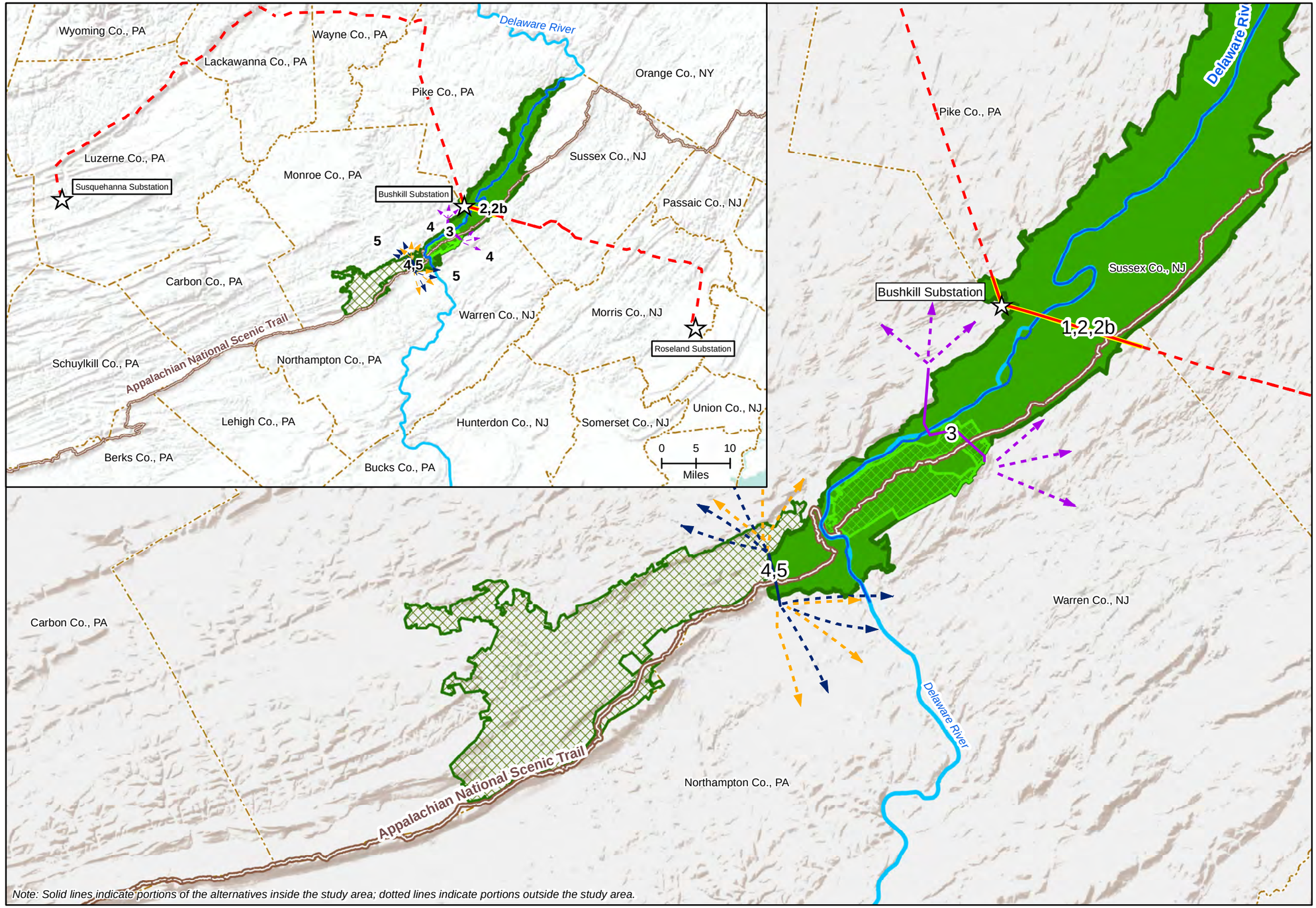
The alignments for all alternatives would follow existing transmission or distribution line ROWs across NPS lands. Alternatives 1, 2, 2b, and 3 would cross all three parks; alternatives 4 and 5 would cross DEWA and APPA but not MDSR. Alternatives 1, 2, and 2b would use the B-K Line alignment across the parks, which would involve crossing approximately 4.3 miles of NPS land through DEWA, while crossing MDSR and APPA. Alternative 3 would traverse a total of 5.4 miles of NPS lands. This alternative would follow the same alignment as alternatives 1, 2, and 2b from the DEWA boundary eastward to the Bushkill Substation, crossing 0.6 mile of NPS lands before leaving NPS lands. The alternative would then reenter the parks and cross a 3.0-mile section, crossing MDSR and APPA within DEWA before again exiting NPS lands. Alternative 3 would then travel along the eastern boundary of DEWA for approximately 1.8 miles, approximately 0.2 mile east of and parallel to APPA. The alignments for alternatives 4 and 5 across the parks are similar to each other, moving through approximately 0.9 mile of NPS lands. Like alternative 3, the alternative 4 alignment would cross the 0.6-mile section of DEWA west of the Bushkill Substation.

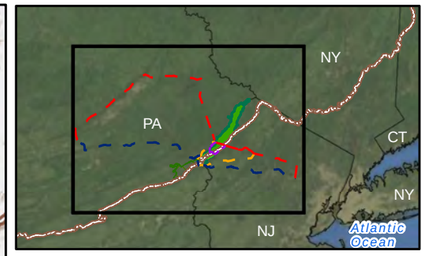
TRANSMISSION SYSTEM OVERVIEW

For the proposed project, power plants would supply electricity, which would flow through transformers and transmission lines to the Susquehanna Substation. From the Susquehanna Substation, electricity would flow through the proposed S-R Line to the Bushkill and Roseland substations to distribution lines, and then finally through the electrical grid to the consumer. Power plants generate three-phase alternating current (AC), which is transmitted through three wires, or conductors. Conductors are usually about an inch in diameter. There is also a smaller shield wire at the top of transmission structures, which is designed to protect the power line from lightning. The proposed double-circuited transmission line structures would carry two transmission lines, each with three conductors (PSC of WI 2010).

The electrical grid consists of two separate infrastructures: the high-voltage transmission system and the lower-voltage distribution system. High-voltage transmission lines, such as those proposed by the applicant, minimize electrical losses and are therefore used to carry electricity hundreds of miles. The Susquehanna, Bushkill, and Roseland substations act as interfaces between the project's transmission lines and the distribution system. The substations use transformers to step down voltages from the higher transmission-system voltages to the lower distribution-system voltages. Transformers located along distribution lines further step down the voltages for household use.

In areas where single-poled structures are preferred, weak or wet soils may require concrete foundations for support. Where a transmission line must change direction, large angle structures or guy wires may be required. Poles with guy wires impact a much larger area because they require foundations where the guy wires are anchored to the ground in addition to the concrete foundation for the structure. Angle structures without guy wires are made of steel and are usually 5 to 6 feet in diameter, more than double the diameter of other steel poles. These structures have a large concrete base, which may be buried 10 or more feet below the ground surface. The diameter of the pole and the depth to which the base is buried depend on the condition of the soils and the voltage of the line (PSC of WI 2010).





Legend

- Substation
- Alternative 1,2
- Alternative 2b
- Alternative 3
- Alternative 4
- Alternative 5
- Appalachian National Scenic Trail
- Middle Delaware National Scenic and Recreational River
- Delaware River
- Delaware Water Gap National Recreation Area
- Worthington State Forest
- CVNWR Boundary
- County Line

Note: Designated boundary of CVNWR is depicted, not all property is owned within the boundary

0 2 4
Miles

Note: Solid lines indicate portions of the alternatives inside the study area; dotted lines indicate portions outside the study area.

Susquehanna to Roseland
Transmission Line Proposal
and
Right-of-Way Request EIS

Figure 2
Alternatives within the Study Area

Source: ESRI Streetmap 2006, Penn State 2010, ESRI ArcGISonline Map Service 2010, PennDOT 2011, NJOIT 2010, USGS 2006, NJ DEP 2008,

Projection: NAD 83 UTM Zone 18N
Date: October, 2011

ALTERNATIVES DEVELOPMENT PROCESS

METHODOLOGIES

The NPS-generated alternatives considered in this EIS (alternatives 3 through 5) were identified based on the resource goals and objectives described in chapter 1, results of the alternatives workshops conducted with NPS staff, applicant representatives, and public comments received during both the scoping period and alternatives workshops comment period. Using the criteria established, such as the design considerations described below and described publicly by the applicant, transmission line engineers under contract to the NPS developed alternatives 3 through 5 primarily by identifying existing linear corridors, via aerial satellite imagery, that could support the proposed 500-kV transmission lines. Existing corridors included electrical transmission lines, an underground pipeline, highways, and a railway.

The transmission engineers, as contracted by the NPS, first identified possible alternate routes through the parks, such as existing transmission lines, where the S-R Line could be co-aligned with the existing line. No new crossings through the parks were identified because new crossings are not compatible with NPS mandates; the NPS would only grant permits for one crossing by the applicant. After exhausting possibilities within DEWA, options were sought that would cross APPA outside the boundaries of DEWA. In all cases, options that would cross APPA at a perpendicular angle were preferred to those that paralleled the trail, to minimize impacts on trail visitors.

Potential routes were then refined by applying clearance distances defined by the National Electric Safety Code (NESC) to avoid sensitive areas, including residences, schools, businesses, and other protected resources, such as public lands. Adopted by law by the majority of states and public service commissions across the United States, NESC is a performance code that defines safeguards from hazards arising from the installation, operation, or maintenance of conductors and equipment in electrical supply stations and overhead and underground electrical supply and communication lines. NESC includes work rules for the construction, maintenance, and operation of electrical supply and communication lines and equipment. The standard is applicable to the systems and equipment operated by utilities; therefore, NESC guidelines were used to minimize impacts of new alternatives on landowners outside NPS boundaries. As a result, transmission engineers identified subalternatives for each alternative, which provided secondary options to a primary route.

These efforts resulted in identification of primary alternatives, each of which included multiple subalternatives. The alternatives and subalternatives were extensively discussed and reviewed during the alternatives workshop conducted on site during May 2010 and are described in more detail below. During this time, transmission engineers visited all the proposed alternative sites where the potential routes would cross DEWA, MDSR, and APPA, photographed the crossing locations, and noted the condition of the existing corridors.

Once the alternatives were developed, visual split locations (VSLs) were determined by the parks. Outside the boundaries of the parks, the applicant exercises its own discretion to determine the route of the line, independent of any NPS permit or other action. The geographical point outside the parks at which it becomes physically possible for the applicant to route the line as it sees fit is called a VSL point, a term created by NPS to describe this point in this EIS. For most resources, the study area for an alternative is defined as the area between the VSLs for that alternative. However, it is important to note that for some resources, the size of the study area may vary depending on the resource being discussed. For example, the study area that would be considered for landscape connectivity or visual impacts of an alternative may not be the same area that would be considered for another resource, such as geologic resources or vegetation, due to the area impacted for that resource.

The determination of the VSLs is important because while NPS can require the applicant to follow a specific route inside the VSLs, the NPS cannot require the applicant to follow a certain route beyond these points. Therefore the applicant and state authorities would ultimately be responsible for the line routing from the Susquehanna Substation to the Roseland Substation, excluding where it crosses DEWA, MDSR, and APPA inside the VSLs. The NPS looked at corridors outside the VSLs only to determine whether a route could be found from the line's endpoints (Susquehanna and Roseland substations) to each crossing. This should not be interpreted as endorsing or recommending any route outside the park boundaries or being able to determine whether this possible route would be the one used by the applicant.

Alternatives 3 and 4 reenter and cross NPS lands outside the VSLs (figure 2). Secondary VSLs were assigned to these sections and they are included in the study area. Thus, all impacts on resources within the parks will be fully analyzed.

CRITERIA

The following route selection criteria were used to select and analyze potential routes:

- Minimize crossing of designated natural resource lands such as state forests, national and state parks, wildlife management areas, designated gamelands, wildlife areas, and conservation areas.
- Avoid new crossings of large lakes.
- Minimize impacts on the natural and human environment.
- Maximize the use or paralleling of existing, cleared power line ROWs.
- When not following existing ROWs, maximize the distances from residences, schools, cemeteries, historical resources, recreation sites, and other important cultural sites.
- Minimize the removal of existing residences, barns, garages, and other structures.
- Minimize route length, circuitry, and cost.

ALTERNATIVES WORKSHOPS

NPS staff conducted an internal alternatives workshop May 4–7, 2010, to discuss the feasibility of potential alternatives. All alternatives proposed by the applicant and the NPS were evaluated based on the potential impacts on resources and residents. The alternatives dismissed as a result of the internal alternatives workshop are discussed in detail in the "Alternatives Eliminated from Further Study" section of this chapter.

Seven alternatives, including the no-action alternative, were retained and presented to the public at the public alternatives meetings August 17–19, 2010. Comments received at the meetings and during the public comment period were compiled in a comment analysis report, which was made available to the public in November 2010 and can be found on the NPS PEPC website (NPS 2010f [http://parkplanning.nps.gov/]). An additional internal meeting was held on November 5, 2010, to discuss the comments. The NPS concluded that no comments had been submitted that would cause any of the action alternatives to be eliminated or new alternatives to be added; therefore, the no-action alternative (alternative 1) and action alternatives 2 through 7 were retained for analysis in this EIS. During analysis of the alternatives in preparing this EIS, the NPS determined that action alternatives 6 and 7 would be dismissed based on the criteria previously listed. The rationale for dismissal of these two alternatives is presented in the "Alternatives Eliminated from Further Study" section of this chapter.

DEVELOPMENT OF THE APPLICANT'S ALTERNATE PROPOSAL

During the development of alternatives, the applicant examined the possibility of constructing the proposed line within their existing ROW for the B-K Line (alternative 2b), a variant of the applicant's proposal. The NPS conducted a preliminary examination of the applicant's property rights and determined that the easements for the existing ROW range from 100 feet to 380 feet. The NPS expressed concern about the feasibility of constructing the proposed line within a 100-foot ROW. The 100-foot-wide portion of the ROW is in Pennsylvania and extends approximately 0.8 mile.

Discussions between the applicant and the NPS over an 8-month period resulted in a difference of opinion on this issue. During public review of the proposed alternatives, the applicant formally requested that the NPS include alternative 2b in its analysis. In a letter dated August 26, 2010, the applicant stated that the proposed double 500-kV transmission line could be safely constructed within their existing ROW. Constructing within the existing easement rights would eliminate the applicant's need for a ROW permit. The NPS agreed to add the analysis of alternative 2b, the applicant's alternate proposal, to the EIS. Correspondence regarding the development of alternative 2b is presented in appendix D.

DESCRIPTION OF THE ALTERNATIVES

This section describes the portions of the alternatives within the study area. Table 2 presents the general elements of the alternatives, and table 3 presents the construction-specific elements of the alternatives. Outside the study area, the NPS cannot require the applicant to follow a certain route; therefore, that portion of the route is not described in detail in this chapter. The alternatives, as developed for this EIS, have been created based on the methodologies and criteria described previously. Possible scenarios for routes for the alternatives for those segments outside NPS jurisdiction are described in appendix C. They are not prescribed or endorsed by the NPS. Their only purpose is to determine the feasibility of the crossings being analyzed in this EIS.

ALTERNATIVE 1: NO ACTION

Under the no-action alternative, the NPS would deny the special use and construction permits to expand the B-K Line to a new double-circuit line through NPS lands.

Under the no-action alternative, the NPS would deny the applications for right-of-way and construction permits to expand the B-K Line to a new double-circuit line through NPS lands. The existing B-K Line traverses approximately 4.3 miles of DEWA. The line initiates at the Susquehanna Substation and enters DEWA in Pennsylvania approximately 0.25 mile east of Big Bushkill Creek. The line then exits the park, connects to the Bushkill Substation, travels through developed areas, including Fernwood Golf Course, and reenters DEWA south of the South Zone Ranger Station and north of DEWA Headquarters, crossing MDSR just north of Depew Island. The line continues southeast past the Watergate Recreation Site and across APPA to the eastern DEWA boundary. There are 22 existing transmission towers located within DEWA boundaries for the existing B-K Line, and there are no existing access roads to the ROW.

This alternative assumes that the existing line within the parks would remain in place without expansion or replacement. In essence, it assumes that current conditions on the ground will continue indefinitely into the future. However, the applicant could seek to expand or replace the existing utility lines within the existing easements through the parks. There are no proposals to do so at this time.

Subject to the foregoing qualification, however, the no-action alternative assumes the following:

- No additional ROW would be granted to the applicant.
- No additional transmission lines or increased voltage would be added.
- No new construction activity would take place; therefore, activities would only include operation and maintenance of the existing line.
- The existing towers would remain in place.

This action would have no effect on the existing transmission line outside NPS property. Though future construction could potentially occur within the existing ROW, for the purposes of the analysis, this alternative assumes that current conditions continue into the future and that no further construction occurs beyond the existing transmission line.

ELEMENTS COMMON TO ALL ACTION ALTERNATIVES

The application is for replacement of the B-K Line with a new line, initially energized at 230 kV but built to carry 500 kV, co-located with a new 500-kV line connecting the Susquehanna and Roseland substations (PPL and PSE&G 2008). Action alternatives 2 through 5 have many common elements related to the construction of the S-R Line. All alternatives would include a double-circuit 500-kV transmission line (consisting of new towers and conductors) and associated telecommunications infrastructure. Two static lightning and communications fiber lines would be installed on top of the structures; these lines, respectively, would protect the transmission lines from electrical interruptions and would serve as a communication link between existing substations. This telecommunications infrastructure would not be highly visible, and would not include cell towers. Telecommunications infrastructure would only be used for electrical transmission purposes and would not be sold to a third party.

The application is for replacement of the B-K Line with a new line, initially energized at 230 kV but built to carry 500 kV, co-located with a new 500-kV line connecting the Susquehanna and Roseland substations (PPL and PSE&G 2008).

Each alternative would be built in accordance with the relevant codes (e.g., NESC Uniform Building Code). In addition, all alternatives would comply with the Avian Power Line Interaction Committee (APLIC) *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006) or subsequent updates. The APLIC standards are described in the "Mitigation and Compensation Measures" section later in this chapter.

Removal and Disposal of Existing Structures

Removal of the B-K Line under alternatives 3, 4, and 5 is a mitigation measure proposed by the NPS. If one of these alternatives were chosen, the NPS would be granting construction and ROW permits to the applicant. Because the NPS would not allow two crossings for the applicant's transmission lines, the NPS would require that the applicant surrender the rights to the existing ROW between the Bushkill Substation and the eastern boundary of DEWA. The NPS would permit the relocation of the B-K Line to a replacement setting co-located with the S-R Line within areas under NPS jurisdiction. Additionally, the NPS would develop one consistent and uniform deeded ROW for the applicant at the crossing selected.

TABLE 2: ELEMENTS OF THE ALTERNATIVES

Alternative Element	Alternative 1	Alternative 2	Alternative 2b	Alternative 3	Alternative 4	Alternative 5
Route description inside the study area	The NPS would deny the special use and construction permits to expand the B-K Line and construct a new double 500-kV line through NPS lands. The alternative assumes the following: • No additional ROW would be granted to applicant. • No additional lines or increased voltage would be added. • No new construction activity would take place; therefore, there would not be any construction activities or tree/vegetation removal, only maintenance of existing line. • The existing towers would remain in place. • The ROW would remain a noncritical element of the electrical transmission grid.	The alternative 2 alignment would cross a total of 4.3 miles of NPS lands. The route would enter DEWA from Pennsylvania approximately 0.25 mile east of Big Bushkill Creek. The alignment would exit the park, travel through a developed area including Fernwood Golf Course, and reenter DEWA south of the South Zone Ranger Station and north of DEWA Headquarters, crossing MDSR just north of Depew Island. The route would continue southeast past the Watergate Recreation Site and across APPA to the eastern DEWA boundary.	The alignment is the same as alternative 2 with the exception of two additional towers in the study area to carry the line through a 100-ft ROW section.	The alternative 3 alignment would cross a total of 5.4 miles of NPS lands. In Pennsylvania, the primary VSL is located in Monroe County outside DEWA boundaries. On the west side of the MDSR, the route would cross River Road and the McDade Trail about 1.0 mile south of the Smithfield Beach Picnic Area and 0.75 mile north of the Hialeah Picnic Area. The route would cross approximately 1.7 miles of Worthington State Forest; the alignment would perpendicularly cross APPA within Worthington State Forest and MDSR within DEWA. The alternative 3 alignment would also cross 0.6 mile of the park west of US Route 209 along the B-K Line ROW from the Bushkill Substation to the Susquehanna Substation. The alignment would parallel APPA for approximately 1.8 miles in New Jersey.	The alternative 4 alignment would cross a total of 1.8 miles of NPS lands. Inside the primary VSLs, upon entering DEWA, the alternative 4 alignment would cross about 0.9 mile of DEWA land near its southern extent, roughly following the DEWA boundary, and would perpendicularly cross APPA near Totts Gap Road. The alternative 4 alignment would also cross 0.6 mile of the park west of US Route 209 along the B-K Line ROW from the Bushkill Substation to the Susquehanna Substation. This alignment would not cross MDSR.	The alternative 5 alignment would cross a total of 0.9 mile of NPS lands. Inside the primary VSLs, upon entering DEWA, the alternative 5 alignment would cross about 0.9 mile of DEWA land near its southern extent, roughly following the DEWA boundary, and would perpendicularly cross APPA near Totts Gap Road. This alignment would not cross MDSR.
Total ROW expansion	None	50–200 feet	None	50–200 feet	100–200 feet	100–200 feet
New crossing at APPA?	No	No	No	No	No	No
New crossing at MDSR?	No	No	No	No	No	No
Total conductor capacity	230 kV	2 new 500 kV	2 new 500 kV	Existing plus 2 new 500 kV	Existing plus 2 new 500 kV	Existing plus 2 new 500 kV
Removal of B-K Line from the Bushkill Substation to the eastern boundary of DEWA	No	No, but existing infrastructure would in fact removed and replaced by the new proposed double 500-kV towers	No, but existing infrastructure would in fact removed and replaced by the new proposed double 500-kV towers	Yes	Yes	Yes
Construction schedule	N/A	approximately 8 months	approximately 8 months	<8 months	<8 months	<8 months
Construction cost	N/A	$2.17 billion	$2.17 billion	$2.22 billion	$2.36 billion	$1.42 billion
Additional staffing needs for the NPS	Same as current	2–3 new DEWA/MDSR staff members	2–3 new DEWA/MDSR staff members	2–3 new DEWA/MDSR staff members	1 new DEWA/MDSR staff member	1 new DEWA/MDSR staff member

N/A = not applicable.

TABLE 3: DESCRIPTION AND NUMBERS OF CONSTRUCTION ELEMENTS OF THE ALTERNATIVES

Construction Element	Description	Alternative 1	Alternative 2	Alternative 2b	Alternative 3	Alternative 4	Alternative 5
Total miles[a]	N/A	147 miles	147 miles	147 miles	157 miles	162 miles	110 miles
Miles within the study area	N/A	5.6 miles, 4.3 miles of which would be on NPS lands	5.6 miles, 4.3 miles of which would be on NPS lands	5.6 miles, 4.3 miles of which would be on NPS lands	6.9 miles, 5.4 miles of which would be on NPS lands	2.3 miles, 1.8 miles of which would be on NPS lands	1.7 miles, 0.9 mile of which would be on NPS lands
Numbers of towers and tower foundations inside the study area	**Typically, the foundation depth will range between 15 and 30 feet with a diameter of 6 to 9 feet.** *6 new towers/tower foundations per mile.*	N/A	26	28	43[d]	16	10
Crane pads inside the study area	**Crane pads would be 100 feet × 100 feet, and would be used to set up a crane to erect the structures.** *Crane pads would be required at each tower location.*	N/A	23	25	43	16	10
Wire pulls inside the study area[b]	*Wire pulling locations would be 200 feet × 200 feet and placed approximately every mile along the ROW.*	N/A	5–6	5–6	7	2–3	1–2
Pulling and splicing sites inside the study area	*On average, pulling and splicing equipment setups require an area of 400 feet × 600 feet outside the ROW where angles occur; two sites are needed per angle.*	N/A	2	2	9	5	5
Staging area for the entire line[a]	**Staging of all equipment and material for work in DEWA would be located on the currently cleared ROW.**[c]	N/A	70 acres	70 acres	50 acres	50 acres	50 acres
Access roads inside the study area	**Access roads would be 20 feet wide during construction and would be reduced to and maintained at 15 feet after construction. The 15-foot-wide access roads would be permanent.**	N/A	Total: 5.4 miles Inside ROW: 3.4 miles Outside ROW: 2.0 miles **Construction phase** Total: 13.1 acres Inside ROW: 8.2 acres Outside ROW: 4.9 acres **Postconstruction phase** Total: 9.8 acres Inside ROW: 6.1 acres Outside ROW: 3.7 acres Time to return to present conditions: 50 years or perhaps never	Total: 5.3 miles Inside ROW: 2.7 miles Outside ROW: 2.6 miles **Construction Phase** Total: 12.8 acres Inside ROW: 6.5 acres Outside ROW: 6.3 acres **Postconstruction Phase** Total: 9.6 acres Inside ROW: 4.9 acres Outside ROW: 4.7 acres Time to return to present conditions: 50 years or perhaps never	Total: 3.5 miles Inside ROW: 2.6 miles Outside ROW: 0.9 mile **Construction phase** Total: 8.5 acres Inside ROW: 6.3 acres Outside ROW: 2.2 acres **Postconstruction phase** Total: 6.4 acres Inside ROW: 4.7 acres Outside ROW: 1.6 acres Time to return to present conditions: 50 years or perhaps never	Total: 1.6 miles Inside ROW: 1.1 miles Outside ROW: 0.5 mile **Construction phase** Total: 3.9 acres Inside ROW: 2.7 acres Outside ROW: 1.2 acres **Postconstruction phase** Total: 2.9 acres Inside ROW: 2.0 acres Outside ROW: 0.9 acre Time to return to present conditions: 50 years or perhaps never	Total: 0.94 mile Inside ROW: 0.78 mile Outside ROW: 0.16 mile **Construction phase** Total: 2.3 acres Inside ROW: 1.9 acres Outside ROW: 0.4 acre **Postconstruction phase** Total: 1.7 acres Inside ROW: 1.4 acres Outside ROW: 0.3 acre Time to return to present conditions: 50 years or perhaps never

Note: Items in **bold** are conditions presented in the applicant's proposed plan (PPL and PSE&G 2008). Items in *italics* are presented in this chapter. These elements were provided where details were absent from the applicant's proposed plan (PPL and PSE&G 2008) and were based on industry standards.

N/A = not applicable.

a. Total mileage and staging areas of the alternatives are used for comparison only. The data presented in this table represent the alternatives as plotted for this EIS. The NPS cannot require the applicant to follow a certain route; therefore, the length of the alternatives cannot be determined.

b. The number of wire pulls was estimated based on the assumption that helicopters would not be used to string the conductor. This presents the most conservative estimate; however, impacts would be reduced if helicopters were used for stringing the conductors.

c. The applicant's proposed plan states that all equipment and materials would be staged within the currently cleared ROW. The NPS does not agree. Where staging areas extend beyond the cleared ROW, the NPS would require the applicant to construct the staging areas outside NPS lands.

d. Although 43 towers are proposed for alternative 3, some of these towers, while in the study area, would not be on NPS land.

Construction of alternatives 2 and 2b and restoration of habitat along the B-K Line for alternatives 3, 4, and 5 would require removal of existing structures in the B-K Line ROW between the Bushkill Substation and the eastern boundary of DEWA. Foundations would remain in place below ground level to avoid additional ground disturbance. Above ground level, foundations would be mechanically chipped and removed and the area would be backfilled, allowing the applicant to revegetate the area.

For alternatives 3, 4, and 5, structures for the power lines that currently exist on each of these routes would be removed to allow the applicant to safely site and construct new lines in the expanded ROW. Existing lines removed prior to construction would be replaced with new lines during construction of the proposed S-R Line. Replacement power lines would be placed on new structures separate from but parallel to the new structures for the S-R Line within the expanded ROW along the alternative alignments.

Removal of existing lines for all action alternatives would require the following:

- **Spur roads**: Existing vegetation would be cleared to permit the construction of spur roads to allow equipment access. Spur roads are temporary construction roads used to access towers; stringing, tensioning, and staging areas; and splicing sites. These spur roads are different than the access roads used for maintenance, which are discussed in the "Project Construction" section in this chapter. Spur roads would be 20 feet wide and would be surfaced with compacted dirt or gravel. The applicant would need additional rights beyond the ROW for construction of spur roads outside the transmission line ROW. The location of these roads outside the ROW would require NPS approval. The applicant would be responsible for the restoration of these spur roads immediately following the conclusion of removal activities. However, return to existing conditions could take up to 50 years based on the time taken to reach those existing conditions since DEWA's creation in 1965.
- **Grading activities**: Grading would occur to backfill over the existing tower foundations, which would be left in place after aboveground structure removal, to create a natural cover. Grading would also occur to backfill disturbance caused by the removal of towers, counterpoises, and ground wires. A counterpoise is a conductor or system of conductors arranged beneath the line; located on, above, or (most frequently) below the surface of the earth; and connected to the grounding systems of the towers or poles supporting the transmission lines (Institute of Electrical and Electronics Engineers Standard 100).
- **Crane pads**: Crane pads would be constructed to provide a safe, level pad for large cranes to mobilize, set outriggers, and aid in the removal of transmission line towers. Crane pads must be large enough to safely level and set outriggers for stability; a typical crane pad is 200 feet by 200 feet, placed 60 feet from the centerline of the ROW. The applicant would be responsible for leveling and revegetating the crane pad site after the crane pad is removed.
- **Wire pulling locations**: At wire pulling locations, all grounding, counterpoises, anchors, and associated equipment listed under "Construction Equipment," below, would be removed. Wire pulling locations would be 200 feet by 200 feet and placed approximately every 2.8 miles along the ROW. The applicant would cut the old conductors in short lengths and remove them with minimal damage to the ground. The wire pulling locations would be used for coiling the sections of conductors after they have been cut.
- **Breakaway reels**: Breakaway reels would be used to coil, remove, and store the decommissioned conductors.
- **Steel removal**: Lattice towers would be disassembled at each tower location in sections and placed on a tractor-trailer or hoisted by an air crane and shipped to a staging area for eventual recycling.

- **Conductor disposal**: The conductors would be transported to a material and equipment yard where they would be prepared for recycling.
- **Helicopter use**: Helicopters may be used to remove towers in three to four sections, depending on the size and weight of the towers. Additional permits could be required governing aircraft use.

Recyclable or salvageable items would be processed into roll-off boxes. Salvageable items (i.e., conductor, steel, and hardware) would be received, sorted, baled off site, and then sold on the open market. Items to be recycled include 100% of the steel from lattice steel towers (i.e., towers, nuts, bolts, and washers), conductor wire (i.e., all 4/0 copper, 336 ACSR [aluminum conductor steel reinforced] overhead wire), and hardware (e.g., shackles, clevises, yoke plates, links, and other connectors used to support conductor).

Vegetation Clearing

All action alternatives would require clearing vegetation inside the ROW. Within the ROW, low-impact tree clearing is the preferred method. Low-impact tree clearing involves directional tree felling, both mechanically and by hand. A professionally created harvesting contract would provide specific regulations for clearing, which would aid in protection of cultural resources, wetland and stream areas, and overall residual quality of the site. A professional forester would be hired to oversee the project. Tree-clearing contractors experienced in low-impact tree clearing would be used. Equipment used to minimize impacts would include forwarders, feller bunchers, cable and grapple skidders, high-flotation tires, portable bridges, and temporary culverts. Skidding of trees along the ground would be limited to areas with low erosion potential, and a forwarder would be used in sensitive soil conditions. Days of operation would be limited to those days with suitable ground conditions. Additionally, trees would be cut close to the ground, and stumps and root systems would be left in place to provide additional soil stability. A 50-foot buffer would be used near intermittent streams and wetlands and a 100-foot buffer near perennial streams. All vegetation would be removed from access roads and in work areas (wire pulling locations, vegetation disposal areas, and structure erection areas).

Clearing would be selective, and efforts to preserve native or compatible species would be made to the greatest extent possible. Species of trees recognized as being fast-growing species would be cut to ground level. Additionally, trees within the ROW that would violate the wire security zone either would be removed or would be pruned to create additional space for growth until scheduled maintenance. Cleared salable timber would be removed from the ROW and placed in neat piles at an NPS-designated site to be determined before construction. Timber would be the property of the United States. Other timber would be placed in tree-length piles away from preserved compatible vegetation. These piles would not be placed on access roads, streams, or trails, or in areas where piles would be highly visible from an improved road. Interspersed with these timber piles, slash piles would be stacked in flattened mounds on the edge of the ROW. Slash piles would also not be built where highly visible from improved roads or other locations with high visibility. Slash piles would not be placed near tower or pole sites. Cleared vegetation could also be chipped and scattered on the ROW. The NPS would not allow vegetation burning within the boundaries of the parks. Additionally, no vegetation disposal would occur within known or suspected wetland areas, and all timber piles, slash piles, and other cleared vegetation would be hauled away from APPA.

Project Construction

Proposed Transmission Facilities

Each action alternative includes construction of one new double-circuit 500-kV transmission line across NPS lands. The S-R Line would be a three-phase, double-circuit, three-bundled 1594 ACSR facility (each of the three-phase circuits consists of three 1594 ACSR conductors connected together). One circuit would operate at 500 kV, and the second circuit would initially operate at 230 kV, with capacity for future energizing to 500 kV. Construction of the new 500-kV towers, including civil work, steel assembly, and erection, would be completed in four steps, as defined below.

Step 1: Access Road Creation: Where necessary, access roads would be created for access to the ROW. Access roads would initially be 20 feet wide to accommodate large construction vehicles. Following construction, access roads would be narrowed to 15 feet wide and would continue to be used for maintenance and vegetation management for the line. Access roads would be composed of gravel or compacted dirt. The lengths of access roads would range from approximately 0.9 to 5.4 miles, depending on the alternative. Wetlands and water crossings by access roads would be avoided to the extent possible. Access roads are depicted on alternative maps as appropriate.

The applicant would need additional rights beyond the ROW for construction of access roads outside the transmission line ROW. Locations of these roads outside the ROW would require NPS approval. The applicant would be responsible for the long-term maintenance of access roads and the restoration of spur roads immediately following the conclusion of construction activities until existing conditions are restored. Restoration of spur roads would include removing all gravel, disposing of geotextile fabric, and seeding the area with an NPS-approved conservation seed mix.

Step 2: Creation of Level Pads for Crane Pads: Crane pads would be used for assembly and erection at each new tower location. Crane pad size and placement are discussed in the "Removal and Disposal of Existing Structures" section of this chapter.

Crane pad sites would be graded or cleared to provide a reasonably level pad free of any vegetation that could hinder tower construction. Some tower sites would require grading either to widen the pads from the existing structures or to create new pads, while other sites would be on relatively level areas that would only require some vegetation removal. At locations with steep topography, blasting may be required to create a level pad. The graded pad would be capable of supporting heavy vehicular traffic.

Step 3: Foundation Construction: The types of towers that would be used in the construction of the S-R Line would be determined during planning. New towers would be constructed on a concrete foundation. Foundation dimensions would depend on topography, tower height, span length, and soil properties; however, tower foundations would generally extend below grade for 15 to 30 feet or more, with a diameter of 6 to 9 feet. On average, a typical concrete foundation would extend approximately 3 feet above ground level.

In order to install tower foundations, extensive excavation and controlled blasting would occur. Several small holes, approximately 3 to 3.5 inches in diameter, would be drilled into the ground, followed by controlled blasting that would be used to excavate the area. Following the blasting, a drill rig with auger would be used to remove the fractured rock. Reinforcement steel and anchor bolts would be installed inside the excavated hole and the hole would be filled with concrete. Prior to any blasting along the proposed ROW, a blasting plan would be prepared and submitted to the NPS for review and approval by a blasting expert.

At the time of construction, elevations would be established, rebar cages set, spur angles and concrete placed, and survey positioning verified. Concrete samples would be drawn at the time of pour and tested to ensure that specified strengths would be achieved.

Step 4: Steel Work for Tower Construction: Several tractors with 40-foot floats (or open-bed trailers) and an on-site loader would haul and stack bundles of steel at each tower location. A combined erection and torqueing crew with a lattice boom crane would perform the steel work for lattice towers, which would include assembly of leg extensions, body panels, boxed sections, and bridges. During the steel work, the construction crew may opt to install insulators and wire rollers.

The types of towers are currently unknown; however, if the NPS were to grant the construction and ROW permits, they could specify a tower type if one would have advantages over others. The following specifications would apply to both lattice and tubular steel towers:

- six new tower structures per mile
- 160 to 200 feet tall
- 1,200-foot ruling span
- 1,800-foot weight span

The following additional information is specific to tubular steel towers:

- single-, double-, and triple-shafted, tapered tubular core consisting of 10 steel structures hermetically sealed with davit and cross arms
- up to 7 feet in diameter
- ten steel single-shafted tangent towers per alternative
- ten steel single-shafted dead-end (terminating) towers per alternative

Helicopters could be used in the construction of the S-R Line; however, helicopters can only be used for construction of lattice towers, because monopole towers are too heavy. Helicopters are often used for tower installation to eliminate the land disturbance associated with crane pads, structure laydown areas, and damage from heavy truck use. If helicopters were to be used for tower erection, methods would be similar to those detailed in Institute of Electrical and Electronics Engineers Standard 951-1996, *Guide to the Assembly and Erection of Metal Transmission Structures*, section 9, "Helicopter Methods of Construction." Helicopters can also be used to string the conductor; this process is described below.

The operations area of the helicopters would be limited to helicopter staging areas and positions along the ROW that have previously been disturbed for other purposes and are considered safe locations for landing. Support trips may also be required to transport material and workers to the material and equipment staging areas. Staging areas would be located as close as possible to the operation area, and would be sited through a screening process involving the helicopter contractor, private landowners, and land management agencies. The NPS would require that any staging areas that would extend beyond the currently cleared ROW be sited outside the boundaries of the parks. Staging areas are discussed in detail below. Helicopter fueling would occur at staging areas or at a local airport using the helicopter contractor's fuel truck and would be supervised by the helicopter fuel service provider. The helicopters and fuel truck would remain overnight at a local airport or at a staging area if adequate security is in place. Safety plans meeting all OSHA standards would be required. It is not anticipated that helicopters would be parked overnight on NPS lands. The applicant's proposed plan states that all equipment and materials would be staged within the currently cleared B-K Line ROW (PPL and PSE&G 2008, 11). The

NPS has concerns that this would be inadequate, especially where the staging areas would be used by helicopters. If staging areas extend beyond the currently cleared ROW, the NPS would require that the applicant construct these staging areas outside NPS lands. During helicopter operations, public access would be restricted. Temporary river, trail, and road closures, traffic detours, and posted notices and signs would be used to block public access to restricted areas. NPS review and approval of aviation plans would be required.

For the impact analysis of the action alternatives in this EIS, it is assumed that helicopters could be used for conductor stringing but would not be used for tower construction.

Wire Installation

Wire installation includes all activities associated with the installation of conductor wire onto the new towers, such as the installation of primary conductor and ground wire, vibration dampeners, weights, spacers, and suspension and dead-end hardware assemblies. Insulators and wire rollers either would be attached as part of the wire-stringing activity or would be attached during the steel erection process.

Any continuous wire installation process between two selected points along a transmission line is termed a "wire pull." Wire pulling locations would be selected based on availability of dead-end towers at the ends of each pull and on the geometry of the line; locations are affected by inflection points, terrain, and suitability of pulling and splicing equipment setups. Wire pulling locations generally occur every 2.8 miles on flat terrain and every 1.7 miles on mountainous terrain and would be 200 feet by 200 feet. For each wire pull, a puller would be positioned at one end, while a tensioner and wire reel stand truck would be positioned at the other. Specialized support equipment such as skidders and wire crimping equipment would be strategically positioned to support the operations.

Wire-stringing activities would be conducted as described in Institute of Electrical and Electronics Engineers Standard 524-1992, *Guide to the Installation of Overhead Transmission Line Conductors*. A standard wire-stringing plan would include a sequenced program of events, beginning with determination of wire pulls and wire pull equipment setup positions. Advance planning would determine circuit outages, pulling times, and safety protocols required to ensure that safe and quick installation of wire is accomplished.

The following steps describe the proposed wire installation activities:

Step 1: Threading: A helicopter would fly a sock line (a small lightweight cable) from tower to tower, which would pull a pilot line (heavier cable) through all the structures and into the tensioner, which would pull the conductor through.

Step 2: Pulling: The pilot line would be attached to the conductor using a special swivel joint to prevent damage to the wire and to allow the wire to rotate freely, which would prevent complications from twisting as the conductor unwinds from the reel.

Step 3: Clipping In: Conductor clamps would be installed to feed the conductor into the roller properly, completing the wire installation phase.

Step 4: Spacers: Spacers would be used to mitigate the potential for code clearance issues or for conductors to touch or flash over and cause an outage. Spacers would be attached between the bundled conductors of each phase. For this purpose, a lineman would ride a small spacer cart between the wires, periodically stopping to attach the spacers.

Pulling and Splicing Sites

New pulling and splicing sites would be needed for each action alternative. For stringing equipment that cannot be positioned at either side of a dead-end transmission tower, anchoring and dead-end hardware would be temporarily installed to sag conductor wire to the correct tension. The pulling and splicing setup locations would be sited where existing spur roads or level pads are available, either near or between the existing towers. A few locations may require minor grading and vegetation removal. The setup locations would be used to remove temporary pulling splices and install permanent splices once the conductor is strung through the rollers located on each tower. This step is necessary because the permanent splices that join the conductor together cannot travel through the rollers. These areas would be restored following construction.

A typical pulling and splicing location would be 400 feet by 600 feet and would be located and positioned for inline cable pulling.

Construction Staging

Construction of transmission facilities would also consist of the establishment of staging yards for construction materials and equipment, completion of any roadwork, and removal of the B-K Line that currently crosses the parks. Staging yards for materials and equipment would be approximately 3 to 4 acres each. Efforts would be made to locate staging areas on previously disturbed property, abandoned excavations, or abandoned parking areas. As previously stated, the NPS would require that any staging areas extending beyond the currently cleared ROW be sited outside the boundaries of the parks. Exact locations would be based on biological and cultural resource studies.

Materials and equipment that would be staged include steel bundles, spur angles, palletized bolts, rebar, insulators and hardware, heavy equipment, light trucks, construction trailers, portable sanitation facilities, and trash and recycling bins. Material that would be removed from the B-K Line that crosses the parks (e.g., conductor, steel, concrete, and other debris) would also be temporarily stored at these sites or other similar sites depending on the proximity of the chosen alternative alignment to the staging sites. Staging areas would also be used for helicopters and helicopter fuel trucks, as previously discussed. The staging areas may include a construction trailer and an access road to the trailer.

Preparation of the staging areas would include the application of road base, installation of perimeter fencing, and implementation of stormwater pollution prevention plan conditions. Following construction, disturbed areas would be restored to predisturbance conditions.

Public and Worker Safety

To ensure public and worker safety, safety devices such as traveling grounds, guard structures, and radio-equipped roving public-safety vehicles and linemen would be in place before the initiation of wire-stringing activities. Guard poles or guard structures would be installed at all transportation, flood control, and utility crossings, and might be installed in the parks or near residences. Guard structures are temporary installations designed to stop the travel of the conductor should it drop below a conventional stringing height. Typical guard structures are standard wood poles, 60 to 80 feet tall; in some cases, structures may consist of specially equipped boom-type trucks with heavy outriggers. Guard poles would be installed only where needed, such as near roads, residences, other utility crossings, or waterways. If required, temporary netting would also be installed to protect some types of infrastructure. In addition, traffic control and safety inspectors would be on the haul routes and construction sites for the duration of the construction period.

Construction Schedule

Construction activities for alternatives 2 and 2b in NPS lands would be expected to last approximately 8 months. Alternative 3 construction activities would be expected to last approximately 8 months, or slightly longer, because the distance inside the park is slightly longer than under alternatives 2 and 2b. Construction for alternatives 4 and 5 would be expected to take less than 8 months because these alignments occupy less mileage within park lands. Activities such as surveys and geotechnical investigations would occur before mobilization for construction and are not included in the construction period. Construction activities would be expected to occur 12 hours a day, 6 days a week, with additional overtime if necessary (PPL and PSE&G 2008).

Construction Workforce

Depending on construction activities, the construction workforce could range from 20 to 120 workers, with an average workforce of 50. In addition to construction workforce, NPS monitoring staff would be required for the project. Construction labor force and machinery requirements typically include the following:

- **ROW clearing**: Three three-person crews with two D9 dozers and five dump trucks, and four tree-trimmer personnel with truck and grinder
- **Foundations**: Drill rig, mixer trucks (two per hour), one truck, one foundation foreman, and three laborers
- **Tower erection**: Five four-person crews with one line truck and one general foreman truck per crew, and two Condor 200-foot boom trucks

Construction Equipment

Construction activities may include the use of the following equipment types:

- **Anchor**: Drills into the ground to stabilize pulling/tensioning equipment
- **Belly dump**: Places roadbed material efficiently
- **Boom crane**: Sets towers; 125 feet to 200 feet tall
- **Bullwheel puller**: Generates pulling or braking tension; 17 inches deep, 5 feet wide, and 14 feet tall
- **Concrete mixer truck**: Hauls concrete to the foundation sites for pouring the tower foundations
- **Concrete pump truck**: Provides efficient delivery of concrete to foundation holes that are not easily accessed
- **Crawler dozer**: Pulls line, applies tension, and clears ROW (heavy civil equipment)
- **Drum puller**: Reels out two or more conductors; includes its own engine, hoist, winch, and trigger
- **Dump truck**: Hauls material to and from the site
- **Excavator**: Performs medium excavations (heavy civil equipment)
- **Foreman truck**: Carries tools, equipment, and fuel (flatbed pickup)
- **Ground grid**: Protects construction areas against a fault current (lightning strike)

- **Guard structure**: Keeps conductor away from energized equipment, roads, and other obstructions the transmission line construction may encounter
- **Line truck**: Houses all construction equipment used by the line mechanic
- **Miscellaneous tractor trailer (equipment)**: Hauls equipment, materials, and tools to and from the construction site
- **Pilot line puller**: Puts tension on pilot line
- **Pilot line**: Follows sock line through travelers, then attaches to conductor and pulls conductor back through travelers
- **Reel puller**: Pulls line and applies tension (shaft driven)
- **Reel stand**: Acts as mount for brakes, stand, jacks, reel transport, and payout (six-axle skid, truck, or trailer)
- **Reel winder**: Recovers conductors
- **Road grader**: Performs final grading of access roads, crane pads, and wire tension and pulling sites
- **Running board**: Pulls multiple conductors with one pilot line
- **Scraper**: Performs large excavations (heavy civil equipment)
- **Service truck**: Lubricates, fuels, and maintains heavy equipment
- **Splice grounding**: Protects workers from an electric shock from induced voltage on the conductor while splicing conductor ends
- **Tensioner with bullwheel**: Holds tension on the pull line, arranged in tandem; places friction and tension on the conductor by the grooves
- **Tractor with lowboy**: Hauls heavy civil equipment and materials to and from the site
- **Traveler ground**: Protects tower and travelers against fault current
- **Traveler**: Provides frictionless rotation for stringing pilot line and conductor
- **Water truck**: Provides dust and fire control
- **Woven wire grip**: Pulls continuous conductor and guys

Construction Vehicle Trips

Construction crews would use public roads and existing access roads to reach the sites. This would include trips to the construction site from homes, hotels, or meeting sites. In general, vehicle trips and miles traveled would include the following:

- **Estimated daily one-way vehicle trips**: 7 vehicles/hour/mile
- **Estimated vehicle miles traveled**: 140 miles/day

Land Disturbance

Land disturbance is generally estimated at 350 feet in width, which is the maximum expected ROW, multiplied by the length of the line. Determining the exact area of land disturbance for alternative 2b is problematic because the ROW width ranges from 100 to 380 feet, as noted in the previous section,

"Development of the Applicant's Alternate Proposal." Therefore, an approximate ROW width of 150 feet is used to estimate land disturbance for alternative 2b. Land disturbance would result from vegetation clearing, tower grading, construction of tower foundations, and new access roads. In some instances, the access roads, both permanent and temporary, occur outside the 350-foot ROW; land disturbance would be greater in these areas. ROW boundaries would be surveyed and trees and shrubs would be marked for removal with green survey tape. Access roads in the ROW would be surveyed and staked to avoid additional disturbance. NPS monitoring staff would ensure adherence to all permit requirements.

Construction Waste

Construction of the transmission line under any action alternative would result in the generation of various waste materials and would require the use of hazardous materials, including fuel, lubricants, and cleaning solvents. All hazardous materials would be stored, handled, and used in accordance with applicable regulations. All waste materials would be stored outside of the parks and disposed of in off-site landfills. Site cleanup would involve the removal of staging area fencing, construction trailers, construction fencing, temporary erosion control measures, temporary culverts and drainage systems, grounding, counterpoises, portable toilets, spur roads, splice sites, crane pads, and foundation spoils.

Restoration

The applicant would restore all spur roads, crane pads, staging areas, and pulling sites as soon as possible once removal of existing structures or construction is complete. Restoration would include removing gravel surfaces and geotextile fabric, seeding disturbed areas with an NPS-approved conservation seed mix, treating noxious weeds, and implementing other BMP treatments. Some disturbed areas may require shallow surface scarifying of severely compacted soils or recontouring of cut and fill areas to help control erosion and promote revegetation. Temporary culverts would be removed and self-maintaining drainage would be restored. All reclaimed areas would be monitored for noxious weeds for at least two years after project completion. For alternatives 3 through 5, mechanical and chemical treatments of native vegetation within the ROW would no longer occur to allow for natural recovery of vegetation and wildlife habitat.

Proposed Information Technology Facilities

Telecommunication infrastructure would be installed under all action alternatives for operation of the existing substations and to protect the new transmission lines from electrical interruptions. The types of circuits to be installed would include fault protection and optical ground wire.

Fault protection would consist of 4/0 copper wire, directly embedded throughout the entire transmission line ROW. This ground wire would be attached to the counterpoises and every tower. The counterpoises would consist of three to four 8-foot ground rods placed strategically around each structure to divert potential fault currents from lightning strikes or line surges. Optical ground wire would provide grounding or lightning protection and communications for the facilities.

Facility and Construction Locations

The applicant included details about specific facility and construction locations for alternative 2 in the application for the permit. That information will be used to describe alternatives 2 and 2b. However, the locations of tower sites, pulling and splicing areas, and construction staging yards have not been defined for alternatives 3, 4, and 5. Therefore, alternatives 3 through 5 assume the following general guidelines:

- ROW width would be 350 feet along the entire length.
- Crane pads (one per tower location) would measure 200 feet by 200 feet.

- Wire pulling locations would measure 200 feet by 200 feet and be situated every 2.8 miles on flat terrain and every 1.7 miles on mountainous terrain.
- Pulling and splicing sites would measure 400 feet by 600 feet and would require additional land outside the ROW or an easement every 4 to 5 miles or where the transmission line turns.
- Construction staging yards would each measure 2 acres when helicopters would not be used and 3 to 4 acres with helicopter use.

Facility Operations and Maintenance

Operation and maintenance of the S-R Line under all alternatives would involve periodic inspection via helicopter and truck. Maintenance of the S-R Line would be performed on an as-needed basis, but is expected to occur at least once annually, and would include maintenance of access roads and erosion/drainage control structures. The applicant would operate and maintain the S-R Line under all the proposed alternatives in accordance with existing procedures and personnel.

All telecommunications equipment associated with the proposed transmission line would be operated and maintained by the applicant's technicians. Preventive maintenance of telecommunications infrastructure, which would be located on the transmission line, would typically be scheduled every 6 months to ensure system reliability and performance.

Vegetation Maintenance

PPL and PSE&G have separate vegetation management plans because they are distinct utility companies working in two different states. However, both companies must comply with the new regulations issued in April 2006 in North American Electric Reliability Corporation (NERC) Standard FAC-003-01. The NPS considers the applicant's current vegetation management plans, as described in the following paragraphs, to be insufficient, and the NPS will require a NPS-specific, NPS- approved vegetation management plan.

PPL has produced guidelines for vegetation management techniques in Pennsylvania, *Specification for Initial Clearing and Control Maintenance of Vegetation on or adjacent to Electric Line Right-of-Way through Use of Herbicides, Mechanical, and Hand-clearing Techniques* (PPL 2010a), which specifies the wire zone–border zone technique of vegetation management. The wire zone is defined as 10 feet out from the centerline to the conductors. Vegetation that is near the wire zone presents a greater threat to the line; vegetation that grows into or falls onto the transmission lines could cause an outage. Within this zone, all native shrubs, grasses, herbaceous species, and low-growing shrubs would be preserved to the greatest extent possible. The border zone stretches from the edge of the wire zone to the edge of the ROW. Vegetation allowed in the border zone is more varied but is limited to grass, ferns, seasonal agricultural crops, shrubs, and small trees. Maintenance would include removal by cutting, pruning, and herbicide use. All vegetation would be removed from access roads. In addition, danger trees outside the proposed ROW would also be pruned or removed. Danger trees are those that, in falling, would either strike the conductor or pass within the minimum conductor clearance, which is 10 feet for 500-kV transmission lines (PPL 2010a, 6). Under PPLs vegetation management guidelines, vegetation would also be cleared within a 15-foot perimeter of towers, or adjacent to any structure.

The vegetation management practices employed in New Jersey by PSE&G are described in *Transmission Rights-of-Way Vegetation Management* (PSE&G 2009a). The minimum clearance required between conductors and the nearest tree is 30 feet. Vegetation maintenance would be achieved by ground line maintenance and selective tree removal. Ground line maintenance requires all trees and shrubs to be cut to ground level or no more than 3 inches above ground level. Selective tree removal requires that all fast-

growing tree species be cut to ground level; these species include white pine and tulip poplar, as well as species of ash and birch. Additionally, all dead, decayed, or dying trees would be removed. Herbicides would be used in vegetation maintenance. Herbaceous plants and grasses and low-growing shrubs would be allowed to remain (PSE&G 2009a, 1–4). Vegetation management under PSE&G guidelines requires a 50-foot buffer beyond the structure foundation perimeter.

PPL contends that clearing of danger trees outside of the ROW would be required for their proposal and alternative (PPL 2010a; PPL 2010b) and that they would not be limited to the constraints of the easement rights. Danger trees would be identified and removed or pruned. A transmission line with a larger footprint would require a larger danger tree zone outside the ROW. It is assumed that larger individual trees outside the ROW would be removed periodically.

Outside the study area, the applicant should follow their respective management plans for maintenance of vegetation; therefore, the conditions of the ROW should be the same inside and outside the study area. However, public comments received during the alternatives workshop indicate that this is not standard practice. Citizens have reported complete clearing of vegetation within the existing ROW to the point of bare ground. Due to this discrepancy, the impacts on resources outside the study area will be presented as a range, where applicable, to encompass all potential effects from vegetation maintenance.

Bushkill Substation

The Bushkill Substation is an integral part of the power supply grid and would remain in use under all alternatives. For alternatives 2, 2b, 3, and 4, the use of the Bushkill Substation is included as part of the S-R Line, where the route from the Susquehanna Substation to the Bushkill Substation would use the existing alignment. Alternative 5 was created without the direct use of Bushkill Substation. Regardless of the alternative chosen, the Susquehanna and Bushkill substations would need to remain connected.

Replacement of Existing Lines for Alternatives 3 through 5

The alignments for alternatives 3 through 5 contain transmission or distribution lines that are not related to the S-R Line, but that would be affected by construction of the S-R Line. Implementation of alternatives 3 through 5 would require the removal of the existing structures in the same fashion as described for removal of the B-K Line earlier in this chapter. The transmission and distribution lines would be replaced during construction and would be placed parallel to the S-R Line within the expanded ROW. The new structures for transmission lines would require a tower foundation approximately 6 feet in diameter, with approximately 16 towers per mile. The distribution lines would be strung on wood poles, which would not be set in concrete. Wood poles would be placed approximately every 200 feet, resulting in approximately 26 poles per mile.

Cost of Implementation

Implementation of the action alternatives would not create any changes to the parks' budgets.

Implementation of the action alternatives would not create any changes to the parks' budgets because the NPS would require the applicant to be responsible for costs associated with NPS managing the permit under 16 USC 3a, "Recovery of Costs Associated with Special Use Permits." Due to the length of the transmission line through the parks and the extensive access roads, it is anticipated that two to three new DEWA staff members would be hired under alternatives 2, 2b, and 3 to assist in park responsibilities associated with construction and post construction monitoring; one new DEWA staff member would be hired under alternatives 4 and 5. Under alternatives 2, 2b, 3, 4, and 5 DEWA staff

would be responsible for monitoring actions along APPA. For a more detailed explanation of personnel responsibilities under the action alternatives, see the "Park Operations" section in chapter 4.

ALTERNATIVE 2: APPLICANT'S PROPOSED ROUTE

Route Description

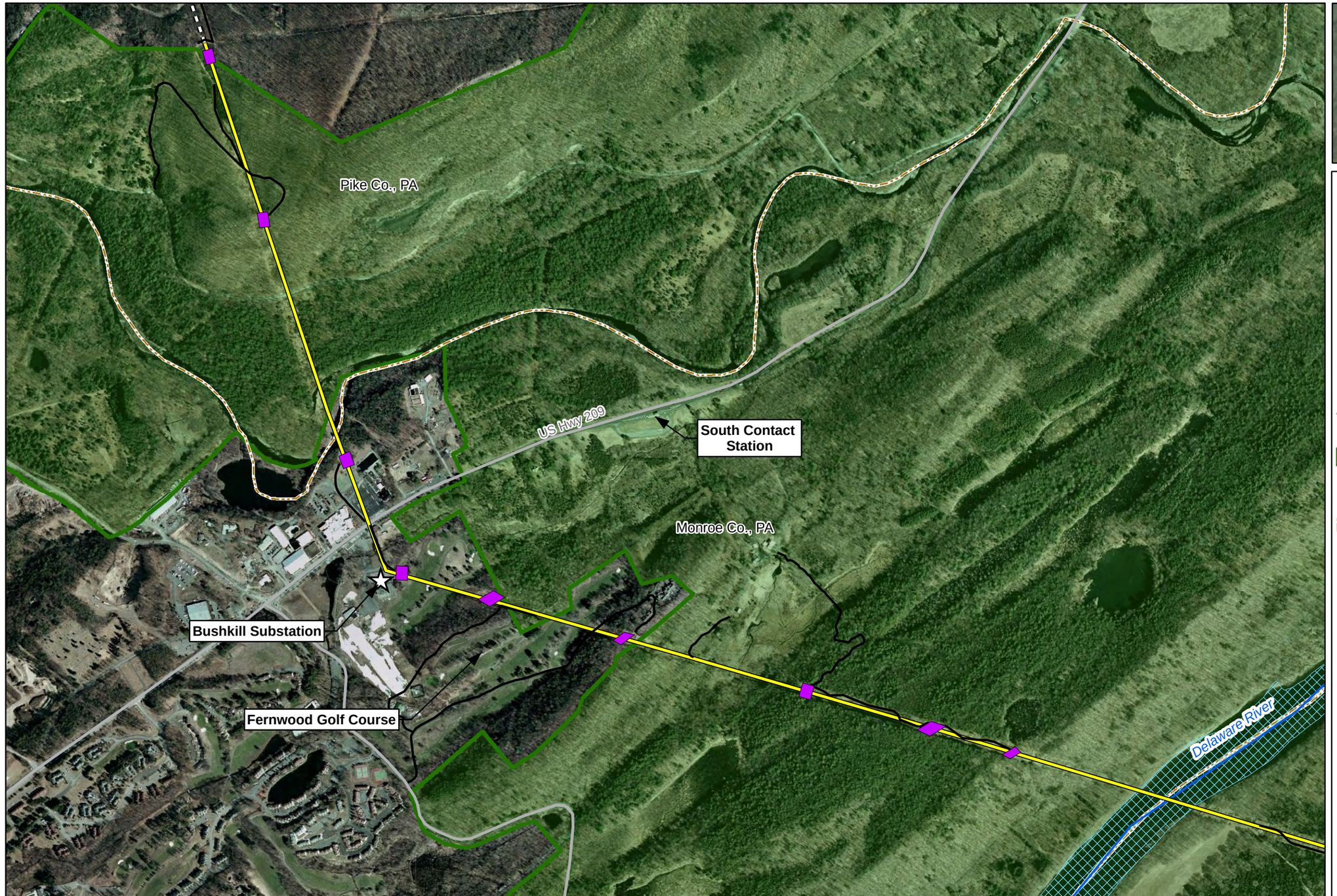
The route identified by the applicant follows the corridor of the B-K Line that traverses approximately 4.3 miles of DEWA. This alternative would require clearing of vegetation for an additional 50 to 200 feet of right-of-way.

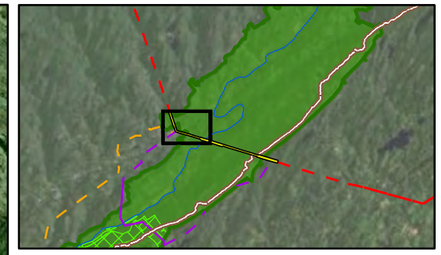
The route identified by the applicant follows the corridor of the B-K Line that traverses approximately 4.3 miles of DEWA. Within DEWA boundaries, the route crosses MDSR and APPA approximately perpendicularly. Figure 3 presents the location of the alternative 2 alignment inside DEWA, the access roads for alternative 2, and the study area and figure 4 presents the proposed tower locations for this alternative.

Within the study area, the alternative 2 alignment is approximately 5.6 miles long. The alignment would enter DEWA from the west at the VSL in Pennsylvania approximately 0.25 mile east of Big Bushkill Creek. The alignment would cross approximately 0.6 mile of DEWA land and then exit the park. In the next approximately 0.68-mile section of the study area, the alignment would travel to the Bushkill Substation, cross a small (0.06-mile) portion of DEWA, cross the Fernwood Golf Course, and then reenter DEWA south of the South Zone Ranger Station and north of DEWA Headquarters. The alignment would travel southeast within DEWA for approximately 0.85 mile, then cross 0.10 mile of MDSR just north of Depew Island. The route would continue southeast approximately 2.4 miles past the Watergate Recreation Site and cross APPA. The route would then traverse another 0.25 mile from APPA to the eastern DEWA boundary. Beyond the boundary, the alignment would travel southeast approximately 0.7 mile to the VSL. The width of the existing B-K Line ROW ranges from 100 to 380 feet in Pennsylvania and New Jersey. This alternative would require clearing of vegetation for an additional 50 to 200 feet of ROW.

Access and Spur Roads

Alternative 2 would require new access roads, because old trails and roadbeds on which the access roads are based are overgrown and would not allow access by large vehicles. Old trails and roadbeds would be cleared of vegetation; blade-graded to remove potholes, ruts, and other surface irregularities; and recompacted to provide a smooth and dense surface capable of supporting heavy equipment. Generally, access roads would fall within the transmission line ROW, but in some instances, it would be necessary for access roads to extend outside the ROW. Alternative 2 would require a total of 5.4 miles of access roads, 2.0 miles of which would be outside the ROW (1.6 miles in Pennsylvania and 0.4 mile in New Jersey). The applicant would need additional rights beyond the ROW for construction of access roads outside the transmission line ROW. Locations of these roads outside the ROW would require NPS approval.





Legend

- Substation
- Crane Pad/ Tower Location
- Inside Study Area
- Outside Study Area
- Appalachian National Scenic Trail
- Delaware River
- Proposed Access Road
- Road
- Delaware Water Gap National Recreation Area
- Middle Delaware National Scenic and Recreational River
- County Line

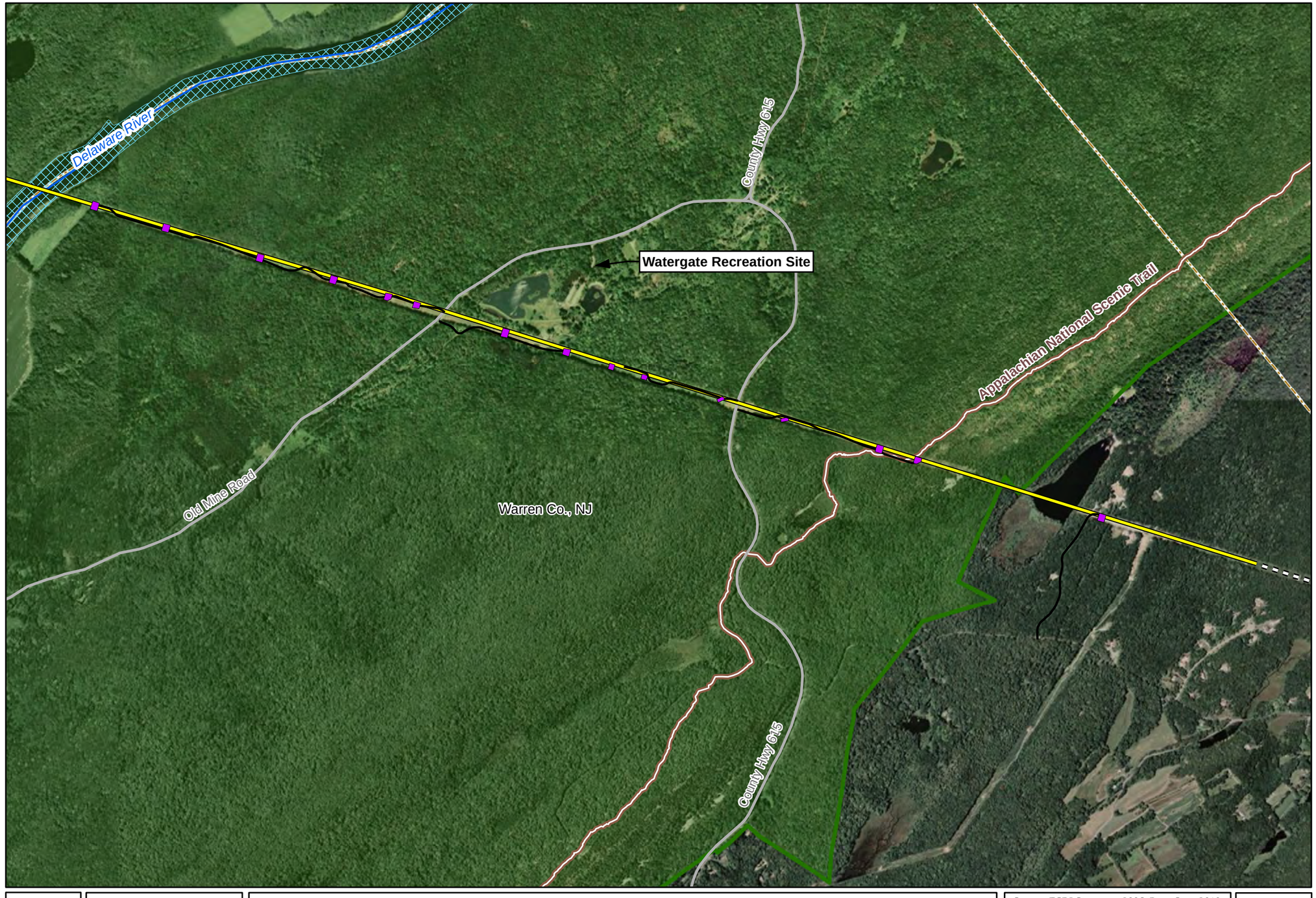
0 0.2 0.4
Miles

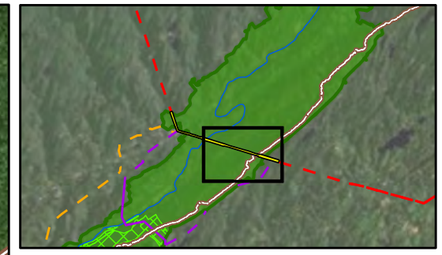
Susquehanna to Roseland Transmission Line Proposal and Right-of-Way Request EIS

Figure 3
Alternative 2 Pennsylvania
Towers and Proposed Access Roads within the Study Area

Source: ESRI Streetmap 2006, Penn State 2010, ESRI ArcGISonline Map Service 2010, PennDOT 2011, USGS 2006, NJ DEP 2008,

Projection: NAD 83 UTM Zone 18N
Date: October, 2011





Legend

- Crane Pad/ Tower Location
- Inside Study Area
- Outside Study Area
- Appalachian National Scenic Trail
- Delaware River
- Proposed Access Road
- Road
- Delaware Water Gap National Recreation Area
- Middle Delaware National Scenic and Recreational River
- County Line

0 0.25 0.5
Miles

Susquehanna to Roseland
Transmission Line Proposal
and
Right-of-Way Request EIS

Figure 4
Alternative 2 New Jersey
Towers and Proposed Access Roads within the Study Area

Source: ESRI Streetmap 2006, Penn State 2010,
ESRI ArcGISonline Map Service 2010,
NJOIT 2010, USGS 2006,
NJ DEP 2008,

Projection: NAD 83 UTM Zone 18N
Date: October, 2011

Access roads would be constructed at 20 feet wide initially to accommodate large construction vehicles. After construction, the roads would be narrowed to 15 feet and maintained permanently for future maintenance and vegetation management. The disturbed areas would be seeded with an NPS-approved conservation seed mix. Acreages of disturbance due to access roads during and after construction are shown in table 3. Drainage structures (e.g., wet crossings, water bars, overside drains, pipe culverts, energy dissipaters) would be installed along spur and access roads to allow for construction equipment use, as well as to prevent erosion from uncontrolled water flow. Slides, washouts, and other slope failures would be repaired and stabilized along roads by installing retaining walls or other means to prevent future failures. The type of mechanically stabilized earth-retaining structure used would be based on site-specific conditions. The applicant would be responsible for the long-term maintenance of access roads within the road and transmission line ROWs. Proposed access road locations are shown in figure 4.

New spur roads may be required for pulling and splicing sites along the ROW. To minimize land disturbance, previously disturbed areas would be used where feasible. Locations of spur roads are currently unknown and would be placed according to the applicant's internal policy, subject to approval from the NPS. The applicant would be responsible for the restoration of spur roads immediately following the conclusion of construction activities. Restoration of spur roads would include removing all gravel, disposing of geotextile fabric, and seeding the area with an NPS-approved conservation seed mix.

Cost of Construction

The total cost of constructing the alternative 2 alignment from Susquehanna to Roseland is estimated to be $2.17 billion. This estimate is based on factors including prices of materials and equipment, purchase and clearing of access roads and ROW, and labor costs. Detailed construction cost estimates can be found in appendix E.

The total cost of constructing the alternative 2 alignment from Susquehanna to Roseland is estimated to be $2.17 billion.

ALTERNATIVE 2b: APPLICANT'S ALTERNATE PROPOSAL

Route Description

The alignment for the applicant's alternate proposal would follow the same route as described for alternative 2, but alternative 2b would be constructed within the existing right-of-way.

The alignment for the applicant's alternate proposal would follow the same route as described for alternative 2 (figure 5). The difference between alternative 2 and alternative 2b is that the former would require widening the existing ROW, while the latter would be constructed within the existing ROW. The towers for alternative 2b would be the same height as those described for alternative 2, but alternative 2b would require two additional towers within NPS lands compared to alternative 2 (figure 6). These towers would be constructed within the 100-foot-wide portion of the alignment. Because the ROW under alternative 2b is narrow, the applicant's plans require these additional towers to protect against fire hazards presented by the risk of conductor blowout. As noted in the "Development of the Applicant's Alternate Proposal" section of this chapter, the minimum horizontal clearance to the edge of the ROW under high wind conditions to prevent conductor blowout was determined to be greater than 100 feet, and the NPS has expressed concern about the safety of constructing within the existing ROW. The applicant's proposal is based upon the controversial assumption that they have a right to clear danger trees on NPS property outside any deeded ROW (PPL 2010b). It is assumed that larger individual trees outside the ROW would be removed periodically.

Access and Spur Roads

Access roads for alternative 2b are similar as those described for alternative 2, with a slight difference in Pennsylvania between the Bushkill Substation and the Delaware River (figure 5). Alternative 2b would require a total of 5.3 miles of access roads, of which 2.4 miles would occur outside the ROW. Roads would be used and maintained as described for alternative 2. The applicant would need additional rights beyond the ROW for construction of access roads outside the transmission line ROW. Locations of these roads outside the ROW would require NPS approval.

Cost of Construction

The total cost of constructing the alternative 2b alignment from Susquehanna to Roseland is estimated to be $2.17 billion. This estimate is based on factors including prices of materials and equipment, purchase and clearing of access roads and ROW, and labor costs. Detailed construction cost estimates can be found in appendix E.

The total cost of constructing the alternative 2b alignment from Susquehanna to Roseland is estimated to be $2.17 billion.

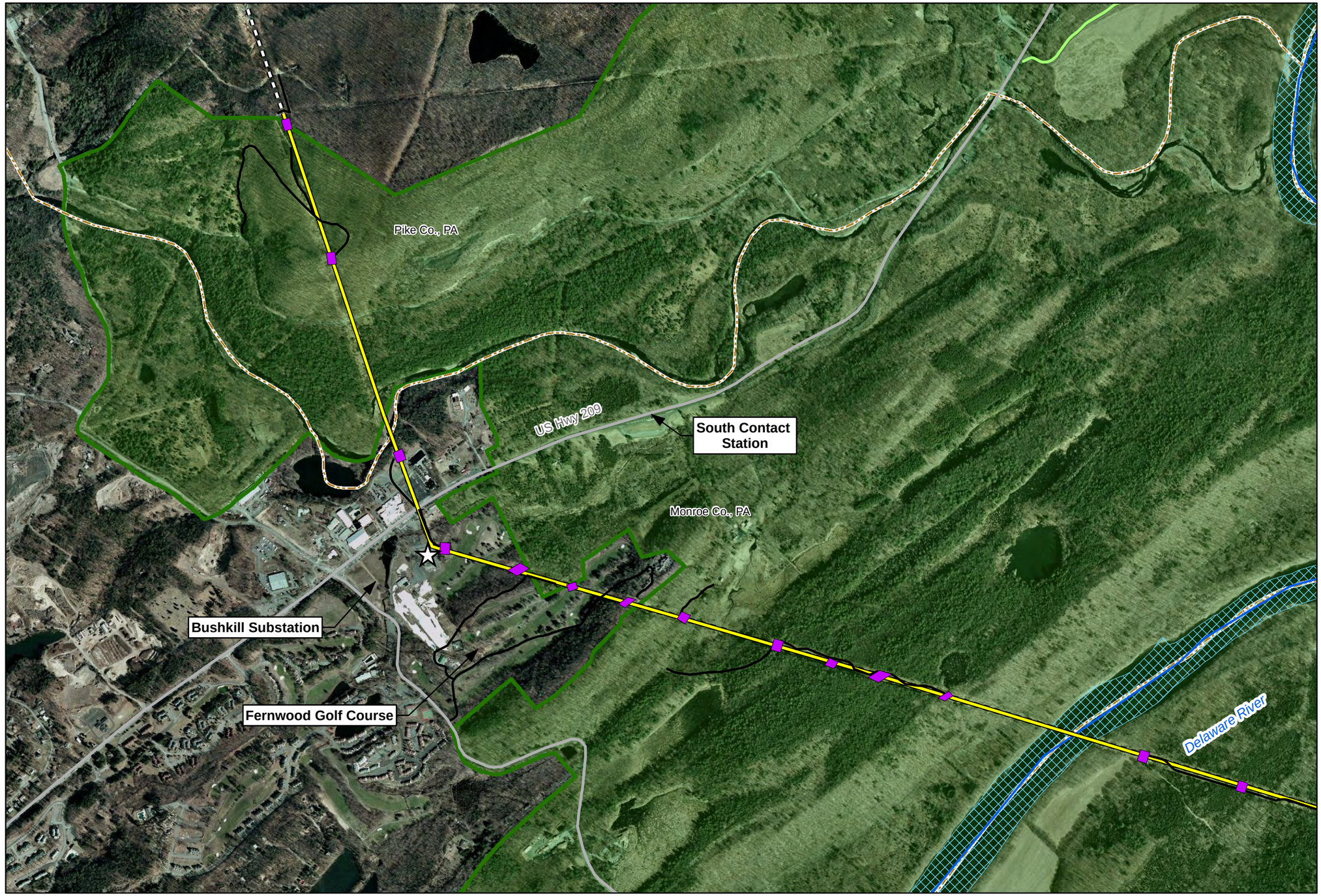
ALTERNATIVE 3

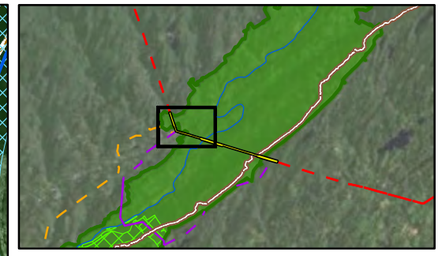
Route Description

The alternative 3 alignment would pass through DEWA along the right of way of existing transmission and distribution lines. This alternative would require clearing of vegetation for an additional 50 to 200 feet of right-of-way.

The alternative 3 alignment would pass through DEWA along the ROW of existing transmission and distribution lines (figure 7). The existing transmission and distribution lines would be removed prior to construction of the S-R Line. The existing transmission line ROW is 100 feet wide, and this alternative would require clearing of vegetation for an additional 50 to 200 feet of ROW. The structures of the transmission and distribution lines would be constructed so that these lines and the S-R Line would run parallel to one another within the expanded ROW. That is, two separate sets of structures would be constructed, one set for the proposed S-R Line and one set for the existing transmission and distribution lines along the alternative 3 alignment. Alternative 3 would cross a total of 5.4 miles within the DEWA boundary. The route would cross about 1.3 miles of DEWA within the study area and about 1.7 miles of the northern end of Worthington State Forest, which is located within DEWA's exterior boundaries. The alignment for this alternative also crosses MDSR within DEWA, and APPA within Worthington State Forest.

The alternative 3 alignment is approximately 6.9 miles long within the study area. The alternative 3 alignment would follow the alignment of the B-K Line for 0.6 mile from the western boundary of DEWA to the Bushkill Substation. The alignment would leave the study area and travel southwest to reenter the study area via the VSL point located in Monroe County, Pennsylvania, outside DEWA (figure 7). From the western VSL, the alignment would cross River Road and the McDade Trail about 1.0 mile southwest of the Smithfield Beach Picnic Area and 0.75 mile northeast of the Hialeah Picnic Area. The alignment would continue southeast within DEWA approximately 0.8 mile to MDSR. On the east side of MDSR, the route would travel northeast approximately 0.49 mile to the boundary of Worthington State Forest; the remainder of the alignment within DEWA boundaries would also be encompassed by Worthington State Forest's boundaries. The alignment would travel southeast approximately 1.69 miles to the eastern edge of DEWA, perpendicularly crossing APPA. The alignment would travel another 0.24 mile beyond the DEWA boundary to the VSL. The alternative 3 alignment would reenter DEWA beyond the eastern VSL as well. In the path to join the alignment of the B-K Line in New Jersey, alternative 3 could travel along the border of DEWA for 1.8 miles, paralleling APPA for this entire distance.





Legend

- Substation
- Crane Pad/ Tower Location
- Inside Study Area
- Outside Study Area
- Appalachian National Scenic Trail
- Delaware River
- Proposed Access Road
- Road
- Delaware Water Gap National Recreation Area
- Middle Delaware National Scenic and Recreational River
- County Line

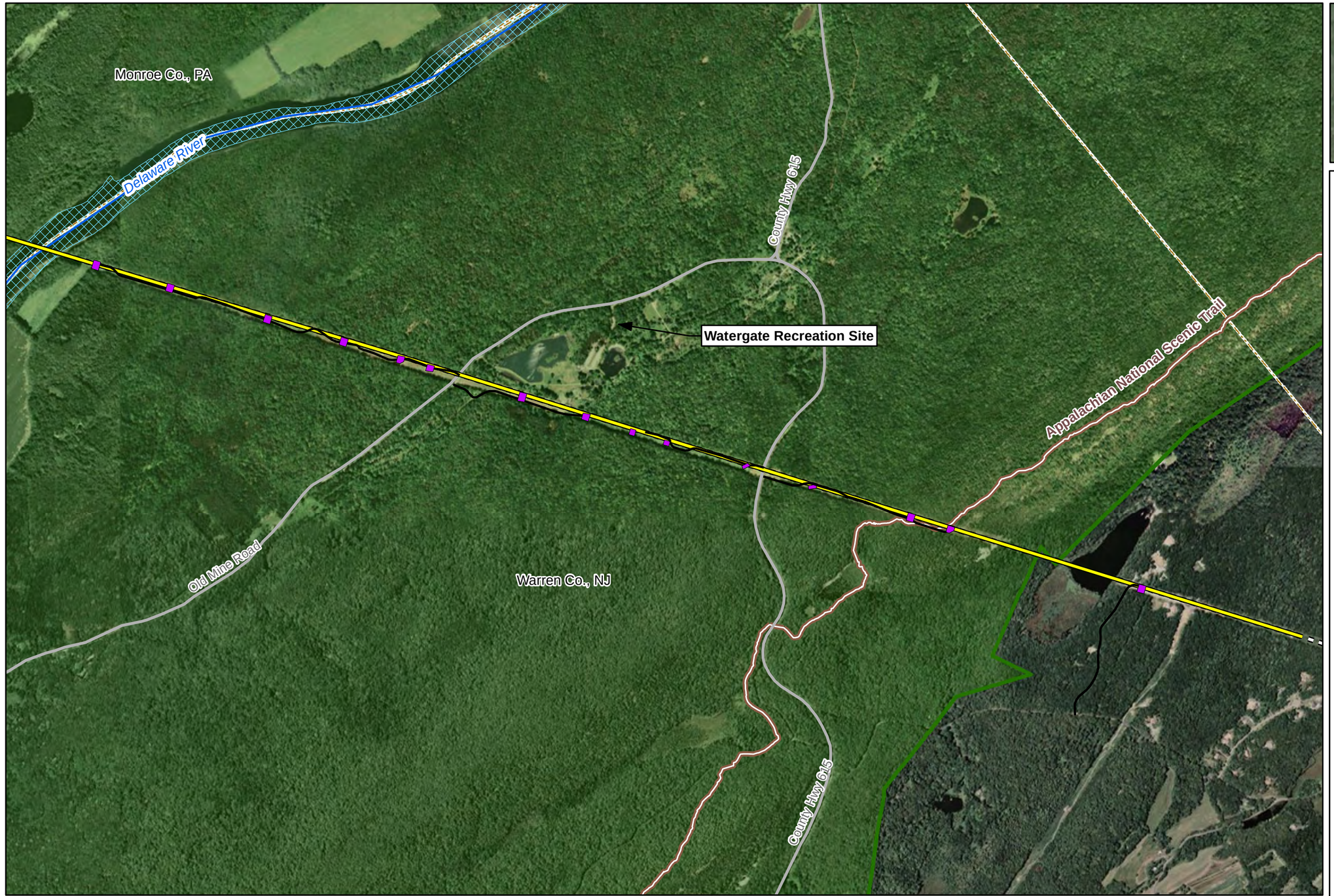
0 0.25 0.5
Miles

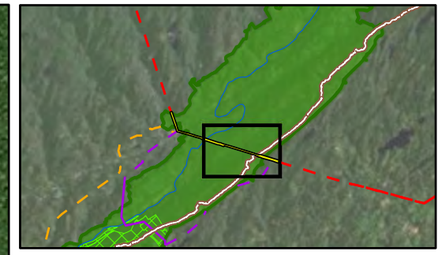
Susquehanna to Roseland Transmission Line Proposal and Right-of-Way Request EIS

Figure 5
Alternative 2b Pennsylvania
Towers and Proposed Access Roads within the Study Area

Source: ESRI Streetmap 2006, Penn State 2010, ESRI ArcGISonline Map Service 2010, PennDOT 2011, USGS 2006, NJ DEP 2008,

Projection: NAD 83 UTM Zone 18N
Date: October, 2011





Legend

- Crane Pad/ Tower Location
- Inside Study Area
- Outside Study Area
- Appalachian National Scenic Trail
- Delaware River
- Proposed Access Road
- Road
- Delaware Water Gap National Recreation Area
- Middle Delaware National Scenic and Recreational River
- County Line

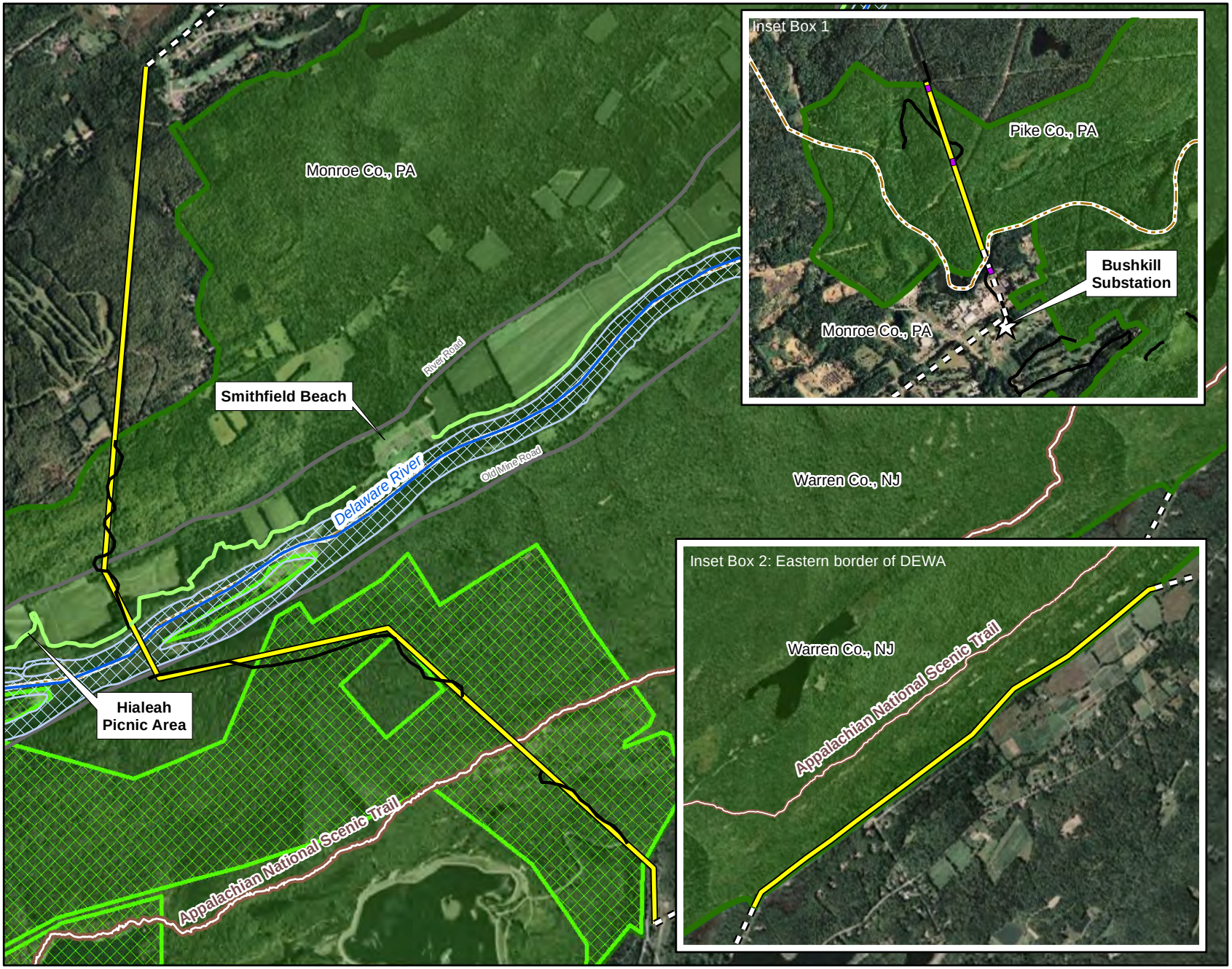
0 0.25 0.5
Miles

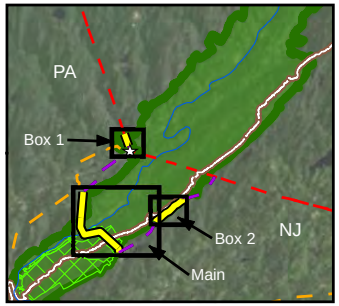
Susquehanna to Roseland Transmission Line Proposal and Right-of-Way Request EIS

Figure 6
Alternative 2b New Jersey
Towers and Proposed Access Roads within the Study Area

Source: ESRI Streetmap 2006, Penn State 2010, ESRI ArcGISonline Map Service 2010, NJOIT 2010, USGS 2006, NJ DEP 2008,

Projection: NAD 83 UTM Zone 18N
Date: October, 2011





Legend

- Substation
- Crane Pad/ Tower Location
- Inside Study Area
- Outside Study Area
- Appalachian National Scenic Trail
- McDadeTrail
- Delaware River
- Proposed Access Road
- Road
- Delaware Water Gap National Recreation Area
- Worthington State Forest
- Middle Delaware National Scenic and Recreational River
- County Line

0 1,800 3,600
Feet
Scale applies to main frame and inset maps

Susquehanna to Roseland
Transmission Line Proposal
and
Right-of-Way Request EIS

Figure 7
Alternative 3
Proposed Access Roads within the Study Area

Source: ESRI Streetmap 2006, Penn State 2010, ESRI ArcGISonline Map Service 2010, PennDOT 2011,NJOIT 2010, USGS 2006, NJ DEP 2008,

Projection: NAD 83 UTM Zone 18N
Date: October, 2011

Access and Spur Roads

Alternative 3 would require new access roads. Access and spur roads would be cleared of vegetation; blade-graded to remove potholes, ruts, and other surface irregularities; and recompacted to provide a smooth and dense surface capable of supporting heavy equipment. Generally, access roads would fall within the transmission line ROW, but in some instances, it would be necessary for access roads to extend outside the ROW. Alternative 3 would require approximately 3.5 miles of access roads, of which 0.9 mile would occur outside the ROW. Acreages of disturbance due to access roads during and after construction are shown in table 3. Roads would be used and maintained as described for alternative 2. The applicant would need additional rights beyond the ROW for construction of access roads outside the transmission line ROW. Locations of these roads outside the ROW would require NPS approval.

Cost of Construction

The total cost of constructing the alternative 3 alignment from Susquehanna to Roseland is estimated to be $2.22 billion. This estimate is based on factors including prices of materials and equipment used; purchase and clearing of access roads and ROW; and labor costs. Detailed construction cost estimates can be found in appendix E.

The total cost of constructing the alternative 3 alignment from Susquehanna to Roseland is estimated to be $2.22 billion.

ALTERNATIVE 4

Route Description

Alternative 4 would pass through the southernmost portion of DEWA along the path of an existing distribution line right-of-way. The existing right of way is 100 feet wide, and this alternative would require permanent clearing and maintenance of vegetation for an additional 100 to 200 feet of right-of-way.

Alternative 4 would pass through three portions of DEWA; the section of the park from the western boundary along the B-K Line to the Bushkill substation; through the southwestern boundary of the park, where the alignment leaves the boundary of the park for 0.51 mile, then re-enters the park (figure 8). On the southernmost portion of DEWA, alternative 4 runs along the path of an existing distribution line ROW (figure 8), and would also pass through a section of the park along the alignment of the B-K line. The existing ROW ranges from 100 to 200 feet wide, and this alternative would require permanent clearing of vegetation for an additional 100 to 200 feet of ROW. This line along alternative 4 would be removed prior to construction of the S-R Line. The structures of the existing distribution line would be replaced so that this line and the double-circuited S-R Line would run parallel to one another within the expanded ROW. The route would cross about 1.5 mile of NPS lands, including DEWA and APPA. This alternative would also cross the Lower Delaware River; however, the crossing of the Delaware River would occur outside DEWA and MDSR boundaries and outside the study area.

Alternative 4 would have a north–south orientation and would be approximately 2.3 miles long within the study area (figure 8). As with alternative 3, the alternative 4 alignment follows the alignment of the B-K Line for 0.6 mile from the western boundary of DEWA to the Bushkill Substation (figure 8, inset box 1). The alignment would leave the study area and travel southwest to reenter the study area via the VSL point at the edge of DEWA, near the southwestern boundary of the park. Upon entering DEWA from the north, the alternative 4 alignment would cross about 0.42 mile of DEWA land, roughly following the DEWA boundary, and would cross Mountain and Totts Gap roads. The alignment would then leave the boundary

of DEWA for approximately 0.51 mile, before re-entering the park. Upon reentering DEWA, the alignment would immediately cross APPA, then extend approximately 0.50 mile south to the southern boundary of DEWA. South of DEWA, the alternative 4 alignment would extend another 0.24 mile before the southern VSL (figure 8). The designated boundary of Cherry Valley NWR borders the existing ROW of the alternative 4 alignment north of APPA for approximately 0.73 mile (figure 8). The alternative 4 alignment would also cross through portions of Cherry Valley NWR outside the study area; these portions of alternative 4 are discussed in appendix C.

Thus, under alternative 4 the applicant would have the option of a secondary crossing of NPS land west of Bushkill while under alternative 5 it would not. This is the only difference between 4 and 5 over which NPS exercises any discretion or control.

Access and Spur Roads

Alternative 4 would require a total of approximately 2.5 miles of access roads, with approximately 1.6 miles within NPS boundaries. Alternative 4 would use 0.9 mile of existing roads as access roads and would require construction of 1.6 miles of new access roads, of which 0.5 mile would occur outside the ROW. Acreages of disturbance due to access roads during and after construction are shown in table 3. Roads would be created, used, and maintained as described for alternative 2. The access roads for alternative 4 would not enter Cherry Valley NWR. The applicant would need additional rights beyond the ROW for construction of access roads outside the transmission line ROW. Locations of these roads outside the ROW would require NPS approval.

Cost of Construction

The total cost of constructing the alternative 4 alignment from Susquehanna to Roseland is estimated to be $2.36 billion. This estimate is based on factors including prices of materials and equipment used, purchase and clearing of access roads and ROW, and labor costs. Detailed construction cost estimates can be found in appendix E.

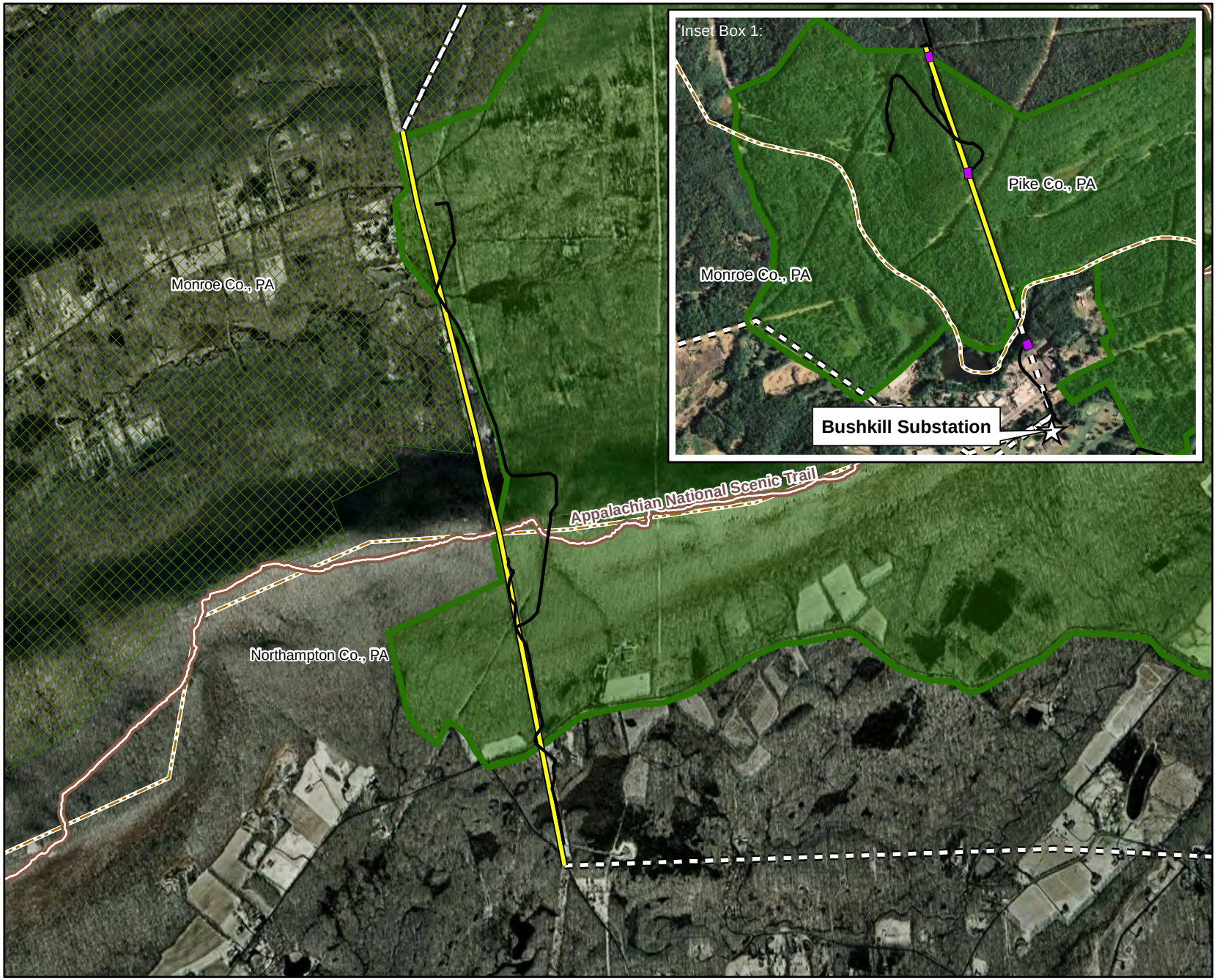
The total cost of constructing the alternative 4 alignment from Susquehanna to Roseland is estimated to be $2.36 billion.

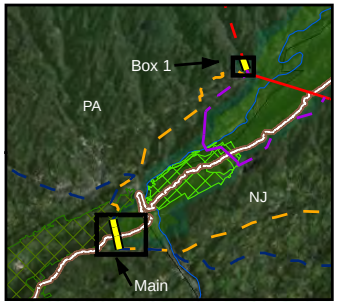
ALTERNATIVE 5

Route Description

At DEWA's southern border, alternatives 4 and 5 follow similar alignments. However, alternative 5 does not include the segment west of the Bushkill Substation, associated with the alternative 4 alignment.

Inside the study area, alternative 5 would follow a similar alignment as alternative 4 (described above); however, beyond the study area, alternatives 4 and 5 would split. The alternative 5 alignment would not cross the 0.6 mile portion west of the Bushkill Substation associated with alternative 4 (figure 9). Thus, under alternative 4 the applicant would have the option of a secondary crossing of NPS land west of Bushkill while under alternative 5 it would not. This is the only difference between 4 and 5 over which NPS exercises any discretion or control. Inside the study area, alternative 5 would be approximately 1.7 miles long, with approximately 0.9 mile within NPS lands. Appendix C contains descriptions of the alternatives outside the study area. Although not analyzed in the EIS, alternative 5 assumes a 230-kV transmission line will run from alternative 5 up to the Bushkill Substation on the west side of the park. In addition, alternative 5 also assumes that a 230-kV transmission line would run up to Kittatinny Substation on the east side of the park.





Legend

- Substation
- Crane Pad/ Tower Location
- Inside Study Area
- Outside Study Area
- Appalachian National Scenic Trail
- Proposed Access Road
- Delaware Water Gap National Recreation Area
- CVNWR Boundary
- County Line

Note:Designated boundary of CVNWR is depicted, not all property is owned within the boundary.

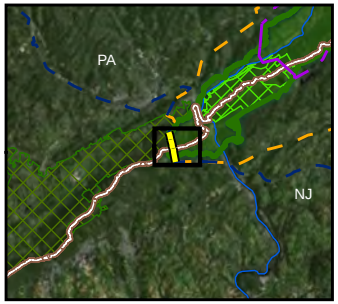
0 1,000 2,000
Feet
Scale applies to main frame and inset maps

Susquehanna to Roseland Transmission Line Proposal and Right-of-Way Request EIS

Figure 8
Alternative 4
Proposed Access Roads within the Study Area

Source: ESRI Streetmap 2006, Penn State 2010, ESRI ArcGISonline Map Service 2010, PennDOT 2011,NJOIT 2010, USGS 2006, NJ DEP 2008,

Projection: NAD 83 UTM Zone 18N
Date: October, 2011



Legend

- Substation
- Inside Study Area
- Outside Study Area
- Appalachian National Scenic Trail
- Proposed Access Road
- Road
- Delaware Water Gap National Recreation Area
- CVNWR Boundary
- County Line

Note:Designated boundary of CVNWR is depicted, not all property is owned within the boundary.

0 1,000 2,000
Feet

Susquehanna to Roseland Transmission Line Proposal and Right-of-Way Request EIS

Figure 9
Alternative 5
Proposed Access Roads within the Study Area

Source: ESRI Streetmap 2006, Penn State 2010, ESRI ArcGISonline Map Service 2010, PennDOT 2011,NJOIT 2010, USGS 2006, NJ DEP 2008,

Projection: NAD 83 UTM Zone 18N
Date: October, 2011

Access and Spur Roads

Alternative 5 would require a total of approximately 1.7 miles of access roads; however, 0.9 mile of existing road would be used. Alternative 5 would require construction of approximately 0.9 mile of new access roads, of which 0.16 mile would occur outside the ROW. Acreages of disturbance due to access roads during and after construction are shown in table 3. Roads would be created, used, and maintained as described for alternative 2. The applicant would need additional rights beyond the ROW for construction of access roads outside the transmission line ROW. Locations of these roads outside the ROW would require NPS approval.

Cost of Construction

The total cost of constructing the alternative 5 alignment from Susquehanna to Roseland is estimated to be $1.42 billion. This estimate is based on factors including prices of materials and equipment used, purchase and clearing of access roads and ROW, and labor costs. Detailed construction cost estimates can be found in appendix E.

ALTERNATIVES ELIMINATED FROM FURTHER STUDY

RATIONALE FOR DISMISSING ALTERNATIVES 6 AND 7

Alternatives 6 and 7, which would have crossed APPA well south of DEWA and MDSR, and for which comment from the public was invited, were dismissed from further analysis.

Both alternatives would unduly complicate and delay the relocation of the existing B-K Line. The permit application is for a double circuit configuration with capacity to carry two new 500-kV transmission lines, one of which would serve as a replacement for the B-K Line allowing that line to be moved to and collocated at a new permitted crossing of the S-R Line. However, the alternative 6 and 7 crossings are too distant from the existing B-K Line to allow for its relocation to either of those crossings at the same time that the new S-R Line would be constructed. Operational constraints would require that the existing B-K Line remain in place for an indefinite time until it could be relocated. This would also indefinitely delay the realization of a major beneficial effect that is integral to alternatives 3, 4, and 5.

Each of these alternatives also suffers from its own unique flaws insofar as they do not sufficiently utilize existing, cleared power line ROWs—a critical criterion. Alternative 6 would require extensive new clearing across the middle of the Cherry Valley NWR, thus failing the "*cleared*" element of this criterion. The alternative 7 alignment follows a gas pipeline ROW, not a *power line* ROW, so it would effectively create a new power line crossing where none exists today (this is also contrary to APPA land management policy which discourages allowing a new type of impact where one does not currently exist). It would also require major additional clearing of vegetation to widen the ROW from 100 to 300 feet to safely accommodate both the gas pipeline and the high voltage electric transmission line within APPA and Cherry Valley NWR.

Because of these considerations, alternatives 6 and 7 were dismissed from further analysis in this EIS.

RATIONALE FOR DISMISSING OTHER POTENTIAL ALTERNATIVES

The following potential alternatives were also eliminated from full consideration in this EIS. A brief description of the alternatives and the reason for dismissal is provided.

- An underground 500-kV line was dismissed because its construction cost would be five to eight times the cost of conventional construction methods. Additionally, blasting the bedrock for an underground line could produce major irretrievable and irreversible impacts on geology.
- Superconductor lines (direct current) were dismissed because their construction would cost three to five times that of conventional transmission line construction. These lines would also require AC/DC (alternating current / direct current) converter stations at Susquehanna and Roseland, in addition to the existing substations at these locations.
- Aluminum conductor composite core (ACCC) is a high-temperature conductor that was dismissed because the existing 230-kV towers would still have to be replaced with 500-kV towers to meet clearances required by NESC. ACCC conductor is still a potential conductor for the project because of the reduced sag on the line, as compared to the standard ACSR conductor. However, ACCC conductor is not a separate alternative by itself.
- The use of a smart grid was dismissed because it does not meet the reliability requirements put forth by PJM. Smart grids provide automated switching for transmission lines but do not provide the redundancy required to meet improved reliability requirements for the transmission grid.
- The use of distributed energy generation sites and localized renewable energy were both dismissed because they do not meet the purpose and need for federal action or that of the applicant. The application is for a permit for a transmission line, driven by a need for transmission capacity. The purpose and need for federal action involves consideration of this application with regard to the purposes and policies governing the national park system. Use of distributed energy generation sites and localized renewable energy is one of a number of possible reactions of PJM and the applicant (and others) if the NPS selects the no-action alternative, but ordering the adoption of such systems is beyond the authority of the NPS.
- An effort to refurbish the existing 230-kV line to meet energy needs was dismissed because energy demand is higher than a 230-kV line can provide. Additionally, the existing structures are only rated at 230 kV and would have to be replaced with new structures that meet the NESC-required clearances for 500-kV transmission lines. This alternative cannot meet either the applicant's needs or the federal purpose and need.
- The alternative identified as alternative 8 in the "Alternatives Considered but Dismissed" handout from the Public Alternatives Workshop in August 2010 (formerly applicant's alternative A) was dismissed because of its socioeconomic and environmental impacts. The alternative alignment would have crossed near High Point State Park, would have been near a known bald eagle nest, and would have had visual impacts on several recreation areas, including the High Point Monument, which is a 220-foot tower affording a large viewshed and is a popular recreation site.
- The alternative identified as alternative 9 in the "Alternatives Considered but Dismissed" handout from the Public Alternatives Workshop in August 2010 (formerly applicant's alternative C) was similar to alternatives 4 and 5 outside the study area. It was dismissed mainly due to its visual impact on APPA, because the line would have paralleled the trail for an extended distance.
- The alternative identified as alternative 10 in the "Alternatives Considered but Dismissed" handout from the Public Alternatives Workshop in August 2010 (formerly River Road alternative) was dismissed because of its impact on the scenic viewshed and surrounding ecosystem. This alternative alignment would have paralleled the Delaware River within the park

and was therefore determined to have the most impact on visitors that use the river, and it did not meet all NPS objectives for the project.

- The alternative identified as alternative 11 in the "Alternatives Considered but Dismissed" handout from the Public Alternatives Workshop in August 2010 (formerly NPS alternative 2) was dismissed based on its similarities to alternative 4 and because the alignment would have passed through the geologic formation of the Delaware Water Gap.
- The alternative identified as alternative 12 in the "Alternatives Considered but Dismissed" handout from the Public Alternatives Workshop in August 2010 (formerly NPS alternative 6) was dismissed because the use of this route would not be advantageous to APPA or the applicant in reducing the cost of construction. In addition, it was similar to alternative 5 in this EIS and had no additional benefits.
- Leaving in place the existing 230-kV B-K Line that the applicant proposes to parallel while permitting an alternative crossing for the new 500-kV line was rejected because it would result in two, rather than one, ROWs crossing the parks while leaving in place a line that the applicant states is becoming, if not already, obsolete.

MITIGATION AND COMPENSATION MEASURES

Mitigation and compensation measures would be required to minimize the impacts on resources from the construction, operation, and maintenance activities. Mitigation, according to NEPA regulations (40 CFR 1508.20), includes the following:

Mitigation and compensation measures would be required to minimize the impacts on resources from the construction, operation, and maintenance activities described for the action alternatives.

- avoiding the impact altogether by not taking a certain action or parts of an action;
- minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- reducing or eliminating the impact over time by implementing preservation and maintenance operations during the period of analysis; and
- compensating for the impact by replacing or providing substitute resources or environments.

Mitigation measures specific to the impact topics, where applicable, are presented in appendix F.

The NPS would also establish mechanisms to ensure that all mitigation obligations are met, mitigation measures are monitored for effectiveness, and unsuccessful mitigation is quickly remedied.

In instances where impacts cannot be avoided and mitigation is not feasible, compensation for resources lost or degraded through project construction, operation, and maintenance would be required. Examples of items that cannot be remedied through mitigation include impacts that degrade the scenic and other intrinsic values of the parks or impacts that result in the loss of recreational use and visitor enjoyment. Compensation would be used to help ensure the stewardship of natural, cultural, scenic, and recreational resources, thus allowing for

- acquisition in fee or easement of lands within or adjacent to APPA and DEWA, which would protect resources and create natural connecting corridors to other protected areas, especially the

newly forming Cherry Valley NWR and existing state protected lands in both Pennsylvania and New Jersey;

- implementation of the parks' existing natural, historic and recreational plans;
- continuation of stewardship, restoration, and enhancement of the parks' natural, historic, scenic, and recreational resources; and
- continuation of the parks' involvement in ongoing landscape-scale conservation connectivity initiatives, strategies, and resource monitoring.

DEWA, MDSR, and APPA are not found in isolation; rather they are important anchors within a larger system of connected lands and waters in Pennsylvania, New Jersey, and New York and play a key role in sustaining the health and values of the local and regional natural environment and economy. The implications of a project of this magnitude reach far beyond the boundaries of the national parks affected; this project has implications nationally. While ongoing planning efforts and initiatives continue to protect the natural, historic, scenic, and recreational resources of the area, ensuring their perpetuation is paramount in maintaining the character and vitality of these resources in perpetuity. While the NPS cannot require the applicant to implement mitigation and compensation measures outside NPS jurisdiction, the NPS encourages the applicant to reduce or eliminate, to the greatest extent possible, all potential adverse impacts by looking beyond boundaries and contributing to conservation initiatives and strategies so that resources are protected at all affected scales.

The applicant submitted a draft Mitigation Concept S-R Line Project to the NPS in May 2011. This draft mitigation plan is included in appendix F.

SUMMARY OF IMPACTS

Chapter 4 of this document describes the effects of each alternative on each resource topic. These impacts are summarized in table 4 at the end of this chapter.

NPS PREFERRED ALTERNATIVE

Currently the NPS does not have a preferred alternative for the S-R Line Project. The NPS is seeking additional public input for the selection of the preferred alternative during the public comment period for the DEIS. Following the public review, the preferred alternative will be chosen and announced in the FEIS.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

The NPS has determined that alternative 1 (no action) is the environmentally preferred alternative. The NPS made this determination based on the analysis of the scientific data about the proposal and included mitigation provided by the applicant and collected by NPS contractors. The environmentally preferred alternative is the alternative that would promote the requirements of the national environmental policy expressed in section 101(b) of NEPA. It is the alternative that causes the least damage to the biological and physical environment and that best protects, preserves, and enhances historic, cultural, and natural resources (CEQ 1981, Q6a). Under the present circumstances, the no-action alternative clearly best meets these requirements.

Alternative 1 would result in the least amount of damage to the biological and physical environment. As the data show, all the alternatives would have some degree of direct and indirect adverse impact on the resources identified within the study area. No alternative would produce a net benefit or even keep

conditions completely neutral; they would all be negative from an environmental point of view. However, overall, alternative 1 would result in the least damage among the alternatives. Alternative 1 would leave the existing B-K Line ROW in place, essentially maintaining conditions at status quo, with the exception of increased vegetation management, which would be likely to occur along the corridor of all the alternatives due to implementation of the newest NERC safety standards. Nonetheless, the relatively minor impacts of additional cutting and clearing in the existing ROW are outweighed by the more significant environmental damage that would certainly occur with the construction and operation of a larger transmission line within the parks along any of the other proposed alternatives, including the two proposed by the applicant.

Some of the action alternatives would have modestly beneficial environmental impacts on certain resources, but they are insufficient to offset the considerable environmental harm these same actions would also produce. Benefits would be marginal, and is not apparent from the analysis that any of them would necessarily counterbalance or outweigh the environmental damages caused by the proposed project. The benefits are not so great or widespread that they eclipse or significantly diminish the adverse impacts described by the data. Thus, they are not sufficiently persuasive to overcome the abundant evidence of the environmental damage that would occur if the project were to move forward.

For these reasons, the NPS finds that alternative 1 would cause the least damage to the biological and physical environment and would best protect and preserve the scenic, historic, cultural, and natural resources of the parks involved. Therefore, alternative 1 would best promote the national environmental policy of NEPA and must be selected as the environmentally preferred alternative.

SUMMARY—CONSISTENCY WITH SECTIONS 101(B) AND 102(1) OF NEPA

The CEQ regulations require that the EIS include an analysis of how each alternative meets or achieves the purposes of NEPA, as stated in sections 101(b) and 102(1) [1502.2(d)]. Each alternative analyzed in a NEPA document must be assessed as to how it meets the following purposes:

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
2. Ensure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings.
3. Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.
4. Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.
5. Achieve a balance between population and resource use that would permit high standards of living and a wide sharing of life’s amenities.
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The CEQ regulations further establish policy for federal agency implementation of NEPA, stating “federal agencies shall to the fullest extent possible interpret and administer policies, regulations, and public laws of the United States in accordance with the policies set forth in the Act and these regulations” [1500.2(a)]; therefore, other acts and NPS policies are referenced as applicable in the following discussion.

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.

   Alternative 1 would fully meet the purpose of fulfilling the responsibilities of each generation as trustee for the environment. Although some impacts would continue to occur to vegetation, wetlands, floodplains, landscape connectivity, special status species, rare and unique communities, cultural landscapes, and visual resources, none of the impacts would change the existing conditions of the resources. Impacts would not adversely affect population viability, overall habitat quality, or functions and values of unique communities.

   Alternative 2 would not meet the purpose of fulfilling the responsibilities of each generation as trustee for the environment due to the magnitude and severity of impacts to resource. Alternative 2 would result in permanent habitat loss and habitat fragmentation from the clearing and reduction of vegetation. Alternative 2 would also disturb or degrade habitat for wildlife and special status species including the federally endangered bog turtle and Indiana bat. Impacts to migratory birds would occur because alternative 2 bisects a major migratory bird flyway and an increase in bird collision is likely. In addition, the transmission line would be located next to one of only two known communal roosts for wintering bald eagles and collision risk would be especially high as eagles move to and from the roost. Blasting and drilling activities associated with alternative 2 would damage or destroy unique geological formations and disturb wetland functions. Overall, significant impacts to geologic resources, wetlands, vegetation, landscape connectivity, wildlife, and rare and unique communities would occur.

   Alternative 2b would not meet the purpose of fulfilling the responsibilities of each generation as trustee for the environment due to the magnitude and severity of impacts to resource. Alternative 2b would result in permanent habitat loss and habitat fragmentation from the clearing and reduction of vegetation. Alternative 2b would also disturb or degrade habitat for wildlife and special status species including the federally endangered bog turtle and Indiana bat. Impacts to migratory birds would occur because Alternative 2b bisects a major migratory bird flyway and an increase in bird collision is likely. In addition, the transmission line would be located next to one of only two known communal roosts for wintering bald eagles and collision risk would be especially high as eagles move to and from the roost. Blasting and drilling activities associated with alternative 2b would damage or destroy unique geological formations and disturb wetland functions. Overall, significant impacts to geologic resources, wetlands, vegetation, landscape connectivity, wildlife, and rare and unique communities would occur. Therefore, alternative 2b would not meet the purpose of fulfilling the responsibilities of each generation as trustee to the environment.

   Alternative 3 would have significant impacts on geologic resources, wetlands, vegetation, rare and unique communities, and special status species. Excavation and blasting activities would create impacts to geologic resources also affecting the function of wetlands and surface waters. Blasting also has the potential to destroy habitat for the state-listed timber rattlesnake. Vegetation clearing would impact mature forests, create additional edge habitat, and increase the risk of invasive species to establish. The transmission line would also bisect a major migratory flyway of the Kittatinny Ridge creating aerial hazards for migratory birds. The removal of the existing transmission line would create beneficial impacts through the rehabilitation of vegetation and reducing the risk of bald eagle collisions. For these reasons, alternative 3 would only partially meet the purpose of fulfilling the responsibilities of each generation as trustee to the environment.

   Alternative 4 and 5 would have similar significant impacts to special status species, wetlands, rare and unique communities, and landscape connectivity. A loss of wetlands would occur from the construction of permanent access roads. The clearing of vegetation would increase habitat fragmentation, impact wildlife, and rare and unique communities including Kittatinny Ridge and

the Minsi Lake Corridor, which support migratory birds, and special status species. The removal of the existing transmission line would create beneficial impacts through the rehabilitation of vegetation and by reducing the risk of bald eagle collisions. For these reasons, alternatives 4 and 5 would only partially meet the purpose of fulfilling the responsibilities of each generation as trustee to the environment.

2. Ensure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings.

   Alternative 1 would fully meet the purpose of ensuring for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings. Alternative 1 would not affect public health and safety as operation and maintenance of the existing transmission line would continue. Although alternative 1 would have some impacts to the cultural landscape and visual resources, there would be no change to the baseline or existing conditions. The existing line has been present at the parks since the parks were established and were thus part of the existing conditions.

   Alternative 2 would create temporary impacts to public health and safety during the construction activities associated with the transmission line. The installation of taller towers would degrade the wilderness viewshed and cultural landscape and create adverse impacts to the visitor experience. The transmission line would also distract from the scenic values along the Delaware River. These visual impacts would occur over a relatively large area and would impact a number of park users. Therefore, alternative 2 would not meet the purpose of ensuring all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings.

   Alternative 2b would have similar impacts to alternative 2. In addition to the temporary impacts to public health and safety associated with construction activities, alternative 2b would have an increased risk of live wires contacting nearby trees. Because the existing ROW would not be expanded, alternative 2b would not meet NERC standards and the potential for forest fires exists which would create substantial public health and safety impacts. In addition to the public health and safety impacts, alternative 2b would have similar impacts to the viewshed and cultural landscape described above. For these reasons, alternative 2b would not meet the purpose of ensuring all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings.

   Alternative 3 would also create temporary impacts to public health and safety during the construction period. The visibility of the new towers along alternative 3 would adversely impact the scenic nature of the parks. The towers would be clearly visible along the Kittatinny Ridge from the Delaware River, McDade Trail, and other popular park sites by numerous park visitors. In addition, the construction of the transmission line would severely degrade the cultural landscape. Therefore, alternative 3 would not meet the purpose of ensuring all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings.

   Alternatives 4 and 5 would have temporary impacts to public health and safety during construction activities. In addition to impacts within the park, impacts to public health and safety would also occur within other federal lands, trails, private properties, and local roads. Impacts to the visual resources would occur along the portion of APPA where the transmission line would cross. The presence of the large tower would diminish the integrity of the viewshed and cultural landscape; however the area impacted would be relatively small when compared to other alternatives. Therefore, alternatives 4 and 5 would partially meet the purpose of ensuring all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings.

3. Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.

   Alternative 1 would fully meet the purpose of attaining the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequence. Although alternative 1 would have temporary impacts to public health and safety and visitor use and experience during the construction period, no changes to the visitor opportunities would occur in the long-term. The existing line has been present at the parks since the parks were established and were thus part of the existing conditions.

   Alternatives 2, 2b, and 3 would partially meet the purpose of attaining the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequence. As discussed above, temporary impacts to public health and safety would occur during construction activities. Additional impacts to public health and safety would occur under alternative 2b since the ROW would not comply with NERC standards. Although, the aesthetic resources and scenic vistas would be degraded, visitor opportunities throughout the park would continue to occur following the construction of the transmission line.

   Alternatives 4 and 5 would fully meet the purpose of attaining the widest range of beneficial uses of the environment without degradation, risk of health and safety, or other undesirable and unintended consequences. Temporary impacts to public health and safety would occur during the construction activities as discussed previously. The scenic viewshed would be impacted in the portion of APPA where the transmission line will cross; however, use of the trail would continue to occur. Other visitor activities within DEWA would not be impacted. Alternatives 4 and 5 would fully meet this purpose because the impacted area would be relatively small.

4. Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.

   Alternative 1 would fully meet the purpose of preserving important historic, cultural, and natural aspects of our natural heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice. Alternative 1 would continue maintenance of the existing ROW corridor in addition to implementing the new vegetation management standards. Although some impacts would continue to occur to vegetation, wetlands, floodplains, landscape connectivity, special status species, rare and unique communities, cultural landscapes, and visual resources, none of the impacts would change the existing conditions of the resources. The existing line has been present at the parks since the parks were established and were thus part of the existing conditions.

   Alternatives 2 and 2b would cross through the center of DEWA, including MDSR which includes large areas of mature forests, rare and unique communities including Arnott fen, Hogback Ridge, Kittatinny Ridge, and Van Campens Brook riparian area. In addition, the transmission line would be located next to one of only two known communal roosts for wintering bald eagles and collision risk would be especially high as eagles move to and from the roost. The transmission line would cross areas with high concentrations of cultural resources including pre-Columbian fishing camps, and 32 historic structures. The implementation of alternatives 2 and 2b would have an adverse effect on 8 historic structures, cultural landscapes and archaeological resources from the visual intrusion of the transmission line. Therefore, alternatives 2 and 2b would not meet the purpose of preserving important historic, cultural, and natural aspects of our natural heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.

   Alternative 3 would bisect large areas of riparian forests, eastern hemlock forests, unique ecosystems, and the Kittatinny Ridge that provide habitat for wildlife such as migratory birds and

rare plant and animal communities. In addition, alternative 3 would have an adverse effect on 6 historic structures, cultural landscapes, and archaeological resources. The construction of the transmission line would create adverse effects from the visual intrusion of the line and through the alteration of character defining features of the landscapes. For these reasons, alternative 3 would not meet the purpose of preserving important historic, cultural, and natural aspects of our natural heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.

Alternatives 4 and 5 would partially meet the purpose of preserving important historic, cultural, and natural aspects of our natural heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice. The transmission line under these alternatives would bisect two unique ecosystems, including Kittatinny Ridge and the Minsi Lake Corridor. These areas provide high quality habitat for a variety of wildlife including migratory birds, forest-dependent wildlife, and vernal pool-dependent wildlife. In addition, the transmission line would traverse through two cultural landscapes including the Appalachian Trail and Totts Gap Farm. The cultural landscapes would be adversely impacted under alternatives 4 and 5 through the alteration of character-defining features. However, these alternatives would partially meet this purpose because the impacted area is relatively small when compared to other alternatives.

5. Achieve a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities.

   As discussed above, alternative 1 would continue maintenance of the existing ROW corridor in addition to implementing the new vegetation management standards. Although alternative 1 would have some impacts to the natural and physical resources of the park, there would be no change to the baseline or existing conditions. The existing line has been present at the parks since the parks were established and were thus part of the existing conditions. Therefore, the resources would remain unimpaired for the enjoyment of present and future generations. Alternative 1 would fully meet the purpose of achieving a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities.

   Alternatives 2 and 2b would cause significant impacts to geologic resources, wetlands, vegetation, landscape connectivity, wildlife, rare and unique communities, archaeological resources, historic structures, cultural landscapes, visitor use and experience, and scenic resources. Under the enabling legislation and Organic Act, the NPS is charged with protecting the scenic, natural, cultural, and archaeological resources at each park. In addition, the enabling legislation for all three parks specifically identifies scenery as a park key resource. The permanent removal of vegetation and installation of visibly apparent towers would degrade the integrity of resources and the scenic landscape. These impacts would be widely distributed across the parks wherever the line is visible to visitors and have the potential to violate the Organic Act. For these reasons, there is potential for the resources to become unavailable for the enjoyment of future generations. Therefore, alternatives 2 and 2b would not meet the purpose of achieving a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities.

   Alternative 3 would have significant impacts to geologic resources, wetlands, visitor use and experience, visual resources, vegetation, rare and unique communities, species of special status, historic structures, and cultural landscapes. The expansion of the ROW and installation of towers would visibly change the scenic landscape of a relatively large area and for a large number of park users. The impacts to migratory birds along Kittatinny Ridge would violate NPS policies and mandates and would counter one of the underlying purposes of the establishment of the parks. Alternative 3 also violates the purpose and significance of the parks to preserve the natural, cultural, and scenic resources within them. Therefore, alternative 3 would not meet the purpose of

achieving a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities.

Alternatives 4 and 5 would have significant impacts to special status species, wetlands, rare and unique communities, landscape connectivity, visitor use and experience, archaeological resources, cultural landscapes, and historic structures. The scenic landscape along portions of the Appalachian Trail would be diminished due to the construction of 200 foot towers. Impacts to cultural resources would also be attributed to the visual impacts from the construction of the towers and ROW clearing. Because the impacted area would be relatively small, park resources would likely remain unimpaired for the enjoyment of present and future generations, alternatives 4 and 5 would partially meet the purpose of not meet the purpose of achieving a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities.

6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

   None of the alternatives would meet the purpose of enhancing the quality of renewable resources and approach the maximum attainable recycling of depletable resources. Alternative 1 would continue to transport energy generated from fossil fuels. Alternatives 2, 2b, 3, 4, and 5 would include the construction of a double circuit 500-kV transmission line in order to transport more energy within the regional area. The action alternatives would result in the use and burning of additional non-renewable fossil fuels. In addition, the construction of the transmission line would require use and degradation of many non-renewable resources. During construction the use of fossil fuels for operation of construction equipment would be required. Some of the parks' natural, physical, and cultural resources impacted during construction are non-renewable which makes any impacts to them all the more serious as they cannot be replaced if lost.

TABLE 4: IMPACTS OF THE ALTERNATIVES

Resource	Alternative 1: No-Action Alternative	Alternative 2: The Applicant's Proposed Route	Alternative 2b	Alternative 3	Alternative 4	Alternative 5
Geologic Resources	No impacts from vegetation maintenance activities on geology and topography; vegetation maintenance could increase access to and visibility of paleontological specimens, particularly at previously identified sites.	Impacts from tower construction and grading on geology, topography, and paleontology; the installation of **12 tower locations/crane pads** in rare or unique features, in areas with slopes greater than 10%, and in unstable geologic formations could impact geologic resources; blasting and/or excavation could disturb paleontological resources.	Same as alternative 2.	Impacts on geology due to the drilling, blasting, and excavation activities; the installation of **25 towers/crane pads** in areas with slopes greater than 10% and 11 to 15 towers in unstable areas and in rare or unique geologic features; construction and clearing would impact paleontology through direct damage, collection, or vandalism of paleontological sites.	Impacts from tower construction and grading on geology, topography, and paleontology; **the installation of 2 towers/crane pads** in areas with slopes greater than 10%; no towers would be constructed within rare or unique geology inside the study area; construction and clearing would impact paleontology through direct damage, collection, or vandalism of paleontological sites.	Same as alternative 4.
Floodplains	Clearing vegetation in the ROW due to periodic maintenance in the floodplain, would affect natural floodplain values but no new development would occur.	A maximum of **14.3 acres of vegetation in the floodplain** would be affected by vegetation management; access roads and crane pads would develop 0.202 acre of the floodplain.	A maximum of **8.35 acres of vegetation in the floodplain** would be affected by vegetation management; access roads and crane pads would develop 0.142 acre of the floodplain.	A maximum **of 7.93 acres of vegetation in the floodplain** would be affected by vegetation management; access roads and crane pads would develop 0.222 acre of the floodplain.	No vegetation in the floodplain would be cleared; access roads and crane pads would develop 0.162 acre of the floodplain.	No vegetation in the floodplain would be cleared and no development in the floodplain would occur.
Wetlands	Impact from maintenance, resulting in **conversion of 9.92 acres of wetlands** to scrub shrub or emergent wetlands; rare and unique wetlands as well as Exceptional Value Wetlands would be affected.	Impacts from clearing wetlands, resulting in **conversion of 23.94 acres of wetlands** to scrub shrub or emergent wetlands; construction of access roads and crane pads in wetlands (1.02 acres), and from blasting activities; rare and unique wetlands as well as Exceptional Value Wetlands would be affected.	Impacts from clearing wetlands, resulting in **conversion of 12.13 acres of wetlands** to scrub shrub or emergent wetlands; construction of access roads and crane pads in wetlands (0.56 acres), and from blasting activities; rare and unique wetlands as well as Exceptional Value Wetlands would be affected.	Impacts from clearing wetlands, resulting in **conversion of 3.21 acres of wetlands** to scrub shrub or emergent wetlands; construction of access roads in wetlands (0.02 acres).	Impacts from clearing wetlands, resulting in **conversion of 5.8 acres of wetlands** to scrub shrub or emergent wetlands; construction of access roads in wetlands (0.09 acres).	Impacts from clearing wetlands, resulting in **conversion of 4.31 acres of wetlands** to scrub shrub or emergent wetlands; construction of access roads in wetlands (0.09 acres).
Vegetation	Impacts would result from vegetation maintenance activities and maintenance of scrub shrub habitat in the ROW.	Approximately **240 acres of vegetation would be cleared** in the ROW, 129 acres of this which is mature forest; impacts would also result from spread of invasive species, vegetation maintenance activities, and vegetation clearing from other construction activities outside the ROW (25.7 acres).	Approximately **144 acres of vegetation would be cleared in the ROW**, 42 acres of this which is mature forest; impacts would also result from spread of invasive species, vegetation maintenance activities, and vegetation clearing from other construction activities outside the ROW (26.7 acres).	Approximately **313 acres of vegetation would be cleared in the ROW**, 204 acres of this which is mature forest; impacts would also result from spread of invasive species, vegetation maintenance activities, and vegetation clearing from other construction activities outside the ROW (100.6 acres).	Approximately **113 acres of vegetation would be cleared in the ROW**, 70 acres of this which is mature forest; impacts would also result from spread of invasive species, vegetation maintenance activities, and vegetation clearing from other construction activities outside the ROW (55.9 acres).	Approximately **74 acres of vegetation would be cleared in the ROW**, 44 acres of this which is mature forest; impacts would also result from spread of invasive species, vegetation maintenance activities, and vegetation clearing from other construction activities outside the ROW (55.3 acres).

Resource	Alternative 1: No-Action Alternative	Alternative 2: The Applicant's Proposed Route	Alternative 2b	Alternative 3	Alternative 4	Alternative 5
Landscape Connectivity, Wildlife Habitat, and Wildlife	Impacts would result from the continued maintenance of the ROW, loss of habitat from removal of danger trees outside the ROW, and disturbance and direct mortality of wildlife.	Impacts would result from habitat loss, habitat alteration, the continued maintenance of the ROW, the isolation of habitat patches, increased edge habitat, the disturbance and direct mortality of wildlife, and the isolation of some species.	Impacts would result from habitat loss, habitat alteration, continued maintenance of the ROW, the isolation of habitat patches, the disturbance and direct mortality of wildlife, and the isolation of some species.	Same as alternative 2.	Impacts would result from habitat loss, habitat alteration, continued maintenance of the ROW, the isolation of habitat patches, increased edge habitat, the disturbance and direct mortality of wildlife, and the isolation of some species.	Same as alternative 4.
Special-status Species: Aquatic Species	Impacts from temporary changes to water quality during maintenance activities.	Impacts from habitat loss and some changes to habitat during construction and maintenance activities.	Same as alternative 2.	Impacts from temporary changes to habitat during construction and maintenance activities.	No impact because no aquatic species are likely to exist in the ROW.	Same as alternative 4.
Special-status Species: Terrestrial Invertebrate Species	Vegetation maintenance activity would maintain and could expand suitable habitat (herbaceous).	Same as alternative 1.	Same as alternative 1.	N/A	N/A	N/A
Special-status Species: Birds	Impacts from presence of existing transmission line, maintenance activities, electrocution/collision potential; could create additional scrub shrub habitat in ROW.	Impacts from construction of line resulting in habitat loss and from presence of line resulting in collision or electrocution; could create additional scrub shrub habitat in ROW; this alternative would not be consistent with the Bald Eagle Guidelines.	Same as alternative 2.	Same as alternative 2.	Impacts from construction of line resulting in habitat loss and from presence of line resulting in collision or electrocution; could create additional scrub shrub habitat in ROW.	Same as alternative 4.
Special-status Species: Reptiles and Amphibians	Impacts from maintenance and human activities from disturbance of denning, basking, foraging, nesting, and breeding as well as introduction of invasive species.	Impacts from direct mortality, destruction of nests and/or overwintering areas; impacts on habitat used for foraging and basking; habitat loss/fragmentation during construction and maintenance activities.	Same as alternative 2.	Same as alternative 2.	Same as alternative 2.	Same as alternative 2.
Special-status Species: Mammals	Impacts from disturbance during maintenance activities and from tree removal in areas with potential habitat.	Impacts from noise and disturbance during construction; loss of potential habitat.	Same as alternative 2.	Same as alternative 2.	Same as alternative 2.	Same as alternative 2.
Special-status Species: Plants	Impacts from maintenance activities, including some wetland areas that support listed plants; disturbance as well as introduction of invasive species would occur.	Impacts from forest clearing, construction in wetland areas from access roads and crane pads, and blasting, as well as from vegetation maintenance.	Same as alternative 2.	Same as alternative 2.	Same as alternative 2.	Same as alternative 2.

Resource	Alternative 1: No-Action Alternative	Alternative 2: The Applicant's Proposed Route	Alternative 2b	Alternative 3	Alternative 4	Alternative 5
Rare and Unique Communities	Impacts from artificially maintaining scrub shrub habitat in the park artificially maintaining scrub shrub habitat in the parks; soils and wildlife would be affected.	Impacts from vegetation clearing, line construction, deconstruction of the existing line, and potential spread of invasive species, as well as artificial maintenance of scrub shrub habitat; six communities would be affected (Arnott Fen, Delaware River Riparian Corridor, eastern hemlock forests, Hogback Ridge, Kittatinny Ridge, Van Campens).	Impacts from vegetation clearing, line construction, blasting, deconstruction of the existing line, and potential spread of invasive species, as well as artificial maintenance of scrub shrub habitat; six communities would be affected (Arnott Fen, Delaware River Riparian Corridor, eastern hemlock forests, Hogback Ridge, Kittatinny Ridge, Van Campens).	Impacts from vegetation clearing, line construction, blasting, deconstruction of the existing line, and potential spread of invasive species, as well as artificial maintenance of scrub shrub habitat; three communities would be affected (Delaware River Riparian Corridor, eastern hemlock forests, Kittatinny Ridge).	Impacts from vegetation clearing, line construction, deconstruction of the existing line, and potential spread of invasive species, as well as artificial maintenance of scrub shrub habitat; for communities would be affected (eastern hemlock forests, Kittatinny Ridge, Minsi Lake / Bear Swamp, Totts Gap).	Same as alternative 5 but would not impact eastern hemlock forests.
Archeological Resources	Impacts on archeological sites due to physical impacts from the maintenance of vegetation along the existing ROW.	Impacts from physical impacts of construction and disturbance of archeological resources; **3 known archeological sites** would be directly affected by construction activities; impacts would depend on the nature and extent of physical disturbance to the archeological resources.	Same as alternative 2.	Possible impacts from physical impacts of construction and disturbance of archeological resources; **1 potential archeological site** exists along this alternative; impacts would depend on the nature and extent of physical disturbance to the potential archeological resources**.**	Possible impacts from physical impacts of construction and disturbance of archeological resources; **1 potential archeological site** exists along this alternative; impacts would depend on the nature and extent of physical disturbance to the potential archeological resources**.**	Same as alternative 4.
Historic Structures	Impacts from the visual impact of vegetation removal during maintenance activities.	**Impacts on 32 identified historic structures** from the visual impact of larger towers and lines, which would diminish the integrity of the setting, feeling, and association of numerous historic structures.	Same as alternative 2.	**Impacts on 72 identified historic structures** from the visual impact of larger towers and lines, which would diminish the integrity of the setting, feeling, and association of numerous historic structures.	**Impacts on 27 identified historic structures** from the visual impact of larger towers and lines, which would diminish the integrity of the setting, feeling, and association of numerous historic structures.	Same as alternative 4.
Cultural Landscapes	Physical and visual impacts of the existing line and vegetation maintenance; would diminish the integrity of setting, feeling, and association of numerous cultural landscapes.	**Five cultural landscapes would be impacted** and the character-defining features would be altered and result in measurable changes, thus diminishing the overall integrity of the resources; additionally, **13 cultural landscapes would be substantially impacted**, producing noticeable changes or alterations to the character-defining features of the cultural landscapes.	**Eight cultural landscapes would be impacted** and the character-defining features would be altered and result in measurable changes, thus diminishing the overall integrity of the resources; additionally, **5 cultural landscapes would be substantially impacted**, producing noticeable changes or alterations to the character-defining features of the cultural landscapes.	**Three cultural landscapes would be impacted** and the character-defining features would be altered and result in measurable changes, thus diminishing the overall integrity of the resources.	**Three cultural landscapes would be impacted** and the character-defining features would be altered and result in measurable changes, thus diminishing the overall integrity of the resources**.**	Same as alternative 4.

Resource	Alternative 1: No-Action Alternative	Alternative 2: The Applicant's Proposed Route	Alternative 2b	Alternative 3	Alternative 4	Alternative 5
Socioeconomics	No impact on socioeconomics.	Impacts to the local and regional economy due to changes in recreation, visitation, tourism, and agricultural revenue. Opportunity for job placement during the construction period.	Same as alternative 2.	Same as alternative 2.	Same as alternative 2.	Same as alternative 2.
Infrastructure, Access, and Circulation	Temporary, brief road closures or detours during the maintenance periods. Hamilton Trail in New Jersey, the McDade Trail near Community Drive, and part of the Van Campens Glen Trail would be used for maintenance activities.	Use of heavy construction equipment on historic River Road and 1.5 miles of Old Mine Road would result in impacts on infrastructure. Impacts on access and circulation would occur at specific locations during the construction period**.**	Same as alternative 2.	Use of heavy construction equipment on approximately 4.5 miles of River Road and 6.5 miles of Old Mine Road would result in impacts to infrastructure. Impacts on access and circulation would occur at specific locations during the construction period**.**	The use of heavy equipment on NPS Drive, Totts Gap Road, and Mountain Road would result in impacts to infrastructure. Impacts on access and circulation would occur during the construction period at specific locations**.**	Same as alternative 4.
Visual Resources	The presence of the existing alignment would affect visual intactness from continued operation of the existing transmission line.	Changes to visual resources from the deconstruction and construction activities would be most apparent along Millbrook Flatbrook Road and Old Mine Road in New Jersey. Affected sites in Pennsylvania potentially include Fernwood Resort, Pennsylvania Hwy 209 near Bushkill, McDade Trail, the cultural landscape related to the Schoonover house, and Community Drive. Affected sites in New Jersey potentially include Van Campens Glen, Hamilton, and Pioneer trails, Watergate Recreation Site, and Millbrook Village.	Changes to visual resources from the deconstruction and construction activities would be most apparent along McDade Trail near the Schoonover House and Community Drive, and MDSR. There would be two additional nearly 200-foot towers.	Changes to visual resources from the deconstruction and construction activities would be most apparent along McDade Trail, Old Mine Road, MDSR, and APPA. Improved visual cohesiveness and unity resulting from the unobstructed natural forest cover within due to the removal of the existing B-K Line.	Changes to visual resources from the deconstruction and construction activities would be most apparent where the line would be in proximity to APPA. Improved visual cohesiveness and unity resulting from the unobstructed natural forest cover within due to the removal of the existing B-K Line.	Changes to visual resources from the deconstruction and construction activities would be most apparent where the transmission line would cross APPA because it would also be intersected by an access road. Improved visual cohesiveness and unity resulting from the unobstructed natural forest cover within due to the removal of the existing B-K Line.
Soundscapes	Intermittent impacts on soundscapes due to maintenance activities associated with continued operation of the existing transmission line.	Impacts would result from disturbance during decommissioning, construction, and maintenance activities. Some readily detectable impacts would be expected within 350 feet of the alignment centerline from the operation of the line.	Same as alternative 2.	Impacts would result from disturbance during decommissioning, construction, and maintenance activities. Some readily detectable impacts would be expected within 300 feet of the alignment centerline during operation and maintenance.	Temporary disturbance during decommissioning, construction, and maintenance activities. Some readily detectable impacts would be expected within 350 feet of the alignment centerline during operation and maintenance.	Same as alternative 4.

Resource	Alternative 1: No-Action Alternative	Alternative 2: The Applicant's Proposed Route	Alternative 2b	Alternative 3	Alternative 4	Alternative 5
Visitor Use and Experience	Impacts would result primarily from the continued visual impacts of the existing transmission line. Noise and visual intrusions would result in slight impacts during maintenance activities.	Impacts to visitor use and experience with the most intense impacts at Watergate Recreation Site. Visitors would experience impacts where the transmission line crosses APPA. Impacts related to deconstruction and construction would be localized, particularly related to noise.	Same as alternative 2.	The 90-degree bend of line would affect views from several vantage points, affecting many visitors. New visual intrusions would be created at Raccoon Ridge along APPA, and would be seen from other vantage points along the trail. Impacts at APPA would occur for 2.5 miles. Construction-related impacts would occur from impacts on soundscapes based on location.	Impacts would occur at the Red Dot (Tammany) Trail and Karamac Trail. APPA would occur for 2.5 miles. Construction-related impacts would occur from impacts on soundscapes based on location.	Same as alternative 4.
Wild and Scenic Rivers	**No impact** on the values on which the river was designated from any maintenance activities.	Many of the values for which the river was designated would be perceptibly changed and would result in visual changes that would affect a relatively large area, a large number of users, and would exist for the period of analysis.	Same as alternative 2.	Many of the values for which the river was designated would be perceptibly changed and would result in visual changes that would affect a relatively large area, a large number of users, and would exist for the period of analysis. Enhancement of MDSR values from the decommissioning and restoration of the alternative 2 alignment.	Enhancement of MDSR values from the decommissioning and restoration of the alternative 2 alignment.	Same as alternative 4.
Park Operations	Park staff would monitor vegetation maintenance activities, but the maintenance would not be conducted on a regular basis; there would be **no change in the number of park staff** and no change to the parks' budgets because it is assumed that the applicant would be responsible for the costs associated with the NPS managing the permit.	Impacts on park operations would result from construction-related activities and monitoring activities; **2 to 3 new employees would be hired**; there would be no change to the parks' or divisions' budgets because the applicant would be responsible for the parks' costs associated with the NPS managing the permit.	Same as alternative 2.	Impacts on park operations would result from construction-related activities and monitoring activities (including actions along APPA); **2 to 3 new employees would be hired**; there would be no change to the parks' or divisions' budgets because the applicant would be responsible for the parks' costs associated with the NPS managing the permit.	Impacts on park operations would result from construction-related activities and monitoring activities (including actions along APPA); **1 new employee would be hired**; there would be no change to the parks' or divisions' budgets because the applicant would be responsible for the parks' costs associated with the NPS managing the permit.	Same as alternative 4.
Health and Safety	No impacts to health and safety.	Impacts on DEWA, MDSR, and APPA from potential safety hazards associated with construction, equipment related hazards, and transportation of materials.	Inconsistent with NESC code / NERC standards.	Impacts on DEWA, MDSR, and APPA from potential safety hazards associated with construction, equipment related hazards, and transportation of materials; removal of the existing B-K Line would eliminate the generation of electromagnetic fields (EMFs) at the line's current location.	Same as alternative 3.	Same as alternative 3.