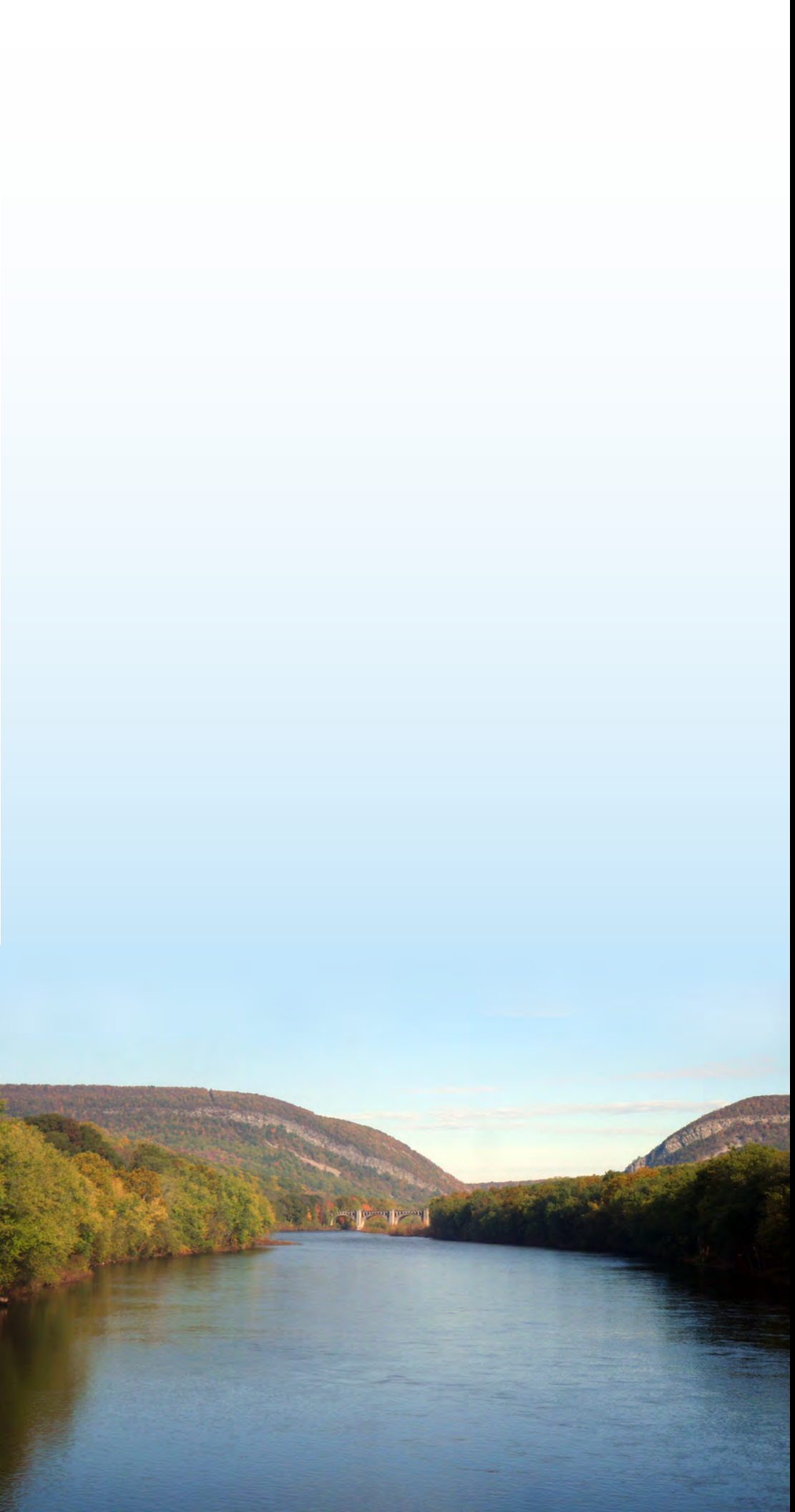


Chapter 3
Affected Environment

CHAPTER 3: AFFECTED ENVIRONMENT

INTRODUCTION

The "Affected Environment" chapter describes the resources that could be affected as a result of implementation of any of the alternatives. The resource descriptions provided in this chapter serve as the baseline against which the potential effects of the proposed actions considered in this draft EIS are compared. The resource topics presented in this chapter and the organization of the topics correspond to the resource impact discussions contained in chapter 4, "Environmental Consequences." The general project setting has been included to provide the background necessary to understanding the park resources and environment. The following resources are included in this chapter: geology (rare and unique geologic communities); floodplains; wetlands; vegetation; landscape connectivity, wildlife habitat (including aquatic habitat), and wildlife (including migratory birds); species of special concern; rare and unique communities; cultural resources; socioeconomics; visitor experience; scenic and aesthetic resources (i.e., viewsheds and soundscapes); wild and scenic rivers; long-term management of resources; park operations; and health and safety. At the time of publication of the DEIS, reports for several resource studies (cultural resources, land survey, etc.) were still being prepared, the results of these studies will be incorporated, as appropriate, into the FEIS.

The resources within the parks are keystones in assuring the persistence of intact, healthy, and functional resources (natural, recreational, cultural, and scenic alike) in the region. The area surrounding the park units is rapidly experiencing development, and these park units were created for protecting these resources in perpetuity. Each resource is described in two different segments (inside the study area and outside the study area) using the endpoints of the S-R Line and study area as described in chapter 2. A study area is delineated by the locations where the line transitions from a known alignment (the alternative described by the NPS and evaluated in this EIS) to an unknown alignment (the applicant could use the route identified or other routes to reach the line end). The study area is bound by the VSLs, as described in chapter 2, and ranges from 100 to 300 feet wide, depending on the alternative. Information inside the study area is more detailed, because the exact location of the proposed S-R Line and other alternatives are known. "Outside the study area" is the area beyond the defined study area to the S-R Line endpoints (the Susquehanna and Roseland substations) in Pennsylvania and New Jersey.

GENERAL PROJECT SETTING

Each of the proposed alternatives crosses at least two of three units of the national park system: DEWA, MDSR, and APPA (figure 2). MDSR is completely within DEWA. APPA is within DEWA where alternatives 1, 2, 2b, 3, 4, and 5 cross the trail. Table 5 presents the resources crossed by each alternative inside the study area.

DEWA encompasses approximately 67,000 acres of mountain ridge, forests, and floodplains on both sides of the Delaware River. MDSR is a 40-mile section of the Delaware River completely within DEWA that flows between low, forested mountains and cuts through the mountain ridge forming the Delaware Water Gap. The Delaware Water Gap is a mile wide from New Jersey's Mount Tammany (1,527 feet) to Pennsylvania's Mount Minsi (1,463 feet), and is about 1,200 feet deep from the tops of these mountains to the surface of the river, which is 290 feet above mean sea level (AMSL). The maximum depth of the river at the Delaware Water Gap is about 55 feet (NPS 2010i, 1).

TABLE 5: SUMMARY OF PHYSICAL AND NATURAL RESOURCES PRESENT ALONG THE ALTERNATIVES INSIDE THE STUDY AREA

Resource	Alternative 1	Alternative 2	Alternative 2b	Alternative 3	Alternative 4	Alternative 5
Acidic broadleaf swamp					X	X
Acidic cliff	X	X	X			
Agricultural land	X	X	X	X		
Calcareous fen	X	X	X			
Circumneutral broadleaf swamp						
Coldwater fishes	X	X	X		X	X
Coniferous forest	X	X	X	X		
Deciduous forest	X	X	X	X	X	X
Forested wetland	X	X	X	X	X	X
Hemlock forest	X	X	X	X		
Limestone bedrock	X	X	X	X	X	
Major migratory bird flyway	X	X	X	X	X	X
Migratory fishes	X	X	X	X	X	X
Mixed forest	X	X	X	X		
Palustrine emergent wetland	X	X	X	X		
Prime farmlands	X	X	X	X	X	X
Rocky summit outcrops					X	X
Scrub shrub	X	X	X	X	X	X
Scrub shrub wetland	X	X	X		X	X
Special-status species—aquatic[a]	X	X	X	X	X	X
Special-status species—plants[a]	X	X	X	X	X	X
Special-status species—terrestrial[a]	X	X	X	X	X	X
Surface waters	X	X	X	X	X	X
Talus	X	X	X	X	X	X
Unique farmland	X	X	X			
Vernal pools	X	X	X			
Warmwater fishes	X	X	X	X		
Within 100-year floodplain	X	X	X	X		

a. Special-status species that are present or could be found based on the presence of suitable habitat.

APPA extends from Georgia to Maine, with approximately 27 miles within DEWA atop the Kittatinny Ridge. Kittatinny Ridge, which includes Kittatinny Mountain in New Jersey and Blue Mountain in Pennsylvania, is a 185-mile ridge that winds through Western New Jersey and eastern and central Pennsylvania south to the Maryland state line.

Outside the study area, the S-R Line could cross through seven counties in Pennsylvania: Carbon, Lackawanna, Luzerne, Monroe, Northampton, Pike, and Wayne. Three counties in New Jersey could be crossed outside the study area: Morris, Sussex, and Warren. Outside the study area, the NPS cannot require the applicant to follow a certain route; therefore, the portion of the route outside the study area is not discussed in detail in this chapter.

GEOLOGIC RESOURCES

GEOLOGY

DEWA lies within the two physiographic provinces – the Appalachian Plateau and the Valley and Ridge. The Appalachian Plateau is known locally as the Pocono Plateau and is characterized with enlarged stream valleys and rounded hills. The Valley and Ridge includes the river lowlands or alluvium-filled basins and the low parallel ridges of the valley. The rocks within the park area aggregate more than 8,000 feet in thickness and primarily range in age from the Middle Ordovician to the Upper Devonian, approximately 440 to 380 million years ago. The structure in the rocks and the resulting landscape features trend northeastward. (Epstein 2001).

Appendix G-1 presents generalized stratigraphic column of the geologic units of DEWA. The major formations are presented to show the range of alternatives that cross inside the study area and the periods in which these formations occurred. Descriptions and properties, including drainage, ease of excavation, and foundation stability for each formation, are included in the table. Overall geology of DEWA is presented on figure 10 and supplemented for DEWA on figure 11. A generalized cross section of the DEWA area is included as figure 12. The locations of the geologic formations along each alternative are shown in figures 13 through 16. Figures 17 through 19 depict the slopes associated with the alternatives. The slopes were assessed in three categories (slopes less than 10%, slopes from 10 to 30%, and slopes greater than 30%) and were based on common slope stability designations.

In the northern two-thirds of DEWA, the Delaware River flows along the eastern edge of a Devonian formation of Mahantango shale, which is dissected by streams flowing from the Pocono Plateau. Waterfalls are frequent features of these tributary streams. The southern third of DEWA includes the project study area and has more complex geology. At Wallpack Bend, the river cuts through the Hogback Ridge, which is composed of Devonian Buttermilk Falls limestone, and then follows the southeastern edge of the Silurian Bossardsville limestone formation to where it cuts through the Shawangunk formation of the Kittatinny Mountains to form the water gap. The area was covered by ice during the last Wisconsin glaciations. The Delaware River valley and tributary streams are characterized by glaciofluvial deposits which comprise and outwash terrace. Kames and kame terraces occur intermittently at the base of the valley walls, which were formed as the ice front retreated north (NPS 1987, 105-106).

There is a database that was developed from the bedrock and surficial geologic mapping by the US Geological Survey, New Jersey Geological Survey and the Pennsylvania Geological Survey which identifies three types of landslides within DEWA; two of these have recently occurred close and to the north of the project study area. A soil slip occurred near just south of Wallpack Bend following a heavy rain in 1995. Here bedding planes of the Bloomsburg Red Beds are covered with a thin veneer of soil and glacial till in a moderately dipping northwest limb of an anticline in the Valley and Ridge province. The combination of heavy rain and lack of anchoring of the soil by tree roots that did not penetrate the polished bedrock surface resulted in the landslide. A debris flow in rain-saturated glacial till developed along the steep bank of Brodhead Road in Pennsylvania in 1996. Glacial till is common throughout the area and landslides may be anticipated in areas where the bases of steep slopes are excavated. Two rockfalls occurred in New Jersey where Old Mine road parallels longitudinal joints near the crest of the anticline just north of Delaware Water Gap and on the northwest limb of an anticline opposite Tocks Island. These fractures are common in bedrock throughout DEWA. Additionally, stress measurements by the US Army Corps of Engineers on the northwest-dipping bedding-plane faults in New Jersey near Tocks Island imply the fact that there is potential for massive failure of rock above these structures should they be exposed by construction (Epstein 2001).

Groundwater: Groundwater is water located beneath the ground surface in soil pore spaces and in the fractures and conduits of rock formations. The overall thickness of most of the water bearing units in the DEWA area are 800 feet deep; however, there is a lack of water bearing fractures and conduits below 500 feet. The water table is an expression of the overall topography of the area and can be found relatively close to the surface in low lying areas, and deeper throughout the uplands. Wells in the area of Warren County, NJ have depths of water that range from 35 feet to 600 feet below ground surface (Carswell and Lloyd 1979).

Paleontology: Paleontological resources are defined as the fossils of plants, animals, or their traces, including both mineral and organic remains of either a body or a trace. Paleontological resources are studied in the context of the geological data associated with the fossil, providing clues as to the ancient environment, or paleogeological context.

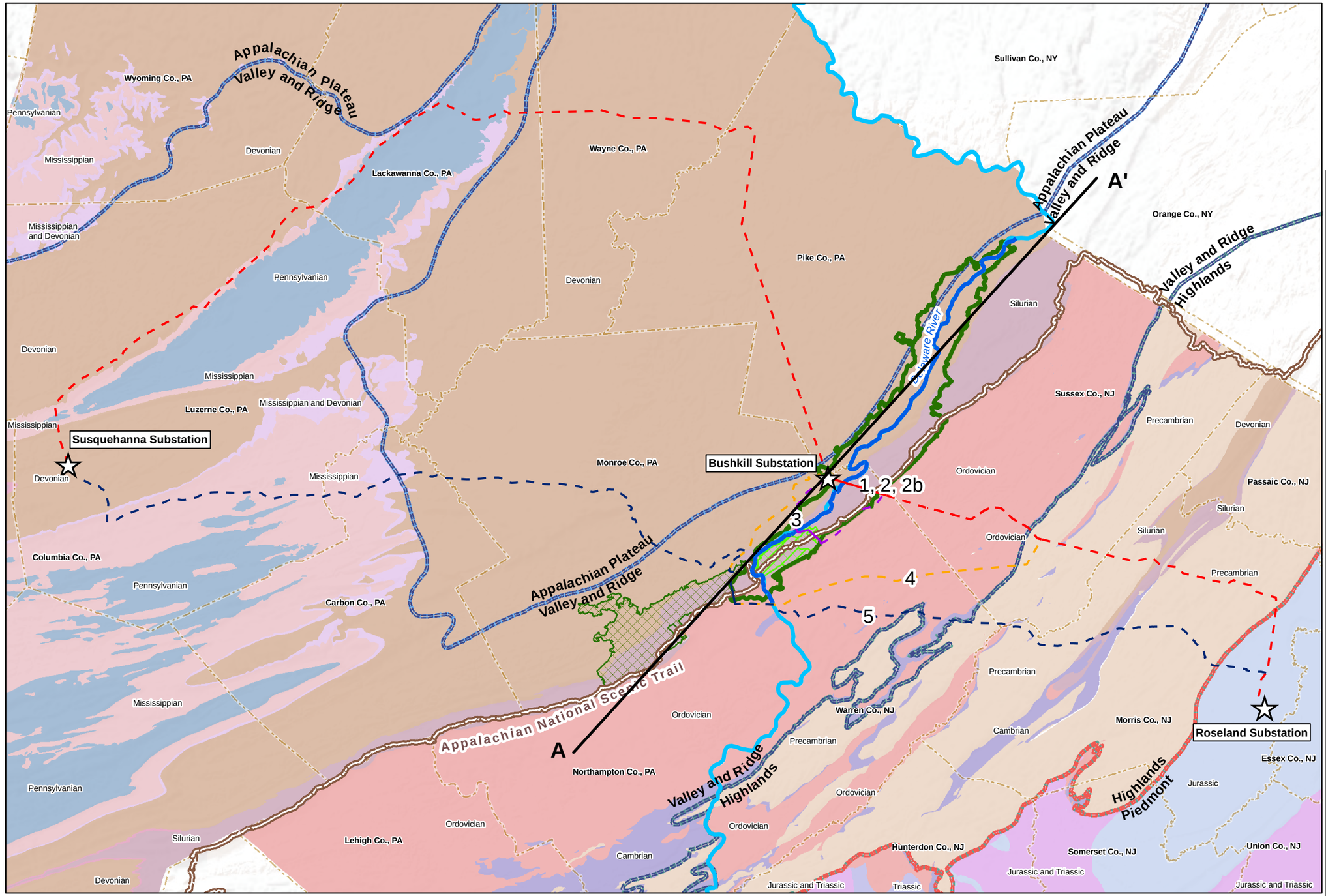
Certain geologic formations tend to contain higher numbers of paleontological specimens. Several of the geologic formations found within the study area are rich in fossils. There are also several known paleontological sites within the study area. Specimens have been collected within some of these sites, providing further knowledge of the paleontological resources found within the study area. Species collected from the study area indicate a rich Paleozoic fossil record, and a more sparse Pleistocene fossil record, though fossils from this era have been underexplored within DEWA (NPS 2004a, 19).

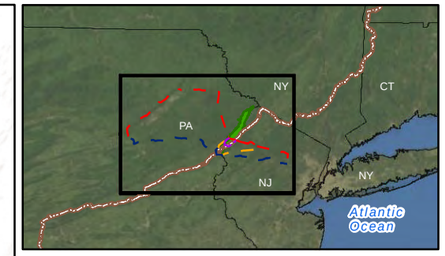
Fossiliferous formations include the Martinsburg, Bloomsburg, Decker, Coeymans, Buttermilk Falls Limestone, and Mahantango formations. All these formations are found along the alignments for alternatives 1, 2, 2b and 3. Four of these formations are found along the proposed corridor for alternative 4, and two along alternatives 5 (appendix G-2).

Rare or Unique Geologic Features: The New Jersey Geological Survey documents a large number of karst features found on the New Jersey side of DEWA. Karst features include sinkholes, sinking streams, spring and a few very small caves. Most of these are found in the middle section of Wallpack Ridge in Onondaga Formation. Onondaga limestone is susceptible to dissolution by water. It is approximately 270 feet thick and contains the Buttermilk Falls Limestone and the Onondaga Limestone. In addition to the Onondaga Formation, other Devonian formations containing limestone can also be present in the area, such as the Ridgeley Formation, and Silurian formations such as the Decker Formation. (NJDEP 2006). The presence of limestone has contributed to the development of plant communities as discussed in the "Rare and Unique Communities" section of this chapter.

The mapped units considered rare or unique within the study area are the Buttermilk Falls Limestone through Esopus Formation, undivided, the Ridgeley Formation through Coeymans Formation, undivided, and the Decker Formation through Poxono Island Formation, undivided. Individual formations within these groups contain varying amounts of carbonate material. Descriptions of these formations are provided in appendix G-1.

Arnott Fen is a calcareous wetland within DEWA that is close to Bushkill, Pennsylvania and within the project study area. A calcareous fen arises out of the unique geological conditions that foster a unique biological community. The Hogback Ridge area of Pennsylvania and New Jersey is considered to be a unique and important habitat containing distinctive geology, which is dominated by limestone and exposed in many areas. Hogback Ridge occurs to the east of Arnott Fen and is also within the project study area.





Legend

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

Physiographic Province

- Appalachian Plateau
- Valley and Ridge
- Highlands
- Piedmont

Geologic Age

- Cambrian
- Devonian
- Devonian into Silurian
- Jurassic
- Triassic into Jurassic
- Mississippian
- Mississippian into Devonian
- Ordovician
- Pennsylvanian
- Proterozoic
- Quaternary
- Silurian
- Triassic

A - A' Cross-section Line

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

0 8 16
Miles

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

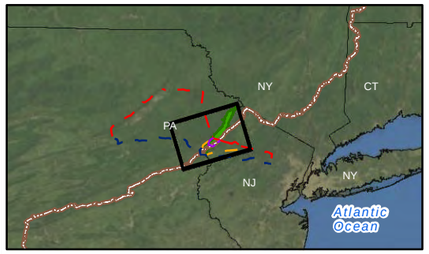
Figure 10
Alternative Overview Geologic Map

Source: ESRI Streetmap 2006;
PASDA 2005, 2010;
ESRI ArcGISonline Map Service 2010;
USGS 1946, 2006; NJ DEP 2002, 2008

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

Geology

- Bloomsburg Red Beds= Sb
- Bossardville Limestone= Sbv
- Buttermilk Falls Limestone through Esopus Formation, undivided= Dbe
- Buttermilk Falls Limestone= Db
- Catskill Formation, Towamensing Member= Dct
- Catskill Formation, Walcksville Member= Dcw
- Decker Formation through Poxono Island Formation, undivided= Sdp
- Esopus Formation= De
- Kalkberg Limestone, Coeymans Limestone, Manlius Limestone, undivided= Dkc
- Mahantango Formation= Dmh
- Marcellus Shale= Dm
- Martinsburg Formation, Graywacke and shale= Omgs
- Martinsburg Formation= Om
- Minisink Limestone and New Scotland Formation, undivided= Dmn
- Oriskany Group= Do
- Port Ewen Shale= Dp
- Poxono Island Formation= Sp
- Ramseyburg Member= Omr
- Ridgeley Formation through Coeymans Formation, undivided= Drc
- Rondout and Decker Formations, undivided= DSrd
- Schoharie Formation= Ds
- Shawangunk Formation= Ss
- Trimmers Rock Formation= Dtr



Legend

- Substation
- Alternative 2, 2b
- Alternative 3
- Alternative 4
- Alternative 5
- Appalachian National Scenic Trail
- Middle Delaware National Scenic & 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

Pike Co., PA
Monroe Co., PA
Sussex Co., NJ
Warren Co., NJ
Northampton Co., PA
Appalachian National Scenic Trail
1, 2, 2b
3
4
4,5
5

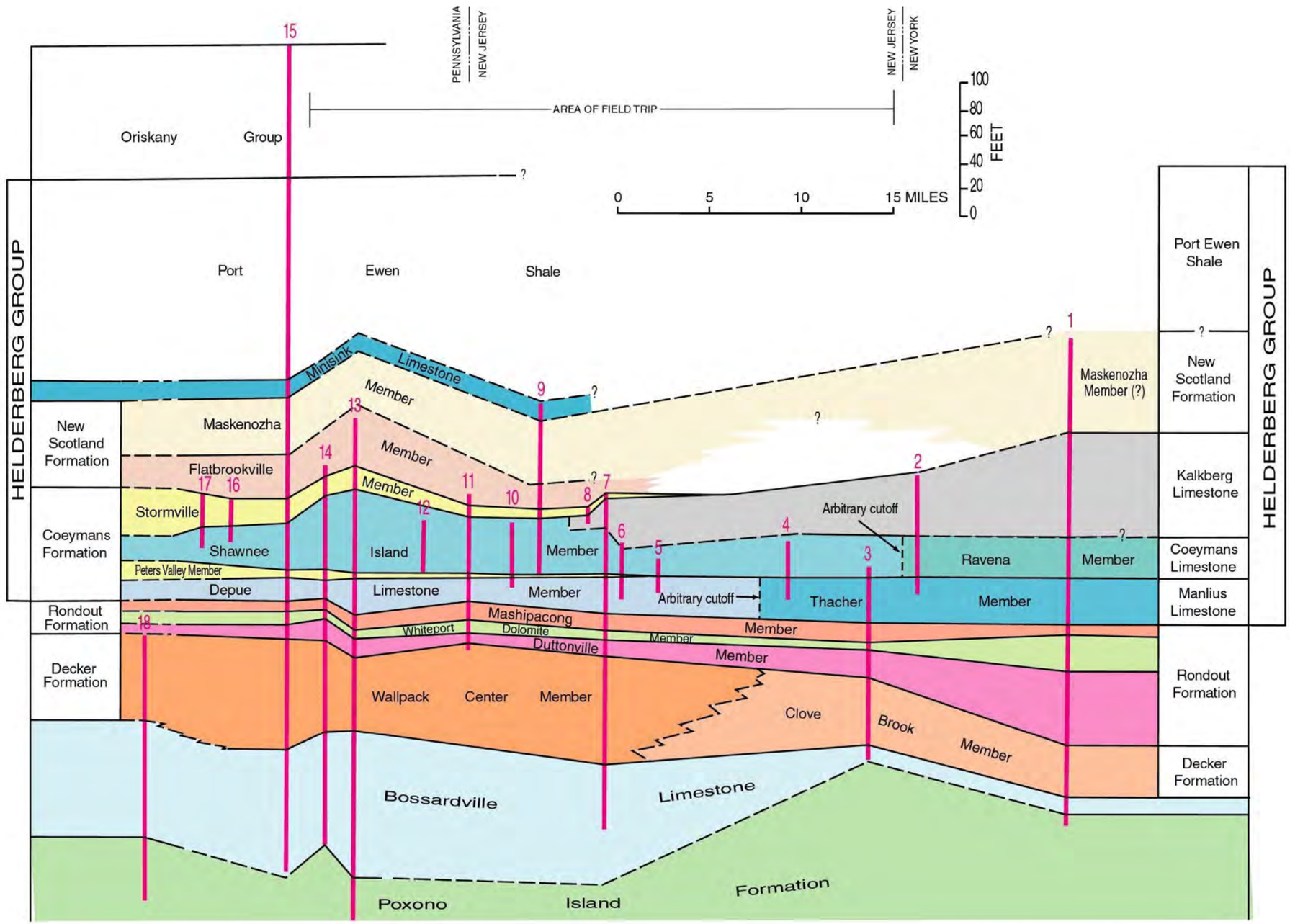
0 3 6
Miles

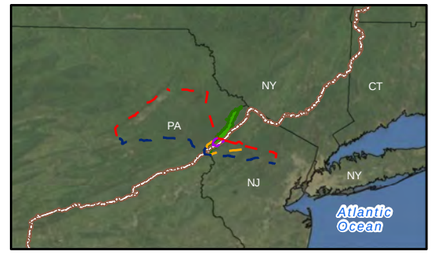
Susquehanna to Roseland Transmission Line Proposal and Right-of-Way Request EIS

Figure 11
Geologic Map of DEWA

Source: ESRI Streetmap 2006;
PASDA 2005, 2010;
ESRI ArcGISonline Map Service 2010;
USGS 1946, 2006; NJ DEP 2002, 2008

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



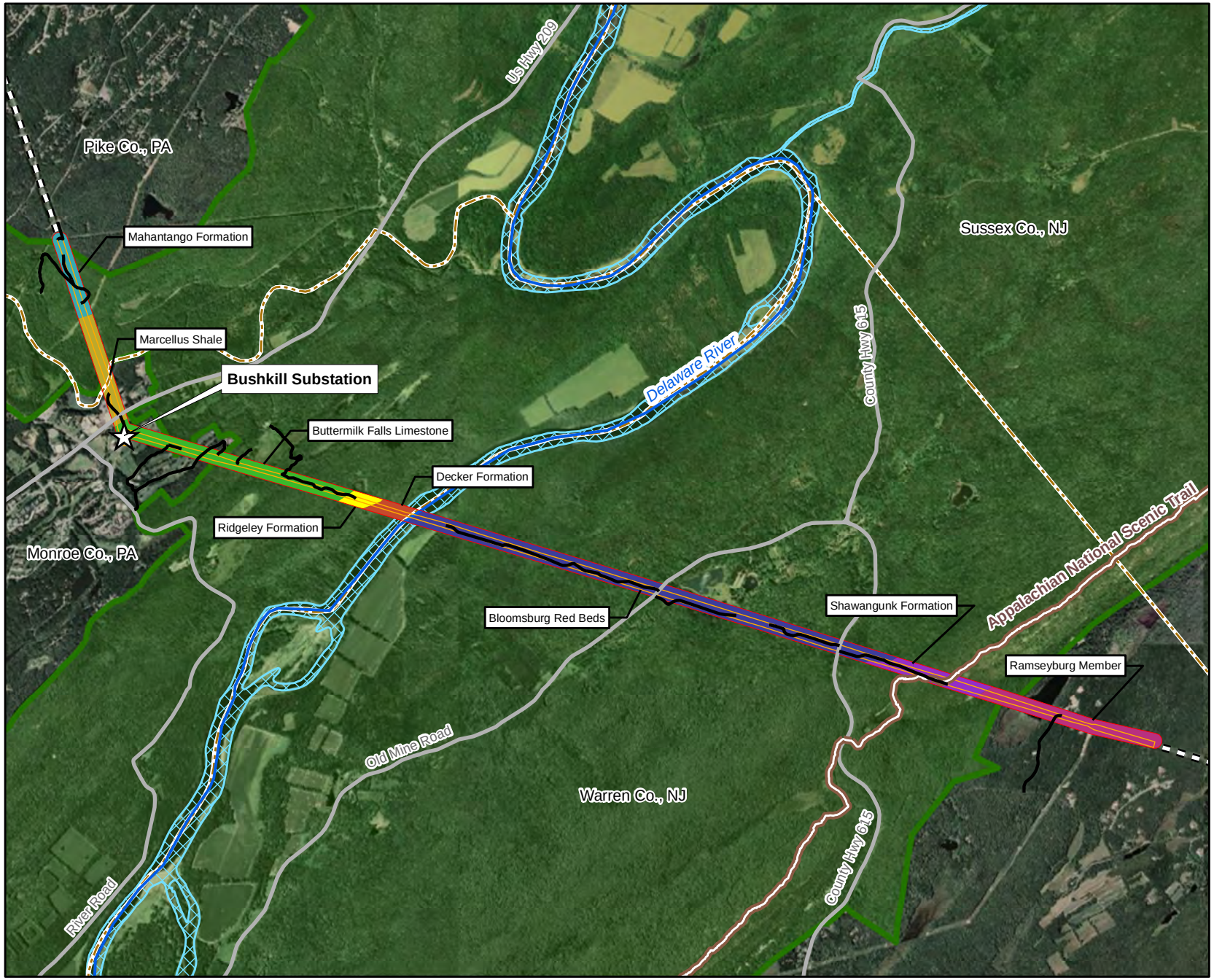


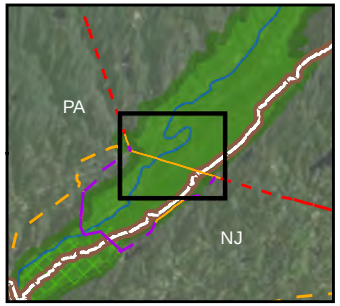
Susquehanna to Roseland
Transmission Line Proposal
and
Right-of-Way Request EIS

Figure 12
Regional Geological Cross-Section

Source: 66th Annual Conference of Pennsylvania Geologist Field Guide

Date: October, 2011





Legend

- Substation
- Outside Study Area
- Existing ROW in Study Area
- 350 ft Corridor
- 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

Geology

- Bloomsburg Red Beds
- Buttermilk Falls Limestone
- Decker Formation
- Mahantango Formation
- Marcellus Shale
- Ramseyburg Member
- Ridgeley Formation
- Shawangunk Formation

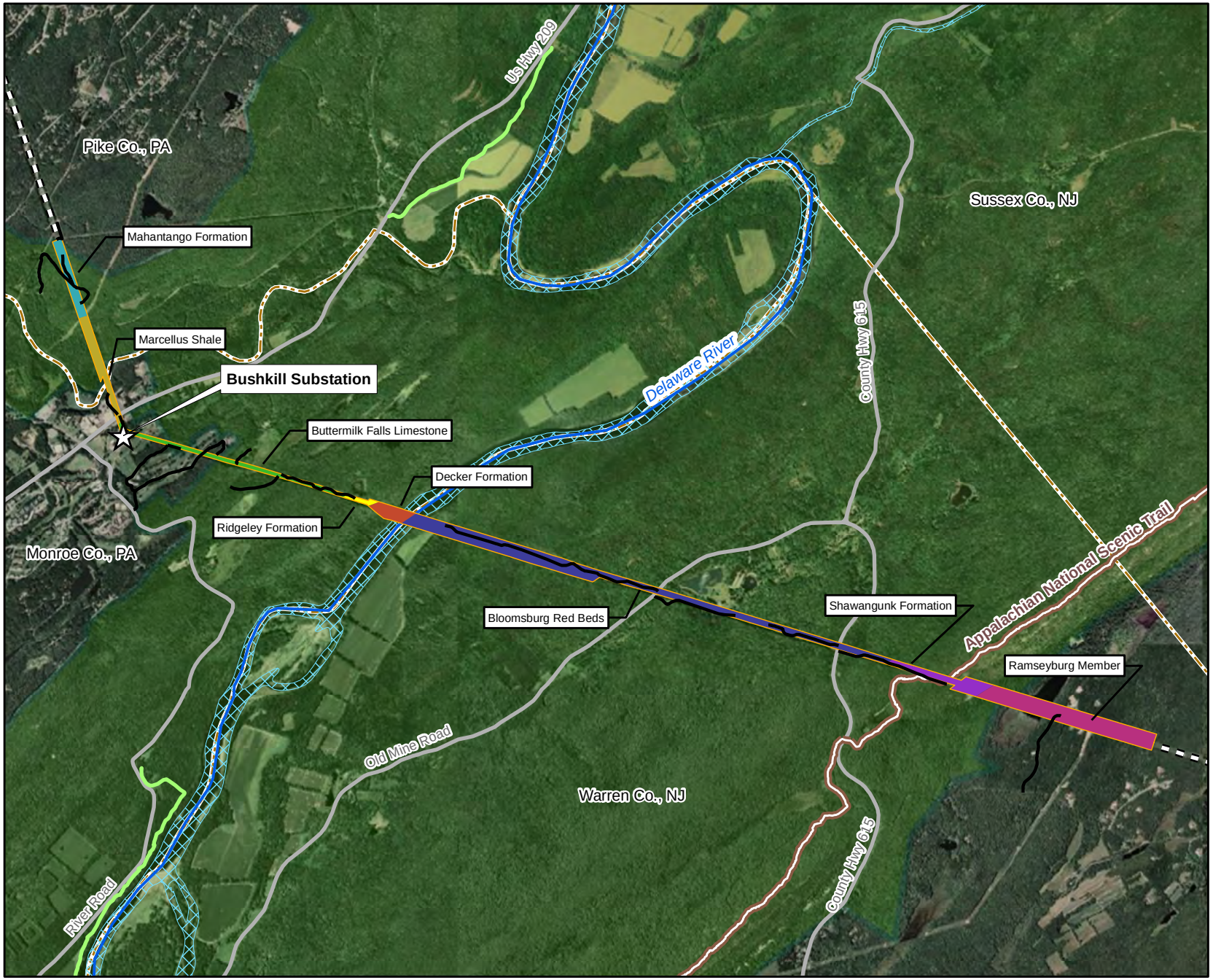
0 2,000 4,000
Feet

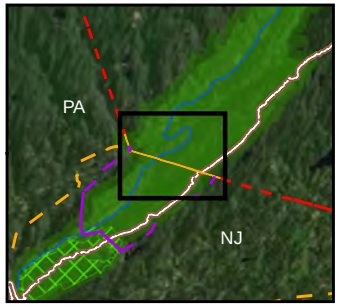
Susquehanna to Roseland
Transmission Line Proposal
and
Right-of-Way Request EIS

Figure 13
Alternative 2 Geology

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
- Outside Study Area
- Alternative 2b Corridor
- Appalachian National Scenic Trail
- McDadeTrail
- Delaware River
- Proposed Access Road
- Road
- Delaware Water Gap National Recreation Area
- Middle Delaware National Scenic and Recreational River
- County Line

Geology

- Bloomsburg Red Beds
- Buttermilk Falls Limestone
- Decker Formation
- Mahantango Formation
- Marcellus Shale
- Ramseyburg Member
- Ridgeley Formation
- Shawangunk Formation

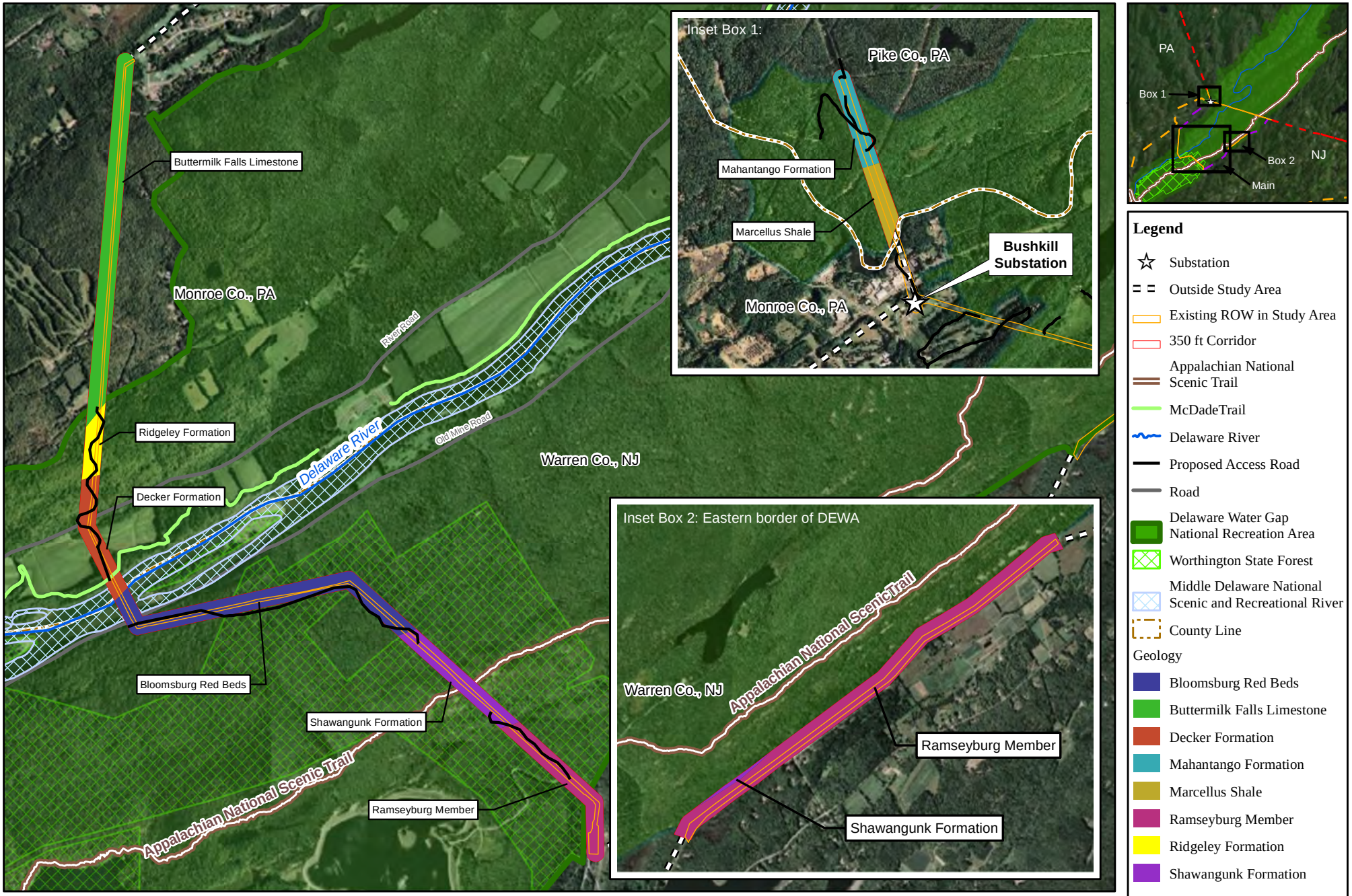
0 2,000 4,000
Feet

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

Figure 14
Alternative 2b Geology

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

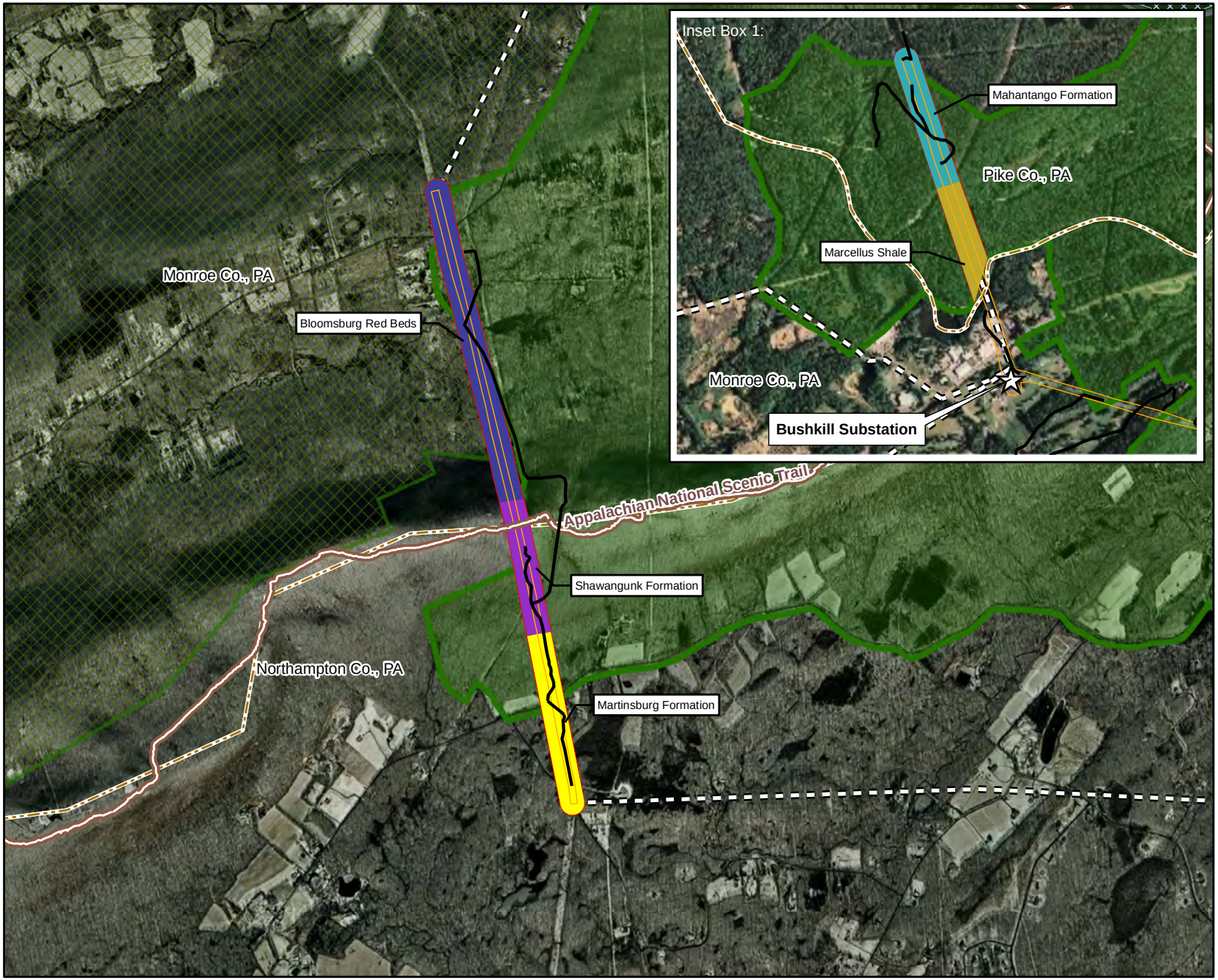


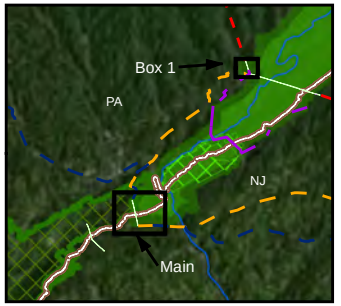
Susquehanna to Roseland
Transmission Line Proposal
and
Right-of-Way Request EIS

Figure 15
Alternative 3 Geology

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
- Outside Study Area
- Existing ROW in Study Area
- 350 ft Corridor
- Appalachian National Scenic Trail
- Delaware River
- Proposed Access Road
- Delaware Water Gap National Recreation Area
- CVNWR Boundary
- County Line

Geology

- Bloomsburg Red Beds
- Martinsburg Formation
- Shawangunk Formation
- Mahantango Formation
- Marcellus Shale

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

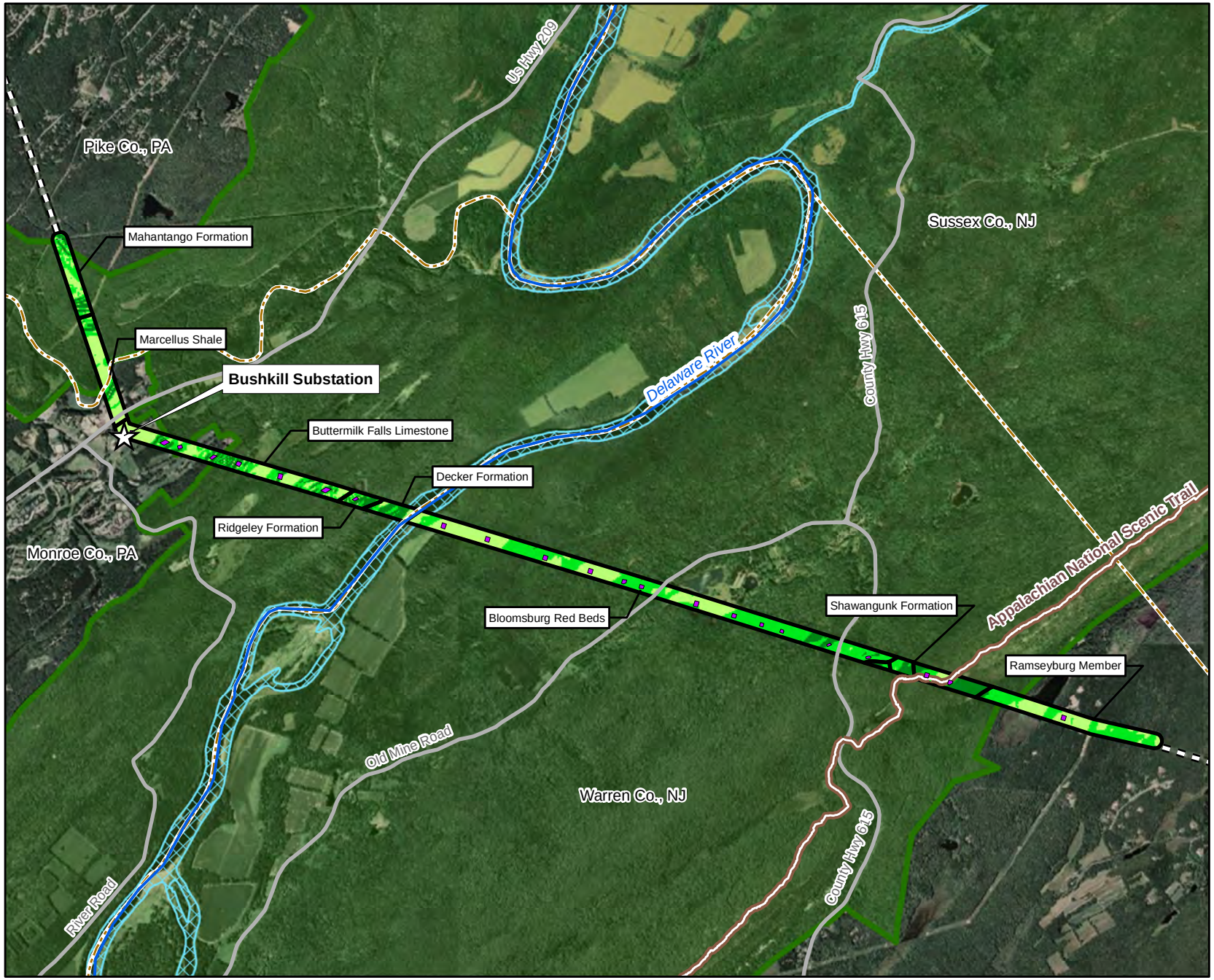
0 1,000 2,000
Feet

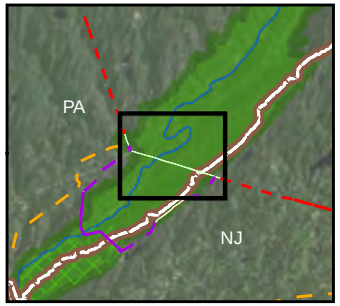
Susquehanna to Roseland Transmission Line Proposal and Right-of-Way Request EIS

Figure 16
Alternative 4/5 Geology

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

Slope Percentages

- 0 - 10%
- 11 - 30%
- 31 - 100%

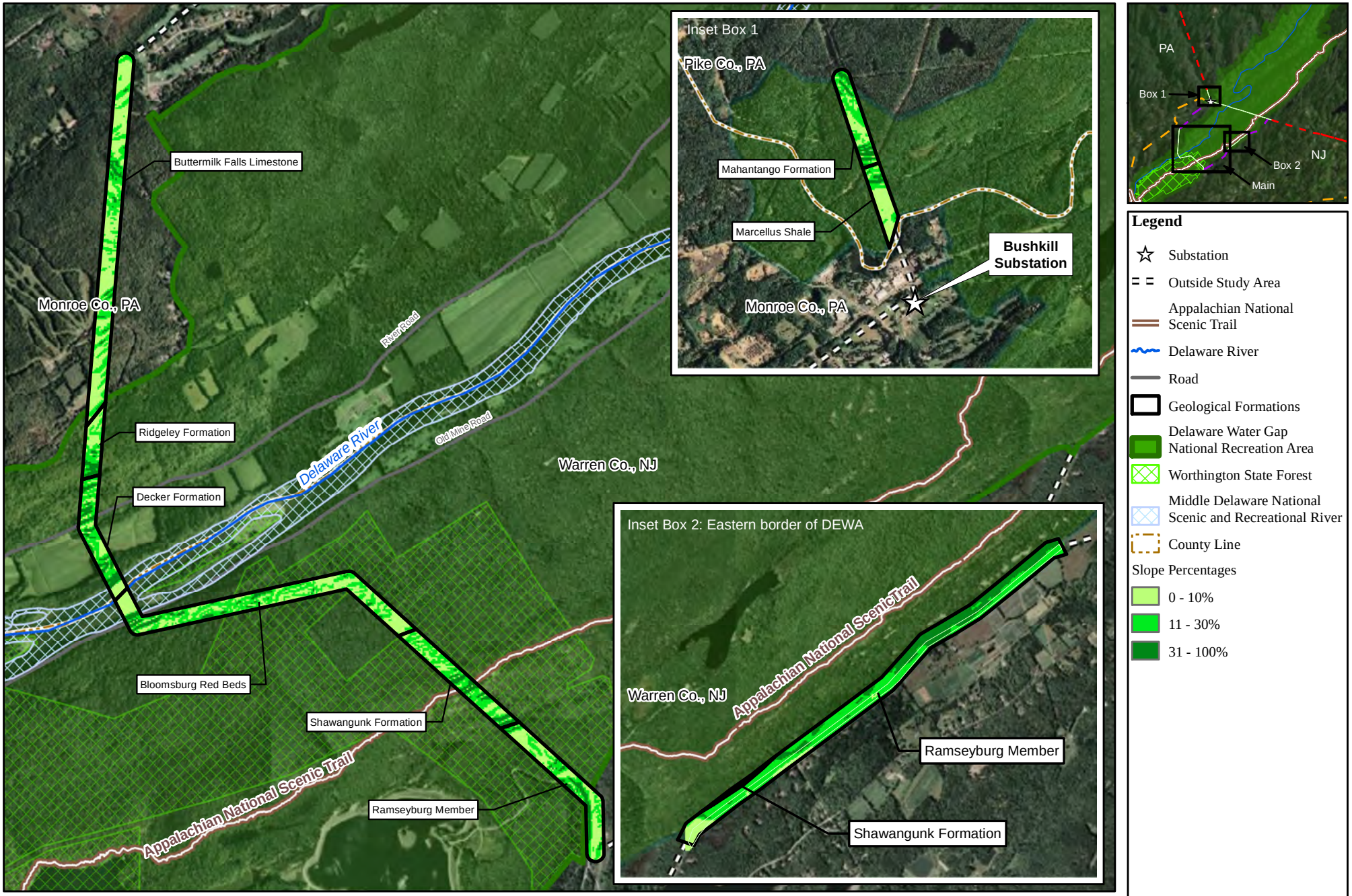
0 2,000 4,000
Feet

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

Figure 17
Alternative 2 Geology and Slopes

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

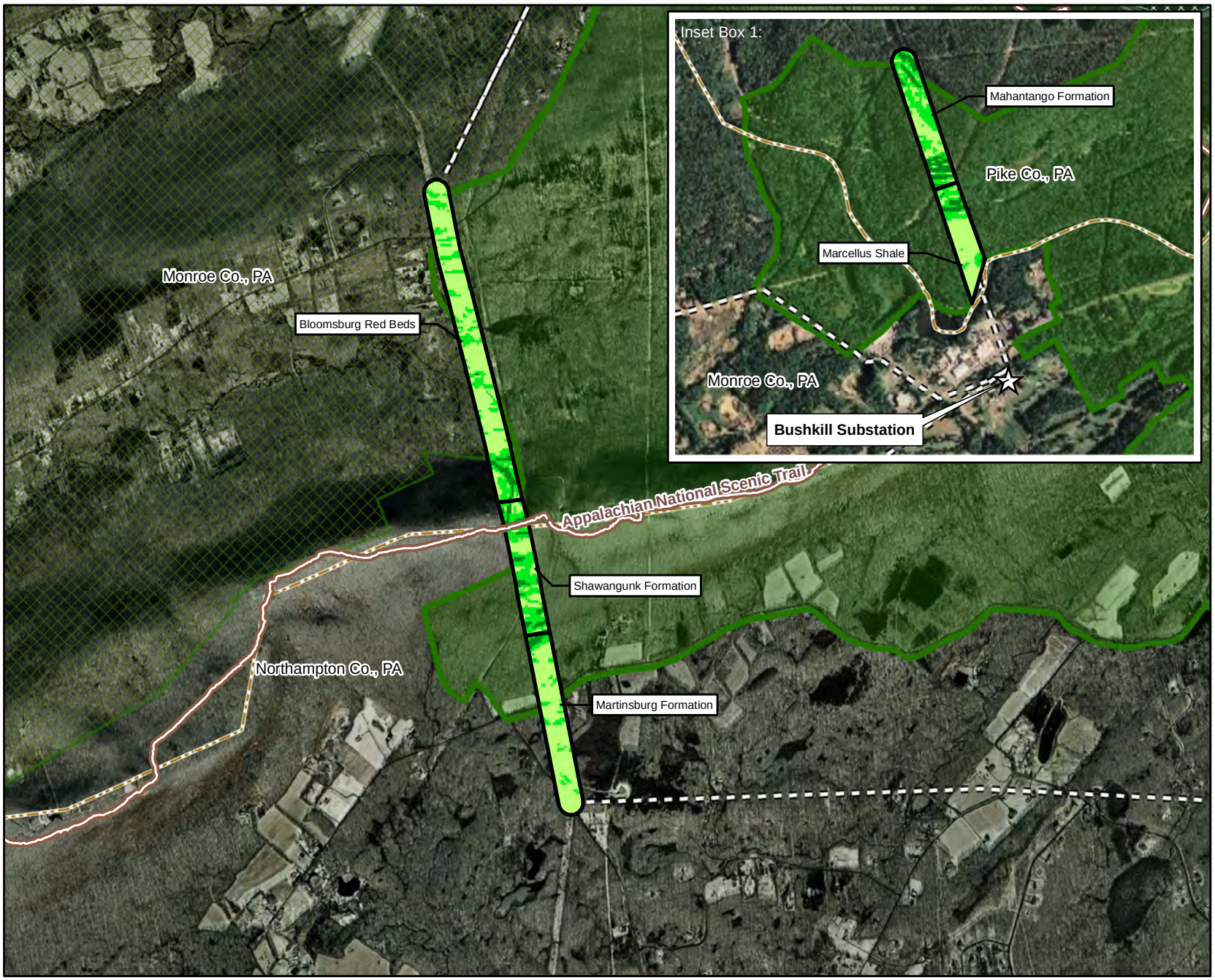


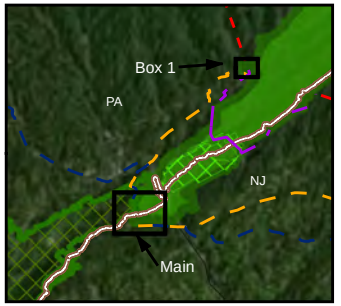
Susquehanna to Roseland Transmission Line Proposal and Right-of-Way Request EIS

Figure 18
Alternative 3 Geology and Slopes

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
- Outside Study Area
- Appalachian National Scenic Trail
- Geological Formations
- Delaware Water Gap National Recreation Area
- CVNWR Boundary

Slope Percentages

- 0 - 10%
- 11 - 30%
- 31 - 100%

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 19
Alternative 4/5 Geology and Slopes

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

OUTSIDE THE STUDY AREA

Appendix G-3 presents the major geologic formations/rock types that the alternatives could cross outside the study area. Descriptions and properties for the formations/rock types are included. Outside the study area to Susquehanna, a range of formations could be crossed by the S-R Line. Geological formations likely to be encountered outside the study area to Susquehanna are those of the Cambrian, Devonian, Mississippian, Ordovician, Pennsylvanian, Precambrian, Quaternary, Silurian, and Triassic ages (figure 10). Geological formations likely to be encountered outside the study area to Roseland are those of the Cambrian, Devonian, Jurassic, Ordovician, Precambrian, Quaternary, Silurian, and Triassic ages (figure 10). Formations outside the study area may contain limestone; therefore, this type of unique geological feature may be crossed by the alternatives outside the study area. None of the major geologic formations listed on in appendix G-3 are considered rare or unique formations; however, appendix G-4 lists the geologic formations containing limestone that may be crossed outside the study area for each alternative. In general, these rare or unique formations occur in less than 5% of the overall counties.

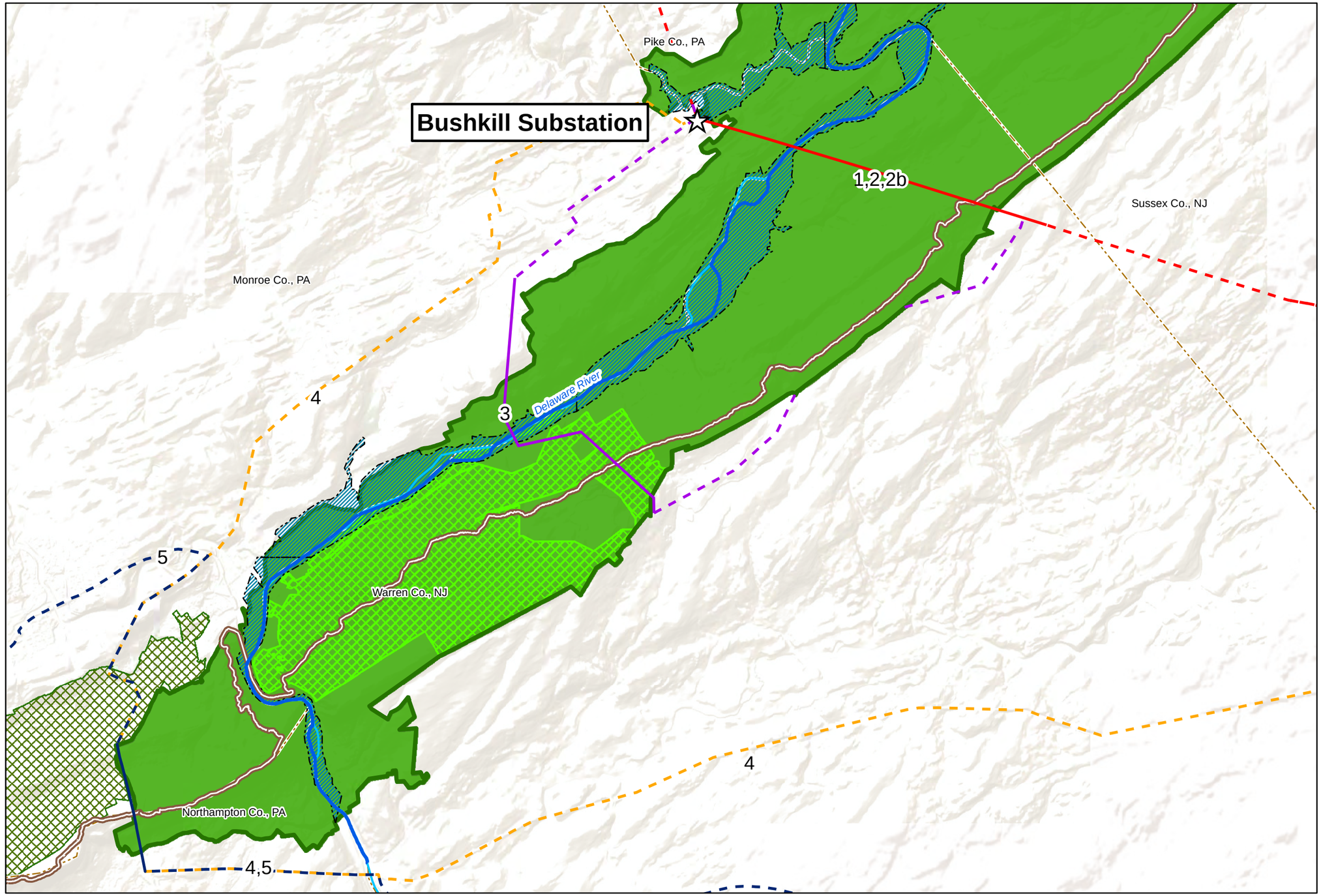
FLOODPLAINS

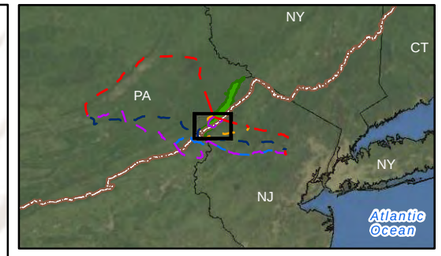
Executive Order 11988, "Floodplain Management," issued May 24, 1977, defines floodplains as "the lowland and relatively flat areas adjoining inland and coastal waters including floodprone areas of offshore islands, including at a minimum, that area subject to a 1% greater chance of flooding in any given year." This floodplain is often called the 100-year floodplain or, more accurately, the 1% annual chance floodplain. The executive order directs all federal agencies to avoid both long- and short-term adverse impacts associated with occupancy, modification, and development in the 1% annual chance floodplain, when possible. This is the flood risk zone regulated through federal, state, and local land use laws. The NPS manages floodplains to preserve floodplain values, minimize potential hazards of flooding, and comply with law (NPS 2006a). Discussions of floodplains in this document refer to the 1% annual chance flood level.

PADEP is the regulating agency responsible for floodplain activities throughout the Commonwealth of Pennsylvania. Pennsylvania state legislation that protects floodplains includes the Dam Safety and Encroachment Act (PL 1375-325), Clean Streams Law (PL 1987-3941) and the Floodplain Management Act (PL 851-166). NJDEP is the governing body that regulates floodplain activities in the State of New Jersey. New Jersey's floodplains are protected by state acts including the Flood Hazard Control Act (NJAC 7.13). State and local communities that participate in the National Flood Insurance Program are required to follow the minimum federal regulations but may also enact stricter local ordinances.

In general, naturally functioning floodplains provide habitat for vegetation and wildlife, provide flood and sedimentation control, support the maintenance of water quality, and aid in transport and deposition of sediment and nutrients within riverine systems. In DEWA, floodplains serve to slow and store water during flooding. Because water on floodplains is slowed significantly, it generally does not cause tree removal or erosion unless ice is present in the flow. Additionally, sediments from floodwater are deposited in floodplains, which keep riverbed habitat (gravels) healthy (NPS 2008a, 1).

Floodplains within the parks were identified using a combination of Federal Emergency Management Agency Flood Insurance Rate Maps and NPS data layers. The floodplain within DEWA and MDSR lies along the entire length of the Delaware River and the confluences of larger tributaries to the Delaware River within the parks in New Jersey and Pennsylvania (figure 20). No floodplains exist within APPA inside the study area. The floodplain zones within the parks support riparian vegetation communities and wetlands. The paragraphs below describe the location of floodplains within the ROWs for alternatives 1 through 5 and outside the study area.





Legend

- Substation
- Alternative 2, 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
- Floodplain
- County Line

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

0 1 2
Miles

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

Figure 20
Alternative Overview Map
Floodplains

Source: ESRI Streetmap 2006, Penn State 2010, ESRI ArcGISonline Map Service 2010, NJOIT 2010, USGS 2006, NJ DEP 2008, NWI 1977

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

ALTERNATIVE 1 (NO ACTION), ALTERNATIVE 2, AND ALTERNATIVE 2b

Within the study area, the alignment for alternatives 1, 2, and 2b would be within the floodplain zone of Big Bushkill and Sand Hill creeks within DEWA and the floodplain zone of the Delaware River within DEWA and MDSR (figures 21 through 24). The ROW for alternatives 1, 2, and 2b would span approximately 700 feet of the floodplain for each watercourse. One tower for the existing B-K Line is currently within a floodplain zone within the ROW for alternatives 1, 2, and 2b.

ALTERNATIVE 3

Within the study area, the proposed transmission line expansion route under alternative 3 within DEWA and MDSR would be constructed within the floodplain zone of the Delaware River (figure 25). The proposed alignment would span approximately 1,320 feet of the floodplain zone just south of Tocks Island, New Jersey. Where the alternative 3 alignment follows the B-K Line, it would cross the floodplain zone of Big Bushkill and Sand Hill creeks.

ALTERNATIVE 4

Within the study area, where the alternative 4 alignment follows the B-K Line, the transmission line would be constructed within the floodplain zone of Big Bushkill and Sand Hill creeks (figure 26).

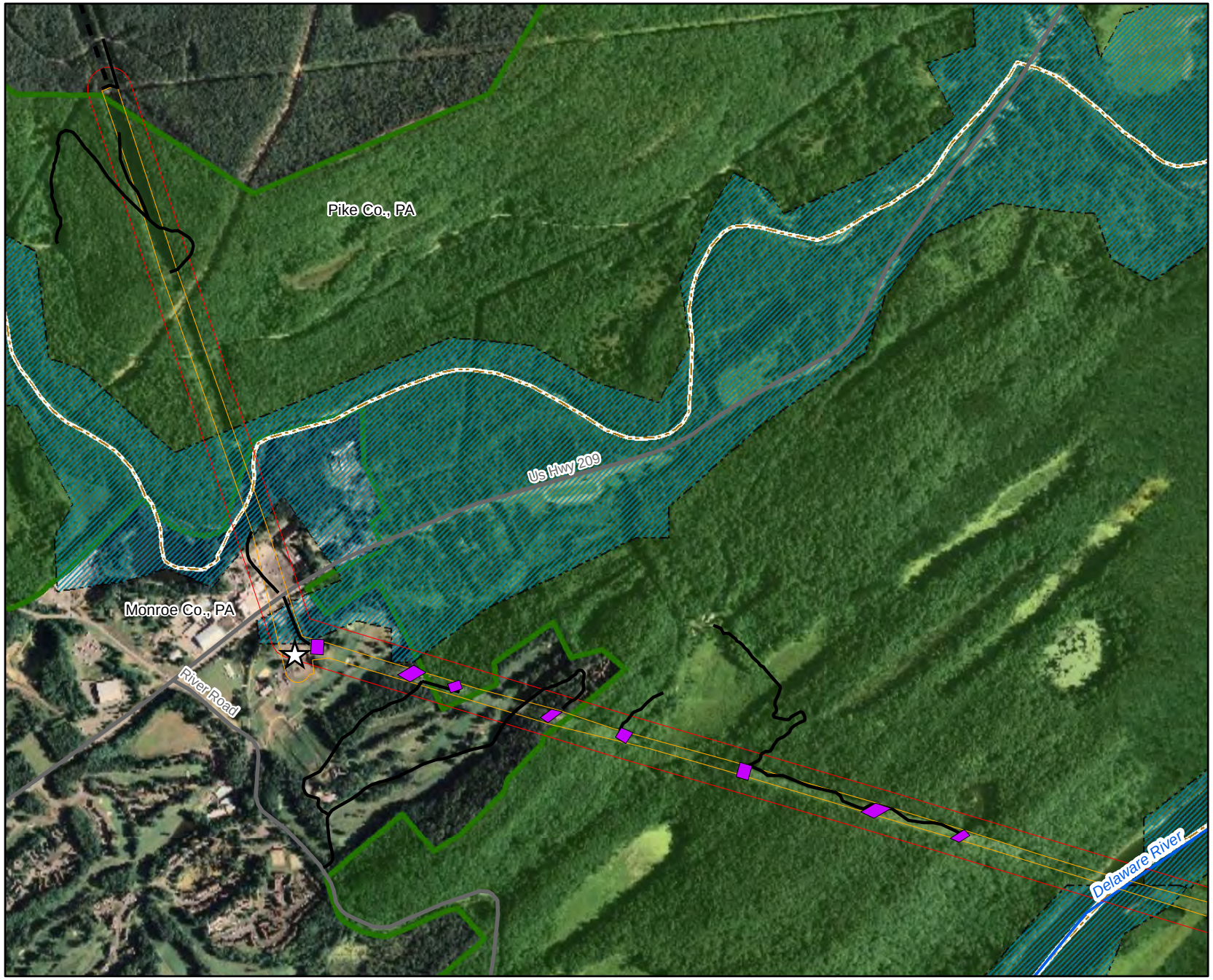
ALTERNATIVE 5

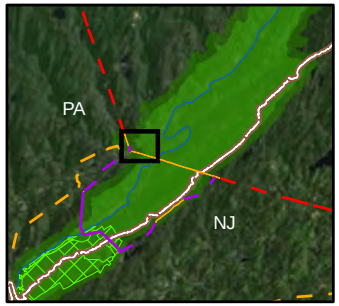
Within the study area, the proposed transmission line expansion route for alternative 5 would not be constructed within any floodplain zones within the boundaries of DEWA and MDSR (figure 26).

OUTSIDE THE STUDY AREA

The Pennsylvania counties outside the study area, Carbon, Lackawanna, Luzerne, Northampton, Monroe, Pike, and Wayne, are rich with surface waters and have floodplains associated with these water bodies. Within these counties, the S-R Line could cross major tributaries of the Delaware River Basin, the Susquehanna River Basin, and the Lehigh River Basin. Some of these tributaries include Bushkill Creek, Cherry Creek, Lackawaxen River, and Marshall Creek in the Delaware River Basin; Big Wapwallopen Creek, Lackawanna River, and the mainstem Susquehanna River in the Susquehanna River Basin; and Jonas Creek, Pond Creek, and Stony Creek in the Lehigh River Basin.

Outside the study area in New Jersey, the S-R Line could cross Morris, Sussex, and Warren counties. In these counties, the route could cross the major tributaries of the Delaware River Basin, the Passaic River Basin, and the Raritan River Basin. Some of these tributaries include the mainstem of the Delaware River, Paulins Kill, Pohatcong Creek, Musconetcong River, and Martins Creek in the Delaware River Basin; Rockaway River, Delawanna Creek, and Whippany River in the Passaic River Basin; and South Branch Raritan River and Lamington River in the Raritan River Basin. The majority of these surface waters have associated floodplains.





Legend

- Substation
- Crane Pad/ Tower Location
- Outside Study Area
- Existing ROW in Study Area
- 350 ft Corridor
- Appalachian National Scenic Trail
- Delaware River
- Proposed Access Road
- Road
- Delaware Water Gap National Recreation Area
- Floodplain
- County Line

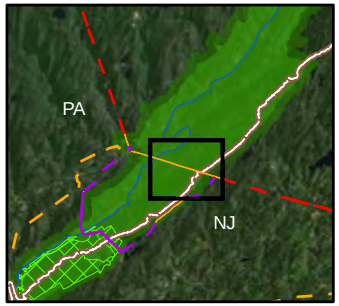
0 500 1,000
Feet

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

Figure 21
Alternative 2 Floodplains in Pennsylvania

Source: ESRI Streetmap 2006, Penn State 2010,
ESRI ArcGISonline Map Service 2010,
PennDOT 2011, USGS 2006,
NJ DEP 2008, NWI 1977

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



Legend

- Substation
- Crane Pad/ Tower Location
- Outside Study Area
- Existing ROW in Study Area
- 350 ft Corridor
- Appalachian National Scenic Trail
- Delaware River
- Proposed Access Road
- Road
- Delaware Water Gap National Recreation Area
- Floodplain
- County Line

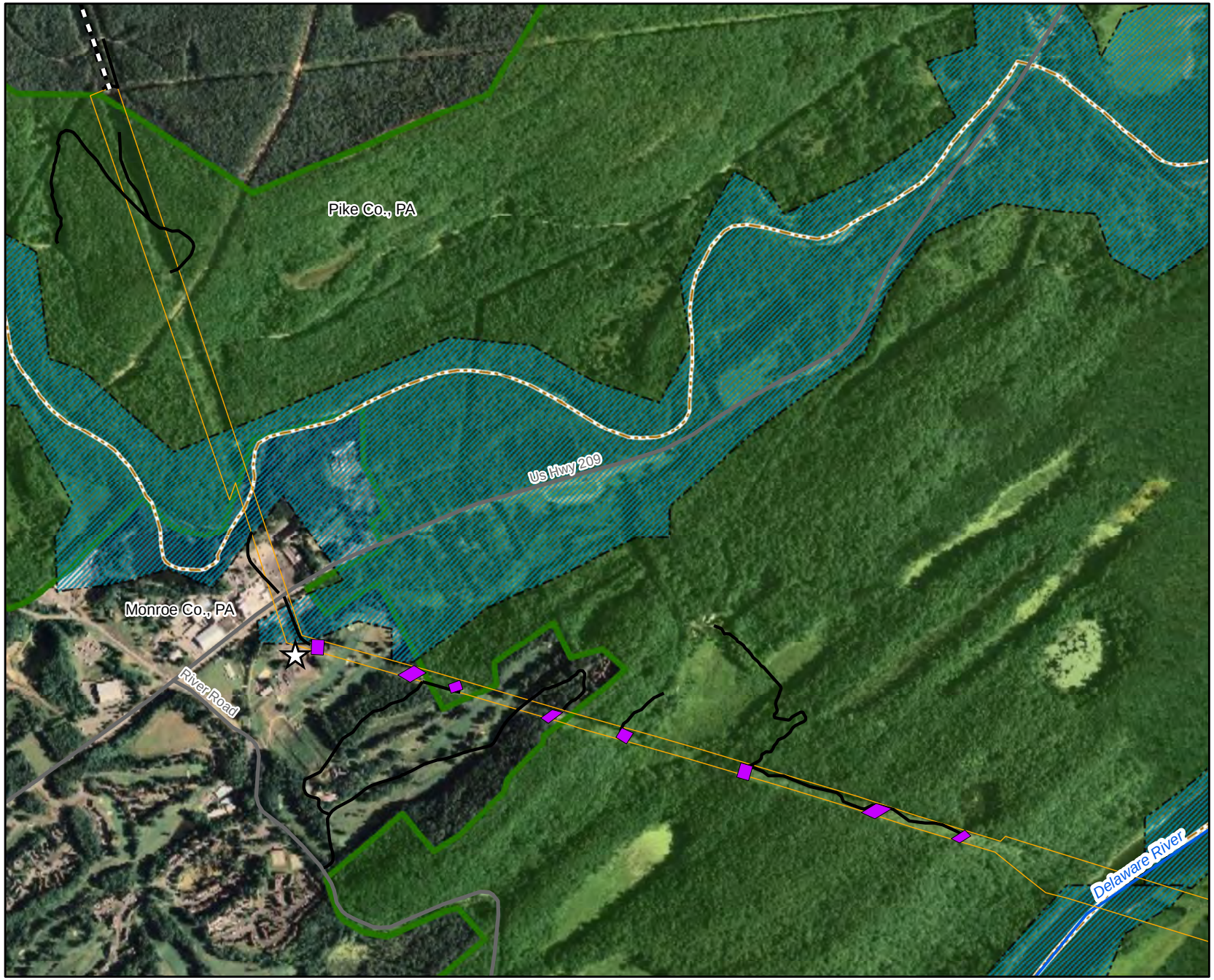
0 1,000 2,000
Feet

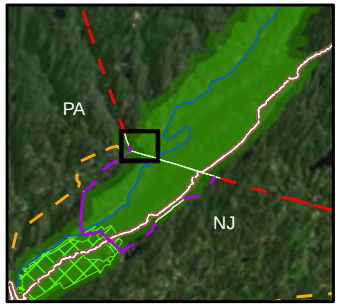
Susquehanna to Roseland Transmission Line Proposal and Right-of-Way Request EIS

Figure 22
Alternative 2 Floodplains in New Jersey

Source: ESRI Streetmap 2006, Penn State 2010, ESRI ArcGISonline Map Service 2010, PennDOT 2011, USGS 2006, NJ DEP 2008, NWI 1977

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





Legend

- Substation
- Crane Pad/ Tower Location
- Outside Study Area
- Alternative 2b Corridor
- Appalachian National Scenic Trail
- Delaware River
- Proposed Access Road
- Road
- Delaware Water Gap National Recreation Area
- Floodplain
- County Line

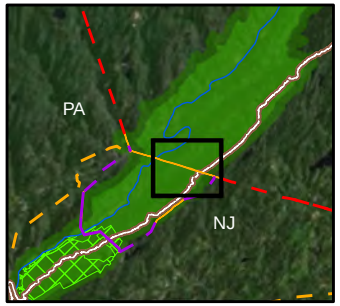
0 500 1,000
Feet

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

Figure 23
Alternative 2b Floodplains in Pennsylvania

Source: ESRI Streetmap 2006, Penn State 2010, ESRI ArcGISonline Map Service 2010, PennDOT 2011, USGS 2006, NJ DEP 2008, NWI 1977

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



Legend

- Substation
- Crane Pad/ Tower Location
- Outside Study Area
- Alternative 2b Corridor
- Appalachian National Scenic Trail
- Delaware River
- Proposed Access Road
- Road
- Delaware Water Gap National Recreation Area
- Floodplain
- County Line

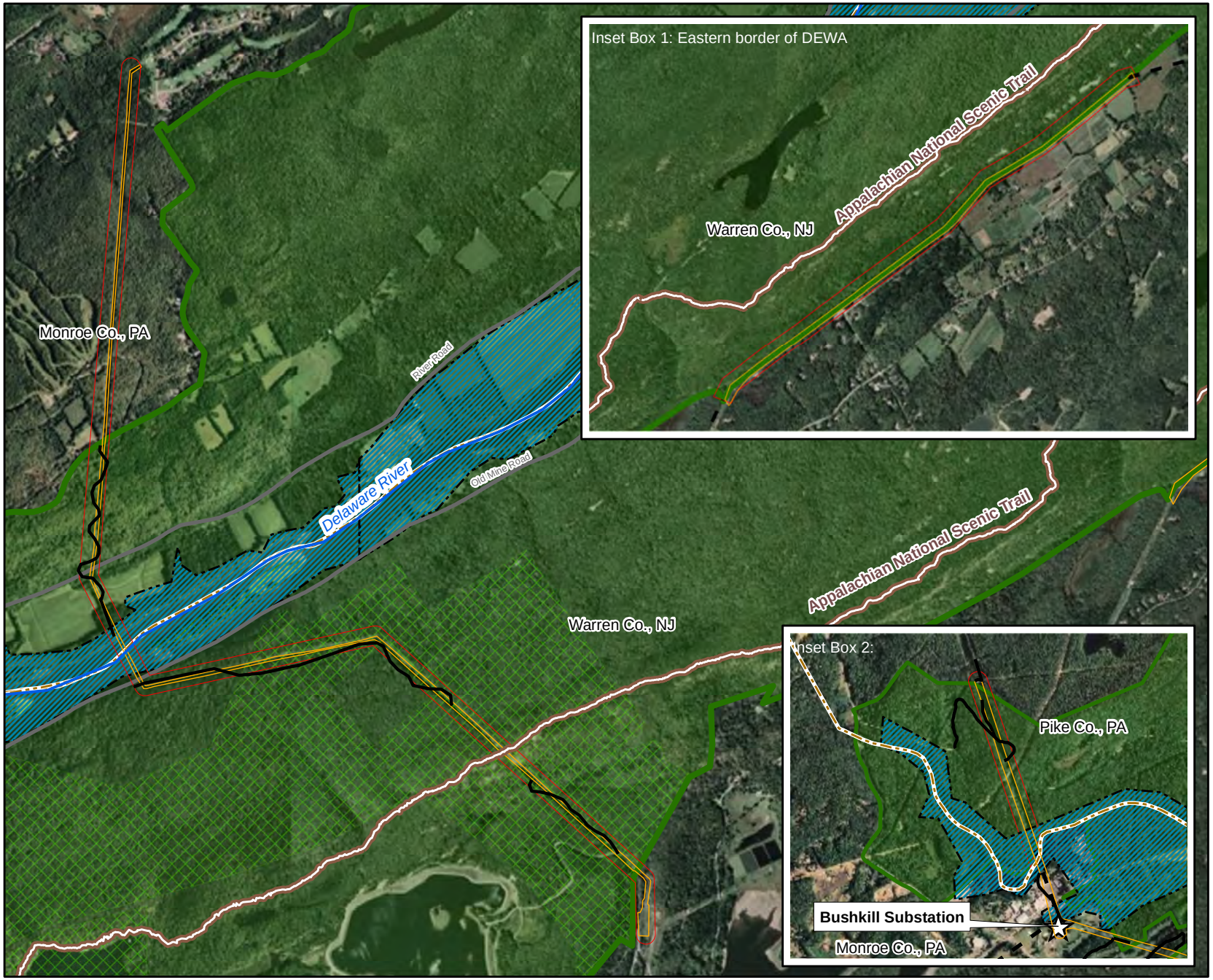
0 1,000 2,000
Feet

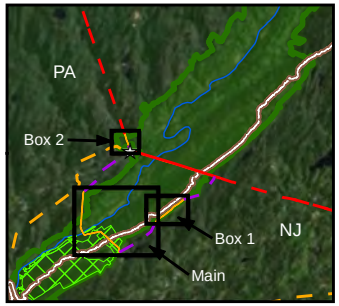
Susquehanna to Roseland Transmission Line Proposal and Right-of-Way Request EIS

Figure 24
Alternative 2b Floodplains in New Jersey

Source: ESRI Streetmap 2006, Penn State 2010, ESRI ArcGISonline Map Service 2010, PennDOT 2011, USGS 2006, NJ DEP 2008, NWI 1977

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





Legend

- Substation
- Existing ROW in Study Area
- 350 ft Corridor
- Appalachian National Scenic Trail
- Delaware River
- Proposed Access Road
- Road
- Delaware Water Gap National Recreation Area
- Worthington State Forest
- Floodplain
- County Line

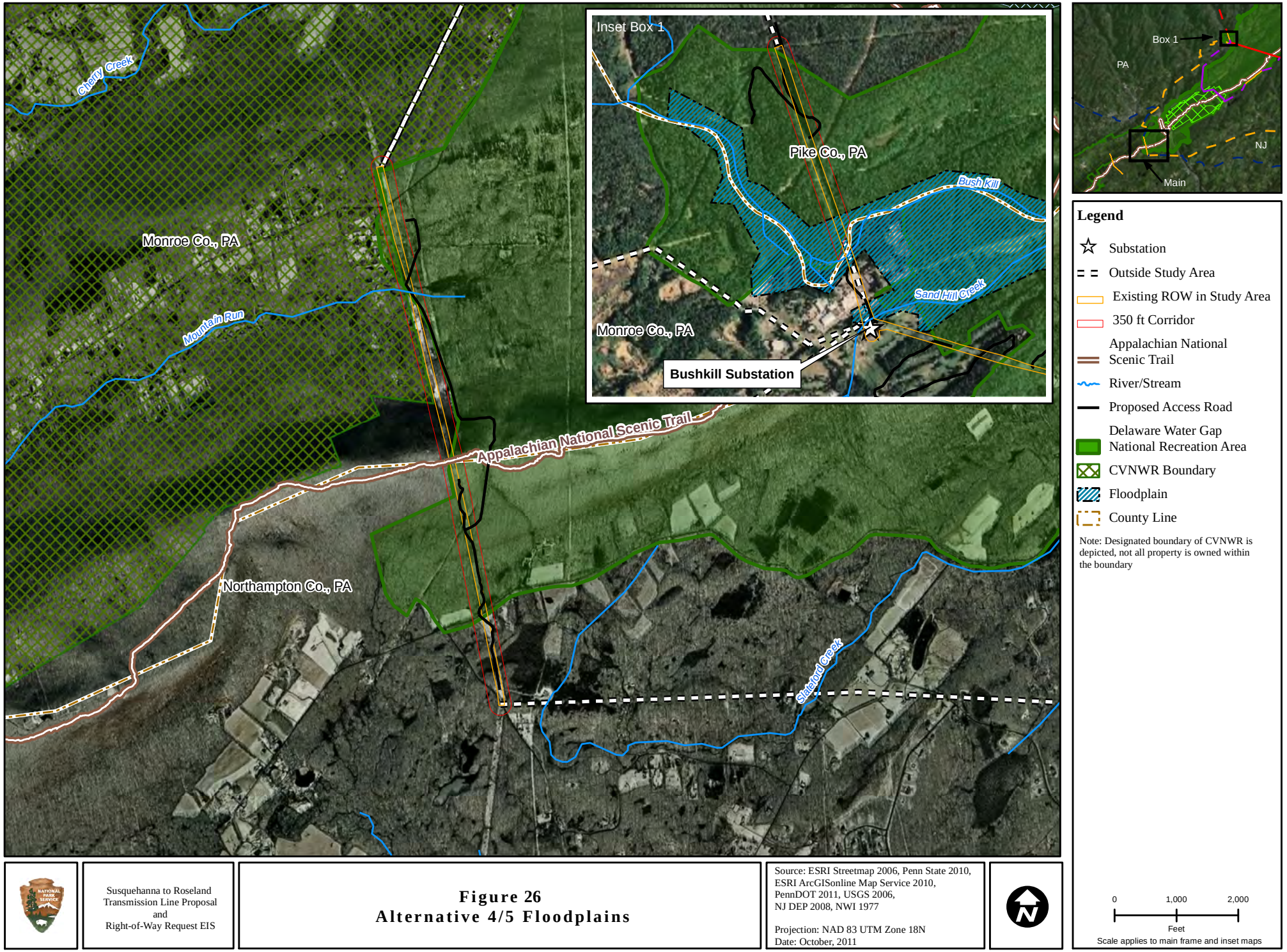
0 1,800 3,600
Feet
Scale applies to main frame and inset maps

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

Figure 25
Alternative 3 Floodplains

Source: ESRI Streetmap 2006, Penn State 2010, ESRI ArcGISonline Map Service 2010, PennDOT 2011, USGS 2006, NJ DEP 2008, NWI 1977

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



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

Figure 26
Alternative 4/5 Floodplains

Source: ESRI Streetmap 2006, Penn State 2010, ESRI ArcGISonline Map Service 2010, PennDOT 2011, USGS 2006, NJ DEP 2008, NWI 1977

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